

red: _____

WATER PERMIT NO. 5115-3

MAP No. same

Name of Applicant City of Sioux Falls
Post Office Address Utilities Dept. - Water Division, 224 W 9th Str, Sioux Falls, SD 57102
Amount of Water Claimed 3.10 cfs (average) 6.70 cfs (peak) Total Acre-feet/year 2244
Source of Water Supply ground water - Big Sioux Aquifer
Water to be used for municipal purposes County Minnehaha
About 1 1/2 miles W of Renner.

PROOF OF PUBLICATION: Received ☒ Not Received ☐

APPLICATION: Approved 5/6/87 Subject to _____

F.F. & C.L. Adopted _____ Not Approved _____ Deferred _____

PRIORITY _____ Date Received Dec 19, 1986 Fee \$650⁰⁰ Remarks develop

12/19/86 water reserved by F.U. Permit No. 448-3

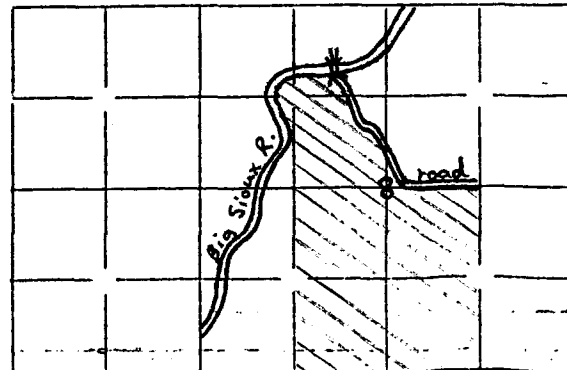
Corrected Application Received _____ Period of Annual Use Jan 1 - Dec 31

WATER QUALITY APPROVAL RECEIVED NA APPROVED/CONDITIONAL (Circle one)

WI-1 Description same as Application YES ☐ NO ☐ REMARKS _____

Diversion Point well field expansion area: W 1/2 SE 1/4,
E 1/2 SW 1/4, East of river in NW 1/4 section 8 - T102 N-
R49 W

Land to be Irrigated NA



Well Log: Driller Lacey Drilling Licensed YES ☒ NO ☐

Depth of Wells ~ 40 feet (5) REMARKS _____

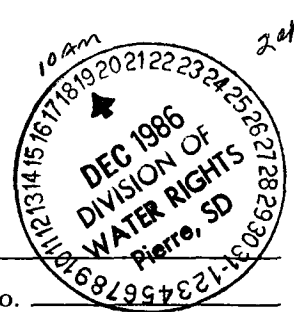
Type of Map topo PREPARED BY DGR & Assoc. Reviewed and the Number assigned on December 31, 1986 By Ron Duvall

No. 5115-3 Hydrologic Unit 101702.03
 Map No. same Basin Big Sioux River
 Newspaper Argus Leader, P.O. Box 5034, Pierre, SD 57501
Sioux Valley News, Box 255, Canton, (Thurs)

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

Check use of water: Industrial ☐ Commercial ☐ Municipal ☒ Other Common Distribution System ☐
 Rural Water System ☐ Suburban Housing ☐ Geothermal Heat ☐ Institutional ☐ Recreational ☐
 Domestic ☐ (above 18gpm) Other ☐

Type of Application: Check one or more of the following

New ☒ Vested Right ☐ Future Use ☐ Change Use ☐☐ Amend Permit No. _____ with old priority date retainedChange diversion point(s) ☐ Add diversion point(s) ☐ Other ☐☐ Application to: Change diversion point(s) ☐ Add diversion point(s) ☐ on Permit No. _____☒ Construction to use water reserved by Future Use Permit No. 448-3

- Name of Applicant City of Sioux Falls Phone No. 605-339-7025
Utilities Department - Water Division
 Post Office Address 224 W. Ninth Street, Sioux Falls SD State 57102
(Street, RR or Box) Zip Code
- Amount of water claimed (c.f.s) 3.10 annual average, 6.70 peak 2244 AF/YR
- Source of water supply Ground Water - Big Sioux Aquifer 5 wells
- Location of point of diversion Approximate Location of wells per plans submitted under
separate cover. Legal Description of site is attached hereto and made part of this
Application. _____ County Minnehaha
- Counties where water will be used Minnehaha
- Annual period during which water is to be used January 1 - December 31
- Give a brief description of proposed 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)
 The project consists of constructing 5 forced false caisson gravel packed wells, a pump control building and necessary pipeline forming a nested site development. Plans and reports have been submitted under separate cover.

Attachments: Attach Form 2A if diversion from a well or dugout, or if storage of water, is proposed. Attach map (see instruction)

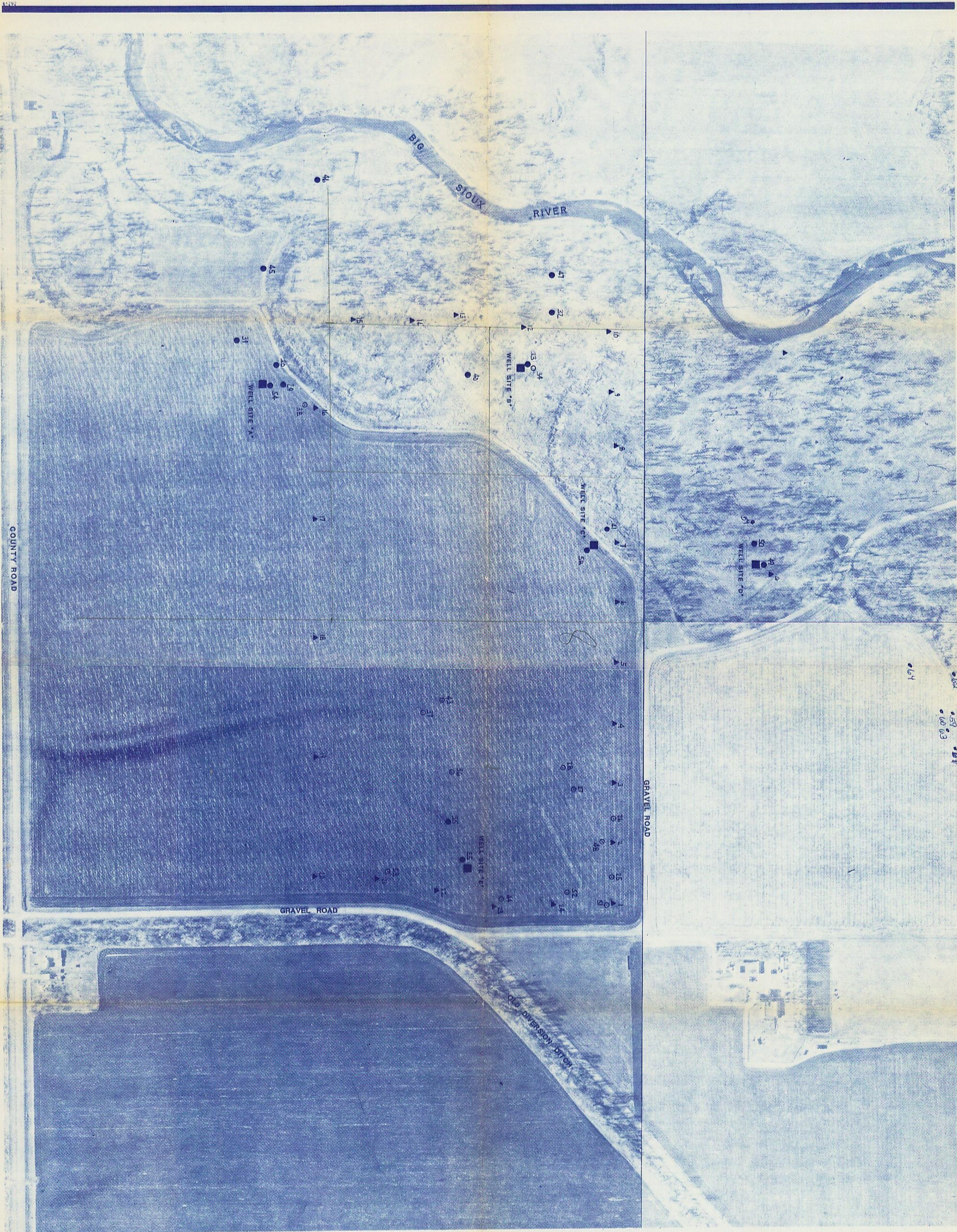
STATE OF SOUTH DAKOTA)
 County of Minnehaha)^{ss}

I, Richard A. Willer, Utilities Director the applicant, certify that I have read the foregoing application, have examined the attached map and that the matters therein stated are true and that I intend, and am able to complete the necessary construction.

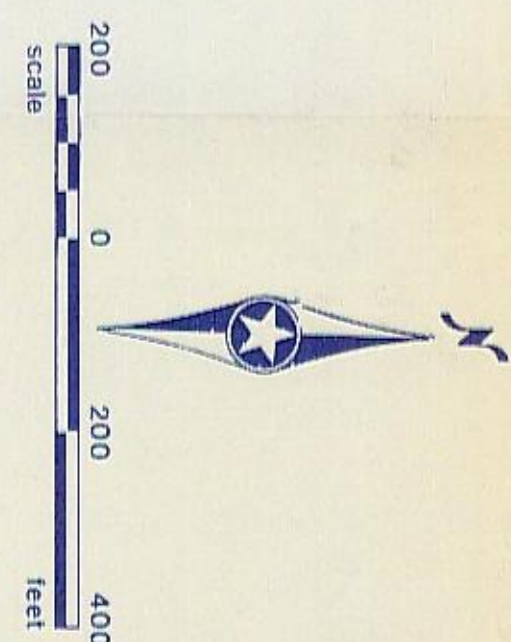
Signed Richard A. WillerSubscribed and sworn to before me this 18th day of DECEMBER 19 86

Notary Public (or other qualified officer)

My Commission Expires
December 28, 1992



- LEGEND
- ▲ EXISTING OBSERVATION WELL
 - TEST HOLE
 - ENCASED OBSERVATION WELL
 - WELL SITE LOCATION



TEST HOLE , OBSERVATION WELL
AND WELL SITE LOCATIONS

I hereby certify that this plan, specification or report was prepared by me or under my direct personal supervision and that I am a duly Registered Professional Engineer under the laws of the State of SOUTH DAKOTA and that I am competent to prepare this document.

Reg. No. 3612 Date 11-12-86

By John A. Reckert

1986 WELL FIELD EXPANSION
SIOUX FALLS, SOUTH DAKOTA

WATER PERMIT

The Water Management Board hereby approves Water Permit Application No. 5115-3

City of Sioux Falls (Applicant) Water Division, 224 W 9th St, Sioux Falls (Post Office Address)
SD (State) 57102 (Zip Code)

With the following qualifications.

The wells 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.

Approval of this Permit authorizes annual withdrawals of 2,244 acre feet.

The wells constructed pursuant to this permit shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04.

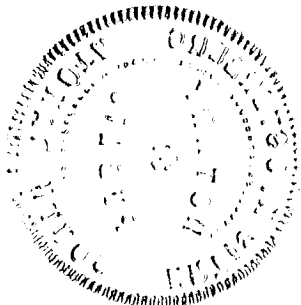
Date of first receipt of application December 19, 1986.

Date of return to applicant for correction, amendments or changes required _____, 19____.

Date of receipt of corrected application _____, 19____. Approved May 6, 1987.

The Water Management Board hereby approves this Water Permit No. 5115-3 authorizing the construction of the water use system and the placing of water to beneficial use as stated in the Application and as qualified in the Water Permit approval, subject, however, to the following limitations and conditions:

1. The date from which applicant may claim right is April 8 1957 December 19, 1986
2. The equivalent of at least one-fifth of the specified work is to be completed on or before October 6, 1989.
3. The whole of said work is to be completed on or before May 6, 1992.
4. The limit of time from proof of beneficial use of water appropriated in accordance herewith is May 6, 1996.
5. The water appropriated shall be used for the purpose of municipal use by the City of Sioux Falls
6. The prior right of all persons who, by compliance with the laws of the State of South Dakota, have acquired a right to the use of water must not be unlawfully impaired by this appropriation.
7. The amount of the appropriation herein granted shall not exceed 2,244 acre-feet annually 6.70 cubic feet per second; neither shall it exceed the capacity of the above described water supply system nor shall it exceed the amount of water needed for beneficial uses served and to which water is actually and beneficially applied for municipal use on or before May 6, 1996; said water to be used during the following described annual period: Jan 1 - Dec 31



WATER MANAGEMENT BOARD

By:

John H. Hald
Chief Engineer

Division of Water Rights

Dept. of Water and Natural Resources

JUL 16 1987

, 19____

Supplemental Information

(type or print in ink)

1. Well Information - Proposed construction Typical per 5 wells

- a) Drill Hole Diameter 20" Depth 40' ave
- b) Casing Type Steel Diameter 12" Thickness .375"
- c) Screen Type Stainless Steel Diameter 12" Thickness 3/16"
- d) Gravel Pack Thickness 4" Length of Gravel Pack 25' ave
- e) Depth to Top of Water Bearing Material 9' ave
- f) Depth of Water (ground surface to water level) 5' ave
- g) Distance to nearest existing domestic well:
- On applicants property _____ On property owned by others 1000' more or less

2. Dugout Information Estimates

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

3. Water Storage Dams

If the proposed water use system contains one or more storage dams, please furnish the information requested below. The locations of each dam should 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

b) Freeboard _____

c) Crest Width _____

Crest Length _____

d) Height _____

e) Outlet Dimensions:
Pipe diameter _____

Spillway width _____

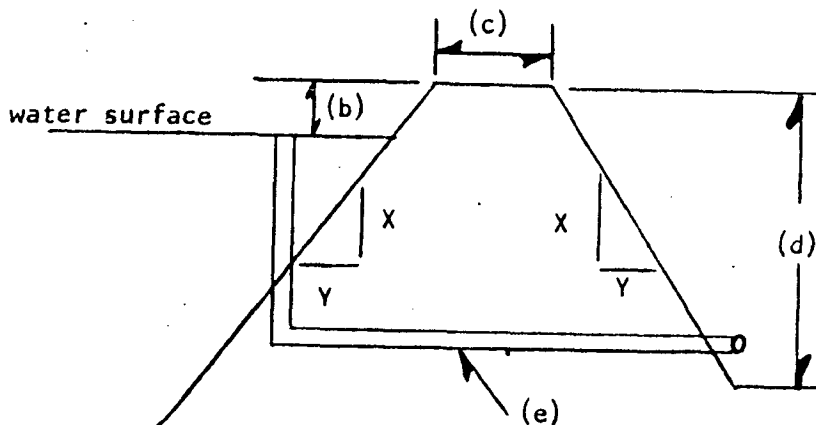
f) X & Y Slope
Upstream _____

Downstream _____

Surface Area of Impoundment _____

Storage _____ acre feet

Drainage area above dam _____



* Richard J. Smith
Signature of Applicant

SUPPLEMENTAL INFORMATION

(type or print in ink)



Well Information - Proposed Construction - Well #48

- a) Drill Hole Diameter 20" Depth 43'
- b) Casing Type Steel Diameter 12" Thickness .375"
- c) Screen Type Stainless Steel Diameter 12" Thickness 3/16"
- d) Gravel Pack Thickness 4" Length of Gravel Pack 33'
- e) Depth to Top of Water Bearing Material 10'
- f) Depth of Water (ground surface to water level) 10'
- g) Distance to nearest Existing Domestic Well:
On applicants property _____ On property owned by others 1,050'
- h) Flow Rate, cfs 1.1

SUPPLEMENTAL INFORMATION

(type or print in ink)



Well Information - Proposed Construction - Well #49

- a) Drill Hole Diameter 20" Depth 43'
- b) Casing Type Steel Diameter 12" Thickness .375"
- c) Screen Type Stainless Steel Diameter 12" Thickness 3/16"
- d) Gravel Pack Thickness 4" Length of Gravel Pack 34'
- e) Depth to Top of Water Bearing Material 9.1'
- f) Depth of Water (ground surface to water level) 9.5'
- g) Distance to nearest Existing Domestic Well:
On applicants property _____ On property owned by others 2,070'
- h) Flow Rate. cfs 1.1

SUPPLEMENTAL INFORMATION

(type or print in ink)



Well Information - Proposed Construction - Well #50

- a) Drill Hole Diameter 20" Depth 42'
- b) Casing Type Steel Diameter 12" Thickness .375"
- c) Screen Type Stainless Steel Diameter 12" Thickness 3/16"
- d) Gravel Pack Thickness 4" Length of Gravel Pack 33'
- e) Depth to Top of Water Bearing Material 9'
- f) Depth of Water (ground surface to water level) 10'
- g) Distance to nearest Existing Domestic Well:
On applicants property _____ On property owned by others 1,900'
- h) Flow Rate, cfs 0.7

SUPPLEMENTAL INFORMATION

(type or print in ink)



Well Information - Proposed Construction - Well #51

- a) Drill Hole Diameter 20" Depth 40'
- b) Casing Type Steel Diameter 12" Thickness .375"
- c) Screen Type Stainless Steel Diameter 12" Thickness 3/16"
- d) Gravel Pack Thickness 4" Length of Gravel Pack 32'
- e) Depth to Top of Water Bearing Material 8'
- f) Depth of Water (ground surface to water level) 9.5'
- g) Distance to nearest Existing Domestic Well:
On applicants property _____ On property owned by others 1,700'
- h) Flow Rate, cfs 0.6

SUPPLEMENTAL INFORMATION

(type or print in ink)



Well Information - Proposed Construction - Well #52

- a) Drill Hole Diameter 20" Depth 33'
- b) Casing Type Steel Diameter 12" Thickness .375"
- c) Screen Type Stainless Steel Diameter 12" Thickness 3/16"
- d) Gravel Pack Thickness 4" Length of Gravel Pack 27'
- e) Depth to Top of Water Bearing Material 6'
- f) Depth of Water (ground surface to water level) 6'
- g) Distance to nearest Existing Domestic Well:
On applicants property _____ On property owned by others 1,200'
- h) Flow Rate, cfs 0.9

Attachment

Location of Points of Diversion

Property Description - Sites A, B, C, & E

West 1/4 of Southeast 1/4 except right-of-way for drainage ditch and except County Auditors Lot H1, of the Southwest 1/4 of the Southeast 1/4 and the East 1/4 of the Southwest 1/4 except County Auditors Log H3, of the Southeast 1/4 of the Southwest 1/4 of Section 8, Township 102 North, Range 49 West.

Description - Site D - per Lease Purchase Option

1 acre to be selected from: 55 acres more or less located West of the Township road and East of the Sioux River within the North 1/2 of Section 8, Township 102 North, Range 49 West.



WELL DRILLING CO.
1401 E. 63rd ST. N.
SIOUX FALLS, SD 57104

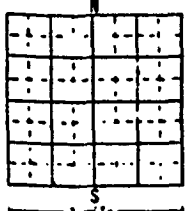
City of Sioux Falls

STATIC WATER LEVELS

Test Holes

# 1	7 ft. $5\frac{1}{2}$ in.
# 2	5 ft. $6\frac{1}{2}$ in.
# 3	6 ft. 3 in.
# 4	7 ft. $5\frac{1}{2}$ in.
# 5	8 ft.
# 6	8 ft. 8 in.
# 7	10 ft. 5 in.
# 8	8 ft. 11 in.
# 9	7 ft. $2\frac{1}{2}$ in.
# 10	5 ft. 9 in.
# 12	8 ft. 6 in.
# 13	10 ft. 6 in.
# 14	10 ft. $4\frac{1}{2}$ in.
# 15	10 ft. $3\frac{1}{2}$ in.
# 16	9 ft. 5 in.
# 17	8 ft. 8 in.
# 18	7 ft. $9\frac{1}{2}$ in.
# 19	7 ft. 1 in.
# 20	6 ft. 11 in.
# 21	6 ft. $5\frac{1}{2}$ in.
# 22	6 ft. $\frac{1}{2}$ in.
# 23	6 ft. 9 in.
# 24	7 ft.

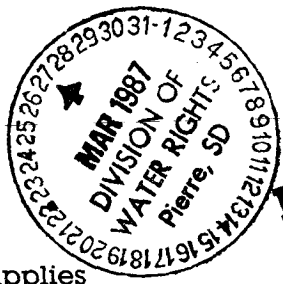
Test hole readings taken at ground level

1. LOCATION OF WELL					MINNESOTA UNIQUE WELL NO.	
WATER WELL RECORD					for Water Sample	
Minnesota Statutes 136A.01-.05						
County Name		Township Name		Range Number	Section No.	Fracture
Distance and Direction from Road Intersections or Street Address and City of Well Location						
Show exact location of well on section grid with "X." 				Sketch map of well location. Additional Name Block Number Lot Number		
2. INFORMATION LOG		COLOR	HARDNESS OF FORMATION	FROM	TO	
Test Log # 8						
top soil		black		0	2	
clay		brown		2	11	
sand-fine		colored		11	17	
sand - med		"		17	29	
sand very fine		grey		29	32	
clay		"		32	33	
sand		"		33	34	
clay		"		34	40	
Fluid loss						
15 to 34 - 20 to 25 gals						
.020 screen						
15. REMARKS, ELEVATION, SOURCE OF DATA, etc.						
WORK COPY						

3. PROPERTY OWNER'S NAME			
Address			
4. WELL DEPTH (completed)		Date of Completion	
5. ☐ Casing used ☐ Reverse ☐ Drive ☐ Plug			
☐ Motor used ☐ Air ☐ Bored ☐ _____			
☐ Rotary ☐ Jetted ☐ Power Auger			
6. USE			
☐ Domestic ☐ Public Supply ☐ Industry			
☐ Irrigation ☐ Municipal ☐ Commercial			
☐ Yes Well ☐ Air Conditioning ☐ _____			
7. CASING		HEIGHT: Above/Below	
☐ Black ☐ Threaded		Surface _____ ft.	
☐ Galv. ☐ Welded		Drive Shaft? Yes _____ No _____	
☐ _____ ☐ _____		In. to _____ ft. Weight _____ lbs./ft. _____ in. to _____ ft.	
☐ _____ ☐ _____		In. to _____ ft. Weight _____ lbs./ft. _____ in. to _____ ft.	
☐ _____ ☐ _____		In. to _____ ft. Weight _____ lbs./ft. _____ in. to _____ ft.	
8. SCREEN		Or open hole	
Make _____		From _____ ft. to _____ ft.	
Type _____		Dia. _____	
Slot/Gauge _____		Length _____	
Set between _____ ft. and _____ ft.		FITTINGS:	
_____ ft. and _____ ft.			
_____ ft. and _____ ft.			
9. STATIC WATER LEVEL			
_____ ft. ☐ Below land surface ☐ Above _____ ft. Measured _____			
10. PUMPING LEVEL (Below land surface)			
_____ ft. after _____ hrs. pumping _____ g.p.m.			
_____ ft. after _____ hrs. pumping _____ g.p.m.			
11. WELL HEAD COMPLETION			
☐ Pressure adapter ☐ Basement offset ☐ At least 12" above ground			
12. Well grouted?			
☐ Yes ☐ No C's. Yds. _____			
☐ Neat Cement ☐ Best mix ☐ _____			
Depth: from _____ ft. to _____ ft.			
from _____ ft. to _____ ft.			
13. Nearest source of possible contamination			
_____ feet _____ direction _____ ft. per			
Well disinfected upon completion? Yes ☐ No ☐			
14. PUMP			
State installed _____			
☐ Not installed			
Manufacturer's Name _____			
Model Number _____ HP _____ Volts _____			
Length of drop pipe _____ ft. capacity _____ g.p.m.			
Material of drop pipe			
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating			
☐ Jet ☐ Centrifugal ☐ _____			
15. WATER WELL CONTRACTOR'S CERTIFICATION			
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.			
Licensee Business Name _____ License No. _____			
Address _____			
Signed _____ Date _____			
Authorized Representative _____			
Name of Driller _____ Date _____			

1. LOCATION OF WELL		STATE OF MINNESOTA DEPARTMENT OF HEALTH WATERWELL RECORD		MINNESOTA UNIQUE WELL NO. <i>(for Water Sample)</i>	
County Name _____					
Township Name _____	Range Number _____ Section No. _____	Easting Number _____	Northing Number _____	Fraction _____	
Distance and Direction from Road Intersections or Street Address and City of Well Location _____					
Show exact location of well in section grid with "X." Sketch map of well location.					
2. FORMATION LOG		COLOR	THICKNESS OF FORMATION	FROM	TO
Test Hole #17 top soil black 0 2 clay brown 2 13 sand coarse colored 13 18 sand fine to med. grey 18 23 sand med to coarse " 23 30 clay grey 30 40					
Fluid loss 13 to 18' 25 to 30 gals. 18 to 23 10 to 15 23 to 30 20 to 25 gals.					
1030 o/bt screen bottom set at 30'					
(or a second sheet, if needed.)					
15. REMARKS, ELEVATION, SOURCE OF DATA, etc.					

3. PROPERTY OWNER'S NAME	
Address _____	
4. WELL DEPTH (completed)	
Total of Completion _____ ft.	
☐ Cable tool ☐ Brownie ☐ Trencher ☐ Dig ☐ Hammer drill ☐ Air ☐ Sand ☐ _____ ☐ Rotary ☐ Jetted ☐ Power Auger	
5. USE	
☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Municipal ☐ Commercial ☐ Test Well ☐ Air Conditioning ☐ _____	
7. CASING	
☐ Black ☐ Threaded HEIGHT: Above/Below _____ ☐ Galv. ☐ Welded Surface _____ ft. ☐ _____ ☐ _____ Drive Shaft? Yes _____ No _____ _____ ft. to _____ ft. Weight _____ lbs./ft. _____ ft. to _____ ft. _____ ft. to _____ ft. Weight _____ lbs./ft. _____ ft. to _____ ft. _____ ft. to _____ ft. Weight _____ lbs./ft. _____ ft. to _____ ft.	
8. SCREEN	
Make _____ Or open hole from _____ ft. to _____ ft. Type _____ Dia. _____ Slot/Gauge _____ Length _____ FITTINGS: Set between _____ ft. and _____ ft. _____ ft. and _____ ft. _____ ft. and _____ ft.	
9. STATIC WATER LEVEL	
_____ ft. ☐ below land surface ☐ above Date Measured _____	
10. PUMPING LEVEL (below land surface)	
_____ ft. after _____ hrs. pumping _____ g.p.m. _____ ft. after _____ hrs. pumping _____ g.p.m.	
11. WELL HEAD COMPLETION	
☐ Pressure adapter ☐ Basement offset ☐ At least 12" above grade	
12. Well grouted?	
☐ Yes ☐ No Gr. Vols. _____ ☐ Most cement ☐ Non-shrink ☐ _____ Depth: From _____ ft. to _____ ft. From _____ ft. to _____ ft.	
13. Nearest source of possible contamination	
_____ feet direction _____ type _____ Well disinfected upon completion? Yes ☐ No ☐	
14. PUMP	
Date installed _____ ☐ Not installed	
Manufacturer's Name _____	
Model Number _____ HP _____ Volts _____	
Length of drop pipe _____ ft. capacity _____ g.p.m.	
Material of drop pipe _____	
Type: ☐ Hammermill ☐ L.S. Turbine ☐ Reciprocating	
☐ Jet ☐ Centrifugal ☐ _____	
16. WATER WELL CONTRACTOR'S CERTIFICATION	
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.	
_____ Licensee Business Name Licensee No. _____	
Address _____	
Signed _____ Date _____	
Authorized Representative	
Name of Driller Date _____	



In Water Since 1946

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Telephone 428-5686 or 428-5979

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Water Source Heat Pumps

Test Drilling City of Sioux Falls

#25 0-10 Brown Clay
10-20 Fine Grey Sand
20-25 Grey Sand
25-28 Grey Gravel
28-33 Fine Sand + mud
33-35 Blue Clay

#26 0-11 Brown Clay
11-23 Fine Grey Sand
23-28 Grey Gravel
28-30 Brown mud
30-33 Sand
33-35 Blue Clay

#27 0-12 Clay
12-20 Good Brown Sand
20-30 Good Gravel
30 Rocks

#28 0-12 Brown Clay
12-20 Brown Sand
20-28 Gravel
28-30 Rocks
30-32 Blue Clay

#29 0-12 Brown Clay
12-20 Grey Sand
20-43 Gravel
43-45 Blue Clay

#30 0-11 Brown Clay
11-20 Grey Sand
20-42 Gravel
42-43 Blue Clay

#31 Pilot Hole Well 'A'
0-10 Brown Clay
10-20 Grey Sand
20-43 Grey Gravel
43-45 Blue Clay

#32 0-6 Clay
6-10 Brown mud
10-13 mud + Sand
13-15 Fine Sand
15-28 Good Grey Sand
28-29 Blue Clay

#33 0-10 Clay
10-15 Fine Brown Sand
15-20 Grey Sand
20-43 Grey Good Gravel
43-44 Blue Clay

#34 Pilot Hole Well 'B'
0-10 Brown Clay
10-15 Fine Sand
15-30 Grey Sand
30-41 Grey Gravel
41-42 Blue Clay

#35 0-8 Grey Clay
8-20 Grey Sand
20-32 Good Gravel
32-33 Blue Clay

#36 0-8 Brown Clay
8-10 mud
10-20 Grey Sand
20-24 Grey Gravel
24-29 Good Grey Gravel
29-30 Blue Clay

Wells
Test Drilling
Irrigation Supplies

LACEY WELL DRILLING

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Trent, South Dakota 57065
Telephone 428-5686 or 428-5979

Pumps
Water Specialists
Water Source Heat Pumps

#37 0-4 Hard Topsoil
4-10 Clay
10-20 Grey Sand
20-25 Grey Gravel
25-30 Fine Sand
30-32 Silty
32-33 Blue Clay

#39 0-5 Topsoil
5-12 Brown Clay
12-20 Fine Sand & Gravel
20-42 Sand & Gravel
42-44 Blue Clay

#41 0-6 Topsoil
6-10 Dirty Sand
10-15 Sand
15-44 Coarse Sand
44-45 Blue Clay

#43 0-5 Black Topsoil
5-10 Grey to tan clay
10-31 medium to Coarse Gravel
31-32 Blue Clay

#45 0-4 Topsoil
4-15 Sand
15-41 Grey medium Sand
41-43 Blue Clay

#47 0-4 Topsoil
4-12 clay
12-24 Sand

#38 0-5 Topsoil
5-9 Mud
9-14 Sand
14-15 mud Lens
15-20 Coarse Gravel
20-25 Sand
25-35 Fine Gravel
35-42 Gravel
42 Blue clay

#40 0-7 Topsoil
7-9 Mud
9-15 Sand
15-40 Coarse Gravel
40-41 Blue Clay

#42 0-6 Topsoil
6-10 Dirty Sand
10-25 Medium Sand
25-43 Coarse Gravel
43-44 Blue clay

#44 0-5 Topsoil
5-10 Brown Clay
10-20 Sand
20-33 Good Gravel
33-34 Blue Clay

#46 0-6 Topsoil
6-9 mud
9-31 Sand
31-33 Blue Clay

#48 0-6 Topsoil
6-9 clay
9-12 mud
12-15 Sand
15-28 Gravel
28-30 Blue clay

In Water Since 1946

LACEY WELL DRILLING

Wells
Test Drilling
Irrigation Supplies

Box 796
Trent, South Dakota 57065
Telephone 428-5686 or 428-5979

Pumps
Water Specialists
Water Source Heat Pumps

3

#49 0-6 Topsoil
6-10 clay
10-12 Brown Sand
12-25 Grey Sand
25-39 Grey Gravel
39-40 Blue Clay

#51 0-5 Black Topsoil
5-9 Tan clay
9-30 Fine Sand
30-36 Hard Clay

#53 0-4 Black Topsoil
4-8 Grey Sand
8-15 Very Rusty Sand
15-30 Sand
30-37 Soft + Hard Clay

#55 0-5 Topsoil
5-9 Brown Sandw/clay
9-31 Good Sand
31-32 Blue clay

#57 Pilot Hole well 'C'
0-8 Black Topsoil
8-12 Brown + Grey Clay
12-42 Sand + Gravel
42-43 Blue clay

#50 0-4 Topsoil
4-12 Brown Sand
12-25 Grey Sand
25-38 Grey Gravel
38-40 Blue Clay

#52 0-6 Black Topsoil
6-10 Tan Clay
10-31 Sand
31-32 Blue Clay

#54 0-10 Black Topsoil
10-43 Gravel
43-44 Blue Clay

#56 Pilot Hole well 'E'
0-5 Topsoil
5-10 Brown Sandy Clay
10-32 Good Sand
32-34 Blue Clay

#58 0-6 Black Topsoil
6-9 Tan Clay
9-15 Fine Brown Sand
15-41 Grey medium Sand
41-43 Blue Clay

In Water Since 1946

LACEY WELL DRILLING

Wells
Test Drilling
Irrigation Supplies

Box 796
Trent, South Dakota 57065
Telephone 428-5686 or 428-5979

4
Pumps
Water Specialists
Water Source Heat Pumps

#59 0-6 Black Topsoil
6-9 Grey Clay
9-12 Sand
12-14 mud lens
14-28 Coarse Gravel
28-30 Blue Clay

#60 0-6 Black Topsoil
6-9 Grey Clay
9-15 Dirty Fine Sand
15-26 Coarse Sand
26-28 Blue Clay

#61 0-6 Black Topsoil
6-10 Brown Clay
10-15 Sand
15-33 Good Gravel
33-35 Blue Clay

#62 0-14 Topsoil
14-17 Sand
17-18 mud
18-23 Sand
23-33 Coarse Gravel
33-34 Blue Clay

#63 0-6 Topsoil
6-10 Clay
10-14 mud
14-20 Sand
20-34 Gravel
34-35 Blue Clay

#64 0-6 Topsoil
6-12 Clay
12-15 Sand
15-28 Gravel
28-31 Fine Sand
31-32 Blue Clay

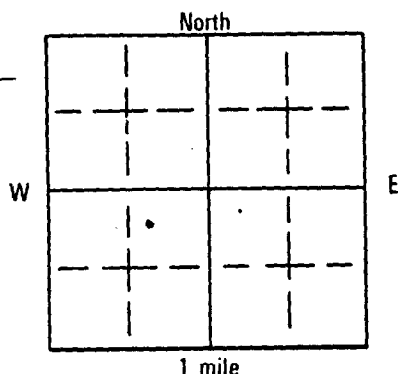
All points from #59 to #64 are north of gravel road
and ~~east~~ of river & pasture land.

All drilling done by : Lacey Well Drilling

Jim Lacey
Joan Redder

SOUTH DAKOTA WATER WELL COMPLETION REPORT

10-85

Location SE SW 1/4 Sec 8 Twp 102N Rg 49WCounty
MINNEAPOLISPlease mark well
location with
an "X"Well Completion Date 12-10-86

PROPOSED USE:

☐ Domestic ☒ Municipal ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Stock

Method of Drilling:

Bucket-Boring-False casing

CASING DATA:

☒ Steel ☐ Plastic ☐ Other

If other describe _____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN

GROUT:

Was the well grouted? ☒ YES ☐ NOTo what depth? 0-10' FEETWhat is grouting material? Bentonite

If cement, number of sacks? _____

Describe grouting procedure _____

What was grout weight? _____ LB/GAL

SCREEN: ☐ Perforated pipe ☒ ManufacturedDiameter 12" IN Length 12' FEETMaterial Stainless SteelSlot Size 1/25 Set From 31 1/2" Feet To 43 1/2" Feet

Slot Size _____ Set From _____ Feet To _____ Feet

Slot Size _____ Set From _____ Feet To _____ Feet

Other information _____

Was a packer or seal used? ☐ YES ☒ NO

If so, what material? _____

Describe packer(s) and location? _____

Was well disinfected upon completion? ☒ YES ☐ NOExplain ChlorinatedBacteriological analysis ☐ YES ☐ NO

Laboratory sent to _____

Well Owner:

Name City of Sioux Falls

Address _____

Well Log:

Formation

Depth

	From	To
<u>Topsail</u>	<u>0</u>	<u>4</u>
<u>Clay + mud</u>	<u>4</u>	<u>10</u>
<u>Sand</u>	<u>10</u>	<u>12</u>
<u>Clay lens</u>	<u>12</u>	<u>13</u>
<u>Grey Sand</u>	<u>13</u>	<u>20</u>
<u>Gravel</u>	<u>20</u>	<u>35</u>
<u>Coarse Gravel</u>	<u>35</u>	<u>38</u>
<u>Good Sand</u>	<u>38</u>	<u>43 1/2"</u>

STATIC WATER LEVEL 10' Feet

If flowing: closed in pressure _____ PSI

GPM flow _____ through _____ inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other

If other, specify _____

Can well be completely shut in? _____

WELL TEST DATA:

☒ Pumped☐ Bailed

Describe: _____

☐ Other _____

Pumping Level Below Land Surface

20' ft. After 72 Hrs. pumped 600 GPM

_____ ft. After _____ Hrs. pumped _____ GPM

_____ ft. After _____ Hrs. pumped _____ GPM

REMARKS: - Fairly good well -This well was drilled under license # 447

And this report is true and accurate.

Drilling firm Lacey Well Drilling

Signature of License Representative:

Jamuel Lacey

Signature of Well Owner:

Douglas T. HalversonDate 3-5-87

SOUTH DAKOTA WATER WELL COMPLETION REPORT

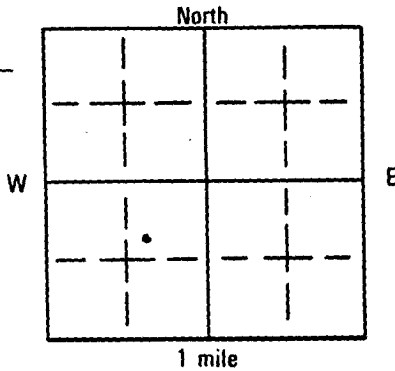
10-85

Location NE 1/4 SW 1/4 Sec 8 Twp 102-N Rg 49-W

County

MINNEAPOLIS

Please mark well location with an "X"

Well Completion Date 12-6-86

PROPOSED USE:

- ☐ Domestic ☒ Municipal ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Stock

Method of Drilling:

Bucket-Boring-False casing

CASING DATA:

- ☒ Steel ☐ Plastic ☐ Other

If other describe _____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
_____ LB/FT	_____ IN	<u>0</u> FT	<u>31'</u> FT	<u>12"</u> IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN

GROUT:

Was the well grouted? ☒ YES ☐ NOTo what depth? 0-9'6" FEETWhat is grouting material? Bentonite

If cement, number of sacks? _____

Describe grouting procedure _____

What was grout weight? _____ LB/GAL

SCREEN: ☐ Perforated pipe ☒ ManufacturedDiameter 12" IN Length 12' FEETMaterial Stainless SteelSlot Size 1/8" Set From 31' Feet To 43' Feet

Slot Size _____ Set From _____ Feet To _____ Feet

Slot Size _____ Set From _____ Feet To _____ Feet

Other information _____

Was a packer or seal used? ☐ YES ☒ NO

If so, what material? _____

Describe packer(s) and location? _____

Was well disinfected upon completion? ☒ YES ☐ NOExplain ChlorinatedBacteriological analysis ☒ YES ☐ NOLaboratory sent to City of Sioux Falls

Well Owner:

Name

City of Sioux Falls

Address _____

Well Log:

B

Depth

Formation

From

To

<u>Topsoil</u>	<u>0</u>	<u>2</u>
<u>Brown clay</u>	<u>2</u>	<u>9</u>
<u>Grey Gravel</u>	<u>9</u>	<u>14</u>
<u>Mud Struck</u>	<u>14</u>	<u>14</u>
<u>Grey Fine Sand</u>	<u>14</u>	<u>16</u>
<u>Grey Sand</u>	<u>16</u>	<u>20</u>
<u>Grey Gravel</u>	<u>20</u>	<u>43</u>

STATIC WATER LEVEL 9'6" Feet

If flowing: closed in pressure _____ PSI

GPM flow _____ through _____ inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other

If other, specify _____

Can well be completely shut in? _____

WELL TEST DATA:

☒ Pumped☐ Bailed

Describe: _____

☐ Other

Pumping Level Below Land Surface

<u>20'</u>	ft.	After <u>72</u>	Hrs.	pumped <u>700</u>	GPM
_____	ft.	After _____	Hrs.	pumped _____	GPM
_____	ft.	After _____	Hrs.	pumped _____	GPM

REMARKS:

This well was drilled under license # 447

And this report is true and accurate.

Drilling firm Lacey Well Drilling

Signature of License Representative:

James J. Lacey

Signature of Well Owner:

Douglas T. Hildebrand

Date

2-25-87

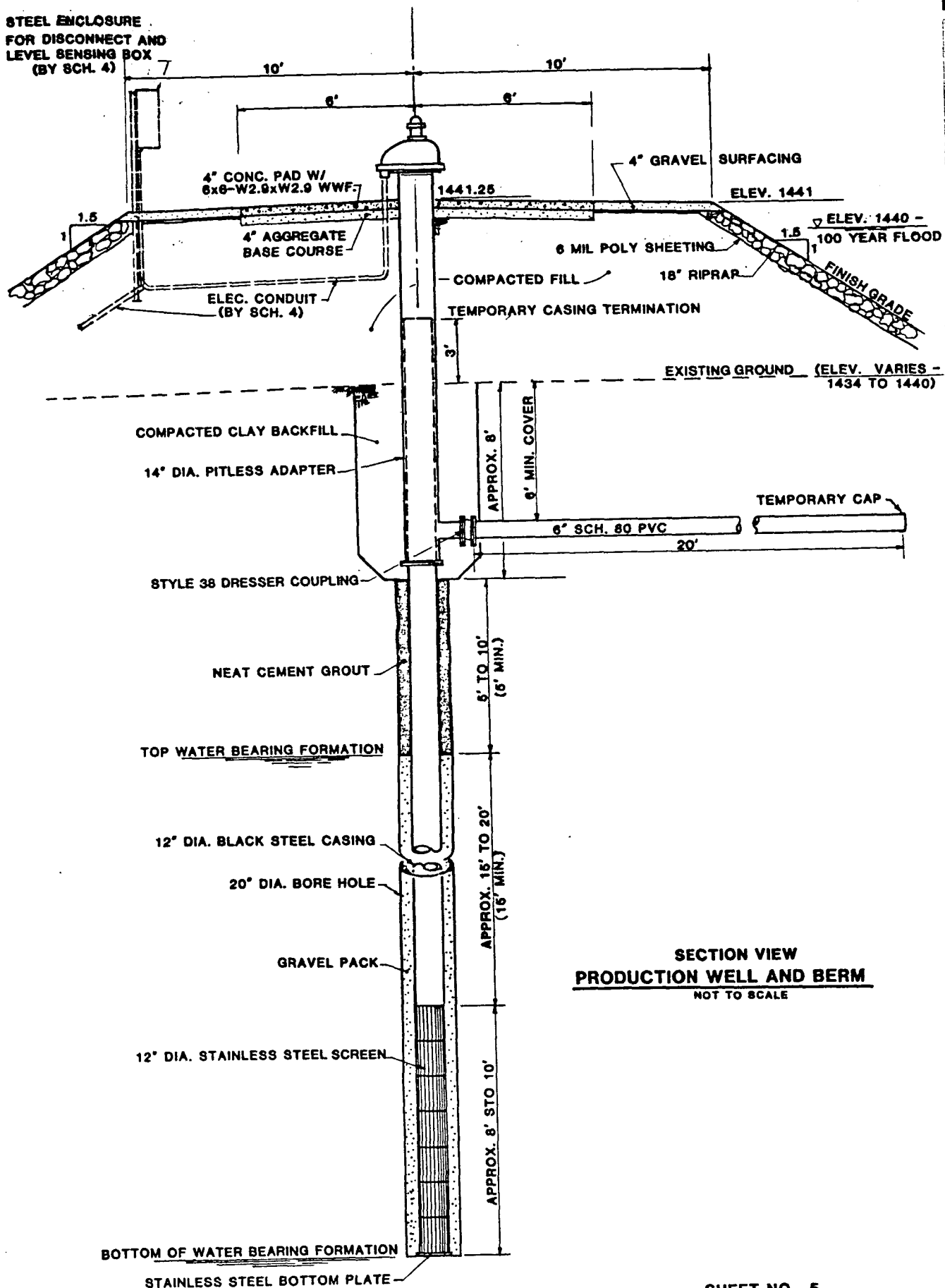
10-85

Date 11/12/2017

10-85

Date 5-25-87

STEEL ENCLOSURE
FOR DISCONNECT AND
LEVEL SENSING BOX
(BY SCH. 4)



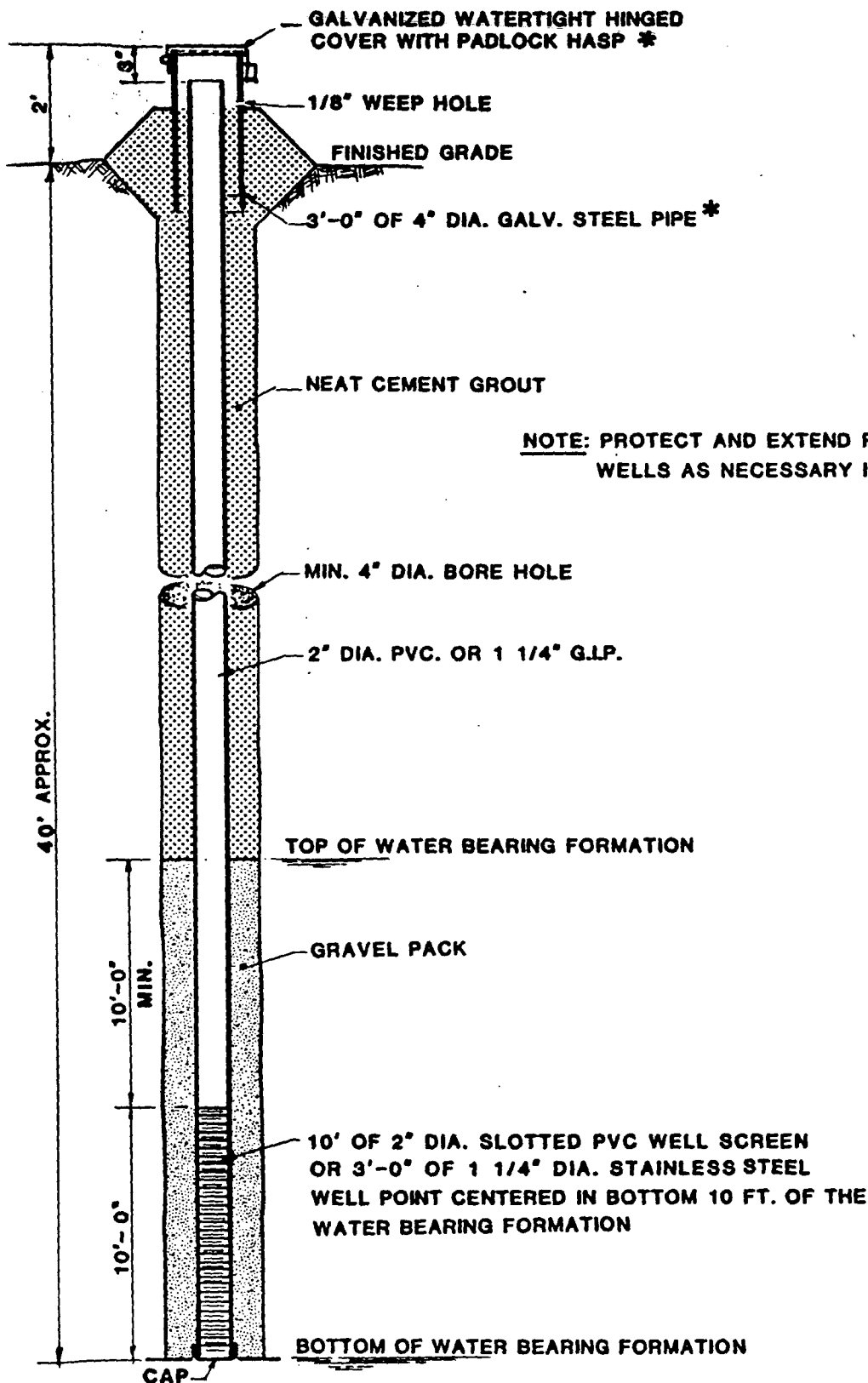
SHEET NO. 5



DeWitt Grant Becker & Associates Co.
Architecture Engineering Planning
Rock Rapids, Iowa
Sioux City, Iowa
Sioux Falls, South Dakota

Date 9-88
Drawn by LO
Approved GJP
Revised
PROJ. #34227

1986 WELL FIELD EXPANSION
SIOUX FALLS, SOUTH DAKOTA



NOTE: PROTECT AND EXTEND PERMANENT OBSERVATION WELLS AS NECESSARY IN BERMED AREAS.

* GALV. STEEL PIPE AND HINGED COVER ARE TO BE INSTALLED ON PERMANENT OBSERVATION WELLS. TEMPORARY OBSERVATION WELLS SHALL BE CAPPED WITH A SOLVENT WELDED PVC CAP OR A SCREWED GALVANIZED CAP.

OBSERVATION WELL

NOT TO SCALE

SHEET NO. 3



DeWild Grant Reckert & Associates Co.
Denver, Colorado
Rock Rapids, Iowa
Sioux City, Iowa
Sioux Falls, South Dakota

Date 9-1986
Drawn By LO
Approved GJP
Revised
PROJ. #34227

1986 WELL FIELD EXPANSION
SIOUX FALLS, SOUTH DAKOTA

RECEIPT

Division of Water Rights

South Dakota Department of Water and Natural Resources

410796

Pierre, March 26, 1987

RECEIVED OF City of Sioux Falls, 224 West 9th, Sioux Falls, SD 57102

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

Fee for Application for Permit No. <u>5115-3</u> to Appropriate Water, to construct works and to put water to beneficial use _____	650	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 Certified Copy of _____		
Fee for Print Copy of Map _____		
Fee for Certifying _____		
Fee for _____		
(Any Other Work Provided by Law)	Total	650 00

By

John Hatch

Chief Engineer

JOHN HATCH

ms

DeWild Grant Reckert & Associates Co.

Architecture Engineering Planning

315 First Avenue
Rock Rapids, IA 51246
Telephone 712 472 2531

October 29, 1986

Office of Drinking Water
Dept. of Water and Natural Resources
Joe Foss Building
Pierre, South Dakota 57501-3101

Attn: Garland Erbele

Re: 1986 Sioux Falls Well Field Expansion
Schedule 3 - Well Construction
DGR File No. 34227

Dear Garland:

Enclosed for Department review are two (2) copies of the Contract Documents for the above referenced project. Please route one copy to the Water Rights Division for review if appropriate.

Please do not hesitate to call me if you have any questions or comments regarding the technical specifications or the drawings.

Very truly yours,

DEWILD GRANT RECKERT
& ASSOCIATES COMPANY


Gary Patton, P.E.

GJP:hlb

cc: Richard D. Willer
Larry Doss
John Hatch

#86-98
RECEIVED

OCT 31 1986

SOUTH DAKOTA DEPARTMENT OF
WATER AND NATURAL RESOURCES
OFFICE OF DRINKING WATER

CONTRACT DOCUMENTS

**WELL FIELD EXPANSION
SIOUX FALLS, SOUTH DAKOTA**

SCHEDULE 3: WELL CONSTRUCTION

1986

#86-98

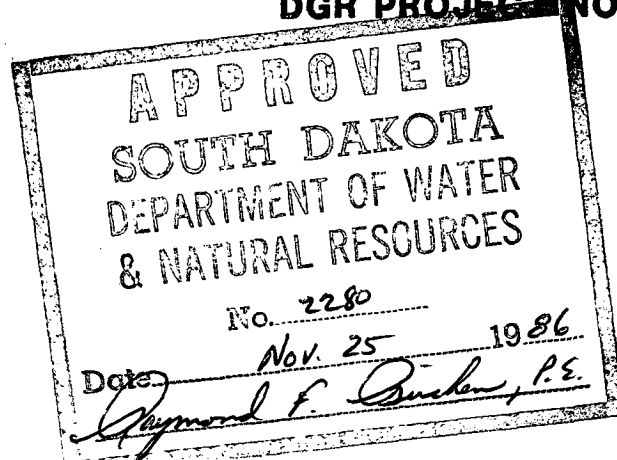
RECEIVED

OCT 8 1986

**SOUTH DAKOTA DEPARTMENT OF
WATER AND NATURAL RESOURCES
OFFICE OF DRINKING WATER**

DeWild Grant Reckert & Assoc. Co.

DGR PROJECT NO. 34227



CONTRACT DOCUMENTS
SIOUX FALLS WELL FIELD EXPANSION
SCHEDULE 3 - WELL CONSTRUCTION
SIOUX FALLS, SOUTH DAKOTA

#86-98

RECEIVED

OCT 31 1986

SOUTH DAKOTA DEPARTMENT OF
WATER AND NATURAL RESOURCES
OFFICE OF DRINKING WATER

I hereby certify that this plan, specification
or report was prepared by me or under my direct
personal supervision and that I am a duly
Registered Professional Engineer under the
laws of the State of South Dakota.

By *Gary Patton*
Gary Patton, P.E.

Registration No. 3612

Date October 8, 1986

DGR Job No. 34227

DEWILD GRANT RECKERT AND ASSOCIATES COMPANY
ARCHITECTURE - ENGINEERING - PLANNING
ROCK RAPIDS, IOWA
SIOUX FALLS, SOUTH DAKOTA
DENVER, COLORADO

CONTRACT DOCUMENTS
SIOUX FALLS WELL FIELD EXPANSION
SCHEDULE 3
WELL CONSTRUCTION
SIOUX FALLS, SOUTH DAKOTA

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PUBLISH: October 17 & 24, 1986

NOTICE TO BIDDERS

The City Commission of the City of Sioux Falls, SD, requests formal bids for Schedule 3 - Well Construction for the 1986 Well Field Expansion.

Sealed bids shall be received in the Finance Department, City Hall, 224 West 9th Street, Sioux Falls, SD 57102, not later than 2:00 P.M. November 3, 1986. At said time each bid shall be publicly opened and read in the City Commission Room.

Specifications and bid forms may be obtained from Engineering Department, at the above address. City Bid Request No. 3067.

The City Commission reserves the right to reject any or all bids.

Finance Department

BID REQUEST NO. 3067

The Board of Commissioners of the City of Sioux Falls, South Dakota, hereby requests formal bids for Schedule 3-Well Construction for the 1986 Well Field Expansion in accordance with the attached conditions and specifications.

Bids shall be received in the Finance Department, Third Floor, City Hall, 224 West Ninth Street, Sioux Falls, South Dakota 57102, not later than 2:00 P.M. on November 3, 1986. Each bid properly received shall be publicly opened and read aloud by the Finance Director or designated person commencing at 2:00 P.M. on November 3, 1986 in the City Commission Hearing Room, First Floor, City Hall.

Bids are to be submitted sealed in the envelope provided herewith, or sealed in an envelope marked on the face with "Bid for Schedule 3-Well Construction" and date. Please put the name of your company and address in upper left hand corner of envelope. Bids received in other than the provided, or properly marked envelope are subject to rejection.

Each bid in excess of \$5,000 must be accompanied by a bid bond or monetary guarantee in accordance with the attached conditions.

The City Commission reserves the right to reject any or all bids, waive technicalities, and make award(s) as deemed to be in the best interest of Sioux Falls, South Dakota.

Finance Director

INSTRUCTIONS TO BIDDERS

1. Completing the Bid Form: All bids must be made on the bid forms provided by the city. Information shall be typed or printed in ink. Erasures and/or corrections must be initialed by the preparer. Each bid must be signed in ink by the bidder or authorized officer.
2. Price Discrepancies: Any discrepancies between the bid unit price and extension shall be resolved in favor of the unit price.
3. Local Preference: By virtue of statutory authority, preference will be given materials, products, and supplies found or produced within the State of South Dakota. Bidders resident in South Dakota shall be allowed a preference over the bid of any bidder from any other state enforcing or having a preference for resident bidders, equal to such preference. Providing all things are equal, bidders resident in the City of Sioux Falls will be given preference.
4. Envelope: Each bid must be sealed and submitted in or under cover of the envelope provided herewith. Any bid submitted in other than the provided envelope may be subject to being opened prior to or after the public bid opening. Any bid so opened shall be rejected and returned to the bidder without further consideration for award. Descriptive literature, if required, may be submitted in the provided envelope or a separate envelope. If in a separate envelope, the lower left corner of that envelope shall be identified as "Literature for Bid Request No. 3067". No prices shall be quoted on the literature.
5. Bid Guarantee: Each bid, the aggregate amount of which is in excess of \$5,000, must be accompanied by a bid bond in the amount of 10% (ten percent) of the amount of the bid, or in lieu thereof a certified check, cashier's check, or draft in the amount of 5% (five percent) of the amount of the bid. All bid guarantees shall be made payable to the City of Sioux Falls. Bonds shall be issued by a surety authorized to do business in this state. Checks shall be certified or issued by a State or National bank. Bid guarantees of unsuccessful bidders shall be returned within 30 calendar days of the bid opening. Bid guarantee of the successful bidder shall be retained until the contract is executed and a performance guarantee (if applicable) has been submitted. Should a successful bidder fail to enter into contract, the bid guarantee shall be forfeited to the city to compensate the administrative expenses of making a re-award or issuing a new request.

6. Method of Award: This request will be awarded to the lowest total bid from a responsive and responsible bidder.
7. Quantities: The quantity indicated for each item in the specifications is estimated only, and the city reserves the right to order less or more as dictated by actual needs.
8. Firm Prices: Unit prices awarded shall remain firm for the entire contract period.
9. Questions: Questions pertaining to this bid request shall be directed to:

Mr. Gary Patton, Project Engineer, DeWild Grant Reckert and Assoc., 315 First Ave., Rock Rapids, IA 51246 (712)472-2531

If the Engineer deems it of general interest, the answer shall be issued in written addendum to each vendor that has been sent a bid request.

A pre-bid conference for prospective bidders will be held at 1:30 P.M. on October 27, 1986, in the conference room of the Sioux Falls Water Purification Plant.

10. Withdrawal of Bids: A bid may be withdrawn by the bidder by letter, telegram, or in person before the time set for the opening of bids. No bid shall be withdrawn for a period of 30 (thirty) days after the bid opening.
11. Federal Tax ID Number: Each bidder shall state its Federal Tax Identification Number on the line provided on the bid form. The city is required to report to IRS on Form 1099 all payments involving labor or services provided by vendors, and lack of this number may delay contract payments until the number is provided.
12. Financing Plan and Monthly Progress Payments: The City of Sioux Falls (the "City") has granted an easement in certain real estate and has sold its existing water treatment facilities to the Sioux Falls Building Authority (the "Corporation"). The Corporation will cause various improvements, including new wells, a new reservoir, a pumping station and replacement of the existing reservoir, to be constructed, and will lease and agree to sell its interest in the real estate, the existing facilities and the improvements to the City. The Corporation will appoint the City as its agent to contract for and cause the improvements to be made.

To provide the funds for the purchase of the existing facilities and the construction of the improvements, the Corporation has caused Norwest Bank Minneapolis, National Association (the "Trustee") to issue and sell Certificates

of Participation (the "Certificates") in the Corporation's lease-purchase agreement with the City. The proceeds of the sale of the Certificates have been deposited with, and disbursed by, the Trustee. The City, as agent of the Corporation, shall be responsible for contracting for and overseeing the construction of the improvements, and the City will submit requests for disbursement of Certificate proceeds to the Trustee and the Trustee will issue checks to the Contractors as set forth in the City's draw request.

PROPOSAL

SIOUX FALLS WELL FIELD EXPANSION
SCHEDULE 3 - WELL CONSTRUCTION

Date _____

TO: THE HONORABLE MAYOR AND THE
CITY COMMISSION OF THE
CITY OF SIOUX FALLS, SOUTH DAKOTA

Gentlemen:

The undersigned, _____,
(hereinafter called Bidder), organized and existing under the
laws of the State of _____, doing business as

_____ *

proposes and agrees to furnish all labor, materials, equipment
and supplies necessary for Schedule 3 - Well Construction, and
all incidentals thereto, for the City of Sioux Falls, South
Dakota, in accordance with the Plans and Specifications set forth
in the Contract Documents furnished by the City Engineer, within
the time set forth and at the prices stated below.

The Bidder has examined the sites of the proposed work, and
investigated the conditions affecting the proposed work, and this
proposal is filed in complete acceptance of such conditions.

By submission of this bid, the Bidder certifies, and in the case
of a joint bid, each party thereto certifies as to his own
organization, that this bid has been arrived at independently
without consultation, communication, or agreement as to any
matter relating to this bid with any other bidder for the same
work.

Accompanying this Proposal is a certified check, cashier's check
or draft made out to the City Finance Director of the City of
Sioux Falls and drawn on a State or National bank, in the amount
of \$ _____, which is at least 5 percent of the amount
of the bid, or, in lieu thereof, a bid bond in the amount of
\$ _____, which is at least 10 percent of the
amount of the bid as guarantee that if this Proposal is accepted,
it is agreed that said bid bond or certified check shall become
property of the City of Sioux Falls for liquidated damages caused
by the Bidder's refusal or inability to contract and furnish the
required surety bonds. If awarded the contract by resolution of

*Insert "a corporation," "a partnership," or "an individual" as
applicable.

the City Commission, the Bidder agrees to sign the prescribed form of contract and furnish the required corporate surety bonds within ten (10) days after the date of such resolution of contract award. This proposal is filed with the understanding that the City Commission may retain the same for consideration for a period of thirty (30) days from and after the established date for receiving bids.

The name and address of the corporate surety with which the Bidder proposes to furnish the specified performance and payment bond is as follows:

The following Bid Schedule lists the various items of work contemplated, with an estimate of the units of each. With these units as the basis, the Bidder has extended each item using the cost inserted in the unit column. Any total cost found inconsistent with the unit cost when the bids are examined will be deemed in error and corrected with the unit cost which shall be considered correct. The following bid includes state sales tax on materials and all other state and federal taxes that would affect the amount of the bid.

BID SCHEDULE

<u>Item No.</u>	<u>No. of Units</u>	<u>Description</u>	<u>Unit Price</u>	<u>Total Cost</u>
<u>TEST DRILLING AND OBSERVATION WELL BID ITEMS:</u>				
1.	Job	Test drilling mobilization, lump sum	\$ <u>L.S.</u>	\$ _____
2.	1,125 L.F.	Test hole and observation well drilling, including sampling and records, per lin. ft.	\$ _____	\$ _____
3.	800 L.F.	Completion of test hole as observation well, including screen, casing, gravel pack and seal, per lin. ft.	\$ _____	\$ _____

<u>Item No.</u>	<u>No. of Units</u>	<u>Description</u>	<u>Unit Price</u>	<u>Total Cost</u>
4.	20 Ea.	Observation well development, water sample collection, disinfection, per ea.	\$ _____	\$ _____
5.	15 Ea.	Furnish and install neat cement grout surface seal, galvanized steel sleeve and cover for permanent observation wells, per ea.	\$ _____	\$ _____
6.	28 Ea.	Abandonment of observation wells, per ea.	\$ _____	\$ _____

PRODUCTION WELL BID ITEMS:

7.	Job	Production well mobilization, lump sum	\$ <u>L.S.</u>	\$ _____
8.	200 L.F.	20" production well drilling, including samples and records, per lin. ft.	\$ _____	\$ _____
9.	165 L.F.	12" steel casing, per lin. ft.	\$ _____	\$ _____
10.	50 L.F.	12" stainless steel screen, per lin. ft.	\$ _____	\$ _____
11.	125 L.F.	Gravel pack, per lin. ft.	\$ _____	\$ _____
12.	35 L.F.	Grout seal, per lin. ft.	\$ _____	\$ _____
13.	5 Ea.	Production well development, per ea.	\$ _____	\$ _____
14.	4,600 L.F.	Installation and removal of temporary discharge piping, per lin. ft.	\$ _____	\$ _____
15.	5 Ea.	Installation and removal of test pump and equipment, per ea.	\$ _____	\$ _____
16.	40 Hrs.	Test pumping, observations and records for maximum 8-hour step-drawdown tests, per hr.	\$ _____	\$ _____

<u>Item No.</u>	<u>No. of Units</u>	<u>Description</u>	<u>Unit Price</u>	<u>Total Cost</u>
17.	120 Hrs.	Test pumping, observations and records for maximum 120-hour tests, per hr.	\$ _____	\$ _____
18.	288 Hrs.	Test pumping, observations and records for maximum 72-hour tests, per hr.	\$ _____	\$ _____
19.	120 Hrs.	Recovery observations and records, per hr.	\$ _____	\$ _____
20.	5 Ea.	Collection of water samples, disinfection and cap, per ea.	\$ _____	\$ _____
21.	5 Ea.	Furnish and install pitless adapter including pipe stub-out, per ea.	\$ _____	\$ _____
22.	5 Ea.	Furnish and install submersible pump and motor, per ea.	\$ _____	\$ _____
23.	1 Ea.	Furnish only, spare submersible pump and motor, per ea.	\$ _____	\$ _____
24.	400 C.Y.	Compacted fill, per cu. yd.	\$ _____	\$ _____
25.	350 C.Y.	Riprap, per cu. yd.	\$ _____	\$ _____
26.	12.5 C.Y.	Gravel surfacing, per cu. yd.	\$ _____	\$ _____
27.	565 S.F.	Concrete pad, per sq. ft.	\$ _____	\$ _____
TOTAL BASE BID			\$ _____	

ADJUSTMENTS TO BASE BID ITEMS

<u>Item No.</u>	<u>Description</u>	<u>Unit Price Adjustment</u>
20.	Amount to be added or deducted from base bid price of pitless adapter for increase or decrease, respectively, in required bury depth, per lin. ft.	\$_____ per L.F.
21.	Amount to be added or deducted from base bid price of submersible pump and motor for increase or decrease, respectively, in required intake setting depth, per lin. ft.	\$_____ per L.F.

NOTE: Bids shall include sales tax and other applicable taxes.

In submitting this bid we understand that the right is reserved by the City to reject any and all bids and to waive technicalities and irregularities and we agree that this bid may not be withdrawn during the period of days provided in the Contract Documents.

Name of Bidder_____

By_____

Title of Signer_____

Federal Tax ID Number_____

Address_____

Date_____

(Corporate Seal)

(Each proposal must be signed with the full name of the Bidder. In the case of a partnership the proposal must be signed in the firm name by each partner. In the case of a corporation the proposal must be signed in the corporate name by a duly authorized officer and the Corporate Seal affixed and attested by the Secretary of the Corporation).

CONTRACT

THIS CONTRACT, made and entered into this ____ day of _____,
19__ by and between the City of Sioux Falls, South Dakota, party
of the first part, otherwise know as the City, and

of _____

party of the second part, hereinafter referred to as the
Contractor, witnesseth:

The City has let and awarded to the Contractor and in
consideration of the covenants and agreements on the part of the
Contractor hereinafter contained to be kept and performed by him,
does hereby let and award to said Contractor, a contract to
furnish all labor, tools, material and equipment necessary for
the construction of

in the City of Sioux Falls, South Dakota, all as described in the
Notice to Bidders and Proposal of the Contractor bearing date of
_____, 19__.

The Contractor shall use the materials specified in the plans and
specifications and shall in every detail as to material and
workmanship, furnish, do and perform said work in strict
accordance with the plans and specifications, which have
heretofore been filed in the Office of the City Engineer which
plans and specifications are herein referred to and made a part
of this contract. It is agreed and understood by the parties
that the plans, specifications, schedule of quantities, the
proposal, and the bond shall be a part of this contract and are
so considered whether or not attached hereto.

And the Contractor in accordance with the letting and awarding to
them of the said contract and in consideration of the payment to
him of certain sums of money as hereinafter provided and under
the penalty stated in the bond of

_____ dollars
hereto attached and made a part of this contract, agrees at his
own expense, to furnish all labor, tools, and material necessary
for the complete construction and work as aforesaid in complete
accordance with the plans and specifications.

The Contractor further agrees to commence construction upon receipt of the Notice to Proceed and have it fully completed by April 30, 1987.

IN CONSIDERATION of the furnishing of all labor, tools, equipment, and material and the complete construction as provided, the Contractor agrees to accept as full and complete compensation for said work, the following prices, to-wit:

Payment to the Contractor will be made by check from funds on hand. Monthly estimates will be paid the Contractor in an amount equal to ninety percent (90%) of the contract value of the work completed, certified by the Engineer, and approved by the City Commission. Final payment shall be made after completion of the Work and acceptance by the City Commission.

IN WITNESS WHEREOF, the City of Sioux Falls as party of the first part has caused these presents to be executed by its Mayor and attested by its Finance Director and the Contractor as party of the second part has hereunto set his hand and seal the day and year first above written.

CITY OF SIOUX FALLS, SOUTH DAKOTA

By _____
Mayor
Party of the First Part

ATTEST:

FOR CITY FINANCE DIRECTOR

By _____

Party of the Second Part

GENERAL REQUIREMENTS

In compliance with the Code of Ordinances for the City of Sioux Falls, South Dakota, all contracts with the city for construction must comply with Section 13-4, Contracts with the City, whereby each contracting party agrees:

- (a) That with respect to any and all business conducted or acts performed pursuant to said contract, such other contracting party shall be deemed an employer within the meaning of this chapter and shall be subject to the provisions of this chapter;
- (b) That in the event said other contracting party fails to perform the aforesaid contractual provisions, said contract may forthwith be terminated and cancelled in whole or in part by the city and said other contracting party shall be liable for any costs or expense incurred by it in obtaining from other sources the work and services to be rendered or performed or the goods or properties to be furnished or delivered to the city under the contract so terminated or cancelled;
- (c) That should the commission in a proceeding brought as hereinafter provided find that the said contracting party has engaged in discrimination in connection with any such contract and issue a cease and desist order with respect thereto, the city shall withhold up to fifteen percent (15%) of the said contract price until such time as the Commission's order has been complied with or said other contracting party has been adjudicated not guilty of such discrimination;
- (d) That said other contracting party will permit access to any and all records pertaining to hiring and employment and to other pertinent data and records for the purpose of enabling the Commission, its agencies or representatives, to ascertain compliance with the provisions of this chapter applicable to said other contracting party;
- (e) This section shall be binding on all subcontractors or suppliers. (1957 Rev. Ords., § 2.1804; Ord. No. 2700, 8-17-70)

GENERAL CONDITIONS

GC-1. DEFINITION OF TERMS

Wherever the term "Engineer" is used, it shall be taken as meaning the City Engineer duly appointed by the Board of Commissioners to have supervision of the work of construction, and to his authorized assistants limited to the duties entrusted to them.

Wherever the term "Contractor" is used, it shall be taken as meaning the party of the second part, who contracts directly with the City to do the work to be performed under the Contract.

Wherever the term "City" or "Owner" is used, it shall be taken as meaning the City of Sioux Falls, South Dakota, party of the first part, as represented by its proper officers.

Wherever the term "Contract" is used, it shall be taken as meaning the agreement covering the performance of the work and/or the furnishing of the materials for the proposed construction. The contract shall include the Contract, Proposal, Plans, Specifications and Performance Bond and all supplementary agreements which reasonably could be required to complete the construction in a substantial and acceptable manner.

GC-2. AWARD OR REJECTION OF BIDS.

The City reserves the right to reject any and all bids, or to accept any bid. The basis for contract award shall be the low bid submitted by a qualified and responsible Contractor. Contractor's proposals shall hold firm for thirty (30) days to allow the City full consideration of the proposal. Mutually agreed upon extension of time may be made, if necessary.

GC-3. BIDDER'S QUALIFICATIONS

Bidders must present satisfactory evidence that they have been regularly engaged in the construction of similar works and are reasonably familiar with it and that they are fully prepared with the necessary capital, materials and machinery to conduct the work to be contracted for to the satisfaction of the City and the Engineer in control of the work.

GC-4. INTENT OF PLANS AND SPECIFICATIONS

It is the intention of the plans and specifications to provide for the improvement in a complete, thorough and workmanlike manner. The Contractor to whom the work is awarded shall furnish all materials, labor and appurtenances, except as otherwise provided herein, necessary to properly complete the work in accordance with the plans and specifications, including the samples of materials furnished to the Engineer for tests. Anything omitted which may reasonable be interpreted as necessary for such completion, the Engineer being the judge, is to be included in the prices bid for the improvements.

GC-5 INTERPRETATION OF PLANS AND SPECIFICATIONS

The Engineer shall decide all cases that may arise as to the intent and meaning of these specifications and the accompanying plans and as to the proper execution of the work, and his decision shall be final during the progress of the work.

Any ambiguity or discrepancies in the plans and specifications shall be decided by using the best class of work and materials which any interpretation would admit of.

All materials and details of whatever nature, not distinctly specified in the plans and specifications for the work, or in the proposal of the bidder, shall be subject to the approval of the Engineer.

GC-6. EQUIVALENCE

Whenever in any section of the Contract Documents, plans or specifications, any article, material or equipment is defined by describing a proprietary product, or by using the name of a manufacturer or vendor, the term "or approved equal" if not inserted, shall be implied. The specific article, material or equipment mentioned shall be understood as indicating the type, function, minimum standard of design, efficiency and quality desired and shall not be construed in such a manner as to exclude manufacturer's products of comparable quality, design and efficiency. The Engineer shall determine the acceptability of articles, materials or equipment proposed as equals.

GC-7. MEANING UNDERSTOOD

The Contractor shall before submitting a bid upon the work covered by these specifications and plans therefor, satisfy himself as to the meaning of these specifications, the "Instructions to Bidders," the "Special Information," the "General Conditions," and the accompanying plans, and the tender of such bid is to be considered that he fully understands the same.

GC-8. EXAMINATION OF SITE

Bidders must satisfy themselves by personal examination of the location of the proposed work, by examination of the plans and specifications and requirements of the work, and by such other means as they may prefer, as to the amount and difficulties of

the work, and shall not at any time after the submission of a bid dispute or complain of the estimate nor assert that there was any misunderstanding in regard to the nature or amount of work to be done.

GC-9. GRADE STAKES, BENCH MARKS AND MONUMENTS

All stakes, stones or monuments now in place and marking lines and corners of boundaries and which are likely to be affected by the work herein provided for shall be carefully preserved by the Contractor and in no case shall any excavation be made within five feet (5') of any such stake, stone or monument until they have been properly reset, witnessed, or otherwise cared for by the Engineer and permission given to proceed with the work.

All lines or grade stakes or bench marks set by the Engineer in connection with the work herein provided for shall be carefully preserved by the Contractor and shall not be disturbed or moved from the exact position and elevation as set by the Engineer. No excavated material shall be thrown over or against said stakes and, except where necessary to remove the stakes as the work progresses, all stakes shall be carefully preserved in the original position and elevation until the work has been finally inspected and accepted, and those stakes which must be removed as the work progresses shall be so removed only upon the order of the Engineer.

All stakes, stones, monuments or bench marks disturbed or removed through carelessness or without proper authority will be reset at the expense of the Contractor.

GC-10. LAWS AND ORDINANCES

All City, County, State or Federal Laws, Ordinances or Regulations limiting or controlling the actions, or operations

of all persons engaged upon the work, or affecting the material supplied therefor, must be complied with.

GC-11. TAXES

The Contractor shall pay all sales, consumer, use and other similar taxes required by law.

GC-12. PERFORMANCE BOND

The Contractor will be required to execute a bond for the use of the City and also for the use of all persons doing work or furnishing skill, tools, machinery or materials, under or for the purpose of the execution of the work. The bond shall provide that the Contractor shall fully and faithfully perform the contract within the time according to the terms therein prescribed and shall pay as they become due, all just claims for work done and for tools, machinery, skill and materials furnished thereunder for the full protection of the City against loss or damage occasioned by mechanics liens or other liens, or by loss or claims on account of material or labor furnished.

The bond shall be executed and filed with the City Auditor within ten (10) days after notice of the award of the contract has been given to the Contractor, and shall be in an amount equal to the aggregate amount of the contract (100%) and shall be in such form as the Board of Commissioners may prescribe or the statute may require, and shall be executed by a licensed surety company satisfactory to said Board.

GC-13. CONTRACTOR'S LIABILITY INSURANCE

During the life of the contract, the Contractor shall effect and maintain, with companies satisfactory to the City, the types and amounts of insurance required. All insurance shall be from

insurance companies duly authorized to do business in and under the laws of the State of South Dakota. No work shall commence until the insurance is in effect and approved by the City. The Contractor shall not allow any sub-contractor to commence work on his sub-contract until all similar insurance required of the sub-contractor has been so obtained and approved.

The Contractor shall carry Public Liability and Property Damage Insurance covering claims for damages for bodily injury, INCLUDING ACCIDENTAL DEATH, as well as from claims for property damage which may arise from operations under the contract, and shall include coverage for explosion, collapse and damage to underground pipes, wires and other utilities caused by mechanical equipment.

The limits of liability shall not be less than:

- \$300,000 per person
- \$500,000 per occurrence for bodily injury
- \$500,000 per occurrence for property damage
- \$500,000 aggregate for property damage

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.

Certificates of insurance shall be filed with the City prior to commencing work. Approval of the insurance by the City shall not relieve or decrease the liability of the Contractor hereunder.

GC-14. CLAIMS AND DAMAGES

The Contractor shall be responsible for and shall save and hold the City harmless against all damages for injuries to real

or personal property or for any injury sustained by any person growing out of any neglect, act or deed of said Contractor or of his employees that is in the nature of a legal liability and he hereby agrees to indemnify and save the City harmless against all suits or actions of every name and description brought against said City on account of such neglect, act or deed in the prosecution of the work embraced in this contract. Said Contractor further agrees to indemnify, keep and save harmless said City from all claims, judgments, awards and costs which may in any way come against said City by reason of any accidental injuries or death suffered by any person employed on the work. The Contractor hereby agrees to save and hold the City harmless against all claims and liens for labor or materials furnished during or under this contract and shall furnish satisfactory evidence whenever called upon to do so, that all such claims have been paid.

All loss or damage arising out of the nature of the work to be done under this agreement, or from any unforeseen or unusual obstruction or difficulties which may be encountered in the prosecution of the same, or for any action of the elements is to be sustained by the Contractor.

GC-15. WORKMEN'S COMPENSATION AND EMPLOYER'S LIABILITY

The Contractor agrees to insure his employees in accordance with the provisions of the "Workmen's Compensation Act" of the State of South Dakota as amended and now in force. Such insurance shall be placed by the Contractor in a company authorized under the laws of the State of South Dakota to insure the liability above specified, or in lieu of such insurance said Contractor agrees to guarantee his liability to pay the compensation provided for in said "Workmen's Compensation Act."

GC-16. COOPERATION BETWEEN CONTRACTORS

When separate contracts are let within the limits of any one project, each Contractor shall conduct his work so as not to interfere or hinder the progress or completion of the work being performed by other Contractors. Contractors working on the same project shall cooperate with each other as directed.

Each Contractor involved shall assume all liability, financial or otherwise, in connection with his contract and shall protect and save harmless the City from any and all damages or claims that arise because of inconvenience, delay, or loss experienced by him because of the presence or operations of other Contractors working within the limits of the same project.

GC-17. CONTRACTOR'S ASSUMPTION OF RISK

The project, from the commencement of work to completion or to such earlier date or dates when the City may take possession and control in whole or in part as hereinafter provided, shall be under the charge and control of the Contractor and during such period of control by the Contractor all risks in connection with the construction of the project and the materials to be used therein shall be borne by the Contractor. The Contractor shall make good and fully repair all injuries and damages to the project or any portion thereof under the control of the Contractor by reason of any Act of God or other casualty or cause whether or not the same shall have occurred by reason of the Contractor's negligence.

GC-18. PROTECTION OF PROPERTY

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work.

The Contractor shall at his own expense, shore up, protect and make good or replace any trees, shrubs, lawns, walks, structures, walls, fences, poles, or other property damaged or moved by reason of the construction. He shall protect from injury all water, gas, or sewer pipes, electrical and telephone cables or conduits encountered, or any other underground structure. In case any such become damaged, the Contractor alone shall be responsible for their repair or replacement.

GC-19. BARRIERS, LIGHTS, WATCHMEN

The Contractor shall provide and maintain such fences, barriers, danger signs, warning lights, watchmen and other safeguards as may be necessary to prevent avoidable accidents to residents and to the public and to protect the project until completed.

GC-20. PROTECTION OF FINISHED WORK

The Contractor will be held responsible for any and all materials or work to the full amount of the payments made thereon, and he will be required to make good, at his own expense, any injury or damage which said materials or work may sustain from any source or cause whatever before final acceptance thereof.

GC-21. PUBLIC CONVENIENCES

No materials, or other obstruction shall be placed within five feet (5') of the fire hydrants, which must be at all times readily accessible to the Fire Department.

During the progress of the work, the convenience of the public and of the residents adjacent to the project must be provided as far as practicable. Convenient access to driveways, houses, buildings and private property along the project must

be maintained wherever possible. Temporary approaches to and crossings of intersecting streets and sidewalks must be provided and kept in good condition, wherever possible.

GC-22. EMPLOYEES

The Contractor shall employ only competent foremen, mechanics and laborers skilled in the task assigned them, and shall discharge, whenever requested to do so, any person who, in the opinion of the Engineer, is incompetent, untrustworthy, abusive, threatening or disorderly in conduct.

GC-23. PROSECUTION OF WORK

The Contractor shall commence and prosecute the work at such points as the Engineer may direct and conform to his direction as to the order of time in which the different parts of the work shall be done, and to all his instructions as to workmanship, quality of material, etc., so as to accomplish the object of this contract in accordance with all its terms and within the time specified, but not so as to effect the Contractor's method and manner of constructing the work in its details. The Contractor shall give his personal attention to the faithful prosecution of said work, shall not sublet the aforesaid work, or any part thereof without the previous consent of the party of the first part endorsed in the agreement, but shall keep the matter under his control.

GC-24. ABANDONMENT

If the work to be done under this agreement or any part thereof should be abandoned by the Contractor, the City shall have the right under the direction of the Engineer, to place such, and as many persons, as he may deem advisable by contract or otherwise, to work at, and complete, the work herein described,

or such part thereof, and to use such materials as he may find along the line of work, or in the case they are unfit, or insufficient, to procure other materials for the completion of the same, and the expense for such materials and labor shall be charged to the Contractor, and the expense so charged shall be deducted from any sums that may become due to the Contractor under this agreement and in case such expense is greater than the sum which would be payable under this contract, if the same had been completed by the said Contractor, he shall pay the amount of such excess to the party of the first part.

GC-25. INSPECTION

The Engineer shall provide for the inspection, by assistants and inspectors under his direction, of all materials used and all work done under this contract. Such inspection may extend to all or any part of the work, and to the preparation or manufacture of all materials to be used, whether within the limits of the work, or at any other place. The Engineer and his inspectors shall have free access to all parts of the work, including mines, quarries, fabricators, factories, or other places where any part of the materials to be used is procured, manufactured or prepared. The Contractor shall furnish the Engineer all information relating to the work and the material therefor, which the Engineer may deem necessary or pertinent, and with such samples of materials as may be required. The Contractor shall at his own expense, supply the inspectors with such labor and assistance as may be necessary in the handling of materials for proper inspection. Inspectors shall have authority to reject defective material and to suspend any work that is being improperly done, subject to the final decision

of the Engineer. Inspectors shall have no authority to permit deviations from, or to relax any of the provisions of these specifications without the permission or instruction of the Engineer nor to delay the Contractor by failure to inspect materials and work with reasonable promptness.

The payment of any compensation, whatever may be its character or form, or the giving of any gratuity, or the granting of any valuable favor, by the Contractor to any inspector, directly or indirectly, is strictly prohibited, and any such act on the part of the Contractor will constitute a violation of these specifications.

GC-26. QUANTITIES OF ESTIMATES

Wherever the estimated quantities of work to be done and materials to be furnished under this contract are shown in any of the documents including the proposal, they are closely approximate and are given for use in comparing bids and the Contractor shall not be entitled to damages for anticipated profits if the amount of work actually performed shall prove to be less than here estimated.

GC-27. CHANGES

The City shall have the right on the order of the Engineer to make such changes in grades, routes and other details, as it may deem necessary, and such changes shall be paid according to the unit prices set forth in the bid, or if such changes involve a class of work not provided for in the bid, it shall be paid for as "Extra Work."

GC-28. EXTRA WORK

The Contractor shall, upon a written order from the Engineer, perform such additional work as the Engineer may deem necessary

for the proper execution of the work.

For such work done by the Contractor for which specific unit prices are not named in the contract, a unit or lump-sum price will be agreed upon by both the Contractor and the Engineer and a change order shall be executed defining the nature and contract price of such extra work. This amount will be paid to the Contractor in either partial or final payments.

GC-29. ARBITRATION (See Special Information, SI-2).

GC-30. UNFORSEEN DIFFICULTIES

The Contractor shall sustain all losses or damages arising from the action of the elements, the nature of the work to be done under these specifications, or for any unforeseen obstructions or incumbrances on the line of work which may be encountered in the prosecution of the same.

GC-31. NOTICE

Notice of imperfections in the work or materials, or of any other nature, to any agent or foreman in charge of any portion of the work, in the absence of the Contractor, will be considered as notice to the Contractor.

GC-32. ACCEPTANCE

All work shall be subject to the acceptance of the Owner and/or the City Engineer and such acceptance is not to be given if the work presented for acceptance by the Contractor has not

been executed in a good and workmanlike manner and according to these specifications, and each part thereof pertaining thereto. Acceptance may be made on completed portions of the work which are ready for service and based upon all work contracted for in the portion to be accepted. It is expressly provided, however, that no acceptance of payment shall operate as releasing the Contractor from the stipulations of the guaranty.

GC-33. SUSPENSION

The Engineer may from time to time, suspend the work at certain places, or altogether, if in his opinion public needs require it; or if the weather is not suitable for doing the work.

GC-34. SUB-CONTRACT

The Contractor will not be allowed to sublet the whole or any part of the work under this contract without the written permission from the Engineer to do so. No sub-contract shall under any circumstances relieve the Contractor of his liability and obligations. Should any sub-contractor fail to perform the work undertaken by him in a satisfactory manner, the Engineer may at his option require the Contractor to terminate such contract.

GC-35. ASSIGNMENT OF CONTRACT

No assignment by the Contractor of any principal construction contract or any part thereof or of the funds to be received thereunder by the Contractor, will be recognized unless such assignment has had the written approval of the Engineer and the Surety has been given due notice of such assignment and has furnished written consent thereto.

GC-36. OLD MATERIAL

All material or structures removed from the project and not required for the new construction, but which the City may desire

to reserve, shall be delivered and neatly stockpiled, by the Contractor, as the Engineer may direct. Such reserved material shall be considered in the custody of the Contractor until delivered at the place designated.

All old material removed from the work including excess excavation, not reserved by the City, not to be used again in the work, shall belong to the Contractor and must be removed by him from the project as promptly as possible at the Contractor's expense. It must not be placed on the sidewalks or adjacent streets, nor on any other street, nor on property belonging to the City, nor on the property of private owners, without the written consent of the Engineer, or the owner of the property.

GC-37. INCIDENTAL WORK

All the work to be done by the Contractor for which specific unit prices are not named in the contract, but obviously necessary for the proper completion of the work, shall be considered as incidental and as being a part of the work and included with the work for which prices are named in the contract. The Contractor will not be entitled to any extra or additional compensation therefor.

GC-38. DELAYS

In case the Contractor is delayed in the prosecution of the work by reason of the direction of the party of the first part, or by reason of any legal difficulty which may arise for which he is not responsible, or by reason of the National Emergency, he shall be entitled to an extension of the date of completion equal to the aggregate time occasioned by such delays.

GC-39. TIME OF COMPLETION

The Contractor shall complete the entire work to be done under these specifications by (see SPECIAL INFORMATION) which shall be known as the Completion Date. Failure to complete the work on or by the completion date, or within such extra time as may have been allowed by increases in the contract or by formally approved extensions granted by the Engineer, there shall be deducted from any monies or amounts due or that may become due the Contractor, the sum set forth in the schedule shown in the section headed "Liquidated Damages," for each and every working day, that the work shall remain uncompleted. This sum shall be considered and treated not as a penalty, but as liquidated damages due the City from the Contractor by reason of inconveniences to the public, added cost of engineering and supervision, and other items which have caused an expenditure of public funds resulting from his failure to complete the work within the time specified in the contract.

GC-40. WORKING DAY

A working day is a calendar day, except holidays, Saturdays and Sundays, on which weather and other conditions not under the control of the Contractor will permit normal construction operation to proceed for the major part of the day. Saturdays will be counted working days if the Contractor utilizes such a day for construction work. The Contractor shall not carry on construction operation, other than emergency repairs and work protection, on Sundays and holidays without written permission from the Engineer.

GC-41. SCHEDULE OF LIQUIDATED DAMAGES

<u>Amount of Contract</u>	<u>Amount of Liquidated Damages per day</u>
Less than \$5,000	\$ 35.00
\$ 5,000 but less than \$10,000	\$ 50.00
\$ 10,000 but less than \$30,000	\$ 75.00
\$ 30,000 but less than \$50,000	\$100.00
\$ 50,000 but less than \$100,000	\$125.00
\$ 100,000 but less than \$500,000	\$150.00
\$ 500,000 but less than \$1,000,000	\$200.00
\$1,000,000 but less than \$1,500,000	\$250.00
\$1,500,000 but less than \$2,000,000	\$300.00
\$2,000,000 but less than \$3,000,000	\$350.00

GC-42. TERMINATION FOR BREACH

In the event that any of the provisions of this contract are violated by the Contractor or by any of his sub-contractors, the party of the first part may serve written notice upon the Contractor and the surety of its intention to terminate such contract.

GC-43. TERMINATION OF CONTRACTOR'S RESPONSIBILITY

The Contract will be considered complete when all work has been finished, the final inspection made by the Engineer, and the project accepted in writing by the City. The Contractor's responsibility shall then cease, except as set forth in his performance Bond and as required by the guaranty period provided herein.

GC-44. CLEANING UP

The Contractor shall remove from the work all surplus or rejected materials and rubbish of any description, and dispose of the same to the satisfaction of the Engineer, leaving the area in the vicinity of the work in a neat condition, free of encumbrance.

GC-45. GUARANTEE

The Contractor shall guarantee all the materials used and all the work done under these specifications, the plans here in before referred to and the instructions of the Engineer. All materials and equipment furnished under this Contract shall be new unless otherwise specified. All work shall be good quality free from defects and faults. Any defects in the completed work, or any part of it, or any failure of the work to fully perform or endure the service for which it was intended, which in the opinion of the Engineer, are attributable to the use of materials, skill, or workmanship not in compliance with the said specifications, plans and instructions will be rejected. The Contractor shall at his own expense at such time and in such manner as the Engineer shall direct, repair or take up and reconstruct any such defective work in full compliance with the original specifications for the guarantee period hereinafter specified.

GC-46. NUMBER AND GENDER OF WORDS

Whenever the context so admits or requires, all references herein in one number shall be deemed extended to and including the other number, whether singular or plural, and the use of any gender shall be applicable to all genders.

GC-47. PRE-CONSTRUCTION

Prior to beginning construction operations, the Contractor shall give the City Engineer at least forty-eight (48) hours notice to allow time for the staking of the work (if required) and for arranging for inspection.

GC-48 UNEMPLOYMENT COMPENSATION

In accordance with SDCL 5-18-17, all contractors for public improvements shall furnish the city prior to final payment, certification from the Department of Labor indicating payment of unemployment compensation contributions and interest due in the performance of the contract. The contractor may obtain certification by contacting the address below:

South Dakota Department of Labor
Unemployment Insurance Division
PO Box 1730
Aberdeen, SD 57401
Phone: 605-622-2312

SPECIAL INFORMATION

SI-1. NOTICE TO PROCEED AND TIME FOR COMPLETION

The Notice to Proceed shall be issued within ten (10) days of the execution of the Contract by the City. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the City and Contractor. The Contractor shall commence construction upon receipt of the Notice to Proceed and have it fully completed by April 30, 1987.

SI-2. ARBITRATION BY MUTUAL AGREEMENT

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 making an acceptance of final payment, may be decided by arbitration if the parties mutually agree. Any 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.

Notice of the request for arbitration shall be filed in writing with the other party to the Contract Documents and a copy shall be filed with the Engineer. Request 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.

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

SI-3. GUARANTEE PERIOD

The guarantee described by General Conditions item GC-45 shall have a period of one (1) year.

SI-4. SUBSURFACE CONDITIONS

In the preparation of Drawings and Specifications, the Engineer has relied upon logs of exploratory test holes drilled in the expansion area. The test holes were completed by Sioux Well Drilling between November, 1984 and January, 1985. Such test hole logs, as well as water level measurements, are reproduced in the Appendix and are not a part of the Contract Documents.

Because the City had no control over the methods used for obtaining, evaluating or recording the test hole logs, because the areas sampled by previous test drilling are small in comparison to the project area, and for other reasons, the City

shall not be responsible for the accuracy or completeness of this information, or for any interpretation of such information by the Contractor. The logs are not necessarily indicative of conditions prevailing or to be encountered in the work to be constructed hereunder. The Contractor shall satisfy himself regarding all local conditions affecting his work by personal investigation.

SI-5. LAND AND RIGHT-OF-WAYS

The land or right-of-way necessary for construction of the project will be provided by the City. The Contractor shall confine his construction operations to the construction limits shown on the Drawings and approved by the Engineer, 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.

Other contractors and employees or agents of the City may for all necessary purposes enter upon the work and premises used by this Contractor and this Contractor shall conduct his work so as not to impede unnecessarily any work being done by others on or adjacent to the site.

TECHNICAL SPECIFICATIONS

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract are hereby made part of this Section.
- B. This Section presents a summary of the intended Work and the Contractor's duties and use of premises.

PART 2 - CONTRACTS

2.01 SCHEDULE 3 - WELL CONSTRUCTION:

- A. Test drilling, approximately 25 holes, each approximately 45 feet deep.
- B. Observation well construction, approximately 20 observation wells, each approximately 40 feet deep.
- C. Production wells, approximately 5 total, each approximately 40 feet deep.
- D. Completion of approximately 5 production wells with embankments, pitless adapters and submersible pumps and motors.

2.02 SCHEDULE 4 - CONTROL BUILDING AND ELECTRICAL:

- A. Control building.
- B. Secondary power and control cable.
- C. Electrical panels at wells.

PART 3 - CONTRACTOR-OWNER RESPONSIBILITIES

3.01 CONTRACTORS' DUTIES:

- A. Except as specifically noted, provide and pay:
 - 1. Labor, materials and equipment.
 - 2. Tools, construction equipment and machinery.
 - 3. Water, heat and utilities required for construction.

4. Other facilities and services necessary for proper execution and completion of work.
- B. Secure and pay for, as necessary for proper execution and completion of Work, and as applicable at time of receipt of bids:
 1. Permits.
 2. Government fees.
 3. Licenses.
 - C. Give required notices.
 - D. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities which relate to performance of Work.
 1. Promptly submit written notice to Engineer of observed variance of Contract Documents from legal requirements.
 2. Assume responsibility for Work known to be contrary to legal requirements if notice is not submitted.
 3. Necessary changes to the Contract Documents will be accomplished by Change Order if the Contract price or completion time are affected.
 - E. Enforce strict discipline and good order among employees. Do not employ on Work:
 1. Unfit persons.
 2. Persons not skilled in assigned task.

3.02 CONTRACTOR USE OF PREMISES:

- A. Confine operations at site to areas permitted by:
 1. Law.
 2. Ordinances.
 3. Permits.
 4. Contract Documents.
- B. Do not unreasonably encumber site with materials or equipment.
- C. Do not load any structures with weight that will endanger structure.

- D. Assume full responsibility for protection and safekeeping of products stored on premises.
- E. Move any stored products which interfere with operations of City or other Contractor.
- F. Obtain and pay for use of additional storage or work areas needed for operations.

3.03 OWNER FURNISHED PRODUCTS:

- A. None.

* * * END OF SECTION * * *

SECTION 01050

COORDINATION

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract are hereby made part of this Section.
- B. This Section describes the necessary coordination between Contractors.
- C. Related requirements specified elsewhere.
 - 1. Summary of Work: Section 01010.

1.02 PAYMENT:

- A. Coordination is considered incidental to the Work with no separate measurement or payment to be made.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 GENERAL:

- A. Any Contractor or subcontractor working on a specific portion of the project shall so schedule and conduct his work as not to impede unnecessarily any work being done by others on or adjacent to his work.

3.02 COORDINATION REQUIREMENTS:

- A. The Contractor (Schedule 3) shall coordinate his work with the Schedule 4 Contractor to permit the installation of the buried electrical cable and conduit at the well sites before finished surfaces are installed.
- B. The Contractor shall install level sensing equipment in the pitless unit and on the drop pipe at each well using materials furnished by and in accordance with the directions of the Schedule 4 Contractor.

- C. The Contractor shall coordinate startup and performance testing, particularly regarding the submersible pumps and motors and level sensing systems, with the Schedule 4 Contractor.

* * * END OF SECTION * * *

SECTION 01080

APPLICABLE CODES

PART 1 - GENERAL

1.01 CODES AND STANDARDS:

A. Design and workmanship of installation and material shall be judged by tests and requirements set forth in the latest revisions of the following codes and standards:

1. American Society for Testing Materials (ASTM).
2. American National Standards Institute (ANSI).
3. American Institute of Steel Construction (AISC).
4. American Concrete Institute (ACI).
5. American Welding Society (AWS).
6. National Electrical Manufacturer's Association (NEMA).
7. National Electrical Code (NEC).
8. American Association of State Highway Transportation Officials (AASHTO).
9. American Water Works Association (AWWA).
10. Uniform Building Code (UBC).
11. South Dakota Well Construction Standards.

* * * END OF SECTION * * *

SECTION 01090

PERMITS, LAWS AND ORDINANCES

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract are hereby made part of this Section.
- B. This Section describes the Contractor's responsibilities pertaining to permits, laws and ordinances.

1.02 PAYMENT:

- A. The requirements of this Section are considered incidental Work with no separate measurement and payment to be made.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 GENERAL:

- A. The Contractor shall comply with all Federal, State, County and local laws, ordinances and rules and regulations relating to the performance of the Work.

3.02 PERMITS:

- A. The Contractor shall, at his expense, procure all permits, certificates, and licenses required of him by law for the execution of his Work.

* * * END OF SECTION * * *

SECTION 01095

EXISTING UTILITIES AND UNDERGROUND OBSTRUCTIONS

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract and the GENERAL REQUIREMENTS (Division 1) are hereby made part of this Section.
- B. This Section describes, but is not limited to, the contact to be made with existing utilities and the Work associated with location, adjustment and repair of underground utilities and obstructions.
- C. The location of underground facilities is not shown on the Drawings.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 GENERAL:

- A. The Contractor shall take all necessary precautions to locate, protect and repair existing utilities, underground obstructions and structures.
- B. The Contractor shall have full responsibility for locating all existing underground facilities affected by construction, for contact with owners of affected underground facilities, for repair or replacement of any underground facilities damaged by the Contractor, and for such other requirements as may be included in the specifications, the cost of all of which will be considered incidental to the Contract Unit Prices or Lump Prices.

3.02 UTILITY CONTACT:

- A. Prior to Work in a specific area affecting underground utilities, the following utility contacts shall be made by the Contractor.

1. Telephone:

- a. Northwestern Bell (ask operator for ZENITH 2345).

2. Electric:

- a. Northern States Power Company (605) 339-8220.
- b. Sioux Falls Light Department (605) 339-7006.

3. Water:

- a. Water Division, Sioux Falls Utilities
Department (605)339-7025.

- B. The above utilities may not be a complete listing of owners of underground facilities in the project area. The Contractor shall be responsible for identifying all owners and making the necessary contacts.

3.03 UTILITY REPAIR:

- A. When a utility line or cable is exposed or damaged, the Contractor shall comply with the repair requirements of the affected utility.
- B. When a utility cable is exposed, the Contractor shall compact the backfill beneath the exposed cable before completion of the backfill operation.

* * * END OF SECTION * * *

SECTION 01340

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract are hereby made part of this Section.
- B. This Section covers the submission, review and distribution requirements of shop drawings, project data and samples.

1.02 PAYMENT:

- A. Shop drawings, project data and samples are considered incidental Work with no separate measurement and payment to be made.

PART 2 - PRODUCTS

2.01 SHOP DRAWINGS: Original drawings, prepared by Contractor, subcontractor, supplier or distributor, which illustrate some portion of the Work; showing fabrication, layout, setting or erection details.

- A. Prepared by a qualified detailer.
- B. Identify details by reference to specification section or detail number from the Drawings.
- C. Minimum Sheet Size: 8-1/2" x 11".

2.02 PRODUCT DATA:

- A. Manufacturer's standard schematic drawings:
 - 1. Modify drawings to delete information which is not applicable to the Work.
 - 2. Supplement standard information to provide additional information applicable to the Work.
- B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data.
 - 1. Clearly mark each copy to identify pertinent materials, products or models.

2. Show dimensions and clearances required.
3. Show performance characteristics and capacities.
4. Show wiring diagrams and controls.

PART 3 - EXECUTION

3.01 CONTRACTOR RESPONSIBILITIES:

- A. Review Shop Drawings, Project Data and Samples prior to submission to Engineer for review.
- B. Verify:
 1. Performance criteria.
 2. Field measurements.
 3. Field construction criteria.
 4. Catalog numbers and similar data.
- C. Coordinate the timing of each submittal with requirements of the Work.
- D. Contractor's responsibility for errors and omissions in submittals is not relieved by Engineer's review of submittals.
- E. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Engineer's review of submittals, unless Engineer gives written acceptance of specific deviations.
- F. Notify Engineer, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.
- G. Begin no work which requires submittals until return of submittals with Engineer's stamp and initials or signature indicating review.
- H. After Engineer's review, distribute copies.

3.02 SUBMISSION REQUIREMENTS:

- A. Schedule submissions at least ten (14) days before date reviewed submittals will be needed.

- B. Submit six (6) copies of Shop Drawings, Project Data and Samples for review. Three (3) copies will be returned. Should more than three (3) copies be required by the Contractor, additional copies should be submitted.
 - 1. The Contractor may provide a presubmittal for review and comment.
- C. Accompany submittals with transmittal letter, in duplicate, containing:
 - 1. Date.
 - 2. Project title and number.
 - 3. Contractor's name and address.
 - 4. The number of each Shop Drawing, Project Data and Sample submitted.
 - 5. Notification of deviations from Contract Documents.
 - 6. Other pertinent data.
- D. Submittals shall include:
 - 1. Date and revision dates.
 - 2. The names of:
 - a. Subcontractor.
 - b. Supplier.
 - c. Manufacturer.
 - d. Separate detailer when pertinent.
 - 3. Identification of product or material.
 - 4. Relation to adjacent structure or materials.
 - 5. Field dimensions, clearly identified as such.
 - 6. Specification section number.
 - 7. Applicable standards, such as ASTM number or Federal Specification.
 - 8. A statement signed by the Contractor that the submittal has been reviewed and meets the requirements except as noted.

3.03 ENGINEER'S DUTIES:

- A. Review and return submittals within ten (10) days of receipt.
- B. Review of separate item does not constitute review of an assembly in which item functions.
- C. Affix stamp and initials or signature certifying review of submittal noting one of the following:
 - 1. No exception taken.
 - 2. Make corrections noted.
 - 3. Revise and resubmit.
 - 4. Submit specified item.
 - 5. Rejected.
- D. Return submittals to Contractor.

3.04 RESUBMISSION REQUIREMENTS:

- A. Shop Drawings:
 - 1. Revise initial drawings as required and resubmit as specified for initial submittal.
 - 2. Indicate on drawings any changes which have been made other than those requested by Engineer.

* * * END OF SECTION * * *

SECTION 01345

MATERIAL SAMPLES AND RECORDS

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract and the GENERAL REQUIREMENTS (Division 1) are hereby made part of this Section.
- B. This Section covers the general requirements for sampling and record keeping to be performed by the Contractor.
- C. Related requirements specified elsewhere:
 - 1. Test Drilling/Observation Wells: Section 02671.
 - 2. Production Wells: Section 02672.
 - 3. Test for Yield and Drawdown: Section 02674.

1.02 PAYMENT:

- A. The collection and submittal of samples and the production and submittal of records are made part of identified unit price bid items and are not included as separate measurement and payment items.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 SCOPE:

- A. This section covers the type and method of material sampling.
 - 1. Drilled geologic formations.
 - 2. Pumped water samples.
- B. This section covers the type, form and number of records to be produced as a result of the Work.
 - 1. Drilling logs and daily reports.

2. Construction details and as-built drawings.
3. Well test observation records.

3.02 SAMPLES REQUIRED AND METHODS:

A. Drilled Material:

1. Method employed shall produce unwashed samples of the formation(s) encountered.
2. Shall accurately reflect the nature and state formations encountered.

B. Water Samples:

1. Shall be representative of the water located in the aquifer in which the well is to be finished. Samples shall be clear, with no visible suspended solids.
2. Shall be collected with the approved methods and in the proper containers consistent with the analysis to be conducted.

3.03 NUMBER OF SAMPLES:

A. Material Samples: Two (2) each from each formation encountered and two (2) each at 5 foot intervals in the water bearing formation.

B. Water Samples:

1. Two 1/2-gallon samples from each observation well.
2. Four 1/2-gallon samples during each well test as follows: two (2) 1/2-gallon samples after three hours of pumping, and two (2) 1/2-gallon samples just prior to well shutdown.

C. Additional volumes as directed during the test(s).

3.04 SAMPLING AND CONSTRUCTION RECORDS:

A. General records required (minimum).

1. Well or test hole log.
2. Sample analysis reports.
3. Detailed map of test hole locations.
4. Pumping test observations.

5. Daily progress report.
 6. Well construction as-built drawings.
- B. Specific requirements:
1. Well and test hole logs.
 - a. Well identification number and location description.
 - b. Reference point for all depth measurement.
 - c. Depth at which each change of formation occurs.
 - d. Depth at which water was first encountered.
 - e. Identification of the material of which each stratum is composed.
 - f. Sieve analyses of samples taken in the water bearing formation.
 - g. Nominal hole diameter of the well bore.
 - h. Total depth of the completed hole.
 - i. Depth or location of any lost drilling fluids, drilling materials or tools.
 - j. Depth and description of the well casing.
 - k. Description of well screens including diameter, length, material, slot sizes, amount of open area, and location.
 - l. Static water level at completion of well development.
 - m. Name of contracting company and job foreman.
 - n. Date(s) work completed.
 2. Location map of exploratory area.
 - a. North arrow.
 - b. Scale.
 - c. Well identification numbers.
 - d. Identification of known reference joints, such as road centerlines, fence lines, bridges, river channels, etc.

3. Pumping test records. See Section 02674.
4. Well construction as-built drawings.
5. Other pertinent data as requested by the Engineer.

* * * END OF SECTION * * *

SECTION 01350

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract are hereby made part of this Section.
- B. This Section describes the Contractor's responsibilities regarding the completion of an operation and maintenance manual.
- C. Related requirements specified elsewhere:
 - 1. Shop drawings, Project Data and Samples: Section 01340.

1.02 PAYMENT:

- A. Operation and maintenance data requirements will be considered as incidental Work with no separate measurement or payment to be made.

PART 2 - PRODUCTS - NOT USED.

PART 3 - EXECUTION

3.01 GENERAL:

- A. The Contractor shall prepare and furnish three (3) manuals of all equipment specified.
- B. The Manual shall cover the installation, operation and maintenance of all equipment and material including:
 - 1. Complete catalog data.
 - 2. Manufacturer's literature.
 - 3. Parts list.
 - 4. Maintenance instructions.
 - 5. Approved shop drawings.
 - 6. Supplier's name, address and telephone number.

C. All such literature shall be bound under hard cover and submitted to the Engineer for review and transmittal to the City.

1. Should modification be required, the bound literature will be returned to the Contractor for modification and resubmittal to the Engineer.

* * * END OF SECTION * * *

SECTION 01500

TEMPORARY FACILITIES

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other Conditions of the Contract are hereby made part of this Section.
- B. This Section describes the temporary facilities to be provided by the Contractor during the Work.

1.02 PAYMENT:

- A. Temporary facilities are considered incidental to the Work with no separate measurement and payment to be made.

PART 2 - PRODUCTS - NOT USED.

PART 3 - EXECUTION

3.01 TEMPORARY WATER:

- A. Water which is required for construction, flushing, testing, disinfection and other purposes shall be obtained by the Contractor at no cost to the Owner.

3.02 TEMPORARY ELECTRICAL:

- A. It will be the Contractor's responsibility to provide, obtain and pay for temporary power for construction, test pumping on other purposes as required to perform the Work.

* * * END OF SECTION * * *

SECTION 01710

PROTECTION AND CLEANING

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract are hereby made part of this Section.
- B. This Section describes the Contractor's responsibilities relative to protection and cleanup of the site during initial construction.

1.02 PAYMENT:

- A. Protection and cleaning of the site is considered incidental to the Work with no separate measurement and payment to be made.

PART 2 - PRODUCTS - NOT USED.

PART 3 - EXECUTION

3.01 GENERAL:

- A. Except as otherwise provided herein, the Contractor shall protect all structures, pipelines, trees, power lines, shrubbery, lawns and agricultural crops during the progress of this work; shall remove from the site all cuttings, drillings, debris, and unused materials.
- B. Water pumped or released during construction, test pumping, development, or other operations shall be conducted by temporary pipe lines or wood or metal flumes away from the work area to natural drainageways. Flushing or drainage shall not be conducted in such a manner as to cause erosion or flooding of land not owned or controlled by the City, except by special permission in writing by the City and affected land owner.
- C. The Contractor shall assure that water discharged to any location during construction does not damage the natural environment or wildlife. The Contractor shall be responsible for any environmental damage which results from this activities.
- D. At all times keep premises free from accumulations of waste material and rubbish.

- E. At the end of each day's work leave construction area in such a condition so as to permit unencumbered access to all private properties in the vicinity.
- F. Upon completion of the work, the site shall be restored as nearly as possible to its original condition, including the replacement, at the Contractor's sole expense, of any facility or landscaping which has been damaged beyond restoration to its original condition or which has been destroyed.

* * * END OF SECTION * * *

SECTION 01760

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 GENERAL:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract are hereby made part of this Section.
- B. This Section describes the measurement and payment to be made for completed Work. The Contractor shall accept the compensation, as herein provided, in full payment for:
 - 1. Furnishing all materials, labor, tools and equipment necessary to the completed Work.
 - 2. Performing all Work contemplated and embraced under the contract.
 - 3. Completing the Work in accordance with the Contract Documents.

1.02 SUBMITTALS:

- A. The Contractor shall furnish a pay request monthly on forms provided by the Engineer.

PART 2 - PRODUCTS - NOT USED.

PART 3 - EXECUTION

3.01 MEASUREMENT:

- A. The determination of final quantities of Work performed under the Contract will be made by the Engineer, based upon the lines, grades, and cross sections given or measurements made by him or his assistants.
 - 1. All items will be computed in the units of the Bid Schedule.

3.02 PAYMENT:

- A. All Work required to complete construction shall be deemed to be included in the unit price or lump sum price items listed in the Contractor's Bid Schedule.
- B. Payment will be made only for materials actually incorporated in the Work or stored on the site.

- C. Payment requests for stored materials shall be supported by paid invoices for same. Material inventory control procedures shall identify reduction for material used in completed Work.
- D. Neither the payment of any estimate nor of any retained percentage shall relieve the Contractor of any obligation to make good any defective Work or material.

3.03 PAYMENTS TO BE WITHHELD:

- A. Applicable retainage, as defined in the Contract Conditions, shall apply to all payments due the Contractor including payment for stored material.
- B. Amounts equal to maximum potential liquidated damages may be withheld from payments due Contractor when Work is not completed within the specified time. Such amounts shall be in addition to other payments withheld.
- C. Payments withheld will be paid as follows:
 - 1. Normal retainage will be paid as required by the General Conditions.
 - 2. Potential liquidated damages withheld will be retained until final resolution of Liquidated Damages is made by the City.

3.04 PAYMENT ITEMS:

- A. Test drilling, observation and production well construction, test pumping, and pump installation:
 - 1. Test drilling mobilization.
 - a. Measurement: The completed work.
 - b. Payment: Contract lump sum price.
 - 2. Test hole and observation well drilling, including sampling and records.
 - a. Measurement: From ground surface to bottom of hole.
 - b. Payment: Contract unit price.
 - 3. Completion of test hole as observation well, including screen, casing, gravel pack and seal.
 - a. Measurement: From ground surface to bottom of screen.

- b. Payment: Contract unit price.
- 4. Observation well development, water sample collection and disinfection.
 - a. Measurement: The completed work.
 - b. Payment: Contract unit price.
- 5. Furnish and install neat cement grout surface seal, galvanized steel sleeve and cover for permanent observation wells.
 - a. Measurement: The completed work.
 - b. Payment: Contract unit price.
- 6. Abandonment of observation wells.
 - a. Measurement: The completed work.
 - b. Payment: Contract unit price.
- 7. Production well mobilization.
 - a. Measurement: The completed work.
 - b. Payment: Contract lump sum price.
- 8. 20" production well drilling, including samples and records.
 - a. Measurement: From ground surface to bottom of hole.
 - b. Payment: Contract unit price.
- 9. 12" steel casing.
 - a. Measurement: The installed length.
 - b. Payment: Contract unit price.
- 10. 12" stainless steel screen.
 - a. Measurement: The installed length.
 - b. Payment: Contract unit price.
- 11. Gravel pack.
 - a. Measurement: The installed length.
 - b. Payment: Contract unit price.

12. Grout seal.
 - a. Measurement: The installed length.
 - b. Payment: Contract unit price.
13. Production well development.
 - a. Measurement: The completed work.
 - b. Payment: Contract unit price.
14. Installation and removal of temporary discharge piping.
 - a. Measurement: The installed length.
 - b. Payment: Contract unit price.
15. Installation and removal of test pump and equipment.
 - a. Measurement: The completed work.
 - b. Payment: Contract unit price.
16. Test pumping, observations and records for maximum 8-hour step-drawdown tests.
 - a. Measurement: Duration of test.
 - b. Payment: Contract unit price.
17. Test pumping, observations and records for maximum 120-hour tests.
 - a. Measurement: Duration of test.
 - b. Payment: Contract unit price.
18. Test pumping, observations and records for maximum 72-hour tests.
 - a. Measurement: Duration of test.
 - b. Payment: Contract unit price.
19. Recovery observations and records.
 - a. Measurement: Duration of observations.
 - b. Payment: Contract unit price.

- 20. Collection of water samples, disinfection and cap.
 - a. Measurement: The completed work.
 - b. Payment: Contract unit price.
- 21. Furnish and install pitless adapter, including pipe stub-out.
 - a. Measurement: Number of units installed.
 - b. Payment: Contract unit price.
- 22. Furnish and install submersible pump and motor.
 - a. Measurement: Number of units installed.
 - b. Payment: Contract unit price.
- 23. Furnish only, spare submersible pump and motor.
 - a. Measurement: Number of units furnished.
 - b. Payment: Contract unit price.
- 24. Compacted fill.
 - a. Measurement: Volume of fill after compaction.
 - b. Payment: Contract unit price.
- 25. Riprap.
 - a. Measurement: Area of riprap times specified depth.
 - b. Payment: Contract unit price.
- 26. Gravel surfacing.
 - a. Measurement: Area of surfacing times specified depth.
 - b. Payment: Contract unit price.
- 27. Concrete pad.
 - a. Measurement: Area paved.
 - b. Payment: Contract unit price.

- B. Incidental Work: All work for which measurement and payment is not detailed above is considered incidental with no separate measurement or payment to be made.

* * * END OF SECTION * * *

DIVISION 2 - SITE WORK

SECTION 02205

SITE EXCAVATION AND ROUGH GRADING

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract and the GENERAL REQUIREMENTS (Division 1) are hereby made part of this Section.
- B. The Contractor shall furnish all labor, materials, tools, equipment and perform all work and services necessary for or incidental to the furnishing and installation, complete, of all operations in connection with excavation, construction of fills, borrow and rough grading as shown on the Drawings and as specified, in accordance with provisions of the Contract Documents, and completely coordinated with work of all other trades.
- C. Although such work is not specifically shown or specified, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure, complete and compatible installation.
- D. Work included consists of, but is not limited to, furnishing and installing the following:
 - 1. Excavation and grading the site to subgrades as indicated on Drawings and/or as specified herein.
 - 2. All filling required to bring existing grades to rough grades on Drawings.
 - 3. Furnish and place all additional approved material required to bring subgrade to proper line and grade.

1.02 PAYMENT:

- A. Payment shall be at the Contract unit prices and lump sum prices as shown on the Bid Schedule.

PART 2 - PRODUCTS

2.01 MATERIAL FOR FILLING:

- A. Materials obtained from the site may be used for filling purposes.

- B. If sufficient suitable fill material is not available on the site, the Contractor shall provide additional suitable material from off-site sources.

2.02 RIPRAP:

- A. Material shall conform to South Dakota DOT Standards, Section 830, Class II or Class III riprap.

2.03 GRAVEL SURFACING:

- A. Material shall conform to South Dakota DOT Standards, Section 882, for Gravel Surfacing.

2.04 BASE UNDER CONCRETE PAD:

- A. Material shall conform to South Dakota DOT Standards, Section 882, for Aggregate Base Course.

PART 3 - EXECUTION

3.01 SITE EXCAVATION AND ROUGH GRADING:

- A. Layout: Plans indicate approximate finished grade required. Perform all layout work required. Replace property corner markers to original location if disturbed or destroyed.
- B. Protection of Facilities: Maintain existing lines (either overhead or underground). Repair any item that is inadvertently damaged to original condition. Notify utility at once so that emergency repair may be made.
- C. Protection of Rough Grade: During construction, shape and drain embankment and excavation. Maintain ditches and drains to provide drainage at all times. Protect graded areas against action of elements prior to acceptance of work. Re-establish grade where settlement or washing occurs.
- D. Maintain proper drainage during grading operations. Replace any embankment material which may be lost or displaced as a result of natural causes such as storms, cloudbursts, etc., or as a result of movement or settlement of ground or foundation upon which embankment is placed with acceptable material. No additional compensation will be allowed for such replacement.
- E. Stability of Excavations: Slope sides of excavations over 5 feet deep to angle of repose of material excavated; otherwise, shore and brace where sloping is not possible either because of space restrictions or stability of material excavated.

- F. Excavated material which is suitable for fill or backfill shall be stockpiled on the project site. Remove unsuitable and unneeded material from the project site.

3.02 CONSTRUCTION OF EMBANKMENTS AND FILLS:

- A. Use fill materials reasonably free of roots, organic matter, trash or frozen material. Remove all soft and yielding material which will not compact readily and replace with suitable material.
- B. Allow material containing an excess of water to dry to a moisture content which will allow acceptable compaction. Material excessively wet or dry and not at optimum moisture content is not considered unsuitable.
- C. Construct embankments and fills at locations and to lines of grade indicated. Completed fill shall correspond to shape of typical cross section or contour indicated regardless of method used to show shape, size and extent of line and grade of completed work.
- D. Provide fill material which is free from roots, organic matter, trash, frozen material, and stones having a maximum dimension greater than 6 inches. Insure that stones larger than 4 inches are not placed in upper 6 inches of fill or embankment. Place material in maximum 12 inch loose thickness. Place layers horizontally and compact each layer prior to placing additional fill.
- E. Compact by sheepsfoot or pneumatic rollers, vibrators or other suitable equipment. Control moisture for each layer as necessary to meet requirements of compaction. Do not place materials in embankments or fills which exceeds optimum moisture content by 3 percent or is 3 percent below optimum moisture content.
- F. Compact embankments and fills to not less than 95 percent of maximum dry density as determined by the Standard Proctor Method, ASTM D698.
- G. Place riprap in accordance with South Dakota DOT Standards, Section 700.

3.03 TOLERANCES OF ROUGH GRADE SURFACE:

- A. For unsurfaced areas bring subgrade to contours indicated (less the topsoil depth) with a maximum tolerance of 0.2 of a foot.

- B. For paved areas bring subgrade to underside of respective surfaces with a maximum tolerance of 0.2 of a foot.

* * * END OF SECTION * * *

SECTION 02671

TEST DRILLING AND OBSERVATION WELLS

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract and the GENERAL REQUIREMENTS (Division 1) are hereby made part of this Section.
- B. The Contractor shall furnish and install all equipment, materials, labor, and appurtenances required and necessary for:
 - 1. Test drilling within the project area.
 - 2. Completion of selected test holes as temporary or permanent observation wells.
 - 3. Developing and obtaining a water sample from selected observation wells.
- C. The quantities detailed in the Bid Schedule are estimates.
 - 1. The number, location and depth of test holes and observation wells shall be determined by the Engineer as the project progresses.
 - 2. Changes to the Bid Schedule quantities will be made by Change Order after the final quantities are known.
- D. Related requirements specified elsewhere:
 - 1. Material Samples and Records: Section 01345.
 - 2. Disinfection and Abandonment: Section 02675.

1.02 SUBMITTALS:

- A. Shop drawings of casing and screen.
- B. Material samples and records per Section 01345.
- C. Submit to state agencies required reports and samples.

1.03 LOCATION:

- A. The area of test drilling and well construction is as shown on the Drawings.

- B. The location for test holes and observation wells will be staked by the Engineer.

1.04 COMPETENT WORKMEN:

- A. The Contractor shall employ only competent workmen for the execution of his work and all such work shall be performed under the direct supervision of experienced personnel satisfactory to the Engineer.

1.05 PAYMENT:

- A. Payment shall be at the Contract unit prices and lump sum prices as shown on the Bid Schedule.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS:

- A. Test holes and observation wells:

- 1. Test holes shall be drilled as field located and to the depth directed by the Engineer. Selected test holes shall be completed as observation wells.

- 2. The observation wells shall be finished to the bottom of the water bearing formation.

- 3. The completed observation wells shall consist of the following principal items as dimensioned in the Drawings.

- a. Bore hole diameter:

- (1) Test holes and observation wells: 4 inch minimum diameter.

- b. Casing material:

- (1) Schedule 40 PVC or
- (2) Galvanized iron pipe.

- c. Screen material:

- (1) Factory slotted schedule 40 PVC or
- (2) Wire wound stainless steel.

- d. Gravel packing.

- e. Grout.

- f. Development of well and water sample as specified.
 - g. Abandonment if requested by City.
4. The Contractor will be required to develop and pump all observation wells and obtain a clean representative water sample from each. Air lift pumping may be used. An observation well which pumps excessive volumes of suspended solids will not be acceptable.

2.02 SCREEN AND FITTINGS:

A. Materials:

- 1. Slot cut Schedule 40 PVC well screen with PVC cap at bottom or
- 2. Wire wound stainless steel well point.

B. All sections and connections shall be threaded together, or chemically welded if PVC.

C. Screen Slot Size: To be determined by the Contractor, but in general shall be sized to retain ninety percent (90%) of the particle size of the select gravel packing media, or to retain between thirty percent and fifty percent (30%-50%) of the formation material if the well is naturally developed.

2.03 GRAVEL PACKING MEDIA:

A. If it is determined by the Contractor, from samples of the formation materials, that the observation wells should be gravel packed, the materials used shall comply with these requirements.

B. Gravel Packing Media: Washed gravel which is screened to the gradation best suited for the maximum development of water from the observation well and which, after development, will result in a finished observation well which does not pump excessive amounts of sand.

C. Add and mix calcium hypochlorite, HTH or equal, 0.50 pounds per cubic yard of gravel, at the time gravel packing media is placed in well.

2.04 BENTONITE GROUT:

- A. Bentonite grout shall contain a high percentage of clay or bentonite to minimize shrinkage of the slurry within the annular space. It shall be a mixture of 10 percent by weight of bentonite added to clean water or approximately 5 percent bentonite added to drilling mud. Bentonite shall contain 85 percent of the mineral montmorillonite and shall meet American Petroleum Institute specification standard 13A (March 1966). Saline, acid or alkaline substances or other additives to cause a temporary increase in viscosity of the bentonite slurry are not permitted.

PART 3 - EXECUTION

3.01 SCOPE:

- A. The Contractor shall furnish and install all labor, tools, equipment and material required to drill each test hole and construct each observation well, including all drilling and placing required to construct and install the screen, casing, gravel packing, seal, and including all development work required.

3.02 GENERAL:

- A. The test holes shall be advanced by a method which allows sampling of unwashed formation materials using split spoon, bailer, auger or other approved technique.

3.03 DRILLING AND SAMPLING PROCEDURE:

A. Exploratory Test Holes:

1. Accurate material samples shall be collected from each succeeding formation encountered and at every five (5) ft. interval in the water bearing formations.
2. Two complete sets of samples are to be collected. Sieve analyses shall be performed on one set of samples and the second set shall be retained by the Contractor for a period of at least sixty (60) days. The Contractor shall dispose of the second set of samples in accordance with instructions from the Engineer.
3. The Contractor shall keep a written log of the formations, giving accurate descriptions of the materials and whether or not they are water-bearing.

3.04 DEVELOPMENT OF WELL:

- A. The methods of developing to be used shall be submitted to and approved by the Engineer. The development time considered acceptable for the wells is that time required for the method approved to yield an ample amount of clear and relatively sand free water.
- B. Each observation well shall be developed so that the water level in the well reflects the water level or piezometric surface in the aquifer. This shall be determined by measuring the static water level and then pouring a volume of clear water into the well equivalent to the volume within a five foot length of the casing. If the water level returns to the initial static level within five minutes, the observation well will be considered open. An observation well which pumps excessive amounts of suspended solids will not be acceptable.

3.05 PROTECTION OF QUALITY OF WATER:

- A. The Contractor shall take such precautions as are necessary or as may be required permanently to prevent contaminated water or water having undesirable physical or chemical characteristics from entering, through the opening made by the Contractor in drilling the well, the stratum in which the well is to be finished.
- B. The Contractor shall also take all necessary precautions during the construction period to prevent contaminated water, gasoline, etc., from entering the well either through the opening or by seepage through the ground surface.

3.09 CORRECTIVE WORK:

- A. In the event that the well becomes contaminated or that water having undesirable physical or chemical characteristics does enter the well due to the neglect of the Contractor, he shall, at his own expense, perform such work or supply such casing, seals, sterilizing agents or other material as may be necessary to eliminate the contamination or stop the flow of the undesirable water.

3.10 TEMPORARY CAPPING:

- A. At all times during the progress of the work, the Contractor shall protect the well in such manner as effective to prevent either tampering with the well or the entrance of foreign matter into it. Upon

suspension of the work for any reason, he shall provide and set a substantial screwed, flanged or welded cap satisfactory to the Engineer on the well which shall remain in place until the well is completed.

3.11 PERMANENT COVER:

- A. Install surface seal, steel sleeve and cover on observation wells to be retained as permanent observation wells, as detailed in the Drawings.
- B. Existing observation wells installed by others, as well as those installed under this contract, may be completed as permanent observation wells, as directed by the Engineer.

* * * END OF SECTION * * *

SECTION 02672

PRODUCTION WELLS

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract and the GENERAL REQUIREMENTS (Division 1) are hereby made part of this Section.
- B. The Contractor shall furnish and install all equipment, materials, labor, and appurtenances required and necessary for the complete construction of the production wells.
- C. The quantities detailed in the Bid Schedule are based on test holes completed in the well field expansion area shown in the Drawings. Logs of these test holes are bound in the Appendix.
 - 1. The number, location and depth of production wells shall be determined by the Engineer as the test drilling, well construction and test pumping progresses.
 - 2. Changes to the Bid Schedule quantities will be made by Change Order after the final quantities are known.
- D. Related requirements specified elsewhere:
 - 1. Material Samples and Records: Section 01345.
 - 2. Well Testing for Yield and Drawdown: Section 02674.
 - 3. Disinfection and Abandonment: Section 02675.

1.02 SUBMITTALS:

- A. Shop drawings of screen and casing.
- B. Material samples and records per Section 01345.
- C. Submit to state agencies required reports and samples.

1.03 LOCATION:

- A. The area of test drilling and well construction is as shown on the Drawings.

- B. Anticipated well sites (A through E) are generally located on the Drawings. These locations may be modified by the Engineer as the work progresses, depending on ongoing test results and other factors.
- C. The location for the production wells will be staked by the Engineer.

1.04 COMPETENT WORKMEN:

- A. The Contractor shall employ only competent workmen for the execution of his work and all such work shall be performed under the direct supervision of experienced personnel satisfactory to the Engineer.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. During loading, transporting and unloading exercise care to prevent damage to materials.
- B. The gravel pack shall be delivered to the well site on approval by the Engineer.
 - 1. The material may be delivered in bags or in bulk.
 - 2. Materials delivered in bags shall be protected from weather until installed.
 - 3. Materials delivered in bulk shall be stored on a surface covered with a 2-mil plastic sheet.
 - 4. Material for the gravel pack that comes in contact with the ground shall not be used, and all material shall be protected from contamination until installed.

1.06 TESTING:

- A. The Contractor shall notify the City of delivery of the gravel pack materials to the site and shall make the materials available for sampling.
- B. Samples may be collected and tested by the City in accordance with AWWA B100, Section 5.
 - 1. Initial sampling and testing shall be done at the City's expense.
 - 2. Subsequent sampling and testing required by the failure of initial samples to meet these specifications shall be done at the Contractor's expense.

1.07 PAYMENT:

- A. Payment shall be at the Contract unit prices and lump sum prices as shown on the Bid Schedule.

PART 2 - PRODUCTS

2.01 SCREEN AND FITTINGS:

- A. Reference Standard: AISI Type No. 304, 18-8 stainless steel.
- B. Minimum Wall Thickness: 7 gauge (3/16 inch).
- C. Johnson wire-wound, continuous-slot type stainless steel screen.
1. Pipe size for gravel pack well.
- D. Bottom Plate: A 3/16 inch thick, 18-8 stainless steel plate shall be securely welded to the bottom of the screen for sealing the bottom of the well.
- E. All sections and connections shall be welded together with full circumferential joints.
- F. Screen Slot Size: To be determined by the Contractor, but in general shall be sized to retain approximately ninety percent (90%) of the particle size of the select gravel packing media.

2.02 STANDARD STEEL CASING PIPE:

- A. Material: New black steel pipe, ASTM Specification A53-84a, plain end.
- B. Minimum wall thickness and weight shall be as follows:

<u>Nominal Casing Diameter</u>	<u>Wall Thickness in Inches</u>	<u>Weight in Pounds per Foot</u>
4	0.237	10.79
5	0.250	14.62
6	0.250	18.97
8	0.322	28.55
10	0.365	40.48
12	0.375	49.56

2.03 GRAVEL PACKING MEDIA:

- A. Gravel pack material shall consist basically of washed gravel, 90% to 95% quartz grains. Approved sources are Northern Gravel Co., Muscatine, Iowa and Eau Claire Sand & Gravel Co., Eau Claire, Wisconsin.
- B. Specific Gravity:
 - 1. Average specific gravity of not less than 2.5.
 - 2. Not more than 1 percent, by weight, of the material shall have a specific gravity of 2.25 or less.
- C. Nonround Pieces: Thin, flat or elongated pieces, the maximum dimension of which exceeds three times the minimum, shall not be in excess of 2 percent, by weight.
- D. Acid Solubles: Not more than 5 percent of the gravel shall be soluble in hydrochloric acid.
- E. Washed Material: The material shall be washed and free of shale, mica, clay, dirt, loam, and organic impurities of any kind.
- F. Iron and Manganese: The material shall contain no iron or manganese in a form or quantity that will adversely affect the well-water supply.
- G. Gradation:
 - 1. Tests for gradation of gravel-pack material shall be in accordance with the method of testing as specified in ASTM C136.
 - 2. Gravel-pack gradation shall be determined by taking the 50th percentile of the finest aquifer material to be filtered.
 - 3. Gravel pack to formation-sand ratio at the 50th percentile point shall fall within the range of 6:1 to 4:1.
- H. Uniformity Coefficient: Shall not exceed 2.5.
- I. Distribution Curve: Shall parallel the main part of the formation-sand distribution curve for formation sands having a uniformity coefficient less than 2.5.

2.04 NEAT CEMENT GROUT:

- A. Shall consist of a mixture in the proportion of one (1) bag (94 pounds) of Portland cement (ASTM C150-84a) to not more than 6 gallons of clean water. The cement shall be sulfate resistant, Type III or better.
- B. Type II cement may be used provided two pounds of bentonite are added per sack of cement.

PART 3 - EXECUTION

3.01 GENERAL:

- A. Construct production wells of the diameter as shown on the Drawings. Depth shall be sufficient to complete the well to the bottom of the water bearing formation as approved by the Engineer.

3.02 WELL DRILLING METHOD:

- A. The production wells shall be dug by use of the "Caisson", "False Casing" or "Blind Casing" method.
- B. Install temporary casings of the necessary diameters to provide a minimum 20" diameter gravel packed well.
- C. Remove all material from inside the temporary casings by orange peel bucket and/or bailer.
- D. As the material is excavated from inside the casings, force the casings down in a manner to avoid displacement or packing of the surrounding aquifer materials.
- E. Material shall not be excavated outside of or below the temporary casing.
- F. Maintain water level in outer casing above static level during the removal of formation materials.

3.03 SCREEN AND CASING INSTALLATION:

- A. The screen shall be installed concentrically in the outer casing, at the bottom of the well.
- B. Steel casing pipe shall be rigidly installed and fastened by full circumferential welded joints in accordance with AWWA C206.
- C. All of the described screen and casing shall be centered in the outer casing with suitable centering guides. Centering guide materials shall be the same as the screen or casing they are attached to .

- D. Centering guides shall not be welded directly to the wire wound portion of the screen.

3.04 GRAVEL PACKING:

- A. Following the setting of the casing and attached screen, the annular spaces between the screen and outer casing shall be filled with gravel pack.
- B. The gravel shall be installed through a tremie pipe of 2 inch diameter and raised in lifts no greater than 10 feet at one time. The gravel pack material shall be installed from the bottom of the well continuously upward.
- C. Carefully withdraw the outer casing as gravel pack is added so there will be no mixing of the gravel pack with the natural formation.
- D. Calcium hypochlorite, HTH or equal, shall be added and mixed with the gravel packing material at the rate of 0.50 pound per cubic yard of material at the time the material is placed in the well.
- E. Install to the dimensions shown on the Drawings.

3.05 GROUTING:

- A. Install grout under pressure by means of a grout pump from the bottom of annular opening upward in one continuous operation.
- B. Shall be commenced without delay upon completion of drilling the well.
- C. Neat cement grout or concrete grout shall be allowed to set a minimum of 12 hours when hi-early cement is used (with steel casings only) or a minimum of 48 hours when regular cement is used, before drilling operations or other work is resumed or test pumping is performed.
- D. Install to the dimensions shown on the Drawings.

3.06 DEVELOPMENT OF WELL:

- A. The methods of developing to be used shall be submitted to and approved by the Engineer. The minimum development time considered acceptable for the well is 8 hours. The Contractor shall provide such additional development time as required for the well at no additional cost to the City to meet the efficiency requirements specified below and to develop the well to a sand-free condition.

- B. The Contractor shall furnish all necessary pumps, compressors, high pressure jets, bailers, or other needed equipment and shall develop the well by such approved methods as shall be necessary to give the maximum yield of water per foot of drawdown and extract from the water bearing formation in the well the maximum practical quantities of sand as may, during the life of the well, be drawn through the screen when the well is pumped under maximum conditions of drawdown, on either a continuous or intermittent basis.
- C. The process shall be continued until the water from the well runs clear and continues to run clear after periods of stopping and starting of the development pumping equipment while pumping the well at a rate of up to 600 gallons per minute.
- D. In the event that chemical additives, such as polyphosphates, are required to aid in development of the well through dissolving drilling muds, silts or clays which may have sealed or partially sealed the outer surfaces of the bore hole in the water bearing portion of the aquifer, the Contractor shall furnish and apply same at no additional cost to the City.
- E. The completed well shall have an actual efficiency of not less than 80 percent of the theoretical efficiency, based on the pumping test specified in Section 02674. The efficiency shall be calculated by the Engineer using non-equilibrium methods and making due allowance for the actual penetration of the aquifer with the amount of screen installed.
- F. Failure by the Contractor to construct a well with an efficiency of 80 percent or higher, as defined above, or to construct a sand-free well, will be considered negligence on the part of the Contractor and will result in refusal to accept the well and the associated pumping test by the City.

3.07 TESTING FOR PLUMBNESS AND ALIGNMENT:

- A. The Contractor shall furnish all labor, material, equipment and tools required to test the well for plumbness and alignment.
- B. The hole shall be constructed and all casing and liners set round, plumb and true to line as defined herein. To demonstrate the compliance of his work with this requirement the Contractor shall make the tests described herein in the manner prescribed by, and to the satisfaction of, the Engineer.

C. Tests for alignment and plumbness must be made after the complete construction of the well and before acceptance. Additional tests, however, may be made by the Contractor during the performance of the Work.

D. Description of Test:

1. Plumbness and alignment shall be tested by lowering into each well to the top of the screen a section of pipe 20 feet long or a dummy of the same length. The outer diameter of the plumb shall not be more than 1/2 inch smaller than the diameter of that part of the casing or hole being tested.
2. If a dummy is used it shall consist of a rigid spindle with three rings, each ring being 12 inches long. The rings shall be truly cylindrical and shall be spaced one at each end of the dummy and one ring in the center thereof. The central member of the dummy shall be rigid to that it will maintain the alignment of the axes of the rings.

E. Requirements for Plumbness and Alignment:

1. The plumbness and alignment of the well shall be corrected by the Contractor at his own expense if:
 - a. The pipe or dummy fails to move freely throughout the length of the casing or hole to the top of the screen. (Requirement for alignment).
 - b. The well varies from the vertical in excess of two-thirds the inside diameter of that part of the well being testing per 100 feet of depth, or beyond limitations of this test. (Requirement for plumbness).
2. Should the Contractor fail to correct such faulty alignment of plumbness, the City may refuse to accept the well.
3. The City may waive the requirements of this paragraph for plumbness if all of the following apply:
 - a. The Contractor has exercised all possible care in constructing the well and the defect is due to circumstances beyond his control.
 - b. The utility of the completed well will not be materially affected.

c. The cost of remedial measures will be excessive.

4. In no event will be provisions of this paragraph with respect to alignment be waived.

3.08 PROTECTION OF QUALITY OF WATER:

- A. The Contractor shall take such precautions as are necessary or as may be required permanently to prevent contaminated water or water having undesirable physical or chemical characteristics from entering, through the opening made by the Contractor in drilling the well, the stratum from which the well is to draw its supply.
- B. The Contractor shall also take all necessary precautions during the construction period to prevent contaminated water, gasoline, etc., from entering the well either through the opening or by seepage through the ground surface.

3.09 CORRECTIVE WORK:

- A. In the event that the well becomes contaminated or that water having undesirable physical or chemical characteristics does enter the well due to the neglect of the Contractor, he shall, at his own expense, perform such work or supply such casing, seals, sterilizing agents or other material as may be necessary to eliminate the contamination or stop the flow of the undesirable water.

3.10 PROTECTION OF WELL AND TEMPORARY CAPPING:

- A. At all times during the progress of the work, the Contractor shall protect the well in such manner as effective to prevent either tampering with the well or the entrance of foreign matter into it.
- B. The well casing shall extend a minimum of 3 feet above existing grade, or such increased height as necessary to prevent the entrance of surface water.
- C. Upon suspension of the work for any reason, the Contractor shall provide and set a substantial screwed, flanged or welded cap satisfactory to the City on the well which shall remain in place until the permanent equipment and structure is completed or the well is abandoned.

* * * END OF SECTION * * *

SECTION 02674

TEST FOR YIELD AND DRAWDOWN

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract and the GENERAL REQUIREMENTS (Division 1) are hereby made part of this Section.
- B. This section describes the materials, equipment and methods to be used in conducting well pumping tests for yield and drawdown.

1.02 PAYMENT:

- A. Payment shall be at the Contract unit prices and lump sum prices as shown on the Bid Schedule.

PART 2 - PRODUCTS - NOT USED.

PART 3 - EXECUTION

3.01 SCOPE:

- A. The Contractor shall furnish all labor, materials, equipment and appurtenant items required to conduct and complete the pumping test described herein for each production well.

3.02 GENERAL:

- A. The pumping test on each production well will consist of a maximum 72-hour or maximum 240-hour drawdown test followed by a 24-hour recovery observation period, with drawdown observations made in accordance with the schedule set out herein.
 - 1. The Engineer will inform the Contractor as to which maximum pumping test duration will be used prior to the start of each test.
- B. The Contractor shall notify the Engineer after the well has been completely constructed, developed and cleaned out and the depth of the well accurately measured, and shall make the necessary arrangements for conducting the pumping test.

- C. In addition to this test the Engineer may order the Contractor to make additional pumping tests if the test pump fails within the test period or the Contractor neglects to perform proper observations. No payment will be made for the failed test.
- D. All tests shall be run with similar equipment and in a like manner to that hereinafter described. Tests shall be made at least 3 days apart. Additional tests requested by the Engineer because of pump failure during the test period, or due to Contractor negligence, will be at the Contractor's expense.
- E. If conditions are encountered during the test period which indicate that additional data are required, the Engineer may direct that the test pumping continue for a longer period than initially indicated, however the Contractor shall not be required to repeat the test if the pump fails or for other good cause must be shut down after the initially indicated period. A corresponding addition to recovery reading time may also be made. Such extensions of the test pumping and recovery periods shall be made with no change in the unit hourly cost.

3.03 TEST PUMP:

- A. The Contractor shall furnish and install necessary pumping equipment required for pumping of the well.
- B. The pump shall be capable of pumping to the required point of discharge at least 600 gallons per minute, but with satisfactory throttling devices so that the discharge may be reduced to 100 gallons per minute if so directed by the Engineer. The pumping rate(s) shall be determined by the Engineer prior to calibrating the test equipment.
- C. The pumping unit shall be complete with prime mover of ample power, controls and appurtenances including all drives, gears and universal shafts and shall be capable of being operated without interruption and at a uniform rate throughout the test.

3.04 AUXILIARY EQUIPMENT:

- A. Temporary discharge piping to a point of discharge as approved by the Engineer.
 - 1. Furnish and install pipe of sufficient size for the pumping rate used.
 - 2. Discharged water shall not be allowed to pond on or near the site of the well.

3. The Contractor will be expected to furnish and install approximately 400 to 1,200 feet of pipe for each production well pumping test.
- B. Furnish and install flow measuring devices approved by the Engineer for accurately measuring the flow of water.
 1. Orifice.
 2. Calibrated, properly sized water meter.
 3. Weir box.
 - C. Furnish and install flow control devices.
 1. Throttling valve(s) capable of maintaining a constant flow rate.
 2. Variation on power source rpm is not approved.
 - D. Water level measurement:
 1. Contractor shall furnish four (4) water level sounding devices capable of indicating drawdown to the nearest 1/8 inch or 0.01 foot in the production well and observation wells.
 2. Air lines shall not be used to determine water levels.

3.05 CONSTANT-RATE PUMPING AND RECOVERY TESTS:

- A. The Contractor shall calibrate his test pump so that he knows precisely the rate of flow to be expected throughout the duration of the pumping test. This flow rate shall be held absolutely constant throughout the entire test pumping period.
- B. The Contractor shall furnish sufficient competent personnel to make the necessary observations. The water level in the well and the designated observation wells shall be recorded immediately prior to the start of the pumping test. The schedule of observations shall be as shown below:

(During Pumping and Recovery Period)

Each 1 minute for first 5 minutes.
Each 5 minutes for next 55 minutes.
Each 20 minutes for next 60 minutes.
Each 30 minutes for next 2 hours.
Each 60 minutes for remainder of pump and recovery test or as directed by the Engineer.

- C. Upon completion of the pumping period the test pump will be stopped and drawdown recovery shall be recorded according to the above schedule.
- D. Each observer shall initial and record the time of each observation, drawdown at said time, and the flow rate on an approved log sheet. In addition to drawdown and recovery readings, the Contractor shall also record the following regarding the test:
 - 1. Type of pump used in the test.
 - 2. Rated horsepower and capacity.
 - 3. Dimensional data as to pump setting, and location of intake with respect to ground level.
 - 4. Distance from well to observation wells.

The original copy of each log sheet shall be delivered to the Engineer upon completion of each test. Copies shall be retained by the Contractor.

3.06 STEP-DRAWDOWN TESTS:

- A. The Contractor shall calibrate his test pump so that he knows precisely the rate of flow to be expected for each step of the pumping test. The flow rate shall be held absolutely constant for the duration of each step of the pumping test.
- B. The Contractor shall furnish sufficient competent personnel to make the necessary observations. The water level in the well shall be recorded immediately prior to the start of each step of the pumping test and shall be recorded each 5 minutes during the pumping and recovery periods.
- C. The step-drawdown test shall consist of several successively higher pumping rates with intermediate recovery periods. Each pumping/recovery step shall be of 1 to 2 hour duration as directed by the Engineer.
- D. Each observer shall initial and record the time of each observation, drawdown at said time, and the flow rate on an approved log sheet. In addition to drawdown and recovery readings, the Contractor shall also record the following regarding the test:
 - 1. Type of pump used in the test.
 - 2. Rated horsepower and capacity.

3. Dimensional data as to pump setting, and location of intake with respect to ground level.

The original copy of each log sheet shall be delivered to the Engineer upon completion of each test. Copies shall be retained by the Contractor.

3.07 REMOVAL OF TEST EQUIPMENT:

- A. Upon instructions received from the Engineer that the pumping test has been satisfactorily completed, the Contractor shall immediately proceed to remove any and all equipment furnished by him for the pumping test.
- B. The Contractor shall remove by bailing, pumping, or other approved methods any sand, stones, or foreign material that may have become deposited in the well.

* * * END OF SECTION * * *

SECTION 02675

DISINFECTION AND ABANDONMENT

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract and the GENERAL REQUIREMENTS (Division 1) are hereby made part of this Section.
- B. This Section includes all labor, materials, tools, equipment and related services necessary to disinfect and or abandon observation wells and production wells.
- C. Related requirements specified elsewhere:
 - 1. Test Hole Drilling and Observation Wells: Section 02671.
 - 2. Production Wells: Section 02672.

1.02 PAYMENT:

- A. Payment shall be at the Contract unit prices and lump sum prices as shown on the Bid Schedule.

PART 2 - PRODUCTS

- A. Disinfecting Agents:
 - 1. Calcium Hypochlorite- 70 percent chlorine.
 - 2. Liquid Sodium Hypochlorite - 12 percent chlorine.
 - 3. Purex, Clorox, etc. - 5.25 percent chlorine.

PART 3 - EXECUTION

3.01 TIME OF DISINFECTION:

- A. After each observation and production well has been completely constructed, it shall be thoroughly cleaned of all foreign substances, including tools, timbers, rope, debris of any kind, cement, oil, grease, joint dope and scum.
- B. The casing pipe shall be thoroughly swabbed, using alkalies if necessary, to remove oil, grease, or joint dope.

- C. The well shall then be disinfected with a chlorine solution.
- D. Disinfection procedures are to be conducted for both the observation wells and the production wells.

3.02 CHLORINE SOLUTION:

- A. The chlorine solution used for disinfecting the well shall be of such volume and strength and shall be so applied that a concentration of at least 200 ppm of chlorine shall be obtained in all parts of the well.

- 1. Chlorine Compound Required to Dose 100 Feet of Water-Filled Well at 200 ppm

Nominal Casing diameter (inches)	Approx. Volume 100 ft. (gals)	Chlorine Compounds	
		70% HTH Perchloron, etc. (dry weight)*	5.25% Purex Clorox, etc. (liquid measure)
2	16	1 oz	8 ozs
4	65	4 ozs	2-1/4 pts
6	146	8 ozs	5 pts
8	261	12 ozs	8-1/2 pts
10	408	1 lb	1-3/4 gals
12	587	1-1/2 lbs	2-1/2 gals
16	1,044	2-1/2 lbs	4 gals
20	1,632	4 lbs	6-2/3 gals
24	2,350	6 lbs	9-1/3 gals

Note: Liquid sodium hypochlorite in a 12 percent solution is often sold for water and wastewater treatment plant use, as a commercial bleach, or for use with swimming pools. Utilizing a solution of this nature would call for a liquid measure equal to one-half the volumes for 5.25% Purex, Clorox, etc.

*Where a dry chemical is used, it shall be mixed with water to form a chlorine solution prior to placing it into the well, expecially when introduced into PVC casings.

- B. Chlorine solution shall be prepared and applied in accordance with the directions of, and to the satisfaction of, the Engineer, and shall remain in the production well for a minimum of 24 hours prior to removal by pumping. The chlorine solution need not be removed from observation wells.
- C. After the above specified chlorination the Contractor shall obtain bacteriological samples from the production wells for analysis. If satisfactory results are not obtained the Contractor will immediately re-chlorinate the well at his own expense and obtain additional bacteriological tests until satisfactory results are obtained.

3.03 REQUIREMENTS FOR DISINFECTION OF PUMPING EQUIPMENT:

- A. In the event that the test pump is to be installed after the well has been disinfected, all interior and exterior parts of the pump and discharge piping coming in contact with the water shall be thoroughly washed with a 10 percent chlorine solution using methods to be approved by the Engineer.

3.04 WELL ABANDONMENT:

- A. In the event that the Contractor fails to sink the well to the depth specified or to such depth as ordered by the Engineer, or should he abandon the well because of loss of tools, negligence, or for any other cause, he shall, if required and as directed by the Owner, and at his own expense, fill the abandoned hole and remove any casing and materials installed therein. Salvaged material furnished by the Contractor shall remain his property.
- B. Upon the request of the Owner, the Contractor shall properly abandon any and all associated observation wells and temporary test wells for the unit price quoted.

3.05 PERMANENT ABANDONMENT OF WELLS:

- A. A well that is to be permanently abandoned shall be filled to prevent contaminating materials from entering the water-bearing ground formations. Concrete or cement grout shall be used for sealing material; however, if the well is so large that the use of these materials is not practical, the filling materials should be selected so as to restore natural conditions as nearly as possible. Sand and heavy drilling fluid may be used in sand and gravel sections of wells.

- B. All materials debris and obstructions that may interfere with sealing operations shall be removed from the well. Liner pipe shall be removed or perforated when necessary to assure placement of an effective seal. The State agency which regulates well construction will be consulted for instruction in case of abandonment of a contaminated well or where there is a question of proper procedure.
- C. All casing and screen may be salvaged except casing that has been cemented in place. The well shall be filled with appropriate sealing materials.
- D. The top of the hole shall be filled with 10 feet of concrete grout to within 2 feet of the land surface. Casing remaining in the hole shall be cut off at least 2 feet below land surface. The remaining top 2 feet of hole shall be filled with native top soil.
- E. An abandoned well shall be filled and sealed by one of the following methods in accordance with the materials penetrated, in such a manner as to prevent it from acting as a channel for pollution:
1. A well in unconsolidated deposits shall be filled with clean sand and puddled clay or concrete grout to provide a permeability no greater than the natural condition.
 2. The section of a well in a cavernous or creviced rock (such as cavernous limestone or basalt lava crack, creviced granite, etc.) shall be filled with concrete grout or alternate layers of concrete grout, gravel or stone aggregate. The filling shall be completed at the top by a layer of cement grout extending at least ten feet (10 ft.) into the above overlying formation.
 3. When concrete grout, puddled clay or heavy drilling fluid is used for sealing an abandoned well, it shall be inserted in the well through a grout pipe from the bottom of the well upward to the surface under pressure and in one continuous operation.
 4. Test wells shall be sealed to prevent the well from being a channel for the vertical movement of water and a source of contamination to the groundwater supply.
- F. Abandon observation wells installed under this contract, as well as existing observation wells installed by others, as directed by the Engineer.

3.06 CLEANUP:

- A. The Contractor shall fill and level the mud pits and shall remove all debris and leave the site in a clean condition satisfactory to the City.
- B. Upon completion of the Work, the site shall be restored as nearly as possible to its original condition, including the replacement, at the Contractor's sole expense, of any facility or landscaping which has been damaged beyond restoration.

* * * END OF SECTION * * *

DIVISION 3 - CONCRETE

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract and the GENERAL REQUIREMENTS (Division 1) are hereby made part of this Section.
- B. This Section includes all labor, materials, equipment and related services necessary to furnish and install all concrete reinforcement indicated on the Drawings or specified herein.

1.02 QUALIFICATION OF WORKMEN:

- A. Provide at least one person who shall be present at all times during the execution of this portion of the work, who shall be thoroughly familiar with the types of materials being installed and the best methods for their installation, and who shall direct all work performed under this Section.

1.03 CODES AND STANDARDS:

- A. In addition to complying with all National, State and Local Codes and Regulations, comply with all recommendations contained in the following references:
 - 1. ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures."
 - 2. CRSI, "Manual of Standard Practice."
 - 3. AWS, "AWS D12.1, Recommended Practice for Welding Reinforcing Steel, Metal Inserts, and Connections in Reinforced Concrete Construction."
 - 4. CRSI, "Placing Reinforcing Bars."
 - 5. ACI 318, "Building Code Requirements for Reinforced Concrete" latest edition with addendums.

1.04 PAYMENT:

- A. Concrete reinforcement is considered incidental Work with no separate measurement or payment to be made.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Reinforcing Bars:

1. Conform to ASTM A615, Grade 60/S1, for #3 to #11 bars, ties, and stirrups.

B. Wire for Reinforcement:

1. Plain wire shall conform to ASTM A82.
2. Deformed wire shall conform to ASTM A185.

C. Welded Wire Fabric:

1. Welded wire fabric shall conform to the gauge and mesh size of plain or deformed wire required or shown in the Contract Documents.
2. Welded wire fabric utilizing plain wire shall conform to ASTM A185.
3. Fabric shall be furnished in flat sheets.

D. All other materials not specifically described but required for a complete and proper installation of concrete reinforcement shall be selected by the Contractor subject to the approval of the Engineer.

PART 3 - EXECUTION

3.01 FABRICATION:

- #### A. Shop fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication tolerances conforming to ACI 315. In case of fabricating errors, do not rebend or straighten reinforcement in a manner that will injure or weaken the material.

- #### B. All bars shall be bent cold. All bends for stirrups, ties and hooks shall have a minimum diameter as required by ACI 318.

- #### C. Reinforcement with any of the following defects will not be permitted:

1. Bar lengths, depths, and bends exceeding specified fabrication tolerances.
2. Bends or kinks not indicated on drawings or final shop drawings.

3. Bars with reduced cross-section due to excessive rusting or other cause.

3.02 DELIVERY:

- A. Deliver reinforcement to the project site bundled, tagged and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams.

3.03 STORAGE:

- A. Store concrete reinforcement materials at the site to prevent damage and accumulation of dirt or excessive rust.

3.04 PLACEMENT:

- A. Prior to the start of concrete placement, accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations.
 1. Portions of supports, spacers, chairs, etc., in contact with formwork shall be coated with plastic or galvanized.
 2. Reinforcement for slabs-on-grade and footings shall be supported on precast concrete units spaced at intervals required by the size of reinforcement used, to provide for minimum clearances specified.
- B. Place reinforcement to obtain the minimum coverages for concrete protection.
 1. Arrange, space, and securely tie bars and bar supports together with 16 gauge wire to hold reinforcement accurately in position during concrete placement operations.
 2. Set wire ties so that ends are directed away from exposed concrete surfaces.
 3. Tack welding of crossing reinforcement for the purpose of proper placement shall not be permitted.
- C. Install welded wire fabric in lengths as long as practicable.
 1. Lap adjoining pieces at least one full mesh and lace splices with 16 gauge wires.

2. Do not make end laps midway between supporting beams or directly over beams of continuous structures.
 3. Offset end laps in adjacent widths to prevent continuous laps.
- D. Place all required steel dowels and securely anchor them into position before the concrete is placed.

3.05 SPLICES:

- A. Provide standard reinforcement splices by lapping ends, placing bars in contact, and tightly wire tying. Comply with requirements of ACI 318 for minimum lap of spliced bars.
- B. Vertical bars in columns shall be offset at least one bar diameter at lapped slices. To insure proper placement, templates shall be furnished for all column dowels.
- C. Make only those splices that are indicated on the approved shop drawings.

3.06 FABRICATING AND PLACING TOLERANCES:

- A. Allowable Variations: Fabrication and placement of reinforcing steel shall conform to the tolerances cited in ACI 301.

* * * END OF SECTION * * *

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract and the GENERAL REQUIREMENTS (Division 1) are hereby made part of this Section.
- B. This Section includes all labor, materials, equipment and related services necessary to furnish and install all cast-in-place concrete indicated on the Drawings or specified herein.
- C. Related requirements specified elsewhere:
 - 1. Concrete Reinforcement: Section 03200.
 - 2. Caulking and Sealants: Section 07900.

1.02 QUALIFICATION OF WORKMEN:

- A. Provide at least one person who shall be present at all times during the execution of this portion of the work, who shall be thoroughly trained and experienced in placing the types of concrete specified and who shall direct all work performed under this Section.
- B. For finishing of exposed surfaces of the concrete, use only thoroughly trained and experienced journeyman concrete finishers.

1.03 CODES AND STANDARDS:

- A. In addition to complying with all pertinent codes and regulations, comply with all recommendations cited in the following publications:
 - 1. ACI 301, "Specifications for Structural Concrete for Buildings."
 - 2. ACI 305, "Recommended Practice for Hot Weather Concreting."
 - 3. ACI 306, "Recommended Practice for Cold Weather Concreting."
 - 4. ACI 311, "Recommended Practice for Concrete Inspection."

5. ACI 318, "Building Code Requirements for Reinforced Concrete."

1.04 SUBMITTALS:

- A. Concrete Materials: Within 35 days after the award of the contract and before any concrete is delivered to the job site, submit to the Engineer:
 1. Concrete Mix Design: Submit written reports for each proposed mix for each class of concrete, as specified elsewhere herein.
 2. Certificates of Compliance: Submit certificates of material properties and compliance with specified requirements for the following materials:
 - a. Normal weight aggregates.
 - b. Portland cement.
 - c. Air-entraining agent.

1.05 PAYMENT:

- A. Cast-in-place concrete is considered incidental Work with no separate measurement and payment to be made.

PART 2 - PRODUCTS

2.01 CEMENT:

- A. Shall conform to ASTM C150.
- B. Provide Type I for all usages.

2.02 AGGREGATES:

- A. Conform to ASTM C33.
- B. Fine and coarse aggregate shall be regarded as separate ingredients.
- C. Each size of coarse aggregate, as well as the combination of sizes when two or more are used, shall conform to the grading requirements of the publications cited herein.

2.03 WATER:

- A. Use clean mixing water free from injurious amount of oils, acids, alkalies, organic materials, or other deleterious substances.

2.04 CONCRETE ADMIXTURES:

- A. Air-Entraining Admixture: Conform to ASTM C260.
- B. Water-Reducing Admixture: Conform to ASTM C494, Type A, free of set-accelerating or set-retarding compounds, chlorides, fluorides, or nitrates.

2.05 CURING COMPOUND:

- A. Conform to ASTM C309, Type I.
 - 1. Provide materials capable of curing, sealing, hardening and dustproofing concrete slabs and floors.
 - 2. All curing compounds shall be non-toxic and taste and odor free.

PART 3 - EXECUTION

3.01 PROPORTIONING OF CONCRETE:

- A. Concrete for all of the work shall be of the specified quality capable of being placed without excessive segregation, and when hardened of developing all characteristics required.
- B. Strength and Proportion:

<u>Compressive Strength (psi) @ 28 Days</u>	<u>Maximum Water- Cement Ratio by Weight</u>	<u>Maximum Aggregate Size</u>	<u>Air Content by Volume Percent</u>
3,500 psi	0.44	1"	3.5-6.5

- C. Concrete of the specified strength and proportion shall be used for all locations.
- D. Slump:
 - 1. Slump Requirements: Concrete shall be proportioned so as to result in slumps at the point of placement as follows:
 - a. Ramps and Sloping Surfaces: Not more than 3 inches.
 - b. Foundation Systems: Not less than 1 inch or more than 3 inches.
 - c. All Other Locations: Not less than 1 inch nor more than 4 inches.

2. Tolerances: A tolerance of up to 1 inch above the indicated maximum shall be allowed for individual batches provided the average of the most recent 10 batches tested does not exceed the maximum limit.

E. Admixtures:

1. General: Provide admixtures produced by acceptable manufacturers and use in compliance with printed directions. Do not use admixtures which have not been incorporated and tested in the accepted mixes.
2. Calcium Chloride: Do not use calcium chloride in concrete.

F. Selection of Proportions:

1. General:
 - a. The proportions of ingredients shall be such as to produce a mixture which will work readily into corners and angles of the forms and around reinforcement by the methods of placing and consolidation employed on the work, but without permitting the materials to segregate or excessive free water to collect on the surface.
 - b. The proportions shall conform to subparagraph B.

3.02 PRODUCTION OF CONCRETE:

A. Ready-Mixed Concrete:

1. All ready-mixed concrete shall be batched, mixed and transported in accordance with ASTM C94.
2. Plant equipment and facilities shall conform to the "Checklist for Certification of Ready-Mixed Concrete Production Facilities" of the National Ready-Mixed Concrete Association.

B. Dispatching of Concrete:

1. Dispatch all loads of concrete with a signed dispatch ticket indicating the exact time, to the nearest minute, when the batch was mixed.
2. Failure to show the dispatch tickets properly filled out or any delay that will result in a period of time longer than one hour between the

time the batch was mixed and the time the batch is finally placed in form will be considered as a basis for rejection of the entire batch.

3. Dispatch tickets shall record any and all additions incorporated in the batch including any water added after the batch was mixed.

C. Control of Admixtures:

1. Chemical admixtures shall be charged into the mixture as solutions and shall be measured by means of an approved mechanical dispensing device. The liquid shall be considered a part of the mixing water. Admixtures that cannot be added in solution may be weighed or measured by volume if so recommended by the manufacturer.
2. Two or more admixtures used in the same batch shall be added separately.
3. Retarding admixtures shall be added to a batch in strict accordance with the manufacturer's recommendations.

D. Tempering and Control of Mixing Water:

1. Concrete shall be mixed only in quantities for immediate use. Concrete which has set shall not be retempered, but shall be discarded.
2. Water may be added to a batch at the project site only if neither the maximum permissible water-cement ratio nor the maximum slump is exceeded.
 - a. Indiscriminate addition of water to a batch to increase slump beyond specified limits shall be cause for rejection of the entire batch.

3.03 CONCRETE PLACEMENT:

A. Preparation Prior to Placing:

1. Remove all wood scraps and debris from the areas in which concrete will be placed.
2. Thoroughly clean the areas to insure proper placement and bonding of concrete.
3. Concrete shall not be placed in standing water or on frozen ground.

B. Concrete Conveying:

1. Handle concrete from the point of delivery and transfer to the concrete conveying equipment and to the locations of final deposit as rapidly as practicable by methods which will prevent segregation and loss of concrete mix materials.
2. Provide mechanical equipment for conveying concrete to insure a continuous flow of concrete at the delivery end. Provide runways for wheeled concrete conveying equipment from the concrete delivery point to the locations of final deposit. Keep interior surfaces of conveying equipment, including chutes, free of hardened concrete, debris, water, snow, ice, and other deleterious materials.

C. Depositing:

1. Deposit no concrete in the work that has attained its initial set or has contained its water content for more than one (1) hour.
2. Exercise special care to prevent splashing the forms or reinforcement with concrete in advance of pouring.
3. Place no concrete on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness within the section.
4. Do not allow concrete to drop freely more than 5 feet in unexposed work nor more than 3 feet in exposed work. Where greater drops are required, employ a tremie or other method approved by the Engineer. Control the discharge of the tremie so that the concrete may be effectively compacted into horizontal layers not exceeding 12 inches in thickness with a minimum of lateral movement.

3.04 MONOLITHIC SLABS:

- A. Apply float finish to monolithic slab surfaces that are to receive trowel finish. After placing concrete slabs, do not work the surface further until ready for floating. Begin floating when the surface water has disappeared or when the concrete has stiffened. Check and level the surface plane to a tolerance not exceeding 1/4 inch in 10 feet when tested with a 10 foot straightedge placed on the surface at not less than two different angles. Cut down high spots and fill all low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat the surface to a uniform, smooth, granular texture.

- B. Apply trowel finish to monolithic slab surfaces that are to be exposed to view. After floating, begin the first trowel finish operation. Begin final troweling when the surface produces a ringing sound as the trowel is moved over the surface. Consolidate the concrete surface by the final hand troweling operation, free of trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 1/8 inch in 10 feet when tested with a 10 foot straightedge.

3.05 CURING AND PROTECTION:

A. Curing:

1. General: Freshly deposited concrete shall be protected from premature drying and excessively hot or cold temperatures, and shall be maintained with minimal moisture loss at relatively constant temperatures for the period of time necessary for the hydration of the cement and proper hardening of the concrete.
2. Curing: Initial curing shall immediately follow the finishing operation. One of the following materials or methods shall be used:
 - a. Ponding or continuous sprinkling.
 - b. Absorptive mat or fabric kept continuously wet.
 - c. Curing Compounds: Such compounds shall be applied in accordance with the recommendations of the manufacturer and shall not be used on any surfaces against which additional concrete or other cementitious finishing materials are to be bonded, nor on surfaces on which such curing is prohibited by the specifications. Advance approval of the Engineer is required if curing compounds are considered for the GSR floor slab.
3. Duration of Curing: The curing operation shall continue until the cumulative number of days or fractions thereof, not necessarily consecutive, during which temperature of the air in contact with the concrete is above 50 degrees F. has totaled seven (7) days.

B. Temperature:

1. Cold Weather: Conform with ACI 306 and the following requirements:

- a. Mix and place concrete only when the temperature is at least 40 degrees F. and rising.
 - b. The temperature of the concrete shall be maintained between 50 degrees F. and 70 degrees F. for the required curing period. When necessary, arrangements for heating, covering, insulating, or housing the concrete work shall be made in advance of placement and shall be adequate to maintain the required temperature and moisture conditions without injury due to concentration of heat.
2. Hot Weather: Conform with ACI 305 and the following requirements:
- a. The maximum temperature of fresh concrete at the time of placement during hot weather is 90 degrees F., to prevent an accelerated setting of the concrete.
 - b. Use retarding densifier admixture, "Plastiment," by Sika Chemical Corporation, during the months of June, July, August, and September when the high expected atmospheric temperature for the day is 85 degrees F. or above. Add "Plastiment" in the proportion of four fluid ounces of liquid per bag of cement.

3.06 TESTING:

- A. The Contractor shall perform, at his own expense, material evaluation tests.
- B. Tests to be Performed:
 - 1. Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94.
 - 2. Slump Test: In the field, determine consistence in accordance with ASTM C143. Make one slump test for each set of concrete test cylinders molded.
 - 3. Compression Test Specimens: ASTM C31, one set of three standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cure test specimens are required.

4. Concrete Temperature: Test hourly when air temperature is 40 degrees F. and below, and when 80 degrees F. and above; and each time a set of compression test specimens is made.
 5. Compressive Strength Tests: ASTM C39, one set for each 50 cubic yards or fraction thereof, placed in any one day, one specimen tested at 7 days and two specimens tested at 28 days.
- C. Testing Reporting: Report test results to Engineer in writing on the same day that tests are made. To facilitate testing services, the Contractor shall:
1. Provide and maintain facilities for the safe storage and proper curing of concrete test cylinders at the project site.
 2. Maintain a complete record of specimens taken giving detailed location of each pour represented.

3.07 EVALUATION OF CONCRETE:

- A. General: Concrete work which does not conform to the specified requirements, including strength, tolerances, and finishes, shall be corrected as directed by the Engineer at the Contractor's expense.
- B. Evaluation of Quality Control Tests:
1. Compressive Strength Tests for Laboratory: Cured cylinders will be considered satisfactory if the averages of all sets of three compressive strength tests results equal or exceed the required compressive strength and, no individual strength test falls below the required compressive strength by more than 500 psi.
 2. Core Tests:
 - a. The testing service shall take core samples of in-place concrete when test results are such that there is reasonable doubt that the specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Engineer.
 - b. The testing service shall conduct tests to determine the strength and characteristics of the in-place concrete by compression tests on cored cylinders complying with ASTM C42, or by load testing specified in ACI 318, or others as directed.

- c. The Contractor shall pay for such tests conducted and any other additional testing as may be required.

C. Formed Concrete Tolerances:

- 1. Formed concrete having any dimension smaller or greater than required, and outside the specified tolerance limits, will be considered deficient in strength and subject to additional testing as herein specified.
- 2. Strength of Concrete Structures: The strength of the concrete structure in-place will be considered potentially deficient if it fails to comply with any of the requirements which control the strength of structure, including the following conditions:
 - a. Failure to meet compressive strength test requirements.
 - b. Concrete which differs from the required dimensions or location in such a manner to reduce strength.
 - c. Concrete subjected to damaging mechanical disturbances; particularly load stresses, heavy shock, and excessive vibration.
 - d. Poor workmanship and quality control likely to result in deficient strength.

* * * END OF SECTION * * *

DIVISION 11 - EQUIPMENT

SECTION 11932

SUBMERSIBLE TURBINE PUMPS AND MOTORS

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract and the GENERAL REQUIREMENTS (Division 1) are hereby made part of this Section.
- B. This Section includes all labor, materials, tools, equipment and related services necessary to furnish and install the submersible turbine pumps and motors as specified herein and as shown on the Drawings.
- C. Related requirements specified elsewhere:
 - 1. Pitless Adapter: Section 11934.

1.02 SUBMITTALS:

- A. Substitutes to named manufacturer:
 - 1. Submit complete substitute information, including dimensions, descriptive data, and performance data, to Engineer at least ten (10) days prior to bid letting for approval.
 - 2. Contractor shall assume overall undivided responsibility for the functioning of the substitute equipment, including the cost of any changes in connections, appurtenances or structures necessitated by the substitution.
- B. Shop Drawings:
 - 1. Dimensions.
 - 2. Descriptive data.
 - 3. Performance data.
 - 4. Installation instructions.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Deliver equipment in manufacturer's original, unopened packaging.
- B. Cover and store equipment indoors to prevent damage.

- C. Handle so as to prevent damage during storage and installation.
- D. Deliver spare submersible motor to the Sioux Falls Water Purification Plant as directed by the City.

1.04 PAYMENT:

- A. Payment shall be at the Contract unit prices and lump sum prices as shown on the Bid Schedule.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS:

- A. Pumps specified or noted as submersible turbine shall be vertical, centrifugal, multiple stage turbine type with submersible electric motors.
 - 1. Pumps shall be furnished and installed with all accessories necessary for a complete, operating unit.
 - 2. Pump motors shall be furnished and installed with the pumps.
 - 3. Driving motor shall be mounted below the pump bowl assembly.
- B. Each unit shall have manufacturer's name, address and catalog or model number permanently marked and readily visible.

2.02 PUMP AND MOTOR CONSTRUCTION FEATURES:

- A. Pump Construction:

- 1. Pump Bowls:

- a. Close grained cast iron, ASTM A48, Class 30.
 - b. Porcelain enamel coated.
 - c. Threaded or bolted connections.
 - d. Replaceable bronze wear rings.

- 2. Impellers:

- a. Enclosed type.
 - b. Bronze, ASTM B584, alloy 836.

- c. Accurately cast, machined, balanced and filed for optimum performance and minimum vibration.
- d. Securely fastened to shaft with stainless steel taper collets or lock bushings.

3. Shaft:

- a. Pump shaft.
 - (1) High chrome stainless steel.
 - (2) Rigidly support impellers between bowl bearings.
 - (3) Diameter sufficient to transmit maximum pump horsepower with liberal safety factor.
- b. Pump shaft bearings:
 - (1) SAE 660 bronze, above and below each impeller.
 - (2) Suction bearing and top discharge case bearing shall be permanently grease packed.

4. Pump Suction:

- a. Net inlet area minimum of five times the impeller inlet area.
- b. Screened for maximum opening not more than 75 percent of the minimum opening of the passages through the bowl and impellers opening.

B. Motor Construction:

- 1. Vertical submersible, squirrel cage motor, designed for continuous operation.
 - a. Copper windings.
 - b. 1.15 service factor.
 - c. Power characteristics as specified and shown on the Drawings.
- 2. Normal starting torque and low starting current for across-the-line starting.

3. The motor shall not be loaded in excess of nameplate rating at any condition of operation from zero flow to maximum pump capacity.
 - a. See pump schedule for maximum horsepower requirements.
4. Water filled with seal to restrict foreign matter from motor.
5. Thrust bearing as integral part of motor.
 - a. Adequate capacity to carry the weight of all rotating parts plus the hydraulic thrust under all flow conditions from zero flow to maximum capacity.
6. A flow inducer sleeve shall be provided to assure proper motor cooling.
7. Jacketed submersible cable:
 - a. Provide synthetic rubber or plastic insulation suitable for continuous immersion in water around each conductor with a full synthetic rubber or plastic jacket around all three conductors.
 - b. Minimum conductor size shall be No. 10 AWG.
 - c. One splice only per conductor at motor leads. No other splices shall be used in the well.
 - d. Protect cable with a steel guard plate where cable passes pump bowls.
 - e. Fasten cable to pump column with stainless steel straps not more than 5 feet apart. Use rubber cable protectors at each strap.

C. Accessories:

1. Motor coupling:
 - a. Coupling connecting the motor to the pump bowl assembly shall be of sufficient size and strength to withstand maximum torque generated by the motor plus added safety factor.
 - b. Coupling shall be of 410 stainless steel and keyed to the pump shaft.

- c. There shall be incorporated in the pumping unit a positive protection for momentary upthrust.
- 2. Check Valve:
 - a. Install a check valve immediately above the pump.
 - b. Flomatic Model 80 DI with replaceable break-off plug.
 - c. 5" size.
- 3. Drop Pipe:
 - a. Furnish in random lengths connected by threaded sleeve couplings. Maximum section lengths shall not exceed ten (10) feet.
 - b. The weight of the pipe shall be no less than stated in ASA Specification B58.1, Section B416.
 - c. ASA standard tapered pipe threads.
 - d. 5-inch diameter.
- 4. Air Line:
 - a. Furnish and install 1/4 inch diameter polyethylene air line from altitude gauge on pitless adapter to top of pump intake.
 - b. Securely fasten air line to drop pipe with stainless steel clamps not more than 10 feet on center.
 - c. Protect line with a suitable guard plate where line passes pump bowls.
- 5. Chemical Application/Water Level Sounding Line:
 - a. Furnish and install 1-inch diameter polyethylene line from pitless adapter vent to top of pump intake to accomplish periodic chemical treatment and/or water level measurement with an electric sounding device. Line shall be installed without sharp bends which would restrict passage of a sounding probe.

- b. Securely fasten line to drop pipe with stainless steel clamps not more than 5 feet on center. Provide a sleeve at clamps to prevent damage to polyethylene line.
- c. Protect line with a suitable guard plate where line passes pump bowls.
- d. The end of the line in the pitless adapter shall be accessible with the 2" cap plug removed.

6. Electronic Level Sensing Line:

- a. Install electronic level sensing line furnished by Schedule 4 Contractor from splice in pitless adapter to pump intake.
- b. Securely fasten line to drop pipe using clamps; sleeves and guards furnished by Schedule 4 Contractor.

2.03 PUMP CHARACTERISTICS:

- A. Specified pump performance characteristics have been selected to match pumps to all anticipated conditions of flow.
 - 1. Pumps shall meet all specified primary and secondary performance requirements.
 - 2. Pumps shall be capable of continuous operation without damage at all specified primary and secondary flow rates.
 - 3. Performance specified is catalog performance at the pump bowl.
 - a. Flow rate is specified in units of U.S. gallons per minute (gpm).
 - b. Total dynamic head (head) is specified in units of feet of water (ft.), specific gravity 1.0.
 - c. Efficiency is pump bowl catalog efficiency, corrected for the impeller trim and number of stages.

B. Performance Characteristics and Dimensions:

1. Pumps at Sites A-E:

	<u>Flow Rate,</u> <u>gpm</u>	<u>Head,</u> <u>ft.</u>	<u>Minimum</u> <u>Acceptable</u> <u>Efficiency</u>
a. Primary	300	98	77
b. Secondary	200	112	66
c. Secondary	400	76	76
d. Maximum acceptable shut-off head 130 feet.			
e. Maximum operating speed 3,500 rpm.			
f. Franklin submersible motor, 15 horsepower maximum.			
g. Motor electrical power - 3/60/480.			
h. Well casing diameter - 12-inch.			
i. Drop pipe diameter - 5-inch.			
j. Intake setting depth, 26 feet below bottom of pitless adapter (base bid). Intake setting depth will be adjusted as necessary after each well is completed.			
k. Acceptable manufacturers:			
(1) Layne 6GH bowl, 2 stage.			

2. Deliver to the City one (1) spare submersible pump and motor identical to the submersible pump and motors installed.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Install as shown on the Drawings and as per manufacturer's instructions.
- B. Check pitless adapter spool and piping for alignment.

3.02 TEST AND ADJUST:

- A. The Contractor shall furnish the services of a qualified manufacturer's representative to check equipment, supervise initial operation, observe equipment testing, and instruct Owner in operation and maintenance.
- B. The Resident Project Representative or Engineer will test equipment to verify operation within the specified performance characteristics.
 - 1. Tests will be made with permanent instruments, including flow meters and pressure gauges, as specified in other Sections of these specifications, and other instrumentation as necessary.
 - 2. The Contractor shall repair or replace equipment which does not meet performance specifications.

* * * END OF SECTION * * *

SECTION 11934

PITLESS ADAPTER

PART 1 - GENERAL

1.01 SCOPE:

- A. The GENERAL, SUPPLEMENTAL and other CONDITIONS of the Contract and the GENERAL REQUIREMENTS (Division 1) are hereby made part of this Section.
- B. Work under this Section includes the furnishing of all labor, material, equipment and appurtenances required for the installation of pitless units to the top of the well casings.
- C. Related requirements specified elsewhere:
 - 1. Submersible Turbine Pump: Section 11932.

1.02 QUALITY ASSURANCE:

- A. Acceptable Manufacturers:
 - 1. Baker-Monitor Division or approved equal.

1.03 SUBMITTALS:

- A. Substitutes to named manufacturer:
 - 1. Submit complete substitute information, including dimensions, descriptive data, and performance data, to Engineer at least ten (10) days prior to bid letting for approval.
 - 2. Contractor shall assume overall undivided responsibility for the functioning of the substitute equipment, including the cost of any changes in connections, appurtenances or structures necessitated by the substitution.
- B. Catalog Data: Obtain manufacturer's literature and illustrations.
- C. Shop Drawings:
 - 1. Dimensions.
 - 2. Construction details.
 - 3. Materials.

D. Installation Instructions: Complete manufacturer's installation instructions.

E. Maintenance Data:

1. Maintenance instructions.

2. Parts list.

F. Certificates: Obtain manufacturer's certification that pitless adapters meet or exceed specification requirements.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING:

A. Store pitless adapters in area protected from weather, moisture, or possible damage.

B. Do not store materials directly on ground.

C. Handle items to prevent damage to interior or exterior surfaces.

1.05 PAYMENT:

A. Payment shall be at the Contract unit prices and lump sum prices as shown on the Bid Schedule.

PART 2 - PRODUCTS

2.01 PITLESS UNIT:

A. The pitless unit shall provide a watertight, unbroken extension of the well casing and provide a sanitary connection.

B. The unit shall have the following features:

1. Designed and sized to attach the unit by welding to the well casings.

2. Black steel upper case.

3. A length sufficient to provide a 12-foot bury depth (base bid) over the discharge connection and to provide the necessary top elevation as shown on the Drawings.

a. Required length will be adjusted as necessary when well location is verified and existing ground elevation is determined.

4. A spool support to eliminate vertical adjustment and any possibility of dropping the inner assembly into the well.
5. A watertight cap, sealed with a compression gasket, on top of the unit which may be removed without disconnecting cables or wiring. Cap cast to provide for an air vent and air line assembly.
6. One 2" and one 1" conduit tapping.
7. Electrical cable seal.
8. A means of determining water level within the well without removing the cap.
 - a. Equipped with a drawdown line connection for 1/4 inch diameter polyethylene.
 - b. Altitude gauge with 3-1/2 inch dial and air pump connection.
 - (1) Gauge range 0 to 30 feet water at all wells.
9. A means for introducing chemical solutions or an electric water level probe into the well by only removing a 2" plug at the top of the unit.
 - a. Equipped such that 1-inch diameter polyethylene tubing may be permanently installed through the spool for chemical application and/or water level sounding.
10. A frost-proof connection for obtaining water samples and discharge pressure readings during operation of the submersible pump.
11. A 1-1/2 inch air vent terminating above the cap in a downward position and covered with 24 mesh bronze screen.
12. Accurately machined water passages and surfaces.
13. A 4-inch lift-out pipe with standard lift-out bail attached to the spool and used to pull the spool out of the pitless unit.
14. Upper pitless case size of 14 inches, O.D., for butt welding to the 12-inch well casings.
15. Spool to drop pipe connection size 5" MIP.
16. Transition sleeve discharge connection, 6" IPS.

- C. The spool shall have the following features:
 - 1. Neoprene o-rings between accurately machined hot-dipped galvanized surfaces sealing the spool and permitting withdrawal of the entire assembly by simply lifting out.

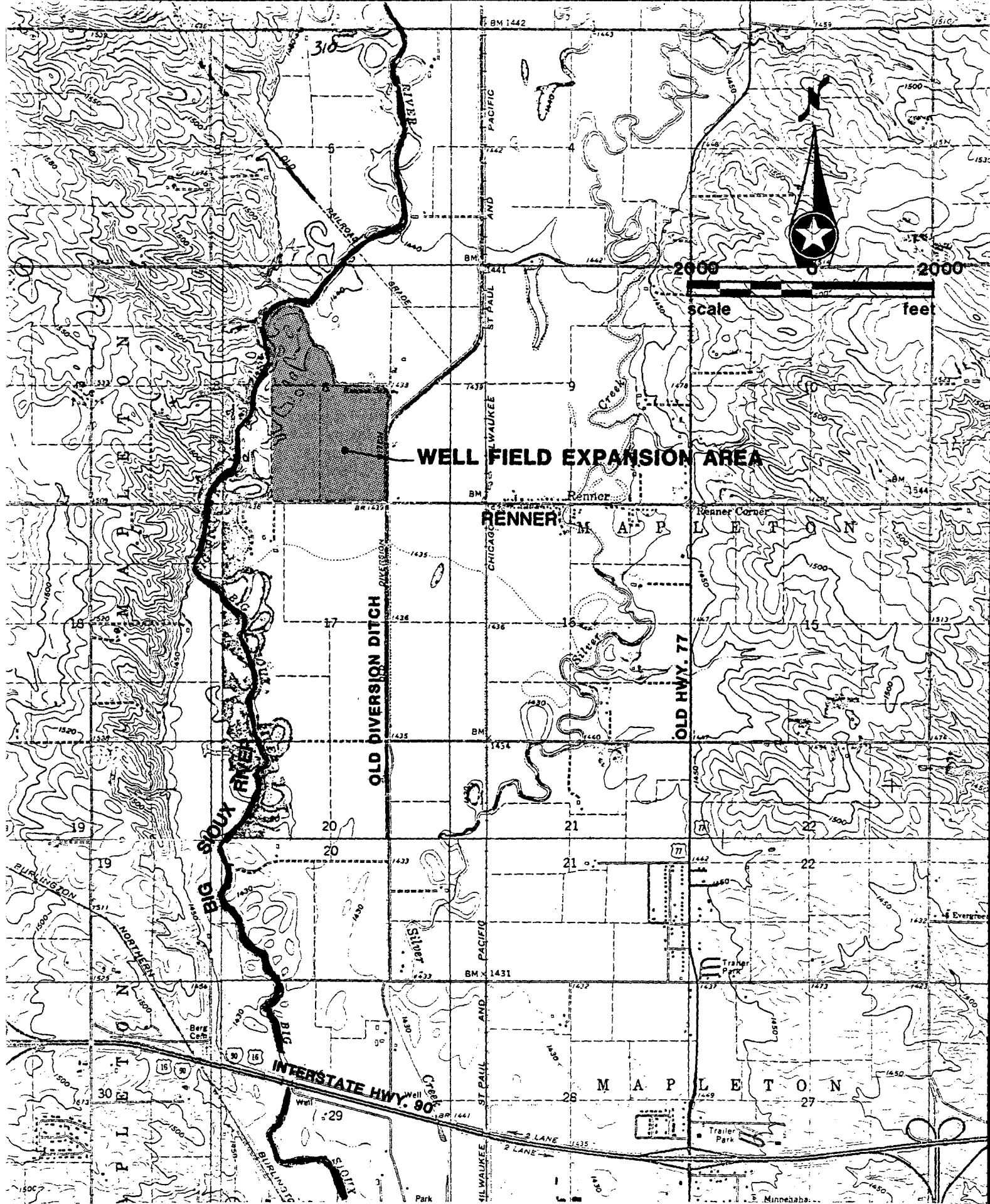
PART 3 - EXECUTION

3.01 INSTALLATION:

- A. The area surrounding the existing casing shall be carefully excavated to permit attachment of the unit to the well casing at the depth specified.
- B. The well shall be adequately protected from contamination or entry by foreign materials and surface drainage at all times during installation.
- C. The well casing shall be cut off at the necessary level.
- D. The units shall be attached with full circumferential welded joints in accordance with AWWA C206 and installation completed in strict accordance with the manufacturer's recommendations.
- E. The excavated area shall be filled with suitable backfill material and thoroughly tamped in successive layers not exceeding twelve (12) inches.

* * * END OF SECTION * * *

DRAWINGS



LOCATION PLAN

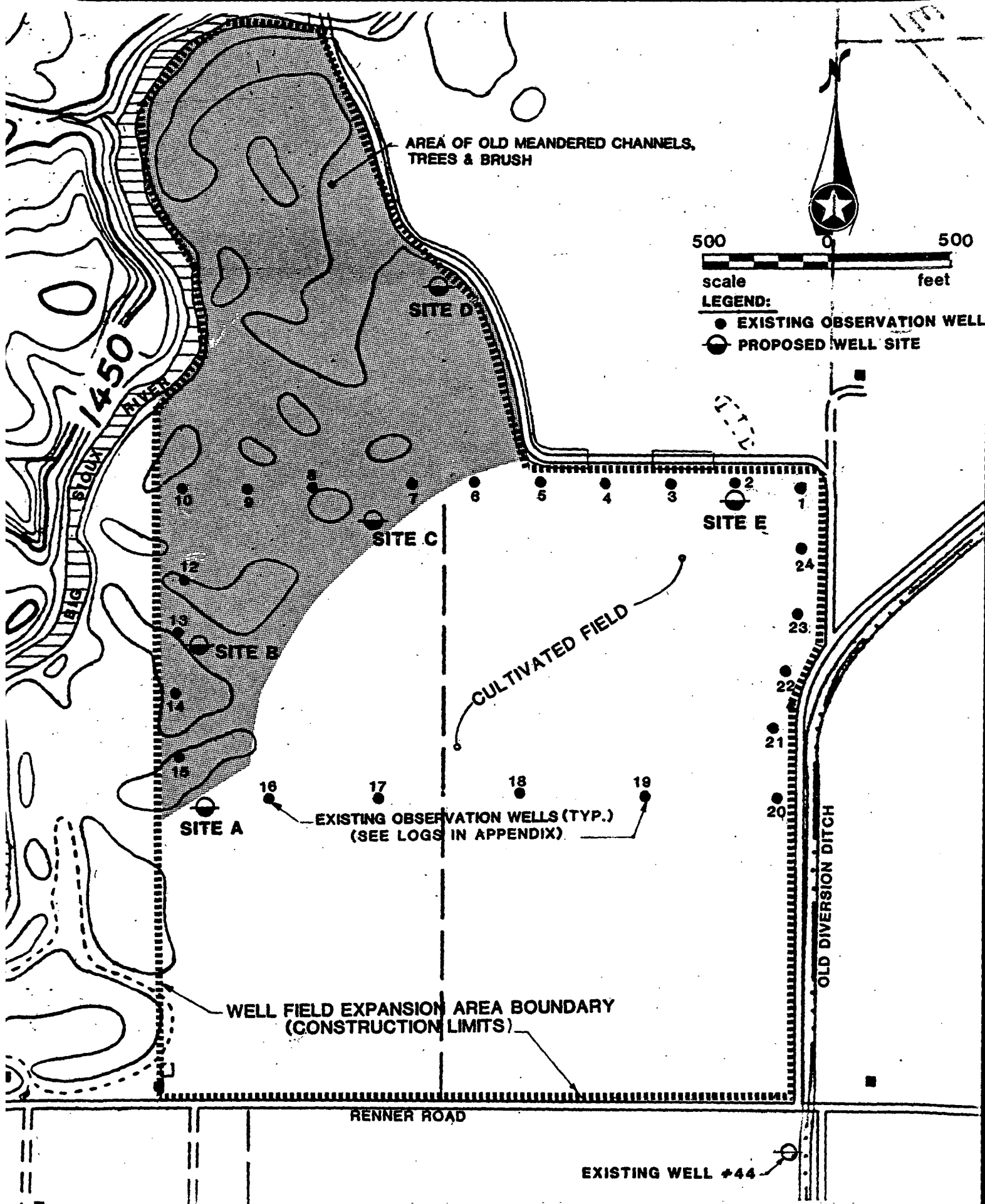
SHEET NO. 1



DeWild Grant Recker & Associates Co.
 Denver, Colorado
 Rock Rapids, Iowa
 Sioux City, Iowa
 Sioux Falls, South Dakota

Date
 Drawn By
 Approved
 Revised
 PROJ. #34227

1986 WELL FIELD EXPANSION
SIoux FALLS, SOUTH DAKOTA



SITE PLAN

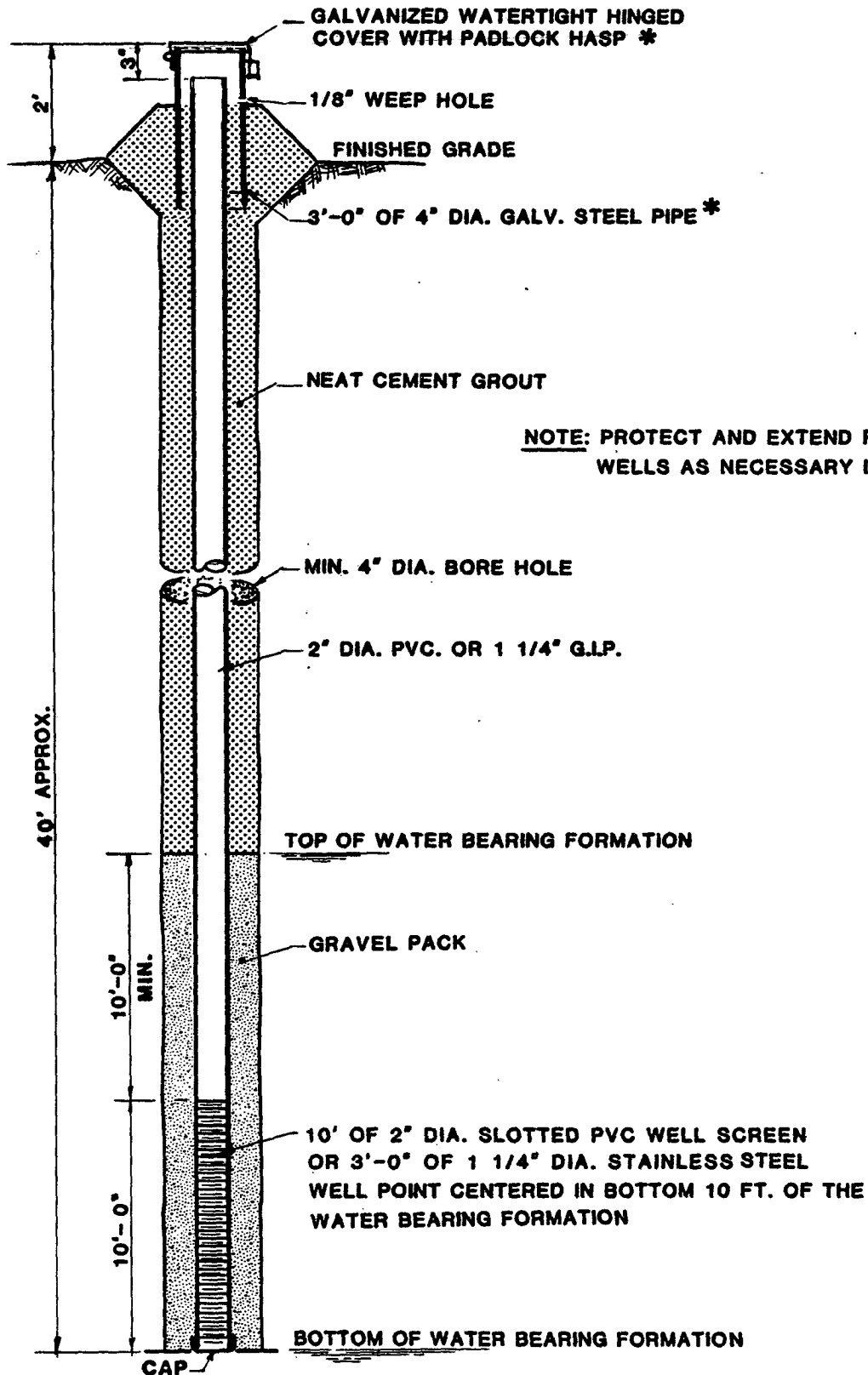
SHEET NO. 2



DeWild Grant Reckert & Associates Co.
 Denver, Colorado
 Rock Rapids, Iowa
 Sioux City, Iowa
 Sioux Falls, South Dakota

Date
 Drawn By
 Approved
 Revised
 PROJ #34227

1986 WELL FIELD EXPANSION
 SIOUX FALLS, SOUTH DAKOTA



NOTE: PROTECT AND EXTEND PERMANENT OBSERVATION WELLS AS NECESSARY IN BERMED AREAS.

* GALV. STEEL PIPE AND HINGED COVER ARE TO BE INSTALLED ON PERMANENT OBSERVATION WELLS. TEMPORARY OBSERVATION WELLS SHALL BE CAPPED WITH A SOLVENT WELDED PVC CAP OR A SCREWED GALVANIZED CAP.

OBSERVATION WELL

NOT TO SCALE

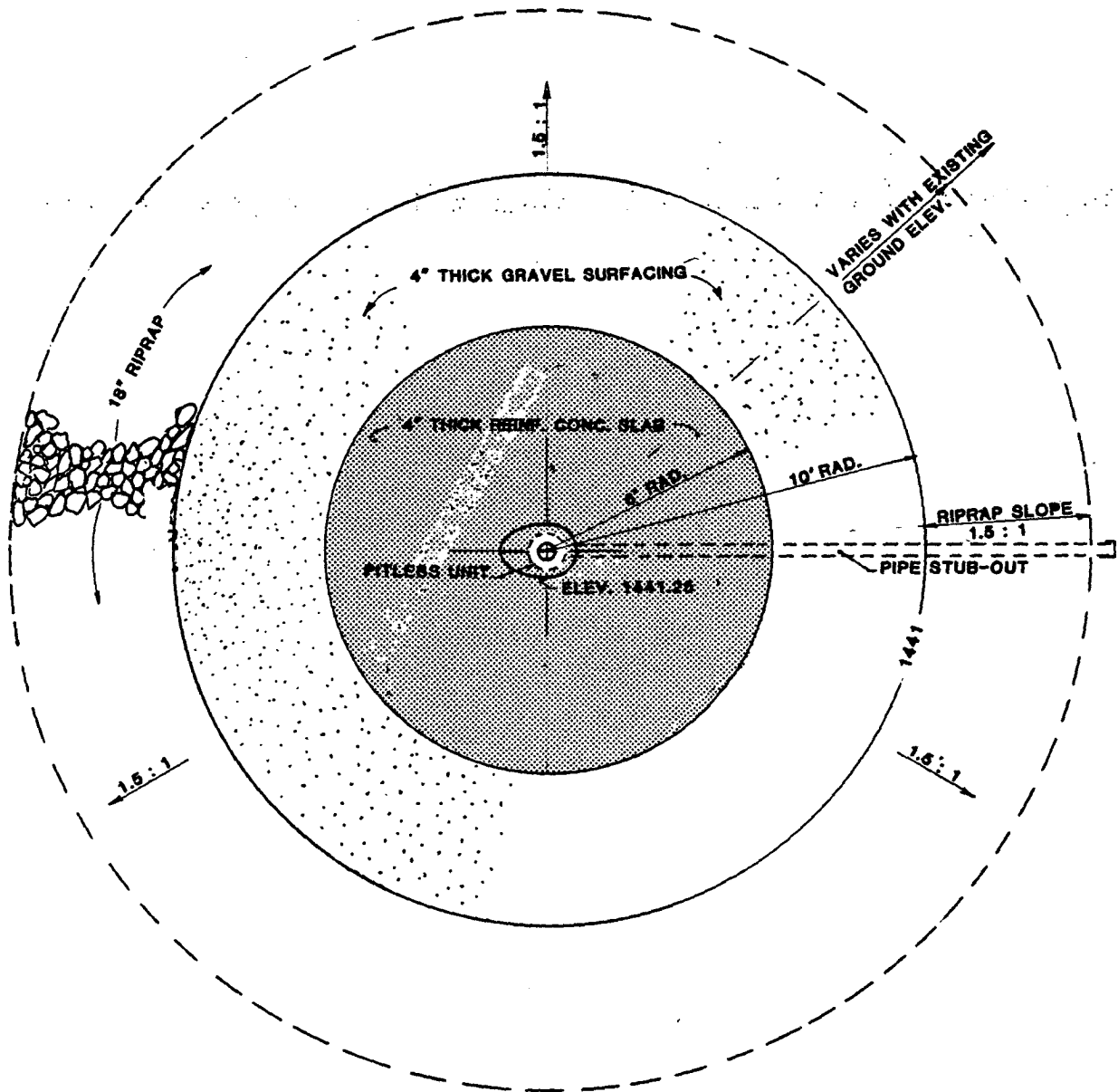
SHEET NO. 3



DeWild Grant Reckert & Associates Co.
Denver, Colorado
Rock Rapids, Iowa
Sioux City, Iowa
Sioux Falls, South Dakota

Date 9-1986
Drawn By LO
Approved GJP
Revised
PROJ. #34227

**1986 WELL FIELD EXPANSION
SIOUX FALLS, SOUTH DAKOTA**



PLAN VIEW - PRODUCTION WELL AND BERM
NOT TO SCALE

SHEET NO. 4

Sheet



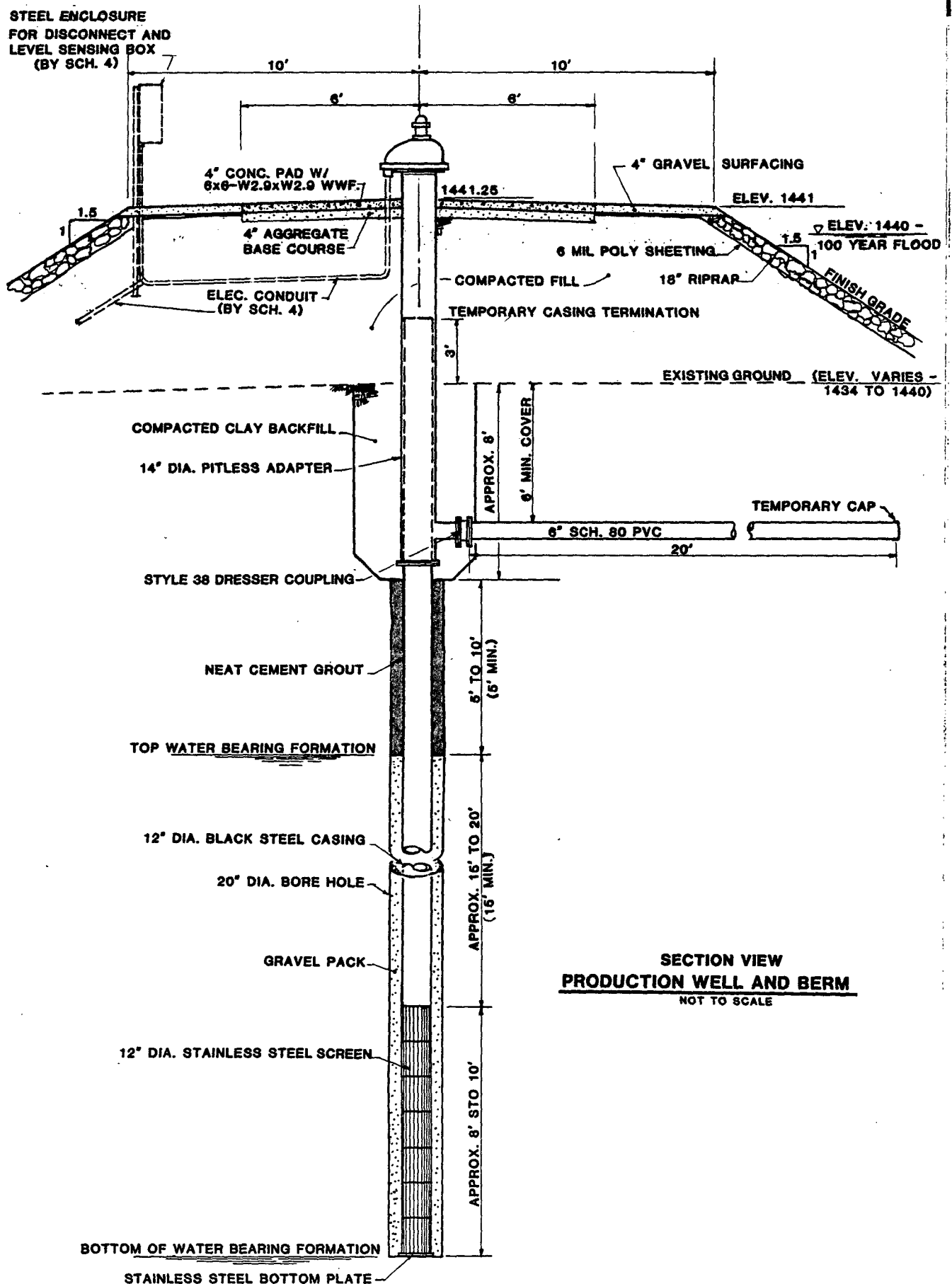
DeWitt Grant Reckert & Associates Co.
Architecture Engineering Planning

Rock Rapids, Iowa
Sioux City, Iowa
Sioux Falls, South Dakota

Date 10-86
Drawn by LO
Approved GJP
Revised
PROJ. #34227

1986 WELL FIELD EXPANSION
SIOUX FALLS, SOUTH DAKOTA

STEEL ENCLOSURE
FOR DISCONNECT AND
LEVEL SENSING BOX
(BY SCH. 4)



SHEET NO. 5



DeWid Grant Reckert & Associates Co.
Architecture Engineering Planning

Rock Rapids, Iowa
Sioux City, Iowa
Sioux Falls, South Dakota

Date 9-88
Designed by LO
Approved GJP
Reviewed
PROJ. #34227

1986 WELL FIELD EXPANSION
SIOUX FALLS, SOUTH DAKOTA

APPENDIX

for Every Sample

Minnesota Statutes / 36A.01-05

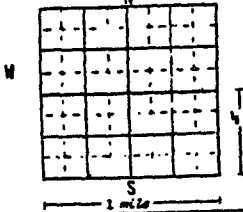
WORK COPY

MINNESOTA UNIQUE #216119
for Water Sample

MINNESOTA Statute 15A.01.04

WORK COPY

[illegible]

1. LOCATION OF WELL					WATER WELL RECORD		MINNESOTA STATE DEPT. OF AGRICULTURE for Water Sample												
County Name _____					Minnesota Statute 154.01.06														
Township Name _____	Township Number _____	Range Number _____	Section No. _____	Fracture _____	3. PROPERTY OWNER'S NAME _____														
Distance and Direction from Road Intersections or Street Address and City of Well Location _____					Address _____														
Show exact location of well in section grid with "X." 					Sketch map of well location. Address Name _____ Block Number _____ Lot Number _____														
2. FORMATION LOG					4. WELL DEPTH (completed) _____ ft. Date of Completion _____														
		COLOR	THICKNESS OF FORMATION	FROM	TO	5. ☐ Cable tool ☐ Reverse ☐ Pinned ☐ Plug													
						6. ☐ Hollow rod ☐ Air ☐ Bored ☐ _____													
						7. ☐ Rotary ☐ Jetted ☐ Power Auger													
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2">8. USE</td> <td colspan="2">9. PUBLIC SUPPLY</td> <td colspan="2">10. INDUSTRY</td> </tr> <tr> <td>☐ Domestic</td> <td>☐ Irrigation</td> <td>☐ Municipal</td> <td>☐ Commercial</td> <td>☐ _____</td> <td>☐ _____</td> </tr> </table>					8. USE		9. PUBLIC SUPPLY		10. INDUSTRY		☐ Domestic	☐ Irrigation	☐ Municipal	☐ Commercial	☐ _____	☐ _____	11. ☐ Test Well ☐ Air Conditioning ☐ _____		
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Make _____	from _____ ft. to _____ ft.	Type _____	Dis. _____	Slot/Cause _____	Length _____														
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_____		_____		_____															

WATER WELL RECORD

Memorandum Dated 1994.08.08

for Water Sampling

[illegible]

WATER WELL RECORD

(for Water Sample)

Minnesota Statutes 13A.01.00

1. LOCATION OF WELL

County Name

Township Name

Township Number

Range Number

Section No.

Fraction

N

S

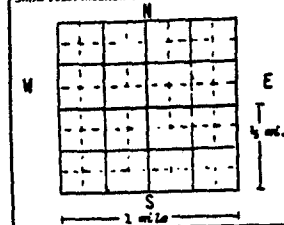
E

W

Distance and Direction from Road Intersection or Street Address and City of Well Location

Show exact location of well on section grid with "X."

Sketch map of well location.



FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Test Hole # 6				
top soil	black		0	2
clay	brown		2	8
river till + F. sand	gray		8	16
sand med	colored		16	31
sand fine	gray		31	32
sand med	"		32	36
clay	gray		36	40
Drilled loss				
8 to 16	5 to 10 gals.			
16 to 31	10 to 15 gals.			
31 to 36	15 to 20 gals.			
.020 slot screen,				

15. REMARKS, ELEVATION, SOURCE OF DATA, ETC.

3. PROPERTY OWNER'S NAME

Address

4. WELL DEPTH (completed)

Date of Completion

5. ☐ Cable tool ☐ Reverse ☐ Driven ☐ Dug
☐ Hand-dug ☐ Air ☐ Bored ☐ _____
☐ Rotary ☐ Jetted ☐ Power Auger

6. USE

- ☐ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Municipal ☐ Commercial
☐ Test Well ☐ Air Conditioning ☐ _____

7. CASING

- ☐ Black ☐ Threaded ☐ Welded ☐ _____
☐ Galv. ☐ _____
☐ _____
HEIGHT: Above/Below _____ ft.
Drive Shoe? Yes _____ No _____
_____ in. to _____ ft. Weight _____ lbs./ft. _____ in. to _____ ft.
_____ in. to _____ ft. Weight _____ lbs./ft. _____ in. to _____ ft.
_____ in. to _____ ft. Weight _____ lbs./ft. _____ in. to _____ ft.

8. SCREEN

- Make _____ from _____ ft. to _____ ft.
Type _____ Dia. _____
Slot/Screen _____ Length _____ FITTINGS: _____
Set between _____ ft. and _____ ft.
_____ ft. and _____ ft.
_____ ft. and _____ ft.

9. STATIC WATER LEVEL

- _____ ft. ☐ below ☐ above land surface Date Measured _____

10. PUMPING LEVEL (below land surface)

- _____ ft. after _____ hrs. pumping _____ g.p.m.
_____ ft. after _____ hrs. pumping _____ g.p.m.

11. WELL HEAD COMPLETION

- ☐ Pitless adapter ☐ Basement offset ☐ At least 12" above grade

12. Well grouted?

- ☐ Yes ☐ No C'u. Yds. _____
☐ Neat Cement ☐ Bentonite ☐ _____
Depth: from _____ ft. to _____ ft.
from _____ ft. to _____ ft.

13. Nearest sources of possible contamination

- _____ feet _____ direction _____ type
Well disinfected upon completion? Yes ☐ No ☐

14. PUMP

- Date installed _____
☐ Not installed
Manufacturer's Name _____
Model Number _____ HP _____ Volts _____
Length of drop pipe _____ ft. capacity _____ g.p.m.
Material of drop pipe _____
Type: ☐ Submersible ☐ E. S. Turbine ☐ Hand-operating
☐ Jet ☐ Centrifugal ☐ _____

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name

License No.

Address

Signed

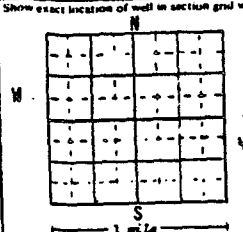
Authorized Representative

Date

Name of Driller

Date

WORK COPY

WATER WELL RECORD					MINNESOTA OFFICE REGISTRATION for Water Sample	
1. LOCATION OF WELL						
County Name _____						
Township Name _____	Township Number _____	Range Number _____	Section No. _____	Fraction _____		
Distance and Direction from Road Intersections or Street Address and City of Well Location _____						
Show exact location of well in section grid with "X." 					Sketch map of well location. Address Name Block Number Lot Number	
2. FORMATION LOG		COLOR	HARDNESS OF FORMATION	FROM	TO	
Test hole # 7						
top soil		black		0	2	
clay		brown		2	9	
sand fine to med.		colored		9	21	
sand med		gray		21	29	
sand fine		"		29	32	
sand med to coarse				32	43	
clay		gray		43	45	
Drill loss						
15 to 29		15 to 20 gals.				
29 to 43		20 to 25 gals.				
.040 clot screen.						
15. REMARKS, ELEVATION, SOURCE OF DATA, etc.						

3. PROPERTY OWNER'S NAME			
Address _____			
4. WELL DEPTH (completed)		Date of Completion _____	
5. ☐ Cable tool	☐ Reverse	☐ Driven	☐ Plug
☐ Handover rod	☐ Air	☐ Bored	☐ _____
☐ Rotary	☐ Jetted	☐ Power Auger	
6. USE			
☐ Domestic	☐ Public Supply	☐ Industry	
☐ Irrigation	☐ Municipal	☐ Commercial	
☐ Test Well	☐ Air Conditioning	☐ _____	
7. CASING		HEIGHT: Above/Below _____	
☐ Black	☐ Threaded	Surface _____ ft.	
☐ Galv.	☐ Welded	Drive Shoe? Yes _____ No _____	
☐ _____	☐ _____	In. to _____ ft. Weight _____ lbs./ft.	
☐ _____	☐ _____	In. to _____ ft. Weight _____ lbs./ft.	
☐ _____	☐ _____	In. to _____ ft. Weight _____ lbs./ft.	
8. SCREEN		On open hole from _____ ft. to _____ ft.	
Type _____		Dis. _____	
Slot/Gauge _____		Length _____	
Set between _____ ft. and _____ ft.		FITTINGS:	
_____ ft. and _____ ft.		_____ ft. and _____ ft.	
_____ ft. and _____ ft.		_____ ft. and _____ ft.	
9. STATIC WATER LEVEL			
_____ ft. below land surface		Date Measured _____	
10. PUMPING LEVEL (below land surface)			
_____ ft. after _____ hrs. pumping		_____ g.p.m.	
_____ ft. after _____ hrs. pumping		_____ g.p.m.	
11. WELL HEAD COMPLETION			
☐ Pitless adapter	☐ Ravelment offer	☐ At least 12" above grade	
12. Well grouted?			
☐ Yes ☐ No		C.C. Yds. _____	
☐ Neat Cement	☐ Bentonite	☐ _____	
Depth: from _____ ft. to _____ ft.		from _____ ft. to _____ ft.	
13. Nearest sources of possible contamination			
_____ feet _____ direction		_____ type	
Well disinfected upon completion?		Yes ☐ No ☐	
14. PUMP			
Date installed _____		☐ Not installed	
Manufacturer's Name _____			
Model Number _____		HP _____ Volts _____	
Length of drop pipe _____		ft. capacity _____ g.p.m.	
Material of drop pipe _____			
Type: ☐ Submersible	☐ L.S. Turbine	☐ Hermetic	
☐ Jet	☐ Centrifugal	☐ _____	
15. WATER WELL CONTRACTOR'S CERTIFICATION			
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.			
Licensee Business Name _____		License No. _____	
Address _____		Date _____	
Signed _____		Authorized Representative	
Name of Driller _____		Date _____	

WORK COPY

[illegible]

1. LOCATION OF WELL
County Name _____

Township Name _____ Township Number _____ Range Number _____ Section No. _____ Fraction _____

Distance and Direction from Road Intersections or Street Address and City of Well Location _____

Show exact location of well in section grid with "X." _____

Sketch map of well location. _____

Address Name _____ Block Number _____ Lot Number _____

MINNESOTA UNIQUE WELL NO. _____
for Water Sample

WATER WELL RECORD
Minnesota Statutes 154A.01-.08

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Test hole # 9				
top soil	black		0	2
clay	brown		2	8
sand fine	colored		8	18
sand med	"		18	35
				40
2 1/2 in loss				
8 to 18	10 to 15			
14 to 25	10 to 15"			
25 to 35	15 to 20			
.030 slot screen				

3. PROPERTY OWNER'S NAME
Address _____

4. WELL DEPTH (completed) _____ Date of Completion _____

5. ☐ Cable tool ☐ Reverse ☐ Probe ☐ Dig
☐ Hand tool ☐ Air ☐ Bored ☐ _____
☐ Rotary ☐ Jetted ☐ Power Auger

6. USE
☐ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Municipal ☐ Commercial
☐ Test Well ☐ Air Conditioning ☐ _____

7. CASING
☐ Black ☐ Threaded ☐ _____
☐ Galv. ☐ Welded ☐ _____
☐ _____ ☐ _____
HEIGHT: Above/Below _____ ft.
Surface _____ ft.
Drive Shaft? Yes _____ No _____
_____ in. to _____ ft. Weight _____ lbs./ft.
_____ in. to _____ ft. Weight _____ lbs./ft.
_____ in. to _____ ft. Weight _____ lbs./ft.

8. SCREEN
Make _____ Or open hole from _____ ft. to _____ ft.
Type _____ Dia. _____
Slot/Grate _____ Length _____
Set between _____ ft. and _____ ft.
_____ ft. and _____ ft.
_____ ft. and _____ ft.

9. STATIC WATER LEVEL
_____ ft. below _____ ft. above _____ Date Measured _____

10. PUMPING LEVEL (below land surface)
_____ ft. after _____ hrs. pumping _____ g.p.m.
_____ ft. after _____ hrs. pumping _____ g.p.m.

11. WELL HEAD COMPLETION
☐ Pitless adapter ☐ Basement offset ☐ At least 12" above grade

12. Well grouted? ☐ Yes ☐ No Co. Yds. _____
☐ Neat Cement ☐ Bentonite ☐ _____
Depth: from _____ ft. to _____ ft.
from _____ ft. to _____ ft.

13. Nearest sources of possible contamination
_____ feet _____ direction _____ type
Well disinfected upon completion? Yes ☐ No ☐

14. PUMP
Date installed _____
☐ Not installed
Manufacturer's Name _____
Model Number _____ HP _____ Volts _____
Length of drop pipe _____ ft. capacity _____ g.p.m.
Material of drop pipe _____
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reversing
☐ Jet ☐ Centrifugal ☐ _____

15. WATER WELL CONTRACTOR'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name _____ License No. _____
Address _____
Signed _____ Date _____
Authorized Representative _____
Name of Driller _____ Date _____

15. REMARKS, ELEVATION, SOURCE OF DATA, etc. _____

Use a second sheet, if needed.

WORK COPY

1. LOCATION OF WELL

County Name _____

STATE OF MINNESOTA

WATER WELL RECORD

Minnesota Statutes 13A.01-.08

MINNESOTA UNIQUE WELL NO. _____

for Water Sample

Township Name _____

Township Number _____

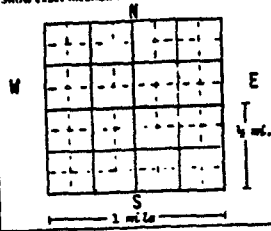
Range Number _____

Section No. _____

Fraction _____

Distance and Direction from Road Intersections or Street Address and City of Well Location _____

Show exact location of well in section grid with "X."



Addition Name _____

Block Number _____

Lot Number _____

Sketch map of well location.

3. PROPERTY OWNER'S NAME

Address _____

4. WELL DEPTH (completed)

Date of Completion _____

5. ☐ Cable tool ☐ Reverse ☐ Drive ☐ Dig
- ☐ Handrow rod ☐ Air ☐ Bored ☐ _____
- ☐ Rotary ☐ Jetted ☐ Power Auger

6. USE

- ☐ Domestic ☐ Public Supply ☐ Industry
- ☐ Irrigation ☐ Municipal ☐ Commercial
- ☐ Test Well ☐ Air Conditioning ☐ _____

7. CASING

- ☐ Black ☐ Threaded
- ☐ Galv. ☐ Welded
- ☐ _____ ☐ _____
- HEIGHT: Above/Below _____ ft.
- Surface _____ ft.
- Drive Shoe? Yes _____ No _____
- _____ in. to _____ ft. Weight _____ lbs./ft.
- _____ in. to _____ ft. Weight _____ lbs./ft.
- _____ in. to _____ ft. Weight _____ lbs./ft.

HOLE DIAM

_____ in. to _____ ft.

_____ in. to _____ ft.

_____ in. to _____ ft.

8. SCREEN

- Make _____
- Type _____ Dia. _____
- Slot/Groove _____ Length _____
- Set between _____ ft. and _____ ft.
- _____ ft. and _____ ft.
- _____ ft. and _____ ft.
- FITTINGS: _____

9. STATIC WATER LEVEL

_____ ft. below land surface ☐ above ☐ Date Measured _____

10. PUMPING LEVEL (below land surface)

_____ ft. after _____ hrs. pumping _____ s.p.m.

_____ ft. after _____ hrs. pumping _____ s.p.m.

11. WELL HEAD COMPLETION

- ☐ Plinth adapter ☐ Basement offset ☐ At least 12" above grade

12. Well grouted?

- ☐ Yes ☐ No C'u. Yds. _____
- ☐ Neat Cement ☐ Bentonite ☐ _____
- Depth: from _____ ft. to _____ ft.
- from _____ ft. to _____ ft.

13. Nearest sources of possible contamination

_____ feet _____ direction _____ 1998

Well disinfected upon completion? Yes ☐ No ☐

14. PUMP

- Date installed _____
- ☐ Not installed
- Manufacturer's Name _____
- Model Number _____ HP _____ Volts _____
- Length of drop pipe _____ ft. capacity _____ s.p.m.
- Material of drop pipe _____
- Type: ☐ Submersible ☐ L. S. Turbine ☐ Reciprocating
- ☐ Jet ☐ Centrifugal ☐ _____

15. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name _____

License No. _____

Address _____

Signed _____

Authorized Representative _____

Date _____

Name of Driller _____

Date _____

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

WORK COPY

1. LOCATION OF WELL

County Name

STATE OF MINNESOTA

WATER WELL RECORD

MINNESOTA UNIQUE WELL NO.

for Water Sample

Minnesota Surface 134.4.01-08

Township Name

Township Number

Range Number

Section No.

Practice

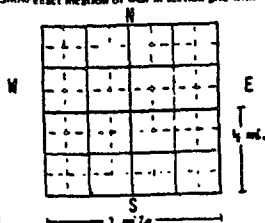
3. PROPERTY OWNER'S NAME

Address

Distance and direction from Road Intersection or Street Address and City of Well Location

Show exact location of well in section grid with "X."

Sketch map of well location.



Addition Name
Block Number
Lot Number

12

1. FORMATION LOG

COLOR

HARDNESS OF FORMATION

FROM

TO

Test hole # 13				
top soil	black		0	2
clay	brown		2	11
sand med	colored		11	22
sand med	grey		22	34
				40

Fluid loss

15 to 20	10 to 15 gals.
20 to 34	20 to 25 gals.

.040 slot screen.

4. WELL DEPTH (completed)

Date of Completion

1. Casing

2. Reverse

3. Drive

4. Dig

5. Mudsink

6. Air

7. Bored

8. _____

9. Drilling

10. Jetted

11. Power Auger

6. USE

1. Domestic

4. Public Supply

7. Industry

2. Irrigation

5. Municipal

8. Commercial

3. Test Well

6. Air Conditioning

9. _____

7. CASING

1. Black

4. Threaded

HEIGHT: Above/Below

2. Galv.

5. Welded

Surface _____ ft.

3. _____

6. _____

Drive Shoe? Yes _____ No _____

_____ in. to _____ ft. Weight _____ lbs./ft.

_____ in. to _____ ft. Weight _____ lbs./ft.

_____ in. to _____ ft. Weight _____ lbs./ft.

_____ in. to _____ ft.

_____ in. to _____ ft.

_____ in. to _____ ft.

8. SCREEN

Make _____

Or open hole

from _____ ft. to _____ ft.

Type _____

Dia. _____

Slot/Gauge _____

Length _____

FITTINGS:

Set between _____ ft. and _____ ft.

_____ ft. and _____ ft.

_____ ft. and _____ ft.

9. STATIC WATER LEVEL

_____ ft. below

land surface

_____ ft. above

Date Measured _____

10. PUMPING LEVEL (below land surface)

_____ ft. after _____ hrs. pumping _____ g.p.m.

_____ ft. after _____ hrs. pumping _____ g.p.m.

_____ ft. after _____ hrs. pumping _____ g.p.m.

11. WELL HEAD COMPLETION

1. Pickoff adapter

2. Basement offset

3. At least 12" above grade

12. Well grouted?

Yes

No

Cu. Yds. _____

1. Neat Cement

2. Bentonite

3. _____

Depth: from _____ ft. to _____ ft.

from _____ ft. to _____ ft.

13. Nearest sources of possible contamination

_____ feet

direction _____

type _____

Well disinfected upon completion? Yes _____ No _____

14. PUMP

Date installed _____

Not installed

Manufacturer's Name _____

Model Number _____

HP _____

Volts _____

Length of drop pipe _____

ft. capacity _____

g.p.m.

Material of drop pipe _____

Type: 1. Sumner-type

3. L. S. Turbine

5. Reciprocating

2. Jet

4. Centrifugal

6. _____

15. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name

License No.

Address

Signed

Authorized Representative

Date

Name of Driller

Date

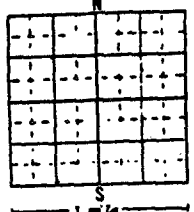
15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

WORK COPY

1. LOCATION OF WELL
County Name _____

Township Name _____ Township Number _____ Range Number _____ Section No. _____ Fraction _____

Distance and Direction from Road Intersection or Street Address and City of Well Location _____

Show exact location of well in section grid with "X".


WATERWELL RECORD
Minnesota Statutes 15A.01-.08

2. PROPERTY OWNER'S NAME
Address _____

3. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
top soil	black		0	2
clay	brown		2	8
sand med.	colored		8	14
sand med to coarse	"		14	21
sand (med)	"		21	32
sand fine to med	gray		32	43
clay			43	45
Fluid loss				
8 to 15' 25 to 30 gals				
15 to 25 15 to 20 gals				
25 to 43 20 to 25 gals.				
.030 slot screen				

4. WELL DEPTH (completed) _____ ft. **Date of Completion** _____

5. ☐ Cable tool ☐ Reverse ☐ Drive ☐ Dig
☐ Hand rod ☐ Air ☐ Bored ☐ _____
☐ Rotary ☐ Jetted ☐ Power Auger

6. USE
☐ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Municipal ☐ Commercial
☐ Test Well ☐ Air Conditioning ☐ _____

7. CASING
☐ Black ☐ Threaded ☐ Galv. ☐ Welded
 HEIGHT: Above/Below Surface _____ ft.
 Drive Shoe? Yes _____ No _____
 _____ in. to _____ ft. Weight _____ lbs./ft.
 _____ in. to _____ ft. Weight _____ lbs./ft.
 _____ in. to _____ ft. Weight _____ lbs./ft.

8. SCREEN
 Make _____ Dr open hole from _____ ft. to _____ ft.
 Type _____ Dia. _____
 Slot/Grass _____ Length _____
 Set between _____ ft. and _____ ft.
 _____ ft. and _____ ft.
 _____ ft. and _____ ft.

9. STATIC WATER LEVEL
 _____ ft. ☐ below ☐ above land surface Date Measured _____

10. PUMPING LEVEL (below land surface)
 _____ ft. after _____ hrs. pumping _____ S.P.M.
 _____ ft. after _____ hrs. pumping _____ S.P.M.

11. WELL HEAD COMPLETION
☐ Plugless adapter ☐ Basement offset ☐ At least 12" above grade

12. Well grouted? ☐ Yes ☐ No C.u. Yds. _____
☐ Neat Cement ☐ Bentonite ☐ _____
 Depth: from _____ ft. to _____ ft.
 from _____ ft. to _____ ft.

13. Nearest sources of possible contamination
 _____ feet _____ direction _____ 15 PM
 Well disinfected upon completion? Yes ☐ No ☐

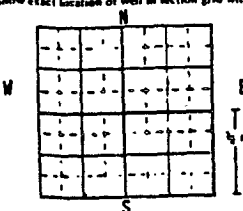
14. PUMP
 Date installed _____
☐ Not installed
 Manufacturer's Name _____
 Model Number _____ HP _____ Volts _____
 Length of drop pipe _____ ft. capacity _____ S.P.M.
 Material of drop pipe _____
 Type: ☐ Submersible ☐ L. S. Turbine ☐ Reciprocating
☐ Jet ☐ Centrifugal ☐ _____

15. WATER WELL CONTRACTOR'S CERTIFICATION
 This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
 Licensee Business Name _____ Licensee No. _____
 Address _____
 Signed _____ Date _____
 Authorized Representative _____
 Name of Driller _____ Date _____

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Use a second sheet, if needed.

WORK COPY

WATER WELL RECORD					for Water Sample	
Minnesota Statute 13A.41-.08						
1. LOCATION OF WELL					2. PROPERTY OWNER'S NAME	
County Name _____					Address _____	
Township Name _____	Township Number _____	Range Number _____	Section No. _____	Tract No. _____		
Distance and Direction from Road Intersection or Street Address and City of Well Location _____						
Show exact location of well in section grid with "X".					4. WELL DEPTH (completed)	
 Addition Name _____ Block Number _____ Lot Number _____					Date of Completion _____	
Sketch map of well location.					5. ☐ Cable tool ☐ Reverse ☐ Driven ☐ Plug	
					6. ☐ Hydraulic rod ☐ Air ☐ Bored ☐ _____	
					7. ☐ Rotary ☐ Jetted ☐ Power Auger	
2. FORMATION LOG					8. USE	
		COLOR	HARDNESS OF FORMATION	FROM	TO	
Top soil		black		0	2	
Clay		brown		2	10	
sand med		colored		10	18	
sand fine to med.		grey		18	38	
Clay		"		38	45	
2' fluid loss						
10 to 15'		25 to 30 gals				
15 to 20		10 to 15 gals				
20 to 30		10 to 15 gals				
30 to 38		10 to 15 gals				
1,040 slot screen						
					9. SCREEN	
					Type _____ Dia. _____	
					Slot/Gauge _____ Length _____	
					Set between _____ ft. and _____ ft.	
					_____ ft. and _____ ft.	
					10. STATIC WATER LEVEL	
					_____ ft. below land surface ☐ show Date Measured _____	
					11. PUMPING LEVEL (below land surface)	
					_____ ft. after _____ hrs. pumping _____ g.p.m.	
					_____ ft. after _____ hrs. pumping _____ g.p.m.	
					12. WELL HEAD COMPLETION	
					☐ Plug adapter ☐ Basement offset ☐ At least 12" above grade	
					13. Well grouted?	
					☐ Yes ☐ No C.u. Yds. _____	
					☐ Neat cement ☐ Bentonite ☐ _____	
					Depth: from _____ ft. to _____ ft.	
					from _____ ft. to _____ ft.	
					14. Nearest sources of possible contamination	
					_____ feet _____ direction _____ type	
					Well disinfected upon completion? Yes ☐ No ☐	
					15. PUMP	
					Date installed _____	
					☐ Not installed	
					Manufacturer's Name _____	
					Model Number _____ HP _____ Volts _____	
					Length of drop pipe _____ ft. capacity _____ g.p.m.	
					Material of drop pipe _____	
					Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating	
					☐ Jet ☐ Centrifugal ☐ _____	
					16. WATER WELL CONTRACTOR'S CERTIFICATION	
					This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.	
					_____ Licensee Business Name License No. _____	
					Address _____	
					Signed _____ Date _____	
					Authorized Representative	
					Name of Driller Date _____	
17. REMARKS, ELEVATION, SOURCE OF DATA, ETC.						

WORK COPY

[illegible]

WORK COPY

for Water Sample

McGraw-Hill, Singapore 154.01.02

WORK COPY

WATER WELL RECORD

for Water Sample

Minnesota Statutes 134A.01-.08

1. LOCATION OF WELL					3. PROPERTY OWNER'S NAME	
County Name					Address	
Township Name		Township Number	Range Number	Section No.	Date of Completion	
		N or S	E or W	1/4 1/2 3/4		
Distance and Direction from Road Intersections or Street Address and City of Well Location					4. WELL DEPTH (completed)	
Show exact location of well in section grid with "X."					5. USE	
Sketch map of well location.					6. STATIC WATER LEVEL	
Addition Name					7. PUMPING LEVEL (below land surface)	
Block Number					8. WELL HEAD COMPLETION	
Lot Number					9. NEAREST SOURCES OF POSSIBLE CONTAMINATION	
1 mile					10. PUMP	
2. FORMATION LOG					11. WATER WELL CONTRACTOR'S CERTIFICATION	
Test Hole #17					This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.	
Top soil black 0 2					Licensee Business Name	
Clay brown 2 13					Licensee No.	
Sand coarse colored 13 18					Address	
Sand fine to med. grey 18 23					Signed	
Sand med to coarse " 23 30					Authorized Representative	
Clay grey 30 40					Date	
Fluid loss					Name of Driller	
13 to 18' 25 to 30 gals.						
18 to 23 10 to 15						
23 to 30 20 to 25 gals.						
1030 shot screen						
bottom set at 30'						
15. REMARKS, ELEVATION, SOURCE OF DATA, etc.						

WORK COPY

STATE OF MINNESOTA

DEPARTMENT OF HEALTH

MINNESOTA UNIQUE WELL NO.

1. LOCATION OF WELL

County Name

2. TOWNSHIP DATA

Township Name

Township Number

Range Number

Section No.

Fracture

3. DISTANCE AND DIRECTION FROM ROAD INTERSECTIONS OR STREET ADDRESS AND CITY OF WELL LOCATION

Distance and Direction from Road Intersections or Street Address and City of Well Location

4. SHOW EXACT LOCATION OF WELL IN SECTION GRID WITH "X."

Sketch map of well location.

W

E

S

N

Addition Name

Block Number

Lot Number

Test hole #19

5. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
top soil	black		0	2
clay	brown		2	9
sand med	colored		9	15
sand med to coarse	grey		15	30
clay	grey		30	40
fluid loss				
10 to 20	25 to 30 gals.			
20 to 30	20 to 25			
.0410 slot screen				
bottom at 30'				

6. PROPERTY OWNER'S NAME

Address

7. WELL DEPTH (completed)

Date of Completion

8. USE

☐ Domestic
☐ Public Supply
☐ Industry

☐ Irrigation
☐ Municipal
☐ Commercial

☐ Test Well
☐ Air Conditioning
☐ Other

9. CASING

☐ Black
☐ Threaded

☐ Galv.
☐ Welded

☐ Other

HEIGHT: Above/Below

Surface

Drive Shaft? Yes No

Weight

HOLE DIAM

10. SCREEN

Make

Type

Size/Gauge

See between

Or open hole

Length

FITTINGS:

11. STATIC WATER LEVEL

ft. below land surface

ft. above

Date Measured

12. PUMPING LEVEL (below land surface)

ft. after

hrs. pumping

g.p.m.

13. WELL HEAD COMPLETION

☐ Pitless adapter
☐ Basement offset
☐ At least 12" above grade

14. WELL GROUTED?

☐ Yes
☐ No

Material

Depth

15. NEAREST SOURCES OF POSSIBLE CONTAMINATION

feet

direction

type

Well disinfected upon completion?

Yes

No

16. PUMP

Date installed

Not installed

Manufacturer's Name

Model Number

Length of drop pipe

Material of drop pipe

Type

17. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

License Business Name

License No.

Address

Signed

Authorized Representative

Date

Name of Driller

18. REMARKS, ELEVATION, SOURCE OF DATA, etc.

19. WORK COPY

1. LOCATION OF WELL

STATE OF MINNESOTA

DEPARTMENT OF HEALTH

MINNESOTA UNIQUE WELL NO.

WATER WELL RECORD

for Water Sample

County Name

Township Name

Township Number

Range Number

Section No.

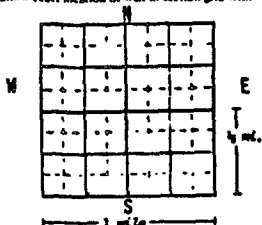
Fraction

N
S
E
W

Distance and Direction from Road Intersection or Street Address and City of Well Location

Show exact location of well in section grid with "X."

Sketch map of well location.



Additional Name

Block Number

Lot Number

2. FORMATION LOG

COLOR

HARDNESS OF FORMATION

FROM

TO

Test hole #20.

Top soil

black

0 2

Clay

brown

2 9

Sand med

colored

9 19

Sand fine

grey

19 22

Sand med to

coarse

22 35

fluid loss

40

9 to 22

35 to 40

22 to 35

35 to 40

.030 slot screen

bottom at 35'

3. PROPERTY OWNER'S NAME

Address

4. WELL DEPTH (completed)

Date of Completion

1. Cable tool

4. Reverse

7. Driven

10. Flag

2. Hollow rod

5. Air

8. Bored

11. _____

3. Rotary

6. Jetted

9. Power Auger

5. USE

1. Domestic

4. Public Supply

7. Industry

2. Irrigation

5. Municipal

8. Commercial

3. Test Well

6. Air Conditioning

9. _____

7. CASING

HEIGHT: Above/Below

1. Black

4. Threaded

2. Galv.

5. Welded

Surface _____ ft.

3. _____

6. _____

Drive Shaft? Yes _____ No _____

_____ in. to _____ ft.

Weight _____ lbs./ft.

_____ in. to _____ ft.

Weight _____ lbs./ft.

_____ in. to _____ ft.

Weight _____ lbs./ft.

8. SCREEN

Or open hole from _____ ft. to _____ ft.

Make _____

Type _____

Dia. _____

Shot/Gauge _____

Length _____

Set between _____ ft. and _____ ft.

_____ ft. and _____ ft.

_____ ft. and _____ ft.

_____ ft. and _____ ft.

9. STATIC WATER LEVEL

ft. below land surface

ft. above

Date Measured _____

10. PUMPING LEVEL (below land surface)

_____ ft. after _____ hrs. pumping _____ p.p.m.

_____ ft. after _____ hrs. pumping _____ p.p.m.

11. WELL HEAD COMPLETION

1. Plugless adapter

2. Rastem offset

3. At least 12" above grade

12. Well grouted?

Yes

No

C'u. Yds. _____

1. Neat Cement

2. Bestmrite

3. _____

Depth: from _____ ft. to _____ ft.

from _____ ft. to _____ ft.

13. Nearest sources of possible contamination

_____ feet

direction _____

TYPE _____

Well disinfected upon completion? Yes ☐ No ☐

14. PUMP

Date installed _____

Not installed

Manufacturer's Name _____

Model Number _____

HP _____

Volts _____

Length of drop pipe _____

ft. capacity _____

p.p.m. _____

Material of drop pipe _____

Type: 1. Submersible

3. L. S. Turbine

5. Reciprocating

2. Jet

4. Centrifugal

6. _____

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name

License No.

Address

Signed

Authorized Representative

Date

Name of Driller

Date

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

WORK COPY

STATE OF MINNESOTA DEPARTMENT OF HEALTH

WATER WELL RECORD

Minnesota Statutes 13A.41-03

MINNESOTA UNIQUE WELL NO. _____

for Water Sample

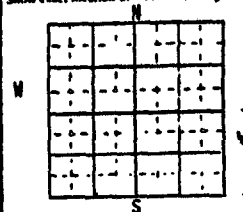
1. LOCATION OF WELL

County Name _____

Township Name _____ Township Number _____ Range Number _____ Section No. _____ Fraction _____

Distance and Direction from Road Intersections or Street Address and City of Well Location _____

Show exact location of well in section grid with "X."



Sketch map of well location.

Addition Name _____

Block Number _____

Lot Number _____

3. PROPERTY OWNER'S NAME

Address _____

4. WELL DEPTH (completed) _____ Date of Completion _____

5. WELL TYPE

☐ Casing test ☐ Reverse ☐ Pitless ☐ Plug
☐ Hand-dug well ☐ Air ☐ Bored ☐ _____
☐ Rotary ☐ Jetted ☐ Power Auger

6. USE

☐ Domestic ☐ Public Supply ☐ Industrial
☐ Irrigation ☐ Municipal ☐ Unnamed
☐ Test Well ☐ Air Conditioning ☐ _____

7. CASING

☐ Black ☐ Threaded ☐ Welded ☐ Surface _____ ft.
☐ Galv. ☐ _____ ☐ Drive Shaft? Yes _____ No _____
 _____ in. to _____ ft. Weight _____ lbs./ft. _____ in. to _____ ft. Weight _____ lbs./ft. _____ in. to _____ ft. Weight _____ lbs./ft.

8. SCREEN

Make _____ Or open hole from _____ ft. to _____ ft.
 Type _____ Dia. _____
 Slot/Screen _____ Length _____ FITTINGS: _____
 Set between _____ ft. and _____ ft. _____ ft. and _____ ft. _____ ft. and _____ ft.

9. STATIC WATER LEVEL

☐ Below land surface ☐ Above Date Measured _____
 _____ ft. after _____ hrs. pumping _____ ft. after _____ hrs. pumping

10. PUMPING LEVEL (below land surface)

_____ ft. after _____ hrs. pumping _____ ft. after _____ hrs. pumping

11. WELL HEAD COMPLETION

☐ Pitless adapter ☐ Basement offset ☐ At least 12" above grade

12. Well grouted?

☐ Yes ☐ No Cu. Yds. _____
☐ Neat Cement ☐ Bentonite ☐ _____
 Depth: from _____ ft. to _____ ft. from _____ ft. to _____ ft.

13. Nearest sources of possible contamination

_____ feet _____ direction _____
 Well disinfected upon completion? Yes ☐ No ☐

14. PUMP

Date installed _____
☐ Not installed
 Manufacturer's Name _____
 Model Number _____ HP _____ Volts _____
 Length of drop pipe _____ ft. capacity _____ gals.
 Material of drop pipe _____
 Type: ☐ Submersible ☐ L. S. Turbine ☐ Reciprocating
☐ Jet ☐ Centrifugal ☐ _____

15. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

 Licensee Business Name _____ License No. _____
 Address _____
 Signed _____ Date _____
 Authorized Representative _____
 Name of Driller _____ Date _____

2. FORMATION LOG

FORMATION LOG	COLOR	THICKNESS OF FORMATION	FROM	TO
Test hole #21				
top soil	black		0	2
clay	blown		2	8
clay	grey		8	9
sand med	colored		9	13
sand med	grey		13	20
sand med to coarse			20	35
2 1/2 in loss				40
9 to 20'	35 to 40	gals		
20 to 35'	35 to 40	"		
1030 slot screen				
bottom at 35'				

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

11 _____

WORK COPY

WATER WELL RECORD

for Water Sample

[illegible]

WATER WELL RECORD

Administrative Structure / SA 4.01-02

[illegible]

WATERWELL RECORD

for Water Samples

Approved Statutes 15A.01-05

[illegible]



WELL DRILLING CO.
1401 E. 63rd ST. N.
SIOUX FALLS, SD 57104

City of Sioux Falls

STATIC WATER LEVELS

Test Holes

# 1	7 ft. $5\frac{1}{2}$ in.
# 2	5 ft. $6\frac{1}{2}$ in.
# 3	6 ft. 3 in.
# 4	7 ft. $5\frac{1}{2}$ in.
# 5	8 ft.
# 6	8 ft. 8 in.
# 7	10 ft. 5 in.
# 8	8 ft. 11 in.
# 9	7 ft. $2\frac{1}{2}$ in.
# 10	5 ft. 9 in.
# 12	8 ft. 6 in.
# 13	10 ft. 6 in.
# 14	10 ft. $4\frac{1}{2}$ in.
# 15	10 ft. $3\frac{1}{2}$ in.
# 16	9 ft. 5 in.
# 17	8 ft. 8 in.
# 18	7 ft. $9\frac{1}{2}$ in.
# 19	7 ft. 1 in.
# 20	6 ft. 11 in.
# 21	6 ft. $5\frac{1}{2}$ in.
# 22	6 ft. $\frac{1}{2}$ in.
# 23	6 ft. 9 in.
# 24	7 ft.

Test hole readings taken at ground level

Architecture Engineering Planning

November 25, 1986

Attn: Jim Goodman

DEC 1966
DIVISION OF
WATER RIGHTS
Piaeto, SD

This is to follow up on our telephone conversation this date regarding the above referenced project. As you noted, the State Well Construction Standards, Section 72:02:04:28, calls for a minimum of 20 feet of cement grout in wells and observation wells. You also noted that you are commonly allowing variances for wells and observation wells in shallow formations with little overburden, such as the Big Sioux aquifer, to permit cement grouting from the top of the water bearing formation to the surface or to the bottom of the pitless adapter. Please consider such a variance for this project.

We would also like you to consider a variance to allow the substitution of bentonite grout for observation wells in lieu of cement grout. You indicated that this would provide as effective a seal in this type of formation as neat cement. A minimum of 12 inches of cement grout would be used at the top of permanent observation wells, where the 4-inch protective sleeve is placed (see Sheet No. 3 of the Drawings).

Enclosed is a copy of the letter dated October 29, 1986, to Garland Erbele requesting review of the plans and specifications on this project. Please call me if there are any other items on which you may have questions or comments.

Very truly yours,

DEWILD GRANT RECKERT & ASSOCIATES COMPANY

Gary Patton
Gary Patton, P.E.

GJP:kld

cc: Larry Doss
Richard A. Willer



Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

December 2, 1986

Larry Doss
224 West 9th
Sioux Falls, SD 57102

Dear Mr. Doss:

This letter is in response to our telephone conversation on December 2, 1986 regarding the Sioux Falls well field expansion.

Enclosed are water permit application forms which need to be completed and returned with an application fee. The fee structure is outlined on the enclosed instruction sheet. Maps and well logs are included in the DGR report and do not need to be submitted with the application. I have also enclosed a listing of permits held by the city and the water appropriation (cfs) for each permit.

Please contact us if you have any questions.

Sincerely,

Ron Duvall
Natural Resources Engineer
enc

Equal Opportunity Employer

Sioux Falls water permits / rights

Permit No	(cubic feet per second) pumping capacity	(limitation) Acres-foot/yr. irrigate 108.8 acres { Sioux Falls Park & Rec.	Permit No	(cubic feet per second) pumping capacity	(limitation) Acres-foot/yr.
218-3	1.55		264-3	1.55	
255-3	1.55		266-3	1.55	
257-3	2.67		268-3	1.00	
259-3	1.33		270-3	1.67	
261-3	1.33		272-3	1.44	
254-3	1.55		274-3	2.00	
256-3	1.11		275-3	1.78	
258-3	.44		2886-3	3.10	
260-3	1.33		299-3	3.12	
262-3	1.55		300-3	3.21	
1305-3	1.57		3981-3	F.U. 170.00	50,000
1347-3	7.75		4099-3	1.00	
396-3	3.12		4101-3	1.00	
2019-3	3.10		449-3	F.U. 15.60	
1306-3	6.20		4812-3	4.01	
1579-3	.72		395-3	3.12	
2018-3	3.10		397-3	3.12	
Future use 2042-3	65.00		4098-3	1.00	
263-3	1.55		4100-3	1.00	
265-3	1.55		448-3	F.U. 21.15	
267-3	1.55		4811-3	2.67	
269-3	1.78				
271-3	1.67				
273-3	1.67				
2747-3	3.10				
276-3	1.78				
298-3	1.78				

REQUEST FOR A VARIANCE FROM CHAPTER 74:02:04

SOUTH DAKOTA WELL CONSTRUCTION STANDARDS

Pursuant to Section 74:02:04:75 of the South Dakota Well Construction Standards, the following is the decision of the Chief Engineer, Water Rights Division, Department of Water and Natural Resources concerning the request for a well construction variance by DeWild, Grant, Reckert & Associates, Co.

The Chief Engineer DENIES a variance request for construction of the production well and grants APPROVAL of the variance request for the monitoring wells as follows:

1. The consulting engineer has requested by letter (attached) a variance from 74:02:04:28 of the SD Well Construction Standards which requires 20 lineal feet of cement grout for all wells. The proposed construction as described in the letter as shown by drawing sheet No. 3 in the Sioux Falls Well Field Expansion is acceptable. Bentonite grout would be substituted for cement grout as shown by the drawing for the monitoring wells.
2. The aquifer is the Big Sioux-Sioux Falls.
3. According to test drilling, the aquifer top varies from 6 to 14 feet below land surface with a static water level varying from 5 to 11 feet below land surface. There is no need to grout the aquifer, it is sufficient to grout from the top of the aquifer to the land surface.
4. The use of bentonite grout allows the driller to recover any casing from monitoring well that will not be permanent. If the well casing is recovered, then plugging according to 74:02:04:69 is required.

This variance approval applies only to this project and expires December 31, 1987.

5. Gary Patton, an engineer for DeWild, Grant, Reckert & Associates also requested by telephone December 1, 1986, relief from cement grouting for the production well. The intent of 74:02:04:29 is very clear. The well must be completed with cement grout similar to sheet No. 5 in the plans and specifications. Although the total lineal feet of grout may be only a few feet, this part of the request is denied.



JOHN HATCH, Chief Engineer
Water Rights Division
December 4, 1986

CITY OF SIOUX FALLS

PURCHASE ORDER

P.O.
NO.

47374

This Number Must Appear On
All Invoices.

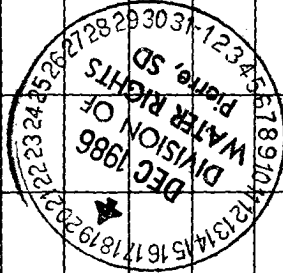
Department of Water and Natural Resources

Water Rights Division Joe Foss Bldg.

Pierre, SD 57501

DEPARTMENT	NUMBER	VENDOR NO.	DATE		
			MO.	DAY	YR.
WATER	75	19311	12	17	86

BASIC ACCOUNT	EXPENSE CLASS	PROJECT NUMBER	QTY.	DESCRIPTION	UNIT PRICE	AMOUNT
	2200 2288	7925		<i>OTHER</i> Professional Services and Fees		\$ 650.00
			120	Acre feet @ 1.25/acre foot	150.00	
			120	Acre feet @ .625	75.00	
				$\frac{2244 \text{ AF/Y} - 240 \text{ AF/Y}}{120 \text{ AF/Y}} = 17$		
			17	120 AF/Y @ 25.00 ea	425.00	
				AF/Y = ACRE FEET PER YEAR		
				Application Fee for Future Use Permit #448-3		
TOTAL						\$ 650.00



AUTHORIZED SIGNATURE

AUDITOR'S COPY

MEMO TO: File 34227.6
FROM: Gary Patton
DATE: 12/19/86
RE: 1986 Sioux Falls Well Field Expansion



I called the DWNR Water Rights Division on Wednesday, December 17 regarding their December 4, 1986, letter granting the bentonite grout variance. I was connected with Ron DeVaul and asked him about the statement in the letter indicating that the water permit for the current project must be obtained before the production wells may be constructed. After checking with John Hatch, Ron said that the State only requires that the water not be utilized until the permit is granted. He indicated that the City could proceed with construction, at its own risk, before the permit is granted.

Ron said the water rights staff has no indication of a problem with the City obtaining the permit, but he noted that any interested person could file a petition to oppose the application up to 10 days before the March 4 Board meeting. If this happens the hearing would be delayed until the May meeting.

Ron told me that the chief engineer (John Hatch) has to issue a written recommendation on the permit application by January 29, 1987, to allow time for publication in advance of the March 4 meeting of the Water Management Board. He indicated that the City should submit the permit application as soon as possible to allow the water rights staff enough time to develop the recommendation. He said the staff needs at least 2 to 3 weeks to consider the recommendation, so an application should be submitted no later than the first of January.

cc: Richard A. Willer
Larry Doss
Ron DeVaul - DWNR ✓

Report on Application No. 5115-3
City of Sioux Falls
January 5, 1987

This application proposes to construct works and divert 6.70 cfs (2,244 acre-feet annually) from Future Use Permit No. 448-3. The proposed project will expand the Sioux Falls well field by the construction of 5 additional wells approximately 40 feet in depth and will be located in the W 1/2 SE 1/4, E 1/2 SW 1/4, in NW 1/4 of Section 8, T102N-R49W. The water will be used to supply the City of Sioux Falls.

Aquifer-Big Sioux: Sioux Falls (BS:SF)

Geology and Aquifer Characteristics

The Big Sioux:Sioux Falls Aquifer is an alluvium mantled outwash consisting of silt, fine to coarse sand, and gravel. The Aquifer overlies relatively impermeable till throughout most of its areal extent and is bounded both on the north and south by Sioux Quartzite (Koch, 1982). The aquifer underlies approximately 22,900 acres in Minnehaha County and contains approximately 103,050 acre-feet of available water in storage (Hedges, Etal., 1982). The aquifer is predominantly under water table conditions and varies in thickness from 4 feet to 48 feet. Recharge to the aquifer is by infiltration of precipitation and the aquifer is hydraulically connected to the Big Sioux River. Subsequent test drilling has indicated the existance of buried Glacial and Bedrock Aquifers which are probably hydraulically connected to the BS:SF.

A recharge rate of 6.9 in/yr (13,200 acre-feet/yr) was derived by computer simulation for steady state conditions (Koch, 1982). This should represent a recharge rate somewhat independent of the river. However, the BS:SF Aquifer is utilized more than the recharge rate. The annual pumpage by Sioux Falls alone exceeds this rate and the SDGS estimated a use of 17,370 acre feet/year from the BS:SF in 1983 (Hedges, Etal, 1983). The difference between the recharge rate and the pumpage is made up through recharge from streamflow from the Big Sioux River. Theoretically, development of the BS:SF, considering proper well spacing and managing pumping rates, is limited by the transmissivity of the aquifer and whether or not there are adequate flows available in the Big Sioux River. Adequate flows are generally available. Historical flows in the Big Sioux River average 431 cfs (312,300 acre-feet/yr) or another way of looking at the flows, the median of yearly mean discharges is 240 cfs (174,000 acre-feet/yr), (Hoffman, Etal, 1984).

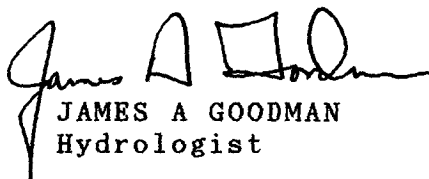
The Division of Water Rights is presently monitoring water levels for 12 observation wells in the BS:SF Management Unit. Records from these wells fluctuate rapidly in response to recharge events. In general, water levels have been above the norm the last 3 years due to the unusually high precipitation (Observation Well Files, 1987).

Review of Existing Water Rights

This application is for wells on the north edge of the present city well field. Interference should not be a problem. Drawdowns caused by pumping are not significant under normal conditions. There are 3 irrigation permits (656-3, 1271-3, 4034-3) located 1 to 2 miles east northeast of this application. These permits are all junior priority and subject to the priority of the Sioux Falls Future Use Permit. That is, if necessary Sioux Falls has first claim to the water. To date, this option has not been exercised by the City of Sioux Falls.

Conclusions

1. Water is available from the Big Sioux:Sioux Falls Aquifer.
2. Interference should not be a problem.
3. The Aquifer and the Big Sioux River are hydraulically connected. The model study by Koch illustrates the extent of this affect. Controlling well spacing and pumping rates increases the efficiency of the City wells.
4. Sioux Falls has 14.17 cfs remaining for development from Future Use Permit No. 6448-3.
5. During extended droughts such as 1976, it may become necessary to restrict water use because of water level declines in the existing Sioux Falls well field. The addition of this new well field should help alleviate some of the past problems of excessive drawdown by spreading the effects out over a larger area. This was also a conclusion presented by Koch's Report.


JAMES A GOODMAN
Hydrologist

Bibliography

Hedges, L. S., S. L. Burch, D. L. Iles, R. A. Barari, R. A. Schoon, 1982, Evaluation of Ground Water Resources Eastern South Dakota and Upper Big Sioux River, South Dakota and Iowa for U.S. Army Corps of Engineers, DWNR, SDGS, Vermillion, S.D., 57069.

Hedges, L.S., J.A. Allen, D. E. Holly, 1983, Task 7 Groundwater Recharge, for U.S. Army Corps of Engineers, DWNR, SDGS, Vermillion, S.D., 57069.

Koch, N.C., 1982, A Digital-Computer Model of the Big Sioux Aquifer in Minnehaha County, South Dakota, USGS, Water-Resources Investigations 82-4064, Huron, S.D., 57350.

Observation Well Files, 1987, Minnehaha County Observation Well Files, DWNR, Division of Water Rights, Joe Foss Building, Pierre, S.D., 57501.

Hoffman, G.B., R. D. Benson, G. R. Wisnieski, 1984, Water Resources Data South Dakota Water Year 1984, USGS Water-Data Report SD-84-1, USGS, Huron, SD 57350.

REVISED RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 5115-3

Pursuant to SDCL 46-2A-2, the following is the revised recommendation of the Chief Engineer, Water Rights Division, Department of Water and Natural Resources concerning Water Permit Application No. 5115-3, City of Sioux Falls, Utilities Dept., Water Division, Sioux Falls SD.

The Chief Engineer is recommending APPROVAL of Application No. 5115-3 because 1) the proposed diversions can be developed without unlawful impairment of existing rights, 2) the proposed use is a beneficial use and 3) in the public interest with the following qualifications:

1. The wells 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. Approval of this Permit authorizes annual withdrawals of 2,244 acre feet.
3. The wells constructed pursuant to this permit shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04.

See the attached report for additional information.



JOHN HATCH, Chief Engineer
March 24, 1987



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

Water Rights Division
605 773-3352

January 27, 1987

NOTE:

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

City of Sioux Falls
Water Division
224 W. 9th
Sioux Falls, South Dakota 57102

Dear Sir:

Your Application No. 5115-3 for a permit to appropriate water for

municipal use, has been examined and found to
comply with the South Dakota Water Laws and applicable rules. A notice of
your intent to appropriate water has been sent to the Publisher of the

Argus Leader

Sioux Valley News

printed at Sioux Falls

printed at Canton

South Dakota. For your information, a copy of this notice, the recommendation
of the Chief Engineer and a report on the application are enclosed. Please
review this 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 intent to appropriate water 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 at least thirty days before the board meeting. We must receive
Proof of Publication before the application can be considered by the Water
Management Board.

Sincerely,

RON DUVALL
Natural Resources Engineer

enclosures



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

Water Rights Division
605 773-3352

January 27, 1987

Sioux Valley News
Box 255
Canton, South Dakota 57013

Dear Sir:

Enclosed is a Notice of Intent to Appropriate Water by City of Sioux Falls
Application No. 5115-3, in Minnehaha County, South Dakota. Please
publish this notice once each week for two consecutive weeks in your paper. The
first publication should be on, or before February 5, 1987.

The APPLICANT MUST VERIFY TO YOU THAT THE NOTICE IS TO BE PUBLISHED, before you
make the first publication. The applicant is to pay the cost of publication and
should make the necessary arrangements with you to pay these costs.

A copy of BOTH publications must be sent to the Water Rights Division. IMMEDIATELY
after the FIRST publication, return a copy of the notice with the FIRST Publication
Transmittal form on the bottom of this page. The first copy is needed to check
the publication for errors so any corrections can be made before the second
notice is published.

Please be sure the SECOND publication is returned with the enclosed Proof of
Publication form. The permit application cannot be considered by the Water
Management Board until proof of publication has been received.

Thank you for your assistance.

Sincerely,

RON DUVAL
Natural Resources Engineer

cc: applicant

***** CUT HERE *****

FIRST
Publication
Transmittal

No. _____
TO: Water Rights Division
Joe Foss Building
Pierre SD 57501-3181

Date _____

We are in receipt of your letter dated _____ and Notice of Hearing to
Appropriate Water by Application No. _____. The notice was first published
in our issue dated _____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

NAME _____ NEWSPAPER _____

Equal Opportunity Employer



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

Water Rights Division
605 773-3352

January 27, 1987

Argus Leader
PO Box 5034
Sioux Falls, South Dakota 57117

Dear Sir:

Enclosed is a Notice of Intent to Appropriate Water by City of Sioux Falls
Application No. 5115-3, in Minnehaha County, South Dakota. Please
publish this notice once each week for two consecutive weeks in your paper. The
first publication should be on, or before February 5, 1987.

The APPLICANT MUST VERIFY TO YOU THAT THE NOTICE IS TO BE PUBLISHED, before you
make the first publication. The applicant is to pay the cost of publication and
should make the necessary arrangements with you to pay these costs.

A copy of BOTH publications must be sent to the Water Rights Division. IMMEDIATELY
after the FIRST publication, return a copy of the notice with the FIRST Publication
Transmittal form on the bottom of this page. The first copy is needed to check
the publication for errors so any corrections can be made before the second
notice is published.

Please be sure the SECOND publication is returned with the enclosed Proof of
Publication form. The permit application cannot be considered by the Water
Management Board until proof of publication has been received.

Thank you for your assistance.

Sincerely,

RON DUVALL
Natural Resources Engineer

cc: applicant

***** CUT HERE *****

FIRST
Publication
Transmittal

No. _____
TO: Water Rights Division
Joe Foss Building
Pierre SD 57501-3181

Date _____

We are in receipt of your letter dated _____ and Notice of Hearing to
Appropriate Water by Application No. _____. The notice was first published
in our issue dated _____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

NAME _____ NEWSPAPER _____

Equal Opportunity Employer

Instruction to Newspaper - Publish first publication of the following Notice on or before February 5, 1987 with 2nd publication 1 week later. The applicant is responsible for payment.

NOTICE OF HEARING on Application No. 5115-3 to Develop Reserved
~~and/or to Amend Water Permit or Water Right No. _____~~

Notice is hereby given that the City of Sioux Falls whose mailing address is Water Division, 224 W 9th St., Sioux Falls, South Dakota has made an application for a permit to construct works and place to beneficial use 6.70 cubic feet of water per second (2,244 acre-feet annually) reserved by Future Use Permit No. 448-3. The proposed project is to expand the Sioux Falls well field by construction of 5 wells (Big Sioux Aquifer) approximately 40 feet deep to be located in the $W\frac{1}{2}SE\frac{1}{4}$, $E\frac{1}{2}SW\frac{1}{4}$, East of Sioux River and West of road in $NW\frac{1}{4}$ Section 8-T102N-R49W. The water will be used to supply the City of Sioux Falls.

Pursuant to SDCL 46-2A-2 the Chief Engineer of the Water Rights Division recommends APPROVAL of Application No. 5115-3 because 1) ~~unappropriated water is available,~~
~~2) will be no unlawful impairment of existing rights,~~ 2) is beneficial use of water and
 3) is in the public interest.

This application will be considered by the Water Management Board at room 213, Joe Foss Building, 523 E. Capitol, Pierre, South Dakota, March 4, 1987 at 10:00 am.

The recommendation of the Chief Engineer is not final or binding upon the Board and the Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application after it reaches a conclusion based upon facts presented at the public hearing. Any interested person who may be affected by a Board decision and who intends to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, must file a written petition with BOTH the applicant and the Chief Engineer by February 20, 1987. The petition may be informal, but it must include a statement describing the petitioners interest in the application, the reasons for the petitioner's opposition to or support of the application, and the signature and mailing address of the petitioner or his legal counsel if legal counsel is obtained. The applicant need not file a petition.

This application is made pursuant to the provisions of SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2 46-5-30.4, 46-5-31; ~~(ground)~~ 46-6-3, 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14; ~~(future use)~~ 46-5-38 thru 46-5-40; ~~(transfer lands)~~ 46-5-30.4, 46-5-33 thru 46-5-35; ~~(10,000 AFA)~~ 46-5-20.1, 46-5-8.1; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15; ~~(future use)~~ 74:02:01:24 thru 74:02:01:25; ~~(10,000 AFA)~~ 74:02:01:15:02 thru 74:02:01:15:05.

This hearing is an adversary proceeding. The applicant or any person, after filing a petition, has the right to be present or to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and the State Supreme Court as provided by law.

Any person wishing a copy of the Chief Engineer's recommendation, further information on this application or to assure access to the hearing by the handicapped can contact the Water Rights Division, DWNr, Joe Foss Bldg, Pierre SD (605 773-3352) for assistance prior to the hearing date. The time of the hearing will be automatically extended for at least twenty days upon written request of the applicant or any person who has filed a petition to oppose or support the application. The request for extension must be filed with the Chief Engineer by February 20, 1987.

**NOTICE OF HEARING
ON APPLICATION NO. 5115-3
TO DEVELOP RESERVED
WATER**

Notice is hereby given that the City of Sioux Falls whose mailing address is Water Division, 224 W. 9th St., Sioux Falls, South Dakota has made an application for a permit to construct works and place to beneficial use 6.70 cubic feet of water per second (2,244 acre-feet annually) reserved by Future Use Permit No. 448-3. The proposed project is to expand the Sioux Falls well field by construction of 5 wells (Big Sioux Aquifer) approximately 40 feet deep to be located in the W $\frac{1}{2}$ SE $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, East of Sioux River and West of road in NW $\frac{1}{4}$ Section 8-T102N-R49W. The water will be used to supply the City of Sioux Falls.

Pursuant to SDCL 46-2A-2 the Chief Engineer of the Water Rights Division recommends APPROVAL of Application No. 5115-3 because 1) will be no unlawful impairment of existing right, 2) is beneficial use of water and 3) is in the public interest.

This application will be considered by the Water Management Board at room 216 Joe Foss Building, 523 E. Capitol Pierre, South Dakota, March 4, 1987 at 10:00 a.m.

The recommendation of the Chief Engineer is not final or binding upon the Board and the Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application after it reaches a conclusion based upon facts presented at the public hearing. Any interested person who may be affected by a Board decision and who intends to participate in the hearing before the Board and present evidence or cross-examine

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
County LINCOLN) ss.

I, CONNIE RENLI hereby

certify that the annexed printed copy of Notice of Intent to Appropriate

Water was taken from the SIoux VALLEY NEWS

A newspaper which during the whole time of publication of said notice
herein after stated, has been and is printed and published in the _____

CITY of CANTON

County of LINCOLN and State of South Dakota;
that the said notice was published in said newspaper on the following
two dates:

February 5, 1987

February 12, 1987

Connie Renli
(Signature)

Bookkeeper
(Title)

February 12, 1987
(Date Signed)

Cost of Printing: \$42.97

witnesses according to SDCL 1-26 must file a written petition with BOTH the applicant and the Chief Engineer by February 20, 1987. The petition may be informal, but it must include a statement describing the petitioners interest in the applicaiton, the reasons for the petitioner's opposition to or support of the application, and the signature and mailing address of the petitioner or his legal counsel if legal counsel is obtained. The applicant need not file a petition.

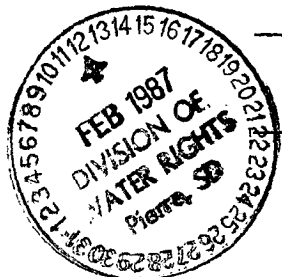
This application is made pursuant to the provisions of SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4, 46-5-31, 46-6-4, 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14; 46-5-38 thru 46-5-40; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15.

This hearing is an adversary proceeding. The applicant or any person, after filing a petition, has the right to be present or to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and the State Supreme Court as provided by law.

Any person wishing a copy of the Chief Engineer's recommendation, further information on this application or to assure access to the hearing by the handicapped can contact the Water Rights Division, DWNR, Joe Foss Bldg, Pierre, SD (605 773-3352) for assistance prior to the hearing date. The time of the hearing will be automatically extended for at least twenty days upon written request of the applicant or any person who has filed a petition to oppose or support the application. The request for extension must be filed with the Chief Engineer by February 20, 1987.

(2-5, 12)

110



Conversation or File Documentation

NAME OF PERSON OR FILE: City of Sioux FallsADDRESS: Water Division 224 W 9th Str COUNTY MADATE: 2/17/87 TELEPHONE 339-7025RE: phone call to Argus Leader

COMMENTS:

I contacted the Argus Leader regarding publication of the notice of hearing for application No. 5115-3. I was informed by the Argus Leader staff that the notice was not advertised due to lack of notice to run the notice of hearing publication. A letter dated February 18, 1987 notified the City of Sioux Falls that Permit Application No. 5115-3 would not be considered at the March Board meeting.

File in Permit or other file as necessary. Use to document conversations and what the other party was told; why action or decision was made.

NAME: Ron Small

South Dakota Department of
Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

February 19, 1987

Richard A Willer, Utilities Director
Utilities Dept., Water Division
224 W 9th St
Sioux Falls SD 57102

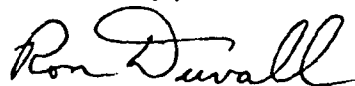
Dear Mr. Willer:

I am writing to advise you that Permit Application No. 5115-3 will not be considered at the March 4, 1987 Water Management Board meeting.

The notice of hearing was not published in the Argus Leader. I contacted the newspaper on February 17, 1987 and was informed that the notice was not published. According to the Argus Leader staff, the newspaper did not receive notification to advertise the notice of hearing (enclosed letter). The deadline for advertising notices for the March Board meeting was February 12, 1987; therefore, the permit application can not be considered at the March Board meeting. A new notice of hearing will need to be advertised in the Argus Leader and the Sioux Valley News for the next scheduled Board meeting. The Sioux Valley News did advertise the notice of hearing. Arrangements for payment or nonpayment of that publication is between the City of Sioux Falls and the Sioux Valley News.

Please contact us if you have any questions.

Sincerely,



RON DUVALL
Natural Resources Engineer

RD:ks

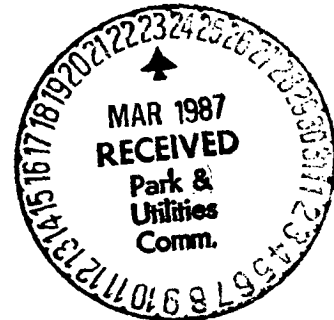
enclosure

**South Dakota Department of
Water & Natural Resources**

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

WATER RIGHTS DIVISION
(605) 773-3352

March 20, 1987



Richard A. Willer, Utilities Director
Water Division, City of Sioux Falls
224 W. 9th Street
Sioux Falls, South Dakota 57501



Dear Mr. Willer:

This letter is in response to receipt of Purchase Order No. 47374 (\$650.00) to cover the fee for Permit Application No. 5115-3. The Application fee is required pursuant to SDCL 46-2-13.2 to obtain a permit to appropriate water. The purchase order form accurately describes the basis for the \$650.00 fee. Please regard this letter as an invoice requesting payment of the fee.

Contact us if you have any questions.

Sincerely,

Ron Duvall
Natural Resources Engineer

RD:ms



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

Water Rights Division
605 773-3352

March 12, 1987

Argus Leader
PO Box 5034
Sioux Falls, SD 57117

Dear Sir:

Enclosed is a Notice of Intent to Appropriate Water by City of Sioux Falls
Application No. 5115-3, in Minnehaha County, South Dakota. Please
publish this notice once each week for two consecutive weeks in your paper. The
first publication should be on, or before March 20, 1987.

The APPLICANT MUST VERIFY TO YOU THAT THE NOTICE IS TO BE PUBLISHED, before you
make the first publication. The applicant is to pay the cost of publication and
should make the necessary arrangements with you to pay these costs.

A copy of BOTH publications must be sent to the Water Rights Division. IMMEDIATELY
after the FIRST publication, return a copy of the notice with the FIRST Publication
Transmittal form on the bottom of this page. The first copy is needed to check
the publication for errors so any corrections can be made before the second
notice is published.

Please be sure the SECOND publication is returned with the enclosed Proof of
Publication form. The permit application cannot be considered by the Water
Management Board until proof of publication has been received.

Thank you for your assistance.

Sincerely,

RON DUVALL
Natural Resources Engineer

cc: applicant

***** CUT HERE *****

FIRST
Publication
Transmittal

No. _____ Date _____
TO: Water Rights Division
Joe Foss Building
Pierre SD 57501-3181

We are in receipt of your letter dated _____ and Notice of Hearing to
Appropriate Water by Application No. _____. The notice was first published
in our issue dated _____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

NAME _____ NEWSPAPER _____

Equal Opportunity Employer



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

Water Rights Division
605 773-3352

March 12, 1987

Sioux Valley News
Box 255
Canton, SD 57013

Dear Sir:

Enclosed is a Notice of Intent to Appropriate Water by City of Sioux Falls
Application No. 5115-3, in Minnehaha County, South Dakota. Please
publish this notice once each week for two consecutive weeks in your paper. The
first publication should be on, or before March 19, 1987.

The APPLICANT MUST VERIFY TO YOU THAT THE NOTICE IS TO BE PUBLISHED, before you
make the first publication. The applicant is to pay the cost of publication and
should make the necessary arrangements with you to pay these costs.

A copy of BOTH publications must be sent to the Water Rights Division. IMMEDIATELY
after the FIRST publication, return a copy of the notice with the FIRST Publication
Transmittal form on the bottom of this page. The first copy is needed to check
the publication for errors so any corrections can be made before the second
notice is published.

Please be sure the SECOND publication is returned with the enclosed Proof of
Publication form. The permit application cannot be considered by the Water
Management Board until proof of publication has been received.

Thank you for your assistance.

Sincerely,

RON DUVAL
Natural Resources Engineer

cc: applicant

***** CUT HERE *****

FIRST Publication Transmittal No. _____ Date _____
TO: Water Rights Division
Joe Foss Building
Pierre SD 57501-3181

We are in receipt of your letter dated _____ and Notice of Hearing to
Appropriate Water by Application No. _____. The notice was first published
in our issue dated _____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

NAME _____ NEWSPAPER _____

Equal Opportunity Employer

No. 5115-3

Instruction to Newspaper - Publish first publication of the following Notice on or before March 20, 1987 with 2nd publication 1 week later. The applicant is responsible for payment.

NOTICE OF HEARING on Application No. 5115-3 to ~~Develop, Reserved~~
~~and/or to Amend Water Permit or Water Right No.~~

Notice is hereby given that City of Sioux Falls whose mailing address is Water Division, 224 W 9th St., Sioux Falls, South Dakota has made an application for a permit

to construct works and place to beneficial use 6.70 cubic feet of water per second (2,244 acre-feet annually) reserved by Future Use Permit No. 448-3. The proposed project is to expand the Sioux Falls well field by construction of 5 wells (Big Sioux Aquifer) approximately 40 feet deep to be located in the $W\frac{1}{2}SE\frac{1}{4}$, $E\frac{1}{2}SW\frac{1}{4}$ East of Sioux River and West of road in $NW\frac{1}{4}$ Section 8-T102N-R49W. The water will be used to supply the City of Sioux Falls.

Pursuant to SDCL 46-2A-2 the Chief Engineer of the Water Rights Division recommends APPROVAL of Application No. 5115-3 because 1) ~~unappropriated water is available,~~ 2) ~~will be no unlawful impairment of existing rights,~~ 3) ~~is beneficial use of water and~~ 4) ~~is in the public interest.~~

This application will be considered by the Water Management Board at room 216, Joe Foss Building, 523 E. Capitol, Pierre, SD, May 6, 1987 at 10:00 am.

The recommendation of the Chief Engineer is not final or binding upon the Board and the Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application after it reaches a conclusion based upon facts presented at the public hearing. Any interested person who may be affected by a Board decision and who intends to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, must file a written petition with BOTH the applicant and the Chief Engineer by April 24, 1987. The petition may be informal, but it must include a statement describing the petitioners interest in the application, the reasons for the petitioner's opposition to or support of the application, and the signature and mailing address of the petitioner or his legal counsel if legal counsel is obtained. The applicant need not file a petition.

This application is made pursuant to the provisions of SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2 46-5-30.4, 46-5-31; ~~(ground)~~ 46-6-3, 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14; ~~(future use)~~ 46-5-38 thru 46-5-40; ~~(transfer lands)~~ 46-5-30.4, 46-5-33 thru 46-5-35; ~~(10,000 AFA)~~ 46-5-20.1, 46-5-8.1; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15; ~~(future use)~~ 74:02:01:24 thru 74:02:01:25; ~~(10,000 AFA)~~ 74:02:01:15:02 thru 74:02:01:15:05.

This hearing is an adversary proceeding. The applicant or any person, after filing a petition, has the right to be present or to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and the State Supreme Court as provided by law.

Any person wishing a copy of the Chief Engineer's recommendation, further information on this application or to assure access to the hearing by the handicapped can contact the Water Rights Division, DWNR, Joe Foss Bldg, Pierre SD (605 773-3352) for assistance prior to the hearing date. The time of the hearing will be automatically extended for at least twenty days upon written request of the applicant or any person who has filed a petition to oppose or support the application. The request for extension must be filed with the Chief Engineer by April 24, 1987.

No. _____

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
County LINCOLN) ss.

I, CONNIE RENLI hereby

certify that the annexed printed copy of Notice of Intent to Appropriate

Water was taken from the SIOUX VALLEY NEWS

A newspaper which during the whole time of publication of said notice
herein after stated, has been and is printed and published in the _____

CITY of CANTON

County of LINCOLN and State of South Dakota;
that the said notice was published in said newspaper on the following
two dates:

March 19, 1987

March 26, 1987

Connie Renli
(Sign)

**NOTICE OF HEARING
ON APPLICATION NO. 5115-3
TO DEVELOP
RESERVED WATER**

Book
(Title)
3-26-87
(Date)

Notice is hereby given that City
of Sioux Falls whose mailing
address is Water Division, 224
West 9th Street, Sioux Falls,
South Dakota has made an
application for a permit to
construct works and place to
beneficial use 6.70 cubic feet of
water per second (2.244 acre-feet
annually) reserved by Future Use
Permit No. 448-3. The proposed
project is to expand the Sioux
Falls well field by construction of
5 wells (Big Sioux Aquifer)
approximately 40 feet deep to be
located in the W $\frac{1}{2}$ SE $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$
East of Sioux River and West of
road in NW $\frac{1}{4}$ Section 8-T102N-
R49W. The water will be used to
supply the City of Sioux Falls.

Cost of Printing: _____

Pursuant to SDCL 46-2A-2 the
Chief Engineer of the Water

Rights Division recommends
APPROVAL Of Application No.
5115-3 because 1) will be no
unlawful impairment of existing
rights, 2) is beneficial use of water
and 3) is in the public interest.

This application will be
considered by the Water
Management Board at Room 216,
Joe Foss Building, 523 E. Capitol,
Pierre, South Dakota May 6, 1987
at 10:00 a.m.

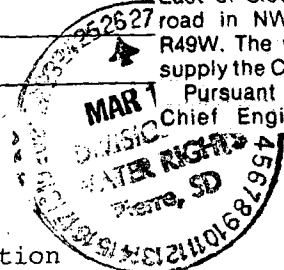
The recommendation of the
Chief Engineer is not final or
binding upon the Board and the
Board is authorized to 1) approve,
2) approve with qualifications, 3)
defer, or 4) deny this application
after it reaches a conclusion
based upon facts presented at the
public hearing. Any interested
person who may be affected by a
Board decision and who intends
to participate in the hearing
before the Board and present
evidence or cross-examine
witnesses according to SDCL 1-26
must file a written petition with
BOTH the applicant and the Chief
Engineer by April 24, 1987. The
petition may be informal, but it
must include a statement
describing the petitioner's interest
in the application, the reasons for
the petitioner's opposition to or
support of the application, and
the signature and mailing address
of the petitioner or his legal
counsel if legal counsel is
obtained. The applicant need not
file a petition.

This application is made
pursuant to the provisions of
SDCL 46-1-1 thru 46-1-9, 46-1-12
thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-
11, 46-2-13, 46-2-17; 46-2A-1 thru
46-2A-10, 46-2A-12, 46-2A-14, 46-
2A-15; 46-5-1 thru 46-5-11, 46-5-13
thru 46-5-15, 46-5-24, 46-5-25, 46-5-
30.2, 46-5-30.4, 46-5-31; 46-6-3, 46-6-
3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-
14; 46-5-38 thru 46-5-40; and Board
Rules ARSD 74:02:01:01 thru
74:02:01:15.

This hearing is an adversary
proceeding. The applicant or any
person, after filing a petition, has
the right to be present or to be
represented by a lawyer. These
and other due process rights will
be forfeited if they are not
exercised. Decisions of the Board
may be appealed to the Circuit
Court and the State Supreme
Court as provided by law.

Any person wishing a copy of
the Chief Engineer's

recommendation, further
information on this application
to assure access to the hearing
the handicapped can contact
Water Rights Division, DWNR
Foss Building, Pierre, S.
Dakota (605 773-3352)
assistance prior to the hear-
date. The time of the hearing
be automatically extended for
least twenty days upon written
request of the applicant or
person who has filed a petition
oppose or support the applica-
The request for extension must
file with the Chief Engineer
April 24, 1987.



No. 5115-3

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
County Minnehaha) ss.

I, R. Deutscher hereby

certify that the annexed printed copy of Notice of Intent to Appropriate

Water was taken from the Argus Leader

A newspaper which during the whole time of publication of said notice
herein after stated, has been and is printed and published in the _____

City Sioux Falls of Sioux Falls

County of Minnehaha and State of South Dakota;
that the said notice was published in said newspaper on the following
two dates:

March 19, 1987

March 26, 1987

R. Deutscher
(Signature)

Controller
(Title)

3/26/87

(Date Signed)

Cost of Printing: 63.25



NOTICE OF HEARING
on Application No. 5115-3 to
Develop Reserved Water
Notice is hereby given that the
City of Sioux Falls whose mailing
address is Water Division, 224 W.
9th St., Sioux Falls, South Dakota
has made an application for a
permit to construct works and
place to beneficial use 6.70 cubic
feet of water per second (2,244
acre-feet annually) reserved by
Future Use Permit No. 448-3. The
proposed project is to expand the
Sioux Falls well field by con-
struction of 5 wells (Big Sioux
Aquifer) approximately 40 feet
deep to be located in the
W $\frac{1}{2}$ SE $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, East of
Sioux River and West of road in
NW $\frac{1}{4}$ Section 8-T102N-R49W.
The water will be used to supply
the City of Sioux Falls.
Pursuant to SDCL 46-2A-2 the
Chief Engineer of the Water
Rights Division recommends Ap-
proval of Application No. 5115-3
because 1) will be no unlawful
impairment of existing rights, 2)
is beneficial use of water and 3)
is in the public interest.
The application will be consid-
ered by the Water Management
Board at room 216, Joe Foss
Building, 523 E. Capitol, Pierre,
SD, May 6, 1987 at 10:00 am.
The recommendation of the
Chief Engineer is not final or
binding upon the Board and the
Board is authorized to 1) ap-
prove, 2) approve with qualifica-
tions, 3) defer, or 4) deny this
application after it reaches a
conclusion based upon facts pre-
sented at the public hearing. Any
interested person who may be af-
fected by a Board decision and
who intends to participate in the
hearing before the Board and
present evidence or cross-exam-
ine witnesses according to SDCL
1-26, must file a written petition
with BOTH the applicant and the
Chief Engineer by April 24, 1987.
The petition may be informal,
but it must include a statement
describing the petitioner's inter-
est in the application, the reasons
for the petitioner's opposition to
or support of the application, and
the signature and mailing ad-
dress of the petitioner or his legal
counsel if legal counsel is ob-
tained. The applicant need not
file a petition.
This application is made pur-
suant to the provisions of SDCL
46-1-1 thru 46-1-9, 46-1-12 thru 46-1-
15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13,
46-2-17; 46-2A-1 thru 46-2A-10, 46-
2A-12, 46-2A-14, 46-2A-15; 46-5-1
thru 46-5-11, 46-5-13, thru 46-5-15,
46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4,
46-5-31; 46-6-3, 46-6-3.1, 46-6-6.1,
46-6-10, 46-6-13, 46-6-14; 46-5-38
thru 46-5-40; and Board Rules
ARSD 74:02:01:01 thru
74:02:01:15.
This hearing is an adversary
proceeding. The applicant or any
person, after filing a petition, has
the right to be present or to be
represented by a lawyer. These
and other due process rights will
be forfeited if they are not exer-
cised. Decisions of the Board
may be appealed to the Circuit
Court and the State Supreme
Court as provided by law.
Any person wishing a copy of
the Chief Engineer's recommen-
dation, further information on
this application or to the hearing
by the handicapped can contact
the Water Rights Division,
DWNRR, Joe Foss Bldg, Pierre,
SD (605 773-3352) for assistance
prior to the hearing date. The
time of the hearing will be auto-
matically extended for at least
twenty days upon written request
of the applicant or any person
who has filed a petition to oppose
or support the application. The
request for extension must be
filed with the Chief Engineer by
April 24, 1987.
454 March 19 & 26, 1987

No. 5115-3

Instruction to Newspaper - Publish first publication of the following Notice on or before April 9, 1987 with 2nd publication 1 week later. The applicant is responsible for payment.

NOTICE OF HEARING on Application No. 5115-3 to ^{Develop Reserved} ~~Appropriate Water~~
~~and/or to Amend Water Permit or Water Right No. _____~~

Notice is hereby given that the City of Sioux Falls whose mailing address is Water Division, 224 W. 9th St., Sioux Falls, South Dakota has made an application for a permit

to construct works and place to beneficial use 6.70 cubic feet of water per second (2244 Acre-feet annually) reserved by Future Use Permit No. 448-3. The proposed project is to expand the Sioux Falls well field by construction of 5 wells (Big Sioux Aquifer) approximately 40 feet deep to be located in the $W\frac{1}{2}SE\frac{1}{4}$, $E\frac{1}{2}SW\frac{1}{4}$, East of Sioux River and West of road in $NW\frac{1}{4}$ Section 8-T102N-R49W. The water will be used to supply the City of Sioux Falls.

Pursuant to SDCL 46-2A-2 the Chief Engineer of the Water Rights Division recommends APPROVAL of Application No. 5115-3 because 1) ~~unappropriated water is available,~~ ~~2) will be no unlawful impairment of existing rights,~~ ~~2d) is beneficial use of water and~~ ~~3d) is in the public interest.~~

This application will be considered by the Water Management Board at room 216, Joe Foss Building, 523 E. Capitol, Pierre, SD., May 6, 1987 at 10:00 am.

The recommendation of the Chief Engineer is not final or binding upon the Board and the Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application after it reaches a conclusion based upon facts presented at the public hearing. Any interested person who may be affected by a Board decision and who intends to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, must file a written petition with BOTH the applicant and the Chief Engineer by April 24, 1987. The petition may be informal, but it must include a statement describing the petitioners interest in the application, the reasons for the petitioner's opposition to or support of the application, and the signature and mailing address of the petitioner or his legal counsel if legal counsel is obtained. The applicant need not file a petition.

This application is made pursuant to the provisions of SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2 46-5-30.4, 46-5-31; (ground) 46-6-3, 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14; ~~(future use) 46-5-38 thru 46-5-40; (transfer lands) 46-5-30.4, 46-5-33 thru 46-5-35; (10,000 AFA) 46-5-20.1, 46-5-8.1; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15, (future use) 74:02:01:24 thru 74:02:01:25; (10,000 AFA) 74:02:01:15:02 thru 74:02:01:15:05.~~

This hearing is an adversary proceeding. The applicant or any person, after filing a petition, has the right to be present or to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and the State Supreme Court as provided by law.

Any person wishing a copy of the Chief Engineer's recommendation, further information on this application or to assure access to the hearing by the handicapped can contact the Water Rights Division, DWNR, Joe Foss Bldg, Pierre SD (605 773-3352) for assistance prior to the hearing date. The time of the hearing will be automatically extended for at least twenty days upon written request of the applicant or any person who has filed a petition to oppose or support the application. The request for extension must be filed with the Chief Engineer by April 24, 1987.



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501

Water Rights Division
605 773-3352

5115-3

JUL 16 1987

City of Sioux Falls
Water Division
224 W. 9th Street
Sioux Falls, South Dakota 57102

Dear Sir:

Enclosed herewith is your Water Permit No. 5115-3 as approved by the Water Management Board authorizing you to construct your water diversion system and the water to beneficial use, not exceeding the limits as specified in said Water Permit No. 5115-3.

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 your Water License may be issued to you, thus completing your acquisition of a Water Right.

Very truly yours,

JOHN HATCH, Chief Engineer
Water Rights Division

JH:ms

enclosure

PLEASE NOTE: Certain changes can be made in your permit within the five year construction period, usually without affecting the priority date provided an application to amend your permit is made within the five year period-i.e. changes in location or number of diversion points (wells) or location of land to be irrigated. Well locations for wells into the same aquifer can be moved up to 660 feet without application.

Applications to amend a permit after the five year construction period will be assigned a new priority date. Applications to change water sources, to add lands or increase original diversion rates, if approved will usually receive the date of the new application as a priority date regardless of the five year construction period.

NOTICE OF COMPLETION OF WORKS AND
APPLICATION OF WATER TO BENEFICIAL USE



Date July 28, 1987

TO: Water Rights Division, DWNR
Joe Foss Building
Pierre SD 57501-3181

FROM: Richard A. Willer Utilities Department Sioux Falls, SD 57102
Utilities Director 224 West 9th Street
name address city

I have completed the construction of the water diversion system and I have put the water to beneficial use to the maximum extent it is going to be used. I have not exceeded the amounts specified in Water Permit No. 5115-3.

Water Permit No. 5115-3 states that the diversion system is to be constructed by May 6, 1992, and that the water is put to beneficial use by June 23, 1987.

The diversion system was completed on June 23, 1987.

Applying the water to beneficial use was completed on June 23, 1987.

You may schedule an inspection so that the Water License may be issued. *Supplemental Information for each well is attached*

signature Richard A. Willer
Utilities Director

WATER RIGHTS DIVISION
(605) 773-3352

August 5, 1987

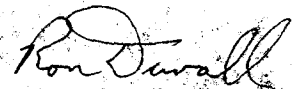
Richard A. Willer, Utilities Director
City of Sioux Falls
Utilities Department, Water Division
224 W. Ninth Street
Sioux Falls, South Dakota 57102

Dear Mr. Willer:

I am writing to advise you that an error was made on Water Permit No. 5115-3 regarding the priority date. Permit No. 5115-3 is a water appropriation taken from water reserved by Future Use Permit No. 448-3. The priority date given to Permit No. 5115-3 should have been the priority date on Future Use Permit No. 448-3. Therefore, the correct priority date is April 8, 1957 not December 19, 1986. Enclosed is a new permit with the correct priority date. Please replace the existing Permit No. 5115-3 with the corrected Permit No. 5115-3.

Please contact us if you have any questions.

Sincerely,



Ron Duvall
Natural Resources Engineer

RD:ms
Enc.

Water Rights Division - DWNR
Conversation or File Documentation

File No. 448-3

NAME OF PERSON OR FILE: City of Sioux Falls

ADDRESS: _____ COUNTY _____

DATE: August 6, 1987 TELEPHONE _____

RE: Status of Future Use Permit No. 448-3

COMMENTS:

Reduction of water appropriation reserved by Future
Use Permit No. 448-3 :

F.U. Permit No. 448-3 → 21.15 cfs
appropriations : Permit No. 5115-3 - 6.70 cfs
Permit No. 5127-3 - 8.00 cfs
Water remaining in reserve → 6.45 cfs

Permit Nos. 5115-3 and 5127-3 have acre-foot limitations of
2,244 ac-ft and 2,160 ac-ft respectively.

Permit No. 5115-3 → 6.70 cfs (4851 ac-ft)

less limitation (2,244 ac-ft)

remaining reserve → 4851 - 2,244 = 2607 ac-ft

Permit No. 5127-3 → 8.00 cfs (5792 ac-ft)

less limitation (2,160 ac-ft)

remaining reserve → 5,792 - 2,160 = 3632 ac-ft

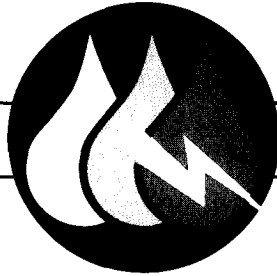
Therefore, F.U. Permit No. 448-3 has in reserve :

A diversion rate of 6.45 cfs (4,670 ac-ft) + 2607 + 3632 = 10,909 ac-ft
with a total volume of 10,909 ac-ft

File in Permit or other file as necessary. Use to document conversations and what the other party was told; why action or decision was made.

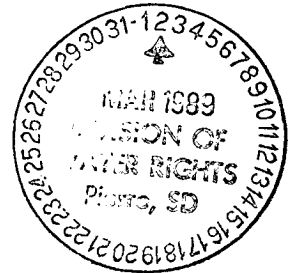
NAME: Ron Duwall

Sioux Falls UTILITIES



WATER • (605) 339-7031
WASTEWATER • (605) 339-7088

LIGHTS • (605) 339-7150
STORM DRAINAGE • (605) 339-7023



February 28, 1989

Ms. Susan Bowar
Water Rights Engineer
SD DWR
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181

Dear Ms. Bowar:

I am writing regarding water permit Nos. 5115-3 and 5127A-3. I received a letter from John Hatch requesting information regarding these two permits.

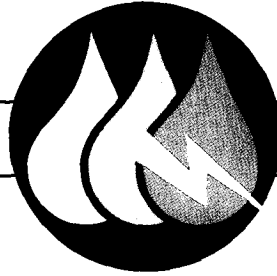
I have referred the inquiry to Lyle Johnson at the Water Purification Plant. He will be responding in the near future. If you have any questions, please contact Lyle directly at (605) 339-7025.

Sincerely,

Richard A. Willer
Utilities Director

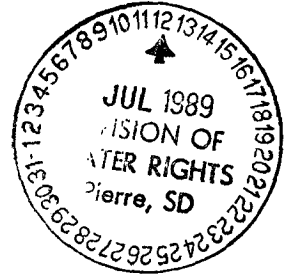
tmc
cc Lyle Johnson

Sioux Falls UTILITIES



WATER • (605) 339-7031
WASTEWATER • (605) 339-7088

LIGHTS • (605) 339-7150
STORM DRAINAGE • (605) 339-7023



July 12, 1989

South Dakota Dept. of Water
and Natural Resources
Water Rights Division
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181

Attn: Mr. John Hatch
Re: Water Permit No's. 5115-3 & 5127A-3

Dear Sir:

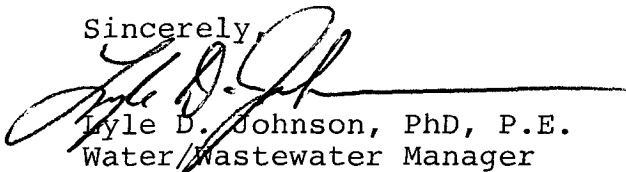
In accordance with qualification No. 2 on Water Permit No's. 5115-3 and 5127A-3, the City of Sioux Falls pumped the following quantities of water under each permit in 1988:

Permit No. 5115-3: 1234.2 acre - ft.
Permit No. 5127A-3: 0 acre - ft.

The five wells constructed under Permit No. 5127A-3 were not put into service until February 9, 1989. Enclosed is the Notice of Completion for this project.

If you have any questions concerning the above information, please contact me.

Sincerely,


Lyle D. Johnson, PhD, P.E.
Water/Wastewater Manager

Enclosure

seh



DEPARTMENT OF WATER & NATURAL RESOURCES

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

February 7, 1991

Lyle D Johnson, Water/Wastewater Manager
Utilities Department
224 W 9th Street
Sioux Falls SD 57102

Dear Mr. Johnson:

This letter is in response to my inspection of the City's water permits/rights completed on January 16, 1991.

Several of the city's permits can be licensed after receipt of the following information:

- 1) Permit Nos. 5127-3 and 5127A-3 (Well Nos. 53 thru 58).
Permit No. 5115-3 (Well Nos. 48 thru 52).
Permit No. 5235-3 (Well Nos. 60 thru 65).
 - Sustained pump rate for each well under optimal operating conditions,
 - Type and horsepower of the submersible units in each of the wells, and
 - Brief description of the distribution system.

I have located a well completion report (copy enclosed) for a well that appears to be north of well No. 58. A copy of the well completion report for well No. 58 is also enclosed. No well was noted north of No. 58 during my inspection. Please explain if the well exists as described on the enclosed report and if the well is being used by the city.

- 2) Permit No. 5202-3 for water impounded in Silver Creek by the Big Sioux diversion dam. Two units are used with a capacity of 700 gpm each.
 - Type and model no. of the motor and pump with the horsepower.
- 3) Permit No. 5334-3 for the Big Sioux River pump facility.
 - Brief description of the operation of the facility at peak operating capacity.

An application (forms enclosed) needs to be approved to increase the permitted pumping rate to 46.4 cfs and to increase the annual volume of water if you plan to exceed the current 10,000 acre-feet. If approved, No. 5334-3 and the new permit would be issued one water license.

(continued)

February 7, 1991
Lyle D Johnson
Page 2 of 3

The following changes are needed to correct errors on the current licenses:

- 1) The following licenses need to have R50W deleted and be reissued for R49W:

254-3, 255-3, 256-3, 257-3, ^{cancel RO 5/13/91} 258-3, 259-3, 260-3, 261-3, 262-3, 264-3, 266-3, 267-3, 269-3, 270-3, 272-3, 273-3, 275-3, 276-3, and 274-3 needs the same range correction plus should be T102N instead of T103N.

License No. 300-3 needs to have section 32 deleted and be reissued for section 33. The original notice of hearing and application are correct.

License No. 4101-3 needs to have T101N deleted and be reissued for T102N and 2,030 feet east rather than 2,030 feet west. The original notice of hearing is correct.

License Nos. 4098-3, 4099-3, 4100-3, and 4812-3 also need to be reissued to identify the correct location of the wells. The original notices of hearing are correct for each license.

- 2) The notice of hearing for 1306-3 needs to be readvertised to correct a diversion point error (should be NW1/4 NW1/4 instead of NE1/4 NE1/4).

The notice of hearing for 4811-3 needs to be readvertised to correct a diversion point error (should be T102N instead of T101N).

Each of these changes (Nos. 1 & 2) will be initiated by the Division of Water Rights. Item No. 2 will require publication of a notice of hearing. The city will be notified of the completion of the corrections.

Well Nos. 30, 31, 32, and 33 have been rehabilitated in the last two years. Revisions may also be needed to some of the water rights held by the city to reflect changes in the pumping capacity of the wells. If the sustained pump rate of these wells under optimal operating conditions is less than the permitted pump rate, then the licenses should be reissued for the reduced pump rate. If the sustained pump rate exceeds the permitted amount, then a new permit is needed for the increase in the pump rate. Please indicate what the sustained pump rates are for well Nos. 30, 31, 32, 33, and other wells as rehabilitation efforts and aquifer conditions allow.

^{258-3 RO 5/13/91}
Water Right Nos. 254-3, 255-3, 265-3, 268-3, 271-3, and 1579-3 will be scheduled for a hearing to allow the Water Management Board to consider cancellation of the water rights due to abandonment and/or forfeiture. Notice will be given of the time and place of hearing. If the Parks and Recreation Department is using of the well authorized by No. 1579-3, please inform me.

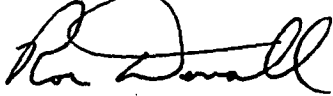
February 7, 1991
Lyle D Johnson
Page 3 of 3

In response to your questions during our meeting on January 17, 1991, the city can plug abandoned wells if the work is completed according to the Well Construction Standards. A copy of the standards and some plugging report forms are enclosed for the city's use.

Water Permit No. 1790-3 held by the Lincoln County Rural Water System is for supplying the rural water system from the city's well field. Enclosed is a copy of Permit No. 1790-3, including the affected city permits and a resolution signed by the mayor of Sioux Falls.

Thank you and your staff for the assistance we received concerning these inspections. I appreciate Mr. Holden taking the time to show us around. If you have any questions regarding any of this information, please contact me.

Sincerely,



Ron Duvall
Natural Resources Engineer
605 773-3352

enc.

cc: Glenn Dostal, HDR Engineering, Inc.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

June 17, 1992

Lyle D Johnson, Water/Wastewater Manager
Utilities Department
224 W 9th Street
Sioux Falls SD 57102

Dear Mr. Johnson:

This letter is in reference to inspections of the city's water permits. On May 28, 1992, I met with Keith DeJong and Doug Holden to collect information to license Water Permit Nos. 5127-3, 5127A-3, 5115-3, 5235-3, and 5242-3.

Several discussions have occurred concerning the proper amount of water to place on the water licenses. The various pump rates discussed have been average pump rates, peak pump rates, design pump rates, and maximum sustainable pump rate under ideal operating conditions. Historically, the amount of water a permit is licensed for is the peak pump rate. Due to the unique nature of some of the city's wells (Bragstad and Ranney wells) licensing for the peak pump rate does not accurately reflect actual well production.

Aside from the Bragstad and Ranney wells, I believe the city's permits should be licensed considering both the peak pump rate (highest one day average) and design pump rate figures. Average pump rates over a year's time are not applicable. Enclosed is a copy of the 1991 pump records for well Nos. 48 thru 65. Well No. 48 produced a maximum flow of 400 gpm during 1991. If, for example, the design pump rate for the well was 425 gpm and you believe the well could produce this amount under more favorable aquifer conditions, then the well should be licensed for 425 gpm. If the design pump rate is 375 gpm and the well produces 400 gpm, then the well should be licensed for 400 gpm rather than the design rate. According to Jim Goodman, staff engineer, the water levels in your wells likely stabilize after a few hours of pumping without a substantial variance in the pump rate. Some informed estimating on your part may be needed to determine the proper pump rates. Keep in mind that the best time to determine what the wells produce is when the wells are relatively new and aquifer conditions are good.

I would appreciate your input before licensing Permit Nos. 5127-3, 5127A-3, 5115-3, 5235-3, and 5242-3. Please refer to the above narrative when commenting on the proposed pump rates for the licenses. Another important consideration is the annual volume of water diverted. Some of the following permits placed water to beneficial use that was originally reserved by a future use permit. Upon licensing, the portion of the annual volume not developed, if any, is reinstated to the future use permit. It is important to note that reinstatement of undeveloped water may only occur at the time of licensing. Reduced usage in the future may not be reinstated.

- 1) Water Permit Nos. 5127-3 and 5127A-3 place to beneficial use up to 2,160 acre-feet of water annually reserved by Future Use Permit No. 448-3 from as many as 8 wells with a maximum diversion rate of 8.0 cfs. The wells developed under these permits are well Nos. 53 thru 58. According to the 1991 pump records, the 6 developed wells produced a maximum of 2,315 gpm (5.16 cfs) and may be licensed 5.16 cfs with an annual volume of 2,160 acre-feet.
- 2) Water Permit No. 5115-3 places to beneficial use up to 2,244 acre-feet of water annually reserved by Future Use Permit No. 448-3 from as many as 5 wells with a maximum diversion rate of 6.70 cfs. The wells developed are well Nos. 48 thru 52. According to the 1991 pump records, the 5 developed wells produced a maximum of 1,850 gpm (4.12 cfs) and may be licensed for 4.12 cfs with an annual volume of 2,244 acre-feet.

June 17, 1992
Lyle D Johnson
Page 2 of 2

- 3) Water Permit No. 5235-3 authorizes construction of 6 wells to divert up to 6.45 cfs. The wells developed are well Nos. 60 thru 65. According to the 1991 pump records, the 6 developed wells produced a maximum of 3,670 gpm (8.17 cfs) which exceeds the permitted pump rate by 1.72 cfs. Any increase over the permitted amount will need to be covered by a new permit application. No future use permit is involved with this water permit.
- 4) Water Permit No. 5242-3 authorizes diversion of 1.56 cfs (700 gpm) from an abandoned quarry to be discharged to the Big Sioux River. I looked at the motor and pump but did not get the pump rate. Please confirm whether or not the pump rate is 700 gpm. No future use permit is involved with this water permit.

An inspection was also made of the one well developed in the Big Sioux:Southern Skunk Creek aquifer as authorized by Permit No. 5214-3. This permit will remain unlicensed since time is available until October 5, 1993, to complete construction of 2 additional wells. I was also informed that changes may be made to the pumping equipment used to recharge the Big Sioux Aquifer as authorized by Permit No. 5431-3. Licensing of this permit can also wait until the permanent equipment is in place.

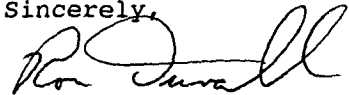
Mr. DeJong informed me that Nos. 1947-3 and 5202-3 can be cancelled. Water Right No. 1947-3 authorized the city to supply water to the EROS complex. According to Mr. DeJong, the complex has been supplied by the Minnehaha Rural Water System for the last couple of years. Permit No. 5202-3 appropriates 4.6 cfs from Silver Creek near the confluence with the Big Sioux River diversion canal. These pump stations provided an emergency water supply and are no longer needed due to well field expansions and construction of the Big Sioux River pump station.

The Bragstad and Ranney wells were licensed several years ago. Whether or not the licensed amount of water is currently accurate may be questionable. In the case of these types of wells, I believe the licensed amount of water should correspond with the maximum sustained pump rate under optimal operating conditions (i.e. wells rehabilitated and favorable aquifer conditions.) The initial peak pump rate would be artificially high for these types of wells due to the reservoir in the wells. The maximum sustained pump rate would occur after the reservoir level has stabilized. As noted on page 2 of my February 7, 1991 letter, the accuracy of the licenses can be reviewed as your well rehabilitation program allows. Well Nos. 30 thru 33 have been rehabilitated within the last few years.

Please comment on the amount of water you want placed on your water licenses. Several of the wells were constructed prior to 1991 and pump records from prior years may be more favorable for purposes of licensing. Especially important is your input on the annual water volume for those permits placing water to beneficial use reserved by Future Use Permit No. 448-3.

If you have any questions, please contact me.

Sincerely,



Ron Duvall
Natural Resources Engineer
605 773-3352

enc.

Well No	GPM		Pump	Motor	Horsepower
	Max.	1991 AVG.			
48	400	386	Aurora 8RL 1 stage	Franklin	15 Submersible
49	550	410	Aurora 8RL 1 stage	Franklin	15 Submersible
50	400	363	Aurora 6RM 1 stage	Franklin	10 Submersible
51	275	249	Aurora 8RXL 1 stage	Franklin	15 Submersible
52	225	142	Aurora 6RL 2 stage	Franklin	10 Submersible
53	480	434	Aurora 8RXL 1 stage	Franklin	15 Submersible
54	400	392	Aurora 6RH 2 stage	Franklin	10 Submersible
55	330	294	Aurora 6RM 2 stage	Franklin	7.5 Submersible
56	325	290	Aurora 6RH 2 stage	Franklin	10 Submersible
57	390	276	Aurora 6RH 2 stage	Franklin	10 Submersible
58	390	354	Aurora 6RH 2 stage	Franklin	10 Submersible
60	700	590	Grundfos 6005150-1		15 Submersible
61	500	311	Western Land Roller 8KKH		20 Submersible
62	600	501	Western Land Roller 8KKH		20 Submersible
63	550	349	Western Land Roller 8KKH		15 Submersible
64	620	569	Western Land Roller 8KKH		20 Submersible
65	700	675	Western Land Roller 8KKH		20 Submersible



CITY OF SIOUX FALLS UTILITIES



August 24, 1992

Mr. Ron Duvall
DENR - Water Rights
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181

Dear Mr. Duvall:

On the attached sheet, I have outlined the information concerning the three well permits that are addressed in your June 17, 1992 letter. This information shows the peak flow rate that we have seen for each well since the wells were put into use; the most water used from each well in any one year; and the percentage of the year that the wells were actually in use. The information also shows the peak flow rate and the maximum yearly flow rate for each permit.

I have also included our recommended peak flow and annual acre-foot limits on this sheet. I reviewed our records and found that in 1989, the wells in Permit #5127A-3 were used an average of 5565 hours each or 63.5 percent of the hours in the year. Based on this information, I projected a maximum well usage of 65 percent of the hours in the year. I then increased the acre-foot quantity for the highest usage year to reflect the wells running 65 percent of the time. This is the number that I have used for the recommended permit acre-foot quantity. The recommended permit cfs quantity is the rounded off sum of the peak rates from the individual wells.

Based on the above information, Permits #5115-3 and 5127A-3 will have a licensed cfs rate and acre-foot rate that is lower than what was requested in the permit application. It is our understanding that this reduced rate will go back into our future use permit and that there is a licensing fee, but no additional permit fee to reduce these quantities.

Utility Office
224 West Ninth Street
Sioux Falls, SD 57102
(605) 339-7031

Water Purification
2100 N. Minnesota Ave.
Sioux Falls, SD 57104
(605) 339-7025

Water Reclamation
4500 N. Sycamore Ave.
Sioux Falls, SD 57104
(605) 339-7088

Lights
2000 N. Minnesota Ave.
Sioux Falls, SD 57104
(605) 339-7150

Maint./Svc. Division
668 Algonquin Avenue
Sioux Falls, SD 57104
(605) 339-7020

Fax
(605) 338-7801

AN EQUAL OPPORTUNITY EMPLOYER

Hearing Impaired
(605) 339-7039

Permit #5235-3 would require an increase of 2.05 cfs to be licensed for the wells that were built. The quantity of 3220 acre-feet would also be on the license. However, we are requesting that only wells 60 through 63 be kept on Permit #5235-3, and that wells 64 and 65 be placed in a new permit. This will reduce the licensing quantities for Permit #5235-3 to 5.45 cfs and 2010 acre-feet. The new permit application for wells 64 and 65 would be for 3.02 cfs and 1210 acre-feet.

Your letter also questioned the flow rate for the pump used at the abandoned quarry. As we discussed in our phone conversation, 700 gpm is an appropriate quantity for licensing this permit.

We are currently in the process of rehabilitating Well #29. This is the last horizontal collector well slated for new laterals. The work should be completed by May 1993 and after we have had a chance to evaluate the well performance, we would like to meet with Water Rights staff to discuss the appropriate method of updating the licenses. If that schedule is not satisfactory, please let us know.

Also, we are preparing a new application for wells 64 and 65 and will be sending that to you in the near future. If you have any questions about any of these items, please contact me.

Sincerely,



Keith DeJong, P.E.
Water Superintendent

Enclosures

KD:seh

1992 WELL PERMIT LICENSING INFORMATION

<u>WELL #</u>	<u>PERMIT #</u>	<u>WATER RIGHT APPLICATION (cfs) (acre-ft/yr)</u>	<u>ACTUAL PEAK FLOW (cfs)</u>	<u>MAX 1 YEAR USE (acre-ft)</u>	<u>PERCENT HOURS in MAX. YEAR</u>	<u>RECOMMENDED PERMIT LICENSE (cfs) (acre-ft/yr)</u>
48-52	5115-3	6.7 2244	5.00	955.4	54.4	5.0 1140
48			1.15	307.1	61.2	
49			1.22	176.8	54.3	
50			0.86	182.1	58.1	
51			0.86	152.0	51.0	
52			0.91	137.4	47.2	
53-58	5127A-3	8.0 2160	5.49	1556.7	63.5	5.5 1600
53			1.41	385.5	68.1	
54			0.87	267.5	66.3	
55			0.75	178.7	59.4	
56			0.72	207.3	61.8	
57			0.87	249.3	58.0	
58			0.87	268.4	67.5	
60-65	5235-3	6.45 ---	8.47	1837.9	37.1	8.47 3220
60			1.56	319.5	31.1	(5.45) (2010)
61			1.11	239.8	34.5	
62			1.67	291.6	34.3	
63			1.11	296.2	53.7	
64			1.40	315.5	34.4	(3.02) (1210)
65			1.62	375.3	34.5	



Permit No. 5115-3
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, May 28, 1992, made a thorough examination of the water use system constructed by the City of Sioux Falls of Utilities Department, 224 W 9th Street, Sioux Falls SD 57102 holder of Permit No. 5115-3, bearing the priority of April 8, 1957, authorizing the diversion of 6.70 cu. ft. per second and up to 2,244 acre-feet of the waters of Big Sioux Aquifer for municipal purposes, in Minnehaha County.

I have to report on the conditions of the same as follows:

A. Works used to divert the water:

Well Nos. 48, 49, and 51:

Motor: Franklin, 15 hp

Well No. 50 and 52:

Motor: Franklin, 10 hp

Pumps: All pumps are Aurora submersibles (see permit investigation sheets for additional detail on individual pumps/motors)

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

Water from well Nos. 48 through 53 is diverted to the 6 pack well house and water from well No. 53 is permitted under 5127A-3. Water is then distributed for use through the city distribution system.

The system is in the following condition good. The points of diversion are located in:

All in section 8-T102N-R49W		
Well No. 48:	1,650 feet E and 1,000 feet N from the SW corner of section 8	SE $\frac{1}{4}$ SW $\frac{1}{4}$
Well No. 49:	1,575 feet E and 1,700 feet N from the SW corner of section 8	NE $\frac{1}{4}$ SW $\frac{1}{4}$
Well No. 50:	2,300 feet E and 2,400 feet N from the SW corner of section 8	NE $\frac{1}{4}$ SW $\frac{1}{4}$
Well No. 51:	2,400 feet E and 3,050 feet N from the SW corner of section 8	SE $\frac{1}{4}$ NW $\frac{1}{4}$
Well No. 52:	3,675 feet E and 1,850 feet N from the SW corner of section 8	NW $\frac{1}{4}$ SE $\frac{1}{4}$

The works are capable of diverting and conveying to the place of use 5.00 cu. ft. per second of water and 1,140* acre-feet of water which is to be used for municipal purposes.

Applicable permit qualifications have been complied with: Yes ☒ No

Exceptions to compliance are: none Date report completed: April 11, 1996


 Ron Duvall
 Natural Resources Engineer
 DENR, Water Rights Program

*Pursuant to a letter dated August 24, 1992, the city requested an annual use of 1,140 acre-feet with the remainder to be returned to Future Use Permit No. 448-3. (2,244 - 1,140 = 1,104 acre-feet)



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

April 23, 1996

5115-3
5127A-3
5242-3

Keith DeJong, P.E.
Water Superintendent
City of Sioux Falls
Utilities Department
224 W. 9th Street
Sioux Falls, SD 57102

Dear Mr. DeJong:

The inspection of your water use system and the inspection of the extent of application of water to beneficial use, as developed under Water Permit Nos. 5115-3, 5127A-3 and 5242-3, has been completed. Your final water right documents, the Water Licenses, can now be issued.

Statutes require that we charge a \$50.00 fee per license for the inspection and issuance of the Water Licenses. Upon receipt of the \$150.00 fee from you, we will begin processing your Water Licenses.

Please remit fee to:
**Department of Environment & Natural Resources
Water Rights Program
523 E. Capitol
Pierre, SD 57501-3181**

Sincerely,

Cheryl F. Frost
Secretary
Water Rights Program
(605) 773-3352

NOTE: On check or money order, please specify your permit number. This will insure proper handling of the fee.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

JUL 2 1996

5115-3
5127A-3
5242-3
5710-3

Lyle Johnson, Utility Manager
City of Sioux Falls
224 West 9th St.
Sioux Falls, SD 57102

Dear Mr. Johnson:

Enclosed are Water License Nos. 5115-3, 5127A-3, 5242-3 and 5710-3. These are the final water right documents completing your process of obtaining a Water Right. Enclosed are Receipt Nos. 413806, 414971, 414972 and 414973 in the amount of \$50.00 each which you paid for the investigation and issuance of the Water Licenses.

For your information SDCL 46-6-27 requires that if the owner of an existing well, such as the well authorized by Water Right Nos. 5115-3, 5127A-3, 5242-3 and 5710-3, constructs replacement wells and does not plan to use the old wells, the old wells are considered abandoned and must be plugged. Also, any well that is being used or is not considered abandoned must be valved and controlled, if flowing, or sealed and capped so that no leaking occurs either underground or at the surface.

As long as you use the water beneficially, as stated in the Water Licenses, the State Water Laws provide that you have a continuing right to use the water. If you have any questions, please contact our office.

Very truly yours,

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

ks
enclosures

NOTE: The applicable portions of Water Permit No. 5127 have been incorporated into this Water License No. 5127A-3, and the applicable portions of Water Permit No. 5235-3 have been incorporated into this Water License No. 5710-3.

RECEIPT

Division of Water Rights

South Dakota Department of Environment and Natural Resources

414971

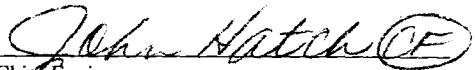
Pierre, _____ May 23, 19 96

RECEIVED OF City of Sioux Falls, 224 W. 9th St., Sioux Falls, SD 57102

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 _____		
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>5115-3</u>	50	00
Fee for Filing Transfer Form _____		
Fee for Filing Extension Request _____		
Fee for _____		

(Any Other Work Provided by Law)	Total	50 00

By John Hatch 
Chief Engineer

STATE OF SOUTH DAKOTA

WATER LICENSE NO. 5115-3

(1) The City of Sioux Falls, 224 W 9th St, Sioux Falls SD 57102 made Application No. 5115-3, December 19, 1986 for a water permit to divert 6.70 cubic feet of water per second (2,244 acre-feet annually) from groundwater (5 wells), Minnehaha County, South Dakota for municipal use purposes. Permit No. 5115-3, with a priority date of April 8, 1957 (established by Future Use Permit No. 448-3) was approved May 6, 1987 and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before May 6, 1992 and for the application to beneficial use of said water on or before May 6, 1996.

Pursuant to a letter dated August 24, 1992, the City of Sioux Falls requested an annual use limitation of 1,140 acre-feet for Permit No. 5115-3 with the remaining 1,104 acre-feet returned to Future Use Permit No. 448-3 (2,244 - 1,140 = 1,104 acre-feet).

(2) It is certified that the applicant has complied with the provisions of South Dakota State Law relating to completion of the construction of the water supply system and is entitled to divert 5.00 cubic feet of water per second (1,140 acre-feet annually) for beneficial use. The location of the diversion points are: **all in T102N-R49W**

- 1,650 feet east and 1,000 feet north from the southwest corner of Sec 8 (SE 1/4 SW 1/4)
- 1,575 feet east and 1,700 feet north from the southwest corner of Sec 8 (NE 1/4 SW 1/4)
- 2,300 feet east and 2,400 feet north from the southwest corner of Sec 8 (NE 1/4 SW 1/4)
- 2,400 feet east and 3,050 feet north from the southwest corner of Sec 8 (SE 1/4 NW 1/4)
- 3,675 feet east and 1,850 feet north from the southwest corner of Sec 8 (NW 1/4 SE 1/4)

(3) The applicant has complied with the provisions of South Dakota State Law relating to the application of water to beneficial use.

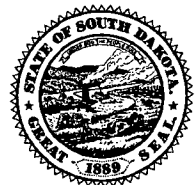
(4) Pursuant to South Dakota Water Law 46-5-30.1 the City of Sioux Falls, 224 West 9th St, Sioux Falls SD 57102 the holder and/or owner of Water Permit No. 5115-3 is issued a license to appropriate water, the right to use 5.00 cubic feet of water per second (1,140 acre-feet annually) from groundwater (5 wells) with a priority date of April 8, 1957 from the location specified in (2) of this license, for the purpose of municipal use. This license is subject to any limitations or qualifications listed in Water Permit No. 5115-3 and subject to South Dakota State Law.



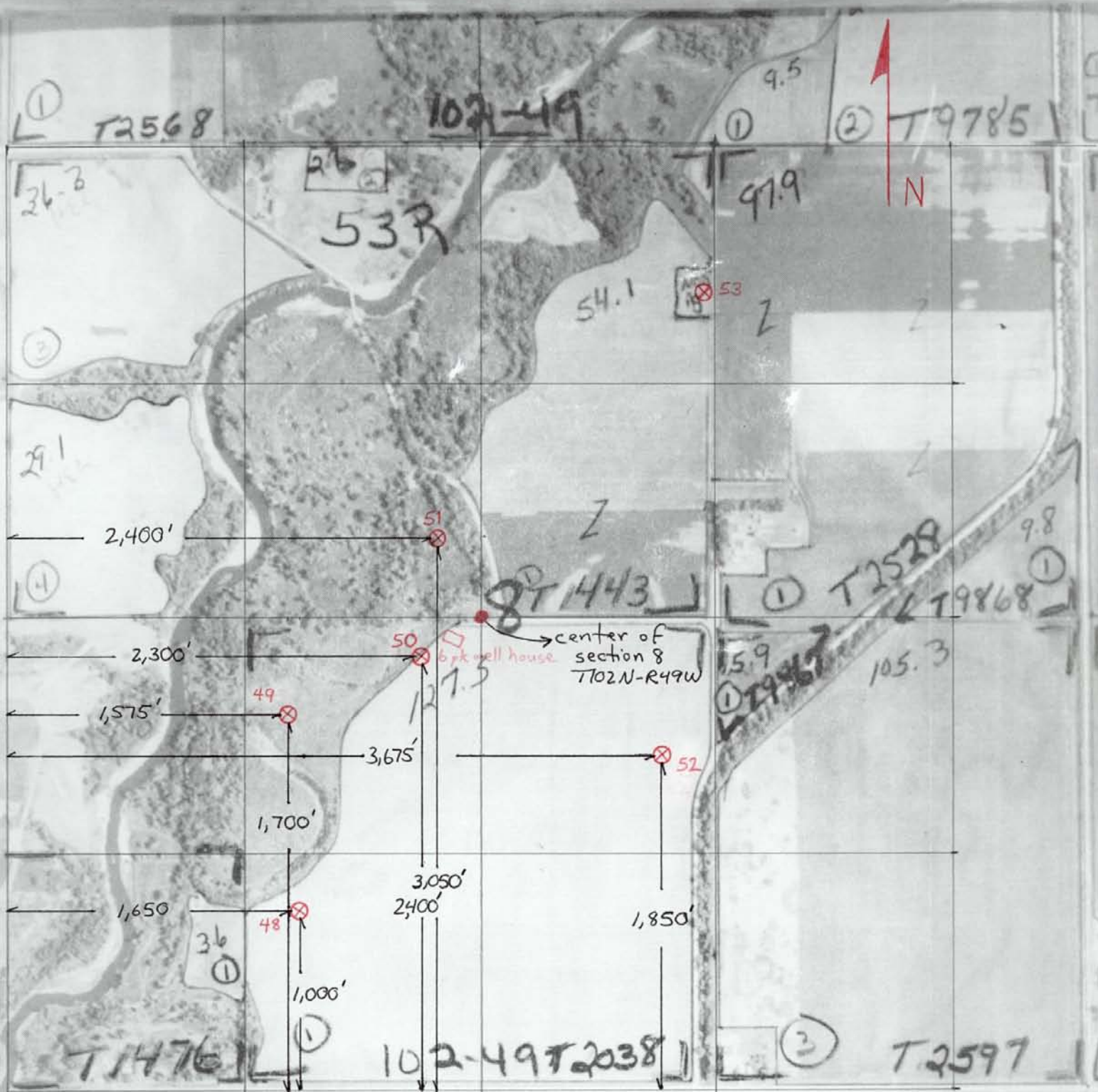
JOHN HATCH, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

JUL 2 1996

date

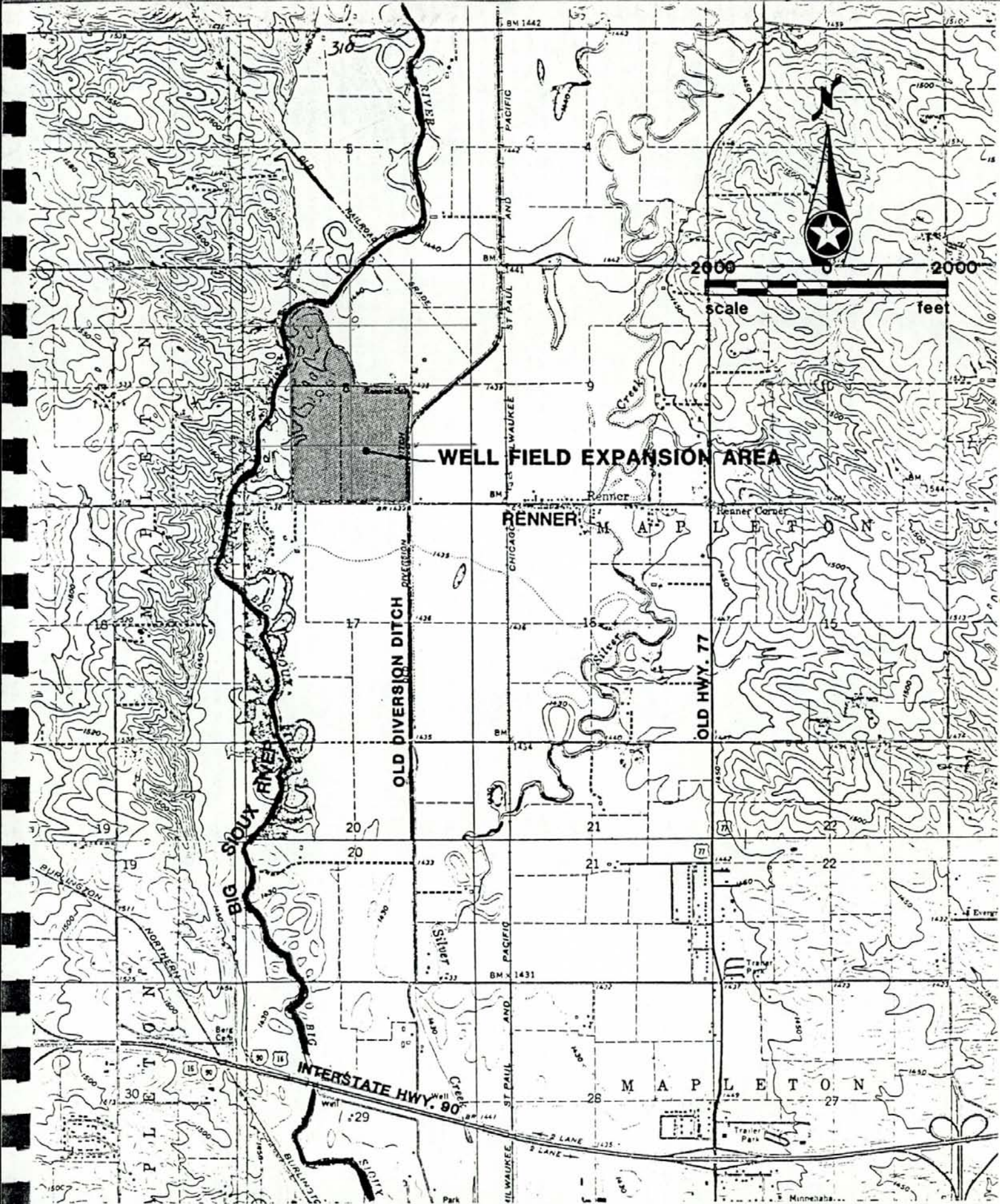


NOT TO SCALE



Don Swall
Natural Resources Engineer
4/11/96

License No. 5115-3



LOCATION PLAN

SHEET NO. 1



DeWild Grant Reckert & Associates Co.
 Denver Colorado
 Rock Rapids Iowa
 Sioux City Iowa
 Sioux Falls, South Dakota

Date
 Drawn By
 Approved
 Revised

PROJ #34227

Appl. No. 5115-3

1986 WELL FIELD EXPANSION
 SIOUX FALLS, SOUTH DAKOTA