

WATER PERMIT NO. 6060-3

Name of Applicant: City of North Sioux City

Address: PO Box 338

Phone: 605 232-4276

Amount of Water Claimed: 2.22 cfs (1500 acre-feet annually)

Total Acres: NA

Source of Water Supply: groundwater

Water to be used for: municipal

County: Union

Type of Waste Disposal System:

Location:

PRIORITY

Date Received: 3-9-1998

Fee: \$500.00

Corrected Application Received: 3-16-1998

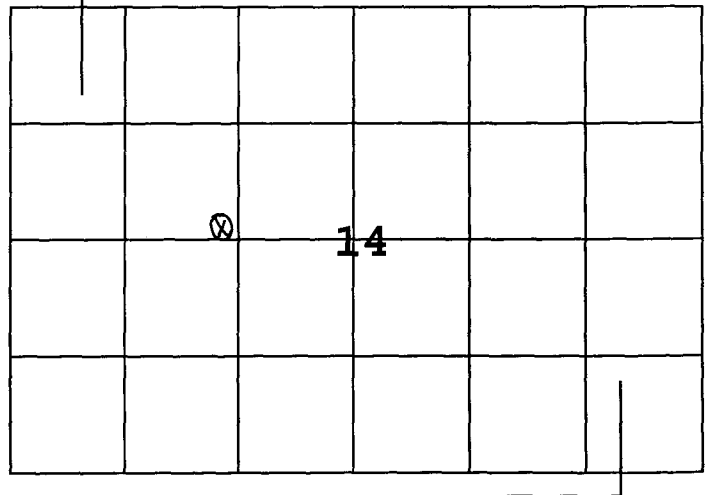
Period of Annual Use: Jan 1 - Dec 31

Remarks:

Diversion Point: SW 1/4 NW 1/4

Sec 14-T89N-R48W

Land to be Irrigated:



Depth of Well: 274 feet deep

Well Driller: Wetmore Drilling

Remarks:

Type of Map: topo

Prepared by: Gregory C Meyer, PE

Reviewed and the Number Assigned on: 3-16-1998

By: Karen Schlaak

Notice of Hearing - date to intervene: _____

FORM 2: Application for uses other than irrigation
(type or print)

Mail to: Water Rights Program Joe Foss Building 523 E. Capitol Pierre, SD 57501-3181 (605) 773-3352	No. <u>6060-3</u>	(office use only) Hydrologic Unit <u>10170101</u>
	Basin <u>Missouri River</u>	
	Newspaper <u>Elk Point Leader Courier, Elk Point, SD</u>	



Application For Permit To Appropriate Water Within The State Of South Dakota

Check use(s) of water:

☒ Municipal ☐ Suburban Housing ☐ Recreational ☐ Institutional
☐ Rural Water System ☐ Commercial ☐ Fish & Wildlife ☐ Geothermal Heat
☐ Domestic (over 18 gpm) ☐ Industrial ☐ Other

Type of Application: ☒ New ☐ Vested Right (Use predates Mar 2, 1955) ☐ Future Use Reservation
(check one) ☐ Place to Beneficial Use Water Reserved by Future Use Permit No. _____
☐ Amendment/Correction to Permit No. _____

Description of amendment/correction: (i.e. change diversion point(s), add diversion point(s), change use, etc.) New Municipal Well

1. Name of Applicant City of North Sioux City Phone 605/232-4276
(check one) ☐ Owner ☐ Tenant/lessee
Mailing Address PO Box 338 State South Dakota 57049
(Street, RR. or Box) (Zip Code)
2. Amount of water claimed 2.22 *CFS or 1,000 **GPM 1500 ***AF
(*Cubic Feet per Second) (**Gallons per Minute) (***)Acre Feet - storage capacity of dam/dugout or annual use if applicable)
3. Source of water supply Dakota Formation
4. Location of point of diversion (example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W) A well at Watier Avenue
and River Drive in SW 1/4, ~~NE~~ NW 1/4, Sec 14, T89N, R48W
County Union
5. County or counties where water will be used Union
6. Annual period during which water is to be used 12 months per year Jan 1 - Dec 31
7. Give a description of the project. When available include any preliminary engineering report or other reports or information that will help explain the project. (Attach sheet if more space is needed)
16 inch diameter casing in 24 inch diameter bore hole to a depth of 274 feet.
See attached plans and specifications

STATE OF SOUTH DAKOTA)

County of Union) SS

Attachments: Attach Form 2A if diversion is from a well or dugout, or if storage of water is proposed. Attach map and any other technical information. (see instructions)

I, Harold Beavers, the applicant, certify that I have read this application, have examined the attached map and that the matters stated are true and that I intend, and am able to complete the necessary construction.

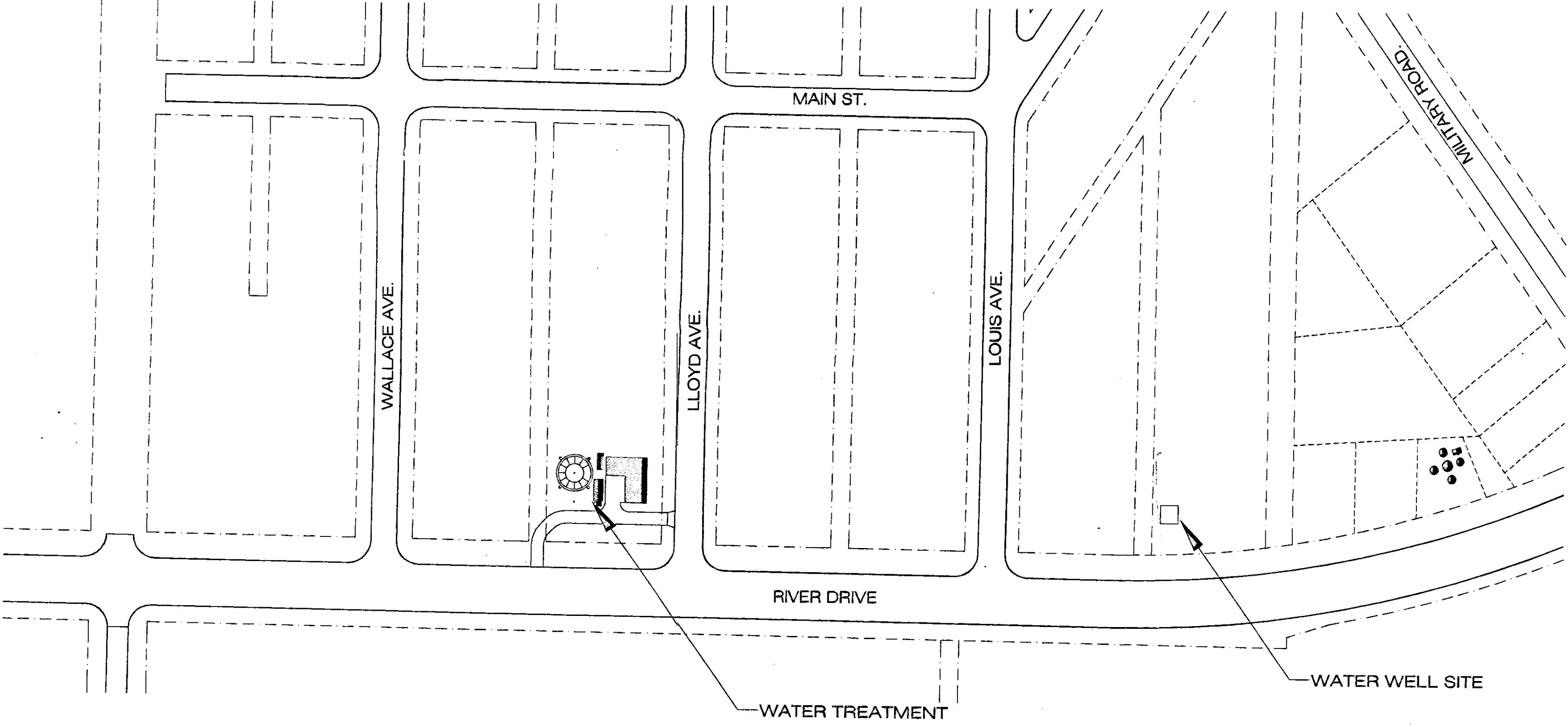
Signed Harold Beavers

Subscribed and sworn to before me this 2nd day of March 19 98

Connie Fiedig

Notary Public Finance Officer

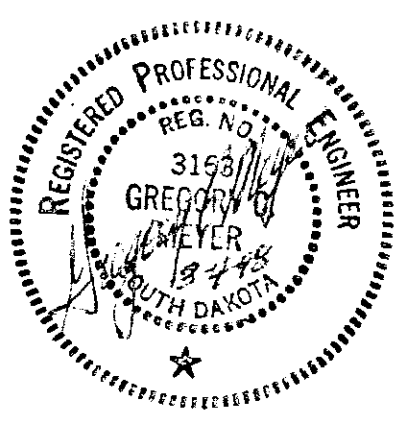
CITY OF NORTH SIOUX CITY, SOUTH DAKOTA WATER WELL PROJECT



Site Location Map

Schedule Of Drawings

- SHEET 1 ---- COVER SHEET
- SHEET 2 ---- SITE PLAN
- SHEET 3 ---- WELL CONSTRUCTION PLAN
- SHEET 4 ---- WELL SIGNAL WIRE PLAN
- SHEET 5 ---- CONSTRUCTION DETAILS
- SHEET 6 ---- CONSTRUCTION DETAILS
- SHEET 7 ---- CONSTRUCTION DETAILS



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 South Dakota

Pages or sheets covered by this seal:
Pages 1 thru 7

BW MA		BUELL WINTER MOUSEL AND ASSOCIATES CONSULTING ENGINEERS	
PROJECT TITLE		SHEET TITLE	
CITY OF NORTH SIOUX CITY, S.D. WATER WELL PROJECT		COVER SHEET	
DATE		REVISION	
		SHEET NO. 1	

3-0900

SOUTH DAKOTA
WATER PERMIT NO. 6060-3

Date of first receipt of application March 9, 1998.

Date of return to applicant for corrections, amendments or changes March 12, 1998.

Date of receipt of corrected application March 16, 1998.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 6060-3 to City of North Sioux City, PO Box 338, North Sioux City SD 57049 authorizing the construction of the water use system and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 6060-3 appropriates 2.22 cubic feet of water per second (1,500 acre-feet annually) from one well (Dakota Formation) 274 feet deep located in the SW ¼ NW ¼ Section 14-T89N-R48W.
2. The water appropriated shall be used for the purpose of supplying water to North Sioux City and may not exceed the amount of water needed for beneficial use for municipal purposes.
3. The water is to be used during the following described annual period: January 1 – December 31.
4. The date of approval of Permit No. 6060-3 is June 1, 1998.
5. The date from which applicant may claim right is March 9, 1998.
6. One-fifth of the construction is to be completed on or before November 1, 2000.
7. All construction is to be completed on or before June 1, 2003.
8. Water is to be put to beneficial use on or before June 1, 2007.
9. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. The well approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. The well authorized by Permit No. 6060-3 shall be constructed by a licensed well driller and construction shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) from the producing formation to the surface pursuant to Section 74:02:04:28.

(continued)

3. Permit No. 6060-3 authorizes a total annual diversion of 1,500 acre feet of water annually from the Dakota Formation.
4. North Sioux City shall report annually to the Chief Engineer on the amount of water withdrawn each year from the Dakota Formation.

WATER MANAGEMENT BOARD

By: _____

John Hatch
John Hatch, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

JUN 29 1998

date



RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date September 23, 20 02

RECEIVED OF City of North Sioux City, PO Box 1845, North Sioux City SD 57049-1845

The following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. _____ to Appropriate Water, to construct and to put water to beneficial use	50	00
Fee for Application for Permit No. _____ to Appropriate Water for Future use		
Fee to retain Future Use Permit No. _____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. <u>6060-3</u>		
Fee for Filing Transfer Form _____		
Fee for _____		
Fee for Issuing New Well Driller's License No. _____ for C.Y. _____		
Fee for Renewal of Well Driller's License No. _____ for C.Y. _____		
Fee for Issuing Well Pump Installer's License No. _____ for C.Y. _____		
Fee for Renewal of Well Pump Installer's License No. _____ for C.Y. _____		
(Any Other Work Provided by Law)	TOTAL	50.00

No.

60603

By

Douglas Ebele

Chief Engineer

gm

Permit No. 6060-3
Big Sioux River - Water District

Report of Examination of Works and/or Application of Water to Beneficial Use

TO: Chief Engineer, Water Rights Program, DENR, Foss Bldg., Pierre, SD 57501

I have this day, June 18, 2002, made a thorough examination of the water use system constructed by the City of North Sioux City of PO Box 338, North Sioux City SD 57049 holder of Permit No. 6060-3, bearing the priority of March 9, 1998 authorizing the diversion of 2.22 cu. ft. per second of the waters of ground water (Dakota Formation) for municipal purposes, in Union County.

Inspection contact & relationship to permit holder, if applicable: **Randy Frederickson, PW Director**

A. Works used to divert the water:

Well Information:

- 1) Well Drilling Firm: Layne Western
- 2) No. of Wells 1
- 3) Depth(s) 276 feet
- 4) Well log is available Y

Casing:

- 1) Diameter 16 inches
- 2) Length 226 feet
- 3) Type Steel

Screen:

- 1) Type Stainless steel
- 2) Length 50 feet
- 3) Static water level 19 feet

Pump/Motor:

- 1) Make Unknown
- 2) Size 50 hp, 8 in
- 3) Capacity 1,000 GPM

B. Works used to transport/apply water to place of use:

Water is diverted from the well into the city's water distribution system.

D. Compliance with Permit Requirements:

- 1) Permit qualifications being abided by Y
- 2) Exceptions to compliance are: none

The system is in good condition with the point of diversion located as follows: Well (SW $\frac{1}{4}$ NW $\frac{1}{4}$): 1,150 feet E and 2,500 feet S from the NW corner section 14-T89N-R48W (Lat 42.52527, Long -96.48322). The works are capable of diverting and conveying to the place of use 2.22 cu. ft. per second of water which is to be used for municipal purposes. Water has been put to beneficial use to the maximum extent and the license should be issued for 2.22 cfs.

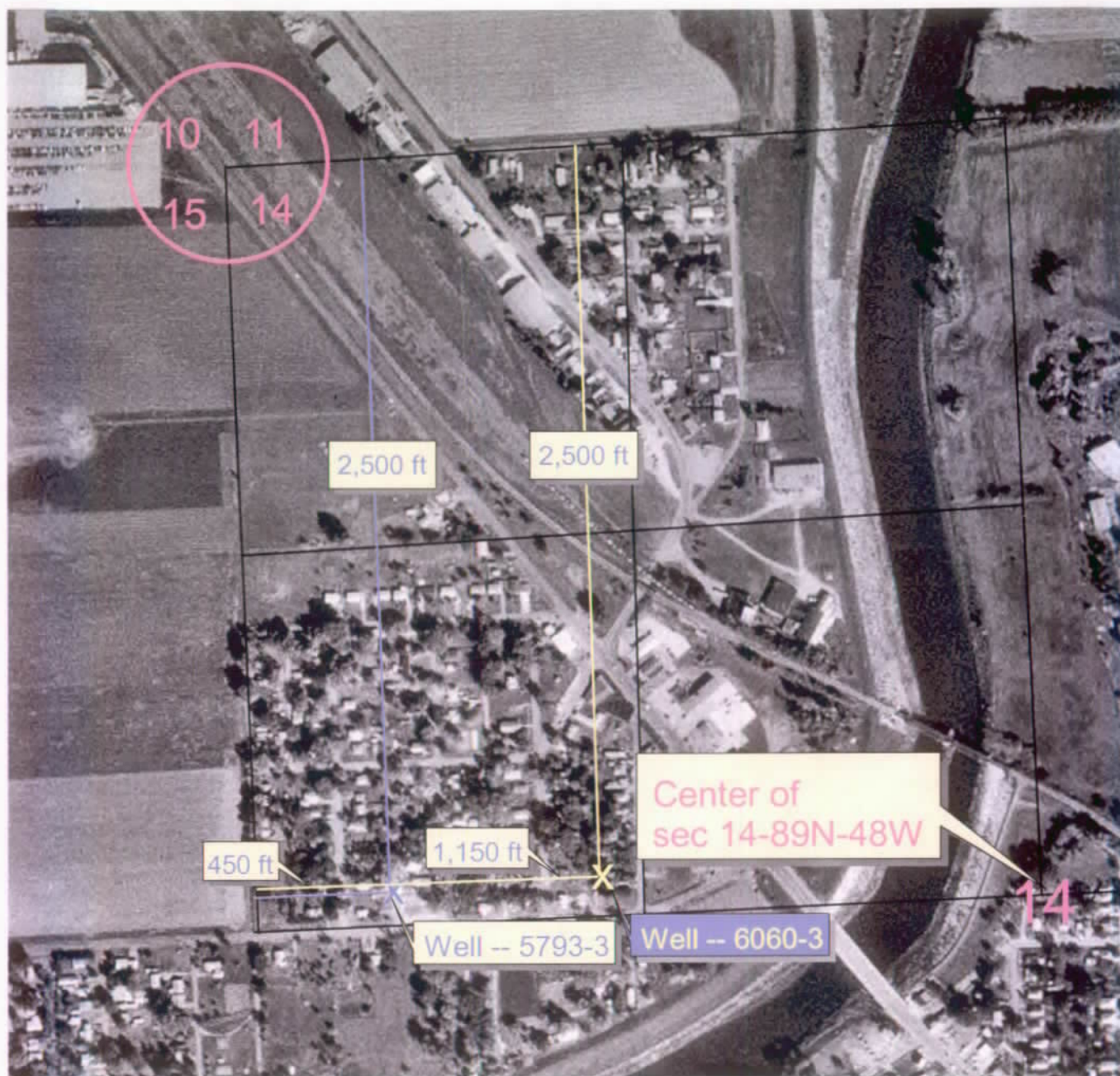
Comments or other permit(s) associated with the project: none | All structures, wells and lands on map Y



Ron Duvall
Natural Resources Engineer
DENR, Water Rights Program

Date report completed: August 29, 2002

900 0 900 Feet



South Dakota
Department of Environment
& Natural Resources
Water Rights

Ron Duvall, Nat. Res. Engineer
August 29, 2002

Nos. 5793-3 & 6060-3



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

September 3, 2002

5793-3
6060-3

Liesel L Hallwas, Mayor
City of North Sioux City
PO Box 338
North Sioux City SD 57049

Dear Mayor Hallwas:

On June 18, 2002, the investigation of city's water use systems, including the extent of application of water to beneficial use, as developed under Water Permit Nos. 5793-3 and 6060-3, was completed by Ron Duvall, a staff engineer with our program. Nos. 5793-3 and 6060-3 refer to wells in Section 14, T89N, R48W.

The final water right document, the water license, can now be issued for each one. State law requires that we charge a \$50.00 fee (each) for the investigation and issuance of the water license. Upon receipt of the \$100.00 fee, we will complete processing the water licenses. The check or money order for the fee should be made payable to the "Water Rights Program".

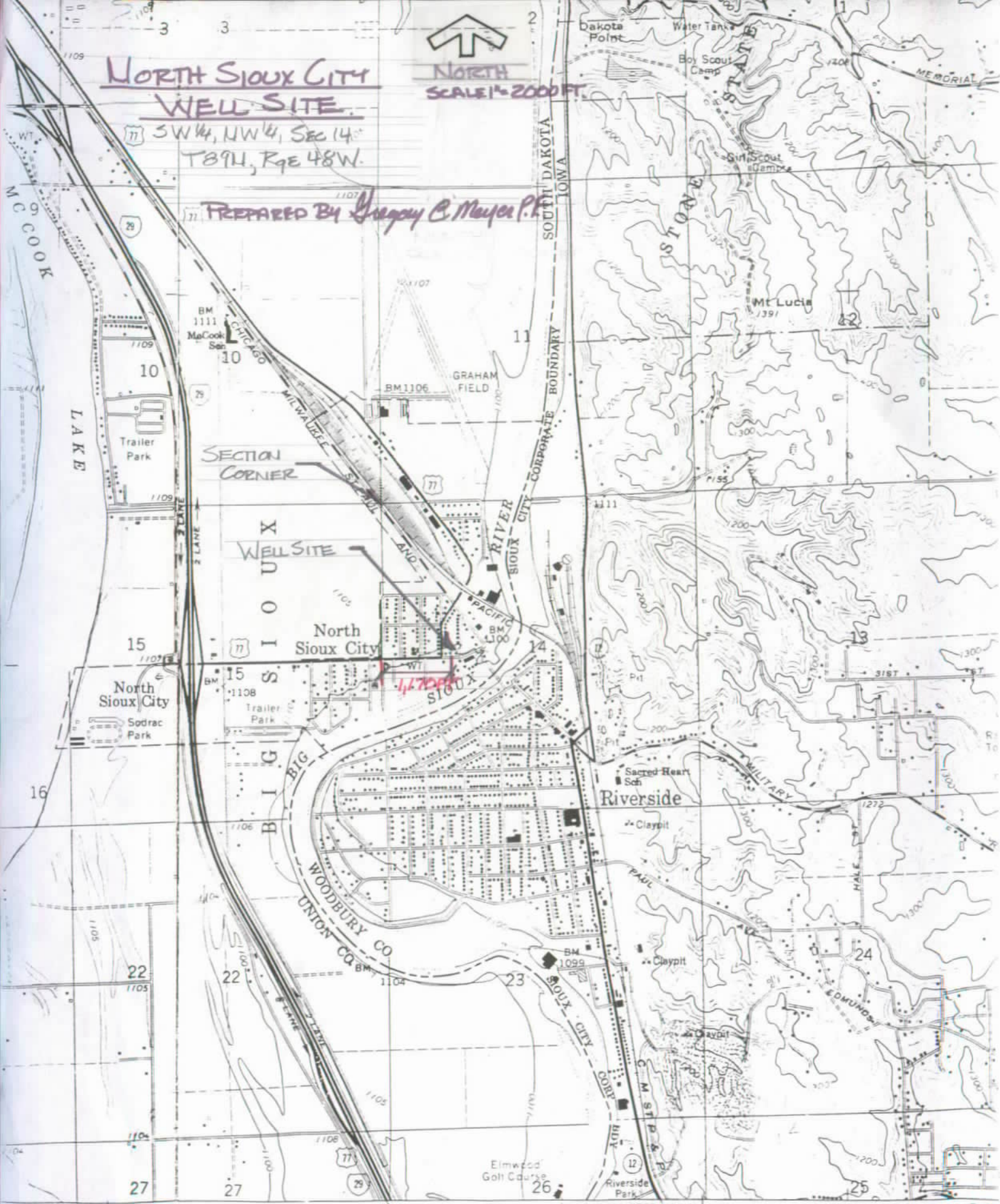
Your licensed water right will be similar to a property right that can not be lost as long as the water use continues and you abide by the permit requirements.

If you have any questions regarding the water permit, investigation of your water use system or payment of the fee, please contact me at (605) 773-3352.

Sincerely,

Genny McMath
Environmental Scientist
Water Rights Program
email: genny.mcmath@state.sd.us

Note: Ron also conducted an investigation of the well and system for Water Permit No. 6285-3 (well is in Section 4). The fee for No. 6285-3 has already been paid and the license is being processed.



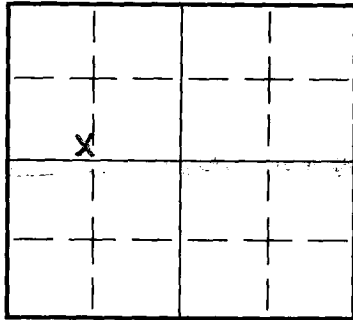
REVISION, VIRGINIA - 1977
R 48 W. 96° 30' 706 707 1:200,000 FEET (10W) 27° 30' 709 R. 48
SIOUX CITY INTERCHANGE 3.7 MI.
Mapped, edited, and published by the Geological Survey
Control by USGS and USC&GS
Topography by photogrammetric methods from aerial
photographs taken 1961 and planetable surveys 1963
SIGNIFICATION
Light-duty
Unimproved dirt
6060-3

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location W 1/4 NW 1/4 Sec 14 Twp 27 N Rg 1 W
County Lincoln

Please mark well location with an "X"



Well Completion Date

11-14-98

LOCATION:

Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? _____ ft. from _____ (identify source).

PROPOSED USE:

- ☐ Domestic/Stock ☒ Municipal ☐ Business ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Institutional ☐ Monitoring well

METHOD OF DRILLING:

Reverse Rotary

CASING DATA: ☒ Steel ☐ Plastic ☐ Other

If other describe _____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
<u>60.33</u> LB/FT	<u>16</u> IN	<u>0</u> FT	<u>220</u> FT	<u>22</u> IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
<u>Portland Cement</u>	<u>610</u>	<u>12.7</u> lb./gal	<u>221</u> ft	<u>10</u> ft
_____	_____	_____ lb./gal	_____ ft	_____ ft

Describe grouting procedure Reverse method

SCREEN: ☐ Perforated pipe ☒ Manufactured

Diameter 16 IN Length 20 FEET

Material Stainless Steel

Slot Size 0.35 Set From 220 Feet to 270 Feet

Other information _____

WAS A PACKER OR SEAL USED? ☐ YES ☒ NO

If so, what material? _____

Describe packer(s) and location? _____

DISINFECTION: Was well disinfected upon completion?

☒ YES, How: Chlorine

Laboratory sent to for water quality analysis _____ NO, Why Not? _____

Well Owner: The City of North Sioux City

Business Name: _____

Address: PO Box 332
North Sioux City, SD 57049-0332

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
Brown Clay	0	15
Grey Clay	15	35
Medium Sand	35	75
Coarse Sand	75	125
Medium Sand, some coarse	125	155
White sandstone	155	175
Thin sandstone with shale	175	195
Thin sandstone	195	215
Sandstone with white shale	215	235
Medium sandstone	235	255
Coarse sandstone	255	275
Thin medium sandstone	275	295
Coarse sandstone	295	315
Grey Shale	315	335

STATIC WATER LEVEL 9 Feet

If flowing: closed in pressure _____ PSI

GPM flow _____ through _____ inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other _____

Reduced Flowrate _____ GPM

Can well be completely shut in? _____

WELL TEST DATA:

☒ Pumped Describe: 24 hour test at 952
☐ Bailed GPM and a 1200 GPM
☐ Other test for 24 hours

Pumping Level Below Land Surface

100.2 ft. After 24 Hrs. pumped 952 GPM

101.3 ft. After 24 Hrs. pumped 1200 GPM

If pump installed, pump rate 1000 GPM

REMARKS

This well was drilled under license # 513

And this report is true and accurate.

Drilling firm LAYNE-WESTERN

Signature of License Representative: _____

Signature of Well Owner or Equitable Property Holder: _____

12-8-98

Date: 12-8-98

RECEIPT

Water Rights Program

South Dakota Department of Environment and Natural Resources

415675

Pierre, March 9, 19 98

RECEIVED OF City of North Sioux City, Box 338, North Sioux City, SD 57049
the following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. <u>166-3</u> to Appropriate Water, to construct and to put water to beneficial use _____	500	00
Fee for Application for Permit No. _____ to Appropriate Water, for Future Use _____		
Fee to retain Future Use Permit No. _____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. _____		
Fee for Filing Transfer Form _____		
Fee for Filing Extension Request _____		
Fee for _____		

(Any Other Work Provided by Law)	Total	500 00

By _____
Chief Engineer

John H. Hatcher

Supplemental Information

(type or print in ink)



1. Well Information - Proposed Construction

- a) Drill Hole Diameter 24 inch Depth 274 feet
- b) Casing Type steel Diameter 16 inch Thickness 0.375 inch
- c) Screen Type stainless steel Diameter 16 inch Thickness 0.375 inch
- d) Gravel Pack Luther Maddox A Length of Gravel Pack 52 feet
- e) Depth to Top of Water Bearing Material 220 feet
- f) Depth to Water (ground surface to water level) 30 feet
- g) Distance to nearest existing domestic well:
- On applicants property 600 feet On property owned by others n/a

2. Wastewater Disposal System Information

- a) Type of System (i.e. septic tank, drain field) gravity sewer
- b) System Capacity (gallons) n/a Year Constructed 1970's
- c) Connected to the City of North Sioux City Sanitary System

3. Dugout Information

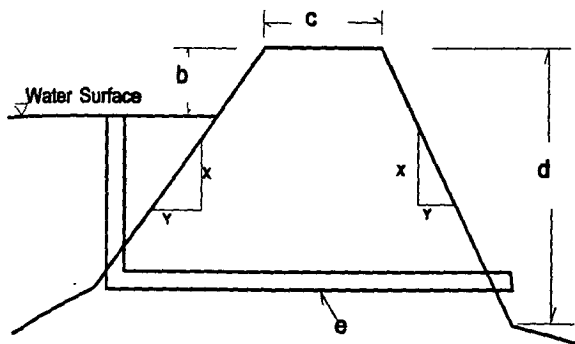
- a) Surface Dimensions n/a Depth n/a
- b) Depth to water (ground surface to water level) n/a

4. Water Storage Dams

If the proposed water use system contains one or more storage dams, please furnish the information requested below for each dam. The locations of the dams need to be shown on the map submitted with the application.

- a) If a private engineering firm or government agency was involved in the design of this dam, please give their name and address:

n/a



- b) Freeboard n/a
- c) Crest Width n/a
Crest Length n/a
- d) Height n/a
- e) Primary Outlet Capacity n/a
If pipe, diameter n/a
- f) Secondary Spillway Capacity n/a
Spillway Width n/a
- g) X & Y Slope n/a
Upstream n/a
Downstream n/a
- h) Surface Area of Impoundment n/a
- i) Storage n/a Acre Feet
- j) Drainage Area Above Dam n/a Acres

REPORT ON WATER PERMIT APPLICATION NO. 6060-3

for North Sioux City

April 24, 1998

Application No. 6060-3 proposes to appropriate 2.22 cfs (1,500 acre feet per year) from one well approximately 274 feet deep located in the SW 1/4 NW 1/4 of Section 14, T89N-R48W in Union County. The water is for municipal use.

AQUIFER - DAKOTA FORMATION (DKOT)

The Dakota Formation consists of sand, sandstone, clay and shale which is buried and under confined conditions in this area. The aquifer underlies all of Union County and is laterally extensive into Iowa to the east and into Clay County to the west, Lincoln County to the north and into Nebraska to the south. The Dakota Formation underlies 935 square miles and contains an estimated 19.4 million acre feet of water in storage in Union and Lincoln Counties (Niehus, 1994). There are areas especially in southern Union County where the overlying Missouri Elk Point aquifer is probably hydraulically connected to the Dakota Formation. However, at this site there is a shale layer ranging in thickness from 52 to 54 feet thick separating the Missouri Elk Point aquifer from the sandstone of the Dakota Formation. This information was provided with the test well logs (#97-1 and #97-2) submitted with the water permit application. Also, pumping information on another city well located about 600 feet west of this application indicated that at a rate of 800 gpm the water level was 112 feet in the pumped well which had a static water level of 26 feet (see Water Permit File No. 5798-3 for North Sioux City). This results in a specific capacity of 9.3 gpm/ft of drawdown. Theoretically, a well at this site could produce the amount of water requested with similar geologic conditions.

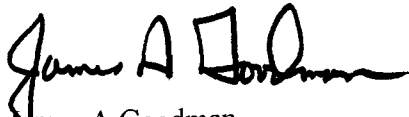
The Water Rights Program does not monitor any observation wells completed into the Dakota Formation in this area. There are numerous observation wells completed into the Missouri Elk Point aquifer in this area. The nearest observation well completed into the Dakota formation is located about 25 miles northwest of this application. This is observation well UN-77E. Water levels for this well appear to behave similarly to the monitor wells completed into the Missouri Elk Point aquifer. That is, rising water levels during wet years (recharge) and gradually declining water levels during dry years (Water Rights, 1998). A hydrograph of UN-77E is included with this report.

REVIEW OF EXISTING WATER PERMITS/RIGHTS

The closest existing water permit/right is No. 5798-3 for North Sioux City. This proposed well and the existing well are located about 600 feet apart. Interference is not expected to be adverse. However, there will probably be overlapping drawdown. At this point, no testing has been done to evaluate the magnitude or extent of the potential drawdown. The city will have control over the system and be able to control withdrawals in order to minimize potential effects.

CONCLUSIONS

1. Water is available from the Dakota Formation.
2. The aquifer is confined and under artesian conditions. Drawdown will occur as a result of pumping. Based upon available data, interference is not expected to be a concern.
3. The well authorized by this application must be constructed in accordance with SD Well Construction Standards.

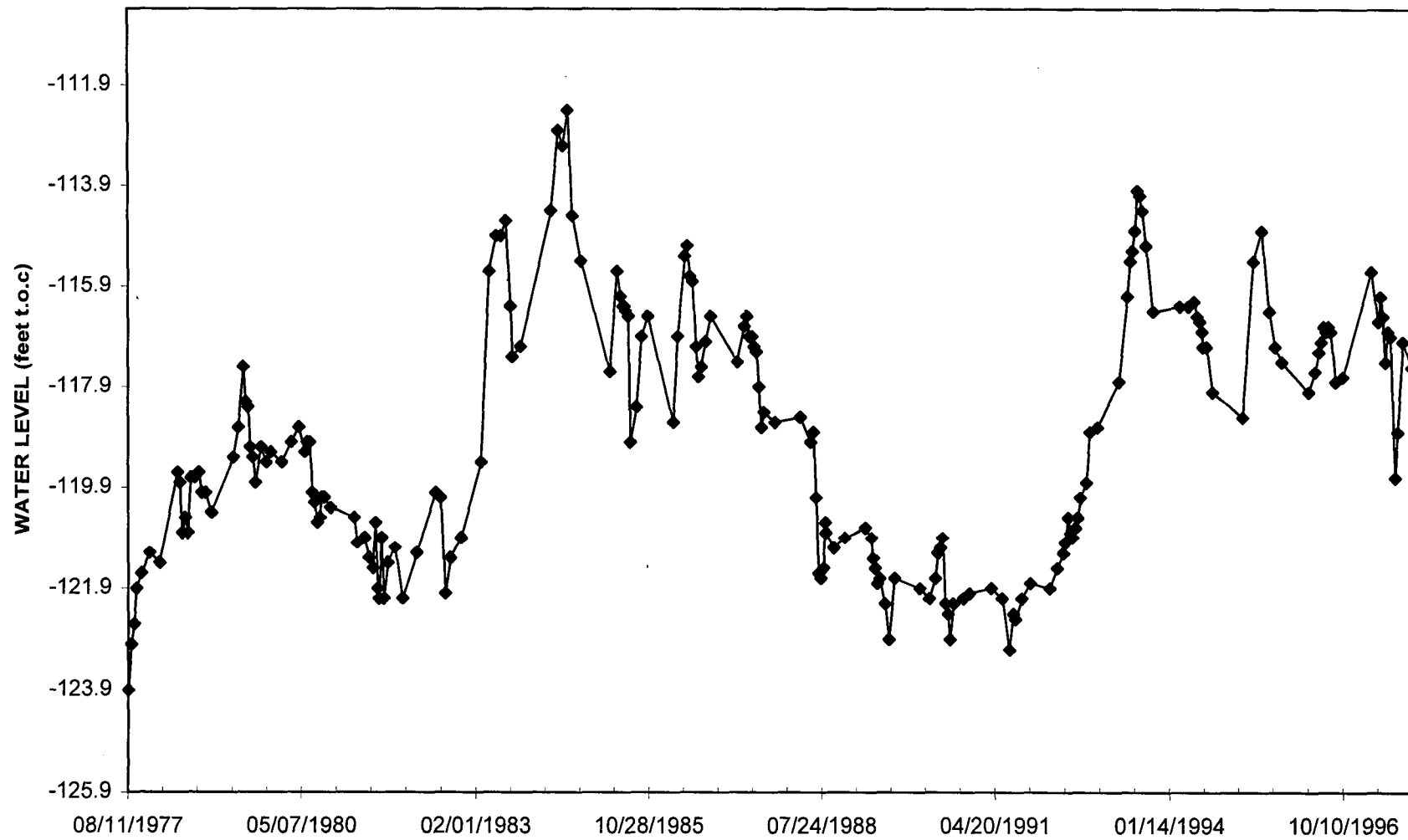

James A Goodman
Natural Resources Engineer

BIBLIOGRAPHY

Niehus, C.A., 1994, Water Resources of Lincoln and Union Counties, South Dakota, Water Resources Investigations Report 93-4195, USGS, Rapid City, SD, 57702.

Water Rights, 1998, Unpublished Observation Well Records for Union County, SD DENR, Division of Environmental Services, Water Rights Program, Pierre, SD, 57501.

WATER RIGHTS' OBSERVATION WELL
UN-77E



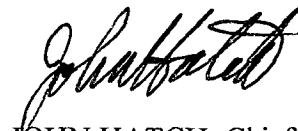
**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 6060-3, North Sioux City**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Environment and Natural Resources concerning Water Permit Application No. 6060-3, North Sioux City, c/o Mayor Harold Beavers, P.O. Box 338, North Sioux City, SD 57049.

The Chief Engineer is recommending APPROVAL of Application No. 6060-3 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing rights, 3) the proposed use is a beneficial use and 4) it is in the public interest with the following qualifications:

1. The well approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. The well authorized by Permit No. 6060-3 shall be constructed by a licensed well driller and construction shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) from the producing formation to the surface pursuant to Section 74:02:04:28.
3. Permit No. 6060-3 authorizes a total annual diversion of 1,500 acre feet of water annually from the Dakota Formation.
4. North Sioux City shall report annually to the Chief Engineer on the amount of water withdrawn each year from the Dakota Formation.

See report on application for additional information.



JOHN HATCH, Chief Engineer
May 1, 1998



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

NOTE: TO BE SURE OF PUBLICATION ON
THE CORRECT DATES, CONTACT
THE NEWSPAPER RIGHT AWAY.

May 6, 1998

City of North Sioux City
%Connie Ferdig, Finance Officer
P.O. Box 338
North Sioux City, SD 57049

Dear Ms. Ferdig:

Water Permit Application No. 6060-3 for municipal use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice of hearing has been sent to the Publisher of the Elk Point Leader Courier printed at Elk Point, SD (Ph # (605) 356-2632). For your information, a copy of the notice, the recommendation of the Chief Engineer and a report on the application are enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

Be sure to contact the above newspaper to authorize publication of your Notice of Hearing and to arrange for payment. Early contact with the paper can eliminate delays. The publisher has been instructed to publish your notice once each week for two consecutive weeks with the last publication to occur twenty days before the board meeting. The newspaper has been instructed to send us the Proof of Publication. We must receive Proof of Publication before action can be taken on the application.

Sincerely,


Eric Gronlund
Natural Resources Engineer
(605) 773-3352

enclosures

NOTE: If you plan to contest any part of the Chief Engineer's recommendation, you must file a petition pursuant to the procedures outlined in the attached notice of hearing. The Water Management Board will then consider your concerns during a hearing on the application.

C: Gregory C. Meyer, P.E.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

May 6, 1998

Elk Point Leader Courier
Box 310
Elk Point, SD 57025-0310

ATTENTION: Legal Department

Enclosed is a Notice of Hearing on Application No. 6060-3 to Appropriate Water to be published twice. Please publish the first notice on May 14, 1998, with the second publication 7 days later.

The applicant must verify to you that the notice is to be published, before you make the first publication. **Please BILL the APPLICANT for the cost of publication.** The APPLICANT is City of North Sioux City, %Connie Ferdig, Finance Officer, P.O. Box 338, North Sioux City, SD 57049 (Ph # (605) 232-4276).

Please send the Water Rights Program the first publication immediately. The publication is checked for accuracy so any corrections can be made in the second publication. You may use the form below or fax a copy of the first publication. Any fax should be sent to the attention of Karen Schlaak at (605) 773-4068. Publication errors can invalidate the public notice.

After the second publication, **please send us an affidavit or use the enclosed Proof of Publication form.** The applicant pays the cost of publication, but the Water Rights Program records require an affidavit or Proof of Publication. Delays in receiving the affidavit can be costly to the applicant.

Sincerely,


Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

-----CUT HERE-----

No. 6060-3

TO: Eric Gronlund
Water Rights Program
Joe Foss Building
Pierre SD 57501-3181

Date _____

We are in receipt of your letter of May 6, 1998, enclosing Notice of Hearing to Appropriate Water by Application No. 6060-3 which was first published in our issue of _____. **ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.**

Name

Newspaper

Instruction to Newspaper - Publish first Notice on May 14, 1998, with the second publication 7 days later. The applicant is responsible for payment.

NOTICE OF APPLICATION NO. 6060-3 to Appropriate Water

Notice is given that the City of North Sioux City, PO Box 338, North Sioux City SD 57049 has filed an application for a water permit to appropriate 2.22 cubic feet of water per second (1,500 acre-feet annually) from one well (Dakota Formation) 274 feet deep located in the SW 1/4 NW 1/4 Section 14-T89N-R48W. The water is for municipal use.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 6060-3 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the chief engineer will act on the application, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the chief engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider the application. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and chief engineer. The applicant must file a petition if contesting the chief engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by June 1, 1998.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Nettie H. Myers, Secretary, Department of Environment and Natural Resources.

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)

County of Union) SS

I, Kelly Kruthoff

certify that the attached printed Notice was taken
from the Leader-Courier

printed and published in Elk Point

County of Union and

state of South Dakota. The notice was published

in the newspaper on the following two dates:

5-14-98

5-21-98

Cost of Printing \$36.20

Kelly Kruthoff
(Signature)

Editor
(Title)

5/20/98
(Date Signed)

NOTICE OF APPLICATION NO. 6060-3 to Appropriate Water

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Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and the chief engineer. The applicant must file a petition if contesting the chief engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by June 1, 1998.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application.

Nettie H. Meyers, Secretary
Department of Environment and
Natural Resources
Publish May 14 and 21, 1998
44-9-63



March 4, 1998



Garland Erbele
South Dakota Department of Environment & Natural Resources
Office of Drinking Water
Joe Foss Building
523 E. Capitol
Pierre, SD 57501

RE: North Sioux City Well 97-2

Dear Mr. Erbele:

Enclosed for your review are three copies of the plans and specifications for the subject project.

If you have any questions on the enclosed, please feel free to contact this office.

Sincerely yours,

Gregory C. Meyer, PE
GM/cjm

Encl.

cc: James Goodman

Nosioux16;erbele@SDDNR

March 4, 1998

James Goodman
Water Rights Program
South Dakota Department of Environment & Natural Resources
Joe Foss Building
523 East Capitol
Pierre, SD 57501



RE: North Sioux City Well 97-2

Dear Mr. Goodman:

Enclosed for your review, is a copy of the plans and specifications for the subject project. Also enclosed is a copy of "Form 2: Application for Uses Other Than Irrigation", and "Form 2A: Supplemental Information", and check No. 025974 from the City of North Sioux City in the amount of \$ 500.00 for the filing fee.

Sincerely yours,

Gregory C. Meyer, PE
GM/cjm

Encl.

cc: Garland Erbele

Nosioux16;goodman@SDDNR



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

March 10, 1998

Harold Beavers, Mayor
City of North Sioux City
PO Box 338
North Sioux City SD 57049

Dear Mayor Beavers:

Thank you for submitting the *Application for a Permit to Appropriate Water* for the City of North Sioux City. In order to complete the application the following information is required.

A map showing the location of the well in relation to a government section corner or quarter corner by direction and distance. The map must be signed by one of the following: Registered Land Surveyor, Registered Professional Engineer or by any other government employee who normally prepares maps as a part of his assigned duties. The plans and specifications submitted with the application, show the location of the well, but do not reference a section corner.

The application filing fee is based on the amount of water claimed. The application indicates the city wishes to appropriate 1000 gallons per minute which is 1607 acre-feet per year when pumped continuously. The application filing fee for 1,000 gallons per minute will be \$525.00. As a general rule, we figure a 60% pumping rate since wells are very seldom pumped continuously. Sixty percent of 1607 acre-feet would be 964 acre-feet. If you wish to amend the application to 964 acre-feet, the filing fee will be \$400.00. The check for \$500.00 has been receipted. If the application is amended, \$100.00 will be refunded. If not, an additional \$25.00 is required.

The report submitted with application also listed the specifications for the new well. Have any test holes been completed? If so, please submit the well logs for the test holes.

If you have any questions, please contact Eric Gronlund or me.

Sincerely,

Karen Schlaak
Water Rights Program
605 773-3352

c: Gregory Meyer, PE, Buell Winter Mousel & Associates

March 12, 1998

Eric Gronlund
Department of Environment & Natural Resources
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181



RE: North Sioux City

Dear Mr. Gronlund:

In response to your letter of March 10, 1998 I've enclosed a copy of the USGS map which shows the location of the proposed well in relation to a government section corner by direction and distance.

Regarding the application fee, we assumed that the well would operate more than 60% - but less than 100 % of the time. If a future increase in well usage in excess of 964 acre feet will not result in additional expense to the City, we would recommend that the City accept your proposed refund.

Enclosed is a copy of the drillers log and South Dakota Geological Service log of the test hole.

If you require any additional information, please feel free to contact this office.

Sincerely yours,

Gregory C. Meyer, PE
GM/cjm

Encl.

cc: Jerry Alexander, Connie Ferdig, Mayor Beavers-
City of North Sioux City

Nosioux16;gronlund

File No.

Water Rights Program - File Documentation

NAME: Greg Meyer, PE

ADDRESS: Buell Winter Mousel and Assoc.

DATE: 3-16-1998

TELEPHONE: 605 232-4276

RE: Pending application for City of North Sioux City

COMMENTS:

I talked with Greg Meyer concerning his letter dated 3-12-98. We had requested an acre-feet amount on the application. Mr. Meyer stated they felt the City would pump more than the suggested amount of 60% of 1000 gpm which was 964 AF. After some discussion on the fee, **Mr. Meyer indicated he would like the application amended to 1500 AF.** The \$500 application fee which was originally submitted is correct for the 1500 AF requested.

Karen Schlaak

Karen Schlaak
Environmental Scientist



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

JUN 29 1998

City of North Sioux City
%Connie Ferdig, Finance Officer
P.O. Box 338
North Sioux City, SD 57049

Dear Ms. Ferdig:

Enclosed is Water Permit No. 6060-3 authorizing construction of your water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

Also enclosed is Form 10, Notice of Completion of Works and Application of Water to Beneficial Use, which you are to complete and submit to the Chief Engineer when you have completed the system and/or have put the water to beneficial use. An inspection can then be scheduled so that the Water License may be issued, thus completing your acquisition of a Water Right.

Very truly yours,

JOHN HATCH, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures

PLEASE NOTE: Certain changes may be made to your water permit usually without affecting the priority date. The location of a point of diversion may be changed or additional points of diversion may be approved if the water source remains unchanged; no additional water is appropriated; and, if irrigating, no additional land is irrigated. The change may be allowed without application or publication, if the Water Rights Program is contacted and the chief engineer makes a finding that the change does not increase the potential for interference with existing diversions.

A new water permit application is required to change water sources, increase the permitted diversion rate, or increase the irrigated acreage. If the application is approved, the water permit will receive a new priority date.

Office:
P.O. Box 880
Elk Point, SD 57025
(605) 356-3757



Mike Wetmore

Geologist

Shop:
I-29 Exit 15
Elk Point, SD 57025
(605) 356-2248

NORTH SIOUX CITY

TEST HOLE # 97-2

DRILLER'S LOG

<u>DEPTH</u>	<u>LITHOLOGY</u>	<u>DRILLING NOTES</u>
0-3	top soil	drill depths adj to e-logs
3-22	yel clay	
22-48	fine, uncon sand	hole washed out
48-54	blue clay	
54-150	sand & gravel	lost circulation boulders @ 75-77 boulders @ 148-150
150-202	black shale	sticky hole
202-274	sandstone	
274-287	red shale	
287-300	dolomite	

log by:

WETMORE DRILLING

A handwritten signature in black ink, appearing to read 'Mike Wetmore', is written over the company name.

Mike Wetmore
geologist

Office:
P.O. Box 880
Elk Point, SD 57025
(605) 356-3757



Shop:
I-29 Exit 15
Elk Point, SD 57025
(605) 356-2248

NORTH SIOUX CITY

TEST HOLE # 97-1

DRILLER'S LOG

<u>DEPTH</u>	<u>LITHOLOGY</u>	<u>DRILLING NOTES</u>
0-3	top soil	drill depths adj to e-logs
3-17	yel clay	
17-38	fine, uncon sand	hole washed out
38-51	blue clay	
51-142	sand & gravel	lost circulation boulders @ 78-80 boulders @ 140-142
142-196	black shale	sticky hole
196-277	sandstone	
277-290	red shale	
290-300	dolomite	

log by:

WETMORE DRILLING

Mike Wetmore
geologist

6060-3

CITY OF NORTH SIOUX CITY

P.O. Box 338
North Sioux City, SD 57049-0338

Phone:
(605) 232-4276/4606

Fax:
(605) 232-4606



DEPARTMENT OF ENVIRONMENT &
NATURAL RESOURCES
WATER RIGHTS PROGRAM
JOE FOSS BLDG.
523 E. CAPITAL
PIERRE, SD 57501

December 8, 1998

Dear Sirs:

Enclosed please find the South Dakota Water Well Completion Report, for the city's new well.

Sincerely,

Connie Ferdig
Finance Officer

**PROJECT MANUAL
FOR
CITY OF NORTH SIOUX CITY**

**- NEW WELL PROJECT –
(WATIER STREET LOCATION)**

UNION COUNTY, SOUTH DAKOTA

BWMA PROJECT NO. 48597

MARCH 1998

**Buell Winter Mousel and Associates, PC
705 Douglas, Suite 636
Sioux City, Iowa 51101
712/258-4202**

PROJECT MANUAL
FOR
NORTH SIOUX CITY, SOUTH DAKOTA
- NEW WELL PROJECT -
(WATIER STREET LOCATION)

BWMA PROJECT NO. 48597

MARCH, 1998

BUELL WINTER MOUSEL AND ASSOCIATES, P.C.

705 DOUGLAS, SUITE 636

SIOUX CITY, IOWA 51101
712/258-4202

TABLE OF CONTENTS

	<u>Pages</u>
Bidding Documents	
Notice to Contractors	NC - 1; 2
Instructions to Bidders	IB - 1; 4
Bid Form	BF - 1; 3
Forms	
Bid Bond	1; 2
Agreement	1; 4
Payment Bond	1; 3
Performance Bond	1; 3
Notice of Award	1
Notice to Proceed	1
Change Order	1
Conditions	
General Conditions Document No. 11	1; 9
Additional Conditions	1; 10
Division 1 - General Requirements	
Section 01010 Summary of Work	1; 2
Section 01150 Project Meeting	1
Section 01200 Progress and Payment	1; 3
Section 01300 Submittals	1
Section 01400 Testing Laboratory Services	1
Section 01500 Temporary Facilities	1; 3
Section 01600 Material and Equipment	1
Section 01700 Project Closeout	1
Division 2 - Site Work	
Section 02010 Subsurface Exploration	1
Section 02221 Utility Excavating, Trenching and Backfilling	1; 3
Section 02260 Finish Grading	1
Section 02486 Seeding	1; 3
Section 02570 Well Drilling	1; 11
Section 02571 Test Well Drilling	1; 3
Section 02580 Pump & Discharge Piping	1; 5
Section 02713 Water Distribution	1; 6

Division 16 - Electrical

Section 16100	Material and Equipment	1;	2
Section 16110	Raceways	1;	4
Section 16120	Wire and Cable	1;	4
Section 16134	Outlet Boxes	1	
Section 16140	Wiring Devices	1;	2
Section 16155	Motor Starters	1;	2
Section 16160	Panelboards	1;	3
Section 16170	Motor and Circuit Disconnects	1	
Section 16181	Fuses	1	
Section 16402	Underground Electrical Services	1	
Section 16450	Grounding	1;	2
Section 16958	Well Control System	1;	2

CITY OF NORTH SIOUX CITY
PO Box 338
North Sioux City, SD 57049
BWMA Project No. 4857

March, 1998

NOTICE TO CONTRACTORS

Sealed Bids will be received by the City of North Sioux City for New Well Project on Watier Street.

Description of Work: Construction of 24 inch diameter gravel pack well with 16 inch casing, pitless adapter, 10 inch drop pipe, pump motor, electrical and miscellaneous site work.

Bids for the City of North Sioux City, New Well Project on Watier Street will be received until 7:00 p.m. (CDT), on April 6, 1998, at the City Hall, located at 300 Military Road, North Sioux City, S. D., at which time they will be accepted for consideration. Bids received after this time will not be accepted.

Nondiscrimination in Employment. Bidders on this Work shall comply with the President's Executive Order No. 11246 as amended. The requirements for Bidders and Contractors under this Order are explained in the Specifications.

The Work shall be started within ten (10) calendar days from the date of the Notice to Proceed and completed by July 1, 1998.

Each bidder shall submit with his Bid a certified check or cashier's check in an amount of not less than ten percent (10%) or a bid bond in an amount of not less than ten percent (10%) of the total amount of the Base Bid. The certified check or cashier's check shall be drawn on a bank in South Dakota or a bank chartered under the laws of the United States of America and payable to the City of North Sioux City as security that, if awarded a Contract by the City of North Sioux City, the Bidder will enter into a Contract at the prices bid and furnish the required Certificate of Insurance. The certified check or cashier's check may be cashed and the proceeds retained as liquidated damages if the Bidder fails to execute a Contract or file acceptable Certificate of Insurance within ten (10) days after the Notice of Award of Bid by resolution of the Owner. No Bidder may withdraw his Bid for at least thirty (30) calendar days after the scheduled closing time for the receipt of bids.

Bidding documents may be obtained from Buell Winter Mousel and Associates, P.C., 705 Douglas, Suite 636, Sioux City, Iowa 51101, **on payment of a deposit of fifty dollars (\$50.00)**. Upon the return of the Bidding documents to the Engineer in good condition, within ten (10 days) after the opening of Bids, all planholders will receive a full refund.

Bidding documents may be examined at the City of North Sioux City, City Hall.

The City reserves the right to reject any or all Bids and to waive informalities in Bids received.

City of North Sioux City

By: Harold Beavers, Acting Mayor

INSTRUCTIONS TO BIDDERS

City of North Sioux City New Well Project on Watier Street
North Sioux City, South Dakota
BWMA Project No. 48597

To be considered, Bids must be made in accord with these Instructions to Bidders.

IB-1. DOCUMENTS. Copies of the bidding documents may be obtained from the Engineer, between the hours of 8:00 a.m. and 12:00 noon and 1:00 p.m. and 5:00 p.m., Monday through Friday, upon the deposit of receipt of fifty dollars (\$50.00) per set. Such deposit will be refunded to all planholders who return the Bidding Documents (Drawings, Project Manuals, and Addenda), in good condition, within ten (10) days after the Bid opening.

IB-2. EXAMINATION. Bidders shall carefully examine the Bidding Documents and the construction site to obtain firsthand knowledge of existing conditions. The contractors will not be given extra payments for conditions which can be determined by examining the site and Bidding Documents. Work shall conform with provisions of state, local, and national codes where applicable. Errors, omissions, and differences between Drawings, and Specifications, and codes shall be called to the attention of the Engineer before submitting a bid. If a discrepancy and/or inadequacy is not brought to the attention of the Engineer, in writing, prior to submittal of the Bid, it will be assumed that the cost of additional requirements to satisfy said discrepancy and/or inadequacy has been incorporated into the Bid by each affected Bidder.

IB-3. QUESTIONS. Submit all questions about Bidding Documents to the Engineer. Replies will be issued to all Prime Bidders of record as Addenda to the Drawings and Project Manual, and will become part of the Contract. The Engineer and the Owner will not be responsible for verbal clarification. Questions received less than forty-eight (48) hours before the Bid opening cannot be answered.

IB-4. SUBSTITUTIONS. Identification of material or equipment by a single manufacturer's name or trade name is not meant to give preference to any one manufacturer but is merely to establish a standard. To obtain approval to use unspecified products, Bidders shall submit written requests at least seven (7) days before the Bid date and hour. Requests received after this time will not be considered. Requests shall clearly describe the product for which approval is asked, including all data necessary to demonstrate acceptability. If the product is acceptable, the Engineer will approve it in an Addendum issued to all Prime Bidders of record.

Any costs for redesign necessitated by the substitution of equipment by the Contractor shall be paid for by the Contractor, and shall not alter the Contract Time except by written approval of the Engineer and in accord with Section 01600 of the Specifications.

IB-5. ADDENDA AND INTERPRETATIONS. No interpretation of the meaning of the Bidding Documents will be made verbally to any Bidder.

Every request for such interpretation shall be in writing addressed to the Engineer and, to be given consideration, must be received at least three (3) days prior to the date fixed for receiving Bids. Any and all such interpretations and any supplemental instructions will be in the form of written Addenda to the Bidding Documents which, if issued, will be mailed to Bidders of record, at the respective addresses furnished for such purposes, prior to the time fixed for the receipt of Bids. Failure of any Bidder to receive any such Addendum or interpretation shall not relieve such Bidder from any obligation under his Bid as submitted, Addenda so issued shall become part of the Bidding Documents.

IB-6. BASIS OF BIDS. The Bidder must include all unit cost items and all Alternates shown on the Bid Form; failure to comply may be cause for rejection.

IB-7. BID SECURITY AND SUBMITTAL. A certified check or cashier's check in an amount of not less than ten percent (10%) or bid bond in an amount of not less than ten percent (10%) of the total amount of the Base Bid, payable to the City of North Sioux City, shall accompany each Bid in a separate sealed opaque envelope, bearing on the outside the Bidder's name and address, and marked "Bid Security for City of North Sioux City New Well Project on Watier Street".

If a Bid Bond is submitted, it shall be issued by a surety company authorized by the State of South Dakota to issue such bonds, to be acceptable to the Owner.

Bid Security will be returned to the Bidders as soon as the successful bidder has executed and delivered the Contract and has furnished satisfactory bonds.

IB-8. LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT. Upon his failure or refusal to execute and deliver the Contract and bonds required within ten (10) days after receiving notice of the acceptance of his Bid, the successful Bidder shall forfeit to the City of North Sioux City the security deposited with his Bid as Liquidated Damages for such failure or refusal.

IB-9. PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENTS BONDS. each in the amount equal to one hundred percent (100%) of the Contract Price, shall be furnished by the successful Bidder in accord with the General Conditions.

IB-10. POWER OF ATTORNEY. Attorneys-in-fact who sign Bid Bonds and Contract Bonds must file with each Bond a certified and dated copy of their Power of Attorney.

IB-11. SALES AND USE TAX. The Bidder shall include State of South Dakota and Sales and Use Tax in his Bid.

IB-12. PREPARATION OF BIDS. Submit Bids on unaltered Bid Forms furnished by the Engineer. In ink or typewritten words and figures, fill in all blank spaces for Bid Prices and submit one (1) copy. Bids shall be signed by the person or persons legally authorized to bind the Bidder to a Contract, with the name or names typed below the signature or signatures. Bids submitted by an agent shall have a current Power of Attorney attached certifying the authority of the agent to bind the Bidder.

IB-13. SUBMITTALS. Submit Bids in opaque, sealed envelopes bearing on the outside the name and address of the Bidder, and marked "Bid for City of North Sioux City New Well Project on Watier Street". If Bids are sent by mail, they shall be received by the City of North Sioux City, PO Box 338, 300 Military Road, North Sioux City, South Dakota 57049. If Bids are faxed, (605/232-0506) the bid bond shall be mailed and received prior to the time of bid and the bid shall be sealed in an envelope prior to the time of bid and deposited with the City.

IB-14. MODIFICATION AND WITHDRAWAL. Bids may not be modified after submittal. The Bid may be withdrawn at any time before opening but may not be resubmitted. No Bid may be withdrawn or modified after the Bid opening, except where the award of the Contract has been delayed for thirty (30) days.

In the event of adverse conditions, the Owner's representative or Project Manager will change the time and location for receipt of bids as required to eliminate the adverse conditions, and direct the Engineer to issue an addendum notifying bidders of the change in the time and place for receipt of bids. Bids received by the Owner, prior to the original time of Bid will be retained (unopened) by the Owner for opening at the new time and place. The Contractor may in accordance with applicable state law modify their bids submitted prior to the original time of bid. Bids not received by the original time may be submitted in accordance with the contract documents up to the new time for receipt of bid as directed by addendum.

IB-15. DISQUALIFICATION. The Owner reserves the right to disqualify Bids, before or after opening, upon evidence of collusion with the intent to defraud or other illegal practices upon the part of the Bidder.

IB-16. PRIME SUBCONTRACTORS. Enter the names of proposed Prime Subcontractors and the percentage of the total Base Bid work that each Subcontractor will be doing on the locations provided on the Bid Form. The failure to list Subcontractors shall indicate that none are going to be used, and that all work will be performed by the Bidder's own work force.

IB-17. NONDISCRIMINATION IN EMPLOYMENT. Contracts for Work described in these Bidding Documents obligate the Contractors and Subcontractors not to discriminate in employment practices.

IB-18. OPENING. Bids for City of North Sioux City New Well Project on Watier Street received until 7:00 p.m. (CDT), on April 6, 1998, at the City of North Sioux City, City Hall, at which time they will be accepted for consideration. Bids received after this time will not be accepted.

IB-19. METHOD OF AWARD.

IB-19.1 BIDDING PROCEDURE INVOLVING A BASE BID AND ALTERNATE ADDITIVE AND DEDUCTIVE BIDS.

If the Base Bid is within the amount of funds available to finance the Contract, and the Owner wishes to accept Alternate Bids, then the Contract award will be made to that responsive, responsible Bidder submitting the low total Base Bid plus any Alternates accepted.

IB-19.2 PREPARATION OF BID. Any Bidder failing to include required data to be submitted with the Bid, or supplying all the information requested on the Bid Form, shall be determined to be nonresponsive and his Bid may be rejected.

IB-20. AWARD OF CONTRACT - REJECTION OF BIDS. The Contract will be awarded to the responsive, responsible Bidder submitting the Base Bid complying with the conditions of the Notice to Contractors and Instructions to Bidders, provided his Bid is reasonable and to the interest of the Owner to accept it. The Bidder to whom the award is made will be notified at the earliest practical date. The Owner, however, reserves the right to reject any and all Bids and to waive any informality in Bids received whenever such rejection or waiver is in the interest of the Owner.

The Owner reserves the right to disqualify Bids, before or after opening, upon evidence of collusion with the intent to defraud or other illegal practices upon the part of the Bidder.

The Owner also reserves the right to reject the Bid of any Bidder who has previously failed to perform properly, or to complete on time, contracts of a similar nature, who is not in a position to perform the Contract, or who has neglected the payment of bills or otherwise disregarded his obligations to Subcontractors, material men, or employees.

BID FORM

CITY OF NORTH SIOUX CITY
NEW WELL PROJECT ON WATIER STREET

City of North Sioux City New Well Project on Watier Street
North Sioux City, South Dakota
BWMA Project No. 48597

Bid of _____

_____ a corporation organized and existing under the laws of the State of

_____ a partnership consisting of _____

_____, partners; or

_____ a Sole Proprietor; or

_____ a Limited Liability Company:

Hereinafter called the Bidder.

To: Harold Beavers, Acting Mayor
City of North Sioux City
PO Box 338, 301 Military Road
North Sioux City, South Dakota 57049

The undersigned acknowledges that he has received, and has familiarized himself with the following:

Project Manual

Addenda: No. _____ through _____

The undersigned further acknowledges that he has received, and has familiarized himself with local conditions affecting the cost of the Work at the place where the Work is to be done.

In submitting this Bid, the undersigned agrees:

BF-1

1. To furnish all material, labor, tools, expendable equipment, and all utility and transportation services necessary to perform and complete, in a workmanlike manner, all of the Work required, in accord with the Bidding Documents prepared by Buell Winter Mousel and Associates, P.C. for the consideration hereinafter set forth.
2. To hold his Bid open for thirty (30) calendar days after the receipt of Bids and to accept the provisions of the Instructions to Bidders regarding disposition of Bid Security.
3. To enter into and execute a Contract, if awarded on the basis of this Bid, and to deliver executed Owner-Contractor Agreements to the Engineer within ten (10) calendar days after Notice of Award.
4. To complete the Work by July 1, 1998.
5. Acknowledges that he has reviewed and read the Drawings, Specifications, General Conditions and Supplementary Conditions, and that there are no errors in or omissions from the Drawings and Specifications. In the event there are errors in or omissions from the Drawings and Specifications, he nevertheless accepts same as is.
6. Items of work required by these documents, if not listed on the Bid Form, are considered incidental.

UNIT PRICE BASE BID: The undersigned agrees to perform all of the Work required to complete the Project for the following Unit Prices:

BID FORM

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>UNIT PRICE</u>	<u>TOTAL</u>
1.	Pitless Adapter	1 ea	_____	_____
2.	24" Dia. Well hole	274 vf	_____	_____
2.	36" Stainless Steel Well Screen	50 vf	_____	_____
4.	16" Well Casing	225 vf	_____	_____
5.	Grout Seal & Backfill	212 vf	_____	_____
6.	Gravel Pack	54 vf	_____	_____
7.	10" Gate Valve & Box	1 ea	_____	_____
8.	Fire hydrant, w/valve, box, tee & pipe	1 ea	_____	_____
9.	Pump & motor	1 ea	_____	_____
10.	10" Drop pipe	220 vf	_____	_____
11.	12" x 10" reducer	1 ea	_____	_____
12.	Pipe & Incidentals	LS	_____	_____

BF-2

13.	Test Pumping	24 Hrs	_____	_____
14.	Sampling	LS	_____	_____
15.	Drop Cable	225 vf	_____	_____
16.	Abandon Existing Test hole	2 ea	_____	_____
17.	Mobilization/Demobil.	1 ea	_____	_____
18.	Seeding	120 sy	_____	_____
19.	Test Well Drilling	300 vf	_____	_____
20.	6- #14 signal wires in PVC			
	Conduit	750 lf	_____	_____
TOTAL :			_____	_____

PRIME SUBCONTRACTORS: The undersigned proposes the following prime subcontractors:

The undersigned has submitted the required Bid Security and other items required in the Instructions to Bidders.

In submitting this Bid, it is understood that the right to reject any and all Bids and to waive irregularities in the Bidding has been reserved by the Owner.

Dated this _____ day of _____, 1998

Name of Bidder

Address of Bidder

Authorized Officer

BID BOND

KNOW ALL MEN BY THESE PRESENTS: that we, the undersigned, _____

_____ as Principal, and _____ as

Surety, are hereby held and firmly bound unto _____

as OWNER in the penal sum of _____

for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves,

successors and assigns. Signed, this _____ day of _____, 19_____.

The Condition of the above obligation is such that whereas the Principal has submitted to

_____ a certain BID, attached hereto and hereby

made part hereto to enter into a contract in writing, for the: _____

NOW, THEREFORE,

- (a) If said BID shall be rejected, or
- (b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID.

Then this obligation shall be void, otherwise the same shall remain in force and effect: it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____(L. S.)
Principal

Surety

BY: _____

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

AGREEMENT

THIS AGREEMENT, made this _____ day of _____, by and between _____, hereinafter called "OWNER" and _____ (Name of Owner), (an Individual) doing business as (an individual,) or (a partnership,) or (a corporation), or a (Limited Liability Company) hereinafter called "CONTRACTOR".

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

1. The CONTRACTOR will commence and complete the construction of _____
2. The CONTRACTOR will furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the PROJECT described herein.
3. The CONTRACTOR will commence the work required by the CONTRACT DOCUMENTS within _____ calendar days after the date of the NOTICE TO PROCEED and will complete the same within _____ calendar days unless the period for completion is extended otherwise by the CONTRACT DOCUMENTS.
4. The CONTRACTOR agrees to perform all of the WORK described in the CONTRACT DOCUMENTS and comply with the terms therein for the sum of \$ _____.
5. The term "CONTRACT DOCUMENTS" means and includes the following:
 - (A) Advertisement for BIDS
 - (B) Information for BIDDERS
 - (C) BID
 - (D) BID BOND
 - (E) Agreement
 - (F) General Conditions
 - (G) SUPPLEMENTAL GENERAL CONDITIONS

- (H) Payment BOND
- (I) Performance BOND
- (J) NOTICE OF AWARD
- (K) NOTICE TO PROCEED
- (L) CHANGE ORDER
- (M) DRAWINGS prepared by Buell Winter Mousel and Associates, PC numbered _____ through _____, and dated _____, 19 _____.
- (N) SPECIFICATIONS prepared or issued by Buell Winter Mousel and Associates, PC, dated _____, 19 _____.
- (O) ADDENDA:
- | | | |
|-----|---|-------|
| No. | , | dated |
| No. | , | dated |
| No. | , | dated |

6. The OWNER will pay to the CONTRACTOR in the manner and at such times as set forth in the General Conditions such amounts as required by the CONTRACT DOCUMENTS.

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

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

OWNER:

BY _____

Name _____
(Please Type)

Title _____

(SEAL)

ATTEST:

Name _____
(Please Type)

Title _____

CONTRACTOR:

BY _____

Name _____
(Please Type)

Address _____

(SEAL)

ATTEST:

Name _____
(Please Type)

FORMS3; Agreemt.doc

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter
called (Corporation, Partnership, Limited Liability Corp (LLC), or Individual)

Principal, and _____
(Name of Surety)

(Address of Surety)

hereinafter called Surety; are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of _____

Dollars, \$ (_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents. THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____, 19____, a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the two year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall promptly pay all taxes accrued to the State of South Dakota, and the Surety shall send Notice of the Bond to the Secretary of the Department of Revenue within sixty days of entering into this bond, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any defaults, then this obligation shall be void; otherwise to remain in full force and effect.

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

PROVIDED, FURTHER, that no final settlement between the OWNER, and the CONTRACTOR, shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied. IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one of which shall be
(Number)
deemed an original, this the _____ day of _____, 19 _____.

ATTEST:

Principal

BY _____(s)

(Principal) Secretary

(SEAL)

(Witness as to Principal)

(Address)

(Address)

(Surety)

ATTEST:

(Surety Secretary)

(SEAL)

(Witness as to Surety)

BY _____
Attorney-in-Fact

(Address)

(Address)

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter
called (Corporation, Partnership, Limited Liability Corp (LLC), or Individual) or

Principal, and _____
(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of _____

Dollars, \$ (_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents. THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____, 19____, a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, SUBCONTRACTORS, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said WORK, and for all labor, performed in such WORK whether by SUBCONTRACTOR or otherwise, then this obligation shall be void: otherwise to remain in full force and effect.

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

PROVIDED, FURTHER, that no final settlement between the OWNER, and the CONTRACTOR, shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one

(Number)

of which shall be deemed an original, this the _____ day of _____, 19_____.

ATTEST:

Principal

(Principal) Secretary

(SEAL)

BY _____(s)

(Address)

(Witness as to Principal)

(Address)

(Address)

(Surety)

ATTEST:

(Witness as to Surety)

BY _____
Attorney-in-Fact

(Address)

(Address)

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

NOTICE OF AWARD

TO: _____

PROJECT Description:

The OWNER has considered the BID submitted by you for the above described WORK in response to its Advertisement for Bids dated _____, _____, and information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$ _____.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, Payment BOND and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this _____ day of _____, _____.

Owner

By _____

Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged

by _____

this _____ day of _____, 19____

By _____

Title _____

forms3;notaward.doc

NOTICE TO PROCEED

To: _____

Date: _____
Project: _____

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 19____, on or before _____, 19____, and you are to complete the WORK with within _____ consecutive calendar days thereafter. The date of completion of all WORK is therefore _____, 19____.

Owner

By _____

Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by

this the _____ day

of _____, 19____

By _____

Title _____

GENERAL CONDITIONS

1. Definitions
2. Additional Instructions and Detail Drawings
3. Schedules, Reports and Records
4. Drawings and Specifications
5. Shop Drawings
6. Materials, Services and Facilities
7. Inspection and Testing
8. Substitutions
9. Patents
10. Surveys, Permits, Regulations
11. Protection of Work, Property, Persons
12. Supervision by Contractor
13. Changes in the Work
14. Changes in Contract Price
15. Time for Completion and Liquidated Damages
16. Correction of Work

17. Subsurface Conditions
18. Suspension of Work, Termination and Delay
19. Payments to Contractor
20. Acceptance of Final Payment as Release
21. Insurance
22. Contract Security
23. Assignments
24. Indemnification
25. Separate Contracts
26. Subcontracting
27. Engineer's Authority
28. Land and Rights-of-Way
29. Guaranty
30. Arbitration
31. Taxes

1. DEFINITIONS

1.1 Wherever used in the CONTRACT DOCUMENTS, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:

1.2 ADDENDA—Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the CONTRACT DOCUMENTS, DRAWINGS and SPECIFICATIONS, by additions, deletions, clarifications or corrections.

1.3 BID—The offer or proposal of the BIDDER submitted on the prescribed form setting forth the prices for the WORK to be performed.

1.4 BIDDER—Any person, firm or corporation submitting a BID for the WORK.

1.5 BONDS—Bid, Performance, and Payment Bonds and other instruments of security, furnished by the CONTRACTOR and his surety in accordance with the CONTRACT DOCUMENTS.

1.6 CHANGE ORDER—A written order to the CONTRACTOR authorizing an addition, deletion or revision in the WORK within the general scope of the CONTRACT DOCUMENTS, or authorizing an adjustment in the CONTRACT PRICE or CONTRACT TIME.

1.7 CONTRACT DOCUMENTS—The contract, including Advertisement For Bids, Information For Bidders, Bid, Bid Bond, Agreement, Payment Bond, Performance Bond, NOTICE OF AWARD, NOTICE TO PROCEED, CHANGE ORDER, DRAWINGS, SPECIFICATIONS, and ADDENDA.

1.8 CONTRACT PRICE—The total monies payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.

1.9 CONTRACT TIME—The number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the WORK.

1.10 CONTRACTOR—The person, firm or corporation with whom the OWNER has executed the Agreement.

1.11 DRAWINGS—The part of the CONTRACT DOCUMENTS which show the characteristics and scope of the WORK to be performed and which have been prepared or approved by the ENGINEER.

1.12 ENGINEER—The person, firm or corporation named as such in the CONTRACT DOCUMENTS.

1.13 FIELD ORDER—A written order effecting a change in the WORK not involving an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, issued by the ENGINEER to the CONTRACTOR during construction.

1.14 NOTICE OF AWARD—The written notice of the acceptance of the BID from the OWNER to the successful BIDDER.

1.15 NOTICE TO PROCEED—Written communication issued by the OWNER to the CONTRACTOR authorizing him to proceed with the WORK and establishing the date of commencement of the WORK.

1.16 OWNER—A public or quasi-public body or authority, corporation, association, partnership, or individual for whom the WORK is to be performed.

1.17 PROJECT—The undertaking to be performed as provided in the CONTRACT DOCUMENTS.

1.18 RESIDENT PROJECT REPRESENTATIVE—The authorized representative of the OWNER who is assigned to the PROJECT site or any part thereof.

1.19 SHOP DRAWINGS—All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the CONTRACTOR, a SUBCONTRACTOR, manufacturer, SUPPLIER or distributor, which illustrate how specific portions of the WORK shall be fabricated or installed.

1.20 SPECIFICATIONS—A part of the CONTRACT DOCUMENTS consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

1.21 SUBCONTRACTOR—An individual, firm or corporation having a direct contract with the CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the WORK at the site.

1.22 SUBSTANTIAL COMPLETION—That date as certified by the ENGINEER when the construction of the PROJECT or a specified part thereof is sufficiently completed, in accordance with the CONTRACT DOCUMENTS, so that the PROJECT or specified part can be utilized for the purposes for which it is intended.

1.23 SUPPLEMENTAL GENERAL CONDITIONS—

Modifications to General Conditions required by a Federal agency for participation in the PROJECT and approved by the agency in writing prior to inclusion in the CONTRACT DOCUMENTS, or such requirements that may be imposed by applicable state laws.

1.24 SUPPLIER—Any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design, but who does not perform labor at the site.

1.25 WORK—All labor necessary to produce the construction required by the CONTRACT DOCUMENTS, and all materials and equipment incorporated or to be incorporated in the PROJECT.

1.26 WRITTEN NOTICE—Any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at his last given address, or delivered in person to said party or his authorized representative on the WORK.

2. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

2.1 The CONTRACTOR may be furnished additional instructions and detail drawings, by the ENGINEER, as necessary to carry out the WORK required by the CONTRACT DOCUMENTS.

2.2 The additional drawings and instruction thus supplied will become a part of the CONTRACT DOCUMENTS. The CONTRACTOR shall carry out the WORK in accordance with the additional detail drawings and instructions.

3. SCHEDULES, REPORTS AND RECORDS

3.1 The CONTRACTOR shall submit to the OWNER such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data where applicable as are required by the CONTRACT DOCUMENTS for the WORK to be performed.

3.2 Prior to the first partial payment estimate the CONTRACTOR shall submit construction progress schedules showing the order in which he proposes to carry on the WORK, including dates at which he will start the various parts of the WORK, estimated date of completion of each part and, as applicable:

3.2.1. The dates at which special detail drawings will be required; and

3.2.2 Respective dates for submission of SHOP DRAWINGS, the beginning of manufacture, the testing and the installation of materials, supplies and equipment.

3.3 The CONTRACTOR shall also submit a schedule of payments that he anticipates he will earn during the course of the WORK.

4. DRAWINGS AND SPECIFICATIONS

4.1 The intent of the DRAWINGS and SPECIFICATIONS is that the CONTRACTOR shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the WORK in accordance with the CONTRACT DOCUMENTS and all incidental work necessary to complete the PROJECT in an acceptable manner, ready for use, occupancy or operation by the OWNER.

4.2 In case of conflict between the DRAWINGS and SPECIFICATIONS, the SPECIFICATIONS shall govern. Figure dimensions on DRAWINGS shall govern over scale dimensions, and detailed DRAWINGS shall govern over general DRAWINGS.

4.3 Any discrepancies found between the DRAWINGS and SPECIFICATIONS and site conditions or any inconsistencies or ambiguities in the DRAWINGS or SPECIFICATIONS shall be immediately reported to the ENGINEER, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. WORK done by the CONTRACTOR after his discovery of such discrepancies, inconsistencies or ambiguities shall be done at the CONTRACTOR'S risk.

5. SHOP DRAWINGS

5.1 The CONTRACTOR shall provide SHOP DRAWINGS as may be necessary for the prosecution of the WORK as required by the CONTRACT DOCUMENTS. The ENGINEER shall promptly review all SHOP DRAWINGS. The ENGINEER'S approval of any SHOP DRAWING shall not release the CONTRACTOR from responsibility for deviations from the CONTRACT DOCUMENTS. The approval of any SHOP DRAWING which substantially deviates from the requirement of the CONTRACT DOCUMENTS shall be evidenced by a CHANGE ORDER.

5.2 When submitted for the ENGINEER'S review, SHOP DRAWINGS shall bear the CONTRACTOR'S certification that he has reviewed, checked and approved the SHOP DRAWINGS and that they are in conformance with the requirements of the CONTRACT DOCUMENTS.

5.3 Portions of the WORK requiring a SHOP DRAWING or sample submission shall not begin until the SHOP DRAWING or submission has been approved by the ENGINEER. A copy of each approved SHOP DRAWING and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ENGINEER.

6. MATERIALS, SERVICES AND FACILITIES

6.1 It is understood that, except as otherwise specifically stated in the CONTRACT DOCUMENTS, the CONTRACTOR shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the WORK within the specified time.

6.2 Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the WORK. Stored materials and equipment to be incorporated in the WORK shall be located so as to facilitate prompt inspection.

6.3 Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

6.4 Materials, supplies and equipment shall be in accordance with samples submitted by the CONTRACTOR and approved by the ENGINEER.

6.5 Materials, supplies or equipment to be incorporated into the WORK shall not be purchased by the

CONTRACTOR or the SUBCONTRACTOR subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

7. INSPECTION AND TESTING

7.1 All materials and equipment used in the construction of the PROJECT shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the CONTRACT DOCUMENTS.

7.2 The OWNER shall provide all inspection and testing services not required by the CONTRACT DOCUMENTS.

7.3 The CONTRACTOR shall provide at his expense the testing and inspection services required by the CONTRACT DOCUMENTS.

7.4 If the CONTRACT DOCUMENTS, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any WORK to specifically be inspected, tested, or approved by someone other than the CONTRACTOR, the CONTRACTOR will give the ENGINEER timely notice of readiness. The CONTRACTOR will then furnish the ENGINEER the required certificates of inspection, testing or approval.

7.5 Inspections, tests or approvals by the engineer or others shall not relieve the CONTRACTOR from his obligations to perform the WORK in accordance with the requirements of the CONTRACT DOCUMENTS.

7.6 The ENGINEER and his representatives will at all times have access to the WORK. In addition, authorized representatives and agents of any participating Federal or state agency shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. The CONTRACTOR will provide proper facilities for such access and observation of the WORK and also for any inspection, or testing thereof.

7.7 If any WORK is covered contrary to the written instructions of the ENGINEER it must, if requested by the ENGINEER, be uncovered for his observation and replaced at the CONTRACTOR'S expense.

7.8 If the ENGINEER considers it necessary or advisable that covered WORK be inspected or tested by others, the CONTRACTOR, at the ENGINEER'S request, will uncover, expose or otherwise make available for observation, inspection or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such WORK is defective, the CONTRACTOR will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction. If, however, such WORK is not found to be defective, the CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate CHANGE ORDER shall be issued.

8. SUBSTITUTIONS

8.1 Whenever a material, article or piece of equip-

ment is identified on the DRAWINGS or SPECIFICATIONS by reference to brand name or catalogue number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. The CONTRACTOR may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the CONTRACT DOCUMENTS by reference to brand name or catalogue number, and if, in the opinion of the ENGINEER, such material, article, or piece of equipment is of equal substance and function to that specified, the ENGINEER may approve its substitution and use by the CONTRACTOR. Any cost differential shall be deductible from the CONTRACT PRICE and the CONTRACT DOCUMENTS shall be appropriately modified by CHANGE ORDER. The CONTRACTOR warrants that if substitutes are approved, no major changes in the function or general design of the PROJECT will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the CONTRACTOR without a change in the CONTRACT PRICE or CONTRACT TIME.

9. PATENTS

9.1 The CONTRACTOR shall pay all applicable royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and save the OWNER harmless from loss on account thereof, except that the OWNER shall be responsible for any such loss when a particular process, design, or the product of a particular manufacturer or manufacturers is specified, however if the CONTRACTOR has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the ENGINEER.

10. SURVEYS, PERMITS, REGULATIONS

10.1 The OWNER shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK together with a suitable number of bench marks adjacent to the WORK as shown in the CONTRACT DOCUMENTS. From the information provided by the OWNER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pile locations and other working points, lines, elevations and cut sheets.

10.2 The CONTRACTOR shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

10.3 Permits and licenses of a temporary nature necessary for the prosecution of the WORK shall be secured and paid for by the CONTRACTOR unless otherwise stated in the SUPPLEMENTAL GENERAL CONDITIONS. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the OWNER, unless otherwise specified. The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the WORK as drawn and specified. If the CONTRACTOR

observes that the CONTRACT DOCUMENTS are at variance therewith, he shall promptly notify the ENGINEER in writing, and any necessary changes shall be adjusted as provided in Section 13. CHANGES IN THE WORK.

11. PROTECTION OF WORK, PROPERTY AND PERSONS

11.1 The CONTRACTOR will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the WORK. He will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the WORK and other persons who may be affected thereby, all the WORK and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

11.2 The CONTRACTOR will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. He will erect and maintain, as required by the conditions and progress of the WORK, all necessary safeguards for safety and protection. He will notify owners of adjacent utilities when prosecution of the WORK may affect them. The CONTRACTOR will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the CONTRACTOR, any SUBCONTRACTOR or anyone directly or indirectly employed by any of them or anyone for whose acts any of them be liable, except damage or loss attributable to the fault of the CONTRACT DOCUMENTS or to the acts or omissions of the OWNER or the ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the CONTRACTOR.

11.3 In emergencies affecting the safety of persons or the WORK or property at the site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the ENGINEER or OWNER, shall act to prevent threatened damage, injury or loss. He will give the ENGINEER prompt WRITTEN NOTICE of any significant changes in the WORK or deviations from the CONTRACT DOCUMENTS caused thereby, and a CHANGE ORDER shall thereupon be issued covering the changes and deviations involved.

12. SUPERVISION BY CONTRACTOR

12.1 The CONTRACTOR will supervise and direct the WORK. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The CONTRACTOR will employ and maintain on the WORK a qualified supervisor or superintendent who shall have been designated in writing by the CONTRACTOR as the CONTRACTOR'S representative at the site. The supervisor shall have full authority to act on behalf of the CONTRACTOR and all communications given to the supervisor shall be as binding as if given to the CONTRACTOR. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the WORK.

13. CHANGES IN THE WORK

13.1 The OWNER may at any time, as the need arises,

order changes within the scope of the WORK without invalidating the Agreement. If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by CHANGE ORDER.

13.2 The ENGINEER, also, may at any time, by issuing a FIELD ORDER, make changes in the details of the WORK. The CONTRACTOR shall proceed with the performance of any changes in the WORK so ordered by the ENGINEER unless the CONTRACTOR believes that such FIELD ORDER entitles him to a change in CONTRACT PRICE or TIME, or both, in which event he shall give the ENGINEER WRITTEN NOTICE thereof within seven (7) days after the receipt of the ordered change. Thereafter the CONTRACTOR shall document the basis for the change in CONTRACT PRICE or TIME within thirty (30) days. The CONTRACTOR shall not execute such changes pending the receipt of an executed CHANGE ORDER or further instruction from the OWNER.

14. CHANGES IN CONTRACT PRICE

14.1 The CONTRACT PRICE may be changed only by a CHANGE ORDER. The value of any WORK covered by a CHANGE ORDER or of any claim for increase or decrease in the CONTRACT PRICE shall be determined by one or more of the following methods in the order of precedence listed below:

(a) Unit prices previously approved.

(b) An agreed lump sum.

(c) The actual cost for labor, direct overhead, materials, supplies, equipment, and other services necessary to complete the work. In addition there shall be added an amount to be agreed upon but not to exceed fifteen (15) percent of the actual cost of the WORK to cover the cost of general overhead and profit.

15. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

15.1 The date of beginning and the time for completion of the WORK are essential conditions of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on a date specified in the NOTICE TO PROCEED.

15.2 The CONTRACTOR will proceed with the WORK at such rate of progress to insure full completion within the CONTRACT TIME. It is expressly understood and agreed, by and between the CONTRACTOR and the OWNER, that the CONTRACT TIME for the completion of the WORK described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.

15.3 If the CONTRACTOR shall fail to complete the WORK within the CONTRACT TIME, or extension of time granted by the OWNER, then the CONTRACTOR will pay to the OWNER the amount for liquidated damages as specified in the BID for each calendar day that the CONTRACTOR shall be in default after the time stipulated in the CONTRACT DOCUMENTS.

15.4 The CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the WORK is due to the following, and the CONTRACTOR has promptly given WRITTEN NOTICE of such delay to the OWNER or ENGINEER.

15.4.1 To any preference, priority or allocation

order duly issued by the OWNER.

15.4.2 To unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to, acts of God, or of the public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and

15.4.3 To any delays of SUBCONTRACTORS occasioned by any of the causes specified in paragraphs 15.4.1 and 15.4.2 of this article.

16. CORRECTION OF WORK

16.1 The CONTRACTOR shall promptly remove from the premises all WORK rejected by the ENGINEER for failure to comply with the CONTRACT DOCUMENTS, whether incorporated in the construction or not, and the CONTRACTOR shall promptly replace and re-execute the WORK in accordance with the CONTRACT DOCUMENTS and without expense to the OWNER and shall bear the expense of making good all WORK of other CONTRACTORS destroyed or damaged by such removal or replacement.

16.2 All removal and replacement WORK shall be done at the CONTRACTOR'S expense. If the CONTRACTOR does not take action to remove such rejected WORK within ten (10) days after receipt of WRITTEN NOTICE, the OWNER may remove such WORK and store the materials at the expense of the CONTRACTOR.

17. SUBSURFACE CONDITIONS

17.1 The CONTRACTOR shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the OWNER by WRITTEN NOTICE of:

17.1.1 Subsurface or latent physical conditions at the site differing materially from those indicated in the CONTRACT DOCUMENTS; or

17.1.2 Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in WORK of the character provided for in the CONTRACT DOCUMENTS.

17.2 The OWNER shall promptly investigate the conditions, and if he finds that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the WORK, an equitable adjustment shall be made and the CONTRACT DOCUMENTS shall be modified by a CHANGE ORDER. Any claim of the CONTRACTOR for adjustment hereunder shall not be allowed unless he has given the required WRITTEN NOTICE; provided that the OWNER may, if he determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

18. SUSPENSION OF WORK, TERMINATION AND DELAY

18.1 The OWNER may suspend the WORK or any portion thereof for a period of not more than ninety days or such further time as agreed upon by the CONTRACTOR, by WRITTEN NOTICE to the CONTRACTOR and the ENGINEER which notice shall fix the date on which WORK shall be resumed. The CONTRACTOR

will resume that WORK on the date so fixed. The CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to any suspension.

18.2 If the CONTRACTOR is adjudged a bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for the CONTRACTOR or for any of his property, or if he files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or if he repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or if he repeatedly fails to make prompt payments to SUBCONTRACTORS or for labor, materials or equipment or if he disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the WORK or if he disregards the authority of the ENGINEER, or if he otherwise violates any provision of the CONTRACT DOCUMENTS, then the OWNER may, without prejudice to any other right or remedy and after giving the CONTRACTOR and his surety a minimum of ten (10) days from delivery of a WRITTEN NOTICE, terminate the services of the CONTRACTOR and take possession of the PROJECT and of all materials, equipment, tools, construction equipment and machinery thereon owned by the CONTRACTOR, and finish the WORK by whatever method he may deem expedient. In such case the CONTRACTOR shall not be entitled to receive any further payment until the WORK is finished. If the unpaid balance of the CONTRACT PRICE exceeds the direct and indirect costs of completing the PROJECT, including compensation for additional professional services, such excess SHALL BE PAID TO THE CONTRACTOR. If such costs exceed such unpaid balance, the CONTRACTOR will pay the difference to the OWNER. Such costs incurred by the OWNER will be determined by the ENGINEER and incorporated in a CHANGE ORDER.

18.3 Where the CONTRACTOR'S services have been so terminated by the OWNER, said termination shall not affect any right of the OWNER against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of monies by the OWNER due the CONTRACTOR will not release the CONTRACTOR from compliance with the CONTRACT DOCUMENTS.

18.4 After ten (10) days from delivery of a WRITTEN NOTICE to the CONTRACTOR and the ENGINEER, the OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the PROJECT and terminate the Contract. In such case, the CONTRACTOR shall be paid for all WORK executed and any expense sustained plus reasonable profit.

18.5 If, through no act or fault of the CONTRACTOR, the WORK is suspended for a period of more than ninety (90) days by the OWNER or under an order of court or other public authority, or the ENGINEER fails to act on any request for payment within thirty (30) days after it is submitted, or the OWNER fails to pay the CONTRACTOR substantially the sum approved by the ENGINEER or awarded by arbitrators within thirty (30) days of its approval and presentation, then the CONTRACTOR may, after ten (10) days from delivery of a WRITTEN NOTICE to the OWNER and the ENGINEER, terminate the CONTRACT and recover from the OWNER payment for all WORK exe-

cuted and all expenses sustained. In addition and in lieu of terminating the CONTRACT, if the ENGINEER has failed to act on a request for payment or if the OWNER has failed to make any payment as aforesaid, the CONTRACTOR may upon ten (10) days written notice to the OWNER and the ENGINEER stop the WORK until he has been paid all amounts then due, in which event and upon resumption of the WORK, CHANGE ORDERS shall be issued for adjusting the CONTRACT PRICE or extending the CONTRACT TIME or both to compensate for the costs and delays attributable to the stoppage of the WORK.

18.6 If the performance of all or any portion of the WORK is suspended, delayed, or interrupted as a result of a failure of the OWNER or ENGINEER to act within the time specified in the CONTRACT DOCUMENTS, or if no time is specified, within a reasonable time, an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, shall be made by CHANGE ORDER to compensate the CONTRACTOR for the costs and delays necessarily caused by the failure of the OWNER or ENGINEER.

19. PAYMENTS TO CONTRACTOR

19.1 At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR will submit to the ENGINEER a partial payment estimate filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the ENGINEER may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the WORK but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the OWNER, as will establish the OWNER's title to the material and equipment and protect his interest therein, including applicable insurance. The ENGINEER will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the OWNER, or return the partial payment estimate to the CONTRACTOR indicating in writing his reasons for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. The OWNER will, within ten (10) days of presentation to him of an approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate. The OWNER shall retain ten (10) percent of the amount of each payment until final completion and acceptance of all work covered by the CONTRACT DOCUMENTS. The OWNER at any time, however, after fifty (50) percent of the WORK has been completed, if he finds that satisfactory progress is being made, shall reduce retainage to five (5%) percent on the current and remaining estimates. When the WORK is substantially complete (operational or beneficial occupancy), the retained amount may be further reduced below five (5) percent to only that amount necessary to assure completion. On completion and acceptance of a part of the WORK on which the price is stated separately in the CONTRACT DOCUMENTS, payment may be made in full, including retained percentages, less authorized deductions.

19.2 The request for payment may also include an allowance for the cost of such major materials and

equipment which are suitably stored either at or near the site.

19.3 Prior to SUBSTANTIAL COMPLETION, the OWNER, with the approval of the ENGINEER and with the concurrence of the CONTRACTOR, may use any completed or substantially completed portions of the WORK. Such use shall not constitute an acceptance of such portions of the WORK.

19.4 The OWNER shall have the right to enter the premises for the purpose of doing work not covered by the CONTRACT DOCUMENTS. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the WORK, or the restoration of any damaged WORK except such as may be caused by agents or employees of the OWNER.

19.5 Upon completion and acceptance of the WORK, the ENGINEER shall issue a certificate attached to the final payment request that the WORK has been accepted by him under the conditions of the CONTRACT DOCUMENTS. The entire balance found to be due the CONTRACTOR, including the retained percentages, but except such sums as may be lawfully retained by the OWNER, shall be paid to the CONTRACTOR within thirty (30) days of completion and acceptance of the WORK.

19.6 The CONTRACTOR will indemnify and save the OWNER or the OWNER'S agents harmless from all claims growing out of the lawful demands of SUBCONTRACTORS, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the WORK. The CONTRACTOR shall, at the OWNER'S request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the CONTRACTOR fails to do so the OWNER may, after having notified the CONTRACTOR, either pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the CONTRACTOR shall be resumed, in accordance with the terms of the CONTRACT DOCUMENTS, but in no event shall the provisions of this sentence be construed to impose any obligations upon the OWNER to either the CONTRACTOR, his Surety, or any third party. In paying any unpaid bills of the CONTRACTOR, any payment so made by the OWNER shall be considered as a payment made under the CONTRACT DOCUMENTS by the OWNER to the CONTRACTOR and the OWNER shall not be liable to the CONTRACTOR for any such payments made in good faith.

19.7 If the OWNER fails to make payment thirty (30) days after approval by the ENGINEER, in addition to other remedies available to the CONTRACTOR, there shall be added to each such payment interest at the maximum legal rate commencing on the first day after said payment is due and continuing until the payment is received by the CONTRACTOR.

20. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

20.1 The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER of all claims and all liability to the CONTRACTOR other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in connection with this WORK and for every act and neglect of the OWNER and others relating to or arising out of this WORK. Any payment, however, final or otherwise, shall not release the CONTRACTOR or his sureties from any obligations under the CONTRACT DOCUMENTS or the Performance BOND and Payment BONDS.

21. INSURANCE

21.1 The CONTRACTOR shall purchase and maintain such insurance as will protect him from claims set forth below which may arise out of or result from the CONTRACTOR'S execution of the WORK, whether such execution be by himself or by any SUBCONTRACTOR or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

21.1.1 Claims under workmen's compensation, disability benefit and other similar employee benefit acts;

21.1.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;

21.1.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;

21.1.4 Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the CONTRACTOR, or (2) by any other person; and

21.1.5 Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

21.2 Certificates of Insurance acceptable to the OWNER shall be filed with the OWNER prior to commencement of the WORK. These Certificates shall contain a provision that coverages afforded under the policies will not be cancelled unless at least fifteen (15) days prior WRITTEN NOTICE has been given to the OWNER.

21.3 The CONTRACTOR shall procure and maintain, at his own expense, during the CONTRACT TIME, liability insurance as hereinafter specified:

21.3.1 CONTRACTOR'S General Public Liability and Property Damage Insurance including vehicle coverage issued to the CONTRACTOR and protecting him from all claims for personal injury, including death, and all claims for destruction of or damage to property, arising out of or in connection with any

operations under the CONTRACT DOCUMENTS, whether such operations be by himself or by any SUBCONTRACTOR under him, or anyone directly or indirectly employed by the CONTRACTOR or by a SUBCONTRACTOR under him. Insurance shall be written with a limit of liability of not less than \$500,000 for all damages arising out of bodily injury, including death, at any time resulting therefrom, sustained by any one person in any one accident; and a limit of liability of not less than \$500,000 aggregate for any such damages sustained by two or more persons in any one accident. Insurance shall be written with a limit of liability of not less than \$200,000 for all property damage sustained by any one person in any one accident; and a limit of liability of not less than \$200,000 aggregate for any such damage sustained by two or more persons in any one accident.

21.3.2 The CONTRACTOR shall acquire and maintain, if applicable, Fire and Extended Coverage insurance upon the PROJECT to the full insurable value thereof for the benefit of the OWNER, the CONTRACTOR, and SUBCONTRACTORS as their interest may appear. This provision shall in no way release the CONTRACTOR or CONTRACTOR'S surety from obligations under the CONTRACT DOCUMENTS to fully complete the PROJECT.

21.4 The CONTRACTOR shall procure and maintain, at his own expense, during the CONTRACT TIME, in accordance with the provisions of the laws of the state in which the work is performed, Workmen's Compensation Insurance, including occupational disease provisions, for all of his employees at the site of the PROJECT and in case any work is sublet, the CONTRACTOR shall require such SUBCONTRACTOR similarly to provide Workmen's Compensation Insurance, including occupational disease provisions for all of the latter's employees unless such employees are covered by the protection afforded by the CONTRACTOR. In case any class of employees engaged in hazardous work under this contract at the site of the PROJECT is not protected under Workmen's Compensation statute, the CONTRACTOR shall provide, and shall cause each SUBCONTRACTOR to provide, adequate and suitable insurance for the protection of his employees not otherwise protected.

21.5 The CONTRACTOR shall secure, if applicable, "All Risk" type Builder's Risk Insurance for WORK to be performed. Unless specifically authorized by the OWNER, the amount of such insurance shall not be less than the CONTRACT PRICE totaled in the BID. The policy shall cover not less than the losses due to fire, explosion, hail, lightning, vandalism, malicious mischief, wind, collapse, riot, aircraft, and smoke during the CONTRACT TIME, and until the WORK is accepted by the OWNER. The policy shall name as the insured the CONTRACTOR, the ENGINEER, and the OWNER.

22. CONTRACT SECURITY

22.1 The CONTRACTOR shall within ten (10) days after the receipt of the NOTICE OF AWARD furnish the OWNER with a Performance Bond and a Payment Bond in penal sums equal to the amount of the CONTRACT PRICE, conditioned upon the performance by

the CONTRACTOR of all undertakings, covenants, terms, conditions and agreements of the CONTRACT DOCUMENTS, and upon the prompt payment by the CONTRACTOR to all persons supplying labor and materials in the prosecution of the WORK provided by the CONTRACT DOCUMENTS. Such BONDS shall be executed by the CONTRACTOR and a corporate bonding company licensed to transact such business in the state in which the WORK is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these BONDS shall be borne by the CONTRACTOR. If at any time a surety on any such BOND is declared a bankrupt or loses its right to do business in the state in which the WORK is to be performed or is removed from the list of Surety Companies accepted on Federal BONDS, CONTRACTOR shall within ten (10) days after notice from the OWNER to do so, substitute an acceptable BOND (or BONDS) in such form and sum and signed by such other surety or sureties as may be satisfactory to the OWNER. The premiums on such BOND shall be paid by the CONTRACTOR. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable BOND to the OWNER.

22. ASSIGNMENTS

22.1 Neither the CONTRACTOR nor the OWNER shall sell, transfer, assign or otherwise dispose of the Contract or any portion thereof, or of his right, title or interest therein, or his obligations thereunder, without written consent of the other party.

24. INDEMNIFICATION

24.1 The CONTRACTOR will indemnify and hold harmless the OWNER and the ENGINEER and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the WORK, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the CONTRACTOR, and SUBCONTRACTOR, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

24.2 In any and all claims against the OWNER or the ENGINEER, or any of their agents or employees, by any employee of the CONTRACTOR, any SUBCONTRACTOR, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR or any SUBCONTRACTOR under workmen's compensation acts, disability benefit acts or other employee benefits acts.

24.3 The obligation of the CONTRACTOR under this paragraph shall not extend to the liability of the ENGINEER, his agents or employees arising out of the preparation or approval of maps, DRAWINGS, opinions, reports, surveys, CHANGE ORDERS, designs or SPECIFICATIONS.

25. SEPARATE CONTRACTS

25.1 The OWNER reserves the right to let other con-

tracts in connection with this PROJECT. The CONTRACTOR shall afford other CONTRACTORS reasonable opportunity for the introduction and storage of their materials and the execution of their WORK, and shall properly connect and coordinate his WORK with theirs. If the proper execution or results of any part of the CONTRACTOR'S WORK depends upon the WORK of any other CONTRACTOR, the CONTRACTOR shall inspect and promptly report to the ENGINEER any defects in such WORK that render it unsuitable for such proper execution and results.

25.2 The OWNER may perform additional WORK related to the PROJECT by himself, or he may let other contracts containing provisions similar to these. The CONTRACTOR will afford the other CONTRACTORS who are parties to such Contracts (or the OWNER, if he is performing the additional WORK himself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of WORK, and shall properly connect and coordinate his WORK with theirs.

25.3 If the performance of additional WORK by other CONTRACTORS or the OWNER is not noted in the CONTRACT DOCUMENTS prior to the execution of the CONTRACT, written notice thereof shall be given to the CONTRACTOR prior to starting any such additional WORK. If the CONTRACTOR believes that the performance of such additional WORK by the OWNER or others involves him in additional expense or entitles him to an extension of the CONTRACT TIME, he may make a claim therefor as provided in Sections 14 and 15.

26. SUBCONTRACTING

26.1 The CONTRACTOR may utilize the services of specialty SUBCONTRACTORS on those parts of the WORK which, under normal contracting practices, are performed by specialty SUBCONTRACTORS.

26.2 The CONTRACTOR shall not award WORK to SUBCONTRACTOR(s), in excess of fifty (50%) percent of the CONTRACT PRICE, without prior written approval of the OWNER.

26.3 The CONTRACTOR shall be fully responsible to the OWNER for the acts and omissions of his SUBCONTRACTORS, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

26.4 The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the WORK to bind SUBCONTRACTORS to the CONTRACTOR by the terms of the CONTRACT DOCUMENTS insofar as applicable to the WORK of SUBCONTRACTORS and to give the CONTRACTOR the same power as regards terminating any subcontract that the OWNER may exercise over the CONTRACTOR under any provision of the CONTRACT DOCUMENTS.

26.5 Nothing contained in this CONTRACT shall create any contractual relation between any SUBCONTRACTOR and the OWNER.

27. ENGINEER'S AUTHORITY

27.1 The ENGINEER shall act as the OWNER'S representative during the construction period. He shall decide questions which may arise as to quality and acceptability of materials furnished and WORK performed. He shall interpret the intent of the CONTRACT DOCUMENTS in a fair and unbiased manner. The

ENGINEER will make visits to the site and determine if the WORK is proceeding in accordance with the CONTRACT DOCUMENTS.

27.2 The CONTRACTOR will be held strictly to the intent of the CONTRACT DOCUMENTS in regard to the quality of materials, workmanship and execution of the WORK. Inspections may be made at the factory or fabrication plant of the source of material supply.

27.3 The ENGINEER will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.

27.4 The ENGINEER shall promptly make decisions relative to interpretation of the CONTRACT DOCUMENTS.

28. LAND AND RIGHTS-OF-WAY

28.1 Prior to issuance of NOTICE TO PROCEED, the OWNER shall obtain all land and rights-of-way necessary for carrying out and for the completion of the WORK to be performed pursuant to the CONTRACT DOCUMENTS, unless otherwise mutually agreed.

28.2 The OWNER shall provide to the CONTRACTOR information which delineates and describes the lands owned and rights-of-way acquired.

28.3 The CONTRACTOR shall provide at his own expense and without liability to the OWNER any additional land and access thereto that the CONTRACTOR may desire for temporary construction facilities, or for storage of materials.

29. GUARANTEE

29.1 The CONTRACTOR shall guarantee all materials and equipment furnished and WORK performed for a period of one (1) year from the date of SUBSTANTIAL COMPLETION. The CONTRACTOR warrants and guarantees for a period of one (1) year from the date of SUBSTANTIAL COMPLETION of the system that the completed system is free from all defects due to faulty materials or workmanship and the CONTRACTOR shall promptly make such corrections as may be

necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. The OWNER will give notice of observed defects with reasonable promptness. In the event that the CONTRACTOR should fail to make such repairs, adjustments, or other WORK that may be made necessary by such defects, the OWNER may do so and charge the CONTRACTOR the cost thereby incurred. The Performance BOND shall remain in full force and effect through the guarantee period.

30. ARBITRATION

30.1 All claims, disputes and other matters in question arising out of, or relating to, the CONTRACT DOCUMENTS or the breach thereof, except for claims which have been waived by the making and acceptance of final payment as provided by Section 20, shall be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association. This agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgment may be entered upon it in any court having jurisdiction thereof.

30.2 Notice of the demand for arbitration shall be filed in writing with the other party to the CONTRACT DOCUMENTS and with the American Arbitration Association, and a copy shall be filed with the ENGINEER. Demand for arbitration shall in no event be made on any claim, dispute or other matter in question which would be barred by the applicable statute of limitations.

30.3 The CONTRACTOR will carry on the WORK and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

31. TAXES

31.1 The CONTRACTOR will pay all sales, consumer, use and other similar taxes required by the law of the place where the WORK is performed.

ADDITIONAL CONDITIONS

- 1.0 Engineer
- 2.0 Contractor
- 3.0 Separate Contracts
- 4.0 Miscellaneous Provisions
- 5.0 Payments and Completion
- 6.0 Correction of Work
- 7.0 Historical and Archaeological Preservation
- 8.0 Williams-Steiger Occupational Safety and Health Act of 1970
- 9.0 Drawings and Specifications at the Site
- 10.0 Insurance
- 11.0 Contractor's Excise Tax
- 12.0 Indemnification
- 13.0 Liquidated Damages
- 14.0 Enumeration of the Drawings, Project Manual and Addenda

REVISED 3-1-95

ADDITIONAL CONDITIONS

1.0 ENGINEER

1.1 Nothing contained in the Contract Documents shall create any contractual relationship between the Engineer and the Contractor.

1.2 The Engineer will make periodic visits to the site to familiarize himself generally with the progress and quality of the Work and to determine in general if the Work is proceeding in accord with the Contract Documents. On the basis of his onsite observations as an Engineer, he will keep the Owner informed of the progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work of the Contractor. The Engineer will not be required to make exhaustive or continuous onsite inspections to check the quality or quantity of the Work. The Engineer will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and he will not be responsible for the Contractor's failure to carry out the Work in accord with the Contract Documents.

1.3 Based on such observations and the Contractor's Applications for Payment, the Engineer will determine the amounts owing to the Contractor, and will issue Certificates for Payment in such amounts as provided by the General Conditions.

1.4 Claims, disputes, and other matters in question between the Contractor and the Owner, relating to the execution or progress of the Work or the interpretation of the Contract Documents, shall be referred initially to the Engineer for decision which he will render in writing within a reasonable time.

2.0 CONTRACTOR

2.1 WARRANTY. The Contractor warrants to the Owner and the Engineer that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not conforming to these standards may be considered defective. If required by the Engineer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

2.2 USE OF SITE

2.2.1 The Contractor shall confine operations at the site to areas contained within the construction limits shown on the Drawings.

2.2.2 The entire Work to be performed under the Contract for this improvement is to be at the Contractor's risk, and he is to assume the responsibilities for all damages to the work or to contiguous property. The Contractor shall have charge of, and be responsible for, the entire improvement until its completion and acceptance. It shall be his responsibility to maintain all states of work in a safe and suitable condition at all times, including nights, weekends, and holidays. The Contractor shall make observations of his work during such periods as are necessary to insure proper care of the work. He shall be liable for any defects which may appear, or be discovered, on his work prior to the termination of the guarantee period.

2.3 CUTTING AND PATCHING OF WORK. The Contractor shall do all cutting, fitting, or patching of his Work that may be required to make its several parts fit together properly, and shall not endanger any Work by cutting, excavating, or otherwise altering the Work or any part of it.

2.4 CLEANING UP.

a. The Contractor, at all times, shall keep the premises free from the accumulation of waste materials or rubbish caused by his operations. At the completion of the Work, he shall remove all his waste materials and rubbish from, and about, the Project as well as all his tools, construction equipment, machinery, and surplus materials, except as otherwise specified.

b. If the Contractor fails to clean up, the Owner may do so and the cost thereof shall be charged to the Contractor.

2.5 COMMUNICATIONS

2.5.1 The Contractor shall forward all communications to the Owner through the Engineer.

2.5.2 The Contractor shall designate one person who shall have charge of the job and to whom the Engineer shall give directions. If any person employed on the Work shall refuse or neglect to obey the directions of the Engineer or his duly authorized representative in anything relating to the Work, or shall appear to be incompetent, disorderly, or unfaithful he shall, upon the request of the Engineer, be at once discharged and not again employed upon any part of the Work.

2.6 SUPERVISION BY CONTRACTOR. In addition to the requirements established in Paragraph 12.1 of the General Conditions, the Contractor shall provide a superintendent on the Project whose experience shall consist of having been assistant superintendent on at least five projects of similar nature to this Project and two projects as superintendent on projects of similar nature. The superintendent shall be on the jobsite to direct and coordinate the work of his workmen and Subcontractors.

3.0 SEPARATE CONTRACTS

3.1 MUTUAL RESPONSIBILITY OF CONTRACTORS

3.1.1 The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and properly coordinate his Work with theirs.

3.1.2 If any part of the Contractor's work depends for proper execution or results upon the work of any other separate Contractor, the Contractor shall inspect and promptly report to the Engineer any apparent discrepancies or defects in such work that render it unsuitable for such proper execution and results. Failure of the Contractor to inspect and report shall constitute an acceptance of the other Contractor's work as fit and proper to receive his Work, except as to defects which may develop in the other separate Contractor's work after the execution of the Contractor's Work.

3.1.3 Should the Contractor cause damage to the work or property of any separate Contractor on the Project, the Contractor shall, upon due notice, settle with such other Contractor by agreement or arbitration, if he will settle. If such separate Contractor sues the Owner or initiates an arbitration proceeding on account of any damage alleged to have been so sustained, the Owner shall notify the Contractor who shall defend such proceedings at the Owner's expense, and, if any judgment or award against the Owner arises therefrom, the Contractor shall pay or satisfy it, and shall reimburse the Owner for all attorneys' fees and court or arbitration costs which the Owner has incurred.

3.2 CUTTING AND PATCHING UNDER SEPARATE CONTRACTS

3.2.1 The Contractor shall be responsible for any cutting, fitting, and patching that may be required to complete his Work except as otherwise specifically provided in the Contract Documents. The Contractor shall not endanger any work of any other Contractors by cutting, excavating, or otherwise altering any work, and shall not cut or alter the work of any other Contractor except with the written consent of the Engineer.

3.2.2 Any costs caused by defective or ill-timed work shall be borne by the party responsible therefor.

3.3 OWNER'S RIGHT TO CLEAN UP

3.3.1 If any dispute arises between the separate Contractors as to their responsibility for cleaning up, the Owner may clean up and charge the cost thereof to the several Contractors as the Engineer shall determine to be just.

4.0 MISCELLANEOUS PROVISIONS

4.1 WRITTEN NOTICE

4.1.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of a firm, or to an officer of the corporation for whom it was intended, or if delivered at, or sent by, registered or certified mail to the last business address known to him who gives the notice.

4.2 CLAIMS FOR DAMAGES

4.2.1 Should either party to the Contract suffer injury or damage to person or property because of any act of omission of the other party or of any of his employees, agents, or others for whose acts he is legally liable, claim shall be made in writing to such other party within a twenty-four (24) hours after the first observance of such injury or damage. If either party to the contract is able to anticipate damages he shall notify the other party seven (7) days before proceeding with the work. The purpose of the notice is to give the party time to remedy any damage if desired before the other party is damaged.

4.3 RIGHTS AND REMEDIES

4.3.1 The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to, and not a limitation of, any duties, obligations, rights, and remedies otherwise imposed or available by law.

4.4 ABNORMAL OR UNREASONABLE WEATHER is weather that exceeds the previous five year average conditions. If a contractor requests an extension of time due to abnormal or unreasonable weather, the contractor shall provide documentation of the previous five years of weather conditions for the same month as the alleged condition causing delay and a written comparison of the five year historical conditions versus the current month condition. All requests for extension due to weather are to be made on the day of the event.

5.0 PAYMENTS AND COMPLETION

5.1 PROGRESS PAYMENTS

5.1.1 The Contractor warrants and guarantees that title to all Work, materials, and equipment covered by an Application for Payment, whether incorporated in the Project or not, will pass to the Owner upon the receipt of such payment by the Contractor, free and clear of all liens, claims, security interests, or encumbrances, hereinafter referred to in this Article 5 as "liens"; and that no Work, materials, or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing the work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein, or an encumbrance thereon, is retained by the seller or otherwise imposed by the Contractor or such other person.

5.1.2 The Contractor shall submit, with each Application for Payment, copies of all invoices, bills, and/or other supporting data for materials and equipment delivered and suitably stored for materials and equipment delivered and suitably stored but not incorporated in the work for which he is seeking partial payment. If requested by the Owner, the Contractor shall provide a record of payment for materials either stored or used on the project.

5.1.3 PAYMENT. Upon certification by the Engineer, the Owner shall pay to the contractor, on account of the Contract, ninety percent (90%) of the value of labor and materials incorporated in the work and ninety percent (90%) of materials suitably stored in accord with Subparagraph 19 of the General Conditions.

5.2 CERTIFICATES FOR PAYMENT

5.2.1 The issuance of a Certificate for Payment will constitute a representation by the Engineer to the Owner, based on his observations at the site as provided in Subparagraph 1.2 and the data comprising the Application for Payment, that the Work has progressed to the point indicated; that, to the best of his knowledge, information, and belief, the quality of the Work is in accord with the Contract Documents (subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to the results of any subsequent tests required by the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and to any specific qualifications stated in his Certificate); and that the Contractor is entitled to payment in the amount certified. In addition, the Engineer's final Certificate for Payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment have been fulfilled. However, by issuing a Certificate for Payment, the Engineer shall not thereby be deemed to represent that he has made exhaustive or continuous onsite inspections to check the quality or quantity of the Work, or that he has reviewed the construction means, methods, techniques, sequences, or procedures, or that he has made any examination to ascertain how, or for what purpose, the Contractor has used the moneys previously paid on account of the Contract Sum.

5.2.2 No certificate for a progress payment, nor any progress payment, nor any partial or entire use or occupancy of the Project by the Owner, shall constitute an acceptance of any Work not in accord with the Contract Documents.

5.3 FINAL QUANTITIES

5.3.1 The Owner reserves the right to increase or decrease, within reasonable limits, any of the quantities shown. The term "reasonable limits" shall mean a twenty-five percent (25%) increase or decrease in the quantities on any one Contract item. In the event the actual quantities differ more than the reasonable limits, an equitable revision of the Unit Price shall be made when requested by either the Owner or the Contractor.

6.0 CORRECTION OF WORK

6.1.1 The Contractor shall promptly correct Work rejected by the Engineer or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected Work, including additional testing and inspections and compensation for the Engineer's services and expenses made necessary thereby.

6.1.2 If, within one year after the Date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Paragraph 29 of the General Conditions, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. This period of one year shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. This obligation under this Subparagraph 6.1.2 shall survive acceptance of the Work under the Contract and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

6.1.3 The Contractor shall remove from the site all portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

6.1.4 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it and charge the Contractor for all costs and services made necessary by such default, neglect or failure. If the Contractor does not proceed with correction of such nonconforming Work within a reasonable time fixed by written notice from the Engineer, the Owner may remove it and store the salvable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten days after written notice, the Owner may upon ten additional days' written notice sell such materials and equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Engineer's services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Sum shall be reduced by the deficiency. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

6.1.5 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

6.1.6 Nothing contained in this Paragraph 6.0 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the time period of one year as described in Subparagraph 6.1.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

6.2 ACCEPTANCE OF DEFECTIVE OR NONCONFORMING WORK

6.2.1 If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not Final Payment has been made.

7.0 HISTORICAL AND ARCHAEOLOGICAL PRESERVATION

7.0.1 If, during the course of construction, evidence of deposits of historical or archaeological interest is found, the Contractor shall cease operations affecting the find, and shall notify the Owner who shall notify the Engineer. No further disturbance of the deposits shall ensue until the Contractor has been notified by the Owner that he may proceed. The Owner will issue a Notice to Proceed only after the State Official has surveyed the find and made a determination of value and effect and submitted such determination to the Owner.

8.0 WILLIAMS-STEIGER OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

8.0.1 The Contract is subject to the provisions of the Williams-Steiger Occupational Safety and Health Act of 1970.

These Contract Documents and the joint and several phases of construction hereby contemplated are to be governed, at all times, by applicable provisions of the Federal law(s), including, but not limited to, the latest amendments of the following:

Williams-Steiger Occupational Safety and Health Act of 1970 Public Law 94-596

Part 1910 - Occupational Safety and Health Standards,
Chapter XVII of Title 29, Code of Federal Regulations

Part 1925 - Safety and Health Regulations for Construction,
Chapter XVII of Title 29, Code of Federal Regulations

9.0 DRAWINGS AND SPECIFICATIONS AT THE SITE

9.0.1 The Contractor shall maintain at the site, for the Engineer, one copy of all Drawings, Specifications, Addenda, approved shop drawings, Change Orders, and other modifications, in good order, and marked to record all changes made during construction. These shall be available to the Engineer. The Drawings, marked to record all changes made during construction, shall be delivered to him upon completion of the Work.

10.0 INSURANCE

10.1 In addition to the insurance requirements listed in Section 21 of the General Conditions, the Contractor shall provide the following insurance:

<u>TYPE INSURANCE</u>	<u>MINIMUM LIMITS</u>
(1) Workmen's Compensation	Statutory Limits
Employer's Liability	\$500,000 each accident \$500,000 disease-policy limit \$500,000 disease-each employee
(2) Contractor's Bodily Injury and Property Damage combined, including products and completed operation coverage, with contrac- tual liability endorsement to cover Contractor's indemnity obligations.	\$1,000,000 combined single limit (CSL)
(3) Automobile Bodily Injury and Property Damage and Liability Combined	\$1,000,000 combined single limit (CSL)
(4) Builders Risk Coverage to protect the Contractor and the Owner from all insurable risks of physical loss or damage to materials and equipment while in warehouse or storage areas, during transportation, during installation, during testing, and after the work is completed, until such a time as the work has been turned over to and accepted by the Owner in its entirety. It shall be of the "all risks" type, with coverage's designed for circumstances which may occur in the particular work included in this Contract Agreement. The coverage shall be for an amount not less than	\$ value of contract

the value of the work at completion. The value shall include the aggregate value of the Owner's - furnished equipment and materials, if any, to be erected or installed by the Contractor and subcontractors.

Builders Risk Insurance shall provide for losses to be payable to the Contractor and the Owner as their interests may appear and shall contain a waiver of subrogation rights against the insured.

Such insurance required and described in the foregoing paragraphs shall be on an "occurrence" basis and shall be maintained in full force and effect throughout the entire term and scope of this Contract. The required policies, with the exception of Worker's Compensation coverage's, shall name the Owner, its employees and public officials as ADDITIONAL INSUREDS as respects operations of the Contractor within the scope of this agreement.

Prior to the commencement of the work, the Contractor shall submit to the Owner a current and valid Certificate of Insurance, and policies if so requested, exhibiting all required coverage's, all in full force and effect, and such Certificate(s) shall designate the Owner as Certificate holder and Additional Insured. Further, the Certificate(s) shall contain a provision that no cancellation or material changes in the policies shall take place except upon thirty (30) days written notice to the Owner.

Should the Owner permit the Contractor to sublet or subcontract any portion of the work that would permit others, including but not limited to subcontractors, subcontractor's employees, assignees, (third parties) to Owner or Contractor, then such subcontractor or third party shall be required to maintain the same insurance coverage's as set forth in this section and provide evidence of such insurance coverage's and minimum set limits prior to the commencement of the work.

11.0 CONTRACTOR'S EXCISE TAX

11.0.1 Contractor shall include State of South Dakota excise tax in his bid and shall provide the Owner with a letter from the South Dakota Department of Revenue that all excise tax is paid before receipt of final payment.

12.0 INDEMNIFICATION

12.0.1 The Contractor shall delete the General Conditions paragraph 24, Indemnification and provide indemnification in accordance with the following:

INDEMNIFICATION PROVISION. The Contractor shall, and hereby does indemnify, protect and hold harmless the Owner and the Engineer from and against any and all liability and all loss, damage, and expense, including judgments, costs, and attorneys' fees by reason of injuries to or death of any person or persons, expressly including therein employees of the Contractor, or loss of or damage to their property or that of any firm, association or corporation, however the same shall occur or be caused and whether the same shall occur or be caused by the negligence of the Owner, or its employees and agents, or otherwise, or by reason of claims of any and every character whatsoever in any manner resulting from, arising out of, or connected with said work, or undertaking, or acts or omissions of the Contractor, or of any subcontractor hereunder, or of the Owner, or its employees and agents, whether such acts or omissions be claimed to be negligent or not, except that the foregoing indemnification provision shall not cover the sole negligence of the Owner.

The Contractor shall promptly pay all wages due its employees and secure all licenses and permits required by law and shall comply with any and all federal, state and municipal laws and ordinances, and any valid rule or regulation of any legally constituted authority, and shall indemnify and protect the Company against all liability, loss, damage or expense arising from any violation by the Contractor of any such federal, state, or municipal law or ordinance, or any valid rule or regulation of any legally constituted authority.

13.0 LIQUIDATED DAMAGES

13.0.1 The Owner will suffer damage if the project is not substantially completed in the contract period set forth in these bidding documents. Should the Contractor fail to substantially complete the work to the point the work is usable within the allotted contract period (or such later date that may result from extension of time guaranteed by the Owner). The Contractor shall pay the Owner, as liquidated damages, the sum of \$100.00 for each consecutive working day that the terms of the contract remain unfulfilled beyond the date allowed by the contract, which sum is agreed upon as reasonable, which the Owner will sustain per day by the failure of the Contractor to complete work within the time as stipulated; it being recognized by the Owner and the Contractor that the injury to the Owner which could result from the failure of the Contractor to substantially complete on schedule is uncertain and cannot be construed as a penalty on the Contractor.

For each consecutive calendar day that the contract remains incomplete, beyond the contract period provided in the contract documents, the Owner will retain compensation otherwise to be paid to the Contractor the amount of \$25.00. This amount is the minimum amount of damages the Owner will sustain by failure of the Contractor to complete all remedial work, deficient work, clean up the project, complete the paper work required in these contract documents, and other miscellaneous tasks as required to complete all work specified herein. This amount is in addition in lieu of the liquidated damages described above and is applied to contract working days between substantial completion and completion of all contract items.

14.0 ENUMERATION OF THE DRAWINGS, PROJECT MANUAL AND ADDENDA

14.0.1 Following are the Drawings and Project Manual which form a part of this Contract as set forth in Subparagraph 1.7 of the General Conditions:

Drawing Sheets

Project Manual

Addenda

DIVISION 1

GENERAL REQUIREMENTS

	Pages
Section 01010 Summary of the Work.....	1; 2
Section 01150 Project Meetings.....	1
Section 01200 Progress and Payment.....	1
Section 01300 Submittals.....	1
Section 01400 Testing Laboratory Services.....	1
Section 01500 Temporary Facilities.....	1; 3
Section 01600 Material and Equipment.....	1
Section 01700 Project Closeout.....	1

SECTION 01010

SUMMARY OF THE WORK

1.0 WORK UNDER THIS CONTRACT Includes all material, labor, tools, expendable equipment, utility and transportation services, and all incidental items necessary to perform and complete, in a workmanlike manner, the Work required for the General Construction for City of North Sioux City New Well Project on Watier Street.

2.0 WORK ON WEEKENDS, HOLIDAYS AND DURING SPECIAL EVENTS. Except for strictly emergency work, or for protection of property or work required by these Specifications, no work shall be performed on weekends or holidays without permission from the Engineer. The intent of this requirement is that the public or any individuals shall not be unduly disturbed by the construction operations on the said days.

3.0 ITEMS TO BE REMOVED BY THE CONTRACTOR BUT TO REMAIN THE PROPERTY OF THE OWNER include the following:

All removal items shall become the property of the City of North Sioux City.

4.0 GIVE AT LEAST A FORTY-EIGHT-HOUR NOTICE to the following, and other involved agencies, before commencing work and cooperate with the utility owners while performing the work:

Electric Company - MidAmerican Energy
Gas Company - MidAmerican Energy
Telephone Company - Northwestern Bell Telephone/Sprint/AT & T
Water and Sewer - City of North Sioux City
Fiber Optics - AT & T
Cable TV - Cable One

5.0 BOUNDARIES AND RIGHTS-OF-WAY

5.1 RIGHTS-OF-WAY necessary for construction of the Project will be provided by the Owner. The Contractor shall confine his construction operations to the immediate vicinity of the location shown on the Drawings, or as required by permit or easement, and shall use due care in placing construction tools, equipment, excavated materials, and pipe line materials and supplies so as to cause the least possible damage to property and interference with traffic.

5.2 THE CONTRACTOR shall be responsible for damage to property outside the boundaries of the construction limits, and shall make satisfactory settlement for such damage directly with the property owner and tenant involved as their interests in such damage may require.

5.3 IF IT IS NECESSARY OR DESIRABLE to use or occupy land outside of the construction limits, obtain written consent from, or execute a written agreement with, the owner and tenant of such land permitting such occupation; do not enter for pipe delivery, or occupy for any other purposes, with men, tools, equipment, construction materials, or materials excavated from the pipe trench, any private property outside the designated construction limit boundaries without such written permission from the owner and tenant of the entered or occupied property.

SECTION 01150

PROJECT MEETINGS

1.0 PRECONSTRUCTION CONFERENCE. The General Contractor shall attend a pre-construction conference to discuss and clarify contract administration procedures, and requirements under which the construction operation is to proceed. Representatives of the Owner and the Engineer will also attend. The Engineer will notify the General Contractor of the date, time, and location of the conference.

SECTION 01200
PROGRESS AND PAYMENT

1.0 SUBMIT APPLICATION FOR PAYMENT to the Engineer on the twenty-fifth (25th) day of each month for Work completed and material stored up to five (5) days prior to the day on which the Application for Payment is submitted. Submit three (3) copies of Applications for Payment on forms provided by the Engineer along with supporting data required in Section 01300, Submittals.

2.0 PAYMENT Upon certification by the Engineer, the Owner shall pay to the contractor, on account of the Contract, ninety percent (90%) of the value of labor and materials incorporated in the work and ninety percent (90%) of materials suitably stored in accord with Subparagraph 19 of the General Conditions.

3.0 FINAL PAYMENT. After Final Completion of any Project Contract, and upon receipt of the project close-out documents required in Section 01400 and upon certification of the Engineer, the Owner shall pay the Contractor the entire balance of the Contract Sum applicable to that Project Contract.

4.0 STORED MATERIALS. With each Application for Payment, submit copies of all invoices, bills, or other supporting data for partial payment of materials, and equipment delivered and suitably stored, but not incorporated in the Work. Also, submit a tabulation form showing previous stored materials, new materials added since the last Application, materials used since the last Application, and materials on the site in this Application.

5.0 BID AND UNIT PRICE FOR ALL UTILITIES shall include mechanical tamping of trenches to a density specified herein.

6.0 BASIS AND MEASUREMENTS FOR PAYMENT

6.1 TAKE MEASUREMENTS with the assistance of the Engineer or his representative.

6.2 MEASURE OF UNIT PRICE QUANTITIES

- .1 Well screen shall be measured from the bottom of the screen to the top of the connection at the well casing. Unit Price shall include screen, screen coupling for multiple sections of screen, and couplings for the well casing connection.
- .2 Drop pipe shall be measured on a lineal foot basis from the top of the pump to the bottom of the reducer. The Unit Price shall include the cost of the material and labor for the drop pipe, couplings, and air lines for drawdown testing. Adjustment for the drop pipe quantity shall be based on the final pump settings. The Unit Price shall be adjustment for related items whose quantities are affected by the pump setting.

- .3 Drilled well hole shall be measured on a vertical foot basis from the bottom of the drill hole to the existing ground surface. Unit Price will include all grouting, gravel pack filler and all labor required to fill the annular space between the casing and bore hole which is not included in the other unit prices. The Unit Price shall include all labor required to fill the annular space between the casing and bore hole. The Unit Price shall include the labor and material required to drill the well hole to the depth and diameter on the drawings.
- .4 Steel casing shall be measured on a vertical foot basis from the top of the well screen connector to the bottom of the pitless adapter. The Unit Price shall include all labor and materials necessary for installation of the well casing.
- .5 Pitless adapter and appurtenances shall be measured on a lump sum basis, which shall be for all labor and material as required to provide the air relief, swing check valve, meter, gate valve, miscellaneous piping, manhole and other miscellaneous mechanical appurtenances as specified and shown on the Drawings.
- .6 Grout seal/backfill shall be measured on a vertical foot basis from the top of the gravel pack to the bottom of the pitless adapter. The ten-foot clay seal shall be included in the grout backfill Unit Price. The Unit Price will include all grout and all labor required to fill the annular space between the casing and the bore hole.
- .7 Gravel pack shall be measured on a vertical foot basis from the bottom of bore hole to the bottom of grout seal/backfill. The Unit Price shall include all gravel pack and all labor required to fill the annular space between the casing or screen and the bore hole.
- .8 Submersible pump and motor shall be measured on a lump sum basis which shall include the submersible pump, motor, and appurtenances as required to make and operational unit.
- .9 Test Well Pumping Unit Price shall be full payment for providing the test pumping on the well as specified herein. The well pumping shall be measured as per one each for each well. If the test pumping is terminated prior to the specified 24 hours the amount of payment will be proportional to the Test Well Pumping Unit Price based on the number of hours of actual test pumping divided by the specified 24 hour test period.
- .10 Sampling Well Unit Price shall be full payment for sampling the wells in bottles supplied by the Owner in accordance with these specifications. The Sampling Well Unit Price shall be measured as per one each for each well.
- .11 Drop cable shall be measured on a vertical foot basis from the top of the pump to junction box in the pitless adapter. The Unit Price shall include the cost of material and labor for the drop pipe, attachment of drop cable to the column pipe.

- .12 Backfill and Abandonment of Existing Test Well Unit Price shall be total payment for abandonment of each existing test well in accordance with the Well Construction Standards – State of South Dakota.
- .13 Mobilization/Demobilization Unit Price shall be full payment for transportation of all equipment to the area of the drilling and the transportation of all equipment away from the area of the well hole. Only one mobilization/demobilization charge will be allowed irregardless of the number of wells drilled. The mobilization/demobilization charges shall include the time interval between completion of the well and the beginning of subsequent wells which shall be sufficiently long to complete the pumping and sampling.
- .14 GATE VALVE AND BOX Unit Price and Contract Price shall include furnishing and installation of the gate valve, valve box, and support block.
- .15 FIRE HYDRANT for water branch line connection. The Unit Bid Price for the fire hydrants shall include the auxiliary 6-inch gate valve and box, hydrant, tee and concrete thrust blocks behind the tee in the main line and behind the hydrant, and all appurtenances including the 6-inch hydrant branch line.
- .16 REDUCER Unit Price shall be for the reducer in the well drop pipe, and shall be complete payment for the reducer material and labor of installation.
- .17 PIPE AND INCIDENTAL Unit Price shall be complete payment for all piping and other materials and labor as shown on the Drawings or specified in the project manual but for which a bid item is not shown.
- .18 SEEDING Square Yard Unit Price shall be considered full compensation for seedbed preparation, seeding fertilizing, mulching, and other work incidental to completion of the work. Seeding quantity shall be measured on the surface and computed using recognized geometric figures.
19. TEST WELL DRILLING Unit Price shall be full payment for drilling of test hole, including casing if, necessary, sampling of the formation, and sieve analysis of the formation samples.

SECTION 01300

SUBMITTALS

1.0 SUBMITTALS SPECIFIED IN OTHER SECTIONS are as follows:

General Conditions

Applications for Payment _____
Consent of Surety to Reduction in or Partial Release of Retainage
Consent of Surety Company to Final Payment
Contractor's Affidavit of Payment of Debts and Claims
Contractor's Affidavit of Release of Liens
Waivers of Liens

Section 01400

Test Reports

Section 01700

Photocopy of South Dakota Sales and Excise Tax License

2.0 AIA DOCUMENTS which are required for submittals in this or other Sections of these Specifications may be obtained from

Nebraska Society of Architects
1910 South 44th Street
Omaha, Nebraska 68105
402/472-1456

3.0 SUBMIT PROGRESS SCHEDULE as required by Paragraph 4.10 of the General Conditions.

4.0 SUBMIT A LIST OF SUBCONTRACTORS AND MATERIAL SUPPLIERS as required by Paragraph 5.2 of the General Conditions.

5.0 SUBMIT A CERTIFICATE OF INSURANCE to the Owner as required by Subparagraph 11.1.4 of the General Conditions.

6.0 SUBMIT SHOP DRAWINGS AND PRODUCT DATA to the Engineer within thirty (30) days after the date of the Contract, as follows:

Fittings	Well Screens
Watermain	Well Casing
Pumps	Motor
Valves	

SECTION 01400

TESTING LABORATORY SERVICES

1.0 TESTING LABORATORY for testing hereinafter specified shall be selected by the Engineer.

2.0 NOTIFICATION OF TESTING LABORATORY that materials are ready for sampling shall be made by the Contractor. In the case of soils testing, such notification shall be made at least three (3) days in advance.

3.0 SAMPLING shall be made by the testing laboratory's authorized representative. The location from which the sample was taken shall be noted on the Test Report.

4.0 REPORTS shall be made in triplicate directly to the Engineer with a copy sent directly to the Contractor and the Owner.

5.0 PAYMENTS shall be made for testing by the Owner. Retesting costs will be the expense of the Contractor.

6.0 PATCHING, if required by the taking of samples, shall be made by the Contractor.

7.0 TESTS ARE SPECIFIED in the following Section:

02713 Water Distribution AND Disinfection Reports

SECTION 01500

TEMPORARY FACILITIES

1.0 WATER shall be furnished by the Contractor as may be needed for the entire prosecution of the Work. The Contractor may receive water at no cost from the Owner through a hydrant connection selected by the Owner.

2.0 TEMPORARY POWER shall be provided throughout the construction period by the Contractor.

3.0 SANITARY CONVENIENCES for use of all persons employed on the Work will be provided and maintained by the Contractor.

4.0 COLD WEATHER PROTECTION (When Applicable). The Contractor shall be responsible for adequately protecting utilities, supplies, and equipment for the Work during cold weather. Protect items subject to cold weather damage by covering, insulating, or storing in heated space.

5.0 FENCES AND GATES

5.1 TEMPORARY REMOVAL AND REPLACEMENT OF FENCES. When it is necessary for the execution of the Work to pass through existing fences, not designated for permanent removal or relocation, remove and replace such fences, or portions thereof, when and as directed by the Contract Documents.

5.2 EXISTING GATES shall be maintained closed by the Contractor who shall be responsible for any damage, injury, or loss to property resulting from any gate left in an open condition by the Contractor or any of his Subcontractors or sub-subcontractors.

6.0 PROTECTION OF UTILITIES

6.1 VERIFY THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES along the route of work. Omission from, or inclusion of, utility locations on the Drawings is not to be considered as the nonexistence of, or a definite location of, existing underground utilities. All existing service lines and utility structures, as shown on the Drawings and/or located in the field by the utility owners prior to commencing the Work, shall be protected and safeguarded from damage during excavation and grading operations. If said service lines and/or utility structures are damaged by the Contractor's operation after the locations are known to him, or could have been known to him by notification of the utility owners, the Contractor shall make the necessary repairs at his expense.

6.2 UTILITY REMOVAL. Before beginning trenching operations, confer with the owners of any underground or overhead utilities which may be on, or in close proximity to, the trenching areas, and arrange for the necessary disconnection of these utilities in accord with the regulations of the utility companies concerned. Take such measures as the Engineer may direct in protecting these utilities properly throughout the period trenching operations are in progress. The party or parties owning or operating overhead or underground utilities shall perform the actual work of moving, repairing, reconditioning, or revising the utilities, unless a Change Order is issued to the Contractor to do the work. Whenever and wherever such operations are undertaken by the owners of utilities, cooperate to the extent that ample protection of their work is provided, so that the entire work is contemplated and expedited to the best interests of all concerned, as judged by the Engineer.

6.3 PROVIDE FOR SURFACE DRAINAGE, during the period of construction, in a manner that protects trenches and adjacent areas. Provide positive drainage for areas to receive pavement, and at no time allow water to puddle or accumulate on the prepared subgrade.

6.4 PROTECT EXCAVATIONS within the area of construction from the action of the elements. Keep excavation free of water during the entire progress of construction, regardless of the cause, source, or nature of the water.

6.5 EROSION CONTROL. Take every precaution and temporary measure, such as temporary seeding, to prevent damage from erosion of freshly graded areas. This applies to damage of newly graded areas within construction limits and damage to adjacent properties by eroded materials.

6.6 MAINTAIN WATER COURSES AND DRAINAGE WAYS in their natural condition or equivalent courses or construct and maintain other means of drainage.

6.7 EXERCISE EVERY PRECAUTION to avoid damage to existing public or private utility lines and appurtenances, including telephone cables and wires, while performing the Work.

6.8 GIVE ADEQUATE AND TIMELY NOTICE to public and private utility owners before commencing work and cooperate with utility owners while performing the Work.

7.0 STAKING OUT THE WORK

7.1 WORK DONE WITHOUT LINES OR GRADES. Any work done without having been properly located and established by base lines, offset stakes, bench marks, or other basic reference points located, established, or checked by the Engineer, may be ordered removed and replaced at the Contractor's expense.

7.2 STAKING OUT THE WORK. The Work will be staked out by the Owner or his representative. Additional stakes requested shall be an additional expense to the Contractor payable to the Owner.

7.3 PRESERVATION OF MONUMENTS AND STAKES. The Contractor shall preserve monuments, bench marks, reference points, and stakes, and, in case of willful or careless destruction of the same, will be charged with the resulting expense of replacement. He shall be responsible for any mistakes or loss of time that may be caused by their unnecessary loss or disturbance.

8.0 ACCESS

8.1 STORAGE OF MATERIALS AND EQUIPMENT. Store material and equipment on the site in locations approved by the Engineer. The Owner shall provide a site for the storage of material and equipment.

9.0 TEMPORARY SIGNS

9.1 SIGNS OF CONTRACTOR AND SUBCONTRACTORS. Subject to prior approval of the Engineer as to size, design, type, location, and local regulations, the Contractor and his Subcontractors may erect temporary signs for purposes of identification and controlling traffic. Furnish, erect, and maintain such signs required by safety regulations and necessary to safeguard life and property.

SECTION 01600

MATERIAL AND EQUIPMENT

1.0 MATERIAL AND EQUIPMENT shall be of the manufacture, model, and type specified. Substitute material and equipment approved prior to bidding, in accord with the Instructions to Bidders, are incorporated into these Specifications as Addenda.

2.0 MATERIAL AND EQUIPMENT OF ACCEPTABLE MANUFACTURE. An item of material or equipment may be used in place of an item which is specified by manufacturer and model number or type, provided that all of the following provisions are met:

- .1 The item is manufactured by one of the acceptable manufacturers listed in the Specifications.
- .2 The item of material or equipment meets or exceeds the minimum qualities established by the specified item.
- .3 The item is used throughout the project so that all items of material or equipment used in place of specified items are of the same make and type.
- .4 The entire cost of all modifications which result from the use of items in place of specified items shall be borne by the Contractor who uses such items, at no additional cost to other Contractors or to the Owner.

3.0 REPEATED FEATURES OR MATERIAL must be constructed alike, although detailed or indicated only once. Where items, devices, or equipment are specified singular in number, the Specification shall apply to as many items, devices, or pieces of equipment as are shown on the Drawings or required to complete the installation. Repeated items of material or equipment shall be of the same manufacture, model number, and type.

SECTION 01700

PROJECT CLOSEOUT

1.0 CLEANING UP. At the completion of the Work, remove waste materials and rubbish from and about the site as well as tools, construction equipment, machinery, and surplus materials in accordance with the General Conditions.

2.0 SUBMITTALS. The following submittals shall accompany the final Application for Payment. Submit in duplicate unless otherwise specified in the Sections indicated.

General Conditions

Contractor's Affidavit of Payment of Debts and Claims
Consent of Surety Company to Final Payment
Contractor's Affidavit of Release of Liens

Photocopy of South Dakota Sales and Excise Tax License

The Contractor will pay South Dakota Department of Labor all costs and interest due under the provisions of SDCL Chapter 61-5 on wages paid to individuals employed in performance of this contract before final payment is made to the Owner. Contractor shall obtain a certificate from the South Dakota Department of Labor that all costs and interest due to said Department have been paid.

3.0 SUBMIT INSPECTION CERTIFICATES issued by regulatory agencies to the Engineer as required by Paragraph 7.7 of the General Conditions.

4.0 SUBMIT TESTING REPORTS to the Engineer before final payment and include the following:

Water System Disinfection Reports
Water System Pressure Tests

5.0 DELIVER A SET OF CONTRACT DOCUMENTS, showing locations and offset distances from permanent surface improvements of underground lines, bends, connections, valves, stops, etc. to the Engineer before final payment.

DIVISION 2

SITE WORK

	<u>Pages</u>
Section 02010 Subsurface Exploration.....	1
Section 02221 Utility Excavating, Trenching and Backfilling.....	1; 3
Section 02260 Finish Grading.....	1
Section 02486 Seeding.....	1; 3
Section 02570 Well Drilling.....	1; 11
Section 02571 Test Well Drilling.....	1; 3
Section 02580 Pump and Discharge Piping.....	1; 5
Section 02713 Water Distribution.....	1; 5

SECTION 02010

SUBSURFACE EXPLORATION

1.0 GENERAL

1.1 SUBSURFACE SOIL DATA

1.1.1 SUBSURFACE SOIL INVESTIGATIONS have been made in the form of a test well. A copy of the test well log is provided on the drawings. The Contractor shall anticipate changes in soil character and include the cost of soil character in his bid. The Contractor shall conduct such additional site investigation work including borings as required to obtain sufficient knowledge to include all subsoil conditions in his bid.

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Mike Wetmore

Geologist

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NORTH SIOUX CITY

TEST HOLE # 97-1

DRILLER'S LOG

<u>DEPTH</u>	<u>LITHOLOGY</u>	<u>DRILLING NOTES</u>
0-3	top soil	drill depths adj to e-logs
3-17	yel clay	
17-38	fine, uncon sand	hole washed out
38-51	blue clay	
51-142	sand & gravel	lost circulation boulders @ 78-80 boulders @ 140-142
142-196	black shale	sticky hole
196-277	sandstone	
277-290	red shale	
290-300	dolomite	

log by:

WETMORE DRILLING

A handwritten signature in black ink, appearing to read 'Mike Wetmore', is written over the company name.

Mike Wetmore
geologist

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NORTH SIOUX CITY

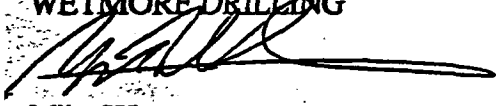
TEST HOLE # 97-2

DRILLER'S LOG

<u>DEPTH</u>	<u>LITHOLOGY</u>	<u>DRILLING NOTES</u>
0-3	top soil	drill depths adj to e-logs
3-22	yel clay	
22-48	fine, uncon sand	hole washed out
48-54	blue clay	
54-150	sand & gravel	lost circulation boulders @ 75-77 boulders @ 148-150
150-202	black shale	sticky hole
202-274	sandstone	
274-287	red shale	
287-300	dolomite	

log by:

WETMORE DRILLING


Mike Wetmore
geologist

SECTION 02221

UTILITY EXCAVATING, TRENCHING AND BACKFILLING

1.0 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

Water Distribution

Section 02713

2.0 PRODUCTS

2.1 BACKFILL MATERIALS

2.1.1 BACKFILL MATERIAL shall be similar to material excavated from the trench. Backfill shall be reasonably free of roots and other organics, trash, frozen material, and stones larger than 6 inches in diameter. Limit stones to 3/4-inch diameter in backfill to 12 inches above the top of pipes larger than 3 inches in diameter. Limit stones to 3/4-inch diameter for backfill to 4 inches above the top of pipes 3 inches or smaller in diameter.

2.1.2 IF THE EXCAVATION MATERIALS includes Flyash this contract shall incorporate Flyash in the backfill to match adjacent soil conditions.

2.2 SHORING MATERIAL

2.2.1 SHORING MATERIAL shall be wood timber or steel sheet piling with cross members and braces to meet local codes or other governmental requirements.

2.2.2 ALL EXCAVATIONS must comply with the requirements of OSHA 29 CFR, Part 1926 Subpart P. "Excavations and Trenches" and other applicable Codes.

3.0 EXECUTION

3.1 PREPARATION

3.1.1 REMOVE AND REPLACE minor structures including fences, culverts, signs, etc., as required for trenching. Reset structures in their original locations.

3.1.2 MAINTAIN vehicular and pedestrian traffic circulation in all public rights-of-way as directed by the Engineer. Furnish, place and maintain sufficient flags, flares, barricades, and signage to provide proper safety to the public.

3.1.3 STAKE utility trenches and verify existing utility inverts and locations to assure that utilities can be constructed as engineered. Excavate and expose existing utilities and tunnels along the utility route prior to opening other sections of trench. If conflicts occur between actual conditions and conditions shown on the Drawings, contact the Engineer.

3.2 TRENCH AND UTILITY STRUCTURE EXCAVATION

3.2.1 EXCAVATE AND BACKSLOPE trenches as required to prevent slides or cave-ins. Install shoring, where required, to protect pavements or structures or where the depth of the trench makes backsloping of trench sides impractical. Pile material a sufficient distance from the banks of the trench to avoid overloading slides, or cave-ins.

3.2.2 EXCAVATE trench width to a point 1 foot above the pipe no less than 8 inches and no more than 12 inches on each side of the pipe. Excavate the width of the trench above 1 foot over the top of pipe as wide as necessary for trench backsloping, shoring or installation and removal of forms.

3.2.3 SHAPE the trench bottom to provide uniform bearing for each section of pipe with the bottom rounded to allow at least one-fourth of the circumference of the pipe to rest firmly on undisturbed earth. Excavate holes for pipe bells only to a sufficient depth necessary to assure accurate jointing of pipes.

3.3 BACKFILLING TRENCHES AND STRUCTURES

3.3.1 TEST piping prior to completing trench backfilling when tests call for inspection of joints. Install thrust blocking and minimal backfilling over pipes to prevent displacement of piping when performing pressurized testing of systems. Repair or replace pipe sections which fail, retest, then complete backfilling operations.

3.3.2 COMPACT BACKFILL for trenches thoroughly and uniformly, in layers, by use of hand, pneumatic, or mechanical compactors eliminating the possibility of lateral displacement. The type of tamper or compactor used shall be approved by the Engineer. Puddling or flooding of trench for consolidation of backfill or the use of wheelrolling by construction equipment is not permitted. Backfill and compact each layer in the following manner:

- .1 Backfill with material containing rocks no larger than 3/4 inch in the greatest dimension and carefully place in uniform layers, not exceeding 6 inches in thickness, to a depth of 1 foot over the top of the pipe. Completely and carefully fill the area under the pipe haunches. Place each layer and moisten if necessary.
- .2 Backfill the areas between 1 foot and 4 feet over the top of the pipe with a select material containing rocks no larger than 8 inches in the greatest dimension.
- .3 Backfill 4 feet over the top of the pipe to the top of the trench shall conform to the above requirements, except there is no limitation on the size of rock used. Uniformly moisten backfill above 1 foot over the top of the pipe, as required, and place in 8-inch layers.

- .4 Compact backfill to at least the following percentage of maximum density, at a moisture content within the limits specified above or below optimum moisture content, as determined by Test Procedure ASTM D 698 for cohesive materials and ASTM D 4253 & ASTM D 4254 for noncohesive materials.

<u>Material</u>	<u>Percent of Maximum Density</u>	<u>Percent Above or Below Optimum Moisture Content</u>
Cohesive Supporting Pavement, Drives, & Sidewalks	95 percent	0/+ 4 percent
Cohesive Nonsupporting	85 percent	n/a
Noncohesive Supporting Pavement, Drives, & Sidewalks	75 percent	n/a
Noncohesive Non- Supporting	65 percent	n/a

3.3.3 CONTRACTOR SHALL dry or wet existing soils as requested to adjust the moisture content of the soils to meet the above specifications. Contractor shall not mix soil types.

The Contractor will include in his bid, the cost of any adjustment in soil character or condition. The inclusion or lack of subsoil logs or investigation shall not relieve the Contractor from any of the work required to meet the requirements of this Section.

3.3.4 IF SETTLEMENT OCCURS WITHIN THE GUARANTEE PERIOD, regardless of the type of compaction or settlement methods used, refill, compact, and smooth off the trench until it is finally made to conform to the ground surface.

3.4 GRADING

3.4.1 GRADE TO A FINISH ordinarily obtained from a blade grader, with no abrupt changes in grade or holes that will hold water and so that effective drainage is secured.

3.5 MINOR STRUCTURES

3.5.1 MOVE MINOR STRUCTURES and restore temporary openings in fences to their original condition. Stockpile culverts, pipes, cables, or minor structures which are moved and reset in the original locations. Determine the actual condition of structures and miscellaneous obstacles to move for construction purposes. Removal and placement of these items are considered as part of the Contractor's obligation, and no additional payment shall be made.

SECTION 02260
FINISH GRADING

1.0 GENERAL

2.0 PRODUCTS

2.1 TOPSOIL

2.1.1 TOPSOIL shall be obtained from existing material stripped from the project.

3.0 EXECUTION

3.1 PREPARATION

3.1.1 COMPLETE PAVEMENTS, WALKS, AND OTHER IMPROVEMENTS, including utilities, prior to finish grading. Where it is necessary for construction and earth moving equipment to pass, delay pavement or walk construction, or build earthen bridges over pavements and walks, to protect them from damage.

3.1.2 COMPLETE ROUGH GRADING and verify grade elevations to assure conformance with contours and elevations indicated on the Drawings prior to spreading topsoil.

3.2 TOPSOIL SPREADING

3.2.1 REPAIR settlements and washes. Scarify areas to receive topsoil to a depth of 3 inches.

3.2.2 SPREAD topsoil to a uniform depth of 4 inches over all areas graded under this Contract not receiving other surfacing.

3.2.3 HOLD surface of topsoil ½ inch below walk and pavement surfaces in the area to be seeded.

3.2.4 LIGHTLY ROLL AND COMPACT finish surface to minimize wind and water erosion.

3.3 SURFACE TOLERANCES

3.3.1 GRADE AREAS to uniformly smooth surfaces, free from irregular surface changes and areas with pocket water.

3.3.2 GRADE DRAINAGE DITCHES AND SWALES to drain readily. Use string lines and batter boards or other approved measures to assure proper slopes on swales of two percent or less.

3.3.3 GRADE OVERLAND SHEET DRAINED AREAS to a tolerance of ¼ percent slope in a distance of 20 feet on slopes between ½ percent and one percent; ½ percent slope in 20 feet on slopes above one percent and less than two percent; and one percent in 20 feet on slopes greater than two percent.

SECTION 02486

SEEDING

1.0 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

Finish Grading

Section 02260

1.2 SUBMITTALS

1.2.1 MAINTENANCE INSTRUCTIONS. Submit full and complete written maintenance instructions for proper care and development of lawn areas to the Engineer prior to the end of the maintenance period.

1.3 DELIVERY, STORAGE AND HANDLING

1.3.1 DELIVER seed in unmixed packages unless seed mixture is certified relative to variety. Seed packages shall state variety, percent of germination, percent of pure live seed (PLS), and percent of weed and other seeds.

1.3.2 STORE seed and fertilizers in original packages and in a shaded, dry environment.

1.4 ENVIRONMENTAL REQUIREMENTS

1.4.1 PLANTING SEASON is from March 1 to May 31 and from August 15 to September 30 when favorable weather conditions permit. Do not seed in windy or wet conditions or when ground is frozen.

1.5 GUARANTEE

1.5.1 GUARANTEE the work covered by the Specification to the extent that seeded areas shall be a good stand, firmly rooted, uniform in color and quality, and reasonably free of weeds, diseases, erosion, or other visible imperfections. Guarantee period shall be for one year beginning at date of Substantial Completion.

1.5.2 NOTIFY the Engineer and Owner in writing seven days prior to the end of the maintenance period provided in this Contract. The Owner shall be responsible for maintenance during the guarantee period. The Contractor shall periodically inspect lawns areas during the guarantee period and immediately notify the Owner and Engineer in writing of any maintenance deficiency observed.

1.5.3 NOTIFY the Engineer and Owner in writing seven days prior to the end of the guarantee period requesting inspection of lawn. After inspection, the Engineer shall notify the Contractor in writing of unacceptable areas and measures required to correct deficiencies. Make corrective measures within 14 days after receipt of notification.

2.0 PRODUCTS

2.1 FERTILIZER

2.1.1 FERTILIZER shall be a complete inorganic 12-12-12 commercial fertilizer.

2.2 SEED

2.2.1 SEED MIXTURE AND RATE OF APPLICATION shall be as follows:

<u>Type of Seed</u>	<u>Pure Live Seed (PLS) per 1,000 square feet</u>
Bluegrass	3.3 pounds
Perennial Ryegrass	3.3 pounds
Fescue	3.3 pounds
Oats	1 pound

2.3 MULCH

2.3.1 STRAW MULCH shall be straw or hay, unweathered, unchopped, small grain straw. Wheat straw is preferred. Hay can be used.

3.0 EXECUTION

3.1 INSPECTION

3.1.1 INSPECT finish grades to assure proper drainage and surface tolerances.

3.2 PREPARATION

3.2.1 APPLY HERBICIDE at rates recommended by the manufacturer. Apply far enough in advance of seeding so seed germination is not affected.

3.2.2 APPLY FERTILIZER at the rate of 40 pounds per 10,000 square feet.

3.2.3 DISK OR TILL fertilizer into the upper 4 inches to 6 inches of soil.

3.2.4 DRAG OR RAKE the finish grade to final grade and as required to break soil surface into 1/4-inch to 3/4-inch soil particles. Avoid excessive raking resulting in powder fine soil articles.

3.3 SEEDING

3.3.1 APPLY seed at rates specified using drills, rotary, or drop spreaders. Sow seed in two directions at right angles to the first pass to achieve a uniform application.

3.3.2 LIGHTLY RAKE seeded areas to partially cover seed.

3.3.3 LIGHTLY ROLL the seed bed to provide a firm surface and good seed-to-soil contact.

3.3.4 SEED may be applied using hydromulch methods approved by the Engineer.

3.4 MULCHING

3.4.1 APPLY STRAW MULCH on seeded areas at the rate of 1 ton per acre on areas up to five percent slope and 2 tons per acre on steeper slopes. Anchor mulch with a weighted disk or cultipacker passing over applied mulch. Remove and dispose of straw when grass reaches 2 inches in height.

3.5 MAINTENANCE

3.5.1 WATER seeded areas immediately after seeding and mulching operations are completed. Keep area moist but avoid puddling. Do not allow seed bed to dry out. When seed germinates, reduce watering intervals to promote a deeper root system. When grass is established, water once a week or as required to supplement natural rainfall to provide a total of 1 inch per week.

SECTION 02570

WELL DRILLING

1.0 GENERAL

1.1 DESCRIPTION

1.1.1 RELATED WORK SPECIFIED ELSEWHERE

Pumps and Discharge Piping Section 02580

1.1.2 WELL DRILLING shall include the drilling, casing, screening, grouting, gravel packing, developing, testing, capping and sterilizing of a water well and site clean-up, all in accord with these Specifications and Drawings. Well Drilling shall be performed with either direct or reverse rotary drilling equipment. The Well Drilling work shall be conducted in accordance with Well Construction Standards of the State of South Dakota here after called Standards. If conflicts exist between these documents and the Standards, the Standards shall prevail.

1.1.3 THE LOCATION of the well is as shown on the Drawings, and shall be field located by the Engineer prior to construction.

1.1.4 INFORMATION AVAILABLE from a previous test hole contract is given as the best available indication as to the probable formations to be encountered in drilling the well. Should the actual formation condition require a gravel pack and screen different than indicated herein, a change order will be issued for the difference in material costs only as supported by invoices.

1.2 QUALITY CONTROL

1.2.1 SHOW EVIDENCE OF EXPERIENCE IN DRILLING at least ten wells of comparable diameter and depth. Equipment must be capable of drilling a minimum 24-inch diameter hole to a depth of 300 feet. If the Contractor does not have experience in grouting at least three wells in the manner specified herein, the grouting must be done by a competent crew experienced in such work.

1.2.2 CONTRACTOR shall be licensed in the State of South Dakota as a well driller.

1.3 SUBMITTALS

1.3.1 SUBMIT SHOP DRAWINGS AND MANUFACTURER'S LITERATURE to the Engineer in accord with the General Conditions and General Requirements. These shall include, but not necessarily be limited to, the following:

- Bacteriological Test Results
- Drop Pipe
- Gravel Pack Gradation
- Steel Well Casing
- Well Screen

1.3.2 WELL LOGS shall be carefully and accurately kept for the hole drilled, with entries made in sequence so that each can be correlated with the depth of the hole at that time. It shall be brought up-to-date at the end of each working day, and shall be furnished to the Engineer within one week after the performance of all work on the well. The well log shall record the following:

- .1 Location of the Well by section, range, township, and quarter section in accord with the USGS standard well location system
- .2 Depth, Thickness, Type, General Characteristics, and Drilling Characteristics of each material encountered
- .3 Time Required to drill each foot of depth, along with the speed of rotation, when a rotary rig is used for drilling in rock foundations
- .4 Depth, Thickness, and Static Water Level of each water-bearing formation encountered
- .5 Order, Number, Diameter, Gauge Thickness, Type of Material, and Lengths of the individual pieces of well casing installed
- .6 Well Screen Size, Material, Length, Manufacturer, Connections, Fittings, Screen Slot Opening Size, and gravel pack or formation stabilizer material and location.
- .7 Test Pumping Data
- .8 Pump Equipment and Drop Pipe
- .9 Method and Date of bacteriological sampling

1.3.3 GEOLOGICAL SAMPLES. Submit a set of geological samples, collected at 5-foot intervals, along with a well log and a log of all materials installed into the well, including gravel pack, grout, and casing, to the Engineer.

1.3.4 SUBMIT CHEMICAL AND BACTERIOLOGICAL TEST RESULTS to the Engineer within three days after they are received by the Contractor.

2.0 PRODUCTS

2.1 DRILLING FLUID

2.1.1 DRILLING FLUID used in the conventional (mud) rotary drilling shall conform to the tentative NWWA Specifications.

2.2. WELL CASING

2.2.1 STEEL WELL CASING used as a permanent part of the well structure shall be steel pipe conforming to ASTM A53-84a. It shall be of standard brand manufacture, and have the brand name clearly printed on each length of pipe. Permanent steel casing shall be 16-inch nominal diameter with a minimum wall thickness of 0.375 inches. Lengths of casing shall be connected with either screwed couplings or approved welds. Welded joints shall be made in accord with the provisions of Paragraph 3.2 of this Section.

2.3 CEMENT GROUT

2.3.1 The cement grout mixture shall consist of approximately six gallons of clean water mixed with one sack of portland cement. The cement shall be sulfate resistant, Type II or better. As per ASTM C150 Type II cement may be used provided two pounds of bentonite are added per sack of cement. Water used in cement grout may not contain oil or other organic material.

2.3.2 Additives such as bentonite may be added to cement grout. When additives are used, up to seven gallons of water may be mixed per sack of cement.

2.4 WELL SCREEN

2.4.1 WELL SCREEN shall be designed to produce a minimum loss of head between the water-bearing stratum and well, and shall be of the continuous slot design, fabricated of specially shaped cold drawn bars. The outer winding that forms the screen surface and the internal longitudinal bars shall be jointed at each intersection by welding, and shall be of Type 304 stainless steel conforming to ASI requirements. Do not order the well screen until the test well samples have been analyzed and the screen slot selection is verified. If the well screen is changed as a result of the new test well data, the contract price will be adjusted based on the change in material price as verified by manufacturer's invoice. The well screen shall meet the following requirements:

- .1 Manufacturer. The screen and accessories required for installation shall be commercial products of a manufacturer regularly engaged in the production of such equipment, such as The Johnson Division, Universal Oil Products Company, St. Paul, Minnesota.
- .2 Openings in the Well Screen shall be of the proper width to permit the maximum practical sandfree yield after development. The size of the slot shall be that recommended by the manufacturer, based on a sieve analysis of a representative sample of the water-bearing formation submitted (or analyzed) by the driller and must retain 90% of the gravel pack. Openings shall be of a geometric shape to permit maximum transmitting capacity without clogging or jamming.
- .3 Joints. If it is necessary to join several screen together, the joints connecting the screen sections shall be butt-type couplings of the same material as the screens.

- .4 Length and Diameter of the Well Screen shall be determined by the Engineer, based on the thickness of the water-bearing formation(s) and the method of installation. Screen diameter and lengths, for the purposes of Bids, shall be as specified herein. If there are significant changes made, based on the actual well profile, additional costs will be negotiated through a change order. The screen is to be a stainless steel type 304, minimum 0.375 -inch thickness.
- .5 The screen is to be provided with a stainless steel type 304 plate welded on the bottom of the screen, minimum 0.375-inch thickness.

2.5 GRAVEL PACK

2.5.1 GRAVEL PACK MATERIAL shall not be ordered until the test well samples have been analyzed and the selected gravel pack material is verified. If the gravel pack material changed as a result of the new test well data, the contract price will be adjusted based on the change in material price as verified by manufacturer's invoice. Gravel pack material shall be composed of well rounded uniform grains of water washed quartz or granitic gravel. Submit the gradation of the gravel pack to the Engineer for approval. The gravel pack shall be sized and graded by the manufacturer of the well screen, based upon the gradation of the material composing the aquifer. Gravel-pack material shall have a uniformity coefficient of 2.0 or less. The use of a gravel matrix performed on an intake screen shall not be applied unless the amount of open area of the screen allows for full development of the formation, and the pack material and screen are sized in accord with artificial gravel pack principles.

2.6 DISINFECTION

2.6.1 DISINFECTION shall be accomplished with calcium hypochlorite, the equal of HTH as manufactured by Mathieson-Alkalai Works.

2.7 FORMATION STABILIZER

2.7.1 FORMATION STABILIZER shall be used when undesirable overlying materials may collapse downward into the annulus around the screen during the development process. Material used for formation stabilizer shall be clean, well rounded, coarse sand, pea gravel, or other material approved by the Engineer.

2.8 CENTRALIZERS

2.8.1 CENTRALIZERS, designed to create minimum obstruction in the annulus, are required at sufficient intervals to center the casing in the drill hole when casing will be grouted. One centralizer is required near the bottom of each size of grouted casing. Centralizer and casing materials must be compatible. Centralizers shall be designed to provide a uniform annulus and to minimize grout channeling and to allow the grout to completely surround the casing.

3.0 EXECUTION

3.1 DRILLING

3.1.1 DRILL WELLS no deeper than that specified by the Engineer. Drilling may be accomplished by a direct or reverse hydraulic drilling machine. Equipment used shall be in good repair and capable of drilling to a depth of 300 feet. It is estimated that sufficient water can be obtained at a depth less than 300 feet.

If the bore hole is inadvertently drilled below the depths to which the casing and screen is to be installed, the lower part of the bore hole shall be grouted in accordance with these specifications for grout and grout placement.

3.1.2 DIAMETER OF DRILL HOLE shall as shown on the Drawing.

3.2 STEEL WELL CASING

3.2.1 INSTALL STEEL WELL CASING to the depth specified by the Engineer and grout in place. The length of casing required depends on the depth of the formation and overlying materials. Casing shall be provided with centralizers at intervals of 30 feet to accurately center the casing and screen in the bore hole.

3.2.2 WELDING

- .1 Preparation. Surfaces to be welded shall be free from loose scale, rust, grease, paint, and other foreign material except for mill scale which withstands vigorous wire brushing. Joint surfaces shall be free from fins and tears.
- .2 Standards. The technique of welding employed, the appearance and quality of welds made, and the methods of correcting defective work shall conform to normally accepted standards of workmanship.
- .3 Temperature of Material to be Welded. No welding shall be done when the temperature of the base metal is lower than 0°F. At temperatures between 0°F and 32°F, heat the surfaces of areas within 3 inches of the edges to be welded until too hot to touch before welding is started.
- .4 Alignment. Welded sections of steel casing shall be true to line and free from twists, bends, offsets, and open joints. Welded joints shall be watertight.

3.2.3 CASING BOTTOM. The bottom of the screen and casing assembly shall be plugged tight by welding on a Type 304 stainless steel plate. The welded seam shall be continuous.

3.3 GROUTING OF WELL CASING

3.3.1 PLACE GROUT in the annular space between casing and drill hole. Grout the well from a point 5 feet above well screen up to the bottom of the pitless adapter. Maintain a minimum grout thickness of 4 inches between the well casing and the drill hole.

3.3.2 TEMPORARY CASING. If necessary, install a temporary casing to insure the minimum specified wall thickness of grout. This casing shall be withdrawn as the grout is placed. No payment shall be made for any temporary casing left in place.

3.3.3 PLACE GROUT by either the TREMIE method or Positive Placement-Exterior method as defined in AWWA A100 Appendix B.

3.3.4 CURING. Allow grout to cure at least 72 hours before drilling, test pumping, or performing other work in the well. If quick set cement is used, the curing period may be reduced to 24 hours upon approval by the Engineer.

3.4 WELL SCREEN INSTALLATION

3.4.1 INSTALL WELL SCREEN by suspended from surface method. If Contractor wishes to deviate from the specified method of screen installation, he shall submit the proposed method of screen installation and gravel packing for approval by the Engineer prior to completion of the wells.

3.5 GRAVEL PACK

3.5.1 PLACE GRAVEL PACK MATERIAL in the annulus surrounding the well screen by use of a tremie pipe lowered to the bottom of the space to be packed and slowly raised as the gravel pack fills the annular space. As the gravel pack is poured into the tremie pipe, water shall also be poured in to help carry the filter material in accordance with the Manual of Water Well Construction Practices Paragraph 50.000-000-300.

3.5.2 DISINFECT GRAVEL PACK in accordance with AWWA A100 Section 11 prior to the time the gravel is placed in the well.

3.5.3 GRAVEL PACK MATERIAL shall be placed to the limits shown on the Drawings.

3.5.4 PLACEMENT OF FILL shall be placed to the limits shown on the Drawings. A 2-foot Bentonite seal will be placed between the gravel pack and grout fill.

3.6 BENTONITE

3.6.1 BENTONITE SEAL shall be a minimum of 5 feet thick, and shall be placed by the tremie method in the annular space outside the well casing beginning at the top of the gravel pack. Disinfect clay in accordance with AWWA A100 Section 11.

3.7 WELL DEVELOPMENT

3.7.1 DEVELOP THE WELL by methods which will effectively extract from the water-bearing formation the maximum practical quantity of drilling mud, fine sand, silt, or other fine materials. Develop the well to obtain the maximum yield per foot of drawdown and sandfree water at the maximum pumping rate.

- .1 Methods. Neither bailing nor pumping shall be considered to be adequate development methods under this Contract. One of the following methods shall be used:
 - Compressed Air
 - High velocity jetting
 - Surge plungers
- .2 Precautions. Develop the well in a manner that does not cause undue settlement of the stratum above the water-bearing formation. Take every precaution to avoid development of the well in a manner which introduces unconsolidated material lying above the aquifer into the water-producing zone.
- .3 Continue Development of the Well until water pumped from the well, at the rate determined by the Engineer, is clear and free of sand and silt. Water shall be considered sandfree when samples taken at the determined pumping rate contain less than two parts per million (by weight) of sand, measured as specified in the Manual of Water Well Construction Practices, paragraph 52.000-001-000.
- .4 Additional Development Work, as directed by the Engineer, to further improve the specific capacity of the well may be required. Such additional work, excluding chemicals, will be paid for at the same hourly rate as the normal development work.

3.8 FIELD QUALITY CONTROL

3.8.1 CHECKING DRILLING FLUID. Control of the drilling fluid shall be accomplished by sampling the fluid at least once an hour, or when a new mud system is started, changed, or added to, when specific formations are penetrated that could drastically alter the mud properties, or when directed by the Engineer. Record the results and the time of the test and include the records with the well logs.

3.8.2 PLUMBNESS AND ALIGNMENT TESTS

- .1 Test in accordance with AWWA 100.
- .2 Rejection. If the well does not pass the testing procedure, the Engineer has the authority to reject the well as drilled and cased, with no payment to the Contractor, until the deficiency is corrected to the satisfaction of the Engineer.

3.8.3 TAKE SAMPLES OF THE FORMATION , as drilling progresses, and furnish to the Engineer. Samples **shall not be washed**, and shall be kept in cloth bags. When an aquifer is encountered, take a sample of sufficient volume and have it analyzed by the manufacturer of the well screen. Samples shall be taken as follows:

- .1 Reverse Hydraulic Drilling. Because the hydrostatic water level of aquifers encountered cannot readily be determined during rotary drilling methods and because of the relatively high speed of penetration of rotary methods of drilling, take samples during drilling at 5-foot intervals and at every change in formation. If so directed by the Engineer, the driller may be required to take samples at 1-foot intervals when a potential aquifer is encountered.

3.9 PRECAUTIONS DURING CONSTRUCTION

3.9.1 TAKE PRECAUTIONS NECESSARY OR REQUIRED to permanently prevent contaminated water or water having undesirable physical or chemical characteristics from entering the well. Also take precautions during construction to prevent contamination or pollution from the ground surface.

3.10 TESTING FOR YIELD AND DRAWDOWN

3.10.1 THE WELL shall be pumped at a discharge rate of 1000 gpm and 1500 gpm for a minimum of 24 hours each with a full recovery between tests. The test pump shall have its intake at least 5 feet below the estimated pumping level, and shall have sufficient power and capacity to achieve the designated discharge rate. Discharge shall be measured with an accurate totalizing meter and stopwatch, a circular orifice meter, or a Venturi meter, any of which are subject to approval by the Engineer or his representative. Discharge shall be maintained within plus or minus 5 percent of the designated rate by means of a gate valve or throttling device. Discharge shall be checked and adjusted, if necessary, every 10 minutes during the first hour of pumping and at 30-minute intervals thereafter. The discharge and time of measurement shall be recorded each time it is checked and a note made of any adjustments. The static or nonpumping water level trend shall be established prior to the start of the test. Drawdown shall be measured according to the following schedule: 0 to 10 minutes- every minute; 10 to 45 minutes - every 5 minutes; 45 to 90 minutes - every 15 minutes; 90 to 180 minutes - each half hour; 180 minutes to the end of the test - each hour. Should the measurements not be made exactly at the times specified, the actual time of each measurement shall be recorded. On completion of pumping, recovery measurements shall be made according to the above drawdown schedule.

3.11 CLEANING AND DISINFECTING

3.11.1 CLEAN THE WELL of foreign substances including, but not limited to, cement, oil, grease, joint dope, and scum, after completion and test pumping.

3.11.2 DISINFECT THE WELL with a chlorine solution prepared prior to injection into the well, of volume and strength, and so applied that a minimum concentration of 50 ppm of free residual chlorine is obtained in all parts of the well for at least 24 hours before removal in accordance with Appendix "H" of the Well Construction Standards for the State of South Dakota. Chlorine may be added to the well by any of the following methods:

- .1 Method A. The chlorine solution may be prepared in a batch having a volume at least twice the volume of water contained in the well. This prepared solution should then be rapidly discharged into the well.
- .2 Method B. A stock chlorine solution of 15,000 ppm may be added to a continuous flow of water into the well to provide the 50 ppm chlorine residual concentration in all portions of the well.
- .3 Method C. A stock solution of chlorine may be added through a pipe discharging at different levels in the well. The well may then be agitated with a bit or bailer to mix the solution.

3.12 TESTING OF WATER SAMPLE

3.12.1 WATER SAMPLES (acquisition only) shall be by the Contractor. The Contractor must take the samples in accordance with recommended practice. The Engineer will review the sampling practice with the contractor if requested.

3.12.2 WATER SAMPLES for bacteriological analysis shall be taken by the Contractor after the 50 ppm of chlorine has been maintained for 24 hours and sufficient water removed from the well to reduce the residual content to not greater than 0.4 ppm. After the well has been flushed, take water samples from the well and submit to a testing laboratory for bacteriological analysis. If bacteriological results obtained are unsatisfactory, repeat the well disinfection and take samples until bacteriologically satisfactory samples are obtained.

3.12.3 SAMPLE ANALYSIS (both acquisition and payment) shall be by the Contractor. The Contractor must submit copies of the water analysis results to the Engineer before payment for the well will be made.

3.13 CAPPING

3.13.1 CAP THE WELL by a method approved by the Engineer. Attach a cap to the top of the casing to protect the well from the entrance of foreign materials.

3.14 ABANDONMENT OF WELL

3.14.1 ABANDONMENT. In the event the well is not accepted by the Engineer for completion, due to insufficient capacity, unsatisfactory chemical or bacteriological quality, or abandoned because of poor alignment, loss of tools, or any other cause, the Contractor shall, as directed by the Engineer, pull the casing and screen and fill the well hole with the grout material up to within 3 feet of the top and then fill the remaining 3 feet with compacted clay material. In this event, the Contractor shall be paid for said well only in the amount of his actual reasonable cost of labor,

expended materials and equipment rental or its equivalent, plus ten percent to cover overhead and all other expenses and profit. The casing and screen shall be salvaged and used by the Contractor under his Contract in a new well to be built at another location. In the event of damage to the casing or screen during pulling operations, where the Contractor is not at fault, the Owner will replace the damaged parts at its expense. If conditions at the jobsite are such that, in the Engineer's opinion, it is extremely difficult, or not feasible, to pull the casing with normally supplied equipment after the Contractor has made every reasonable effort to do so, then he will be excused from further efforts to pull the casing. The Contractor shall adhere to the State Health Department rules and regulations for well abandonment including the filing of test hole plugging records.

3.15 RECORDS

3.15.1 A RECORD OF WATER WELL CONSTRUCTION shall be furnished by the driller to the Engineer and to the well owner. The record shall contain the following:

1. The name and complete mailing address of the owner;
2. The legal description of the well location;
3. The completion date;
4. The driller's log of geologic formations penetrated plus any geophysical logs;
5. The depth of the well;
6. The depth of the static water level in the well;
7. The size of the drill hole and the method of drilling;
8. The length, depth, and size of the casing, changes in size of casing, and type of casing;
9. The grout used; the amount, type, slurry weight, and location in hole of the grout used; and a description of the grouting procedure;
10. The packers, their location in hole, and the type used;
11. The length of the screen or casing perforations;
12. The location of the top and bottom of the screen, the top and bottom of the aquifer, and the location of multiple screens;
13. The screen slot or perforation size;
14. The gravel pack and its volume, type, or size;

15. The well test that includes specific capacity, static water level, flow, shut-in, pressure or estimate, or actual pump test data if available;
16. The type and method of disinfection;
17. The date and signature of the license representative, and
18. The signature of the well owner.

SECTION 02571

TEST WELL DRILLING

1.0 GENERAL

1.1 DESCRIPTION

1.1.1 TEST WELL DRILLING shall include the drilling, casing, screening, formation stabilization, gravel packing, developing, testing, and sterilization as necessary for test well and site clean-up, all in accord with these Specifications and Drawings. The Test Well Drilling shall be conducted in accordance with the Well Standards of the State of South Dakota hereafter called Standards. If conflicts exist between these documents and the Standards, the Standards shall prevail.

1.1.2 THE LOCATION of the test well shall be the location of the production well as shown on the plans. The Test Well Contractor shall secure the location of all underground utilities and the location of the test well to avoid all underground utilities.

1.1.3 THE DESIRED YIELD from the future well is 1000 gpm.

1.1.4 IN THE EVENT THE FUTURE WELL IS NOT expected to meet the flow conditions being sought, the Contractor shall advise the Engineer of the anticipated yield.

1.2 SUBMITTALS

1.2.1 SUBMIT to the Engineer the following:

Well Log
Formation Samples

1.2.2 WELL LOG shall be carefully and accurately kept for the hole drilled, with entries made in sequence so that each can be correlated with the depth of the hole at that time. It shall be brought up-to-date at the end of each working day, and shall be furnished to the Engineer within one week after the performance of all work on the well. The well log shall record the following:

- .1 Location of the well by section, range, township, and quarter section, in accord with the USGS standard well location system.
- .2 Depth, thickness, type, general characteristics, and drilling characteristics of each material encountered.
- .3 Time required to drill each foot of depth along with the speed of rotation when a rotary rig is used for drilling in rock foundations.
- .4 Depth, thickness, and static water level of each water-bearing formation encountered.

1.2.3 GEOLOGICAL SAMPLES. Submit to the Engineer a set of geological samples collected at 5-foot intervals, along with a well log and a log of all materials installed into the well including gravel pack, grout, and casing. Submit a second set of geological samples collected at 5-foot intervals for the formation to be screened to a laboratory for sieve analysis. The laboratory to conduct the sieve analysis must be a laboratory acceptable to the Engineer that is recognized for conducting sieve analysis on water bearing formations for gravel pack and sieve design.

2.0 PRODUCTS

3.0 EXECUTION

3.1 DRILLING

3.1.1 DRILL-WELL no deeper than the depth authorized by the Owner.

3.1.2 DRILLING may be accomplished by a cable tool, conventional hydraulic (mud) rotary, reverse hydraulic, or air rotary drilling machine. Equipment used shall be in good repair and capable of drilling to the depth specified.

3.1.3 DIAMETER OR DRILL HOLE shall be as required to test pump the well for water quality.

3.1.4 TAKE SAMPLES OF THE FORMATION, as drilling progresses, and furnish to the Engineer. Samples shall not be washed, and shall be kept in cloth bags. When an aquifer is encountered, take a sample of sufficient volume and have it analyzed, by the manufacturer of the well screen or by the driller, to determine the required slot size of the well screen and gradation of gravel pack. Samples shall be taken as follows:

- .1 Cable Tool Drilling. As each water-bearing stratum is encountered, keep an accurate record of the location of the top and bottom of each stratum penetrated and the elevation to which the water level stabilized. Samples taken from each 5 feet of drilling and at every change in formation shall be placed and saved in cloth bags. If so directed by the Engineer, the driller may be required to take samples at 1-foot intervals in a potential aquifer.
- .2 Conventional Hydraulic (Mud) Rotary, Reverse Hydraulic, or Air Rotary Drilling. Because the hydrostatic water level of aquifers encountered cannot readily be determined during rotary drilling methods and because of the relatively high speed of penetration of rotary methods of drilling, take samples during drilling at 5-foot intervals and at every change in formation. If so directed by the Engineer, the driller may be required to take samples at 1-foot intervals when a potential aquifer is encountered.

3.2 PRECAUTIONS DURING THE CONSTRUCTION

3.2.1 TAKE PRECAUTIONS NECESSARY OR REQUIRED to permanently prevent contaminated water or water having undesirable physical or chemical characteristics from entering the well. Also take precautions during construction to prevent contamination or pollution from the ground surface.

3.3 ABANDONMENT OF WELL

3.3.1 ABANDONMENT. The Contractor shall pull the casing and screen and fill the well hole with the excavated material up to within 12 feet of the top and then fill the remaining 12 feet with well compacted clay material. The casing and screen may be salvaged and used by the Contractor. In the event of damage to the casing or screen during pulling operations, where the Contractor is not at fault, the Owner will not replace the damage parts. The Contractor shall adhere to the State Health Department rules and regulations for well abandonment.

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SECTION 02580

PUMPS AND DISCHARGE PIPING

1.0 GENERAL

1.1 DESCRIPTION

1.1.1 THE CONTRACTOR is responsible for the submersible pump, motor, discharge piping and appurtenances as covered in this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Excavation, Trenching and Backfilling

Section 02221

Water Distribution

Section 02713

1.3 SUBMITTALS

1.3.1 SUBMIT SHOP DRAWINGS to the Engineer in accord with the General Conditions and General Requirements. Shop drawings shall include, but are not limited to, the following:

Check Valve

Pitless Adapter

Gate Valves

Motor

Pressure Gauge

Submersible Pump

1.3.2 SUBMITTAL. The Bidder shall submit with his Bid Form the characteristics and pump curves for each pump showing the following:

Rated Speed

Rated Total Pump

Rated Horsepower at rated speed and capacity

Pump Efficiency at rated point

Shut-off Head

Column Piping, Type of Joints and Opening of Joints

Line Shafting, Length of Sections and Diameter

Spacing of Line Shaft Bearing

Manufacturer of Motor

Type of Motor

Horsepower of Motor

Efficiency of Motor

Electrical Equipment and Wiring Diagram

Guaranteed Wire-to-water Efficiency of the installed pumping equipment

1.3.3 SUBMIT PERFORMANCE CURVES, including head capacity, efficiency, and break horsepower, along with a guaranteed wire-to-water efficiency of the installed pumping equipment.

1.3.4 SUBMIT OPERATION AND MAINTENANCE MANUALS to the Engineer, in triplicate, prior to substantial completion for the following items:

Check and Gate Valves
Pump and Motor

1.4 WORK SPECIFIED THIS PROJECT

1.4.1 Work under this contract consists of construction of well, piping and other work as described on the Plans and Specifications, except for work to be performed by the Owner.

1.5 QUALITY OF WORK

1.5.1 MAXIMUM PUMP VIBRATION shall not exceed the limits as set forth in the latest edition of the Hydraulic Institute. Pump shall not dewater the screen.

1.5.2 AWWA Standard E101 shall govern the execution of this work.

2.0 PRODUCTS

2.1 SUBMERSIBLE PUMP

2.1.1 PUMP shall be of the submersible type and shall consist of the proper number of stages for a pumping capacity as follows:

Well Description	Capacity	Total Dynamic Head	RPM	Minimum Effluent	Minimum Motor HP
98-1	1,000 gpm	150	1,750	80%	75 hp

Pump bowls shall be constructed of cast iron with cast bronze impellers of either the semi-open or enclosed type, accurately machined and balanced, and securely attached to an impeller shaft of stainless steel. Pump shall be designed for water lubrication, and bowl bearings may be either of cutless rubber or bronze. Provide pump discharge bowl with flanged connection for a 10-inch I.D. wrought steel column pipe. Provide a check valve in the column pipe above the pump.

2.1.2 PROVIDE AN INTERCONNECTION UNIT with motor mounting adapter and stainless steel suction strainer of the proper size.

2.1.3 THE PITLESS ADAPTER UNIT shall be an industrial type similar or equal to Monitor for installing the submersible pump as specified above and as shown on the Drawings. It shall have a spool with an integral check valve, with seals that permit withdrawing the entire assembly within the casing without any excavation and also provide space for passage of power cable and air testing tube. The cap shall be the watertight type with a vent top and a conduit tap. All major parts below ground shall be either galvanized or constructed of corrosion-resistant materials. The unit shall be mounted on the well casing with a threaded or welding connection. Provide an air depth test block fitting on the pitless adapter.

2.2 ELECTRIC MOTOR

2.2.1 SUBMERSIBLE ELECTRIC MOTOR shall be a submersible type suitable for across-the-line starting service and designed to operate on 480-volt, 3-phase 60-cycle current.

- .1 Motor shall be water-filled, water-cooled, and lubricated of the wet stator type with mechanical seal fitted outside the motor to exclude abrasive material in the well water. A diaphragm shall be provided in the base of the motor to provide for internal water expansion during operation.
- .2 Motor shall be provided with a thrust bearing of sufficient capacity for carrying the weight of rotating parts of the pump plus the maximum downthrust of the pump under continuous operation.
- .3 A sufficient length of three-conductor flexible insulated lead wire for connection to the drop cable shall be sealed into the motor.
- .4 Motor and end bells shall be sufficient to not overload under any conditions of pumping or discharge head, shall be in accord with the manufacturer's recommendations, and further provided that the minimum size of motor shall be as listed in paragraph 2.1.1.

2.2.3 CABLE shall be sized as shown on the Drawings. Cable shall be 600-volt and suitable for submerged installation.

2.3 DISCHARGE COLUMN

2.3.1 PUMP COLUMN PIPE shall be the size shown on the Drawings and shall conform to the dimensions and weight of extra strong pipe as defined by the American Institute of Steel Construction. Column pipe shall meet the requirements of AWWA E101, along with ASTM A53 and A120.

2.4 DISINFECTION

2.4.1 PUMP DISINFECTION shall be accomplished with calcium hypochlorite, the equal of HTH, as manufactured by Mathieson Alkali Works.

2.5 CHECK VALVE

2.5.1 CHECK VALVE shall be installed in the column pipe just above the pump motor. Check Valve shall be designed for in-line installation in the vertical position. The Check Valve flap or flaps shall be spring loaded, normally closed and designed to prevent water hammer. Seating shall be resilient and water tight.

3.0 EXECUTION

3.1 PUMP INSTALLATION

3.1.1 PUMP SHALL NOT BE ORDERED until the well production test has been completed and written instructions received from the Engineer regarding the exact characteristics of the pump to be furnished. The pump characteristics as previously specified are the best obtainable in advance of conducting the well production test, and will serve for the taking of Bids for this item. In the event that characteristics vary widely from those specified any changes in the Contract Price will be negotiated at that time before the order for the pump is placed by the Contractor. The basis for any adjustment in Contract Price shall be the difference in the invoice price of the specified pump and the new pump.

3.1.2 FOLLOWING PUMP INSTALLATION, conduct a field performance test of the installed equipment to determine the actual wire-to-water efficiency at the specified capacity and head. Provide all necessary testing equipment, such as accurate test gauges, electrical instruments, orifice meter, weir box, etc. Failure to meet the specified capacity at specified head or the guaranteed wire-to-water efficiency may be cause for rejection of the installed pumping equipment.

3.2 PUMP STERILIZATION

3.2.1 EXTERIOR OF PUMP BOWL ASSEMBLY AND PUMP COLUMN PIPE shall be thoroughly cleaned and then rinsed with hypochlorite solution as the pump is being installed. Following installation, pour a solution made up of two pounds of hypochlorite through the pump discharge openings to sterilize the interior of the pump. After sterilization, pump water to waste until hypochlorite is eliminated.

3.3 MOTOR

3.3.1 INSTALL PUMP MOTOR according to the manufacturer's recommendations and make electrical connections as specified in Division 16, Electrical.

3.4 PUMP DISCHARGE PIPING

3.4.1 FOLLOWING INSTALLATION OF PUMP, install the discharge piping and connection piping as shown on the Drawings.

3.5 STERILIZATION

3.5.1 DURING THE PROGRESS OF PIPING INSTALLATION, each piece of pipe and fitting shall be thoroughly cleaned before final installation in place, and two tablets of HTH 70 percent chlorine or other chlorine compound of equal strength shall be placed in each piece of piping installed. The pipe shall then be slowly filled with water and allowed to stand for 24 hours to effectively sterilize the piping system. The Contractor shall collect two samples 24 hours apart for coliform test to be conducted by a testing laboratory. If the two tests do not pass, the Contractor shall redisinfect the wells equipment until two tests taken 24 hours apart are tested safe.

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SECTION 02713

WATER DISTRIBUTION

1.0 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

Utility Excavation and Backfilling Section 02221

1.2 SUBMITTALS

1.2.1 SUBMIT SHOP DRAWINGS AND PRODUCT DATA to the Engineer in accord with the General Conditions and General Requirements. Submittals shall include, but are not limited to, the following:

Gate Valve and Box
Pipe and Fittings

1.2.2 SUBMIT RECORD DRAWINGS to the Engineer within ten days after completion of the installation. Record Drawings shall show the location of water mains, gate valves, curb stops and bends. Measure gate valves from two permanent objects.

1.3 PROTECTION OF WATER SUPPLIES

1.3.1 PARALLEL INSTALLATION - water mains shall be laid at least 10 feet horizontally from any existing or proposed sewer. The distance shall be measured edge to edge. In cases where it is not practical to maintain a ten foot separation, the reviewing authority may allow deviation on a case-by-case basis, if supported by data from the design engineer. Such deviation may allow installation of the water main closer to a sewer, provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer.

1.3.2 CROSSINGS - Whenever the water main is below or within 18 inches above any sewer the sewer main shall be constructed of water main material for a distance of 10 feet in each direction. If it is not practical to construct the sewer main using water main material, then the water main shall be encased for a distance of 10 feet in each direction.

2.0 PRODUCTS

2.1 PIPE MATERIALS

2.1.1 POLYVINYL CHLORIDE (PVC) PIPE shall be 150 psi rated, and shall meet the requirements of AWWA C900 with a SDR of 18. Make joints for pipe with rubber rings which meet the requirements of ASTM D1869. Install No. 12 single conductor RRUSE direct burial trench wire over water main. Fitting shall be cast or ductile iron, same class as pipe, and shall be in accord with AWWA C-900.

2.1.2 DUCTILE CAST IRON (DI) PIPE shall be Pressure Class 350, with a working pressure of 350 psi, and shall meet the requirements of AWWA C151 and ANSI A21.51. Joints shall be cement-mortar lined to meet the requirements of AWWA C104 and ANSI A21.4, with a minimum thickness of 1/16 inch. Fittings shall be ductile cast iron, and shall meet the requirements of AWWA C110. The class of all fittings shall be compatible with working pressure and class of pipe specified. All pipe and fittings shall be encased with polyethylene in accordance with AWWA C105.

2.1.3 LUBRICANT for pipes with rubber ring joints shall be water soluble, non-toxic, unable to support bacteria growth, impart no objectionable taste when dissolved in the water, and nondestructive to pipe or gasket. Lubricant shall have an easily spreadable consistency at all operating temperatures, and shall provide adequate lubrication for assembly and re-assembly, if required, after 20 minutes. Lubricant shall adhere satisfactorily to wet pipe.

2.1.4 FITTINGS shall be in accord with ANSI A21.10 (AWWA C110 or AWWA C153) for a working pressure of 250 psi, and shall have a one-mil bituminous coating and cement lining in accord with ANSA based on equivalent cast iron weights.

2.1.5 SEAMLESS COPPER PIPE shall be soft temper, Type K, which meets the requirements of ASTM B 88, with brass compression or flared joint fittings.

2.2 VALVES AND BOXES

2.2.1 GATE VALVE shall meet the requirements of AWWA C-509, and shall be iron body, with nonrising stem, with type of ends to fit pipe to which they are to be connected. Valve shall have a clear waterway equal to the full nominal diameter of valve, and shall be opened by turning in a counterclockwise direction. Operating nut shall have an arrow cast thereon indicating direction of opening. Valve shall have the manufacturer's name or trademark, pressure rating, and year in which made cast on the body. Design valve for a working pressure equal to, or greater than, that of pipe to which it is connected.

2.2.2 GATE VALVE BOX shall be Buffalo type, two-piece cast iron with a slip-style adjustment and flared base. Stamp lid with the word "Water." Furnish a gate valve wrench 2 feet longer than depth of burial. Box shall be equal to Mueller H 10346.

2.2.3 CURB STOPS shall have outlet connections for type and size of service pipe used. Curb stop shall be the size shown on the contract documents and shall have threads compatible with the manufactured by Ford Meter Box Company, Inc.

2.2.4 CORPORATION STOPS shall be for use with service saddles, and shall be the same size as the service pipe with AWWA taper inlet threads and outlet connection for the type of service pipe used. Corporation stops shall be manufactured by Ford Meter Box Company, Inc. for use with the service pipe indicated on the Drawings.

2.2.5 CURB STOP BOX shall be cast iron, Minneapolis type, Mueller No. H10300 with stationary rod or approved equal.

2.2.6 SADDLES shall be double-strap cast bronze with AWWA taper thread and neoprene gaskets cemented in place. The saddle connection shall provide full support around the circumference of the pipe. The saddle strap shall be stainless steel and have a bearing area of sufficient width along the axis of the pipe, 2-inch minimum, so that the pipe will not be distorted when the saddle is made tight.

2.2.7 BUTTERFLY VALVES shall be furnished with mechanical joint ends. Valves shall meet or exceed all the design strength, testing, and performance requirements of AWWA Specification C504-74, Class 150B. Furnish with cast iron body, one piece stainless steel thru-shaft, aluminum-bronze disc and a buried service to those with operating nut. Valves shall be an approved equal to those manufactured by Keystone, Pratt, Clow, or Centerline.

2.3 FIRE HYDRANT

2.3.1 FIRE HYDRANTS shall be American Darling B612B-1 with 4 1/2" pumper nozzles and 2 - 1/2 hose nozzles.

2.4 CONCRETE

2.4.1 CONCRETE for thrust blocks shall be 3,000 psi at 28 days.

2.5 CHLORINE

2.5.1 CHLORINE for disinfection shall meet the requirements of FS BBC-120. Hypochlorite shall meet the requirements of FS OC-114, Type II, Grade B, or FS O-S-602.

3.0 EXECUTION

3.1 PREPARATION

3.1.1 EXCAVATE trench in accord with Section 02221, Utility Excavating and Backfilling. Minimum cover over top of pipe shall be six feet measured from existing or finish grade, whichever is deeper, and shall avoid interference with other utilities.

3.1.2 THOROUGHLY CLEAN interior of pipes and valves of foreign objects prior to lowering in trench. Keep interior clean during construction operations by the use of plugs or other suitable means.

3.1.3 KEEP TRENCH free of water. Do not lay pipe in water, under water, or when unfavorable weather conditions exist.

3.2 BEDDING AND ALIGNMENT OF PIPE

3.2.1 LAY pipe on an even grade free of humps which pocket air. Install mains at grades which permit air to be released at fire hydrants.

3.2.2 ALIGN water main in a straight line or smooth radius curves by deflecting pipe at joints. Make deflections at joints according to pipe manufacturer's engineering data for maximum pipe deflections. Install special bends or a sufficient number of short pipe lengths, at manufacturer's maximum pipe deflections to meet radii shown on the Drawings.

3.3 PIPE INSTALLATION AND JOINTING

3.3.1 CLEAN surfaces of pipes at points where pipes are joined.

3.3.2 LUBRICATE SPIGOT END of PVC ring jointed pipe. Do not lubricate rubber or groove. Insert spigot end into bell and push pipe to depth specified by pipe manufacturer.

3.3.3 LUBRICATE GASKET RETAINING GROOVE of ductile iron pipe bell, insert gasket, and press firmly to seat. Apply lubricant to gasket and beveled nose at end of pipe. Insert pipe into bell and push pipe to depth specified by pipe manufacturer.

3.3.4 CONNECT SPECIALTIES AND PIPES of different materials and sizes according to manufacturer's recommendations and the approval of the Engineer.

3.4 TRENCH WIRE

3.4.1 LAY trench wire directly above the top of PVC water main. Bring wire to ground surface at hydrants, valve boxes, and end of mains. Test wire for electrical conductivity continuity and correct discontinuities.

3.5 VALVE AND BOX INSTALLATION

3.5.1 INSTALL valves and boxes as recommended by the manufacturer and as shown on the Drawings.

3.6 FIRE HYDRANT INSTALLATION

3.6.1 INSTALL HYDRANTS with pumper nozzle facing toward the street and at the elevation required to set 2-1/2-inch nozzles 18 inches above finished grade. No adjustment in contract amount will be given for hydrant adjustment required to meet the contract requirements.

3.6.2 CONSTRUCT gravel seepage area around hydrant barrel drain. Extend seepage area from 18 inches below to 6 inches above drain hole. Fill seepage area with 18 cubic feet of clean crushed gravel or stone. Do not connect gravel drain to a sewer.

3.2 BEDDING AND ALIGNMENT OF PIPE

3.2.1 LAY pipe on an even grade free of humps which pocket air. Install mains at grades which permit air to be released at fire hydrants.

3.2.2 ALIGN water main in a straight line or smooth radius curves by deflecting pipe at joints. Make deflections at joints according to pipe manufacturer's engineering data for maximum pipe deflections. Install special bends or a sufficient number of short pipe lengths, at manufacturer's maximum pipe deflections to meet radii shown on the Drawings.

3.3 PIPE INSTALLATION AND JOINTING

3.3.1 CLEAN surfaces of pipes at points where pipes are joined.

3.3.2 LUBRICATE SPIGOT END of PVC ring jointed pipe. Do not lubricate rubber or groove. Insert spigot end into bell and push pipe to depth specified by pipe manufacturer.

3.3.3 LUBRICATE GASKET RETAINING GROOVE of ductile iron pipe bell, insert gasket, and press firmly to seat. Apply lubricant to gasket and beveled nose at end of pipe. Insert pipe into bell and push pipe to depth specified by pipe manufacturer.

3.3.4 CONNECT SPECIALTIES AND PIPES of different materials and sizes according to manufacturer's recommendations and the approval of the Engineer.

3.4 TRENCH WIRE

3.4.1 LAY trench wire directly above the top of PVC water main. Bring wire to ground surface at hydrants, valve boxes, and end of mains. Test wire for electrical conductivity continuity and correct discontinuities.

3.5 VALVE AND BOX INSTALLATION

3.5.1 INSTALL valves and boxes as recommended by the manufacturer and as shown on the Drawings.

3.6 FIRE HYDRANT INSTALLATION

3.6.1 INSTALL HYDRANTS with pumper nozzle facing toward the street and at the elevation required to set 2-1/2-inch nozzles 18 inches above finished grade. No adjustment in contract amount will be given for hydrant adjustment required to meet the contract requirements.

3.6.2 CONSTRUCT gravel seepage area around hydrant barrel drain. Extend seepage area from 18 inches below to 6 inches above drain hole. Fill seepage area with 18 cubic feet of clean crushed gravel or stone. Do not connect gravel drain to a sewer.

3.6.3 INSTALL AUXILIARY GATE VALVE AND BOX at each hydrant.

3.6.4 PAINT hydrants with one coat of red paint and two finishing coats of paint conforming to local standards.

3.7 THRUST BLOCKS

3.7.1 INSTALL thrust blocks at bends, tees, valves, hydrants, and ends of mains. Pour thrust blocks against undisturbed earth and in a manner to keep joints and pipe accessible for repair. Precast thrust blocks will not be allowed.

3.8 BACKFILLING

3.8.1 BACKFILL trenches as specified in Section 02221, Utility Excavating and Backfilling.

3.9 TESTS (PIPE OVER 2 INCH DIAMETER)

3.9.1 PREPARE water system for testing. Install thrust blocking and allow time for concrete to properly set up. Backfill over top of pipe as required to prevent movement under pressure. If practical, leave joints exposed to allow visual inspection during testing. Install additional temporary bracing as required to withstand appreciable thrust developed while testing. Cap or valve open ends of system.

3.9.2 TEST PIPE in accord with AWA C600-93, Section 4.

3.9.3 TEST FOR PRESSURE by subjecting pipe to 150 psi at point of testing for a period of not less than two hours and as required to permit inspection of line and marking of defective joints. Supply specified tests pressure by means of a hand-operated force pump or other suitable means. Do not allow pressure to change +/- five percent above or below specified test pressure.

3.9.4 TEST FOR LEAKAGE after pressure tests are completed and accepted. Test for leakage at 100 psi maintained pressure for two hours. Maximum allowable leakage in gallons per hour shall be determined using the following formula:

$$L = \frac{ND}{7400} \times P^{1/2} \text{ where:}$$

L = leakage in gallons per hour

N = number of joints in pipe section under test

D = pipe diameter in inches

P = average test pressure, psig

3.9.5 REPAIR defective joints or pipe sections which fail and retest until pipe passes tests. Complete backfilling after approval of tests.

3.10 DISINFECTION

3.10.1 DISINFECT DOMESTIC WATER SERVICE with chlorine before acceptance. Each time a section of main is tapped or depressurized for any reason, all portions depressurized must be disinfected.

3.10.2 DISINFECT WATER DISTRIBUTION SYSTEM as described below or to meet the requirements of AWWA C651-92. (Thoroughly flush system before adding chlorine.) Do not introduce chlorine in granular or tabular form. After a contact period of not less than 24 hours, flush system with potable water until residual chlorine content is not greater than two parts per million. Chlorine solution shall be discharged in such a manner that it does not reach a stream or waterway. Open and close valves several times during contact period. Introduce chlorine into system in an approved manner and at a rate to provide not less than 50 parts per million.

3.10.3 WATER SAMPLES. After disinfection and final flushing, collect two samples taken at least 24 hours apart from the end of the line and test to show the absence of coliform organisms. In the case of long mains, also collect inter mediate samples. Samples shall not be collected from a hose or fire hydrant due to the possibility of contamination during collection. Take samples from sampling taps consisting of a standard corporation cock installed in the main with a copper tube gooseneck assembly. After the samples have been collected the gooseneck assembly may be removed and retained for future use. The samples shall be tested by Woodbury County Department of Health Laboratory for bacteriological examination. Test results shall be delivered to the Engineer and shall be acceptable before delivering any water to the consumer. Cost of this testing shall be incidental to the watermain unit price.

3.10.4 CHLORINE SOLUTION used in the disinfection of watermains shall not be discharged to a receiving stream or water course that discharges to a receiving stream. Discharge into a storm sewer will not be allowed.

DIVISION 16

ELECTRICAL

	<u>PAGES</u>
Section 16100 Material and Equipment.....	1; 2
Section 16110 Raceways.....	1; 4
Section 16120 Wire and Cable.....	1; 4
Section 16134 Outlet Boxes.....	1
Section 16140 Wiring Devices.....	1; 2
Section 16155 Motor Starters.....	1; 2
Section 16160 Panelboards.....	1; 3
Section 16170 Motor and Circuit Disconnects.....	1
Section 16181 Fuses.....	1
Section 16402 Underground Electrical Service.....	1
Section 16450 Grounding.....	1; 2
Section 16958 Well Control System.....	1; 2

SECTION 16100

MATERIAL AND EQUIPMENT

1.0 MATERIAL AND EQUIPMENT shall be of the manufacture, model, and type specified. Substitute material and equipment approved prior to bidding, in accord with the Instructions to Bidders, are incorporated into these Specifications as Addenda.

2.0 MATERIAL AND EQUIPMENT OF ACCEPTABLE MANUFACTURE. An item of material or equipment may be used in place of an item which is specified by manufacturer and model number or type, provided that all of the following provisions are met:

1. The item is manufactured by one of the acceptable manufacturers listed in the Specifications. Lighting fixtures are exempt from this provision.
2. The item of material or equipment meets or exceeds the minimum qualities established by the specified item.
3. The item is used throughout the project so that all items of material or equipment used in place of specified items are of the same make and type.
4. The entire cost of all modifications which result from the use of items in place of specified items shall be borne by the Contractor who uses such items, at no additional cost to other Contractors or to the Owner.

3.0 REPEATED FEATURES OR MATERIALS must be constructed alike, although detailed or indicated only once. Detail and ornament must continue throughout all moldings, bands, etc. Where items, devices, or equipment are specified singular in number, the Specification shall apply to as many items, devices, or pieces of equipment as are shown on the Drawings or required to complete the installation. Repeated items of equipment or materials shall be of the same manufacture, model number, and type.

4.0 WHEN BULKY MATERIAL AND EQUIPMENT ARE FURNISHED BY OTHERS, the General Contractor shall, upon receipt of notice in ample time, leave proper openings to permit the installation and properly close such openings afterwards.

5.0 WHEN EQUIPMENT IS FURNISHED BY OTHERS, the Contractor shall use the manufacturer's detail drawings to establish roughing-in dimensions and location of services. In case of conflict, the equipment detail drawings and dimensions shall be used, except where aesthetic or structural considerations make an adjustment necessary.

6.0 DISCREPANCIES. In the event of discrepancies within the Drawings, within the Specifications, or between the Drawings and Specifications, the more costly of the two or more methods or construction or items shown shall be considered to be shown or specified at all locations where the discrepancies occur.

SECTION 16110

RACEWAYS

1.0 GENERAL

1.1 REQUIREMENTS OF REGULATORY AGENCIES

1.1.1 NATIONAL ELECTRICAL CODE (NEC). Raceways shall be approved for the intended application, and shall meet the requirements of the NEC.

1.2 UNDERWRITERS LABORATORIES INC.

1.2.1 RACEWAYS shall be UL listed.

2.0 PRODUCTS

2.1 CIRCULAR METALLIC RACEWAYS

2.1.1 SIZE. Circular raceways shall be 3/4-inch minimum diameter for lighting and receptacle branch circuit home runs and exterior work and 1/2-inch minimum diameter for other interior work, unless otherwise shown or specified.

2.1.2 RIGID STEEL CONDUIT (RSC) shall be hot-dipped galvanized mild steel, manufactured to ANSI C80.1 and FS WW-C-581.

2.1.3 RIGID ALUMINUM CONDUIT (RAC) shall be nonmagnetic, corrosion-resistant, solid aluminum, manufactured to meet NEC requirements and ANSI C80.5.

2.1.4 ELECTRICAL METALLIC TUBING (EMT) shall be mild steel, electrically welded, galvanized, and produced to ANSI C80.3 and FS WW-C-563. Couplings, fittings, and connectors shall be raintight and concretetight,, steel compression type.

2.1.5 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC) shall meet the specifications for flexible metal conduit, and shall have an outer liquidtight, nonmetallic, sunlight- resistant jacket.

2.2 CIRCULAR NONMETALLIC RACEWAYS

2.2.1 POLYVINYL CHLORIDE CONDUIT (PVC) shall be of the following types:

1. Type 40, Heavy Wall, shall be UL listed for direct burial and exposed use, and shall conform to NEMA standards.
2. Type 80, Extra Heavy Wall, shall conform to U. S. Product Standard PS-21.

2.2.2 BOXES, COVERS, ACCESSORIES, FITTINGS, AND EXPANSION JOINTS shall be UL listed and designed for use with each type of PVC specified.

2.2.3 PVC SOLVENT CEMENT shall be fast drying, solvent weld cement for joining conduits and fittings, and shall be of the same manufacture as the nonmetallic conduits.

2.3 NONCIRCULAR CUSTOM-MADE RACEWAYS

2.3.1 FABRICATE custom-made raceways of code gauge aluminum to configuration suitable for the application and size to meet NEC requirements regarding proper area for conductor fill.

3.0 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

3.1.1 RACEWAYS TYPES for specific applications shall conform to NEC Articles 345 through 362. Use PVC conduit for underground installation only or where specified elsewhere. PVC conduit may also be installed in or below concrete and masonry floors and walls.

3.1.2 INSTALL AN INDEPENDENT RACEWAY SYSTEM for emergency circuits to meet the requirements of NEC, Article 700.

3.1.3 ALL CONDUIT run exposed shall be rigid aluminum.

3.2 INSTALLATION OF CIRCULAR RACEWAYS

3.2.1 DETERMINE EXACT CONDUIT LOCATIONS in the field. Conduit runs shown on the Drawings are diagrammatic.

3.2.2 RUN CONCEALED CONDUITS with long sweep bends and offsets in finished areas.

3.2.3 RUN EXPOSED CONDUITS in unfinished areas parallel, and at right angles, to building lines. Install conduits perpendicular to open web joists directly beneath the upper cord and install conduits parallel to open web joists along the lower cord with no part of the conduit below the cord. Filter and boiler room, only, shall be considered unfinished.

3.2.4 FIT BOX CONNECTIONS with an approved lock nut and steel bushing to form a tight bond with the box.

3.2.5 PROTECT UNGROUNDED CONDUCTORS of No. 4 and larger with insulated bushings where conduits enter boxes, cabinets, gutters, etc., and provide lock nuts on both inside and outside of enclosures to which the conduit is attached.

3.2.6 NONMETALLIC CONDUIT shall have rigid steel ells where penetrating concrete slabs. Do not expose the nonmetallic conduit above finished floor.

3.2.7 CONDUITS CAST IN CONCRETE TOPPINGS, SLABS, AND WALLS shall be of such size and in such a location so as not to impair the strength of the construction. Conduits shall meet the following requirements unless shown otherwise on the Drawings or approved, in writing, by the Engineer.

- .1 Maximum Diameter or conduit thickness shall be $\frac{1}{3}$ of the concrete thickness.
- .2 Minimum spacing of conduit shall be 6 diameters.
- .3 Minimum Concrete Cover shall be $\frac{3}{4}$ inch.
- .4 Reinforcing Bars shall not be displaced.

3.2.8 CONDUITS shall not be cast in or pass through beams, columns, or joists unless shown on the Drawings or approved, in writing, by the Engineer.

3.2.9 SLEEVES for conduits or pipes passing through walls or floors shall be of sizes and locations that do not impair the strength of the construction. Sleeves shall meet the following requirements, unless shown otherwise on the Drawings or approved, in writing, by the Engineer.

- .1 Maximum Diameter shall be 4 inches
- .2 Minimum Spacing shall be 3 diameters.
- .3 Reinforcing Bars shall not be displaced.

3.2.10 DO NOT EMBED ALUMINUM CONDUIT in concrete or earth. Coat aluminum conduit with asphaltum where it passes through concrete or masonry.

3.2.11 BURY PVC conduits a minimum of 18 inches for underground installations, except areas subject to vehicular traffic shall have a minimum cover of 24 inches. The Electrical Contractor shall be responsible for trenching, forming of duct assemblies, backfilling and removing excess earth.

Record dimensions from concrete or building walls to underground electrical work and mark on the record copy of the Drawings.

3.2.12 INSTALL APPROVED EXPANSION JOINTS on PVC conduits where raceway crosses building expansion joint.

3.2.13 INSTALL PVC-COATED CONDUIT AND FITTINGS where indicated for highly corrosive atmospheres.

3.2.14 INSTALL FLEXIBLE CONDUIT for motor connections and other electrical equipment connections where subjected to movement and vibration.

3.2.15 INSTALL LIQUIDTIGHT FLEXIBLE CONDUIT for connection of motors and other electrical equipment where subject to movement and vibration and also where subjected to movement and vibration.

SECTION 16120

WIRES AND CABLES

1.0 GENERAL

1.3 REQUIREMENTS OF REGULATORY AGENCIES

1.3.1 NATIONAL ELECTRICAL CODE (NEC). Wiring methods, conductor applications, and insulations shall meet the requirements of the NEC.

1.3.2 STANDARDS. Conductors shall conform to IPCEA and NEMA specifications for manufacturing, cable identification, and testing, and shall be listed and labeled by the Underwriters Laboratories Inc.

2.0 PRODUCTS

2.1 CONDUCTOR MATERIAL, SIZES AND INSULATION

2.1.1 CONDUCTOR MATERIAL shall be copper. Aluminum conductors will not be permitted.

2.1.2 MINIMUM CONDUCTOR SIZE shall be No. 12 AWG except that or larger, unless otherwise specified herein and permitted in Article 310-5, NEC. Signal and pilot control circuits may be No. 14 AWG minimum.

2.1.3 STRANDED CONDUCTORS. Conductors 8 AWG and larger shall be stranded.

2.1.4 INSULATION. Rate insulated conductors for 600 volts for electrical systems up to 600 volts, unless otherwise specified. Color code insulation as hereinafter specified.

2.2 BUILDING WIRE AND CABLE 600 VOLTS, NOMINAL OR LESS

2.2.1 SECONDARY FEEDERS AND SUBFEEDERS shall be Type RHW, RUW, THW, THWN, or XHHW rated 75C (167F), sized as shown on the Drawings.

2.2.2 POWER BRANCH CIRCUITS shall be sized as shown on the Drawings and shall be of the following types:

RHW, RUW	Dry and Wet Locations
THW, THWN, XHHW	Dry and Wet Locations
RH, RHH, RUH	Dry Locations
THHN	Dry Locations

2.2.3 LIGHTING AND RECEPTACLE CIRCUITS shall be of the following types:

THW, THWN, XHHW	Dry and Wet Locations
THHN	Dry Locations and where run through lighting fixtures
TW	Dry and Wet Locations, No. 10 and smaller

2.2.4 ELECTRIC HEATING CIRCUITS shall be sized as shown on the Drawings, and shall be of the following types:

THW, THWN, XHHW	Dry and Wet Locations
THHN	Dry Locations
THHN or XHHW 90C (194F)	Through electric heating wireway

2.2.5 OIL-RESISTANT FEEDER AND BRANCH CIRCUIT WIRE, for use in areas subject to oil conditions such as shop areas, welding areas, and machine installations, shall be Machine Tool Wire Type MTW.

2.2.6 PULL WIRE shall be 16 AWG galvanized iron in empty conduits in dry locations and 12 AWG copper wire in conduits in, or under, concrete slab-on-grade or in damp locations.

2.3 WIRE CONNECTORS

2.3.1 HAND-APPLIED WIRE CONNECTORS for circuit and fixture conductors from 8 AWG through 10 AWG shall be UL listed for AL/CU, AL/AL, and CU/CU, 600-volt insulated, pressure type, 105C, and shall have an integral self-locking spring grip.

2.3.2 PRESSURE CONNECTORS AND SPLICES for No. 8 AWG through No. 750 MCM shall be mechanical screw or compression type as follows:

- .1 Use Mechanical Connectors for copper conductors only. Connectors shall be copper or bronze bodied and shall be UL listed configurations for taps, tees, or crossover-tees-parallel tap.

2.5 TERMINALS AND SPLICES

2.5.1 SMALL TERMINALS (WIRE SIZE 22-10). Connectors and splices for miscellaneous terminal block connections shall be ring- tongue, insulated indent sleeve type of the proper size to accommodate the conductor.

2.5.2 GROUND CONNECTIONS for 1/0 AWG and larger shall be Cadweld or Burndy "Thermoweld," fusible-metal process or Thomas and Betts Copperweld connectors, Series 53000.

2.6 MISCELLANEOUS WIRING MATERIAL

2.6.1 MISCELLANEOUS CONNECTING AND SPLICING DEVICES. Miscellaneous products, such as heat shrink tubing, electrical insulation, plug caps, splices and kits, tapes, terminal blocks, and terminations, shall be approved for the specific application.

2.6.2 JOINT COMPOUNDS shall be approved for the specific type metal joint to be prepared.

2.6.3 WIRE PULLING LUBRICANTS shall be UL listed for the conductor insulation types.

2.6.4 CABLE TIES, CLAMPS, AND IDENTIFICATION shall be nylon, self-locking.

2.6.5 FIRE SEAL FITTINGS, certified by NEL-PIA, for installation where sleeves penetrate fire-rated walls, floors, etc., as required by NEC Article 300-21. Size fire seals for the application.

2.6.6 UNDERGROUND TAPE WARNING SYSTEM shall be yellow-color-coded, polyethylene tape reading "CAUTION - ELECTRIC LINES BELOW."

3.0 EXECUTION

3.1 WIRING METHODS

3.1.1 INSTALL CONDUCTORS IN CONDUIT unless noted otherwise.

3.1.2 PROVIDE NO. 10 MINIMUM WIRE SIZE from panelboard to first 120-volt lighting fixture or first receptacle for runs 50 feet or more.

3.2 INSTALLATION

3.2.1 INSTALL CONDUCTORS to conform to the applicable requirements of NEC Article 300, Wiring Methods.

3.2.2 RUN FEEDER CABLES CONTINUOUS from origin to termination without splices. Unless otherwise noted, each conduit raceway shall contain only those conductors constituting a single feeder circuit.

3.2.3 JOIN both ends of parallel conductors electrically to form a single conductor. Parallel conductors shall meet the requirements of NEC Article 310-4.

3.2.4 SINGLE-PHASE WIRING. Install one common neutral with 2-phase conductors and a maximum of two circuits per conduit home run, except where otherwise shown on the Drawings. Derating factors for additional number of conductors in conduits shall be applied per NEC Table 310, Note 8.

3.2.5 THREE-PHASE WIRING. Install one common neutral with 3-phase conductors and a maximum of three circuits per conduit home run, except where otherwise shown on the Drawings. Derating factors for additional number of conductors in conduits shall be applied per NEC Table 310, Note 8.

3.2.6 EMERGENCY CIRCUIT WIRING shall comply with Article 700, NEC.

3.2.7 INSTALL CABLE in a neat and substantial manner with necessary hangers, racks, cable cleats, and supports.

3.2.8 CABLE TERMINALS, TAPS AND SPLICES

- .1 Pressure-Type Solderless Connectors shall be used, unless otherwise noted or specified.
- .2 Install Compression-Type Connectors with approved hydraulic tools to assure a permanent, mechanically secure, high-conductivity joint.
- .3 Soldered Joints, where noted or specified, shall be made to mechanically strong cable joints. Apply solder carefully without the use of acid. Wrap soldered connections with insulating plastic tape in a manner approved for circuit voltage.

3.2.9 PROTECT direct buried underground conductors from physical damage with supplementary protection, such as sand, sand and suitable running boards, suitable sleeves, or other approved means.

3.2.10 BURY underground tape warning system 2 foot below the surface before final backfilling of trenches.

3.2.11 IDENTIFICATION

1. Identify Feeder and Branch Circuit Conductors by the following color-coded system:

<u>Phase</u>	<u>120/240 Volts</u>
A	Black
B	Red
C	--
Neutral	White
Equipment Ground	Green

- .2 Exit Light Circuits shall be yellow phase conductor, white neutral conductor.

3.3 STORAGE AND HANDLING

3.3.1 STORE WIRING MATERIALS in a protected environment not subject to physical damage or the effects of sunlight or inclement weather.

SECTION 16134

OUTLET BOXES

1.0 GENERAL

1.1 REQUIREMENTS OF REGULATORY AGENCIES

1.1.1 OUTLET BOXES shall be UL listed.

1.2 ACCEPTABLE MANUFACTURERS

1.2.1 OUTLET BOXES shall be as manufactured by the following:

Appleton Electric
Lew Electric Co.
National Electrical Products Company
Rayco Inc.
Steel City

2.0 PRODUCTS

2.1 OUTLET BOXES

2.1.1 OUTLET BOXES shall be as follows:

Lighting Boxes (flush)	Appleton No. 40-3/4
Lighting Boxes (concrete)	Appleton No. OCR Series
Lighting Boxes (surface)	Appleton No. GS Series
Switch, Receptacle and Telephone Outlets (flush)	Appleton No. 4S-3/4
Switch, Receptacle and Telephone Outlets (surface)	Appleton No. FS and FD

3.0 EXECUTION

3.1 OUTLET BOXES

3.1.1 INSTALL OUTLET BOXES as shown on the Drawings and where required by NEC. Install extension rings where required. Install outlet boxes plumb and flush with finished surfaces. Outlet boxes installed in wet or damp areas shall be enclosed and gasketed.

SECTION 16140

WIRING DEVICES

1.0 GENERAL

1.1 STANDARDS

1.1.1 WIRING DEVICES manufactured by the following will be equally acceptable:

Bryant
Arrow-Hart
Leviton
Slater

1.2.2 WIRING DEVICES shall be listed by Underwriters Laboratories Inc.

1.3 SUBMITTALS

1.3.1 SUBMIT SHOP DRAWINGS AND PRODUCT DATA to the Engineer in accord with the General Conditions and General Requirements as follows:

- .1 Submit Four Copies of Product Data for each type of wiring device and device cover plate.

2.0 PRODUCTS

2.1 SWITCHES

2.1.1 SWITCHES shall be as follows:

Single Pole, 20 ampere	Hubbell 1121 - Ground
Three Way, 20 ampere	Hubbell 1123 - Ground
Four Way, 20 ampere	Hubbell 1124 - Ground
Single Pole, 20 ampere, 120 volt w/pilot	Hubbell 1221PL - Ground
Single Pole, 20 ampere, 277 volt w/pilot	Hubbell 1112PL7 - Ground

2.2 RECEPTACLES

2.2.1 RECEPTACLES shall be as follows:

Duplex, 20 ampere, 120 volt (NEMA 5-20)	Hubbell 5352GRY
Wall Outlet (Microhpone)	Switchcraft G3MS

2.3 DEVICE PLATES

2.3.1 DEVICE PLATES shall be as follows:

Switch Plate, smooth finish Aluminum	Hubbell A1
Receptacle Plate, smooth finish	Hubbell A8
Receptacle Plate, weatherproof	Hubbell 5205

3.0 EXECUTION

3.1 GENERAL REQUIREMENTS

3.1.1 FURNISH AND INSTALL WIRING DEVICES as shown on the Drawings and as specified.

3.1.2 INSTALL WIRING DEVICES plumb with walls so that device plates are tight to finished surfaces.

3.1.3 DEVICE PLATES IN FINISHED AREAS AND ON PAINTED WALLS shall be satin finish stainless steel. Oversized device plates shall not be used.

3.1.4 MOUNT WIRING DEVICES at heights above finished floor as shown on the Drawings.

3.1.5 RUN equipment grounding wire from isolated receptacle ground terminal to main service panel ground. Isolate this conductor from all other interim grounding points.

SECTION 16155

MOTOR STARTERS

1.0 GENERAL

1.1 REQUIREMENTS OF REGULATORY AGENCIES

1.1.1 MOTOR STARTERS shall comply with NEMA Standards, and shall be UL listed.

1.2 ACCEPTABLE MANUFACTURERS

1.2.1 MOTOT STARTERS shall be manufactured by:

Allen Bradley Co.
Cutler Hammer Inc.
General Electric Co., General Purpose Control
I-T-E Electrical Products
Square D Company
Westinghouse, Control Products

2.0 PRODUCTS

2.1 MOTOR STARTER ENCLOSURES

2.1.1 MOTOR STARTER ENCLOSURES shall be NEMA 1 unless noted otherwise, and shall be galvanized, prime painted, and finished in the manufacturer's standard color.

2.2 MANUAL MOTOR STARTERS

2.2.1 FURNISH AC FRACTIONAL HORSEPOWER TYPE for single-phase motors, 1 hp, 230 volt maximum, consisting of a manually-operated pushbutton switch with integral bi-metal thermal overload element and pilot light. Starters shall be capable of being padlocked in the OFF position.

2.3 AC COMBINATION STARTERS

2.3.1 COMBINATION STARTERS shall be fusible type, NEMA Size 1 minimum across-the-line, polyphase, and shall have the following features as called out on the Drawings:

Auxiliary Contacts, a minimum of two normally open and two normally closed
Pushbutton Units
Selector Switch, oiltight with spring return
Indicating Pilot Lights
Padlock Feature
Undervoltage Protection
Ambient Temperature Compensated Melting Allow Type Thermal Overload Element
Control Transformer, 120-volt, with two primary and one secondary fuseholders and fuses

3.0 EXECUTION

3.1 MOTOR STARTERS

3.1.1 INSTALL MOTOR STARTERS with integral control stations and pilot lights, sized as shown on the Drawings. Verify motor characteristics and ambient temperature and size thermal elements accordingly.

SECTION 16160

PANELBOARDS

1.0 GENERAL

1.1 REQUIREMENTS OF REGULATORY AGENCIES

1.1.1 PANELBOARDS shall comply with NEMA Standards, shall be UL listed, and shall have an Integrated Equipment Rating.

1.2 WORK FURNISHED AND INSTALLED BY OTHERS

1.2.1 HOUSEKEEPING PADS FOR FREESTANDING PANELBOARDS shall be furnished and installed by the General Contractor.

1.3 ACCEPTABLE MANUFACTURERS

1.3.1 PANELBOARDS shall be as manufactured by:

Crouse-Hinds Co.
Cutler-Hammer, Inc.
General Electric Co., Distribution Assemblies
Square D Co.
Westinghouse, Control Products
Challenger

1.4 SUBMITTALS

1.4.1 SUBMIT SHOP DRAWINGS to the Engineer in accord with the General Conditions and General Requirements. Shop drawings shall include the following:

Rating Standards
Circuit Breaker Withstandability Data
General Standards

2.0 PRODUCTS

2.1 PANELBOARD ENCLOSURES

2.1.1 CABINETS shall be of code gauge galvanized steel.

2.1.2 TRIM AND DOORS shall be suitable to the mode of mounting, and shall be primed and painted in the manufacturer's standard color.

2.1.3 LOCKS shall be flush cylinder tumbler type and furnished with two keys for each lock. Locks shall be keyed alike.

2.1.4 LOCATE BRANCH CIRCUIT DIRECTORY inside the door. Directory shall consist of a metal frame, clear plastic cover, and typed circuit directory.

2.1.5 MOUNT PANELBOARD IDENTIFIER permanently on the exterior side of the door. Identifier shall consist of white letters on black background for all other panels with a metal frame and clear plastic cover.

2.1.6 PROVIDE EQUIPMENT GROUNDING BAR in panelboards.

2.1.7 PROVIDE BONDED GROUNDING LUG in the main panelboard.

2.1.8 FURNISH SPECIAL FEATURES, such as sub-feed lugs, split bus, or integral contactors as shown on the Drawings.

2.1.9 PROVIDE NEUTRAL BAR where required.

2.1.10 LOAD CENTER TYPE PANELS will not be accepted, unless otherwise specified.

2.1.11 PANELBOARDS used on this project shall be the product of one manufacturer.

2.1.12 MAIN AND BRANCH CIRCUIT BREAKERS shall be plug-on type, and shall have interrupting ratings of 10,000 AIC.

2.2 CIRCUIT BREAKER LIGHTING PANELBOARDS

2.2.1 CIRCUIT BREAKER LIGHTING PANELBOARDS shall be dead front, and shall have an integrated equipment rating (existing).

2.2.2 BRANCH CIRCUIT BREAKERS shall be bolt-on, thermal magnetic type, full size, quick-make, quick-break, trip indicating, with common trip on multiple breakers.

2.2.3 BRANCH CIRCUIT BREAKER minimum interrupting ratings shall be 10,000 AIC for 120/240 volts.

2.3 CIRCUIT BREAKER DISTRIBUTION PANELBOARDS

2.3.1 CIRCUIT BREAKER DISTRIBUTION PANELBOARDS shall be UL labeled for service entrance equipment dead front, and shall have an integrated equipment rating.

2.3.2 EXTENDED VERTICAL BUSSING the full height of the panelboard.

2.3.3 MAIN CIRCUIT BREAKERS shall be bolt-on thermal magnetic type, and shall be capable of being padlocked in the OFF position.

2.3.4 MAIN CIRCUIT BREAKER MINIMUM INTERRUPTING RATINGS shall be 25,000 AIC for 120/240 volt.

2.3.5 BRANCH CIRCUIT BREAKERS shall be plug on thermal magnetic type, full size, quick-make, quick-break, trip indicating, with common trip on multi-pole breakers.

2.3.6 BRANCH CIRCUIT BREAKER MINIMUM INTERRUPTING RATINGS shall be 10,000 AIC for 120/240 volts

3.0 EXECUTION

3.1 INSTALLATION

3.1.1 MOUNT PANELBOARDS plumb, with the top of panelboard at 72 inches above finished floor.

3.1.2 FURNISH AND INSTALL TYPED BRANCH CIRCUIT DIRECTORY for panel boards and typed panelboard identifier.

3.1.3 PROVIDE new circuit breakers in existing panelboards.

16160-3

SECTION 16170
MOTOR AND CIRCUIT DISCONNECTS

1.0 GENERAL

1.1 REQUIREMENTS OF REGULATORY AGENCIES

1.1.1 MOTOR AND DISCONNECT SWITCHES shall be NEMA rated and UL listed, and shall meet the requirements of NEC.

1.2 ACCEPTABLE MANUFACTURERS

1.2.1 DISCONNECT SWITCHES shall be as manufactured by the following:

Allen-Bradley Co.
Cutler-Hammer Inc.
General Electric Co., General Purpose Control
I-T-E Electrical Products
Square D Company
Westinghouse, Control Products

2.0 PRODUCTS

2.1 SWITCHES AND ENCLOSURES

2.1.1 DISCONNECT SWITCHES shall be general duty, fusible, unless noted otherwise, horsepower rated for voltage applied, quick-make, quick-break, and shall be capable of being padlocked in the OFF position. Disconnect switches for main service entrance equipment shall be heavy duty type.

2.1.2 DISCONNECT SWITCH ENCLOSURES shall be NEMA 1, unless noted otherwise, and shall be galvanized, prime painted and finished in the manufacturer's standard color. NEMA 4 enclosures shall be stainless steel.

2.1.3 SERVICE DISCONNECT SWITCH shall be rated for service entrance equipment.

3.0 EXECUTION

3.1 INSTALLATION

3.1.1 INSTALL DISCONNECT SWITCHES as shown on the drawings and where required by NEC.

3.1.2 MAKE LINE SIDE CONNECTIONS to connect switches furnished with pre-wired mechanical equipment.

3.1.3 LABEL EACH DISCONNECT SWITCH with card holder with typed label behind clear plastic cover, with red letters on black background for emergency loads, and white letters on black background for other loads.

SECTION 16181

FUSES

1.0 GENERAL

1.1 REQUIREMENTS OF REGULATORY AGENCIES

1.2.1 FUSES shall be UL listed.

1.2 SUBMITTALS

1.2.1 SUBMIT SHOP DRAWINGS to the Engineer in accord with the General Requirements and General Conditions. Shop drawings include the following:

Catalog Data on each fuse type
Fault Current Analysis of complete distribution system with graphics including fuse Coordination.

1.3 ACCEPTABLE MANUFACTURER

1.3.1 FUSES shall be manufactured by Bussmann Company, Inc., Economy Fuse, or Gould Inc., Electric Fuse Division (Shawmut). Fuses for the project shall be by the same manufacturer.

1.4 SPARE STOCK

1.4.1 FURNISH THREE SPARE FUSES for each size of fuse used on this project.

2.0 PRODUCTS

2.1 FUSES

2.1.1 MAIN SWITCHES, FEEDERS AND BRANCH CIRCUITS

0 - 600 amperes	Bussman Class K1 Low-Peak
0 - 250 volts	LPN-RK1, Dual Element

2.1.2 PANELBOARDS

0 - 600 amperes	Bussman Class K1 Low-Peak
0 - 250 volts	LPN-RK1

2.1.3 MOTORS

0 - 100 amperes	Bussmann Class K5 Fusetron
0 - 250 volts	FRN K5, Dual Element

2.2 LABELS

2.2.1 SWITCHES shall be labeled with the following information and placed on the inside of switch enclosure:

Manufacturer
Type of Fuse
Amperage

3.0 EXECUTION

3.1 FUSES

3.1.1 INSTALL FUSES as shown on the Drawings. Do not install fuses until the equipment has been finally installed, protected, and ready to be energized.

SECTION 16402
UNDERGROUND ELECTRICAL SERVICE

1.0 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

Panelboards	Section 16160
Fuses	Section 16181

1.2 SERVICE ELECTRIC UTILITY

1.2.1 SERVING ELECTRIC UTILITY is as follows:
MidAmerican Energy

1.3 ASSESSMENTS

1.3.1 INCLUDE ALL CHARGES OR FEES levied by the serving electric utility company relative to this Project.

1.4 WORK BY OTHERS

1.4.1 This contract shall coordinate the work and include the costs of work by others including the electric utility as required to complete the electrical and control work as required to make a complete and functional well.

2.0 PRODUCTS

3.0 EXECUTION

3.1 INSTALLATION

3.1.1 INSTALL UNDERGROUND ELECTRIC SERVICE as shown on the Drawings and as required by the serving Electric Utility Company.

SECTION 16450

GROUNDING

1.0 GENERAL

1.1 REQUIREMENTS OF REGULATORY AGENCIES

1.1.1 GROUNDING shall comply with Articles 250 and 680, NEC, and state and local codes. Grounding electrodes and bonding equipment shall comply with NEMA Standards, and shall be UL listed.

2.0 PRODUCTS

2.1 GROUNDING CONDUCTORS

2.1.1 GROUNDING CONDUCTORS shall be insulated. Insulation type shall be identical with the circuit conductors serving the load. Insulation shall be colored green.

2.2 GROUND ELECTRODES

2.2.1 GROUND ELECTRODES shall be copper-clay steel, 3/4-inch diameter, and a minimum of 10 feet long.

2.3 GROUNDING CLAMPS

2.3.1 GROUNDING CLAMPS shall be Thomas and Betts Catalog No. 390 *BU for connection to copper water pipes and Thomas and Betts Catalog No. 3846 for connection to grounding electrodes. (*Contractor to add number as required for pipe size.)

2.4 GROUNDING LUGS

2.4.1 GROUND LUGS shall be Ilsco Catalog No. SL35.

3.0 EXECUTION

3.1 SYSTEM GROUNDING

3.1.1 BOND the grounding electrode conductors to the neutral service entrance conductor(s) and to the metal frame of the main service entrance equipment.

3.1.2 BOND the grounding electrode conductors to the driven grounding electrodes, to the main service code water pipe, and to both sides of the main service water metering equipment.

3.1.3 BOND the grounding electrode conductors to the grounded metal frame of the buildings and bolted frame connections to each other.

3.2 EQUIPMENT GROUNDING

3.2.1 BOND the equipment grounding bus in the main service entrance equipment to the grounding electrode conductor.

3.3 GROUNDING CONDUCTORS

3.3.1 INSTALL equipment grounding conductors on all circuits. Run equipment grounding conductors in the same raceway as the circuit conductors serving each load.

3.3.2 INSTALL equipment grounding conductors on transformers, motor starters, disconnect switches, and other noncurrent carrying parts per NEC.

SECTION 16958

WELL CONTROL SYSTEM

1.0 GENERAL

This well shall be controlled from the existing water treatment plant control panel by a new on/off switch which remotely energizes the starter for the new water well.

1.1 SUBMITTALS

1.1.1 SUBMIT SHOP DRAWINGS AND PRODUCT DATA to the Engineer in accord with the General Conditions and General Requirements as follows:

Starters

Circuit Breakers

Alarms

1.2 DESCRIPTION

This well shall be controlled by a signal wire to be installed by this contract from the existing water treatment plant control panel to the new well control panel. The signal wire shall be 6 - #14 wires in a PVC conduit. A hands-off-automatic (HOA) switch shall be installed in the well control panel. When the HOA switch is in the automatic position the well pump start and stop shall be controlled from the existing water treatment plant control panel with a new on/off switch to control the new well. On (green) and off (red) indication lights shall be installed in the existing water treatment plant control panel above the new on/off switch and the indicator lights shall be labeled on/off, respectively. As a contractor's option the new on/off switch and indicator lights may be mounted in a separate panel and wired to the existing panel. The new well will convert to automatic operation when the water plant expansion occurs. The panel at the new well shall have an HOA switch that provides for manual off in the off position, manual run in the hand position and control from the remote switch in the water plant when in the automatic position. The panel at the new well shall also have on (green) and off (red) indication lights. This contract shall provide the well pump electrical work including the above described control panel with indication lights, the work in the existing control panel and the connection of the new controls and indicator lights to the existing control panel as required to provide a complete and functional system.

1.3 QUALITY ASSURANCES

1.3.1 STANDARDS AND PERFORMANCES for work, equipment, instruments and materials supplied by the Contractor shall conform to the following:

Institute of Electrical and Electronic Engineers, Inc. (IEEE)

IEEE Standard Digital Interface for Programmable Instrumentation

National Electrical Code (NEC)

National Standards Institute (ANSI)

2.0 PRODUCTS

2.1 SIGNAL SWITCHES

2.1.1 SIGNAL SWITCHES shall be utilized and mounted in a panel at the Control Panel with nameplates to direct the sequence of operations.

2.2 INDICATING LIGHTS

2.2.1 THESE SHALL BE REQUIRED ON AND OFF LIGHTS on all units. Lights shall be of the ½ inch bulls eye type.

STATE OF SOUTH DAKOTA

WATER LICENSE NO. 6060-3

(1) The City of North Sioux City, PO Box 338, North Sioux City SD 57049 made Application No. 6060-3, March 9, 1998 for a water permit to divert 2.22 cubic feet of water per second, with total annual diversion of 1,500 acre feet of water from groundwater (one well – Dakota Formation), Union County, South Dakota for municipal purposes. Permit No. 6060-3, with a priority date of March 9, 1998 was approved June 1, 1998 and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before June 1, 2003 and for the application to beneficial use of water on or before June 1, 2007.

(2) The water supply system has been completed and water applied to beneficial use in accordance with South Dakota State Law. Pursuant to South Dakota Codified Law 46-5-30.1, the holder and/or owner of Water Right No. 6060-3 is issued a license, bearing a priority date of March 9, 1998, to appropriate 2.22 cubic feet of water per second, with total annual diversion of 1,500 acre feet of water from groundwater (one well - Dakota Formation). The water is diverted for municipal purposes from the following location:

1,150 feet east and 2,500 feet south from the northwest corner Section 14-T89N-R48W (SW ¼ NW ¼)

(3) This license is subject to South Dakota Water Law, any limitations or conditions listed in Water Permit No. 6060-3 including the following qualifications:

- The well approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
- The well authorized by Permit No. 6060-3 shall be constructed by a licensed well driller and construction shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) from the producing formation to the surface pursuant to Section 74:02:04:28.
- Permit No. 6060-3 authorizes a total annual diversion of 1,500 acre feet of water annually from the Dakota Formation.
- North Sioux City shall report annually to the Chief Engineer on the amount of water withdrawn each year from the Dakota Formation.



Garland Erbele, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

OCT 25 2002

date

