July 2000
DNR Form 618-2

STATE OF NEBRASKA
DEPARTMENT OF NATURAL RESOURCES

COPY

orig returned 4/13/06

APPLICATION FOR A MUNICIPAL AND RURAL DOMESTIC GROUND WATER TRANSFERS PERMIT

INSTRUCTIONS

Complete items 1 through 10 by printing in ink or typing the appropriate information and by placing an (X) in the appropriate boxes.

The following information shall be provided on 8½ x 11 inch paper (or folded to such size). An answer is required for each item of A-H. Each answer must be clearly identified in the application. When using a ground water model, justify the applicability to the given geologic setting.

For Department Use Only

Application Number: MT-21
Date Filed: March 3, 2006
Receipt Number: G77
Amount: $70.00

A. Discussion of impacts on surrounding ground water and surface water supplies. Include expected radius of cone of depression and how it was determined and location of any existing wells or water rights that may be impacted.
B. Statement of impacts on any existing threatened or endangered species in project area.
C. Pump test information, if available, including length of test, data from pump test, and location of observation wells.
D. Information on geology and hydrology of area such as thickness of aquifer, depth to water, aerial extent, transmissivity and how it was determined, and whether aquifer is confined or unconfined.
E. Description of type of well, including drawings.
F. Planned operation schedule. (Describe hours per day the wells will likely be pumped, whether there will be seasonal changes to schedule, whether there will be a rotation of wells pumped, and whether certain wells are only for backup purposes.)
G. Explanation of the basis for the amount of water requested. This should include current population and projected growth, daily per capita water use data, current industrial or other large uses and projected growth. The explanation should also include answers to the requirements for approval of the application stated in § 46-642, R.R.S., 1943, as amended, namely: whether request is reasonable, not contrary to the conservation and beneficial use of ground water, and not detrimental to the public welfare.
H. Map showing location of proposed wells, pipelines (exclusive of distribution lines) and the area of proposed use. The map shall be legible and at a scale of not less than one inch to the mile.

A non-refundable filing fee (payable to the Department of Natural Resources) can be computed from the table below and must accompany this application.

QUANTITY OF WATER REQUESTED (daily average)	COST
First 5,000,000 gallons per day	$50.00
Each additional increment (or portion) of 5,000,000 gallons per day	$20.00

1. Name, address and telephone number of Applicant:
City of Kearney
Kirk Stocker Director of Utilities
1220 East 26th Street
Kearney, NE 68847
Name, address and telephone number of person to contact concerning application:
Chris Miller
Miller & Associates Consulting Engineers, P.C.
1111 Central Avenue
Kearney, NE 68847

2. Identify the city, village, rural area or other entity to be supplied water:
City of Kearney

3. Maximum rate of withdrawal for which a permit is requested (complete both) **4,900** gallons per minute
7,056,000 gallons per day

Indicate whether the amount is for each well or a total rate for all wells.
Total rate for all wells

4. The daily AVERAGE amount of water requested: **4,000,000** Gallons per day

5. Total quantity of water to be withdrawn annually (gallons). **146,000,000**

6. Number of wells proposed: **9** Number of existing wells: **0 this application**

7. Location of the proposed ground water wells and existing wells:
(Indicate 40-acre government subdivision, Section, Township, Range and County, and registration number(s) if applicable):

West 1/2 Section 23, T9N, R17W and
NE 1/4 Section 23, T9N, R17W and
East 1/2 Section 14, T9N, R17W

8. Construction will start on or before **August**, 20**06**.

9. Construction will be completed on or before **September**, 20**07**.

10. If the permit is granted, does the applicant request imposition of statutory spacing protection for one year for test holes or wells to be constructed? [■] Yes [ ] No

If yes, indicate below the name and address of the owners and occupiers of land affected by the granting of such spacing protection, and a description of the land they own or occupy.

1.•Miriam Eileen Brandt---PO Box 2082---Kearney, NE 68848
2.•Pauline K. Jacobson, Trustee----PO Box 87----Riverdale, NE 68870
3.•Carlene K. Jacobson and Lana L. Jacobson---PO Box 14---St. Paul, NE 68873
4.•Allen J. Robinson and Jane M. Robinson---8051 Eagle Rd.---Kearney, NE 68845-0607
5.•Mark Robinson and Gretchen Robinson---21329 Leavenworth St.---Elkhorn, NE 68022
6.•Stephen Sheen and C. Edward Sheen---2530 Dove Hill Ave.---Kearney, NE 68847
7.•Arlys M. Torrey, Trustee---3803 6th Ave.----Kearney, NE 68845-2843
8.•Robert W. Dyer and Judith A. Dyer---6880 Eagle Rd.---Kearney, NE 68845
9.•Dean A. Beavers, Trustee---2116 Central Ave.---Kearney, NE 68847
10.•Galen Killion---5292 Eagle Rd.---68845
11.•Kevin E. Millsap and Claressa L. Millsap---6180 Eagle Rd.---Kearney, NE 68845
12.•Garland D. Snow, Lorna S. Snow and Trenton D. Snow---3662 W. 70th St.---Kearney, NE 68845
13.•Randall Alexander---PO Box 744---Kearney, NE 68848-0744
14.•Patricia J. Standage, Trustee---38565 295th Rd.---Ravenna, NE 68869
15.•Keith G. Stafford---4614 Parklane Dr.---Kearney, NE 68847-8328

I certify that I am familiar with the information contained in this application, and that to the best of my knowledge and belief, such information is true.

Applicant (Signature and Title) — Mayor — Date: February 28, 2006

Forward application and fee to:

State of Nebraksa
Department of Natural Resources
301 Centennial Mall South
P.O. Box 94676
Lincoln, Nebraska 68509-4676
(402)471-2363

Municipal & Rural Domestic Ground Water Transfer Permit Application

Northwest Well Field - 2006

Prepared for

CITY OF KEARNEY
HEART OF NEBRASKA

Prepared By:

Miller & Associates
CONSULTING ENGINEERS, P.C.

Project No. 130-C1-049

February 28, 2006

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APPLICATION FOR A MUNICIPAL AND RURAL DOMESTIC GROUNDWATER TRANSFER PERMIT

Additional Information for Items A-H

BACKGROUND

The proposed Northwest Well Field, which will include nine wells, will be beneficial to City of Kearney's economic growth and sustainability. The Northwest Well Field will provide a redundant supply to the existing Platte River Well field and will allow the City to continue expansion to the north. The Northwest Well Field will supplement the City supply from the Platte River Well Field during drought years and provide water capacity to meet annual high summer demand in the developing parts of the City. The transfer permit is completed for the long-term maximum withdrawal rate for these wells. The maximum withdrawal rate may only be needed for a portion of the high demand summer season. The proposed Northwest Well Field will have beneficial environmental and social impacts and will increase the safety of the citizens of Kearney.

The City water supply is supplied from a well field located in the Platte River southeast of the community and from six older wells located within the City. The City of Kearney water system operates two pressure zones. The north high pressure area, which is higher in elevation than the older part of Kearney, is supplied water through a series of booster pump stations and elevated storage facilities. The water is pumped from the Platte River Well Field and the six older wells through the booster pump stations. The north high pressure zone is experiencing a lot of development and the booster pump stations are not designed to supply peak water usage. The City is experiencing difficulty in supplying peak demand with the existing infrastructure.

The proposed Northwest Well Field will provide water directly to the north high pressure area and will reduce demand for the booster pump stations. The Northwest Well Field will allow the City to continue to grow to the north. If the Northwest Well Field is not constructed, the City of Kearney will need to make major upgrades and improvements to the booster pump stations. The Northwest Well Field is needed to provide water during times of drought when the Platte River Well Field capacity is reduced as a result of low flow in the Platte River.

The environmental benefits of the Northwest Well Field are two fold. During the summer when the City uses the greatest volume of water, flow in the Platte River is at the minimum. The City has developed a groundwater flow model, which indicates the Platte River Well Field capacity will decrease over time during extended periods of low flow in the Platte River. If the City draws its high summer volume during periods of low flow in the Platte River, stream depletions will increase. By changing the point of diversion from the Platte River Well Field, to the Northwest Well Field several miles north of the river, stream depletion will be reduced. The biggest impact will occur in the summer when increased flows are needed in the river.

A second environmental benefit is to provide the City with a safe and reliable source of water. The Platte River Well Field is susceptible to river contamination. Should some unforeseen incident happen to cause the river to become contaminated by a spill upstream of the well field, water from the Platte River Well Field may not meet drinking

water standards. This has the potential to shut down the Platte River Well Field for an extended period of time.

The existing Platte River Well field is also susceptible to power outages caused by tornados, ice storms and ice jams. Each of these threats can decrease the capacity of the Platte River Well field and adversely impact water supply to the City.

The City has one water supply pipe line across the Platte River from the Platte River Well Field. Damage to the water pipe line has the potential to cripple the entire water supply for the City of Kearney.

The Northwest Well Field will supply the City with an alternate water supply to meet essential water needs if any problems arise due to contamination or damage to the supply pipeline in association with the Platte River Well Field.

The key to this transfer permit request is that the water supply requested will serve the same service area, the City of Kearney. Water transfer requested is not a new depletion to the basin but rather a change in the diversion location within the basin. This is demonstrated by the distance from the Platte River Well Field to the proposed Northwest Well Field. If the transfer permit is not approved, water for the City of Kearney will be withdrawn from the Platte River Well Field and six older wells in the City. If the transfer permit is approved, a portion of the water supplied to the City will be withdrawn from the Northwest Well Field and water will be returned to the river from the wastewater treatment system. Thus, there should not be any net depletion to the river system but an increase in river flow during high summer water use periods.

A. Discussion of impacts on surrounding ground water and surface water supplies. Include expected radius of cone of depression and how it was determined and the location of any existing wells or water rights that may be impacted.

The City of Kearney proposes to construct a new municipal well field with a maximum capacity of 4,900 gallons per minute (gpm) based on an maximum withdrawal rate of 7,056,000 gallons per day, or 7.056 million gallons per day (MGD). This will require pumping capacity of approximately 545 gallons per minute (gpm) per well. The Northwest Well Field was selected after several years of investigation of the surrounding area. Based on well production, intensity of development and land use, five potential sites were selected for water quality testing. Water samples were obtained and analyzed and 25 test holes were drilled to evaluate potential sites. Throughout this process, one of the main site selection criteria was to select a site outside of the 40-year/28% stream depletion line developed as part of the Cooperative Hydrology Study (COHYST) groundwater flow model (COHYST model).

The Platte River Well Field and the six older wells in the City of Kearney are located within the area defined by the 40-year, 28-percent depletion line (28/40 line). The Platte River Well Field is located on an island in the middle of the Platte River. The Platte River Well Field lies between both 50-day stream depletion lines. The six wells in the City are between the 500 and 10,000-day stream depletion lines. The estimated percent of pumped water that is attributed to surface water in the Platte River Well Field is over 90%.

An evaluation of the Northwest Well Field location based on the river depletion values indicates use of the Northwest Well Field will benefit the Platte River. An evaluation of flow from the Northwest Well Field, with a corresponding reduction of pumping from the existing City wells, demonstrates use of the Northwest Well Field will result in increased flow in the Platte River.

The proposed Northwest Well Field is located in Sections 14 and 23 of Township 9 North, Range 17 West, Buffalo County, Nebraska. **Figure 1 – Project Location** illustrates the location of the proposed well field. The proposed site is approximately 3 miles from the north property line to the Wood River and approximately 5 miles from the south property line to the Platte River.

During the siting process for the well field, the 28/40 stream depletion line was re-evaluated and moved farther north thus placing a large portion of the well field site inside the 28/40 stream depletion line (see **Figure 1**). The stream depletion lines continue to be re-evaluated. The selected well field location is partially within the last known 28/40 stream depletion line. The Central Platte Natural Resource District (CPNRD) has completed some model runs for the proposed well field site and preliminary numbers indicate the Northwest Well Field site is located at what would be the 40-year, 31 percent depletion line.

The CPNRD has provided technical assistance during the selection of the Northwest Well Field. The CPNRD has made several runs of the COHYST model with varying pumping scenarios at the proposed Northwest Well Field well locations. The model runs utilized for analysis included:

A. Present development conditions for 48 years
B. Irrigation development on the proposed well field site for 48 years
C. Four million gallons per day (MGD) pumping for a 5 month summer period for 48 years
D. Nine MGD pumping for a 5 month summer period for 48 years
E. Four MGD pumping continuously for 48 years
F. Seven MGD pumping continuously for 48 years

The pumping scenarios are described as stress scenarios to evaluate the changes in the aquifer system. Stress scenarios A and B were developed as a base line for comparison of the other scenarios. Scenario C is the first stress situation expected for the well field. Scenario D was run with a 1 MGD withdrawal from each well. This exceeds the design capacity of the pipeline and wells, which will be 7 MGD and 0.785 MGD, respectively. Scenario D was run in error. The results are included for completeness. Scenario E is the total quantity of water to be requested as part of this transfer permit. The results for scenarios D and E demonstrate similar results as demonstrated in impacts to the surrounding area. Scenario F was run based on a comment at a public meeting. The scenario was designed to determine impacts of pumping continuously at the maximum well capacity. Scenario F demonstrated excessive drawdown of water levels, which could result in damage to the wells and pumps. Continuous pumping at 7 MGD is not an option for the proposed well field.

The City of Kearney has presented information regarding this transfer permit and the proposed Northwest Well Field to the Central Platte Natural Resources District (CPNRD) and the Buffalo County Commissioners at a public information meeting. The City has been negotiating the purchase of the well field property with landowners and will be

acquiring easements for the water main from landowners and government agencies. The wells will be drilled to reduce pressure on existing booster pump stations; provide water directly to the north, high pressure, growth area of Kearney; provide additional water capacity during summer peak water usage; provide a redundant water supply for the City; and to improve flow in the Platte River during the summer.

The model results are graphically provided in **APPENDIX A** for the well field operations as provided by CPNRD. Hydrographs were extracted as part of the analysis for the first node west (up gradient) of the proposed well field site for each stress scenario. The hydrographs of the model runs are shown in **Figure 2 – CPNRD Modeled Ground Water Elevations.**

The calibrated and accepted COHYST model utilized the following average properties in and around the proposed well field area.

Transmissivity = 26,800 gpd/ft
Specific Yield = 0.15 ft/ft

Nine test holes were drilled at the proposed Northwest Well Field site. One 16-inch diameter cased well and three 2-inch diameter cased observation wells were constructed. The distances from the observation wells to the pumping well are 401, 762 and 2056 feet. The 16-inch well was test pumped at an average pumping rate of 600 gallons per minute (gpm) for 46 hours. Water levels were monitored in the pumping well and the observation wells. The results of test pumping are summarized below. The data collected by the contractor is provided in **APPENDIX B.**

Table 1 – Test Pumping Data

	Pumping Well	North Well	West Well	South Well
Distance	-	401 feet	762 feet	2056 feet
Drawdown	117 feet	10 feet	3 feet	0 feet

The average design flow rate per well for the Northwest Well Field is 545 gpm. Data published by the Conservation and Survey Division (CSD) in 1980 indicates a transmissivity between 20,000 and 50,000 gallons per day per foot (gpd/ft) in the well field area. The CSD values are based on grain size analysis of formation material. By interpolation of the CSD transmissivity data, 30,000 gpd/ft was selected as a representative transmissivity value for the proposed well field. This value corresponds to the COHYST model parameters. A map of transmissivity values in the area is shown in **Figure 3 – CSD Transmissivity Values.**

The test pump data at the 16-inch well can be utilized to estimate transmissivity using the empirical equation below.

$$\frac{Q}{s} = \frac{T}{2000}$$

Where:
Q = yield of well in gpm
s = drawdown in well in feet
T = transmissivity of the well in gpd/ft

The drawdown for the pumping wells was 117 feet at an average flow of 600 gpm. The empirical equation yields a transmissivity value of approximately 10,250 gpd/ft. This transmissivity value is lower than the Conservation Survey Division estimates and the value used in the COHYST model.

A preliminary layout of nine potential well sites has been determined based on the test pump data, land acquired by the City of Kearney, topography and well permits issued by the Central Platte Natural Resource District (CPNRD). The nine locations are depicted in **Figure 4 – Potential Well Sites**. Final well locations may vary based on well construction and existing well spacing. The well drilling contractor lost circulation of drilling fluids during drilling of the test holes and the 16-inch well. The contractor moved to alternate drilling locations. These types of issues may also be experienced during the final well construction.

Figure 5 – Registered Wells shows the area of the proposed well field and the registered wells in, and surrounding the proposed site. There are some domestic wells around the proposed well field site, which are not shown in **Figure 5**. The domestic wells are not included in the registered wells data base. The domestic well locations were estimated based on field observations and were used to determine setback distances in the selection of the proposed well sites.

Analytical equations can be used to calculate conservative estimates of drawdown due to pumping wells for short term pumping increments. The primary parameter in calculating drawdown is transmissivity. A higher transmissivity value will provide for a larger estimated cone of depression. This is demonstrated in **Figure 6 – Effects of Transmissivity** from the 1996-second edition of Ground Water and Wells by Dr. Fletcher Driscoll.

Using a modified Thies equation ($\mu < 0.05$) by Cooper and Jacob (1946) the drawdown a selected distance from the pumping well can be estimated using the following equation:

$$s = {}^{264Q}/_{T} \log\left({}^{0.3Tt}/_{r^2 S}\right)$$

Where:
Q = yield of well in gpm (assume 545 gpm)
s = drawdown in well in feet (to be solved for)
T = transmissivity of the well in gpd/ft (assume 30,000 gpd/ft)
t = time in days (assume 365 days of continuous pumping)
S = coefficient of storage (unit ess) (assume 0.15)
r = distance in feet (varies)

Based on the above equation and the theory of superposition, drawdown of the two closest wells located in the southwest quarter of Section 14 (G-052978) and the unregistered domestic well in the southeast quarter of Section 22 (see **Figure 4)** can be estimated. The distance from each well site was determined and the individual drawdown for each well was calculated. The results for drawdown (s) using the values described above are provided in **Table 2 – Drawdown by Superposition**.

TABLE 2 – Drawdown by Superposition

Modified Cooper Jacob (1946)
365 days of continuous pumping

	Well SE Quarter Section 22				Well G-052978 (Section 14)		
	r (ft)	u	s (ft)		R (ft)	u	s (ft)
Well 2006-1	2,850	0.03	2.1	Well 2006-1	6,750	0.16	Negligible
Well 2006-2	1,000	0.00	6.4	Well 2006-2	4,800	0.08	Negligible
Well 2006-3	2,850	0.03	2.1	Well 2006-3	4,200	0.06	Negligible
Well 2006-4	2,250	0.02	3.1	Well 2006-4	2,700	0.02	2.3
Well 2006-5	4,650	0.07	Negligible	Well 2006-5	5,550	0.11	Negligible
Well 2006-6	5,100	0.09	Negligible	Well 2006-6	3,900	0.05	Negligible
Well 2006-7	6,000	0.12	Negligible	Well 2006-7	3,300	0.04	1.5
Well 2006-8	7,200	0.18	Negligible	Well 2006-8	3,450	0.04	1.3
Well 2006-9	9,300	0.30	Negligible	Well 2006-9	5,550	0.11	Negligible
	Calculated Drawdown		13.7		**Calculated Drawdown**		**5.1**

The City anticipates decreasing their consumption of Platte River water flow by two substantial methods. The first method is the physical location of the supply wells. By relocating the City wells from an area of over 90% depletion to an area of 31% depletion, a net increase in stream flows will be realized. By allowing the City of Kearney to move their point of groundwater withdrawal from an area of over 90% stream depletion to an area of 31% or less stream depletion, stream flows in the Platte River may increase by 59% of the current City of Kearney water use for 40 years in accordance with the COHYST model.

The rate and volume of stream depletions for the City of Kearney well field can be calculated by the current COHYST model or based on the original equations developed by C.T. Jenkins of the United States Geological Survey (USGS) originally printed in 1968. In the near future, the COHYST model will have the stream depletion factors calculated by cell and can be used for river or stream depletion calculation. Until that time, the depletions can be calculated by hand. Using Techniques described by Jenkins in Chapter D1, Book 4 of Hydrologic Analysis and Interpretation by the USGS, calculations were performed for the proposed well field. The assumptions to these equations are that the water withdrawal rate is uniform every year, the transmissivity does not change over time, the stream fully penetrates the aquifer and the temperature is constant in the stream.

Pumping of the proposed Northwest Well Field will begin slowly and gradually increase to the permit limits requested in this transfer permit over the life of the well field. For the purpose of being conservative, the stream depletion numbers developed for the Northwest Well Field at the fully developed annual capacity and compared it to the Platte River Well Field and 6 older wells in the City capacity. When these two curves intersect in the future; at that point in time, the stream depletion is equivalent. The graphs for stream depletion will be presented after the water use is projected and the future pumping condition is selected.

However, it should be noted until the time when the curves intersect, the volume of water contained between the curves will be "saved" or "unused" and the City of Kearney should be entitled to a "credit" to the Platte River to offset future depletions. This was discussed with Nebraska Department of Natural Resources (NDNR) staff and at this time the regulations do not allow for credits of this type to be applied.

B. Statement of impacts on any existing threatened or endangered species in the project area.

As part of the project pre-design process, nineteen (19) governmental agencies were supplied with a preliminary transmission main route and proposed well field area. The list of agencies that were requested to comment and the seven (7) responses are provided in **APPENDIX C**. The written response letters have been transmitted to Tom Fuenning at the Drinking Water State Revolving Loan Fund to draft an environmental review or Finding of No Significant Impact (FONSI).

The United States Department of the Interior Fish and Wildlife Service requested some additional information on stream depletions for the proposed well field. A copy of this transfer permit is being provided to Mr. Jeff Runge for his review. With this data, it is anticipated a No Affect Determination will be provided in writing from the Fish and Wildlife Service.

The remaining comments of governmental agencies will be handled through the permitting and design process.

C. Pump test information, if available, including length of test, data from pump test, and location of observation wells.

Test pumping data is discussed in ***Item A***, above, and is included in **APPENDIX B**. The City of Kearney will perform test pumping on all nine proposed production wells to determine aquifer characteristics. However, the COHYST model has been used to provide a preliminary evaluation of this site and proposed pumping scenarios. The COHYST model, the best tool available for evaluation of the site, this site is capable of supporting the proposed withdrawals.

Data collected during the construction of the nine municipal wells will be collected by Miller and Associates Consulting Engineers, P.C. using data logging equipment. The data will be provided to the CPNRD. The actual test pumping data will be used to assist the City in operating the well field.

D. Information on geology and hydrology of area such as thickness of aquifer, depth to water, aerial extent, transmissivity and how it was determined, and whether aquifer is confined or unconfined.

The proposed well field area has surface elevations varying from 2,250 feet to 2,370 feet above sea level. Groundwater elevations fluctuate from 2,190 to 2,210 feet. Depths to water could range from 60 to 180 feet across the site. The well field is located in the

dissected plains topographic and groundwater regions according to The Groundwater Atlas of Nebraska.

Surface deposits in the area include Quaternary deposits consisting of Peorian loess and Loveland formations. The Quaternary deposits are underlain by Tertiary Miocene Ogallala Group materials including sand, sandstone, silt and gravel. The sand and Ogallala Group materials extend to 300 to 400+ feet below grade in the proposed well field. The base of the aquifer is expected at approximate elevations ranging from 1,850 to 1,900 feet above mean sea level. The formation below this level is the Cretaceous Pierre shale that is weathered in most cases. **APPENDIX D** has an excerpt of a geologic cross section form US Geological Survey Water Supply Paper 1358.

In the proposed well field, the thickness of the aquifer is approximately 300+ feet according to the Conservation and Survey Division (CSD). This can be seen in **Figure 7 – CSD Saturated Thickness**. The unconfined aquifer is recharged through rainfall, subsurface inflow and seepage from canals and irrigation water.

Transmissivity of the area is fairly uniform in the proposed well field and has been discussed in previous sections. Groundwater elevations are shown in **Figure 8 – Regional Ground Water Elevations** as digitized by the Conservation and Survey Division 1995. The groundwater flow direction at the proposed well field is generally from west to east as shown in **Figure 8,** but may vary seasonally.

E. Description of type of well, including drawings.

The proposed wells will be drilled utilizing rotary drilling methods. A 32-inch diameter hole and 16-inch diameter casing and screen are anticipated. The city will construct well houses and a water condition building to comply with Nebraska Department of Health and Human Services rules and regulations.

A minimum of forty feet of stainless steel, wire-wrapped screen with a proposed slot size of 0.030 inches will be used for the municipal wells. The gravel pack and slot size are based on sieve analysis results for formation samples from the test holes drilled on site. A drawing of the typical well construction is shown in **Figure 9 –Well Construction Schematic**.

F. Planned operation schedule. (Describe hours per day the wells will likely be pumped, whether there will be seasonal changes to schedule, whether there will be a rotation of wells pumped, and whether certain wells are only for backup purposes.)

The City proposes to construct and use all nine wells at the proposed well field by December 31, 2007. Pumping from the proposed Northwest Well Field will replace pumping from the Platte River Well Field and will the impact on stream flows in the Platte River.

Nine wells are proposed to meet peak flow requirements based on an average pumping capacity of 545 gpm per well. The goal is to provide a maximum withdrawal rate of 7 million gallons per day (MGD) during peak usage and an average annual withdrawal rate

dissected plains topographic and groundwater regions according to The Groundwater Atlas of Nebraska.

Surface deposits in the area include Quaternary deposits consisting of Peorian loess and Loveland formations. The Quaternary deposits are underlain by Tertiary Miocene Ogallala Group materials including sand, sandstone, silt and gravel. The sand and Ogallala Group materials extend to 300 to 400+ feet below grade in the proposed well field. The base of the aquifer is expected at approximate elevations ranging from 1,850 to 1,900 feet above mean sea level. The formation below this level is the Cretaceous Pierre shale that is weathered in most cases. **APPENDIX D** has an excerpt of a geologic cross section form US Geological Survey Water Supply Paper 1358.

In the proposed well field, the thickness of the aquifer is approximately 300+ feet according to the Conservation and Survey Division (CSD). This can be seen in **Figure 7 – CSD Saturated Thickness**. The unconfined aquifer is recharged through rainfall, subsurface inflow and seepage from canals and irrigation water.

Transmissivity of the area is fairly uniform in the proposed well field and has been discussed in previous sections. Groundwater elevations are shown in **Figure 8 – Regional Ground Water Elevations** as digitized by the Conservation and Survey Division 1995. The groundwater flow direction at the proposed well field is generally from east to west as shown in **Figure 8,** but may vary seasonally.

E. Description of type of well, including drawings.

The proposed wells will be drilled utilizing rotary drilling methods. A 32-inch diameter hole and 16-inch diameter casing and screen are anticipated. The city will construct well houses and a water condition building to comply with Nebraska Department of Health and Human Services rules and regulations.

A minimum of forty feet of stainless steel, wire-wrapped screen with a proposed slot size of 0.030 inches will be used for the municipal wells. The gravel pack and slot size are based on sieve analysis results for formation samples from the test holes drilled on site. A drawing of the typical well construction is shown in **Figure 9 –Well Construction Schematic**.

F. Planned operation schedule. (Describe hours per day the wells will likely be pumped, whether there will be seasonal changes to schedule, whether there will be a rotation of wells pumped, and whether certain wells are only for backup purposes.)

The City proposes to construct and use all nine wells at the proposed well field by December 31, 2007. Pumping from the proposed Northwest Well Field will replace pumping from the Platte River Well Field and will the impact on stream flows in the Platte River.

Nine wells are proposed to meet peak flow requirements based on an average pumping capacity of 545 gpm per well. The goal is to provide a maximum withdrawal rate of 7 million gallons per day (MGD) during peak usage and an average annual withdrawal rate

of 4 MGD. Historic data indicate higher water use and the occurrence of peak flows during summer months, especially during July and August. The proposed wells will be used in conjunction with water storage in the City. Flows will be balanced to provide service to decrease the use of booster pumping stations on the low side of the distribution system and to maintain water storage levels on the high (north) side of the water distribution system. The Northwest Well Field will provide much needed additional pumping capacity during daytime and summer high water demand periods. Control of the wells will be accomplished through the use of the City's existing Supervisory Control and Data Acquisition (SCADA) software.

G. **Explanation of the basis for the amount of water requested. This should include current population and projected growth, daily per capita water use data, current industrial or other large uses and projected growth. The explanation should also include answers to the requirements for approval of the application stated in 46-642, R.R.S. 1943, as amended, namely: whether request is reasonable, not contrary to the conservation and beneficial use of groundwater and not detrimental to the public welfare.**

Population data for the City of Kearney from 1900 to present is provided in **Table 3 – Historical Population**.

Table 3 – Historical Population

Year	Population
1900	5,634
1910	6,202
1920	7,702
1930	8,575
1940	9,643
1950	12,115
1960	14,210
1970	19,181
1980	21,158
1990	24,396
2000	27,431

In reviewing the historical population, it is apparent that the City of Kearney has continued to grow and prosper with each census. **Figure 10 – Population Projection** is a linear trend line projecting the future population of Kearney for the next 25 years. The estimated population for the year 2031 is approximately 32,500.

The City of Kearney has 21 active municipal wells and 7 inactive municipal wells to serve the 2000 census population of 27,431. The well registration numbers and approximate legal descriptions for the existing municipal wells are provided in **Table 4 – Existing Municipal Wells**.

REVISED TABLE 4 - Existing Municipal Wells

City Well ID	NDHHS	Reg. No.	City Status*	Legal Description
Well 1	54-1	G-070525	Active	3010 Avenue H
Well 5	71-1	G-035409	Active	1620 East 34th Street
Well 9	46-2	G-070518	Active	1616 Central Avenue
Well 10	48-2	G-070522	Active	323 West 19th Street
Well 19	73-1	G-039526	Active	16th Street & Avenue L
Well 20	73-2	G-039525	Active	18th Street & Avenue L
Well 7	41-1	G-070523	Inactive	T8N R16W Sec 2 SE1/4 SE1/4
Well 15	48-1	G-070520	Inactive	T8N R16W Sec 1 NE1/4 SW1/4
Well 12	54-3	G-070521	Aband.	T8N R16W Sec 2 SW1/4 NE1/4
	55-1		Inactive	
Well 16	66-1	G-070524	Inactive	T8N R16W Sec 2 SW1/4 SE1/4
	68-1	G-030624	Inactive	T8N R16W Sec 2 SW1/4 SE1/4
Well 4	69-1	G-070519	Inactive	T8N R16W Sec 1 SW1/4 SW1/4
Cemetery Well		G-030625	Aband.	Abandonment Form Enclosed
Harvey Park Well		G-060265		T9N R16W Sec 19 SE1/4 SE1/4
Grandpa's Well		G-070227		T8N R16W Sec 13 NE1/4 NW1/4
83-1	83-1	A-16167D	Active	T8N R15W Sec 16 SE1/4 NW1/4
83-2	83-2	A-16167B	Active	T8N R15W Sec 16 SW1/4 NE1/4
83-3	83-3	A-16167A	Active	T8N R15W Sec 16 NW1/4 NE1/4
83-4	83-4	A-16167C	Active	T8N R15W Sec 16 SE1/4 NE1/4
83-5	83-5	A-16167F	Active	T8N R15W Sec 16 NE1/4 NE1/4
83-6	83-6	A-16167E	Active	T8N R15W Sec 15 NE/14 NE1/4
92-7	92-7	G-76596	Active	T8N R15W Sec 16 SW1/4 NW1/4
92-8	92-8	G-76597	Active	T8N R15W Sec 16 SW1/4 NW1/4
92-9	92-9	G-76598	Active	T8N R15W Sec 16 SE1/4 NW1/4
92-10	921	G-76599	Active	T8N R15W Sec 16 SW1/4 NE1/4
92-11	921A	G-76600	Active	T8N R15W Sec 16 NW1/4 NE1/4
92-12	922	G-76601	Active	T8N R15W Sec 16 NE1/4 NE1/4
01-13	2000-3	G-113358	Active	T8N R15W Sec 16 SE1/4 NW1/4
01-14	2000-1	G-113359	Active	T8N R15W Sec 16 SW1/4 NE1/4
01-15	2000-2	G-113360	Active	T8N R15W Sec 16 NE1/4 NE1/4

City status reflects the current water supply rotation and is not representative of the NDNR well registration records.

The combined pumping capacity of the existing 21 active municipal wells is 21,300 gpm. The wells are shown in **Figure 11 –Municipal Wells.** The City of Kearney will permanently abandon the 7 inactive wells following receipt of this transfer permit. The City will consider these as permanent offset for depletions. The seven wells are currently on standby due to water quality concerns or mechanical failures.

As previously discussed, this transfer permit and the Northwest Well Field are needed to provide water at sufficient quantity and pressure for the north high pressure side water system for future growth. The City has recently added a 2 million gallon water storage facility to the north side to assist with the increasing demand. The City is still experiencing challenges keeping up with the demand through the booster pumping stations. The storage facility was completed in 2000 and the water demand for the last 6 years would be representative of the north side demand with the new elevated tower in service.

TABLE 4 - Existing Municipal Wells

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83-3	83-3	A-16167A	Active	T8N R15W Sec 16 NW1/4 NE1/4
83-4	83-4	A-16167C	Active	T8N R15W Sec 16 SE1/4 NE1/4
83-5	83-5	A-16167F	Active	T8N R15W Sec 16 NE1/4 NE1/4
83-6	83-6	A-16167E	Active	T8N R15W Sec 15 NE/14 NE1/4
92-7	92-7	G-76596	Active	T8N R15W Sec 16 SW1/4 NW1/4
92-8	92-8	G-76597	Active	T8N R15W Sec 16 SW1/4 NW1/4
92-9	92-9	G-76598	Active	T8N R15W Sec 16 SE1/4 NW1/4
92-10	921	G-76599	Active	T8N R15W Sec 16 SW1/4 NE1/4
92-11	921A	G-76600	Active	T8N R15W Sec 16 NW1/4 NE1/4
92-12	922	G-76601	Active	T8N R15W Sec 16 NE1/4 NE1/4
01-13	2000-3	G-113358	Active	T8N R15W Sec 16 SW1/4 SE1/4
01-14	2000-1	G-113359	Active	T8N R15W Sec 16 NE1/4 SW1/4
01-15	2000-2	G-113360	Active	T8N R15W Sec 16 NE1/4 NE1/4

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The 6 year summary of annual pumping is reproduced below in **Table 5 – North System Annual Water Use 2000-2006.**

TABLE 5 - North System Annual Water Use 2000-2006

ENTIRE SYSTEM	2000	2001	2002	2003	2004	2005	6 Year Avg.
Total Water Used	2,502,406,000	2,435,278,000	2,605,136,000	2,582,672,000	2,256,648,000	2,340,426,000	2,453,761,000
Average Day Water Use	6,855,900	6,672,000	7,137,400	7,075,800	6,182,600	6,412,126	6,722,600
Peak Day Water Use	14,189,000	15,546,000	16,580,000	16,880,000	13,633,000	14,834,000	15,277,000
Peaking Factor	2.07	2.33	2.32	2.39	2.21	2.31	2.27
NORTH SYSTEM	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**6 Year Avg.**
Total Water Used	984,369,000	937,635,000	1,145,166,000	968,180,400	890,772,000	884,498,700	968,436,850
Average Day Water Use	2,696,900	2,568,900	3,137,400	2,652,500	2,440,500	2,423,300	2,653,300
Peak Day Water Use	5,010,000	5,867,200	7,293,000	8,208,000	6,129,000	7,110,000	6,602,867

The average daily demand for the period 2000-2006 was approximately 6,412,126 gallons per day. With a 2000 population of 27,431 this is equivalent to 233 gallons per capita day including the industrial use. To provide the average day use a constant production rate of 4453 gpm is required.

When looking at the ratio of the peak production in **Table 5** to the average daily flow we see that for Kearney peak flows versus average flow ratio is approximately 2.31. As indicated in **Table 5**, the average daily water use for the north system is approximately 2,653,300 gallons. The transfer permit request of 4 MGD will provide for the growth of the City for the next 20-25 years utilizing the existing infrastructure.

By providing an average of 4 MGD from the proposed Northwest Well Field and decreasing pumping from the Platte River Well Field, stream depletion calculations were completed to verify the COHYST model results for this Groundwater Transfer Permit.

To calculate impacts to the Platte River via stream depletion, a conservative approach was taken. For comparison, it is assumed the amount of water pumped from the proposed Northwest Well Field is saved and not pumped from the Platte River Well Field. It is also assumed the full permit request of 4 MGD is immediately and continuously used, although as shown in **Table 5** the average is only 2.65 MGD at this time.

Stream depletion rates and factors were calculated for each location using the annual average withdrawal quantity per day, the physical location of the existing and proposed well fields, storability of the aquifer, and transmissivity from the COHYST model. See **Figure 12 – Stream Depletion Graphs/Calculations** for the assumption summary and stream depletion graph generated.

The stream depletion factor of the existing well field is calculated as 10, which seems somewhat lower than expected, however, they do place the existing well field in the area of Stream Depletion Factor (SDF) under 50. The proposed well field site is located on both sides of the 15,000 SDF line. The calculations in **Figure 12** estimate a SDF of 23,635.

In **Figure 12**, the stream depletion lines for the existing well field and the proposed well field do not cross even with 80 years of pumping. Thus, if the City of Kearney were to develop the entire well field at once, begin pumping at the average rate of 2,778 gpm to

the system, the proposed well field is estimated to conserve over 600 million gallons of water. The City should be allowed stream flow credit for the development of the Northwest well field.

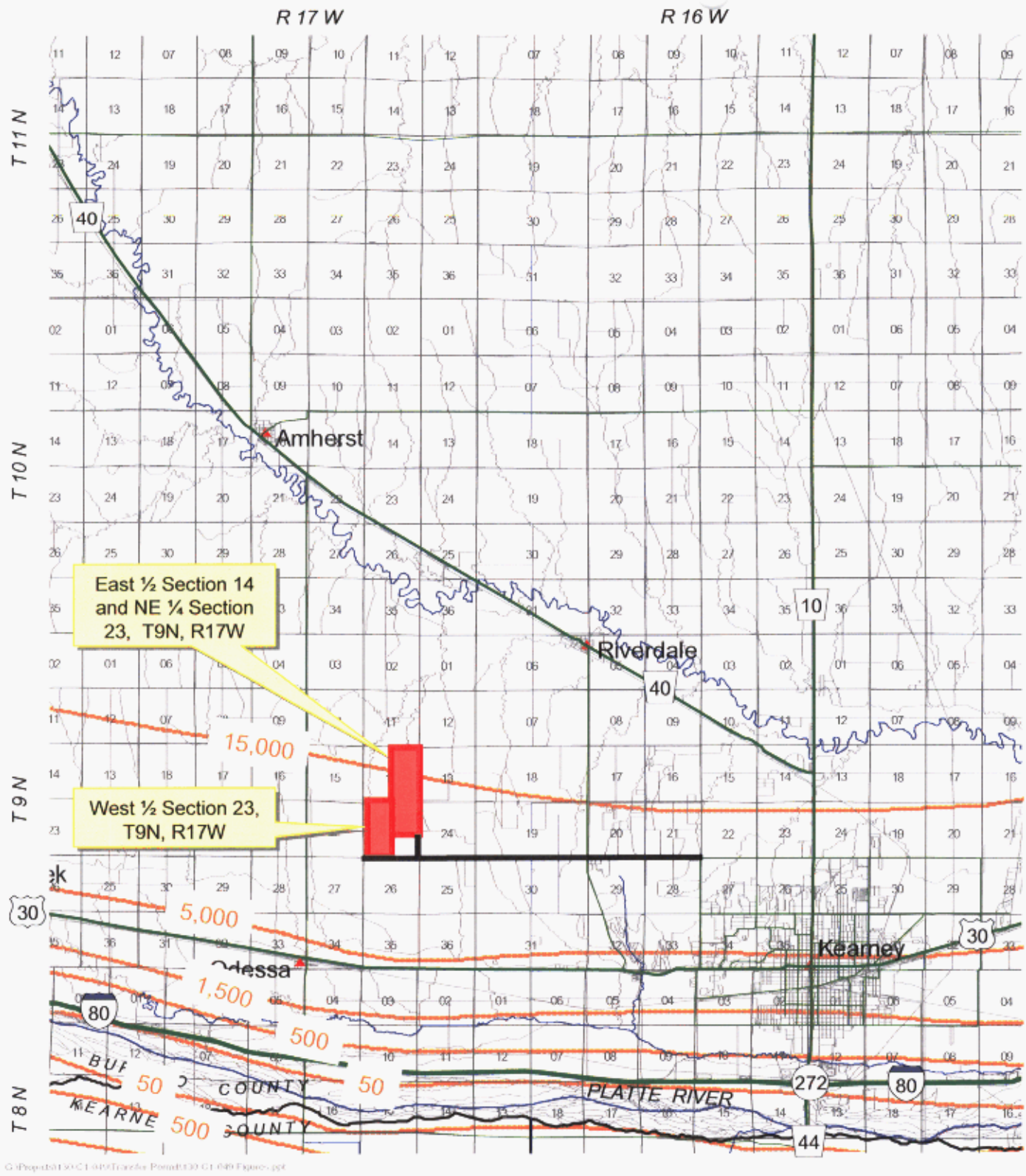
The City has an existing groundwater transfer permit on file at the NDNR for the Platte River Well Field. The permit number is A-16167. The permit priority date was set at January 10, 1983. The allotted water use for the permit is 24,048,000 gallons per day.

Due to the priority dates of transfer permits, the benefits to stream depletions and the existing quantity allocated, the City is requesting the new permit not decrease the allotted water use for permit number A-16167. This is justified due to the long phasing process of pumping from the existing wells and development of the new well field.

The request to obtain quality drinking water for the citizens of Kearney is reasonable, is not contrary to the conservation and beneficial use of groundwater, and is not detrimental to the public welfare. Approval of this permit should result in no net increase in withdrawals from the Platte River basin for at least 80 years based on the calculations and assumptions presented above.

H. **Map showing location of proposed wells, pipelines (exclusive of distribution lines) and the area of proposed use. The map shall be legible and at a scale of not less than one inch to the mile.**

Figure 1 shows the proposed well field and transmission main. **Figure 13 – Service Area** depicts an area two mile outside of the City limits for the City of Kearney. The City has zoning jurisdiction 2 miles outside of the City limits. This area is constantly being modified by the City of Kearney during annexation processes.



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North

Legend

- Well Field Location
- Transmission Main
- CPNRD Stream Depletion Contour

Figure 1
Project Location
City of Kearney, Nebraska

MAR 03 2006

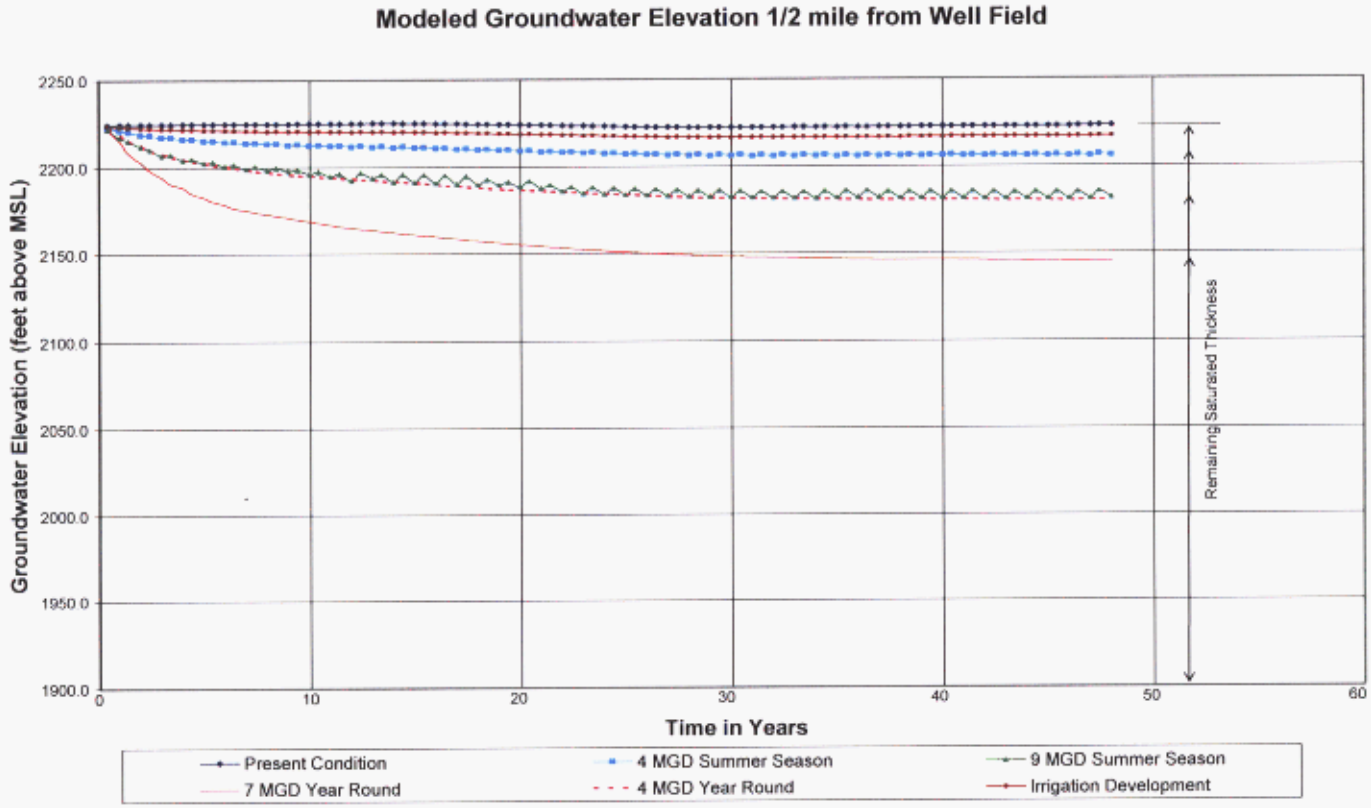

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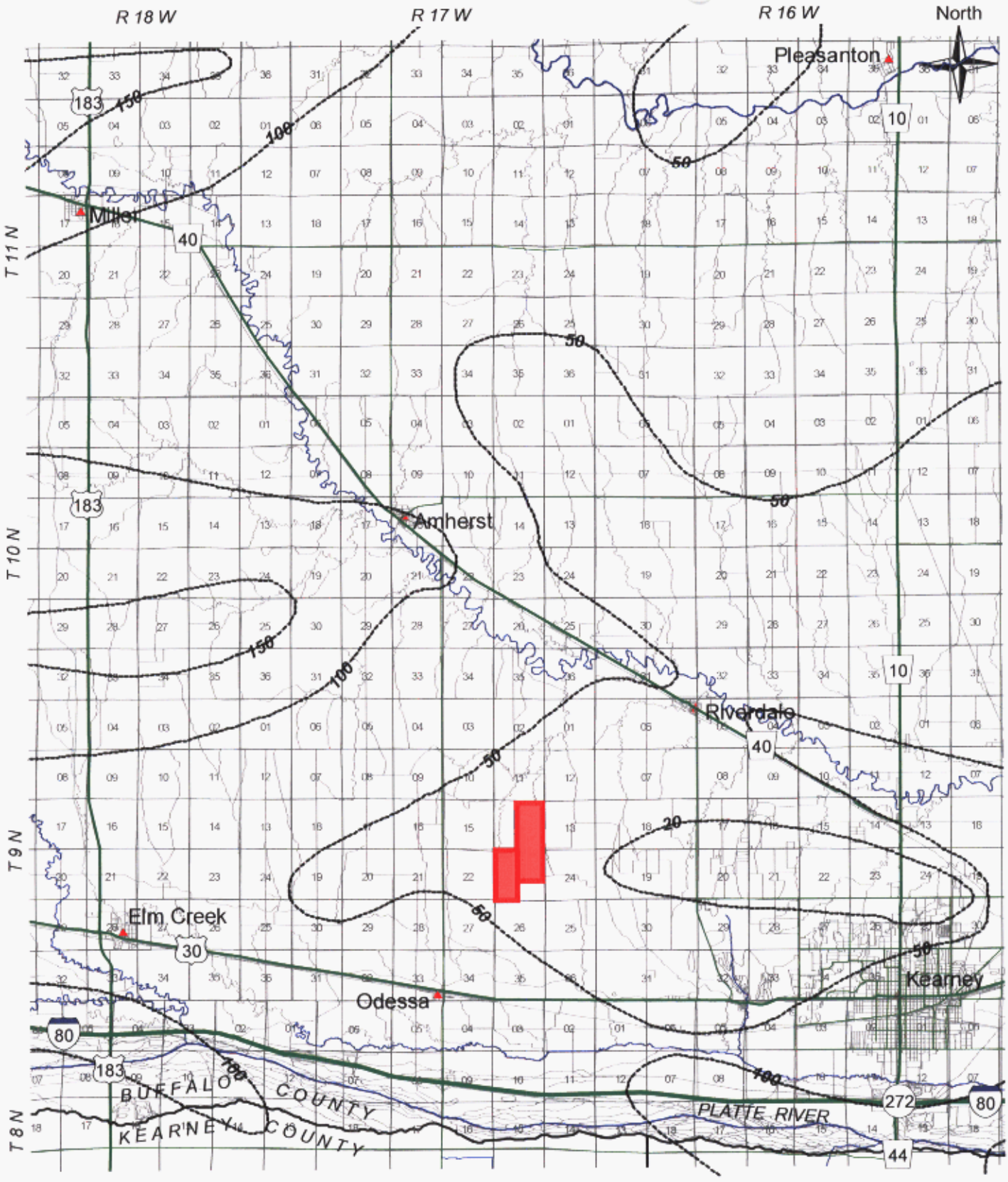
Figure 2
CPNRD Modeled Ground Water Elevations
City of Kearney, Nebraska



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Well Field Location

Transmissivity in thousand of gallons per day per feet. *Digitized from Conservation & Survey Division UNL - Pub. 1980.*

Figure 3
CSD Transmissivity Values
City of Kearney, Nebraska

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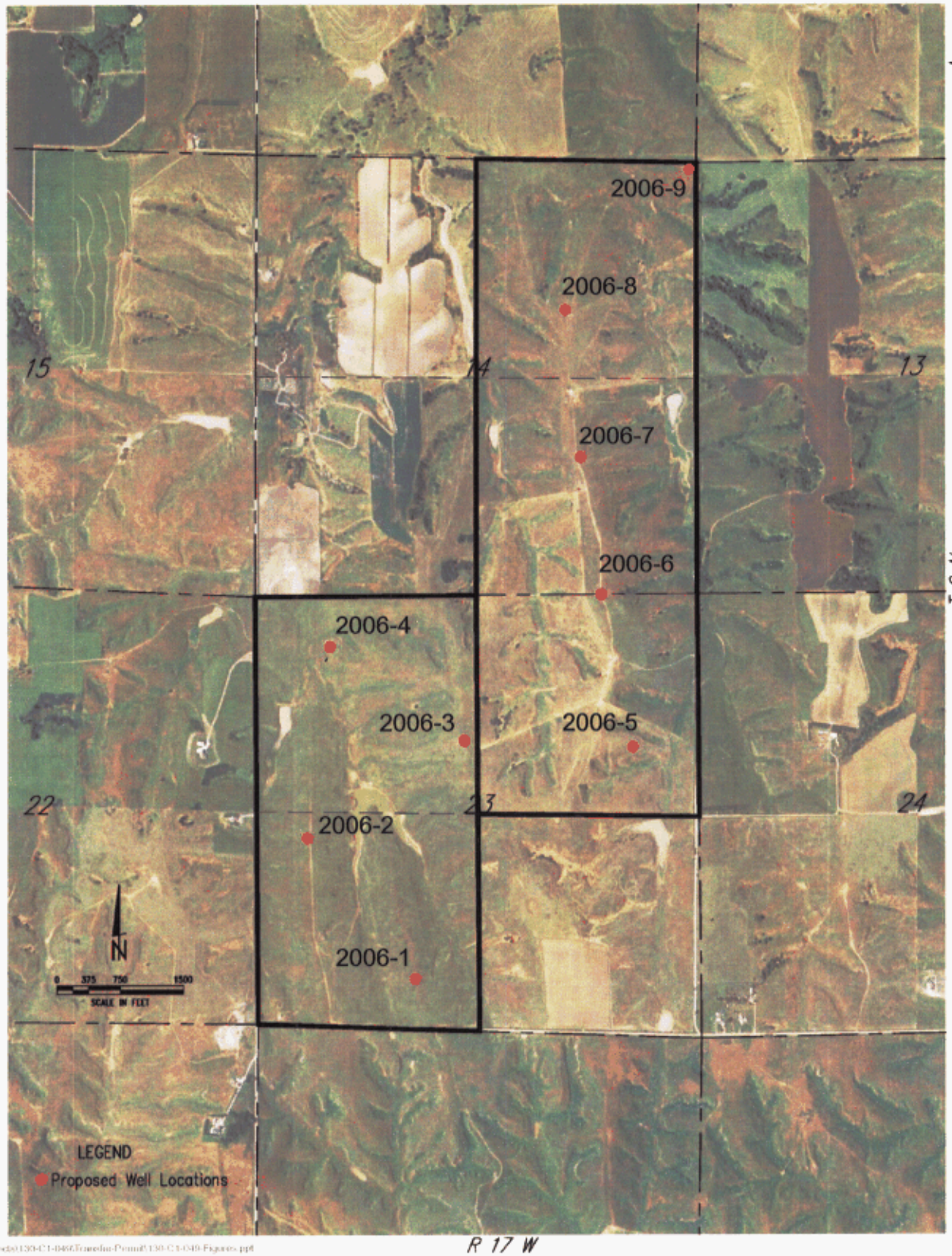

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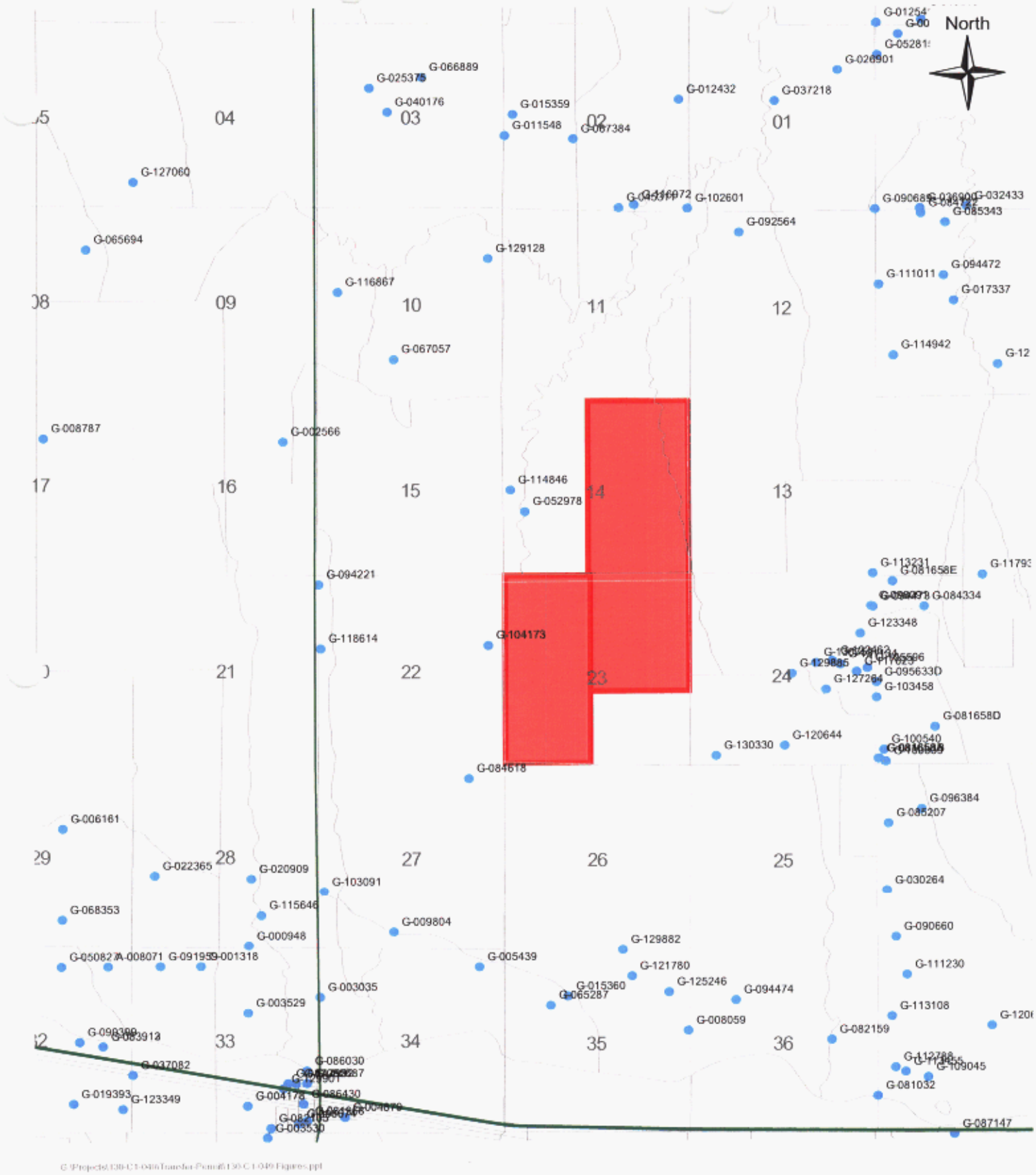
Figure 4
Potential Well Sites
City of Kearney, Nebraska



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Well Field Location

Registered Well

Figure 5
Registered Wells
City of Kearney, Nebraska

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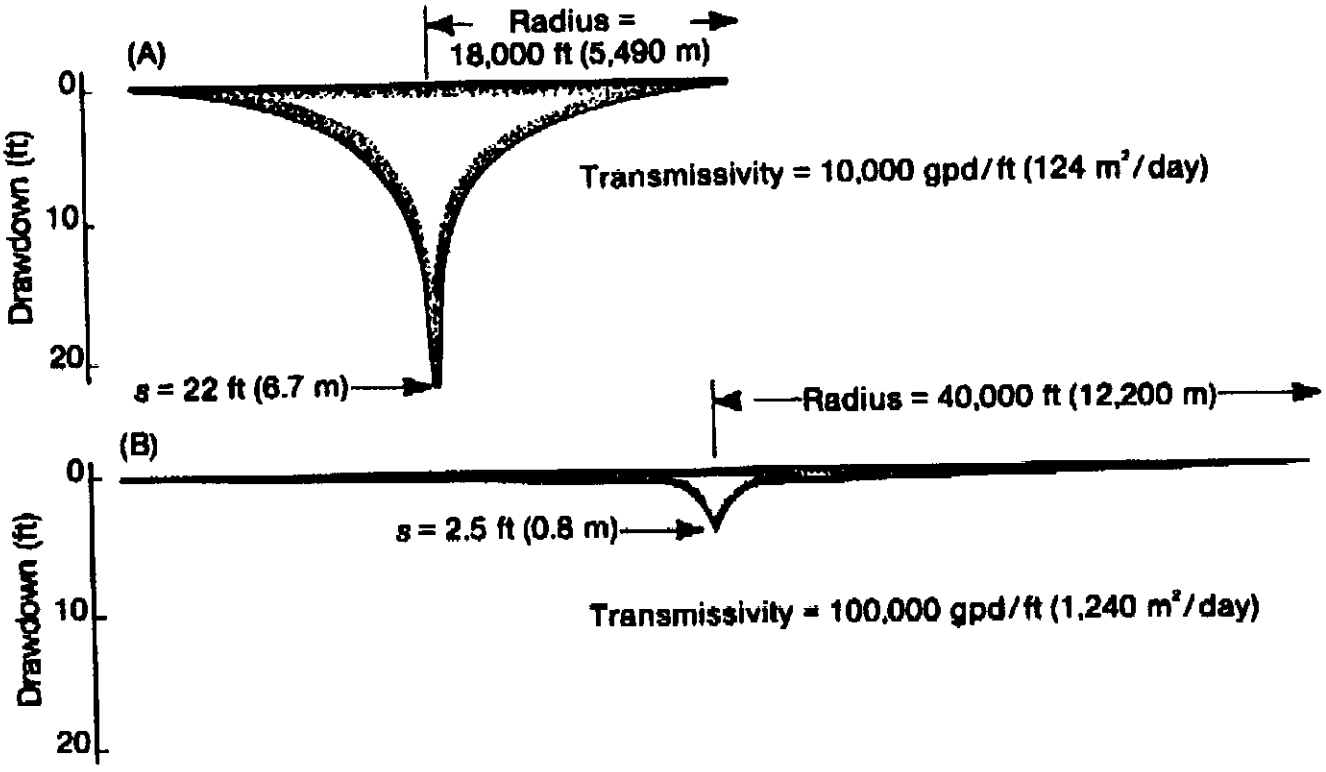

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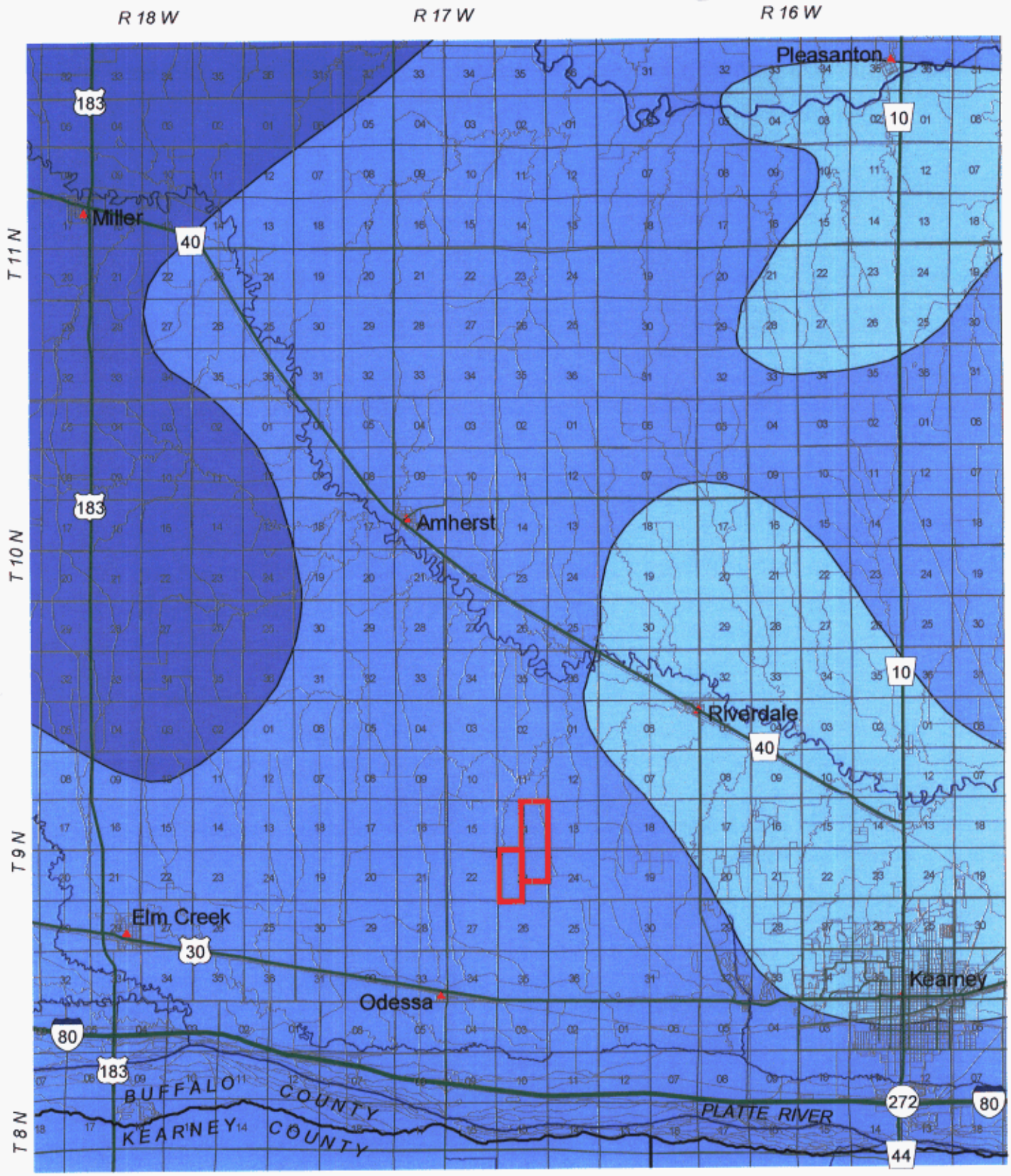
Figure 6
Effects of Transmissivity
City of Kearney, Nebraska



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Well Field Location

200 Feet
300 Feet
400 Feet

Figure 7
CSD Saturated Thickness
City of Kearney, Nebraska

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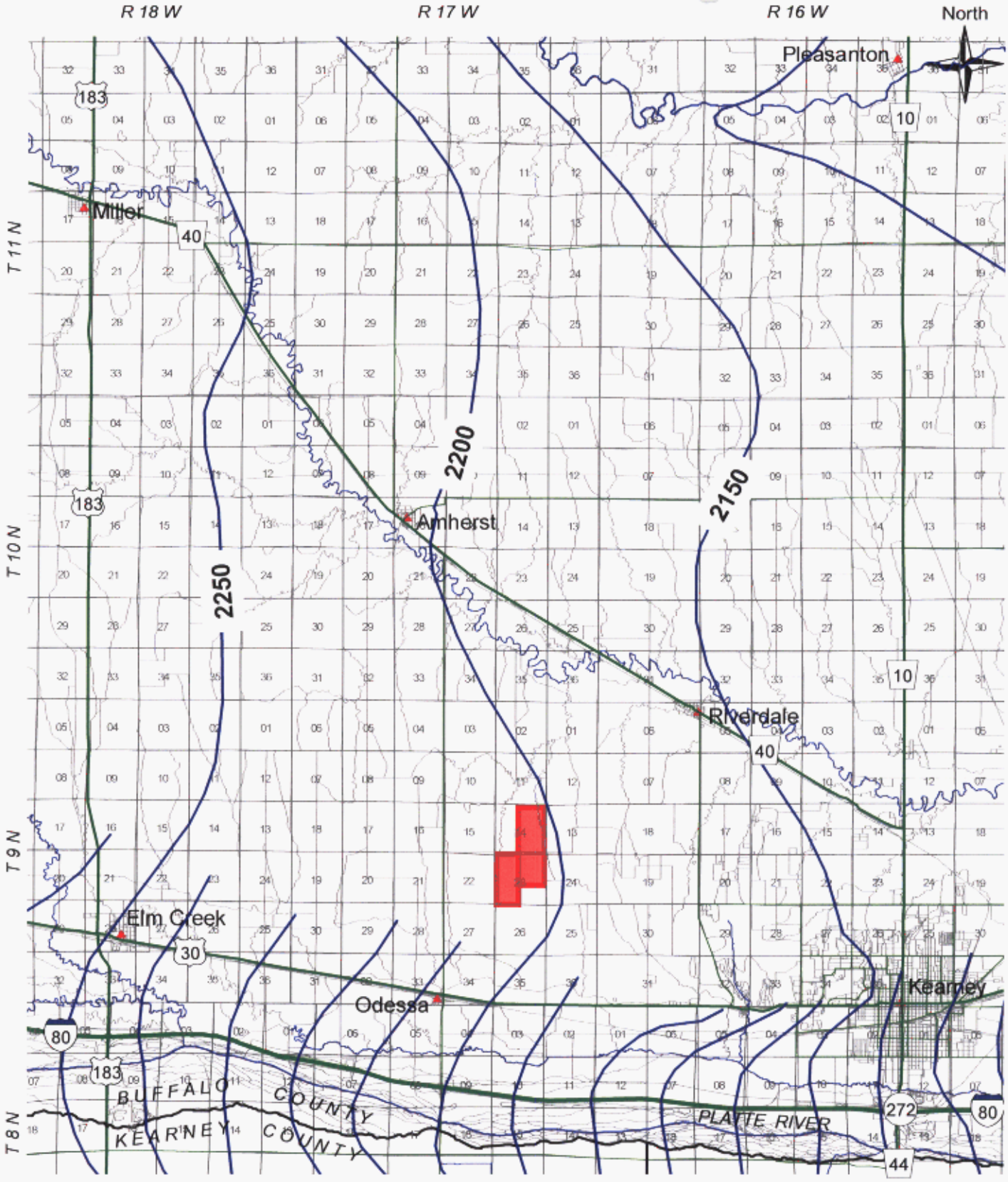

Well Field Location

— 2250 —

1995 ground water contours were digitized by the Conservation and Survey Division, University of Nebraska-Lincoln, from Maps developed by the U.S. Geological Survey.

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Figure 8
Regional Ground Water Elevation
City of Kearney, Nebraska

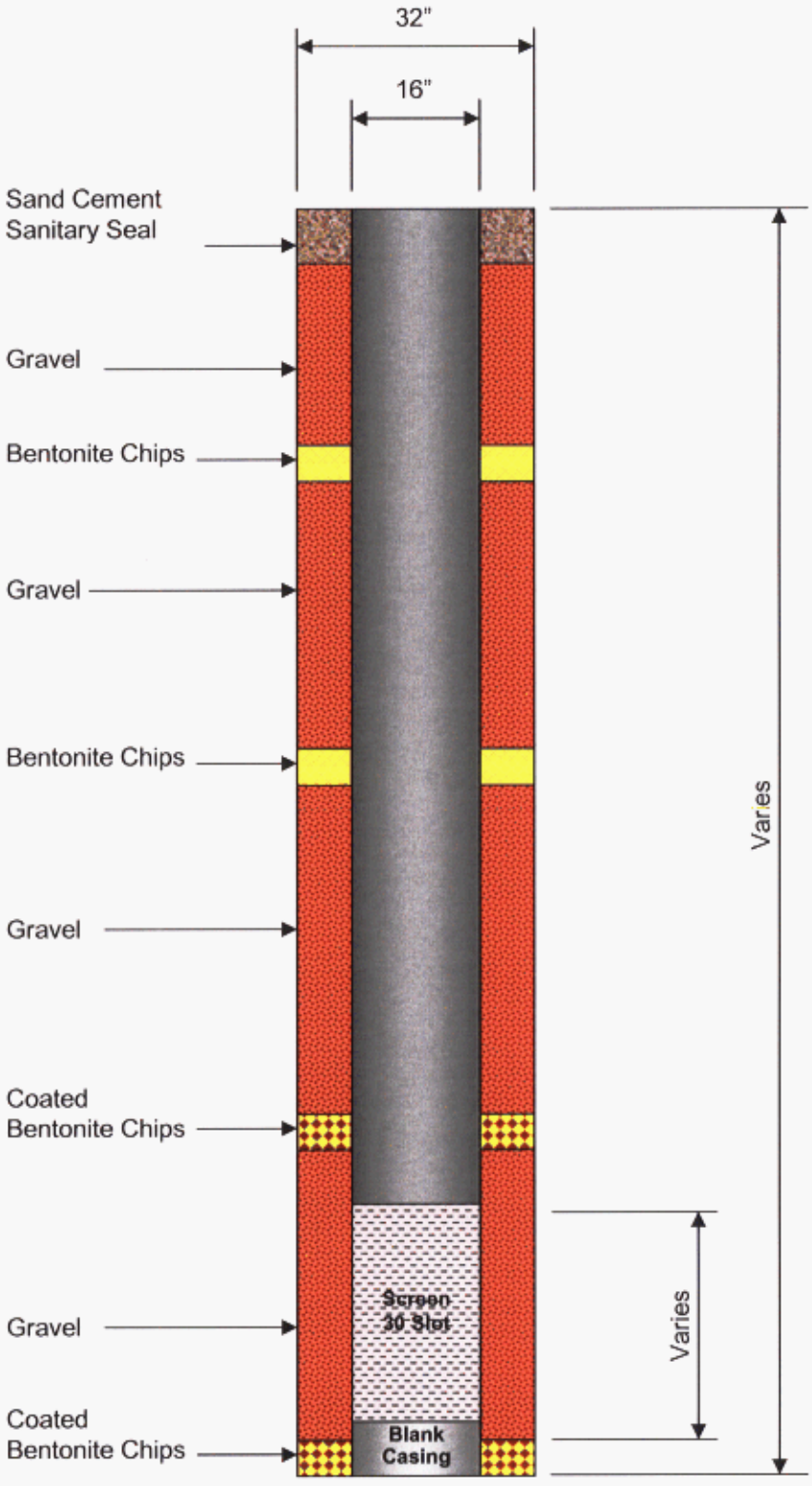

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Figure 9
Well Construction Schematic
City of Kearney, Nebraska

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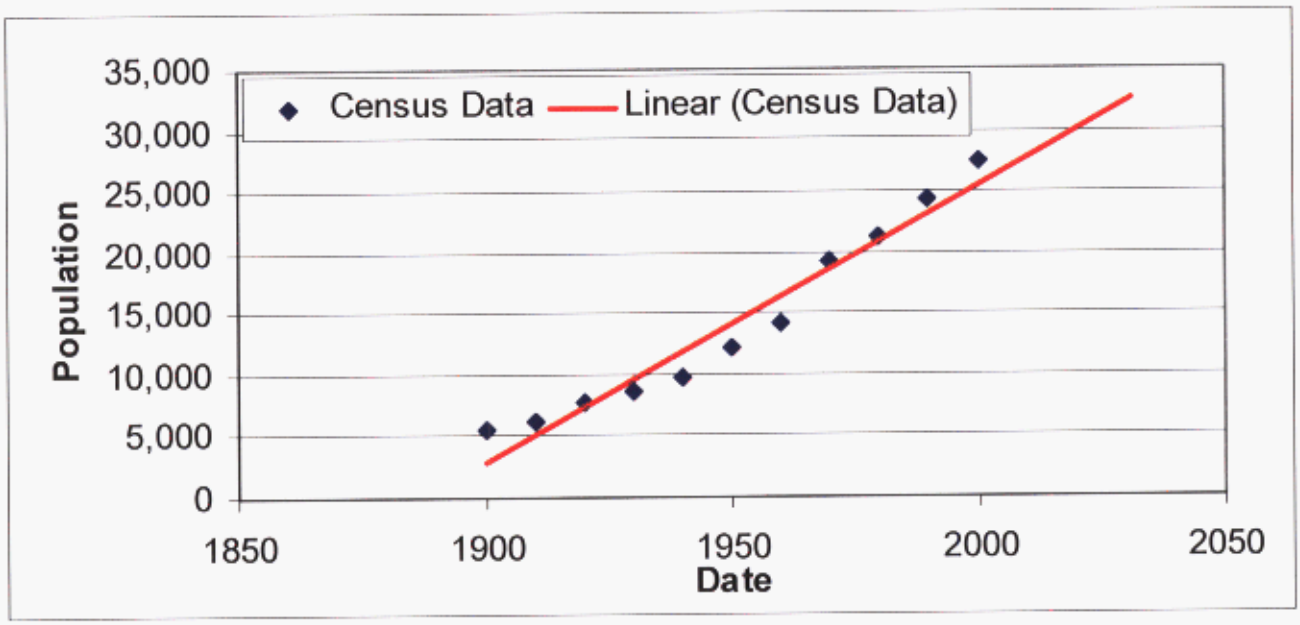

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Figure 10
Population Projection
City of Kearney, Nebraska

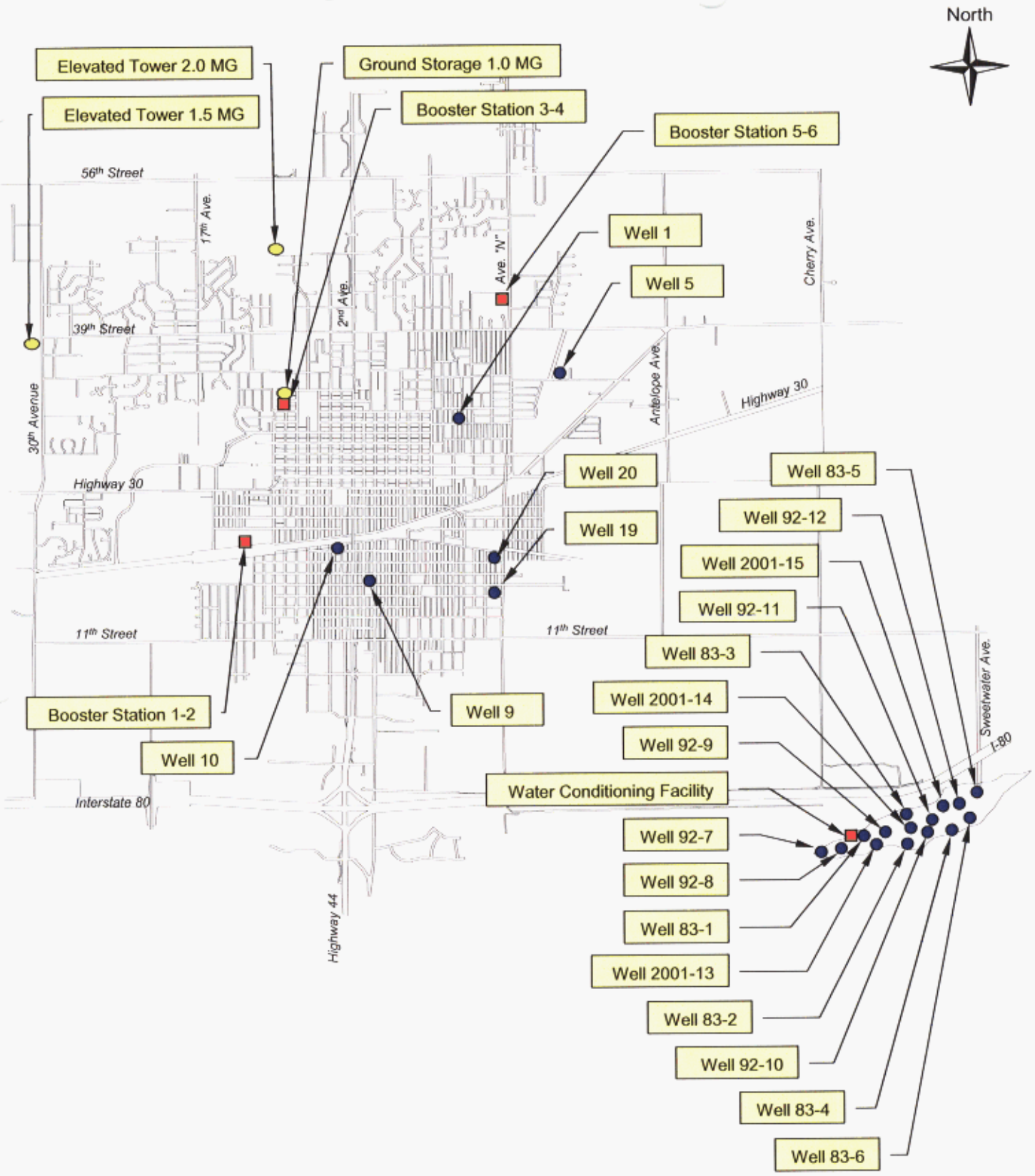

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Figure 11
Municipal Wells
City of Kearney, Nebraska

Formulas are taken from USGS Chapter D1 - Computation of Rate and Volume of Stream Depletion by Wells by CT Jenkins, Book 4

sdf = a^2S/T

a= perpendicular Distance from well
S= specific yield
T = Transmissivity
t = time
Q = pumping rate
tp = time pumping
ti = time after pumping stops
q = rate of stream depletion
Qt = net volume pumped during ti
Qtp = net volume pumped
v = volume of stream depletion
sdf = stream depletion factor

units are dimensionless and can be used with any units but MUST be consistent

	Existing Wells	Proposed Wells
a= feet	1000	23760
S=	0.2	0.15
T (gpd/ft)	150000	26800
T = Sq. Ft/d	20053	3583
t = day	365	365
Q (gpm)	2778	2778
Q = cfd	534802	534802
sdf =	10	23635

error function erf(x) = (2/pi)* x-x^3/3+x^5/10-x^7/42+x^9/216)
complementarty error function erfc(x) = 1-erf(x)

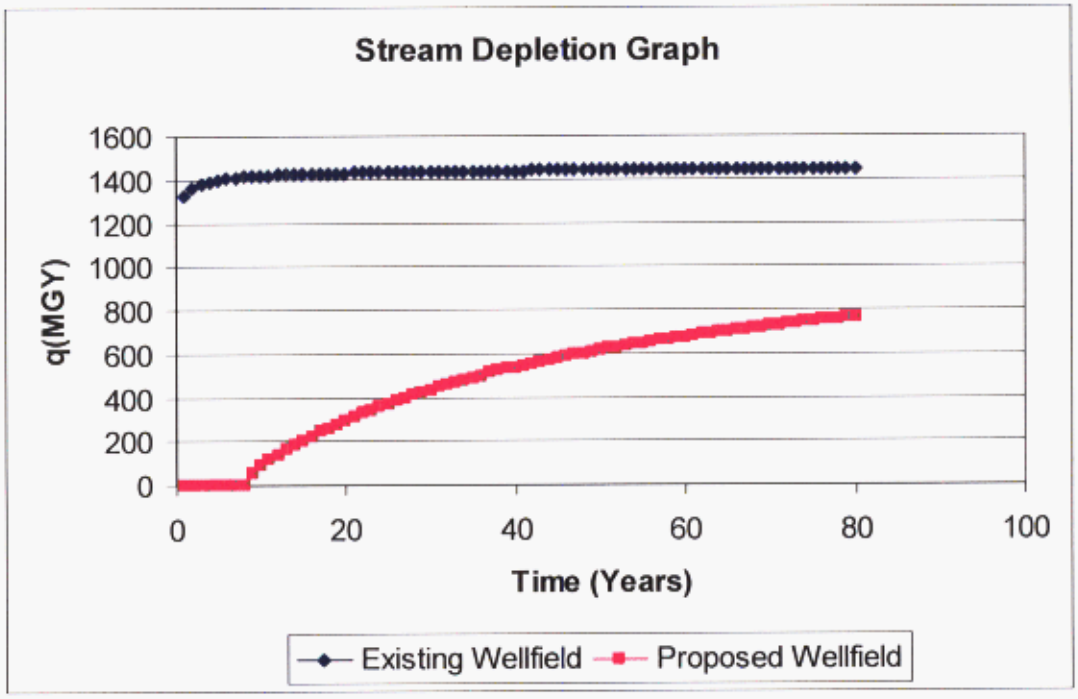

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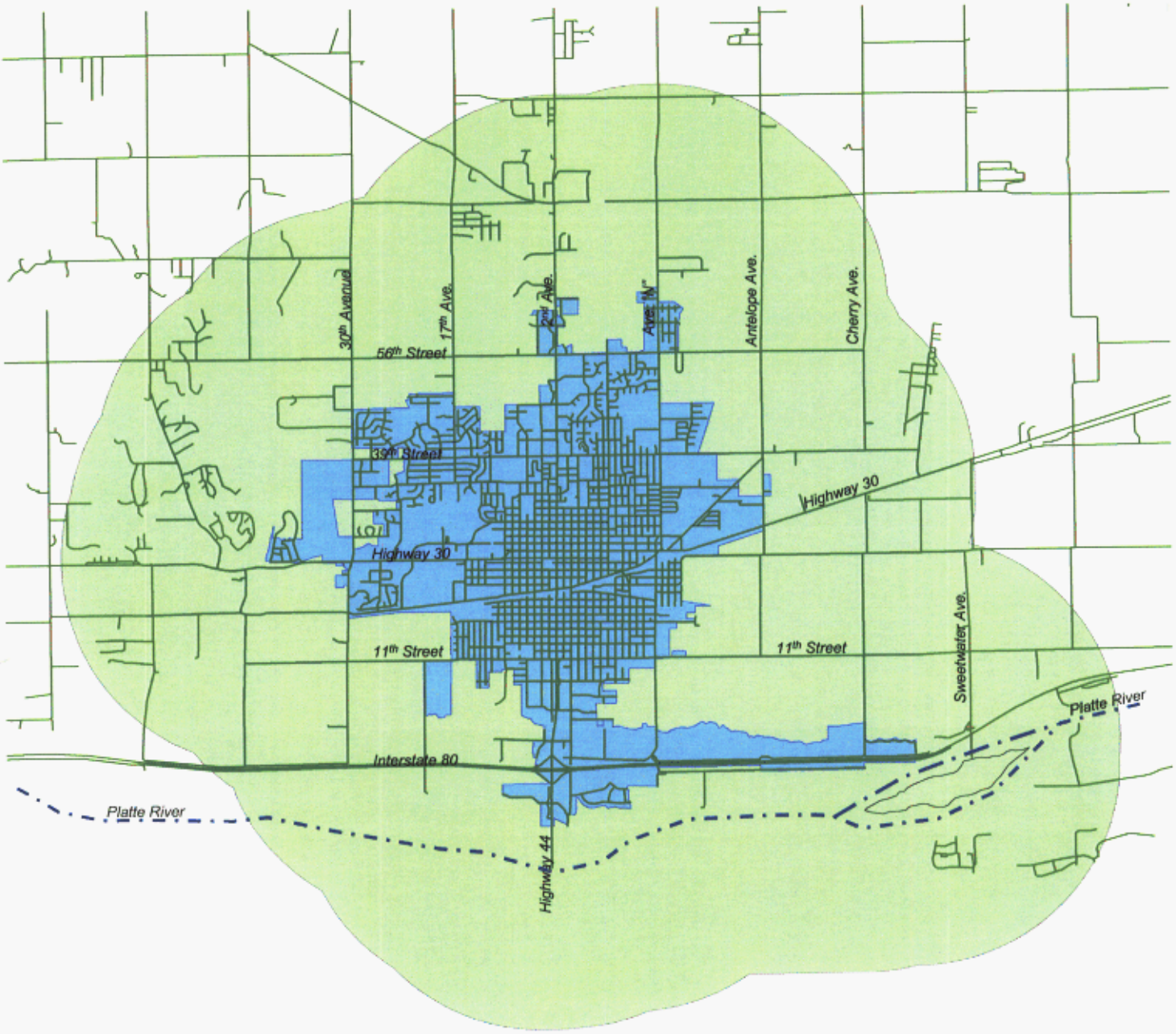
Figure 12
Stream Depletion Graphs / Calculations
City of Kearney, Nebraska



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North

City of Kearney - Corporate Limits

City of Kearney - 2 Mile Jurisdiction

Figure 13
Service Area
City of Kearney, Nebraska

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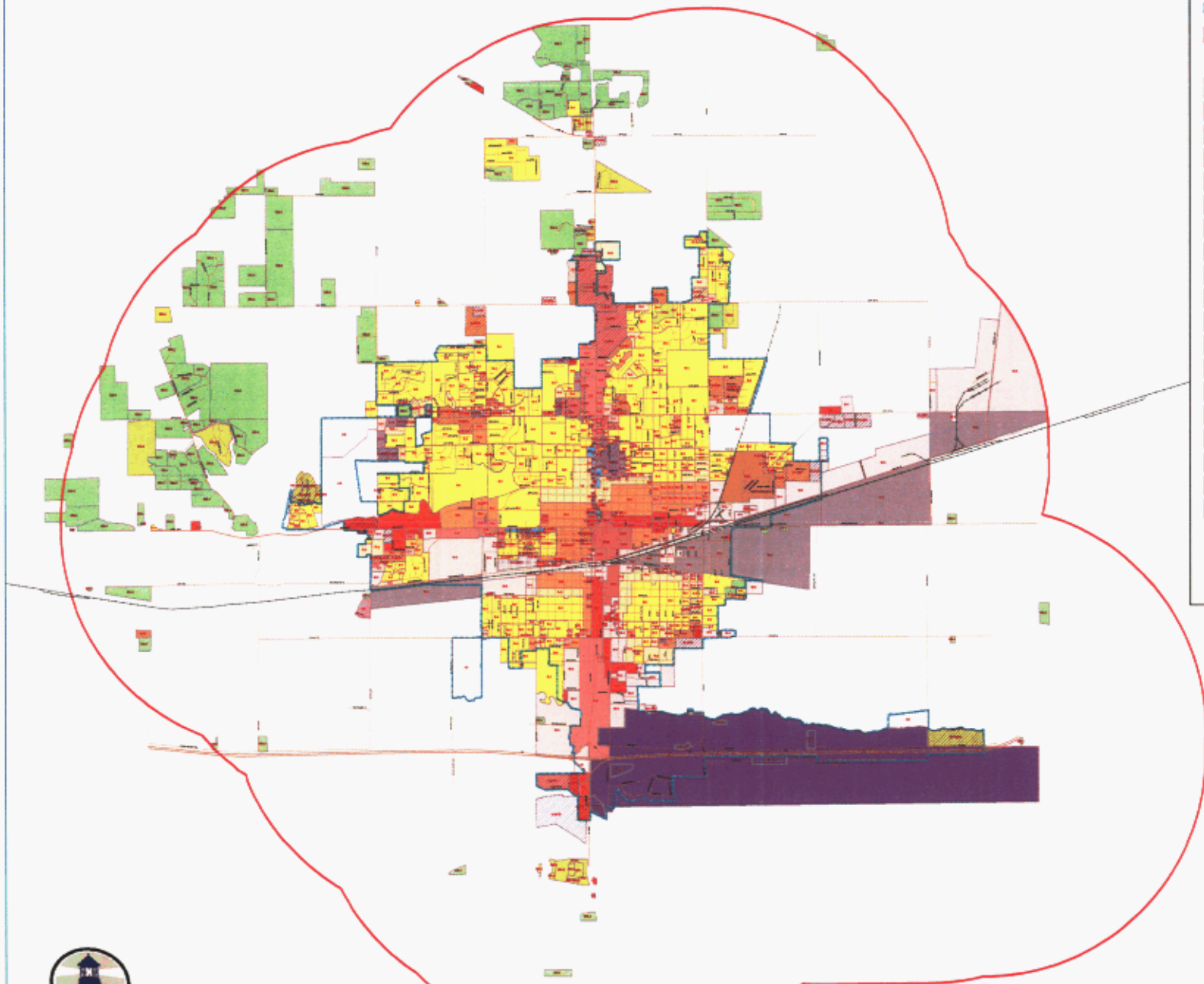
CITY OF KEARNEY
Zoning Map



Legend

City Limits

Two-mile Extra-territorial Jurisdiction

ZONING DISTRICT

- AG - Agricultural
- BP - Business Park
- C-1 - Limited Commercial
- C-2 - Community Commercial
- C-3 - General Commercial
- C-O - Office
- CBD - Kearney Center Mixed Use
- ICMU - Interstate Corridor Mixed Use
- M-1 - Limited Industrial
- M-2 - General Industrial
- MU - Mixed Use
- R-1 - Urban Residential Single-Family Low
- R-2 - Urban Residential Mixed-Density
- R-3 - Urban Residential Multi-Family Medium
- R-4 - Urban Residential Multi-Family High
- RM - Mobile Home Residential
- RR-1 - Rural Residential-Rural
- RR-2 - Rural Residential-Intermediate
- UC - Mixed Use Urban Corridor

OVERLAY DISTRICT

- PD - Planned Development
- ND-1 - Pioneer Park Neighborhood Conservation

CITY OF KEARNEY

City of Kearney GIS

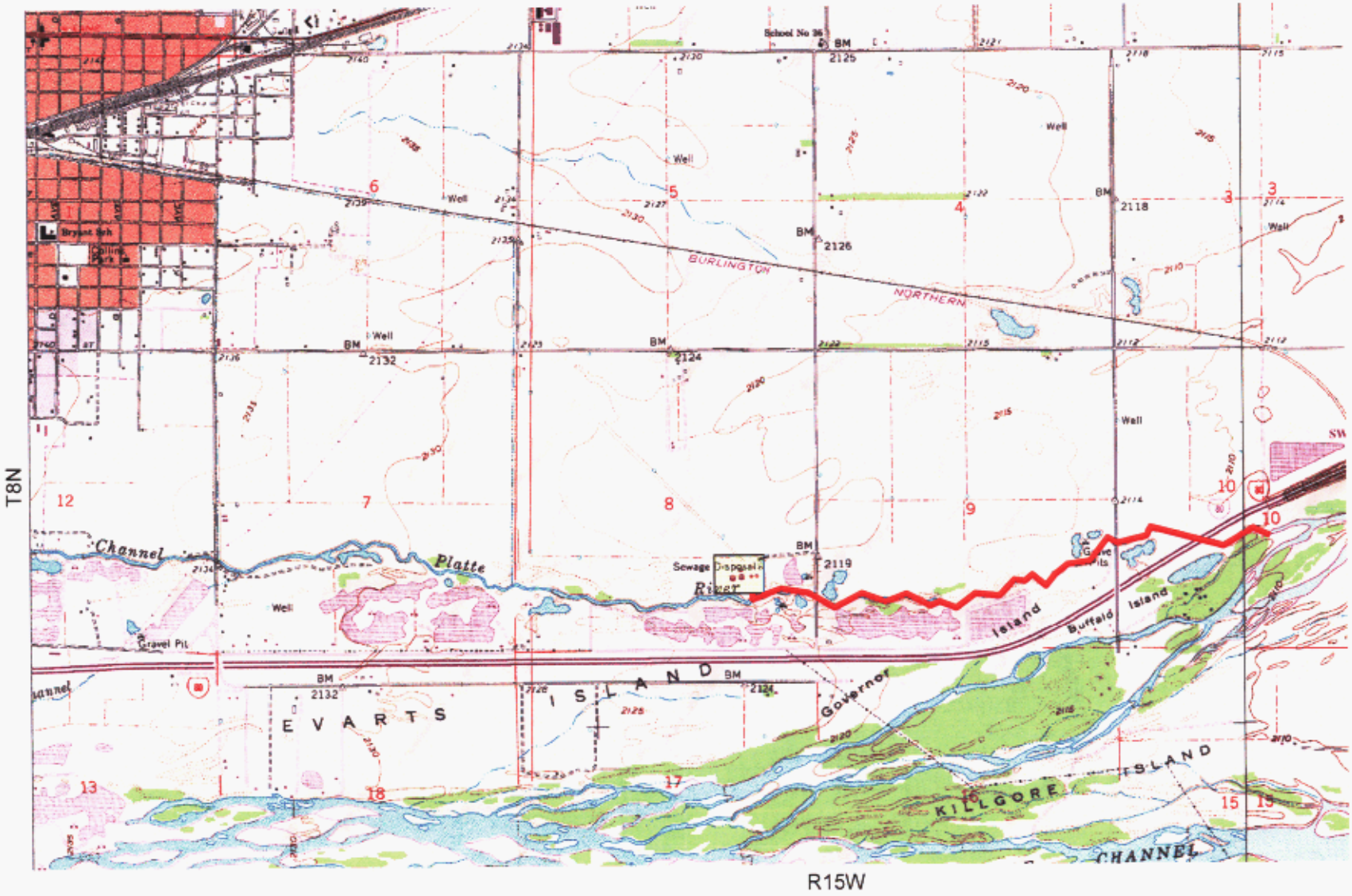
December 2004

N W E S

4,100 2,050 0 4,100 Feet

CORRECTED FILED

MAY 0 1 2006



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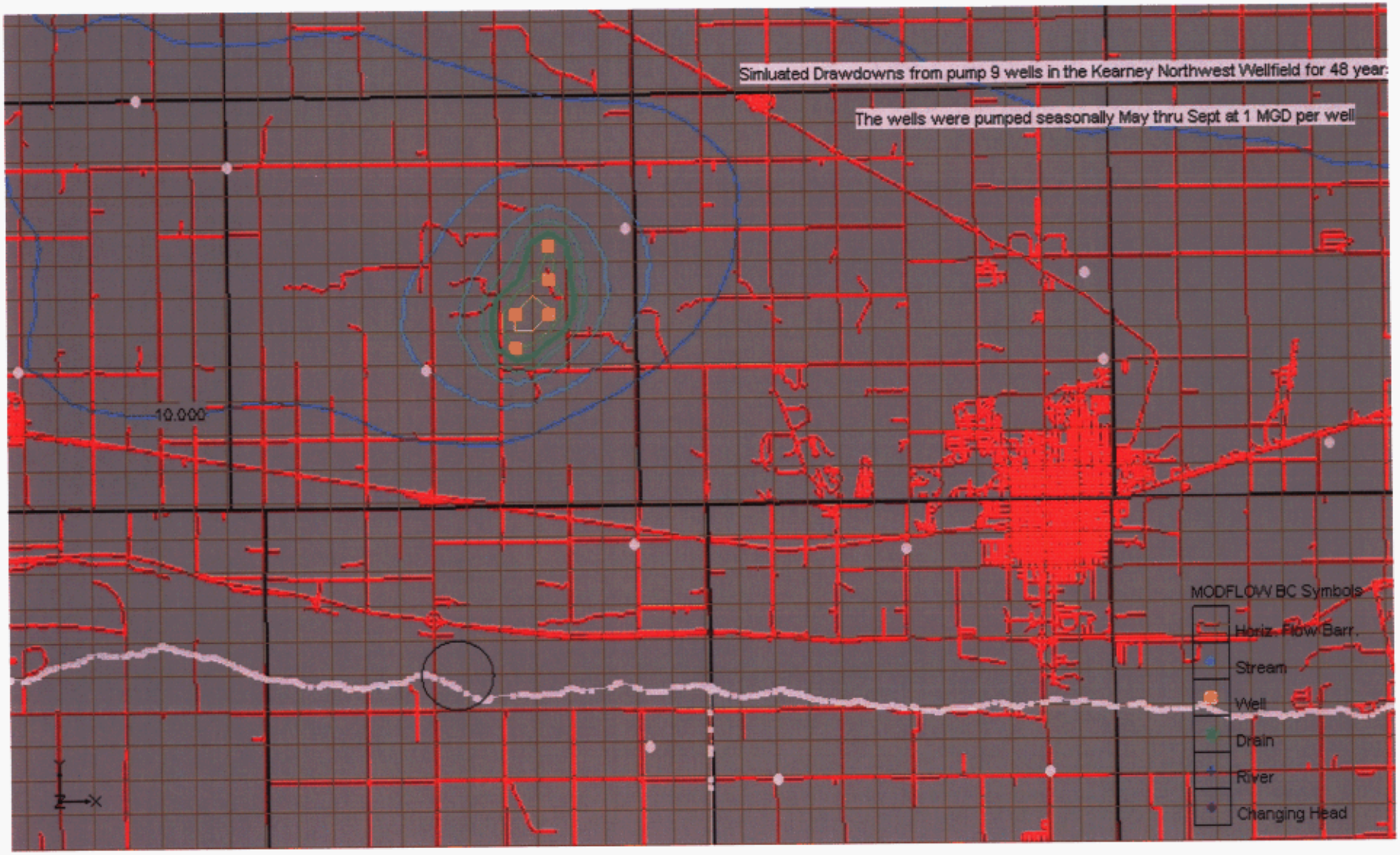
North

Effluent Return Route

Location of WWTF

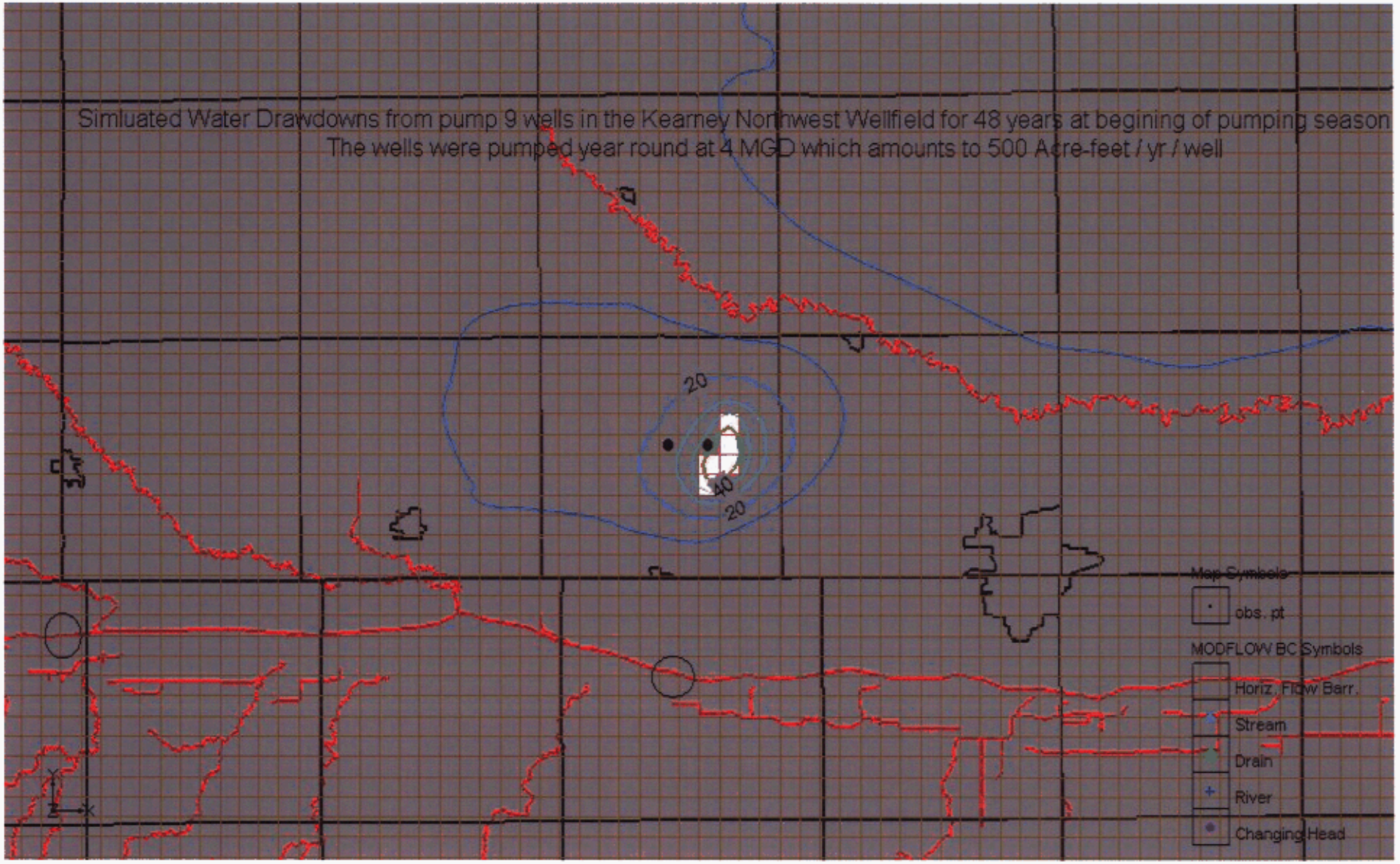
Figure 14
WWTP Location Map
City of Kearney, Nebraska

CORRECTED
FILED
MAY 01 2006



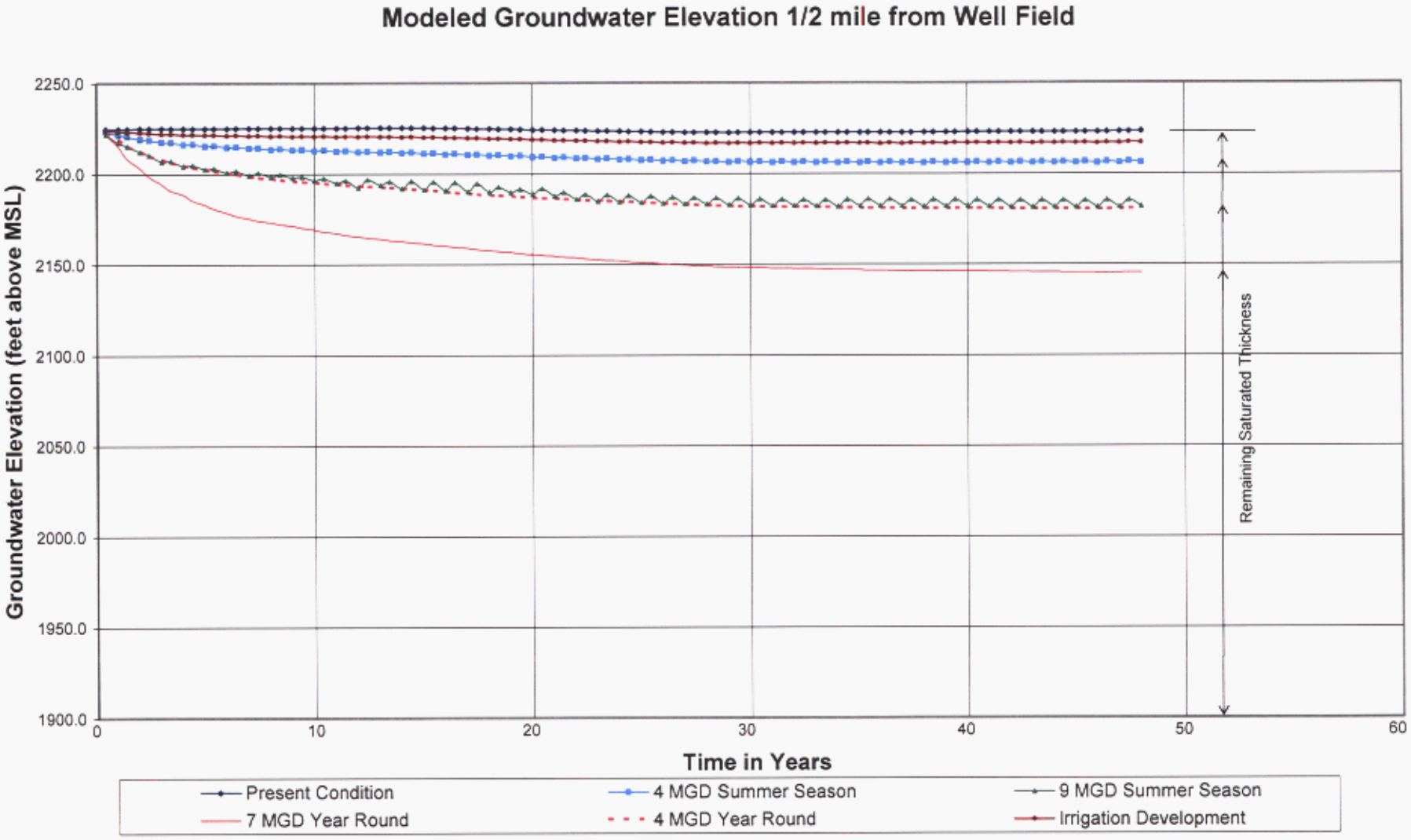
Appendix A – CPNRD Selected Modeling Results

Drawdowns at 9MGD
Summer Months



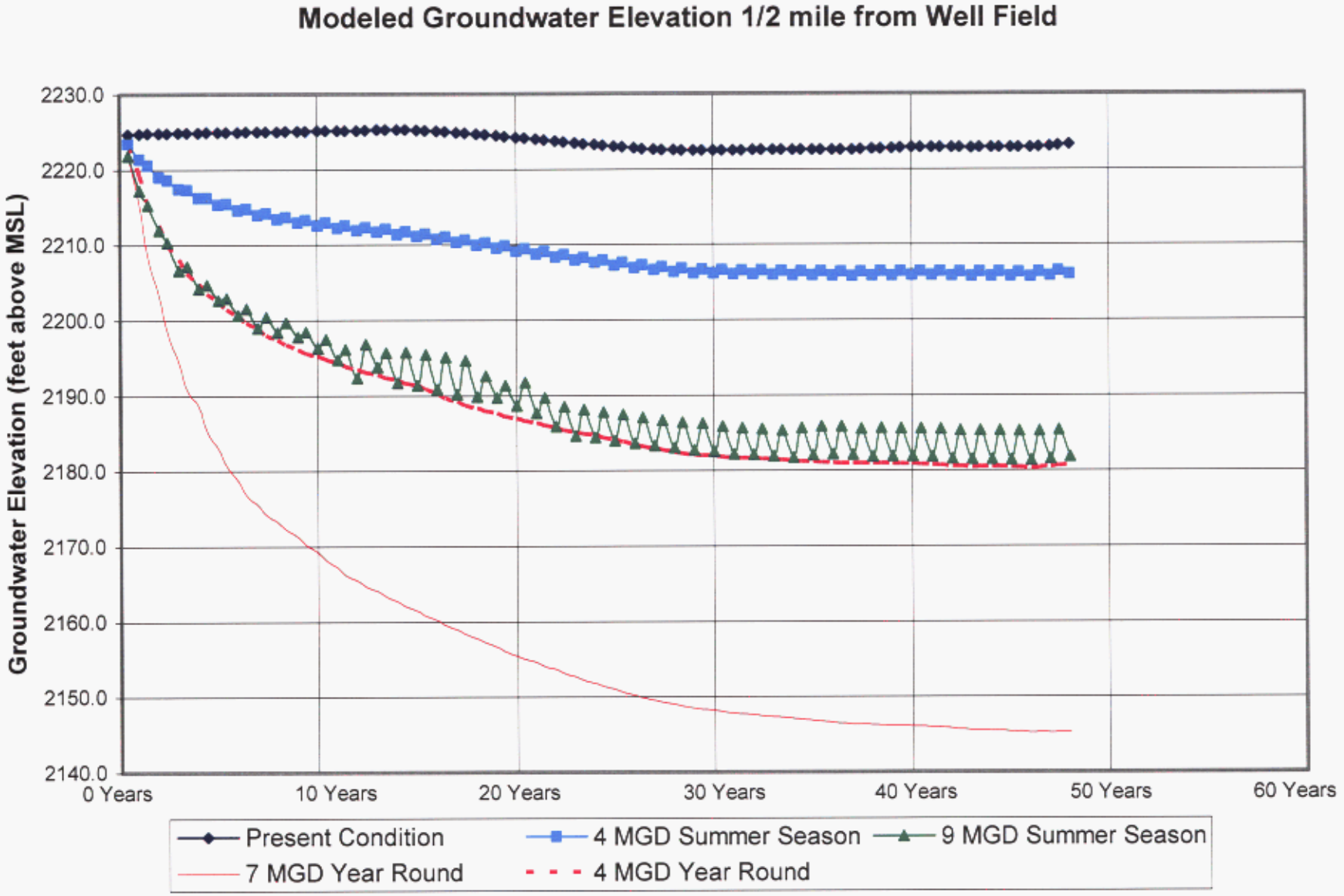
Appendix A – CPNRD Selected Modeling Results

Drawdowns at 4MGD
For 48 years



Appendix A – CPNRD Selected Modeling Results

Hydrograph of Observation Point from Modeling



Appendix A – CPNRD Selected Modeling Results

Enlarged Hydrograph of Observation Point from Modeling

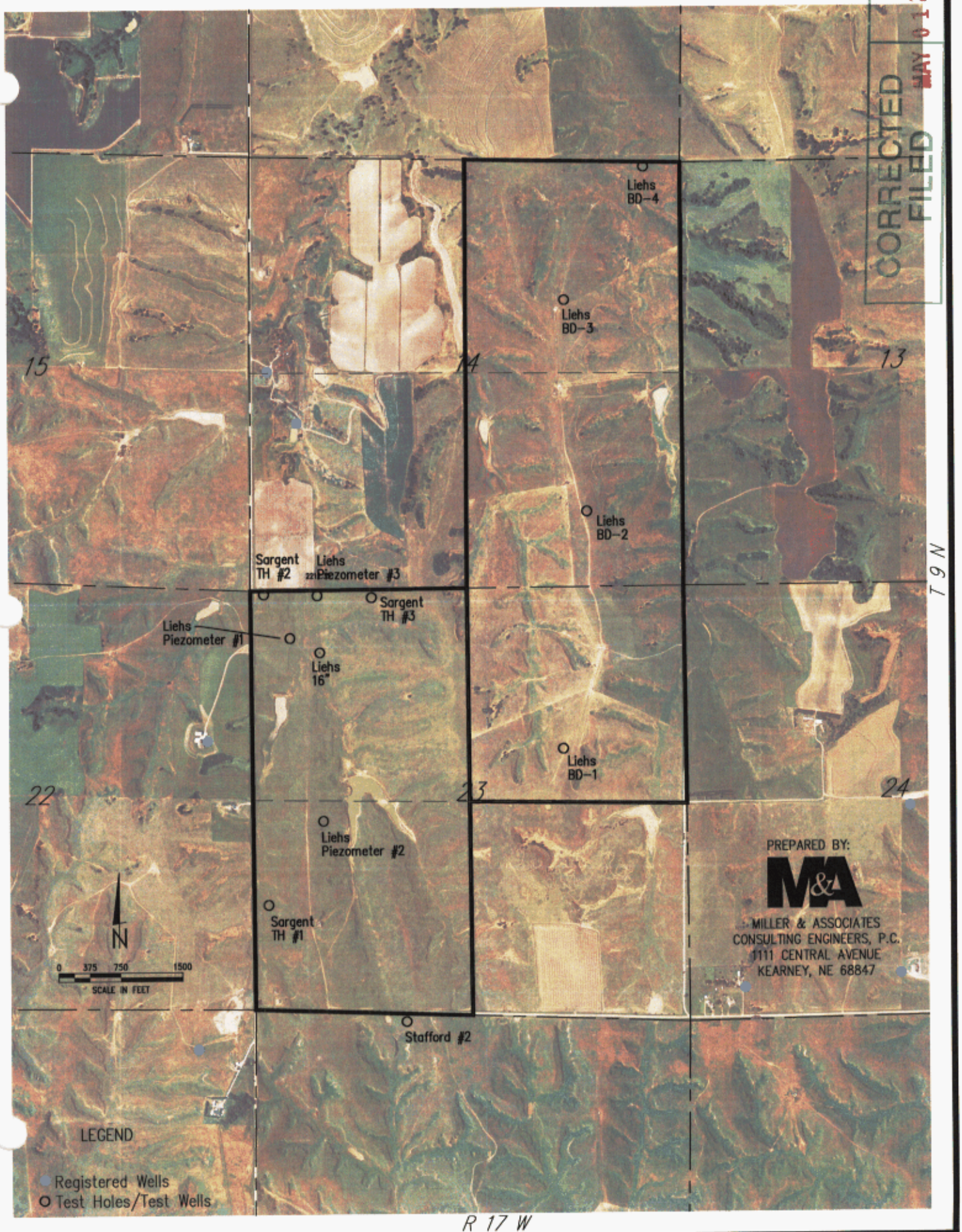
Kearney Well Field COHYST model info

	Elev-Bot feet- MSL	K value ft/day	Spe-Stor	Spe-Yield	Start-head feet-MSL	Saturated Thickness
LSD	2314.6				2214	
Layer 1	2197.6	10	1.00E-06	0.16		16.4
Layer 2	2196	99.2	1.00E-06	0.123		1.6
Layer 3	2154	5	1.00E-06	0.075		42
Layer 4	1901	12	1.00E-06	0.144		253
Layer 5	1900	12	1.00E-06	0.144		1
						314

This data is for model row 104 and column 103 but it was similar for all model nodes in the well field area

SEPT 20, 2005 * 05:54:13 Location: G:\Projec' '30\130-C1-039\Test-Holes\Dibbern-Theis-Test-Hole adius.dwg

CORRECTED
FILED MAY 0 1 2006

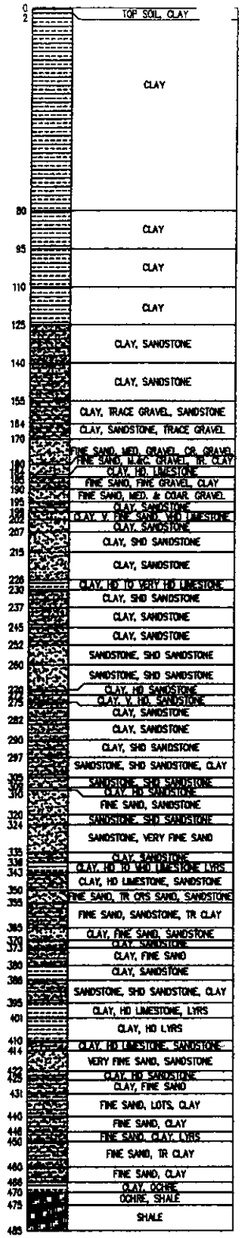


PREPARED BY:

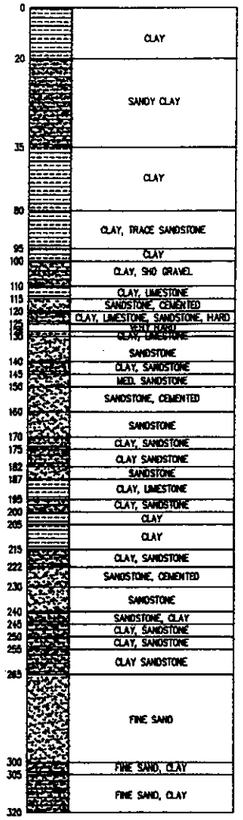
M&A

MILLER & ASSOCIATES
CONSULTING ENGINEERS, P.C.
1111 CENTRAL AVENUE
KEARNEY, NE 68847

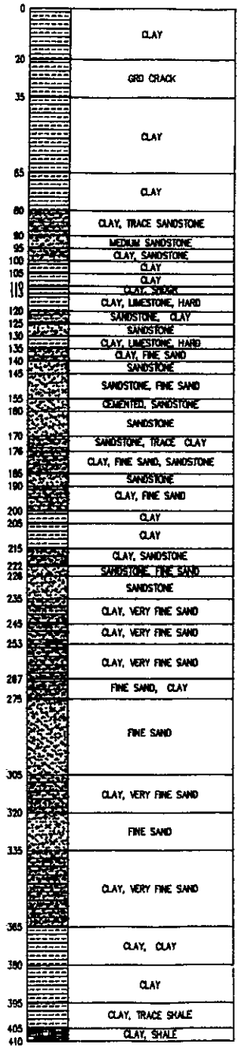
SWL - NOT AVAILABLE



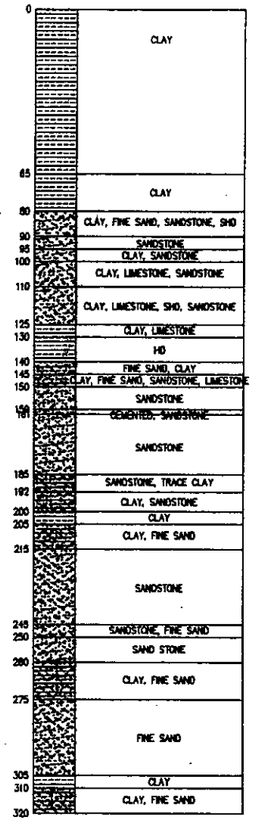
APPROX. SWL 122' ▽
5-2005



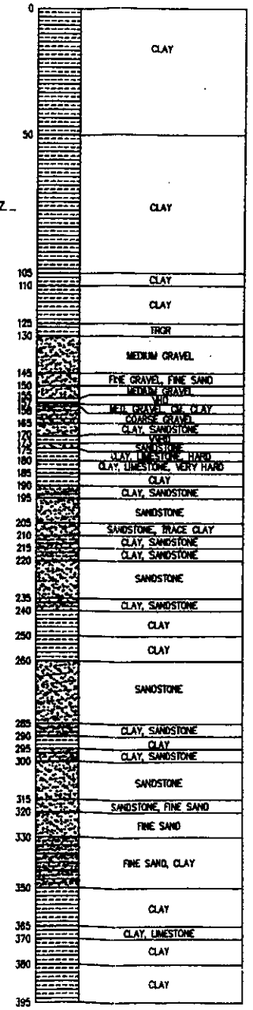
APPROX. SWL 77' ▽
5-2005



APPROX. SWL 61' ▽
5-2005



APPROX. SWL 80' ▽
5-2005



DRAFT
9-27-05

Prepared by:
M&A
Miller & Associates

DRILLERS LOG OF
TEST HOLE #2
DRILLED BY:
LIEHS DRILLING INC.
AUGUST 15, 2002

DRILLERS LOG OF
PIEZOMETER #2
DRILLED BY:
LIEHS DRILLING INC.
APRIL 20, 2005

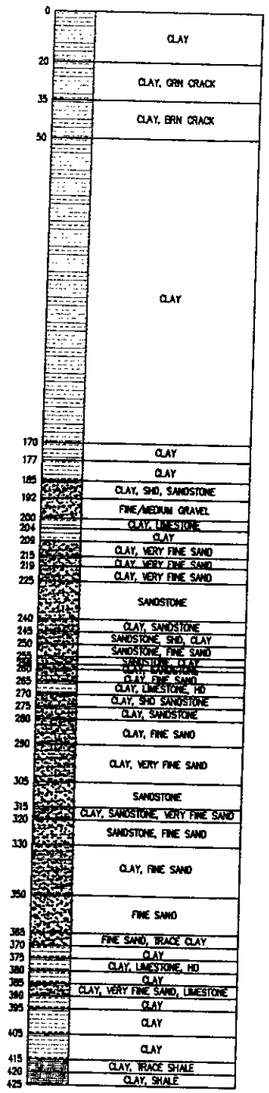
DRILLERS LOG OF
16" CASING
DRILLED BY:
LIEHS DRILLING INC.
APRIL 12, 2005

DRILLERS LOG OF
PIEZOMETER #1
DRILLED BY:
LIEHS DRILLING INC.
APRIL 19, 2005

DRILLERS LOG OF
PIEZOMETER #3
DRILLED BY:
LIEHS DRILLING INC.
APRIL 21, 2005

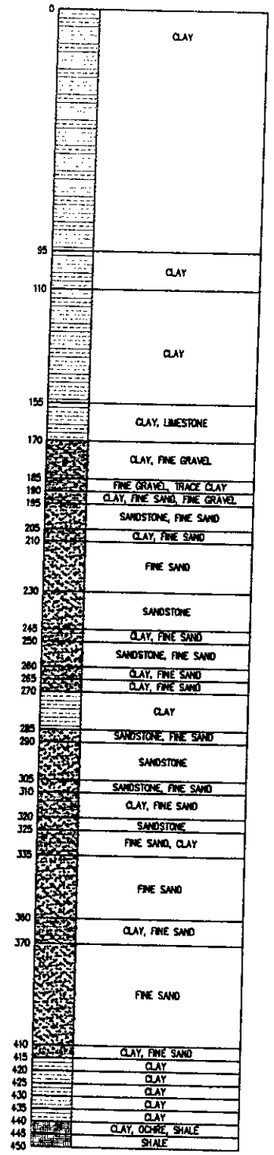
THEIS WELL LOGS
KEARNEY WELL FIELD

SEPTEMBER, 2005



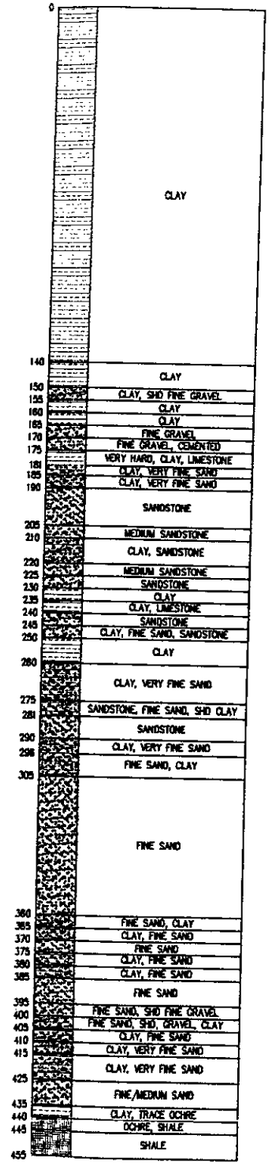
DRILLERS LOG OF
BD-1

DRILLED BY:
LIEHS DRILLING INC.
APRIL 19, 2005



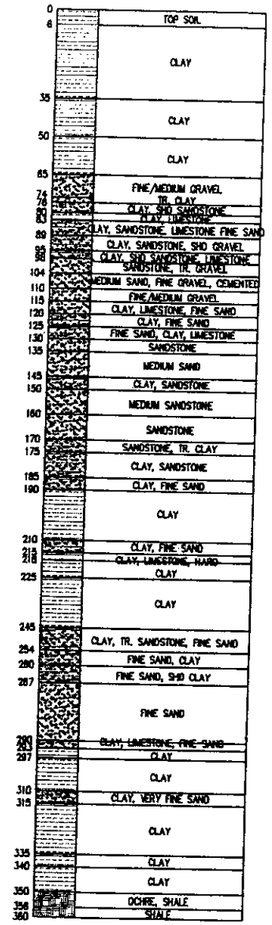
DRILLERS LOG OF
BD-2

DRILLED BY:
LIEHS DRILLING INC.
DECEMBER 31, 2004



DRILLERS LOG OF
BD-3

DRILLED BY:
LIEHS DRILLING INC.
DECEMBER 31, 2004



DRILLERS LOG OF
BD-4

DRILLED BY:
LIEHS DRILLING INC.
DECEMBER 17, 2004

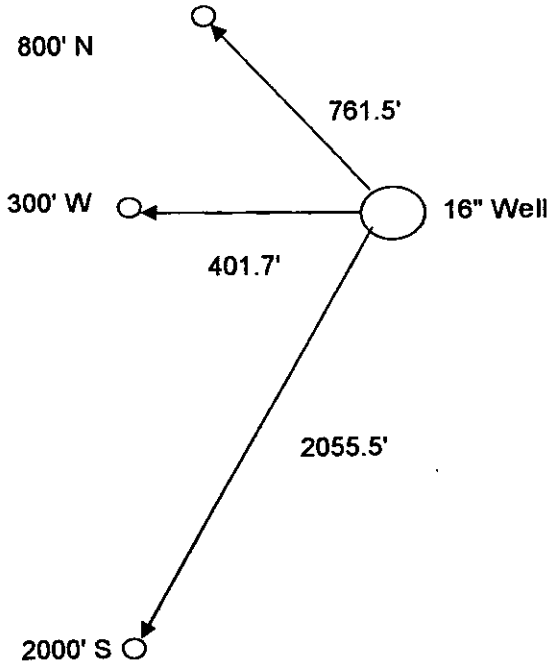
Prepared by:
Miller & Associates

DRAFT
9-27-05

DIBBERN WELL LOGS
KEARNEY WELL FIELD

SEPTEMBER, 2005

test pump on Theis Property



KEARNEY TEST HOLE DATA

DRAWDOWN

lapse time minutes	LARGE TEST HOLE	NORTH WELL	West WELL	SOUTH WELL	TIME	GPM
0	73	81	80	122	1:00	
150	187	81	86	122	3:30	500
210	187	81	86	122	4:30	500
270	187	81	86	122	5:30	500
330	187	82	86	122	6:30	500
390	187	82	86	122	7:30	500
420	192	82	86	122	8:00	650
480	192	82	86	122	9:00	650
540	193	82	88	122	10:00	600
600	193	82	88	122	11:00	600
660	193	82	88	122	12:00	600
780	193	82	88	122	1:00	600
840	193	82	88	122	2:00	600
900	193	82	88	122	3:00	600
960	193	82	88	122	4:00	600
1020	193	82	88	122	5:00	600
1080	193	82	88	122	6:00	600
1140	193	82	88	122	7:00	600
1290	230	84	90	122	9:30	700
1410	230	84	90	122	11:30	700
1530	230	84	90	122	1:30	700
1650	230	84	90	122	3:30	700
1770	230	84	90	122	5:30	700
1830	230	84	90	122	6:30	700
1890	230	84	90	122	7:30	700
1920	193	84	90	122	8:00	600
1980	193	84	90	122	9:00	600
2040	193	84	90	122	10:00	600
2160	193	84	90	122	12:00	600
2220	193	84	90	122	1:00	600
2280	193	84	90	122	2:00	600
2340	193	84	90	122	3:00	600
2400	193	84	90	122	4:00	600
2460	193	84	90	122	5:00	600
2520	193	84	90	122	6:00	600
2580	193	84	90	122	7:00	600
2670	190	84	90	122	8:30	600
2730	190	84	90	122	9:30	600
2760	190	84	90	122	10:00	600

Sent To	Date Sent	Response Received
National Natural Landmarks Mr. Mike Gallagher 1709 Jackson Street Omaha, NE 68102	6/13/2005	
Lewis & Clark National Historic Trail Mr. Richard Williams 1709 Jackson Street Omaha, NE 68102	6/13/2005	
Oregon National Historic Trail Mr. Jere Krakow 324 S. State Street, Suite 250 Salt Lake City, UT 84145-0155	6/13/2005	
Nebraska Game & Parks Commission Mr. Robert Harms 2200 North 33rd Street Lincoln, NE 68503	6/13/2005	7/15/2005
U. S. Army Corps of Engineers Mr. Mike Rabbe 8901 South 154th Street Omaha, NE 68138-3621	6/13/2005	8/15/2005
U. S. Army Corps of Engineers Mr. Keith Tillotson 1430 Central Avenue Kearney, NE 68847	6/13/2005	
U.S. Fish and Wildlife Service Mr. Wally Jobman 203 West 2nd, Federal Bldg Grand Island, NE 68801-5907	6/13/2005	6/27/2005
NDHHS Dept of Licensure and Regulation P O Box 95007 Lincoln, NE 68509-5007	6/13/2005	6/27/2005
Department of the Army Omaha Dist Corps of Engineers 6014 US Post Office & Courthouse Omaha, NE 68102	6/13/2005	6/27/2005
Kansas City Dist. Corps of Engineers 700 Federal Bldg 601 East 12th Kansas City, MO 64106	6/13/2005	
Department of Natural Resources Mr. Steve McMaster P O Box 94676 Lincoln, NE 68509-4676	6/13/2005	7/1/2005
Nebraska Game & Parks Commission Mr. Frank Albrecht P O Box 30370 Lincoln, NE 68508-0370	6/13/2005	

Director Nebraska State Historical Society P O Box 82554 Lincoln, NE 68508-2554	6/13/2005	6/27/2005
State Conservationist Natural Resources Conservation Services Federal Building, Room 152 100 Centennial Mall North Lincoln, NE 68508-3866	6/13/2005	
Central Platte NRD Mr. Ron Bishop 215 North Kaufman Avenue Grand Island, NE 68801	6/13/2005	
Nebraska Department of Aeronautics Planning & Engineering Division P O Box 82088 Lincoln, NE 68501-2055	6/13/2005	
Pawnee Nation of Oklahoma Mr. Francis Morris P O Box 470 Pawnee, OK 74058	6/13/2005	
National Park Service Midwest Region 601 Riverfront Drive Omaha, NE 68102-4226	6/13/2005	
Nebraska Dept of Natural Resources Mr. Bill Jones P O Box 94876 Lincoln, NE 68509-4876	6/13/2005	

Miller & Associates
CONSULTING ENGINEERS, P.C.

109 East 2nd McCook, NE 690013719

Tel: 308-345-3710
Fax: 308-345-7370
www.miller-engineers.com

June 13, 2005
McCook, Nebraska

Mr. Bill Jones
Nebraska Department of Natural Resources
PO Box 94876
Lincoln, NE 68509-4876

RE: Construction of New Well Field and Transmission Main
City of Kearney, Nebraska
M&A Project No. 130-C1-039

Dear Mr. Jones:

The City of Kearney, Nebraska is in the final planning phase of developing a water system improvement project, which could be partially funded by the Nebraska State Revolving Fund. The purpose of this letter is to request your review and response regarding any environmental impacts that your Agency may identify for this proposed project pursuant to the National Environmental Policy Act and the Historic Preservation Act.

The proposed project consists of the construction of nine new wells located approximately 6 miles west of the City of Kearney. Water transmission main will be constructed from the well field east to Kearney and will connect to the existing water system at the intersection of 30th Avenue and 56th Street. The project is being proposed to provide potable water to serve the City of Kearney. The new wells are being constructed to provide peak shaving, a redundant water supply and to supply the growing population of the north side of the City. Enclosed is a U.S. Geological Survey map that depicts the proposed project's improvements and areas of potential effect of construction activities. The exact well locations are not identified on this map, but the map does indicate the proposed target area for the nine new wells. An alternate supply route has been provided should an environmental issue be identified on the primary route. Please consider and comment on both routes in your review and response letters.

We request that you advise us of any comments that you may have regarding this project within 30 days, so the City can proceed with this project and completion of the environmental assessment.

If you have any questions concerning this proposed project or if you need any further information, please feel free to advise this office at your convenience.

Sincerely Yours,
MILLER & ASSOCIATES
CONSULTING ENGINEERS, P.C.

Chris A. Miller, P.E.

CAM/jh

Enclosure

cc: Kirk Stocker, Director of Utilities, City of Kearney, w/enclosure

MAR 0 3 2006

R 17 W

R 16 E

T 9 N

T 8 N

Proposed Kearney North Wellfield

Alternate Water Main Route

Proposed Water Main Route

Approx. 1 Mile

North

Prepared By:

Miller & Associates

1111 Central Avenue
Kearney, Nebraska 68847
ph. (308) 234-6456
fax (308) 234-1146
email eng@miller-engineers.com

Kearney North Wellfield
Environmental Review

Kearney, Nebraska
June, 2005

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
203 West Second Street
Grand Island, Nebraska 68801

June 27, 2005

Chris A. Miller
Miller & Associates
109 East 2nd
McCook, NE 69001-3719

RE: Control Number 6-5-I-225, Water System Improvements, City of Kearney, Buffalo County, Nebraska

Dear Mr. Miller:

This responds to your June 13, 2005, letter requesting comments from the U.S. Fish and Wildlife Service (Service) on the proposed upgrade to the existing water system, City of Kearney, Buffalo County, Nebraska. These comments are provided as technical assistance and predevelopment consultation and do not constitute a Service report under authority of the Fish and Wildlife Coordination Act (FWCA) (16 U.S.C. 661 et seq.) on any required federal environmental review or permit.

The Service has responsibility, under a number of authorities, for conservation and management of fish and wildlife resources. Chief among the federal statutes with which our office deals are the FWCA, Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*), and the National Environmental Policy Act (NEPA)(83 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). The FWCA requires that fish and wildlife resources be given equal consideration in the planning, implementation, and operation of federal and federally funded, permitted, or licensed water resource developments. Section 7 of ESA outlines procedures for interagency consultations on the effects of federal actions on federally listed threatened and endangered species and their designated critical habitats. The Service participates in scoping and review of actions significantly affecting the quality of the environment under authority of the NEPA. In addition to these statutes, the Service has authority under several other legislative, regulatory, and executive mandates to promote conservation of fish and wildlife resources for the benefit of the public.

FEDERALLY LISTED SPECIES AND DESIGNATED CRITICAL HABITAT

Pursuant to section 7 of ESA, every federal agency, in consultation or conference with the Service, is required to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any federally listed or proposed species

and/or result in the destruction or adverse modification of designated and/or proposed critical habitat. In accordance with section 7(a)(2) of ESA, the lead federal agency should determine if any federally listed/proposed threatened or endangered species and/or designated/proposed critical habitat would be directly and/or indirectly affected by this proposed project. The assessment of potential impacts (direct and indirect) must include an "affect" or "no effect" determination and be presented to the Service in writing. If the Service agrees with the lead federal agency's determination, this office would provide a letter of concurrence. If federally listed species and/or designated critical habitat would be adversely affected by this action, the lead federal agency will need to formally request further section 7 consultation with the Service prior to authorizing/funding the proposed project.

Based on the information provided in your June 13 letter, we assume that the lead federal agency has preliminarily determined that the proposed activities conducted under the subject action will not adversely affect federally listed species. In accordance with section 7 of ESA, the Service has determined that the following federally listed species may occur or be affected by the proposed subject action:

Listed Species	Expected Occurrence
Bald eagle (*Haliaeetus leucocephalus*)	Migration, wintering, and nesting
Whooping crane (*Grus americana*)	Roosting, migrant
Interior least tern (*Sterna antillarum*)	Migration, nesting
Piping plover (*Charadrius melodus*)	Migration, nesting
Pallid sturgeon (*Scaphirhynchus albus*)	Lower Platte River and Missouri River
Western prairie fringed orchid (*Platanthera praeclara*)	Tall-grass prairie and wet meadows

Bald Eagle

The bald eagle, federally listed as threatened, nests, migrates, and winters statewide. Bald eagles utilize mature, forested, riparian areas near rivers, streams, lakes, and wetlands and occurs along all the major river systems in Nebraska. The bald eagle southward migration begins as early as October and the wintering period extends from December-March. Additionally, many bald eagles nest in Nebraska from mid-February through mid-August. Disturbances within 0.5-mile of an active nest or within line-of-sight of the nest could cause adult eagles to discontinue nest building or to abandon eggs. Human disturbances and loss of eagle wintering habitat can cause undue stress leading to cessation of feeding and failure to meet winter thermoregulatory requirements. These affects can reduce the carrying capacity of preferred wintering habitat and reproductive success for the species. The Service does not anticipate any adverse impacts to the bald eagle due to the proposed project.

Whooping Crane

Whooping cranes, federally listed as endangered, use shallow, sparsely vegetated wetlands and streams in which to feed and roost during migration. Major river systems used by whooping cranes in Nebraska include the Platte, Loup, Republican, and Niobrara rivers. In addition, a 3-mile-wide, 56-mile-long reach of the Platte River between Lexington and Denman, Nebraska has been federally designated as critical habitat for whooping cranes. Migration periods for the whooping crane in Nebraska are from approximately March 23 through May 10 and from September 16 through November 16. Channel constrictions caused by bridges, bridge approaches, roadway embankments, bank stabilization, levees, and other unnatural obstructions can result in the loss of broad, shallow, unobstructed channel and sandbar complexes used as roosting habitat by whooping cranes. Drainage and filling of playa wetlands can also result in the loss of important foraging and roosting habitats. Ill-timed human activities in the vicinity of important roosting and feeding habitats can disturb whooping cranes, prematurely hastening their departure from riverine and wetland habitats. The whooping crane and its designated critical habitat may be impacted by water depletions in the Platte River system.

Least Tern and Piping Plover

The least tern, federally listed as endangered, and the piping plover, federally listed as threatened, nest on unvegetated or sparsely vegetated sandbars in river channels. The nesting season for the least tern and piping plover is from April 15 through August 15. Least terns feed on small fish in the river and piping plovers forage for invertebrates on exposed beach substrates. The Service has designated critical habitat for the northern Great Plains breeding population of the piping plover on the Platte River from Lexington, Nebraska, downstream to its confluence with the Missouri River. Habitat included in the designation on the Platte River is comprised solely of river channel and riverine sandbars within the high banks. The least tern and the piping plover and its designated critical habitat may be impacted by water depletions in the Platte River system.

Pallid Sturgeon

The pallid sturgeon was officially listed as an endangered species on September 6, 1990. In Nebraska, the pallid sturgeon is found in the Missouri and lower Platte rivers. Floodplains, backwaters, chutes, sloughs, islands, sandbars, and main channel waters formed the large-river ecosystem that provided macrohabitat requirements for the pallid sturgeon, a species that is associated with diverse aquatic habitats. These habitats historically were dynamic and in a constant state of change due to influences from the natural hydrograph, and sediment and runoff inputs from an enormous watershed spanning portions of ten states. Navigation, channelization and bank stabilization, and hydropower generation projects have caused the widespread loss of this diverse array of dynamic habitats once provided to pallid sturgeon on the Missouri River, resulting in a precipitous decline in populations of the species. The pallid sturgeon may be impacted by water depletions to the Platte River system.

Western Prairie Fringed Orchid

The western prairie fringed orchid, federally listed as threatened, inhabits tall-grass calcareous silt loam or sub-irrigated sand prairies. Declines in western prairie fringed orchid populations have been caused by the drainage and conversion of its habitats to agricultural production, channelization, siltation, road and bridge construction, grazing, haying, and the application of herbicides. Populations are known to occur in Boone, Cherry, Dodge, Garfield, Grant, Greeley, Hall, Holt, Lancaster, Loup, Madison, Otoe, Pierce, Rock, Saline, Sarpy, Seward, and Wheeler counties, and may occur at other sites in Nebraska. This plant may also be impacted by alterations to the hydrology of sub-irrigated wetland habitat areas along the Platte River resulting from depletions to the Platte River system.

Depletions to the Lower Platte River

Since 1978, the Service has concluded in all of its section 7 consultations on water projects in the Platte River basin that the Platte River ecosystem is in a state of jeopardy, and any federal action resulting in a water depletion to the Platte River system will further or continue the deterioration of the stressed habitat conditions. Due to the cumulative affect of many water depletion projects in the Platte River basin, the Service considers any depletion of flows (direct or indirect) from the Platte River system to be significant. Consequently, the Service has adopted a jeopardy standard for all section 7 consultations on federal actions which result in water depletions to the Platte River system. The Service considers the Platte River and its associated wetland habitats to be resources of national and international importance.

Because the proposed water supply wells appear to be located near the Platte and Wood Rivers, the Service is concerned that the proposed action could result in instream flow depletions to the central and lower Platte River reaches, respectively, which would impact federally listed species and designated critical habitat. The Service is primarily concerned about what effect, if any, the proposed project will have upon the Platte River system, and requests that an engineering analysis be performed regarding the net effect in terms of acre-feet that may be depleted during each month on an average annual basis over the life of the project. Central Platte River depletions should be calculated for the month of January through December, and depletions to the lower Platte River should be calculated for the months of February through July. It is further requested that the lead federal agency provide the results of that analysis in support of its determination of effect for consideration by the Service in partial fulfillment of the section 7 consultation process as outlined in this letter.

Affect/No Affect Determination

The Service recommends that the lead federal agency consider the information provided above with regard to making its assessment of potential impacts of the proposed project on federally listed species and designated critical habitat, and in making the "affect/no affect determination." Further, the Service recommends that the lead federal agency not limit its consideration of affect to just the above project information, but other potential affects as

they become apparent during the course of other project studies and/or project development and modification.

SERVICE REVIEW AND COMMENTS ON THE IMPACTS OF THE PROPOSED ACTION ON FISH AND WILDLIFE RESOURCES

Streams and Wetlands

The Service further recommends that unavoidable impacts to stream pattern, profile, and dimension be mitigated at a ratio of no less that 1:1 (stream length and number, pattern, and length of meanders created/restored versus stream length and number, pattern, and length of meanders impacted; sequence and number of pools and riffles created/restored versus sequence and number of pools and riffles impacted). Unavoidable wetland impacts caused by the proposed construction project should be mitigated at a ratio of no less than 1.5:1 (wetlands created/restored versus wetlands impacted). The Service also recommends that unavoidable wetland impacts caused by the proposed project be mitigated at a ratio of no less than 1:1 should mitigation be applied to a certified wetland mitigation bank.

Migratory Birds

The proposed action is subject to regulations in the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712: Ch. 128 as amended). Construction activities in grassland, wetland, stream, and woodland habitats that would otherwise result in the taking of migratory birds, eggs, young, and/or active nests should be avoided. Although the provisions of MBTA are applicable year-round, most migratory bird nesting activity in Nebraska occurs during the period of April 1 to July 15. However, some migratory birds are known to nest outside of the aforementioned primary nesting season period. For example, raptors can be expected to nest in woodland habitats during February 1 through July 15, whereas sedge wrens which occur in some wetland habitats normally nest from July 15 to September 10. If the proposed construction project is planned to occur during the primary nesting season or at any other time which may result in the take of nesting migratory birds, the Service recommends that the project proponent (or construction contractor) arrange to have a qualified biologist conduct a field survey of the affected habitats and structures to determine the absence or presence of nesting migratory birds. Surveys must be conducted during the nesting season. It is further recommended that the results of field surveys for nesting birds, along with information regarding the qualifications of the biologist(s) performing the surveys, be thoroughly documented and that such documentation be maintained on file by the project proponent (and/or construction contractor) for potential review by the Service (if requested) until such time as construction on the proposed project has been completed. The Service's Nebraska Field Office should be contacted immediately for further guidance if a field survey identifies the existence of one or more active bird nests that cannot be avoided by the planned construction activities. Adherence to these guidelines will help avoid the unnecessary take of migratory birds and the possible need for law enforcement action.

The Service recommends continued section 7 consultation on the proposed project with the project applicant once the above requested information has been provided. The requested information, supplemented by previous studies, should assist the project applicant and the Service with the development of a supportable determination of affect and concurrence/ nonconcurrence, respectively with regards to the effect of the proposed project on the federally listed species.

The Service appreciates the opportunity to provide comments on the proposed action. Should you have any questions regarding these comments, please contact Mr. Jeff Runge within our office at (308) 382-6468, extension 22.

Sincerely,

John Cochnar
Acting Nebraska Field Supervisor

cc: NGPC; Lincoln, NE (Attn: Troy Rahmig)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
203 West Second Street
Grand Island, Nebraska 68801

April 10, 2006

Chris Miller
Miller & Associates
1111 Central Avenue
Kearney, NE 68847-6833

RE: Control Number 6-5-I-225, Proposed Water Improvement, City of Kearney, Buffalo County, Nebraska

Dear Mr. Miller:

This responds to your letter, received March 1, 2006, and an E-mail, received April 6, 2006, addressing comments from the U.S. Fish and Wildlife Service (Service) and other government agencies on the proposed well field, City of Kearney, Buffalo County, Nebraska. Based on the information provided in the referenced communications, the Service has determined that the proposed project will not result in a depletion to the Platte River. Therefore, the Service concurs that the proposed project will not adversely affect federally listed species or designated critical habitat. Reinitiation of consultation with the Service will be required under section 7 (a)(2) of the Endangered Species Act of 1973, as amended, if the proposed action is changed in any way.

If you have any further questions, please contact Mr. Runge at (308)382-6468, extension 22.

Sincerely,

Steve Anschutz
Nebraska Field Supervisor

cc: NGPC; Lincoln, NE (Attn: Kristal Stoner)
NGPC; Lincoln, NE (Attn: Carey Grell)
NDEQ; Lincoln, NE (Attn: Rick Bey)

1 : 2006

NEBRASKA HEALTH AND HUMAN ..VICES SYSTEM

RTMENT OF SERVICES • DEPARTMENT OF REGULATION AND LICENSURE
DEPARTMENT OF FINANCE AND SUPPORT

STATE OF NEBRASKA
DAVE HEINEMAN, GOVERNOR

June 23, 2005

RECEIVED
JUN 27 2005
BY:.....

Mr. Chris Miller, P.E.
Miller & Associates, Consulting Engineers, P.C.
109 East 2nd Street
McCook, NE 69001-3719

Re: Water System Improvement Project – City of Kearney – Nebraska State Revolving Funds

Dear Mr. Miller,

It would appear that the water project dealing with the City of Kearney, which you discuss in your letter, deals with construction that would be subject to Nebraska Department of Health and Human Services Regulation and Licensure Regulations Governing Public Water Supply Systems Title 179. As long as the Project follows proper submission of plans and specifications to the NHHS Engineering Services and adheres to all State regulation and local ordinances in this project and does not impact any encroachment criteria to public drinking water wells or compromise the drinking water system, the Department does not foresee issues that would affect the drinking water quality.

The Department would defer further judgment pursuant to the National Environmental Policy Act and the Historical Preservation Act to agencies more closely associated with this area of the state.

We advise the Project management to coordinate with other State agencies, such as the Department of Environmental Quality, to assure all other issues are covered.

Please feel free to contact this office if circumstances change or you have further questions. My phone number is (402) 471-0930.

Sincerely,

Howard P. Isaacs

Howard P. Isaacs, Program Manager
Monitoring and Compliance
Drinking Water Program

cc: Kirk Stocker, Director of Utilities, City of Kearney

DEPARTMENT OF HEALTH AND HUMAN SERVICES REGULATION AND LICENSURE
PO BOX 95007, LINCOLN, NE 68509-5007 PHONE (402) 471-2133
PHONE (402) 471-0930 FAX (402) 471-6436 TTY (402) 471-9570

MAR 0 3 2006

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
NEBRASKA REGULATORY OFFICE - KEARNEY
1430 CENTRAL AVENUE, SUITE 4
KEARNEY, NEBRASKA 68847-6856

REPLY TO
ATTENTION OF

June 27, 2005

Mr. Chris Miller
Miller & Associates
109 East 2nd
McCook, Nebraska 69001-3719

Dear Mr. Miller:

This letter pertains to your proposal, on behalf of the City of Kearney, to improve the water system.

The following is based on an office determination only. According to the data available at this time, it appears that the pipeline (both routes) may impact "waters of the US". If this is the case, please submit specific locations of stream/channel crossings, project descriptions and the method by which the streams will be crossed (trenched, directionally bored).

If you have any questions regarding this matter, please feel free to contact Mrs. Barb Friskopp at the above address or at (308) 234-1403 and refer to file number **NE 05-10745.**

Sincerely,

Barb Friskopp

for Michael Rabbe
NE State Program Manager

MAR 03 2006

STATE OF NEBRASKA

Dave Heineman
Governor

DEPARTMENT OF NATURAL RESOURCES
Roger K. Patterson
Director

July 1, 2005

IN REPLY TO:

Chris Miller, P.E.
Miller & Associates
109 East 2nd Street
McCook, NE 69001-3719

RE: City of Kearney, Construction of New Well Field and Transmission Main

Dear Mr. Miller:

The Nebraska Department of Natural Resources has reviewed this proposed project and has the following comments:

Surface Water/Ground Water

There are no surface water appropriations or projects in the proposed project area.

There is no spacing requirement for new municipal water wells. Furthermore, our database shows no registered ground water wells in the two sections proposed for the well field.

Floodplain Management

The only potential floodplain management impact is located on the alternative transmission main route in the northeast corner of Section 19, Township 9 North, Range 16 West. There is a small stream which has a narrow floodplain associated with it. If the alternative route is chosen for construction, please call me for further guidance.

If you have any questions about this letter, please call me at (402) 471-3957.

Sincerely,

Steve McMaster
Water Resources Planner III

clrshare/engineering/mcmaster

MAR 0 3 2006

301 Centennial Mall South, 4th Floor • P.O. Box 94676 • Lincoln, Nebraska 68509-4676 • Phone (402) 471-2363 • Telefax (402) 471-2900

NEBRASKA STATE HISTORICAL SOCIETY
1500 R STREET, P.O.BOX 82554, LINCOLN, NE 68501-2554
(402) 471-3270 Fax: (402) 471-3100 1-800-833-6747 www.nebraskahistory.org

27 June 2005

Chris A. Miller
Miller & Associates
109 East 2nd
McCook, NE 69001-3719

Re: Well Field and Transmission Main
Kearney, NE
130-C1-039
Buffalo Co.
H.P. #0506-066-01

Dear Mr. Miller:

A review of our files indicates that the referenced project does not contain recorded historic resources. It is our opinion that no survey for unrecorded cultural resources will be required. Your undertaking, in our opinion, will have no effect for archaeological, architectural, or historic properties.

There is, however, always the possibility that previously unsuspected archaeological remains may be uncovered during the process of project construction. We therefore request that this office be notified immediately under such circumstances so that an evaluation of the remains may be made, along with recommendations for future action.

Sincerely,

Terry Steinacher
H.P. Archaeologist

Concurrence:

L. Robert Puschendorf
Deputy NeSHPO

MAR 03 2006

Nebraska Game and Parks Commission

2200 N. 33rd St. / P.O. Box 30370 / Lincoln, NE 68503-0370
Phone: 402-471-0641 / Fax: 402-471-5528 / www.outdoornebraska.org

July 11, 2005

Chris Miller
Miller & Associates
109 East 2nd
McCook, NE 69001-3719

RE: Water system improvements in the City of Kearney, Buffalo County

Dear Mr. Miller:

Nebraska Game and Parks Commission (NGPC) staff members have reviewed the information for the proposal identified above. The project involves the construction of nine new wells, located approximately six miles west of the City. Water transmission mains will be constructed from the well field to the City and will connect to the existing water system northwest of town. The project is being proposed to provide potable water to serve the City of Kearney.

The project will not impact any NGPC park areas or wildlife management areas, as none are located in the immediate project area.

The map and aerial photograph do show that several stream drainages will be crossed with the proposed new water transmission main. NGPC encourages that impacts to streams and associated riparian areas, and wetlands be avoided and minimized, and that any unavoidable impacts to these habitats be mitigated. If any streams or wetlands will be impacted as a result of this project, the U.S. Army Corps of Engineers should be contacted to determine if a 404 permit is needed.

We are concerned that the portion of this project involving the development of nine new water wells could result in a depletion to Platte River flows. Depletions to Platte River flows may impact several federal and state-listed threatened and endangered species. Please reference the letter from the U.S. Fish and Wildlife Service dated June 27, 2005 for more information, as they are the lead federal agency for matters regarding depletions.

Thank you for the opportunity to review this proposal. If you have any questions, please contact me at (402) 471-5423.

Sincerely,

Carey Grell

Carey Grell
Environmental Analyst
Realty and Environmental Services Division

cc: Jeff Runge, USFWS
Troy Rahmig, NGPC

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
NEBRASKA REGULATORY OFFICE - KEARNEY
1430 CENTRAL AVENUE, SUITE 4
KEARNEY, NEBRASKA 68847-6856

REPLY TO
ATTENTION OF

August 10, 2005

Mr. Chris Miller
Miller & Associates
109 East 2nd
McCook, Nebraska 69001-3719

Dear Mr. Miller:

This letter pertains to your proposal, on behalf of the City of Kearney, to improve the water system.

The following is based on an office determination only. According to the data available at this time, it appears that the pipeline (both routes) may impact "waters of the US". If this is the case, please submit specific locations of stream/channel crossings, project descriptions and the method by which the streams will be crossed (trenched, directionally bored).

If you have any questions regarding this matter, please feel free to contact Mrs. Barb Friskopp at the above address or at (308) 234-1403 and refer to file number **NE 05-10745.**

Sincerely,

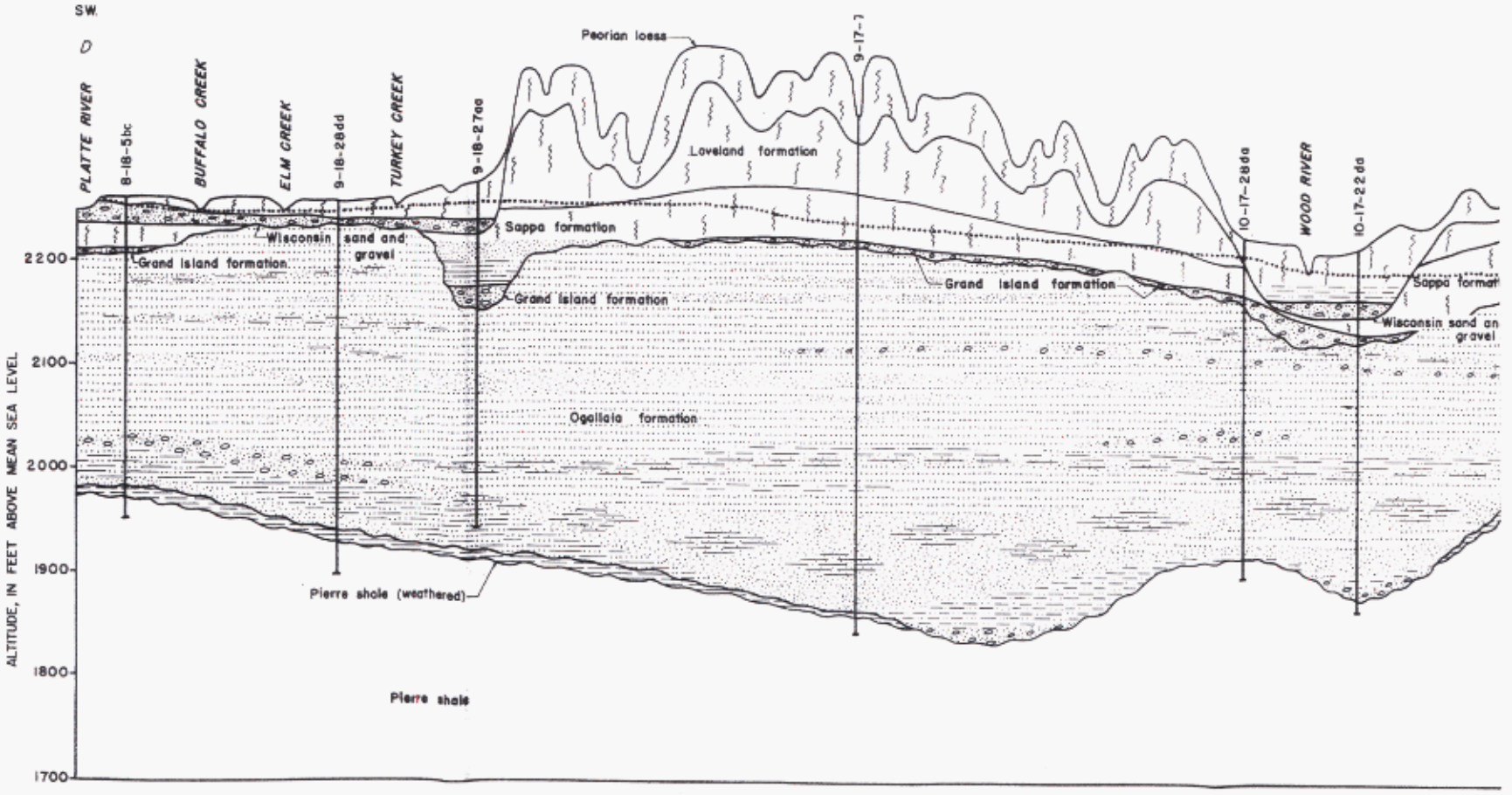
Barb Friskopp

for Michael Rabbe
Nebraska State Program Manager

MAR 03 2009

Appendix D – Geologic Section

Geologic Section and Well Field Location Map



Appendix D – Geologic Section

Excerpt Geologic Cross Sections – Geological Survey Water Supply Paper 1358

April 24, 2006
Kearney, Nebraska

Miller& Associates
CONSULTING ENGINEERS, P.C.

1111 Central Ave. Kearney, NE 68847-6833
Tel: 308-234-6456
Fax: 308-234-1146
www.miller-engineers.com

Tracy Zayac
Natural Resource Program Specialist
Nebraska Department of Natural Resources
301 Centennial Mall South, 4th Floor
P.O. Box 94676
Lincoln, NE 68509-4676

Re: Municipal & Rural Domestic Ground Water Transfer Permit
Kearney, Nebraska
NDNR Permit MT-21
Project No. 130-C1-049

Dear Tracy:

We are in receipt of your letter dated April 13, 2006. The questions have been reproduced and italicized, and our comments follow. Where changes in the application were necessary, new pages were printed and three-hole punched reflecting the modifications. The modified pages have revised dates in the footer. Please replace the pages which are enclosed for your applications. Please place copies of this correspondence in Appendix E – Future Correspondence.

1. ***The application requests an average withdrawal of four million gallons per day, which equates to 1,460,000,000 gallons per year. Section 5 of the application, however, requests a total annual withdrawal of 146,000,000 gallons. I am returning the original application to you for correction of the requested withdrawals as needed.***

   The application has been modified to reflect the 1,460,000,000 as intended. The original and one copy are provided for your two sets of Applications.

2. ***In Section 7 of the application, please indicate the county in which the proposed wellfield will be constructed.***

   The application has been modified to reflect the well field will be located in Buffalo County.

3. ***Table 4 of the application materials lists the City of Kearney's existing municipal water supply wells, along with each well's status and location. The following table compares the information included in the Applicant's Table 4 with the Department's current water well registration information for the City of Kearney's municipal water wells.***

Registration Number	Application information (Table 4)		Department Records	
	Well Status	Well Location	Well Status	Well Location
G-030624	Inactive	SE1/4SW1/4Sec 2 T8N R16W	Active	SW1/4SE1/4 Sec 2 T8N R16W
G-030625	Not listed in table		Active	NW1/4NE1/4 Sec 25 T9N R16W
G-060265	Not listed in table		Active	SE1/4Se1/4 Sec 19 T9N R16W
G-070227	Not listed in table		Active	NE1/4NW1/4 Sec 13 T8N R16W
G-070519	Inactive	N/A	Active	N/A
G-070520	Inactive	SW1/4NE1/4 Sec 1 T8N R16W	Active	NE1/4SW1/4 Sec 1 T8N R16W
G-070521	Inactive	SE1/4SW1/4 Sec 2 T8N R16W	Abandoned	SW1/4NE1/4 Sec 2 T8N R16W
G-070523	Inactive	N/A	Active	N/A
G-070524	Inactive	SE1/4SW1/4 Sec 2 T8N R16W	Active	SW1/4SE1/4 Sec2 T8N R16W
G-113358	N/A	SW1/4SE1/4 Sec 16 T8N R15W	N/A	SE1/4NW1/4 Sec 16 T8N R15W
G-113359	N/A	NE1/4SW1/4 Sec 16 T8N R15W	N/A	SW1/4NE1/4 Sec 15 T8N R15W

If the information currently shown in the Department's well registration records (e.g., well status or location) is incorrect, then the City will need to submit water well registration modification forms, or their forms as needed, to update the Department's records. These forms can be accessed on the Department's website, http://www.dnr.ne.gov/docs/wellforms.html.

The column heading on TABLE 4 reflects the current pumping status for the City of Kearney's water supply operations. This does not necessary reflect the NDNR status of well registrations. The wells listed as inactive still have pumps installed, but are not used in the water supply rotation at this time. The table is clarified by a footnote as shown below.

Registration G-070521 has been changed in REVISED TABLE 4 to reflect the status of abandoned. Discrepancies in legal descriptions were also modified in the revised table. The three wells not listed have been included in the table. Registration G-030625 was an old cemetery well which has been abandoned and the pump removed. Enclosed with this correspondence is an abandonment form for G-030625. We have also enclosed two revised page 10's for your applications.

REVISED TABLE 4 - Existing Municipal Wells

City Well ID	*NDHHS*	*Reg. No.*	*City Status**	*Legal Description*
Well 1	54-1	G-070525	Active	3010 Avenue H
Well 5	71-1	G-035409	Active	1620 East 34th Street
Well 9	46-2	G-070518	Active	1616 Central Avenue
Well 10	48-2	G-070522	Active	323 West 19th Street
Well 19	73-1	G-039526	Active	16th Street & Avenue L
Well 20	73-2	G-039525	Active	18th Street & Avenue L
Well 7	41-1	G-070523	Inactive	T8N R16W Sec 2 SE1/4 SE1/4
Well 15	48-1	G-070520	Inactive	T8N R16W Sec 1 NE1/4 SW1/4
Well 12	54-3	G-070521	Aband.	T8N R16W Sec 2 SW1/4 NE1/4
	55-1		Inactive	
Well 16	66-1	G-070524	Inactive	T8N R16W Sec 2 SW1/4 SE1/4
	68-1	G-030624	Inactive	T8N R16W Sec 2 SW1/4 SE1/4
Well 4	69-1	G-070519	Inactive	T8N R16W Sec 1 SW1/4 SW1/4
Cemetery Well		G-030625	Aband.	Abandonment Form Enclosed
Harvey Park Well		G-060265		T9N R16W Sec 19 SE1/4 SE1/4
Grandpa's Well		G-070227		T8N R16W Sec 13 NE1/4 NW1/4
83-1	83-1	A-16167D	Active	T8N R15W Sec 16 SE1/4 NW1/4
83-2	83-2	A-16167B	Active	T8N R15W Sec 16 SW1/4 NE1/4
83-3	83-3	A-16167A	Active	T8N R15W Sec 16 NW1/4 NE1/4
83-4	83-4	A-16167C	Active	T8N R15W Sec 16 SE1/4 NE1/4
83-5	83-5	A-16167F	Active	T8N R15W Sec 16 NE1/4 NE1/4
83-6	83-6	A-16167E	Active	T8N R15W Sec 15 NE/14 NE1/4
92-7	92-7	G-76596	Active	T8N R15W Sec 16 SW1/4 NW1/4
92-8	92-8	G-76597	Active	T8N R15W Sec 16 SW1/4 NW1/4
92-9	92-9	G-76598	Active	T8N R15W Sec 16 SE1/4 NW1/4
92-10	921	G-76599	Active	T8N R15W Sec 16 SW1/4 NE1/4
92-11	921A	G-76600	Active	T8N R15W Sec 16 NW1/4 NE1/4
92-12	922	G-76601	Active	T8N R15W Sec 16 NE1/4 NE1/4
01-13	2000-3	G-113358	Active	T8N R15W Sec 16 SE1/4 NW1/4
01-14	2000-1	G-113359	Active	T8N R15W Sec 16 SW1/4 NE1/4
01-15	2000-2	G-113360	Active	T8N R15W Sec 16 NE1/4 NE1/4

**City status reflects the current water supply rotation and is not representative of the NDNR well registration records.*

4. ***Information supplied for Question D of the application states that ground water flow in the wellfield area is generally from east to west, although Figure 8 of the application materials indicates that ground water flow is generally from west to east.***

   The correct notation as indicated in Figure 8 is west to east. Two copies of revised page 8 are included for your applications.

5. ***Current average per-capita daily water use, according to the application information, is 233 gallons per capita per day, including industrial uses.***

   a. ***Does the City anticipate that this per-capita use rate will change as the population grows?***

   The City is not anticipating the per capita use rate will change as the City grows.

   b. ***Does the City anticipate the addition of new industrial or other large uses in the future? Please explain the basis for your answer.***

   The growth to the north is primarily commercial and residential uses. Although Kearney is always looking for new industrial development, the logical industrial locations are in the industrial area located along Highway 30 and not in the north growth area. Attached is a copy of the December 2004 zoning map which identifies permitted industrial uses along Highway 30.

6. ***Please submit information on Kearney's wastewater discharges to surface water. Include information on volume of discharge in gallons per year, the locations of any waste water treatment facilities, and the surface-water bodies to which they discharge.***

   Attached is a map identifying the location of the WWTF and the discharge route to the Platte River. The effluent from the WWTF is provided in the following table from 2002 to 2005.

City of Kearney WWTF Annual Discharge in Gallons 2002 – 2005

2002	2003	2004	2005
1,490,000,000	1,442,000,000	1,372,000,000	1,469,000,000

   a. ***Is the percentage of water pumped that is subsequently discharge as waste water anticipated to change as the City grows?***

   It is not anticipated that the percentage of water pumped –vs- wastewater discharged will change as the city grows.

8. ***What is the contour interval on the drawdown figures located in Appendix A – CPNRD Selected Modeling Results?***

   The contour intervals are 10 feet.

9. ***Appendix B contains two well log diagrams, but no index map was included to show the locations of the test holes and piezometer holes depicted on the diagrams. Please submit a map showing the locations o the wells for which lithologic logs were included in Appendix B.***

   The map was inadvertently left out of Appendix A. Enclosed are two copies of the well locations for Appendix A.

a. ***No static water levels (SWL) were shown on the figure entitled "Dibbern Well Logs." Are SWL data available for the borings shown on that diagram?***

No static water levels were recorded by the driller for the Dibbern Well Logs.

Please contact me if you have any questions regarding this project, or require additional information.

Very truly yours,
MILLER & ASSOCIATES
CONSULTING ENGINEERS, P.C.

Chris A. Miller

Chris A. Miller, P.E.

CAM/jh

Enclosures

cc: Kirk Stocker, City of Kearney, w/3 sets of enclosures
Ron Bishop, CPNRD, Grand Island, w/o enclosures
Tom Hayden, Nebraska Dept. of Natural Resources, Bridgeport, w/o enclosures

NEBRASKA DEPARTMENT OF NATURAL RESOURCES
P.O. BOX 94676, LINCOLN, NEBRASKA 68509-4676
(402) 471-2363

County Buffalo
9N T. 16 R. 25 S

DNR ABAN
OCTOBER 2003

FILE REF #

NOTICE OF WATER WELL ABANDONMENT

Instructions
Complete by printing in ink or typing the appropriate information. Submit the completed form to the above address within 60 days of decommissioning. This form is to be completed by water well contractor (owner signature not required) for all wells decommissioned after 7/1/2001. For wells decommissioned prior to 7/1/2001, or for a sand point well, the well owner may complete and sign the form if they did the actual decommissioning, or if the well no longer exists, and it is unknown when the decommissioning occurred or who decommissioned the well.

1. Well Owner Name: City of Kearney

Address: 1220 East 26th Street

City: Kearney State: NE Zip: 68848

( ) (308) 233-3241
Home Phone Number Work Phone Number

2. Person Completing Decommissioning (if not owner)

Name: Mark Bowman

Address: 2797 Cottonmill Ave

City: Kearney State: NE Zip: 68845

(308) 233-3241 29172
Business Phone Number Contractor's License Number

FOR DEPARTMENT USE ONLY	
Filing Date	Registration Number
Owner Code	Sequence Number
	NRD

a. Well Registration Number G-030625

3b. Purpose of Well Municipal Water Supply

3c. Date Well Last Operated August 1984

3d. Date of Decommissioning August 1984

3e. Location of Well: County Buffalo
Township 9N Range 16 E ☐ W ☒ Section 25
NW ¼ of the NE ¼

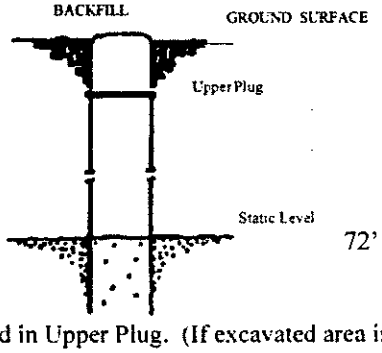
3f. The well is 1310 feet from the (N ☐ S ☒) section line (circle one)
and 1620 feet from the (E ☐ W ☒) section line or (circle one)
Latitude Degree ____ Minutes ____ Second ____
Longitude Degree ____ Minutes ____ Second ____

3g. Street Address of Block, Lot and Subdivision (if applicable).

3h. Location of Water Use: County Buffalo
Township 9N Range 16 E ☐ W ☒ Section 25
NW ¼ of the NE ¼

4a. Actual Method for Decommissioning of Well. Use Sketch below (if appropriate), or illustrate method of decommissioning on a separate sheet.

The well was filled with gravel to 15' of surface, then a 7' lift of Bentonite was placed, a hole was dug to the top of the Bentonite where the casing was cut off and capped with 3' of concrete, the remainder of the hole was filled with black dirt to existing ground surface.



4b. Type of Back Fill Used in Upper Plug. (If excavated area is greater than three feet, indicate depth of excavation.)
Clay Dirt

4c. Illustrate method to create upper plug.
Bentonite, Concrete Plug

4d. Type, Amount, and Location of Materials Used in Lower Casing. Gravel

4e. Type and Thickness of Materials Used Between Confining Layers and at static water levels. Indicate plug depth(s) on left side of sketch.

4f. Well Casing Size ____

4g. Well Diameter 32"

I am familiar with the information submitted on this form and to the best of my knowledge, it is true.

Water Well Contractor's Signature — Date 4/25/06

Well Owner's Signature (Kirk Stoltenberg, Director of Utilities) — Date 4/25/06

MAY 01 2006
607-8