

**Testimony of  
Lillian Anderson  
Dakotans Concerned With the TransCanada Pipeline  
Langford, South Dakota  
Before The  
South Dakota Public Utilities Commission  
June 27, 2007  
Britton, South Dakota**

**RE: HP07-001 In the Matter of the Application of TransCanada Keystone Pipeline, LP for a  
Permit under the South Dakota Energy Conversion and Transmission  
Facility Act to Construct the Keystone Pipeline Project.**

My name is Lillian Anderson and I live close to Langford, SD. My husband, Raymond and I have farmed there for 38 years. Raymond grew up on our farm and has been renting and buying land since he was eighteen years old —52 years. He bought this land when he was 20. We operate our family farm with our son.

I helped organize and I am the Chair of the group called **Dakotans Concerned with the TransCanada Pipeline**. I'm presenting testimony today on my own behalf and that of Dakotans Concerned. First let me say that our group is opposed to the TransCanada Keystone Pipeline crossing South Dakota because of the potential damage it will do to farm land, ground water and our rural communities.

IF the TransCanada-Keystone crude oil pipeline has to cross South Dakota, then the Public Utilities Commission should set conditions on the permit to place the least amount of impact on South Dakota.

We believe the best route is along the I-29 corridor. TransCanada included an **alternative route using the I-29 corridor** in the application they filed with the US State Department and with the PUC. We feel that the I-29 Alternate Route would be the best possible route for the placement of this oil pipeline, and would have the least negative impact when taking into consideration all factors.

1. The I-29 route would **place the impacts of the crude oil pipeline in the eastern part of the state where the benefit of the \$8 billion oil refinery near Elk Point, SD will be realized**. If eastern and south eastern South Dakota wants an oil refinery then they should also host the impacts of the crude oil pipeline required to serve it.
2. The I-29 route would take **very little private farm land out of production, or lands for business development**.
3. With the I-29 route, **with one signature the governor could grant TransCanada most of the easement** they will need and the state would get most of the easement payment.

4. With the I-29 route the governor and **the state would still get the \$6.4 million in annual tax revenues** they desire with the least amount of impact on townships and county governments.
5. With the I-29 route the **aquifer that BDM Rural Water relies on** would be protected, which serves homes, farms and towns from the James River in Brown County all the way east to the Sisseton and the Minnesota border.
6. With the I-29 route the **thousands of miles of buried PVC rural water pipelines would not be impacted**, such as those used by WEB rural water, Clark rural water, Hanson rural water, Turner-McCook rural water and B-Y rural water system. The thousands of towns and rural hookups they serve would not be impacted or placed at risk from oil leaks and contamination.
7. The I-29 route **would avoid sensitive shallow aquifers** and groundwater in the counties of Marshall, Day, Clark, Beadle, Hanson, Hutchinson, Yankton, McCook and Moody.
8. The I-29 route has **properly equipped and trained fire departments of Watertown, Brookings and Sioux Falls available to contain oil spills and fight crude oil fires**. These and other emergency responders would be ready and able to respond along a well maintained four lane interstate highway system

TransCanada has proposed a pipeline across a quarter of our good farmland and land owned by our neighbors and friends in Marshall County. South Dakota. The pipeline will lie on or next to a piece of virgin sod that Raymond has protected for 50 years. My family is opposed to granting an easement to TransCanada. So are many of our neighbors.

A few years ago or even a few months ago, I would never have thought about being in front of the Public Utilities Commission presenting testimony or speaking to groups of people. But that was before I was given a reason that I believe is so very important to each and every South Dakotan here and those that have not come but will be impacted. The decisions that are made by the PUC and what is done here in the next few months and years will affect SD for 50 to 100 years. We must all be very careful. We don't need our state run by big oil interests.

I received a phone call from Texas last night while I was in Clark from an individual in Texas. He warned me how our quiet life will change when the construction crews come through our area. He said that crime and other problems will increase greatly while their crews are in the area. Where will these people stay and eat? Most of these little towns have no place for that. I would imagine that these crews would have trailers for their employees to stay and probably food trailers for their eating. I doubt that there will be little money spent in the towns.

There are some who say that South Dakota is a poor state, but poor in what? We all seem to have enough to eat. We have plenty of fresh, pure clean safe drinking water for people and livestock. We have some of the best air quality in the country if not the world. Maybe we don't have a restaurant or theater on every corner like New York City or Dallas, but we don't have their problems either. You can still see the sunrise and sun set here. We don't have smog and air quality alerts. Most of us live a life of freedom in clean, quiet place with open spaces that city dwellers can only read about and dream about.

TransCanada – Keystone will change all that. TransCanada's own documents confirm that there will be oil leaks, every 5 to 12 years depending on which document you are looking at. Independent reports from the US Geological Service and other say the leaks could be more often and larger. I am attaching two maps and a copy for the SD Geological Survey. The maps show the first occurrence of aquifer materials for Marshall and Clark Counties. Once the aquifer is damaged, there is no other water and there is no going back. We have several shallow wells on our farm—about 20 to 25 feet. They have served our farm and the surrounding community for years, since statehood. How long do you think it would take for an oil spill to go through 25 feet of sandy soil? At 1,400 psi to 1,700 psi of pressure, a crude oil leak will quickly contaminate and ruin the ground water aquifer that our farm and many others in our county and area rely on. Buster Grey of TransCanada assured a group of landowners at a meeting in Britton that he would see to it that water would be hauled anywhere it was needed if there was an oil spill and a water source or water system was damaged. There are hundreds of large feedlots and livestock operations in Marshall County and other counties that would be crossed by the oil pipeline route. One would need a small army and hundreds of tanker trucks to haul water to just the cattle on a hot summer day, let alone the water that would be needed for human consumption and household use. It's a promise that Mr. Grey and TransCanada never intend to keep. Nothing was included in any of the easement documents TransCanada is trying to get landowners to sign.

We wish the SDPUC had handled this matter with TransCanada the way that I was told Iowa does. A lot of what has happened could have been avoided. It is my understanding that under Iowa law, TransCanada could not have contacted or threatened any landowners with easements until public information meetings had been held in each county by the PUC or its staff and with landowners to inform them of their rights under the law by elected officials. Everyone would have known their rights and they would also have been given a warning of what was coming. Instead, TransCanada was allowed to determine what information South Dakota citizens and tax payers see and don't see. They were even allowed to keep documents blocked from public review until just a few days before these hearings. Even today, not all of the information filed by TransCanada in support of their application for permit has been opened up and made available to the public. Why? There is no good reason for all this secrecy. Of course not, unless TransCanada has something to hide.

Because the people in South Dakota did not have this knowledge, some easements have been sold—66 as of May 25, 2007 according to Jeff Rauh, a public relation consultant for TransCanada from Wisconsin. The WEB rural water system had the foresight to research what could happen in the event of an oil leak or spill and then inform the landowners along the route. Why hasn't more been done by the Public Utilities Commission, or the PUC staff or the Department of Environment and Natural Resources or the Governor's Office? On this issue, who do the state elected officials work for, TransCanada or the taxpayers and landowners of South Dakota?

We now know that there are Alternative Routes that the pipeline could have taken to get through South Dakota. The Public Utilities Commission should condition their approval by requiring placement of the oil pipeline along I-29 where the oil pipe could be placed in highway road ditch area. There would be no safety risks during construction as Mr. Rauh of TransCanada claims because the pipe materials and construction crews could work off of private land easement secured along the edge of the highway ditch and when the work is completed and the pipe installation is completed, the temporary construction easement on private lands could be placed back into production. The I-29 road ditches are wide enough to accommodate any future

maintenance work that may be needed. The highway would offer great access for inspection and emergency response.

We now know that the standard easement presented by TransCanada is unfair and does not provide long term protection for landowners on easement lands and adjacent lands in the event of an oil spill. Landowners that have had their lawyers look at the easement were advised NOT to sign it. It is a one sided easement leaving the landowners possibly holding the oil soaked bag.

We now know that landowners should not have let them survey the land until after information of the project was made public and before the Public Utilities Commission hearings were held.

The PUC should require that all such survey easements and land easements secured by TransCanada and their land agents before documents were released to the public and before these hearings were held, be nullified, destroyed and/or returned to the landowners.

TransCanada assures everyone that they are above board with everything in their easements. Why are they so against signing them? What have they got to lose? I know what I have to lose.

TransCanada must feel fairly certain that they are going to get a favorable decision from the PUC since they are already paying for land easements. We feel they are picking off spots here and there so they can come in and request that the PUC let them fill in the blanks using condemnations. They especially like the older residents because they offer the least resistance. TransCanada has lied repeatedly to the landowners, promising cleanup and other assurances that are not covered in the easement documents.

The PUC should have looked this over that land easement document and had the state attorney general write a document that best served the citizens of SD. Their job is to protect the citizens of SD—not foreign oil companies like TransCanada. If the state attorney had written an easement, that could have saved the citizens going to different lawyers. It is a good idea for every landowner to have their lawyer review anything they sign—no matter who wrote it. This easement is for 50 to 100 years. You and any of your family that stay on the farm will have to live with your decision. Why would the PUC let a foreign country have perpetual easements in our state? Why not put a limit on them with a renewal? What happens if they abandon these lines?

As this elected board deliberates, the Public Utilities Commission should keep in mind that as of the date of this hearing, the majority of the landowners, over 600 landowners in South Dakota alone, have NOT signed the TransCanada easement. Furthermore, the PUC should take heed that over 120 people have filed Application for Party Status which is an indication of the concern and interest in this permit and this project. Far more than the number filed in other PUC cases.

We have been contacted by landowners and citizens from North Dakota, Nebraska, Oklahoma, Montana, Illinois, and Texas who are concerned with and are opposed to TransCanada Keystone Pipeline for the same reasons people in South Dakota area concerned and opposed. They feel they are being pushed around by oil interests that mask their true identity by hiding behind a Limited Liability Partnership status and hire PR firms and land agents for hire to come in do their dirty work. This is not the way to solve energy independence, by trampling the rights of landowners in this country in the name of big oil and big oil profits. If regulatory bodies, like the



PUC, fail to protect the rights of the landowners and taxpayers who they were elected to protect and serve, then the only remedy left to the public will be the ballot box.

Landowners need to know that the South Dakota PUC will not stand for TransCanada bullying, threatening or coercing South Dakota landowners and taxpayers into signing documents under the threat of condemnation. The PUC can set conditions for how TransCanada crosses South Dakota. TransCanada should not decide what information to share with the public and whatever route they feel is best.

The TransCanada land agent who came to our farm threatened us in front of a witness stating that if we didn't sign their document and take the payment offered then and there we would get nothing at all. He told us that TransCanada had deep pockets and that we couldn't possibly win against a big oil company. Other landowners received the same treatment. When confronted about this at several public meetings, TransCanada officials Buster Grey and Jeff Rauh said that they would talk to their land agent staff and stop the practice. We were told anyone who felt that they were being unduly pressured should call Buster Grey, the head engineer for this project in Kansas, MI. Yet more than two months later, no TransCanada land agent has been disciplined or released for this kind of action. A retired gentleman we met at a meeting in Raymond, SD told us that elderly brother in California who suffers from mild dementia was conned by TransCanada into signing his rights away. TransCanada is still lying to land owners as late as the middle of June 23, 2007. TransCanada is abusing South Dakota landowners and taxpayers.

I became very angry with Mr. Grey on Monday when he pretended not to know of this abuse. He took notes on the very first meeting in Aberdeen on May 10<sup>th</sup> this year. He took our names. We all know these land agents are not running around with no one knowing who they are contacting so he could have easily found out how this person was. He made statements that he would stop this immediately. His staff now says they will stop this. I want proof that they have. You should demand proof that they have.

TransCanada is a foreign oil company from a foreign country. I cannot believe that Governor Mike Rounds and the South Dakota Legislature and elected Public Utility Commission would give the right eminent domain and condemnation over the citizens and tax payers of SD to a foreign oil company. If anyone has already done so, do they realize what they have done? In my opinion, whoever agreed to that change sold out our South Dakota.

I would like the PUC to consider this question: "Why don't state and federal agencies treat TransCanada the same way they treat and regulate farmers and small business". Every government agency in Pierre and Washington is concerned with cattle waste and place more and more conditions on farmers and feedlot operators. Yet no one seems to care if oil permeates our soil and reaches our groundwater. I would rather take my chances with the cattle manure any day than crude oil. It is bio-degradable and actually improves the land. Unlike crude oil, we know that livestock waste will decompose and something will grow where it is placed.

As every farmer knows, if he has fuel on his place, he must have a cement containment pad to protect the water and land. TransCanada will be sending 435,000 barrels—(18,270,000 gallons)—of crude oil every day through our land. Where is TransCanada's containment plan? The little guy has to provide containment, but big oil doesn't. So where is the fairness in that.

The fact is, state and federal government agencies regulate the little guy because they can, and don't regulate oil pipelines because they are afraid of big oil.

What guarantee do we have that this crude won't go right out the Gulf of Mexico to be refined in another country? I feel South Dakota is being used not for the betterment of our area and country, but for the big oilmen and their high profits.

Our governor has made the statement that our gas prices will go down. Will they? It is my understanding that in order for this kind of crude to pay, gas prices need to stay at \$65 per barrel and \$3.00 a gallon or higher. So where is that helping South Dakota?

The township where Raymond and I live and pay taxes can hardly handle snow removal and getting enough gravel on the roads for local travel, let alone heavy construction equipment and pump trucks that will need to come in and suck up the oil leaks. We have roads that are almost washed out on a regular basis. Unless the PUC places conditions in any permit they issue, I doubt that TransCanada will be caring about any damage they cause to local roads. They say they will bore roads that are used a lot. How many township roads are not graveled but do what is needed by the farmers of the area? After they have cut a trench through them, they will never be the same. None of the annual tax revenue the Governor talks about collecting will go back to help the townships. They can sustain the traffic from the locals but not big equipment. The Association of Townships is working on putting together a state wide policy to protect all the townships. The PUC should include protection and maintenance of township roads as a condition for any permit approval.

Some local fire departments have less than 5 to 10 people at times. One grass fire that I know of, there were only three of the firemen available. If not for the farmer and his disk, I don't think they could have handled it. If they come to harm because of oil fumes or burns, who will pay for their treatments and time lost from their jobs? There is no Workman's Comp for volunteer fire departments who try to help their community—they are not equipped to deal with big crude oil fires. The fire departments from Watertown, Brookings and Sioux Falls could possibly have the equipment and training. They would be the respondents if there were to be a fire along I-29. This is another reason why the I-29 corridor would be the best route for the Keystone Pipeline.

TransCanada came through our communities and went to the town boards and possibly the commissioners. They promised big tax money. When asked how they came to that number, they admitted that they didn't know. They just decided that this might be how it could be. Anyone who has lived for long should know that if there are taxes to be handed out, they will go to the state and bigger cities first. Right after we make jobs for more friends, relatives and influential people in Pierre. This tax money will be like the lottery money that no one seems to be able to explain where it goes. Our schools should not be in trouble because all the lottery money was to go there. But it seems that somehow that has not happened. What guarantee do we have that this money will return to us.

Because of these concerns, we formed a group in our state to oppose TransCanada. The group is called **Dakotans Concerned with the TransCanada Pipeline**. We then traveled south to inform others about what their rights are. We advise no one to sign until they have seen their lawyer. And by all means, do not sign until after the PUC has made a ruling following the June 25-27 hearings.

Can anyone tell me what is so important about this strip of land? This is the third time in the last 30 years that we have had to fight to keep our property. Some of you might remember the **Mandan Power Line project**. Then we had the **Backscatter Project** that never worked where it was built in Maine and California. Now we have **TransCanada – Keystone oil pipeline**. Is there something this remote rural area that we call home that we don't know about? Or are we picked for projects of this kind because of its remoteness because other parts of the state want the development dollars but don't want the impacts. If the eastern part of South Dakota wants an oil refinery then the eastern part of the state should have to host the crude oil pipeline. Don't push it off on to our rural area.

The one thing that we can not make any more of is good farm land. Once it is destroyed, we can not get it back. We must be good stewards of the land. SD farmers understand that their land is their livelihood. TransCanada wants to pay around \$7,600 to \$7,800 for three acres of land for 100 year lease. That averages about \$26 per year ( $\$7,800 / 3 \text{ acres} = \$2,600/\text{acre} / 100 \text{ years} = \$26 \text{ per acre}$ ). That is not very profitable. Cash rent is at least 4 times higher. Our good South Dakota farm lands are worth more than that! Who knows what land will be bringing in 10 or 20 years. Will we be forced to sell our land and get to pay a nominal price? If this goes through, why shouldn't TransCanada or the owners of the oil be required to pay a yearly payment to the land owner for the risk and aggravation of having a high pressure oil pipe on their land? They continue to receive income as long as this pipeline is in use—every day, every week, every month, every year....just like the oil companies do on the oil they pump across the land. Why do we only get one payment while their income continues to increase after they decrease the value of our land? Why do they not have to pay us an annual payment? At today's prices, TransCanada will make \$28 million a day (\$10 billion a year) off the oil that flows through South Dakota. Who knows what the future will give them. Now add to that a spill. You could lose your farm if this easement isn't properly written. Be careful of what you sign. By their own admission, they don't give them back!

TransCanada says that they do not own the oil in the lines. That being the case, they should go to the owners of the oil and work on negotiations so the landowners receive annual payments.

If there were a glass of clean water on the table and a glass with oil tainted water, which would you want your family to drink? Which would be more important to you if you could only have one or the other? Which would sustain your life longer?

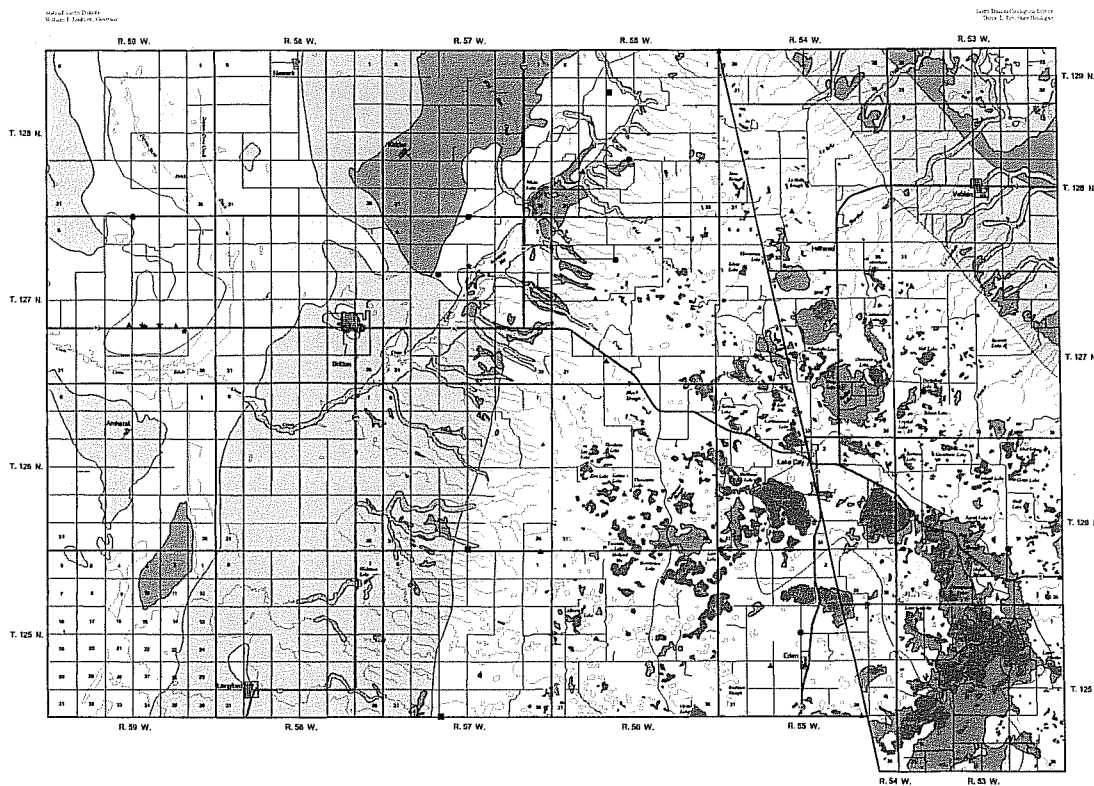
In closing, remember once our water is contaminated and rich farm land is contaminated by a crude oil, it is gone and it is not coming back, not in our life time or the life times of our children. Oil doesn't make a very good substitute. Oil doesn't make a fertile valley. It makes a barren waste.

The Public Utilities Commission is charged with the task of protecting South Dakota citizens, land, water and natural resources. We hope and trust you will do your duty.

Thank you.

# First Occurrence of Aquifer Materials in Marshall County, South Dakota

Department of Environment and Natural Resources  
Division of Financial and Technical Assistance  
Geological Survey  
Aquifer Materials Map 3  
Ann R. Jensen, 2001



### Explanation

This map is provided for use as a guide to determine areas suitable for aquifer material. The aquifer materials shown on this map are categorized below. The map does not show individual aquifers. There may be more than one type of aquifer material present in an area. However, only the first occurrence of aquifer material is shown. Within the boundaries of any given map unit, there may be localized areas where aquifer material is absent. The thickness and permeability of aquifer material may vary significantly. Also, the map is a guide to determine areas suitable for aquifer material. Therefore, not all of the areas outlined on this map may be suitable for aquifer material. Consult the map with the following information for more details.

- Alfalfa:** Consists of deep and shallow water aquifers of sand and gravel.
- First occurrence is generally less than or equal to 50 feet below land surface:**
  - Fallen Sand:** Sandstone, siltstone, and clay.
  - Sand and Gravel:** Sandstone, siltstone, and clay.
  - Sand and Gravel:** First occurrence is generally below land surface. May be continuous or discontinuous, and may be continuous or discontinuous.
- First occurrence is generally greater than 50 feet and less than or equal to 100 feet below land surface:**
  - Sand and Gravel:** May be continuous or discontinuous, and may be continuous or discontinuous.
- First occurrence is generally greater than 100 feet below land surface:**
  - Sand and Gravel:** May be continuous or discontinuous, and may be continuous or discontinuous.
  - Heavy Formation:** Consists of sandstone, siltstone, and clay.
- Other:**
  - Other: First occurrence of aquifer material is generally less than or equal to 50 feet below land surface.
  - Other: First occurrence of aquifer material is generally greater than 50 feet below land surface.
  - Other: First occurrence of aquifer material is generally greater than 100 feet below land surface.
  - Other: First occurrence of aquifer material is generally greater than 100 feet below land surface.

Highway  
 Road  
 Township boundary  
 River or stream  
 Lake  
 Through or intermittent lake

For township and range numbering system, see T. 125 N., R. 59 W.

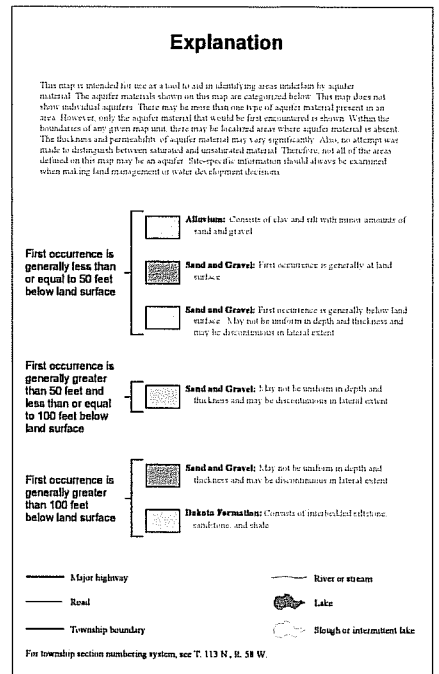


This map was prepared from the best available data. The map is not a warranty of accuracy.

Map 3-1, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 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Aquifer Materials Map 2  
Ann R. Jensen, 2001

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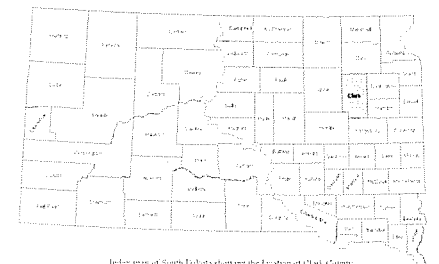
With *Geophila* and *Leptogomphus* as outgroups, *Chel. G. con.* is sister to *Lept. G. con.* and *Lept. G. con.* is sister to *Lept. G. con.*

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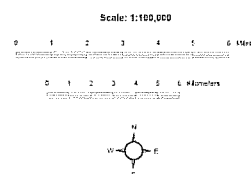
Geological Survey, Lithologic Data Base

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Index map of South Dakota showing the location of Clark County

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STATE OF SOUTH DAKOTA  
Richard Kneip, Governor

SOUTH DAKOTA GEOLOGICAL SURVEY  
Duncan J. McGregor, State Geologist

Information Pamphlet No. 1

MAJOR AQUIFERS AND SAND AND GRAVEL  
RESOURCES IN MARSHALL COUNTY, SOUTH DAKOTA

by

Neil C. Koch  
U. S. GEOLOGICAL SURVEY  
United States Department of the Interior

Prepared in cooperation with the  
South Dakota Geological Survey,  
Marshall County, and the  
Oahe Conservancy Subdistrict

Science Center  
University of South Dakota  
Vermillion, South Dakota  
1972

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# Major Aquifers and Sand and Gravel Resources in Marshall County, South Dakota

by  
Neil C. Koch

## INTRODUCTION

This publication is designed to acquaint the reader with the general distribution, quantity, and quality of water available from major aquifers, and to aid in the exploration and development of sand and gravel resources in Marshall County. A comprehensive report on the technical aspects of the geology and hydrology will be published at a later date.

Copies of this publication and other available county reports may be obtained from the South Dakota Geological Survey in Vermillion or the U.S. Geological Survey in Huron. Persons wishing additional information about the geology and hydrology may contact either of the above organizations.

Figure 1 shows the location of test holes and wells from which data are available.

## AQUIFERS

An aquifer is defined as a formation from which water may be obtained in useful quantities. Glacial aquifers are composed mostly of sand and gravel. Where the glacial aquifers are confined by overlying material, this overlying material generally consists of clay containing some sand, gravel, and stones of all sizes. When an aquifer is confined by an overlying, relatively impermeable material such as clay, and the water in wells rises above the top of the aquifer, the water is said to be under artesian pressure. Some aquifers are under sufficient pressure that water flows from the well at the land surface. In an unconfined aquifer the surface of the saturated zone is called the water table. In the saturated zone all openings between rock particles are filled with water.

### Glacial Aquifers

Three major glacial aquifers, the Veblen, James, and Coteau-Lakes aquifers, are present in the county (fig. 2). The Veblen aquifer underlies an area of about 24 square miles in northeastern Marshall County and extends north into North Dakota and east into Roberts County. The aquifer may yield as much as 500 gpm (gallons per minute) to properly constructed wells at depths ranging from 130 to 180 feet. Aquifer thickness ranges from 10 to 70 feet except at one test hole which penetrated 200 feet of aquifer. Water in the Veblen aquifer occurs under artesian conditions, and water levels in wells tapping the aquifer range from about 14 to 80 feet below land surface.

The James aquifer is in north-central Marshall County with narrow channels extending southwest into Brown County and southeast into Day County. The aquifer may yield as much as 500 gpm to properly constructed wells. In low-lying areas, the aquifer is at depths ranging from 120 to 190 feet below land surface. At higher altitudes, on the Coteau des Prairies (hereafter call the coteau), the aquifer is 390 feet or more below land surface. Aquifer thickness ranges from 10 to 70 feet. Water in the aquifer occurs under artesian conditions and water levels range from 3 to 40 feet below land surface in low-lying areas.

The Coteau-Lakes aquifer is in the southeastern part of the county. It occurs at or near land surface and is hydraulically connected with the waters in Buffalo, Red Iron and Clear Lakes. The thickness of the aquifer differs considerably from place to place, ranging from about 5 feet to a known maximum to 57 feet. Water in the aquifer may be under water-table or artesian conditions, and water levels range from that of the lake levels to 40 feet below land surface. Because of the considerable range in aquifer thickness, it is difficult to predict yield; however,

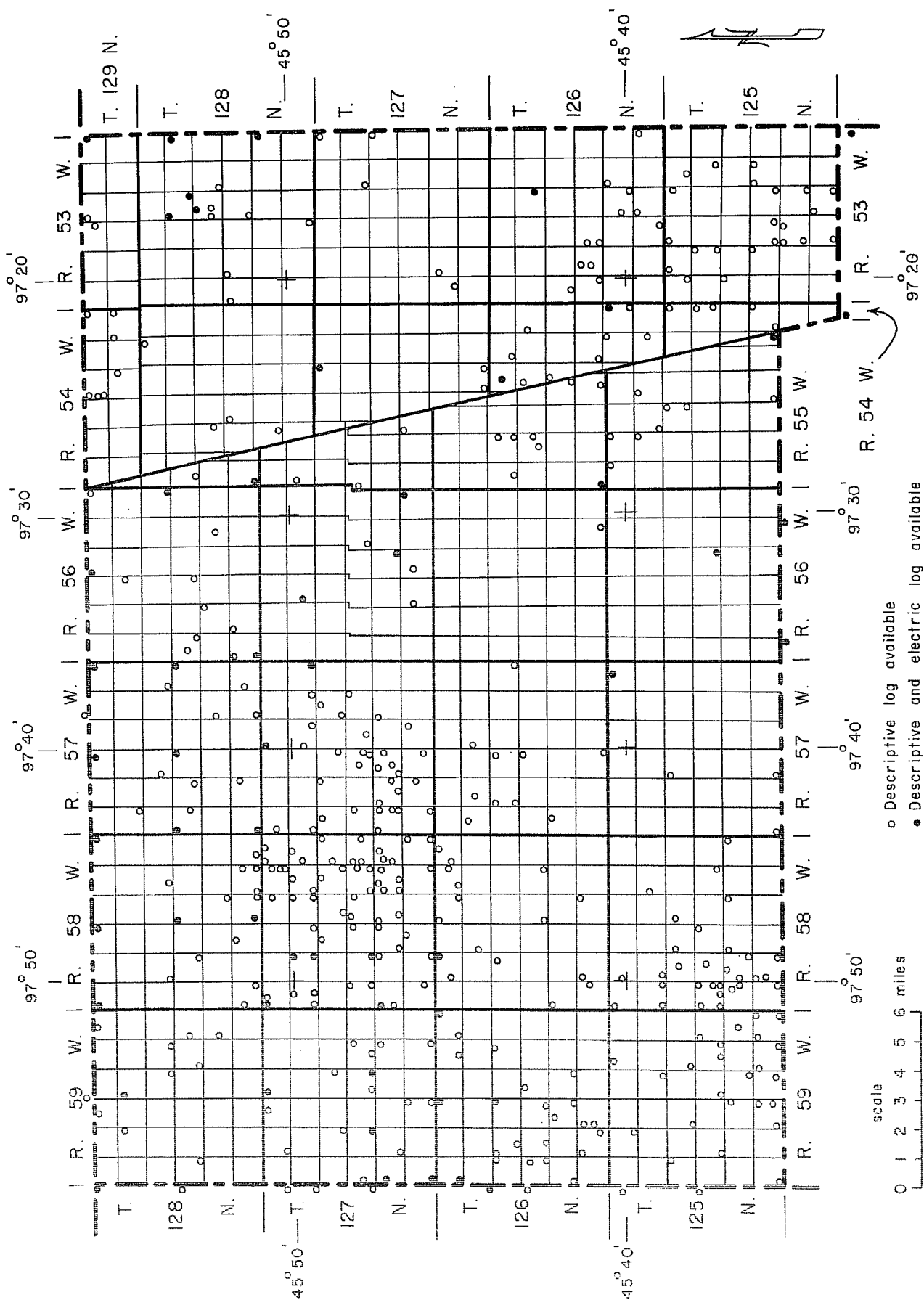


Figure 1. Map showing locations of wells and test holes in Marshall County for which data are available.

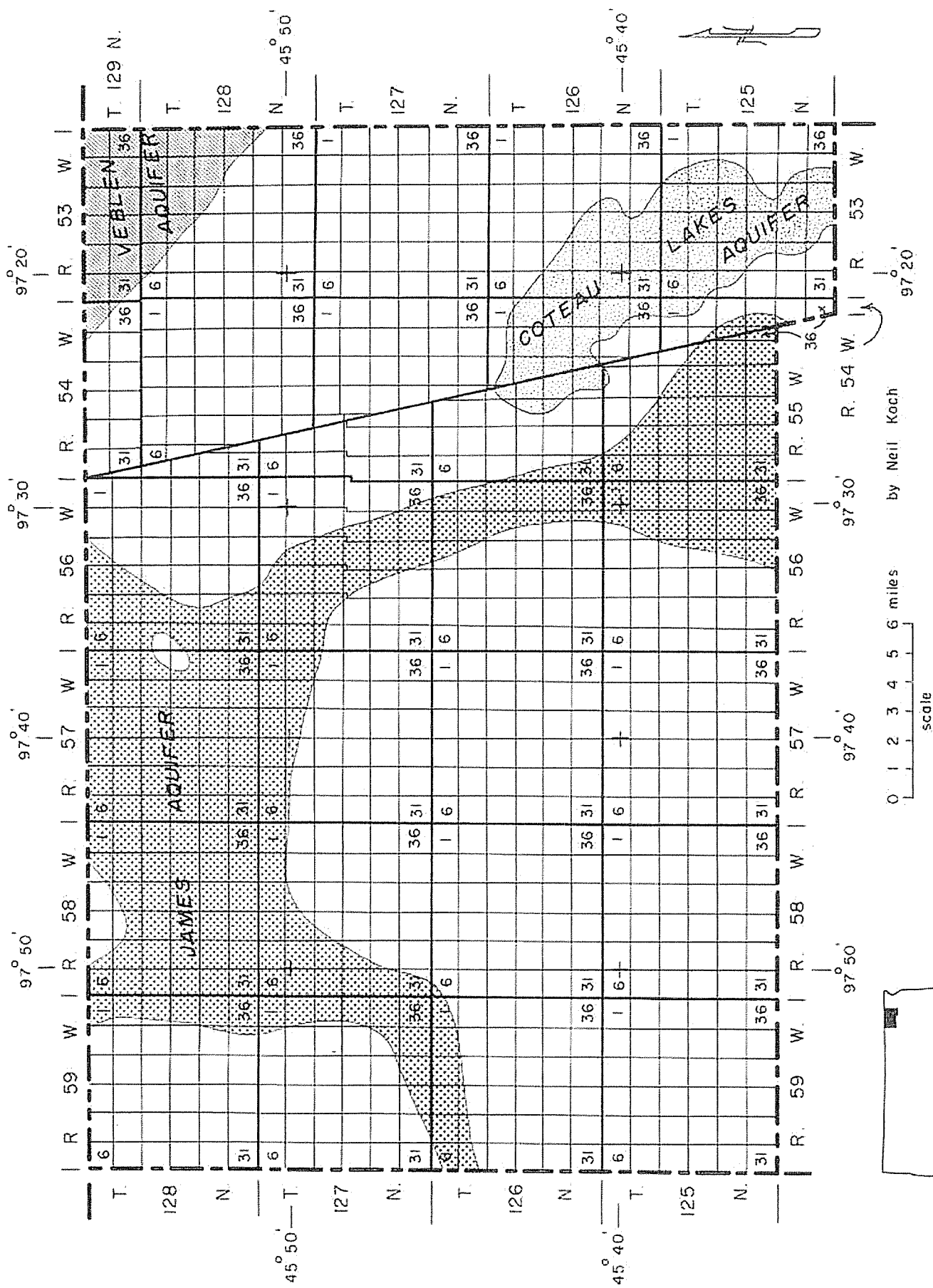
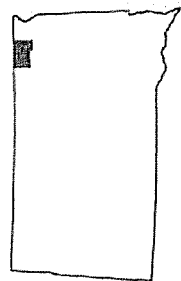


Figure 2. Map showing locations of major glacial aquifers in Marshall County.



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where the aquifer is sufficiently thick and has a good permeable connection with a lake, well yields of 500 gpm can be expected.

The Veblen aquifer yields water that is predominantly of calcium-sulfate and calcium-bicarbonate types, with specific conductance ranging from 777 to 2,130 micromhos per centimeter. The specific conductance of water is a measure of the water's capacity to conduct an electrical current; it is the function of the amount and kind of dissolved mineral matter. An estimate of the total dissolved solids in milligrams per liter can be obtained by multiplying specific conductance by 0.65. Hardness ranges from 274 to 856 mg/l (milligrams per liter) or 16 to 50 grains per gallon.

Water in the James aquifer is predominantly of sodium-, calcium-, bicarbonate, sulfate types with specific conductance ranging from 1,030 to 2,050 micromhos per centimeter. Hardness ranges from 103 to 856 mg/l (6 to 50 grains per gallon).

The water from the Coteau-Lakes aquifer is of a calcium-magnesium-bicarbonate type with specific conductance ranging from 400 to 700 micromhos per centimeter. Hardness ranges from 205 to 702 mg/l (12 to 41 grains per gallon).

### Bedrock Aquifer

The Dakota sandstone aquifer underlies all of Marshall County at depths ranging from 900 feet beneath the low-lying areas in the western part of the county to 1,500 feet below the high areas of the coteau in the eastern part. Water in the aquifer occurs under artesian conditions, and in the low-lying area in western Marshall County many of the wells flow. Yields of up to 200 gpm may be obtained from properly constructed wells.

Water from the Dakota aquifer is soft, ranging from 17 to 137 mg/l (1 to 8 grains per gallon) hardness, and is of the sodium-sulfate type with specific conductance ranging from 3,500 to 4,050 micromhos per centimeter.

### HIGH-YIELD WELLS

Before high-yield wells such as those generally needed for irrigation are constructed, it is desirable that a test well be drilled at the selected location to determine the thickness of the aquifer and provide samples for determining the grain size of the aquifer material. This information will help in the selection of the proper slot size and length of screen to be used. Pumping the test well shows the yield of the aquifer at that locality and provides a water sample for chemical-quality analysis. The type of soil and subsoil and the topography are also important in determining the suitability of the land for irrigation, and in selecting the most suitable irrigation system.

### SAND AND GRAVEL RESOURCES

The following definitions of geologic terms are intended to aid in understanding the occurrence of sand and gravel deposits in Marshall County.

#### Outwash

Outwash is any deposit of clay, silt, sand, gravel, or boulders that has been washed and sorted by natural processes during transport, and subsequently deposited by water from melting glacial ice. An outwash deposit is usually composed primarily of sand and gravel. Most of the sand and gravel pits in Marshall County are in outwash deposits.

### **Till**

Till in Marshall County consists of clay containing some sand and gravel, and stones varying in size up to boulders. It is the unsorted and unstratified material deposited by continental glaciers. This material in general has not been subjected to the action of running water.

Pockets of stratified sediment containing sand and gravel occur within the till. Occasionally these sand and gravel pockets are large enough for commercial production; however, in general, the till areas do not contain much sand and gravel and do not constitute good areas for exploration.

### **Alluvium**

Alluvium is sediment deposited by streams. It consists of material ranging in size from clay to boulders, depending on the kinds of material available to the stream and the velocity of the stream. In Marshall County most of the alluvium does not contain large deposits of sand and gravel.

### **Bedrock**

The term bedrock refers to consolidated rock. In Marshall County it is predominantly shale. There is no possibility of finding unconsolidated sand and gravel deposits beneath the bedrock.

### **Location of Sand and Gravel Deposits**

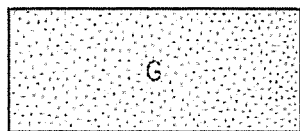
Figure 3 is a map showing the probability of occurrence of sand and gravel deposits, and the locations of gravel pits. The map does not show the quality of the sand or gravel, and should be used only as a guide to further exploration of sand and gravel resources. The development of any specific site would depend upon material specifications for the desired use.

Table 1 is a list of sand and gravel pits that have been tested by the South Dakota Department of Highways.

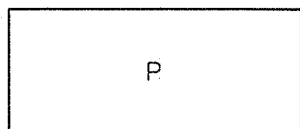
## EXPLANATION



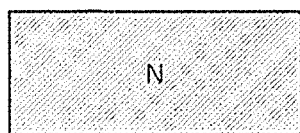
High probability of finding sand and gravel deposits.




Good probability of finding sand and gravel deposits.



Poor probability of finding sand and gravel deposits.



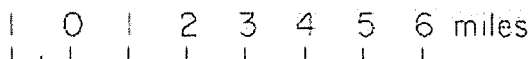
Shale - no probability of finding sand and gravel deposits.

 Sand and gravel pit, no distinction between those presently used and those abandoned. Number refers to pits for which data are available. (see table 1)



Lake or pond

Scale



Index map of South Dakota



6	5	4	3	2	1
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

Sectioned Township

by Neil C. Koch, 1972

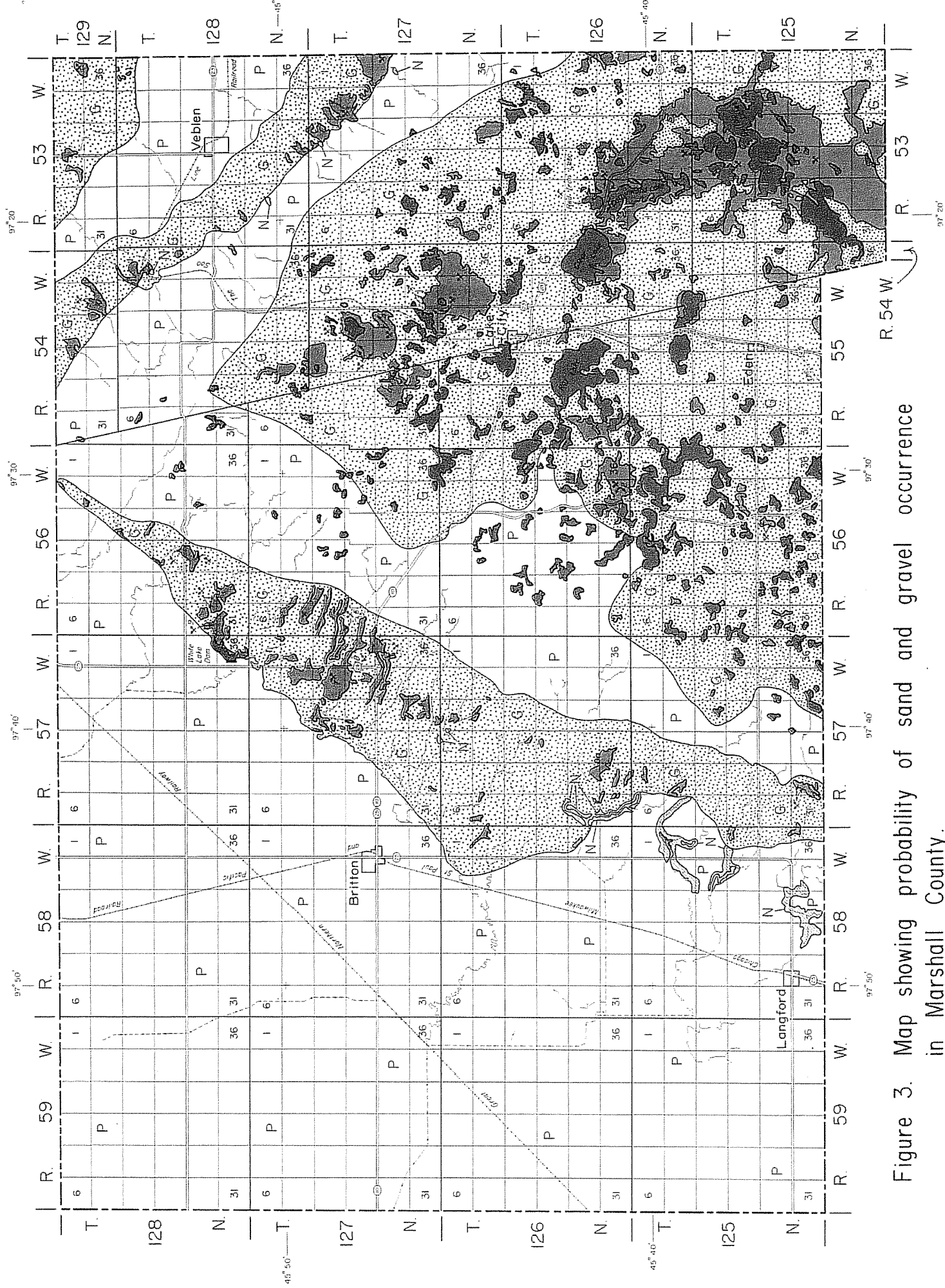
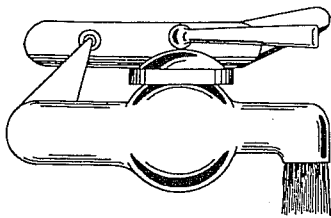


Figure 3. Map showing probability of sand and gravel occurrence in Marshall County.

Table 1 -- List of sand and gravel pits in Marshall County described  
by the South Dakota Department of Highways

Pit No.	Owner	Location	Type	Approximate size of deposit, in cubic yards
1	John Johannsen	NW¼&W½NE¼27-125-56	Gravel	37,000
2	Roman Mechlitsch	NE¼SW¼35-126-56	Gravel	35,000
3	Henry Anderson Bennet and Verlyn Tollefson Ingeborg Vestly	NW¼11-127-53	Sand & Gravel	100,000
4	Robert Juran	NE¼NE¼15-127-54	Sand & Gravel	
5	Paul Casperson	NW¼27-127-54	Sand & Gravel	48,000
6	Merle Behnke	SW¼18-127-56	Gravel	8,000
7	Philip Muth	N½SE¼14-127-57 N½SW¼14-127-57	Gravel	47,000
8	Ross Hinkley	S½SE¼24-127-57	Sand & Gravel	
9	Thorp Farm	SE¼21-128-56	Gravel	30,000
10	Arman Crandall	W½NE¼35-129-54 NW¼NW¼35-129-54	Gravel	80,000





**BROWN  
DAY  
MARSHALL**

P.O. Box 49  
705 7th Street  
Britton, South Dakota 57430  
Phone 605-448-5417

**Rural Water System, Inc.**



PUBLIC HEARING – SD PUBLIC UTILITIES COMMISSION

WEDNESDAY, JUNE 27, 2007, NOON

David C. Wade, General Manager  
BDM Rural Water System, Inc.

BDM RURAL WATER SYSTEM, INC. is a member owned rural water system in NE SD that serves water to 2,000 members, 15 bulk users and several large animal units. The system is about 4,500 square miles in size and a population total of about 6,000 people drink the water on a daily basis.

1) Our main concern is the proposed crossing of the Middle James aquifer. This is our only source of drinking water and could easily become contaminated in the event of a crude oil or fuel spill. The Middle James is very close to the surface in the proposed crossing area. Most recharge to James aquifer is by percolation of precipitation in ranges 58 and 59 W of T 128 N. This puts the proposed pipeline directly through the most important part of our drinking water source.

PROPOSAL: Our first proposal is to move the pipeline out of the aquifer. If this is not possible then we would like to see TransCanada line the pipeline with a special fabric that would protect the Middle James aquifer from any type of spill. If this is not possible, we would like to see TransCanada sleeve the line through the aquifer as to prevent any leakage into the aquifer. Does TransCanada have special plans for sensitive areas?

2) Our second concern is with the proposed pipeline crossings of BDM lines.

PROPOSAL: We may require a crossing permit of our existing 30 ft. or 60 ft. easement. We would also like to see TransCanada, in good faith, pay BDM for the expense to install ductile iron pipe in BDM's existing system for 1,000 feet on each side of each crossing to reduce or prevent contamination in the event of a spill close to the dozen or so proposed crossings. This is a way to be proactive in the prevention of contamination and destruction to BDM's pipeline system. Also, the State should require TransCanada to sleeve each pvc pipe crossing for 250 ft. on each side of the crossing to prevent potential spills from being close to the crossing itself. What is TransCanada's plan for crossings?

3) Our third concern is with cleanup of spills in the aquifer and by a crossing site.

**PROPOSAL:** We propose that TransCanada place a cash bond in the bank to take care of the cleanup that will occur in the event of a spill. TransCanada acknowledges that they will clean up any spill, but its much deeper than that. There would be much more expense to our water system, county property, township property, and state property than just the cleanup. BDM may need to find an alternate water source or perform different treatment on the finished water if there was a spill. This could cost millions of dollars. The total amount of the cash bond could be determined by a percentage of the total miles of pipe that cross our system based on the total cost of the 1,800 mile TransCanada pipeline. What is TransCanada's intent for Cash Bonds?

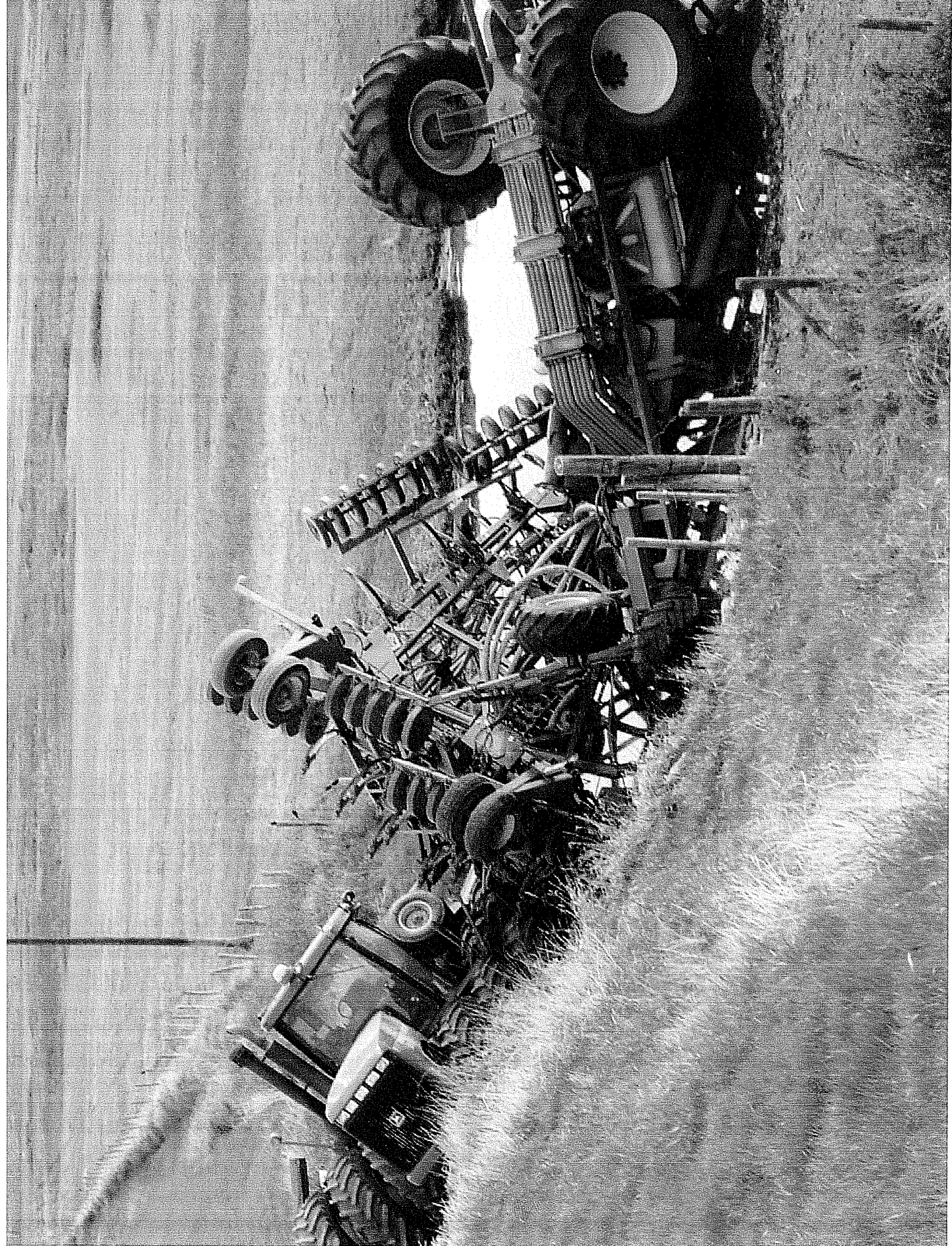










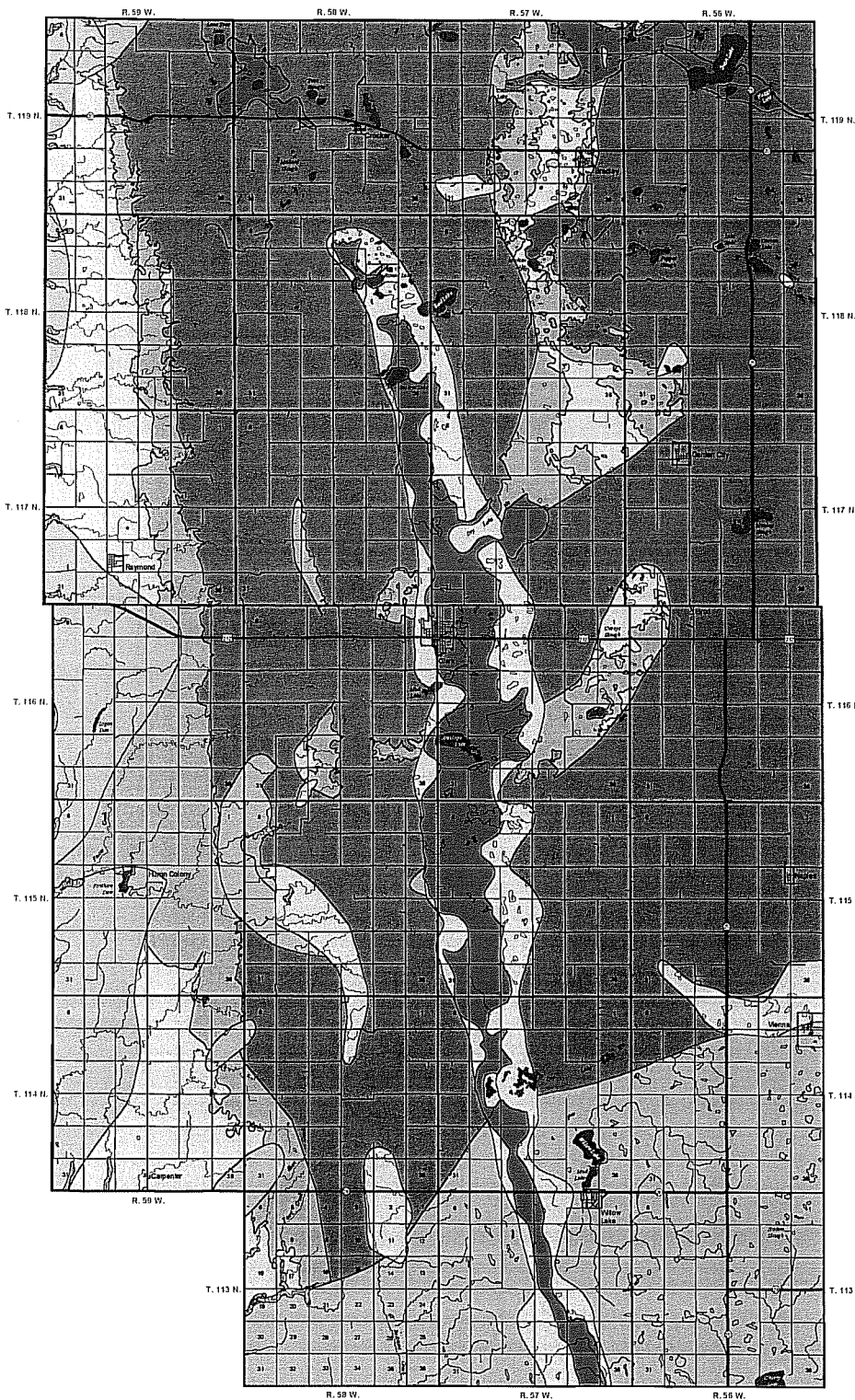


# First Occurrence of Aquifer Materials in Clark County, South Dakota

Department of Environment and Natural Resources  
Division of Financial and Technical Assistance  
Geological Survey  
Aquifer Materials Map 2  
Ann R. Jensen, 2001

Map 1:100,000 at  
Scale 1:100,000

Map 1:100,000 at  
Scale 1:100,000



## Explanation

This map is intended for use as a tool to help identify areas underlain by aquifer material. The aquifer materials shown on this map are categorized below. This map does not show individual aquifers. There may be more than one type of aquifer material present in an area. However, only the aquifer material that would be first encountered is shown. Within the boundaries of any given map unit, there may be localized areas where aquifer material is absent. The thickness and permeability of aquifer material may vary significantly. Also, no attempt is made to be distinguishable between unconsolidated and consolidated material. Therefore, in all of the areas defined on this map may be aquifers. Site-specific information should always be obtained when making land management or water development decisions.

First occurrence is generally less than or equal to 50 feet below land surface

- Alluvium** Consists of clay and silt with minor amounts of sand and gravel
- Sand and Gravel** First occurrence is generally at or below surface
- Sand and Gravel** First occurrence is generally below land surface. May not be uniform in depth and thickness and may be discontinuous in lateral extent

First occurrence is generally greater than 50 feet and less than or equal to 100 feet below land surface

- Sand and Gravel** May not be uniform in depth and thickness and may be discontinuous in lateral extent

First occurrence is generally greater than 100 feet below land surface

- Sand and Gravel** May not be uniform in depth and thickness and may be discontinuous in lateral extent
- Dakota Formations** Consists of interbedded siltstone, sandstone, and shale

- Major highway**
- Road**
- Township boundary**
- River or stream**
- Lake**
- Slough or intermittent lake**

For township section numbering system, see T. 113 N., R. 56 W.

This map was developed from data published in previous maps. The results are of approximate nature.

Chapman, C. M., 1977, "Geology and water resources of Clark County, South Dakota," *Clark County, South Dakota water geology map* (Plate 27, 3 p.).

Branson, J. E., 1977, "Water geology of Clark County, South Dakota," in *Water geology of Clark County, South Dakota* (Plate 27, 3 p.).

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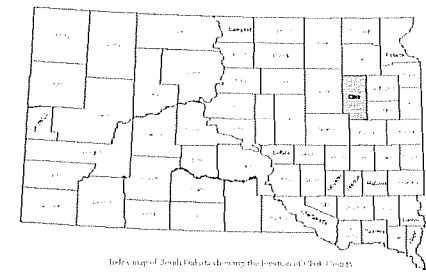
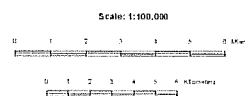
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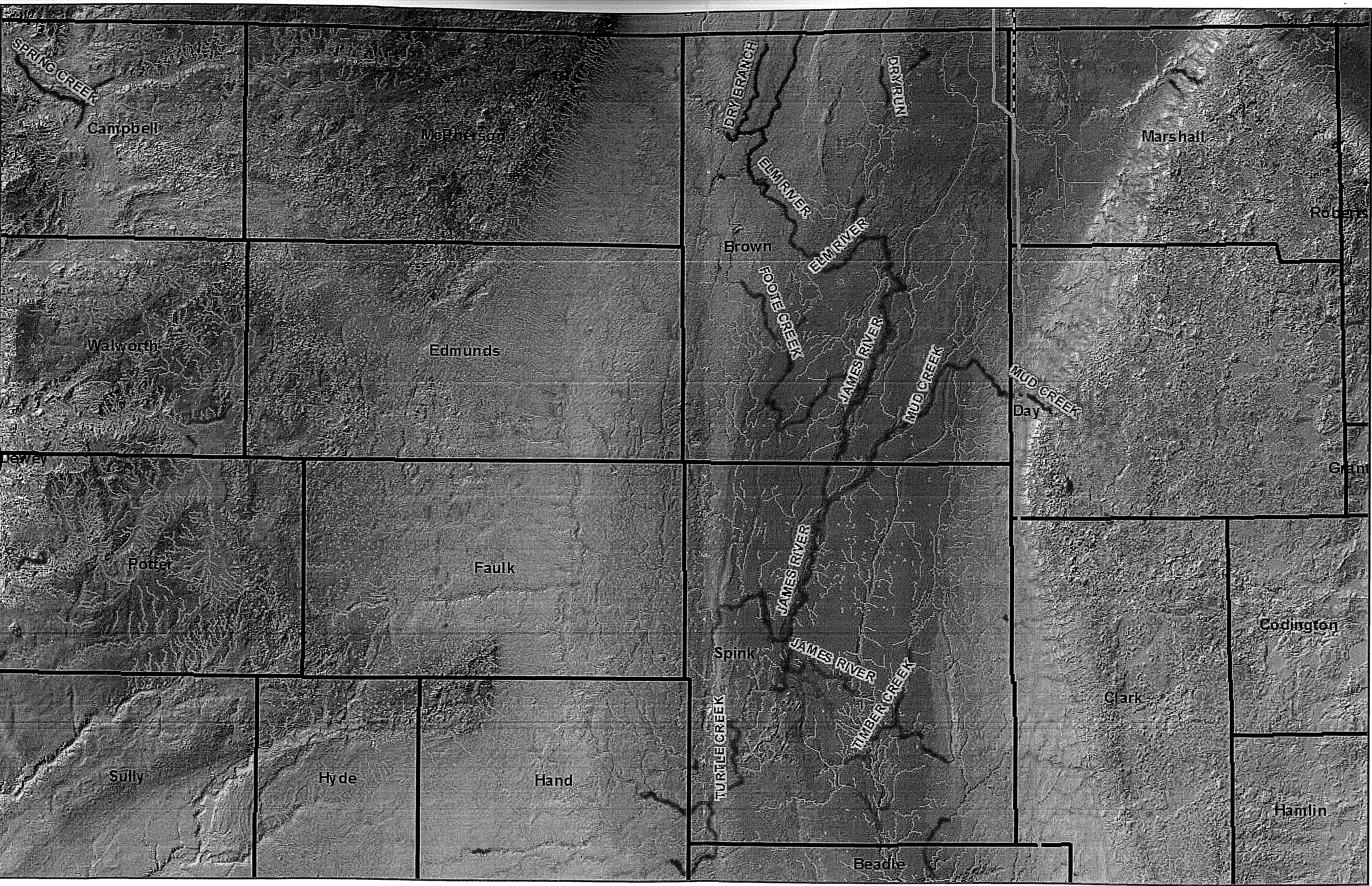


Inset map of South Dakota showing the location of Clark County

Publication Date: April 3, 2001







SPRING CREEK

Campbell

Marshall

Marshall

Roberts

Brown

ELM RIVER

ELM RIVER

KOOTIE CREEK

JAMES RIVER

DRY RUN

MUD CREEK

MUD CREEK

Day

Grant

Walworth

Edmunds

Potter

Faulk

Codrington

Spink

JAMES RIVER

JAMES RIVER

TIMBER CREEK

TURTLE CREEK

Clark

Hamlin

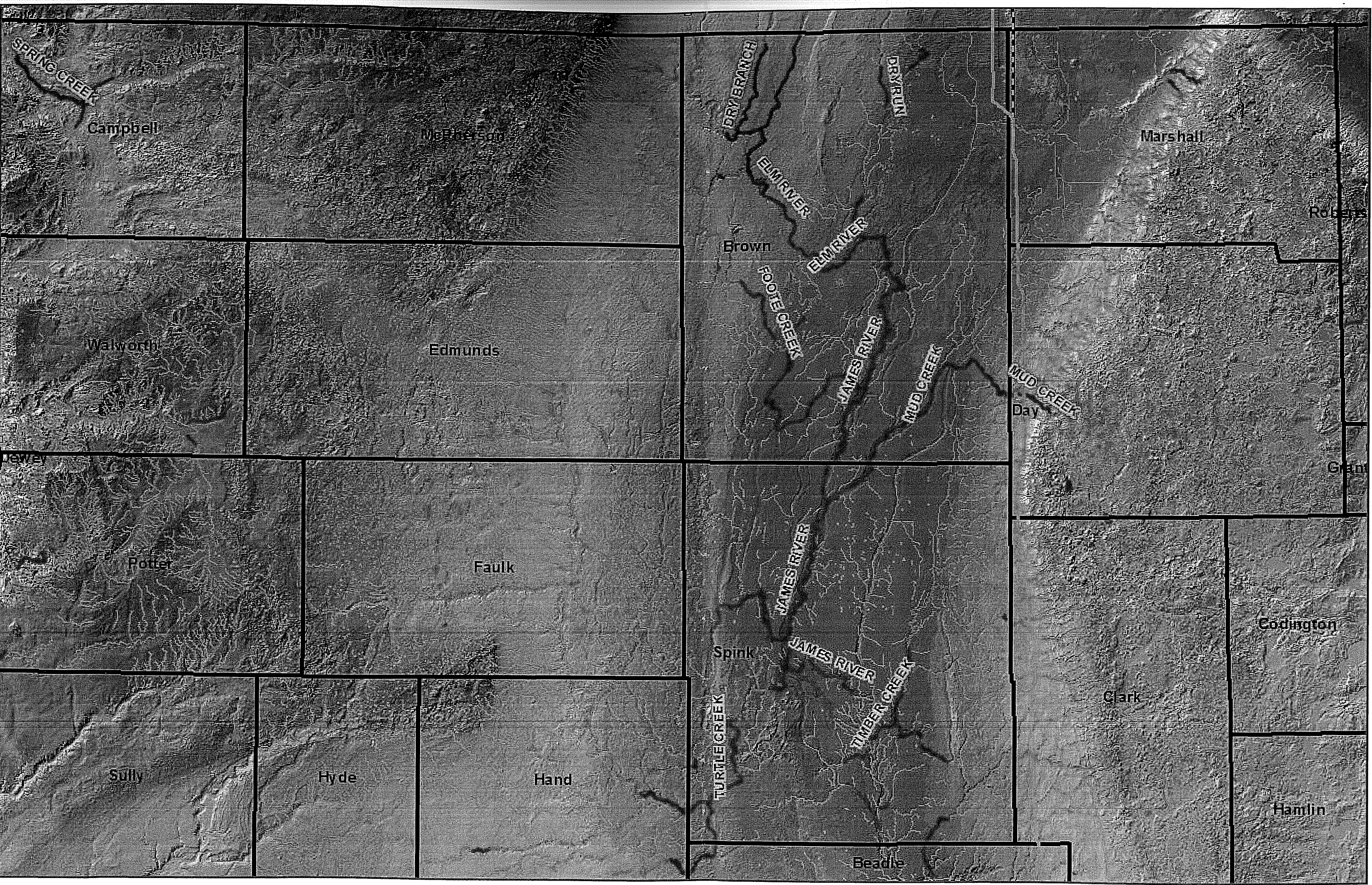
Hand

Hyde

Sully

Beadle

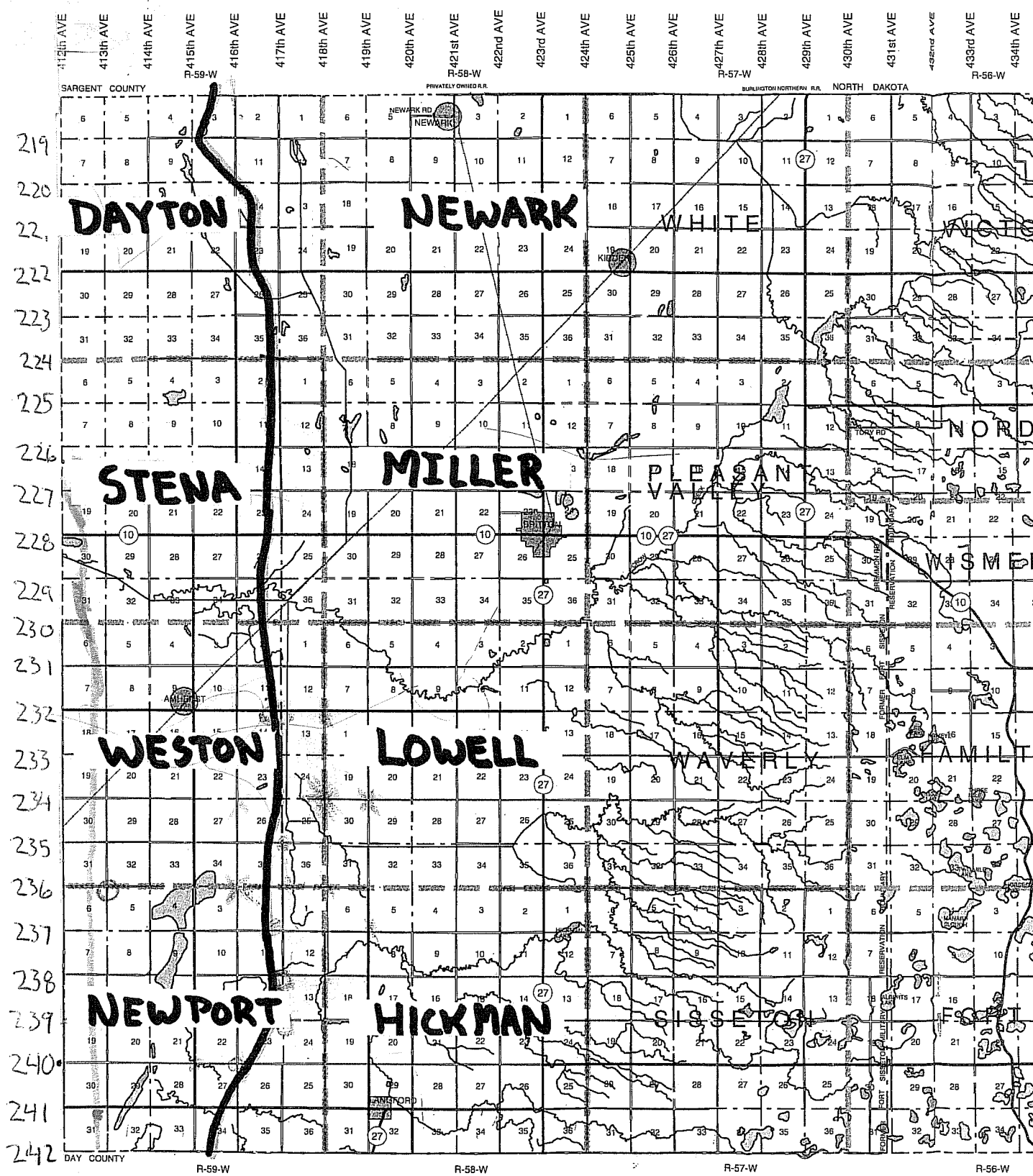






# Marshall County, South Dakota

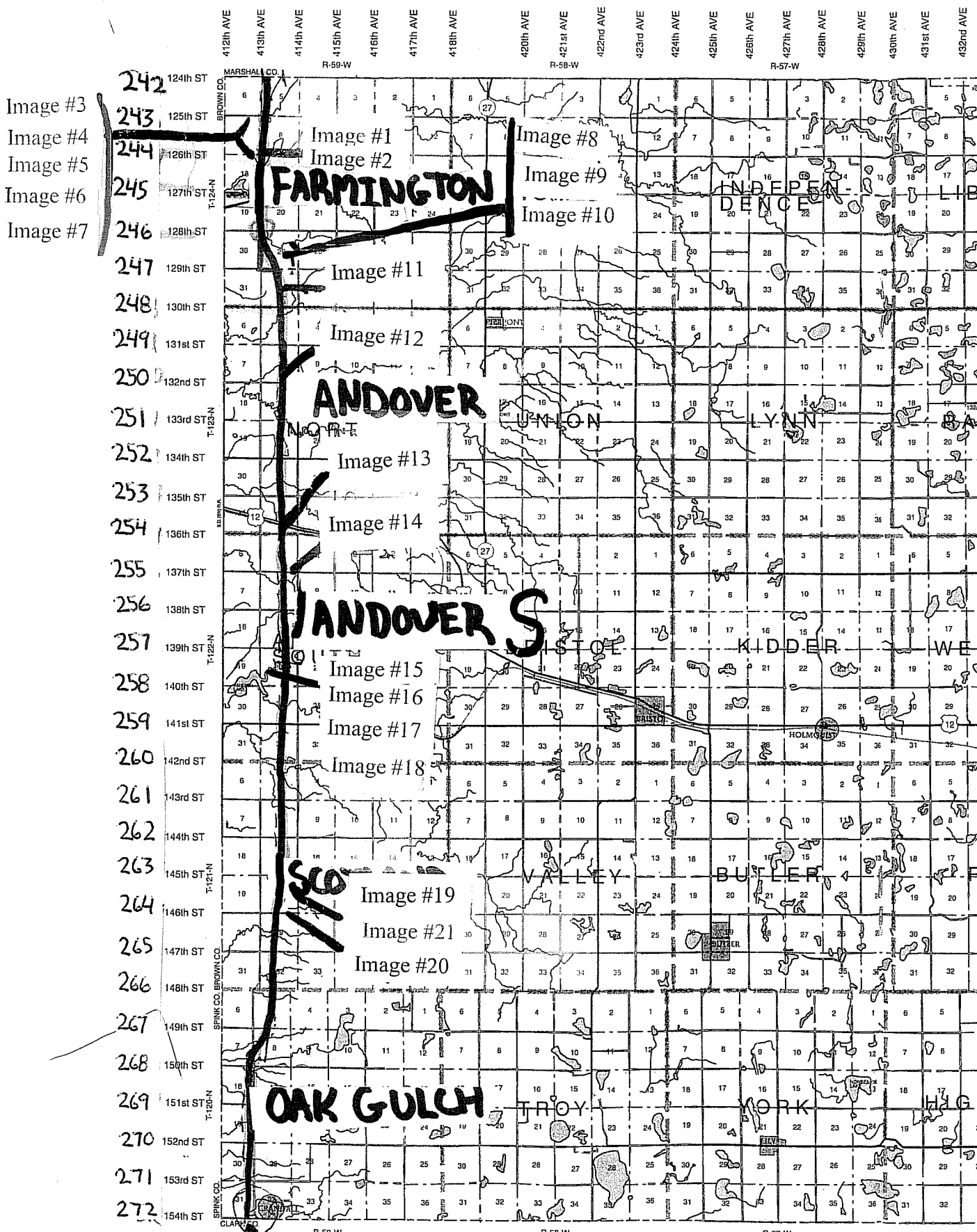
COUNTY MAP

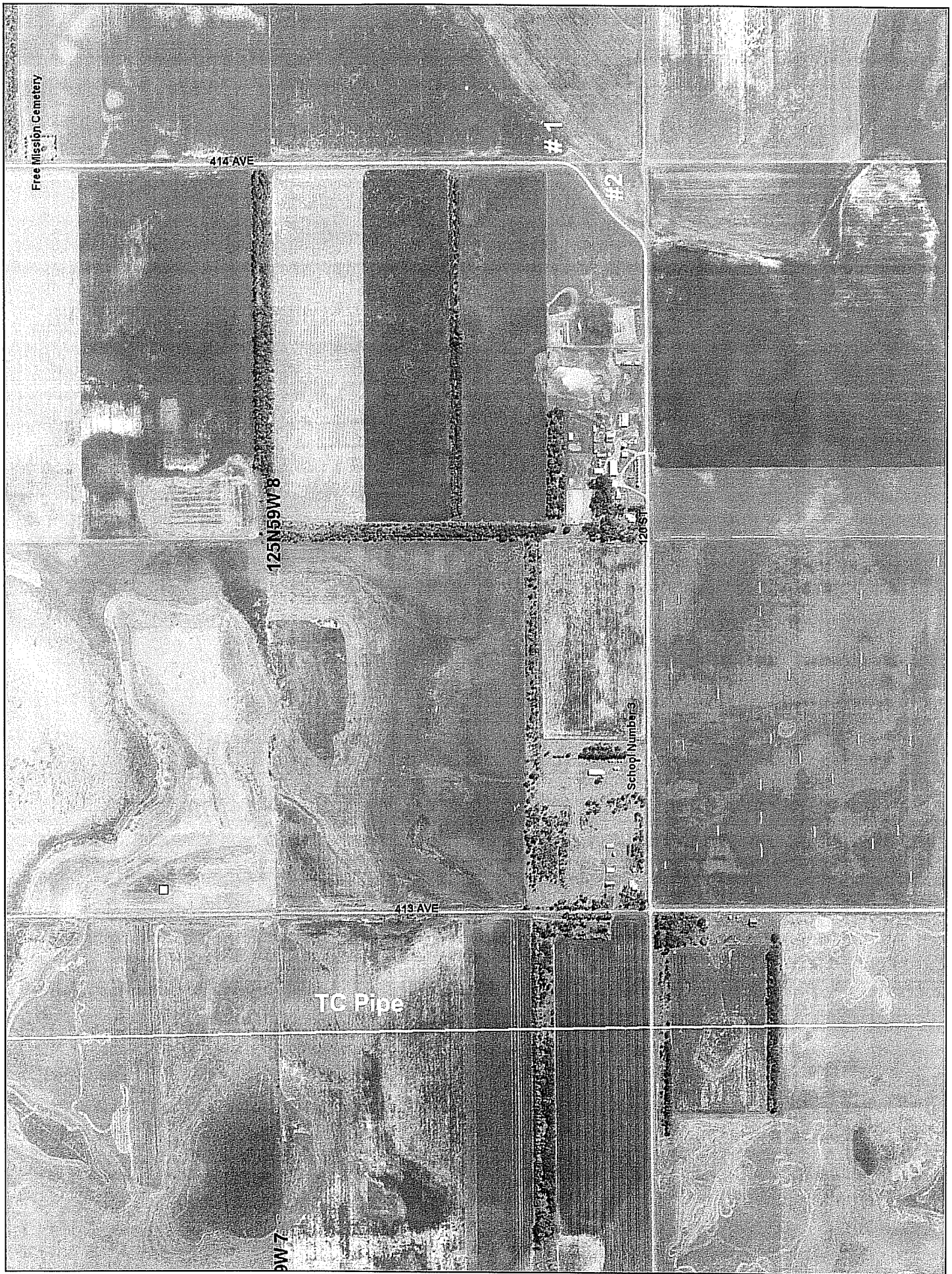


↑  
TransCanada  
Pipe -1-

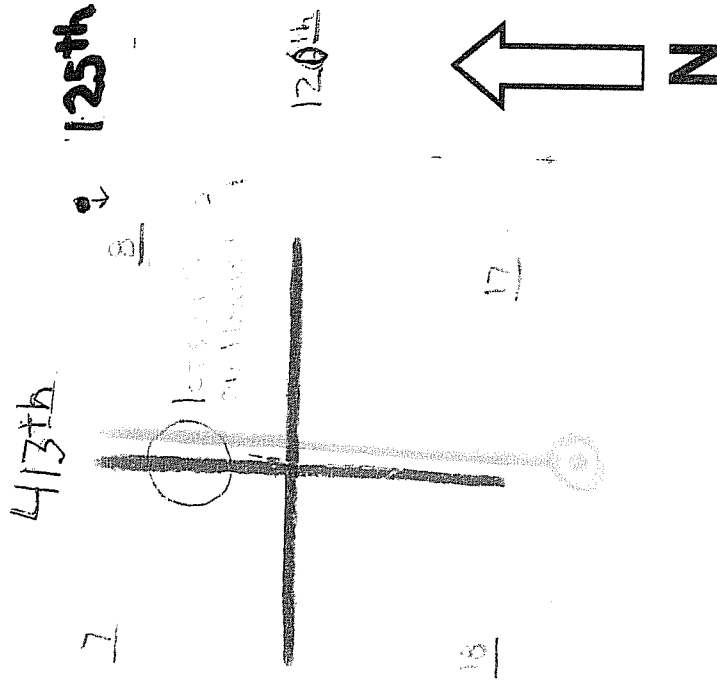
# Day County, South Dakota

COUNTY MAP



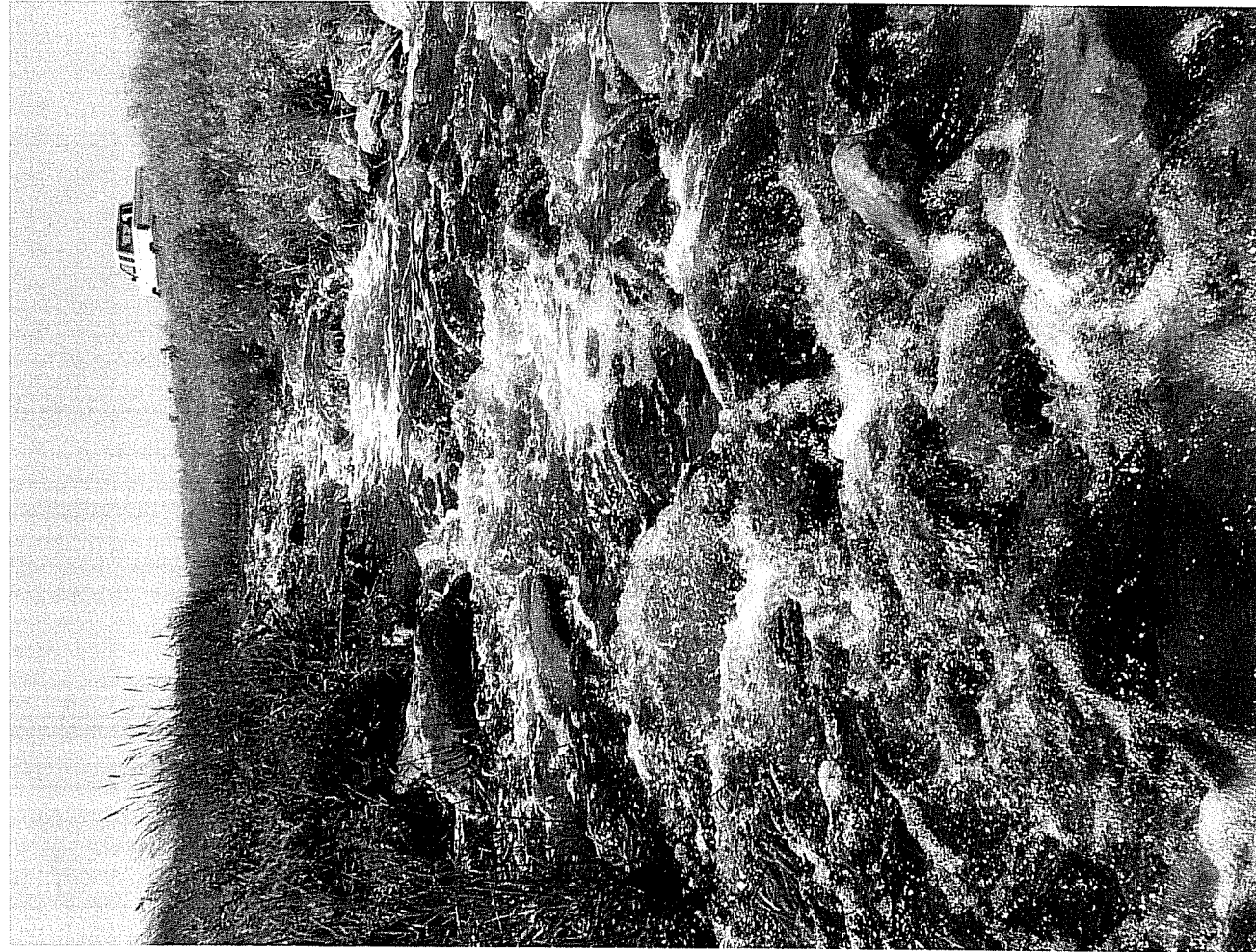




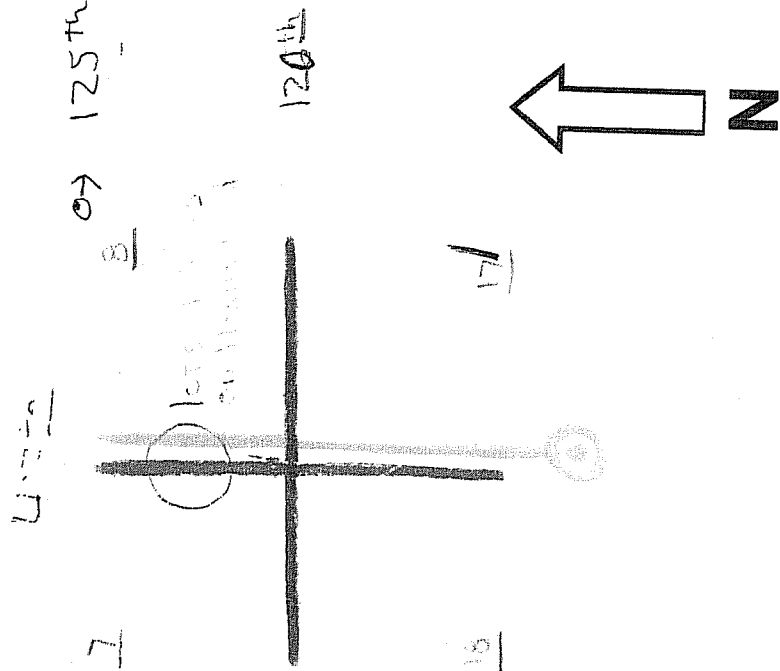


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MP 243

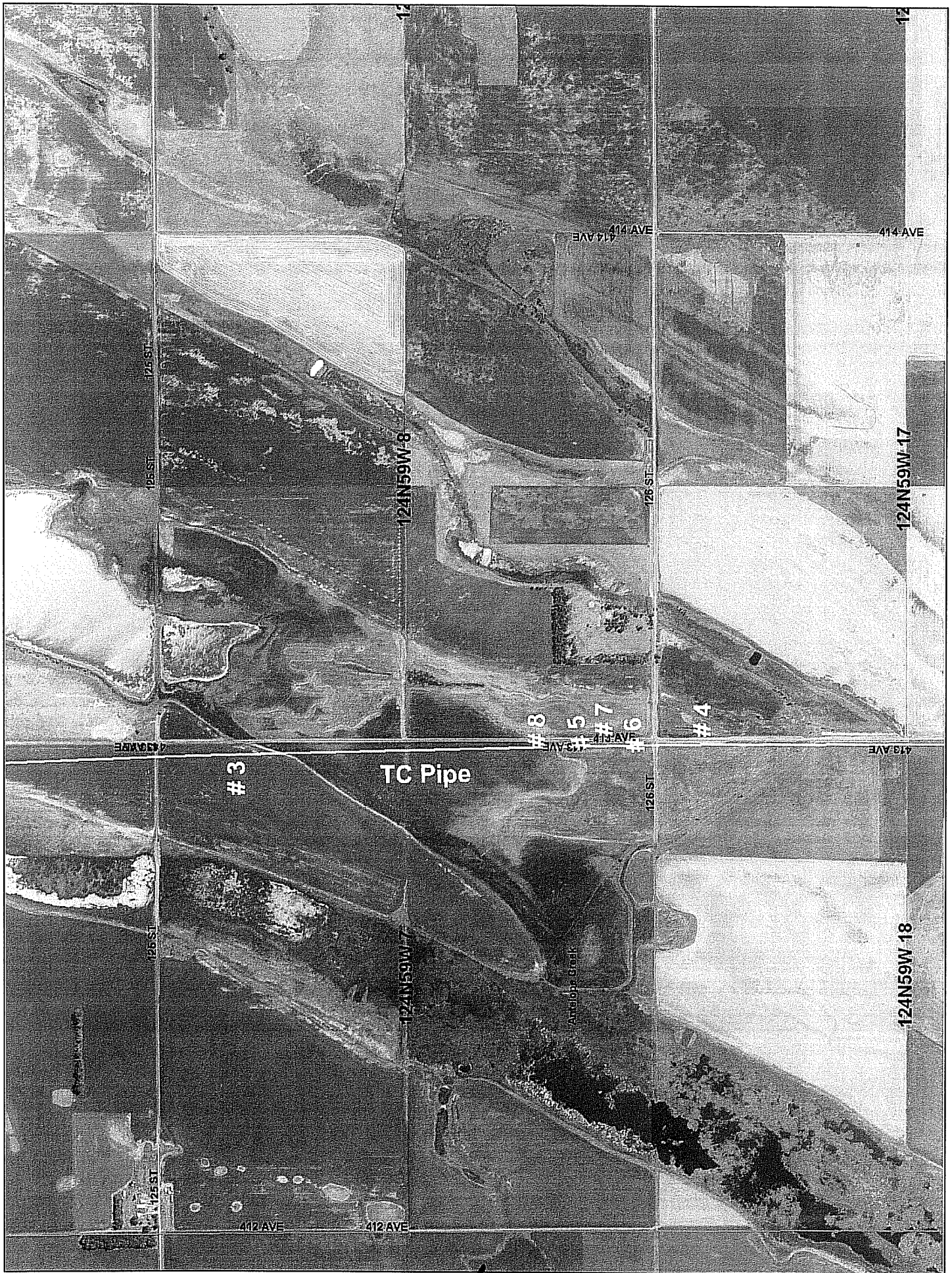
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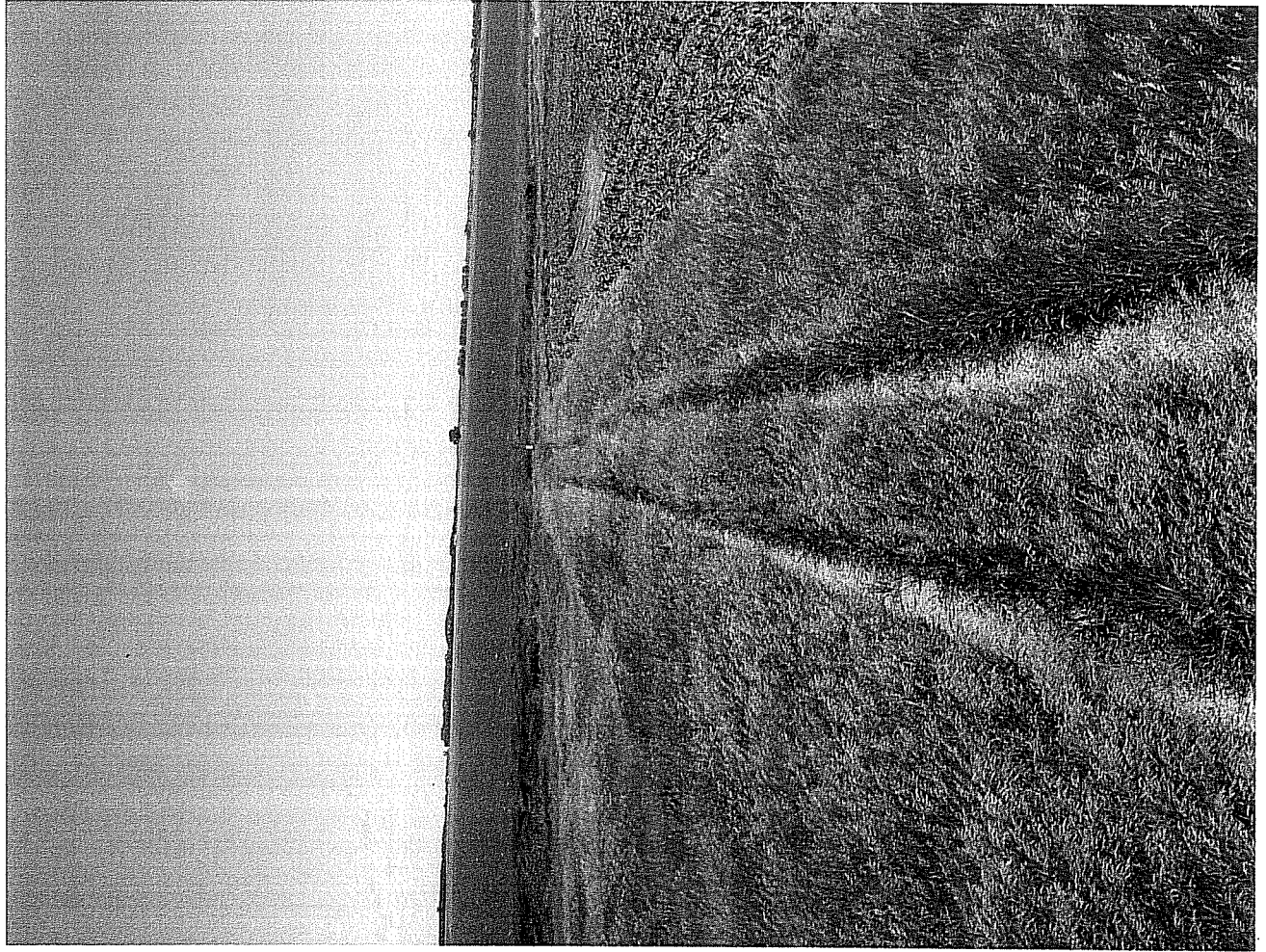
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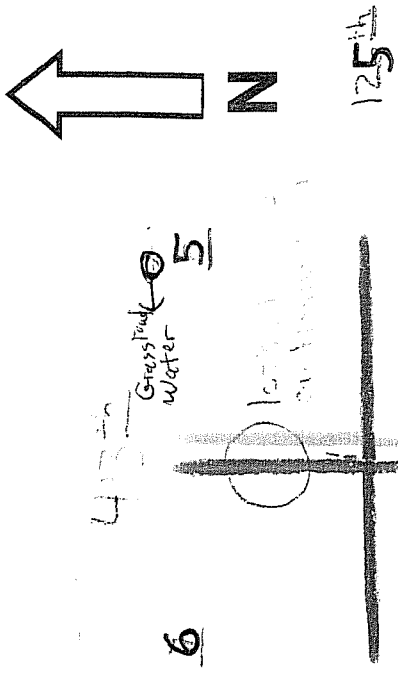
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MP 243







-7-



T-124-N / W-59-W  
MP 243

Image #3





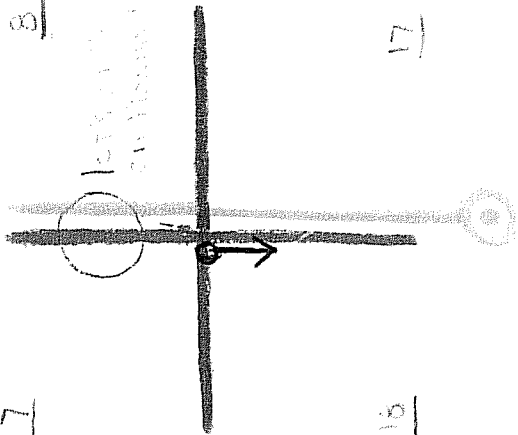
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7

8

1000 ft  
contour

126th

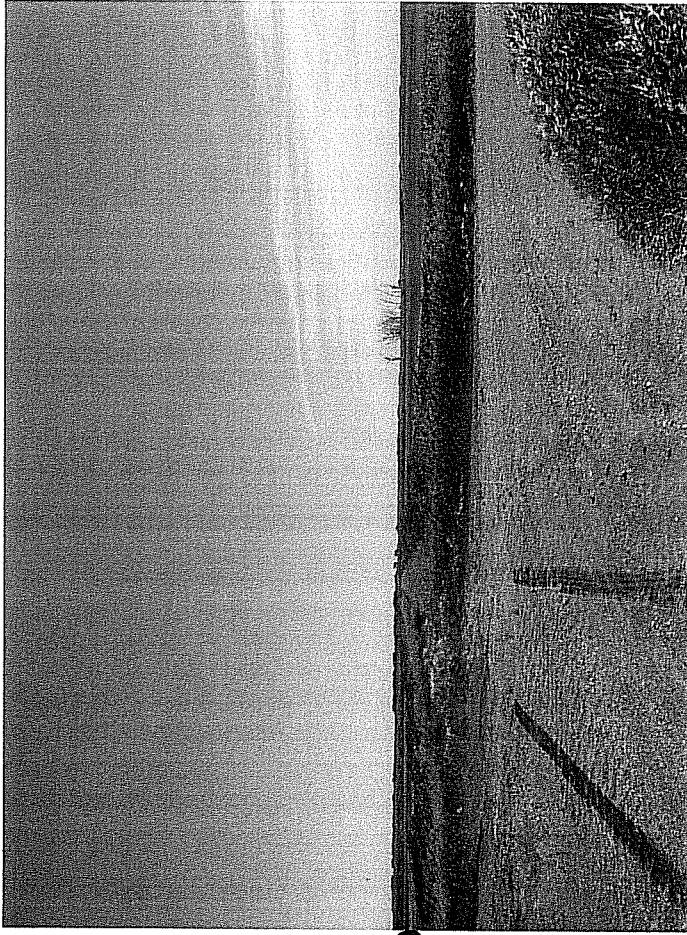


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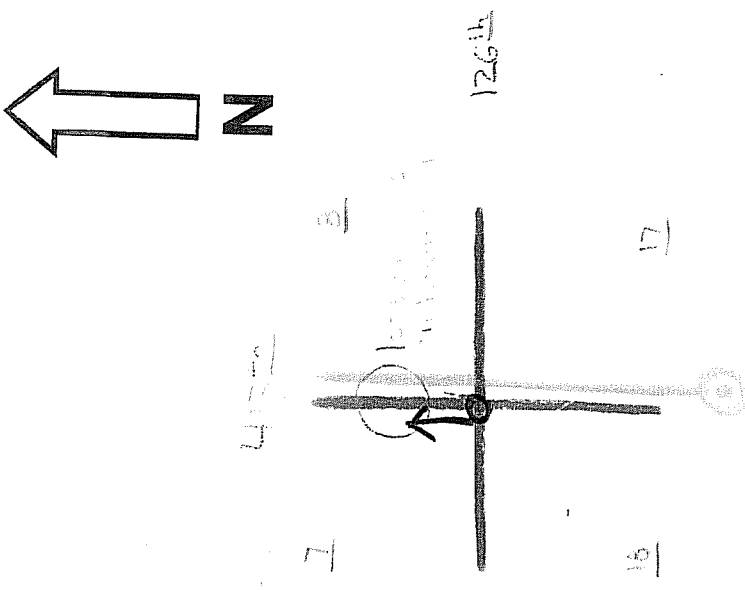
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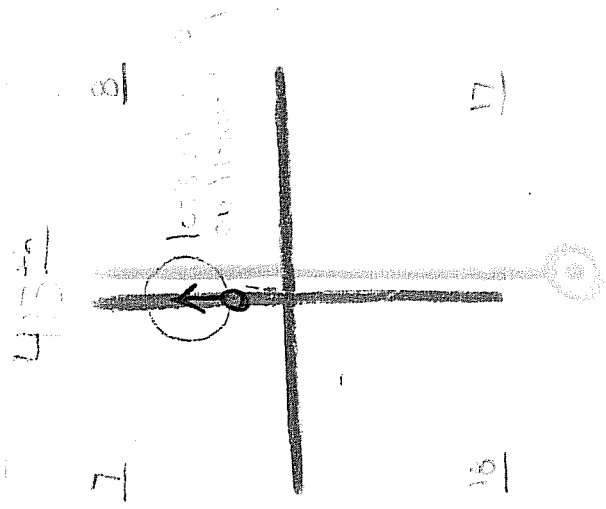


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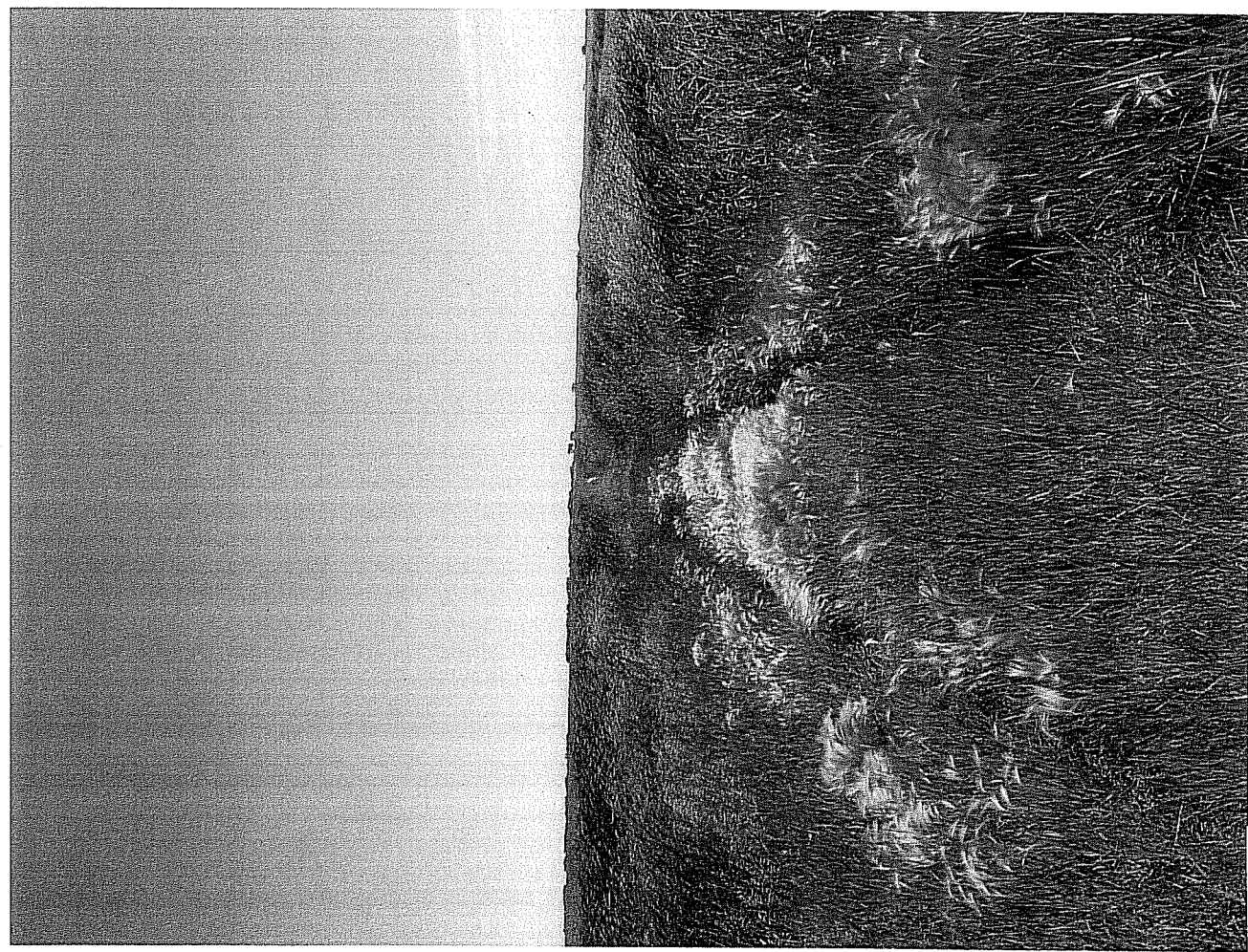


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Image #6



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MP 243 / MP 244

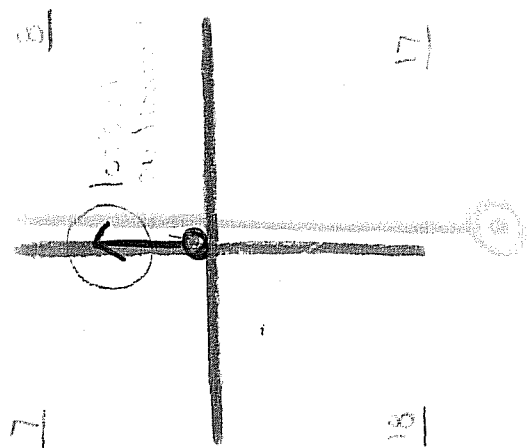


-10-

Image #7



476



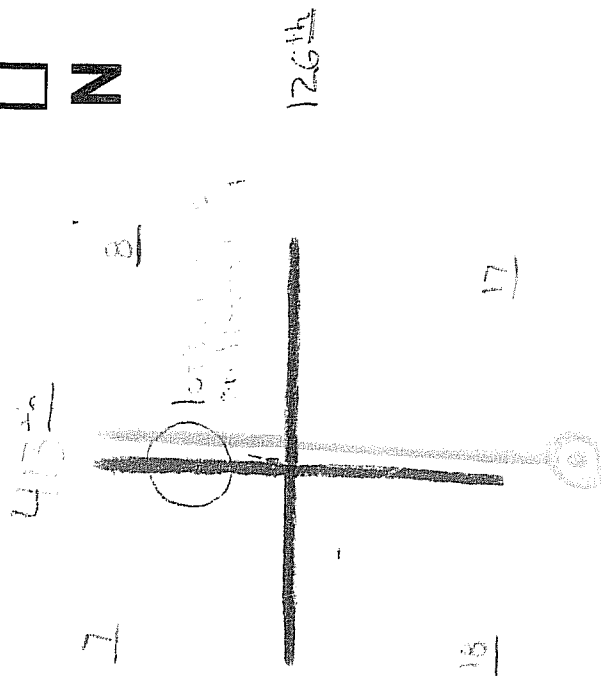
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MP 243 / MP 244



-/-

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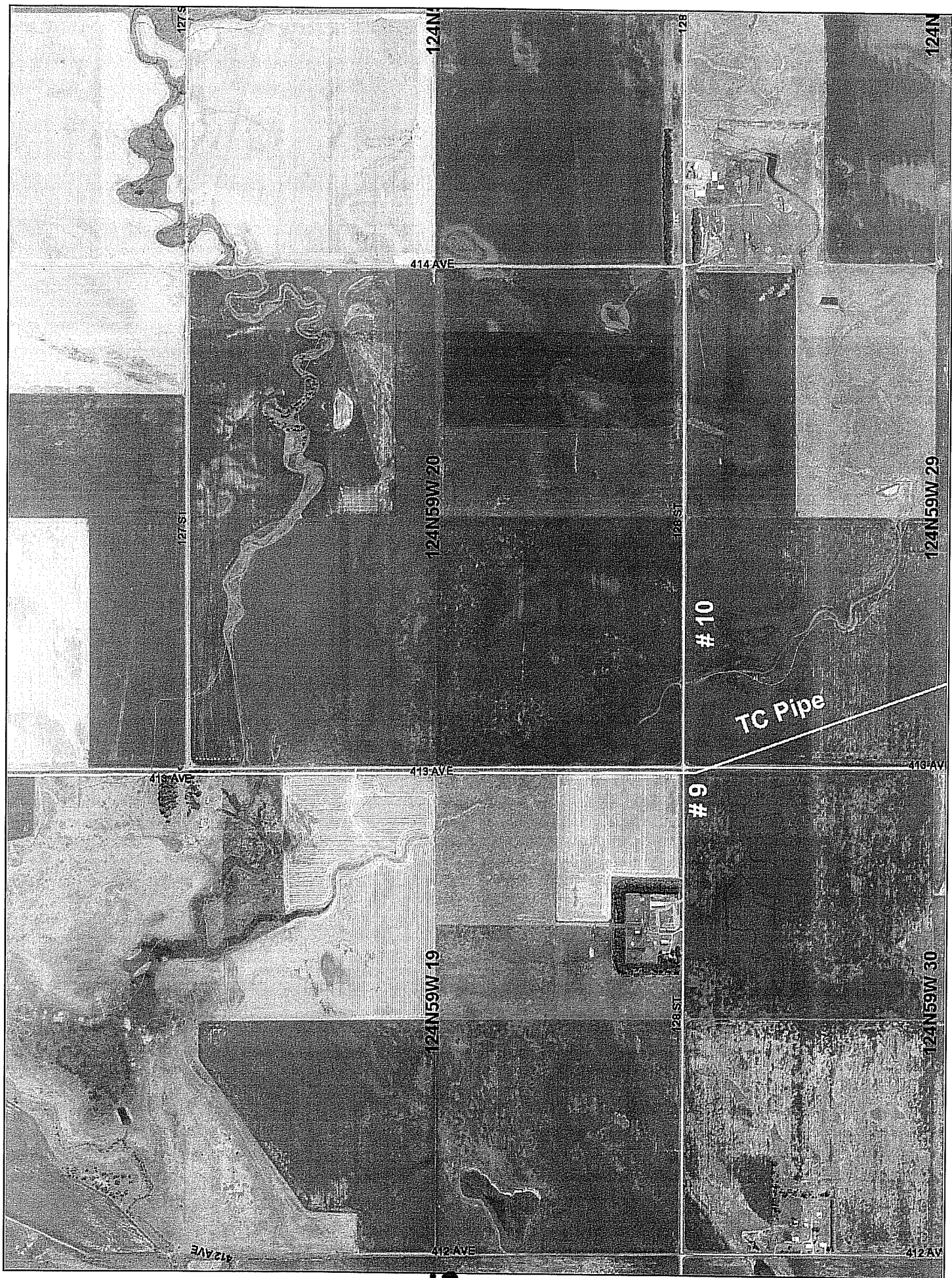


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MP 243 / MP 244



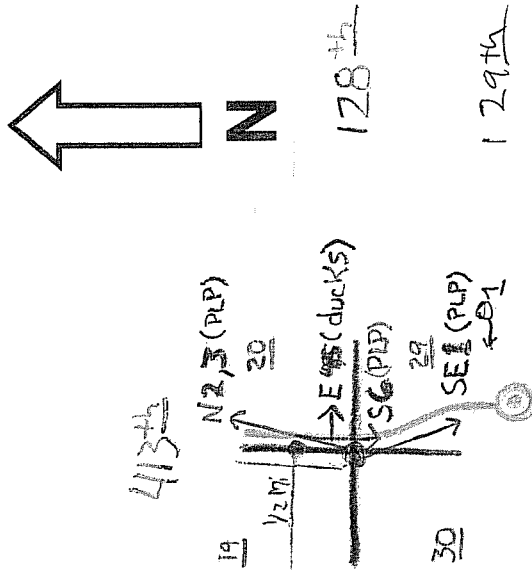
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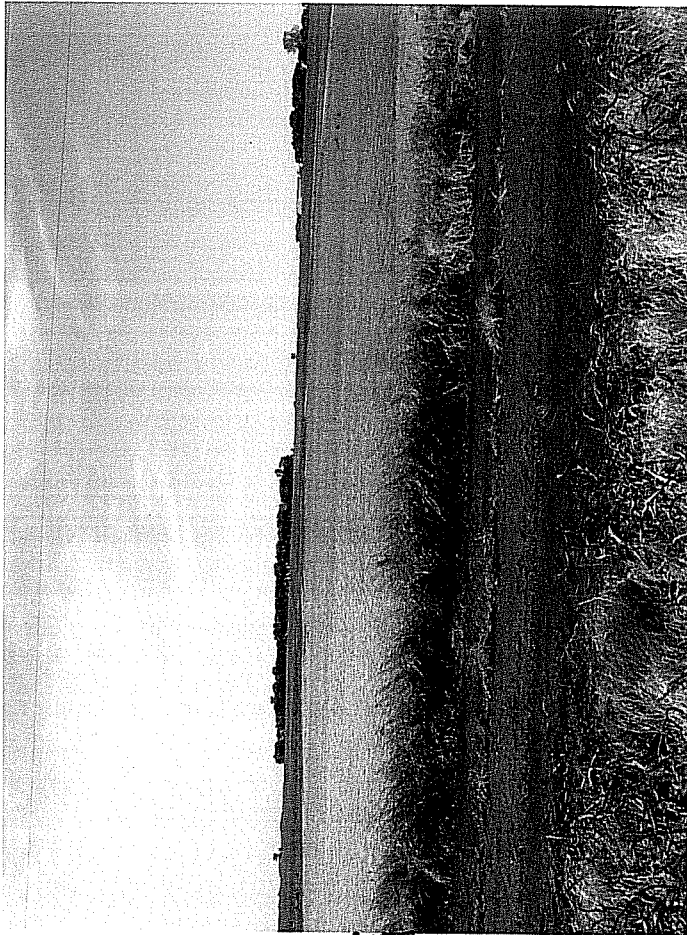
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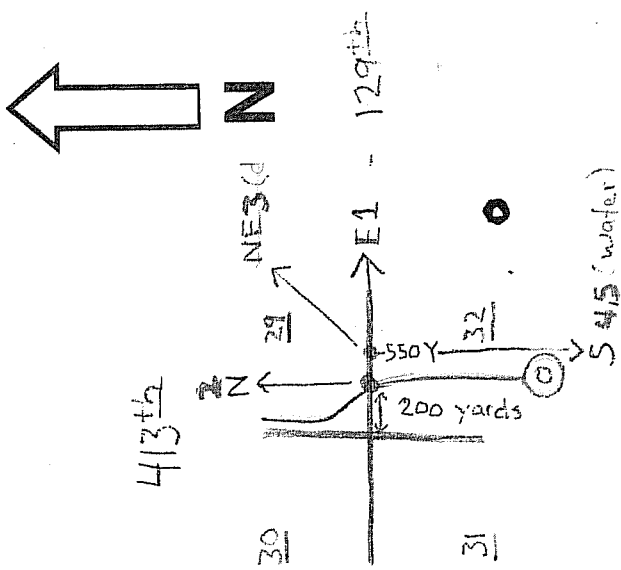
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MP 247

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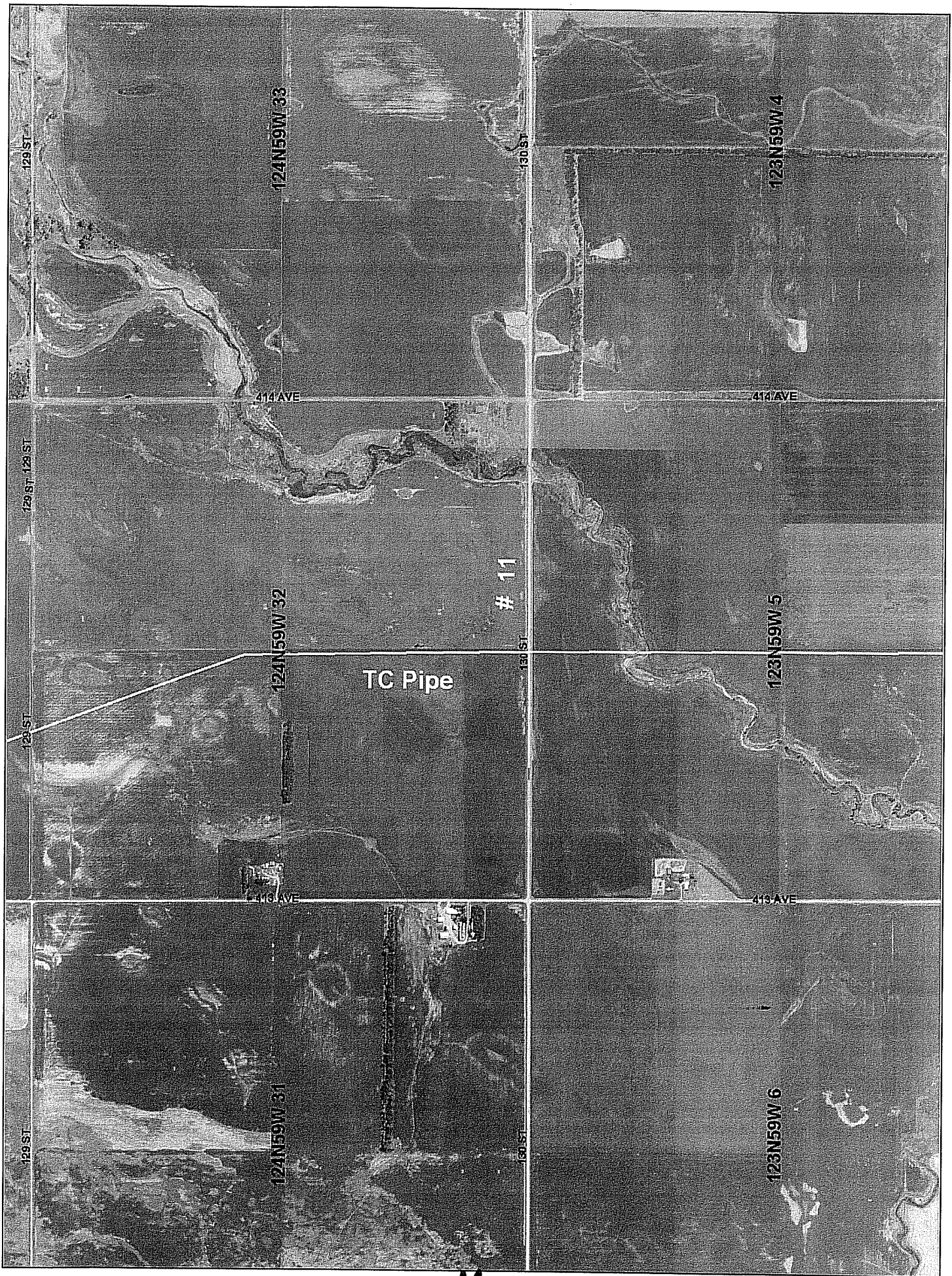


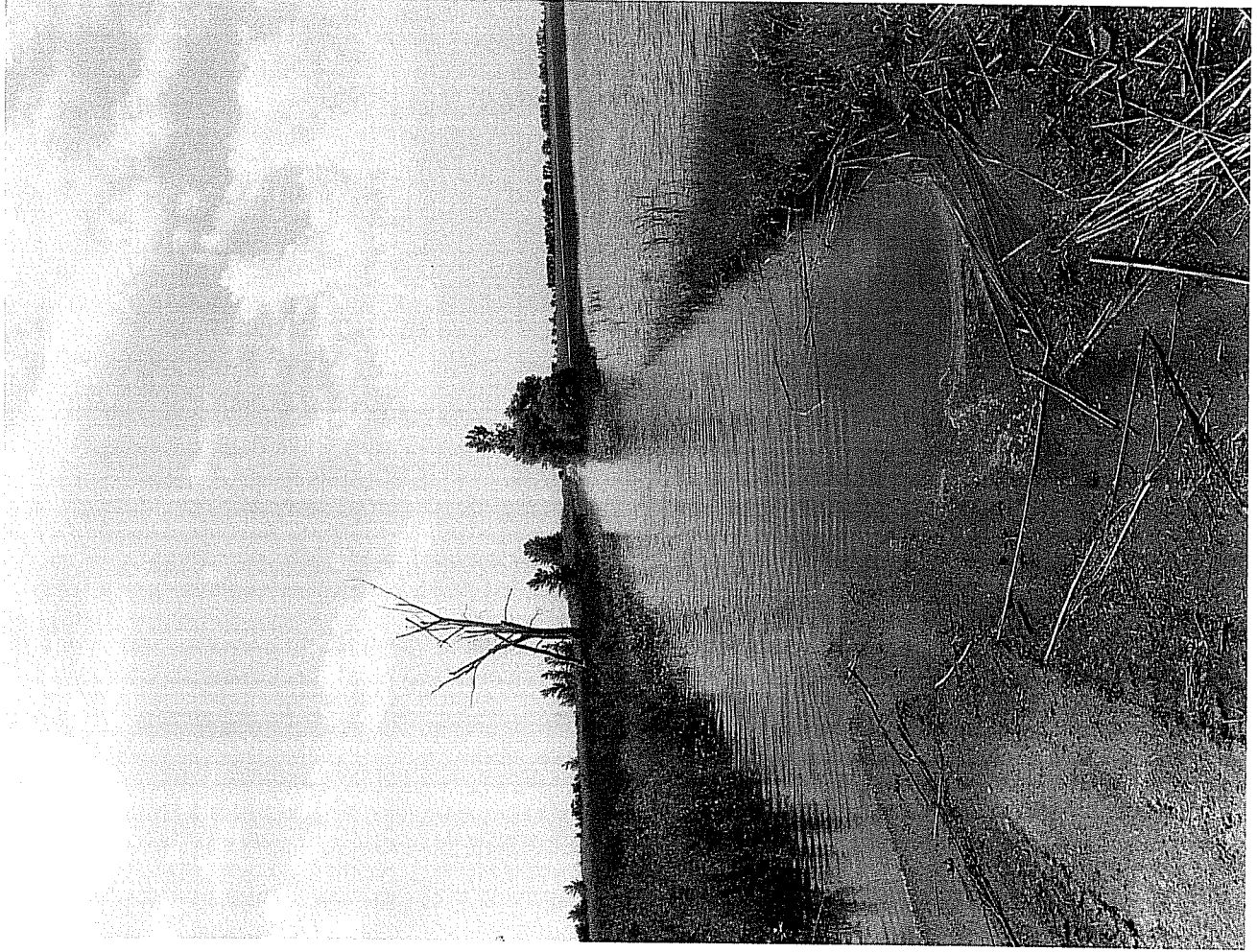
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T-124-N / R-159-W  
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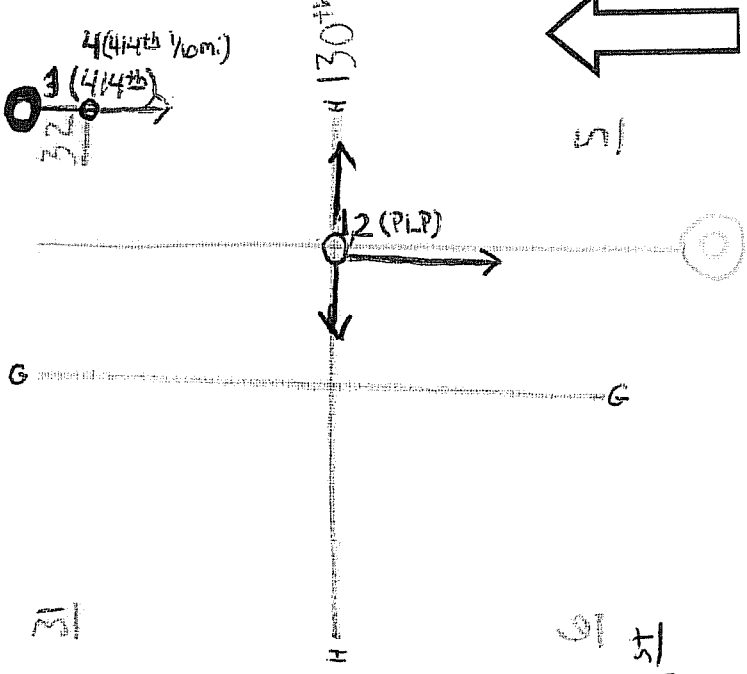
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Image #11

413<sup>th</sup>

G

31

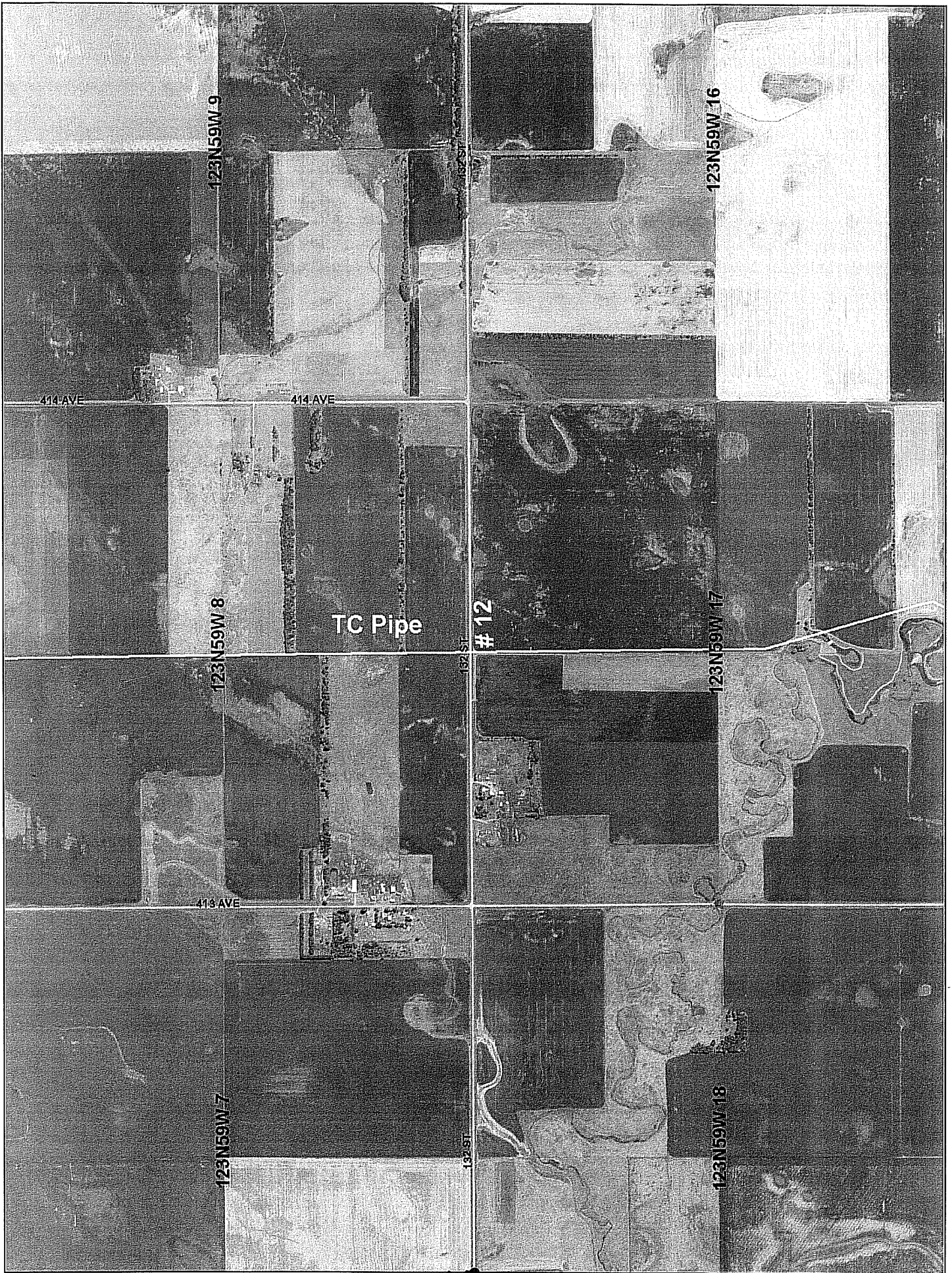


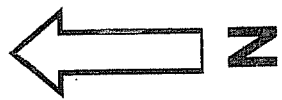
131<sup>st</sup>

51

T-122-N / R-59-W  
MP 248







7/1  
100  
51

6

71

06/32nd

1 (414th) road  
2 (Soy, water)

3 (PLP water in field)

6

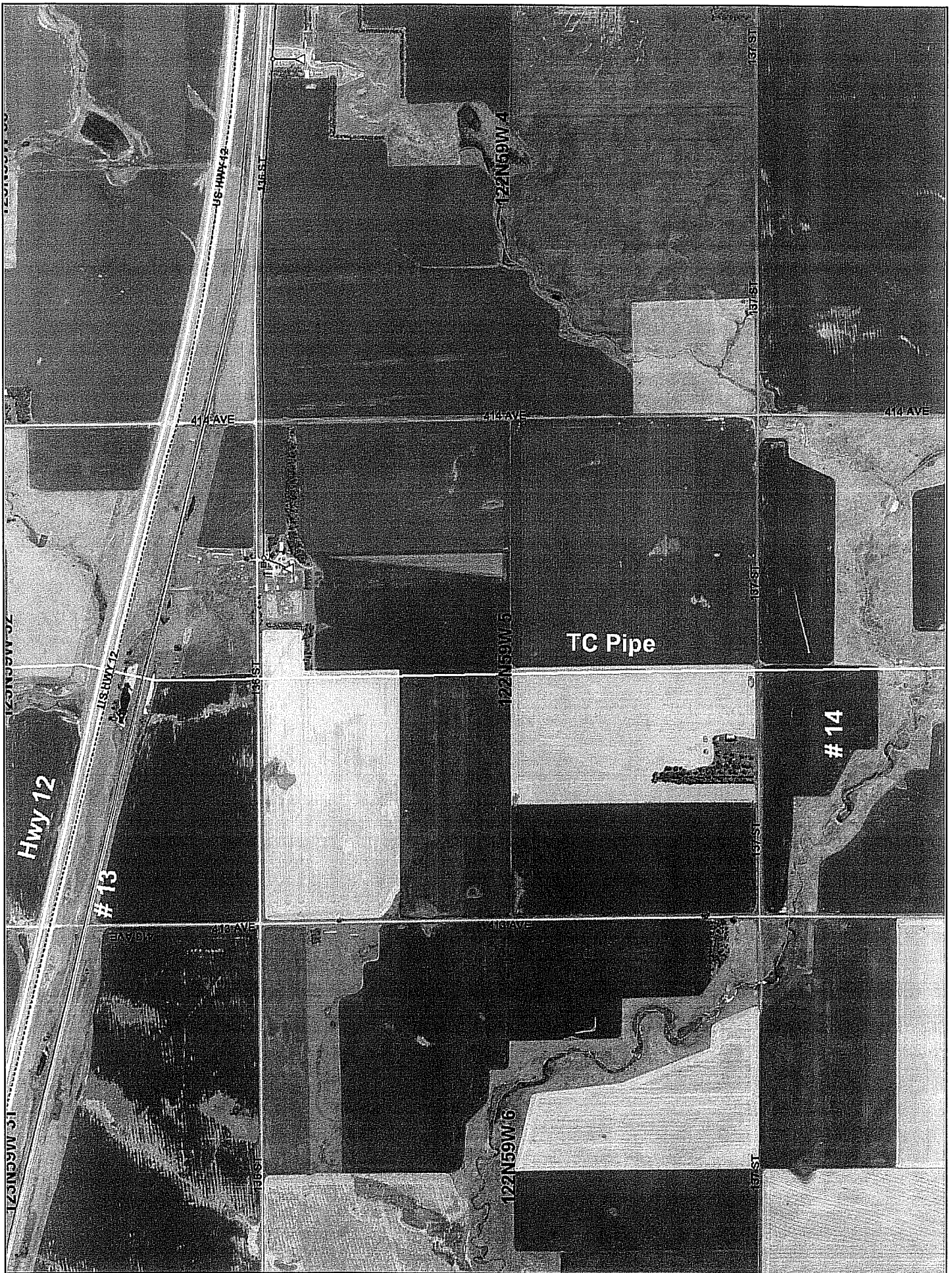
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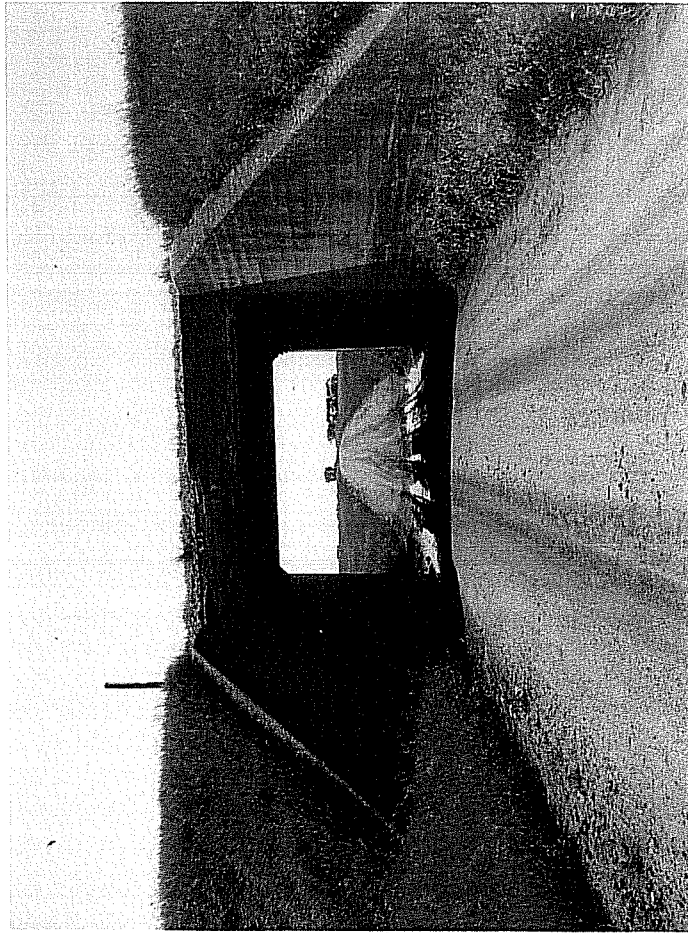
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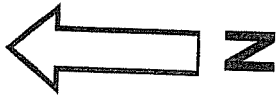
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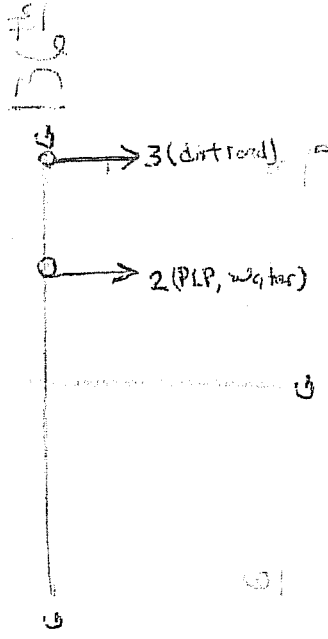
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413<sup>th</sup>

135<sup>th</sup>

01 (BRIDGE)  
32

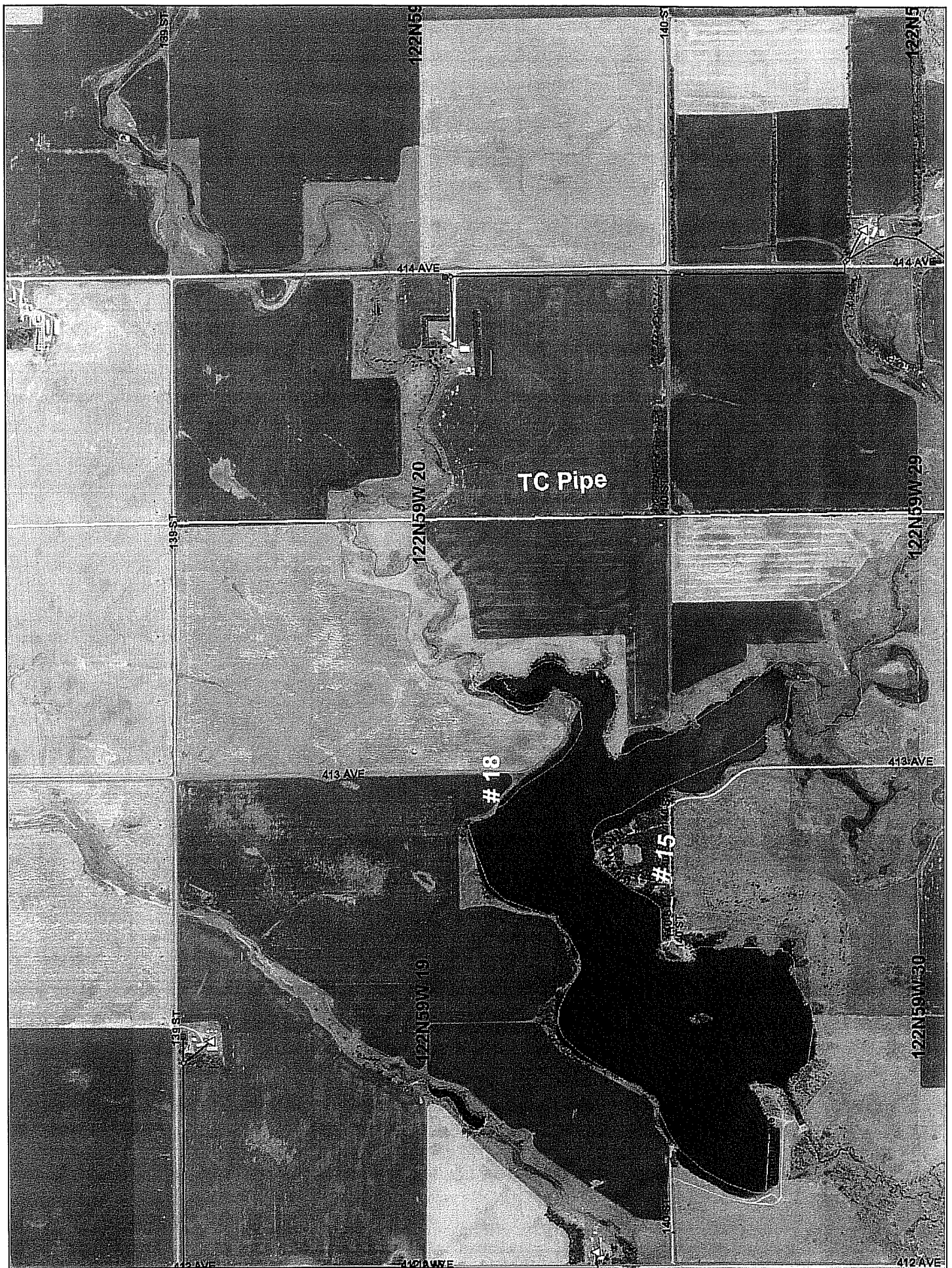


T-123-N / R-159-W  
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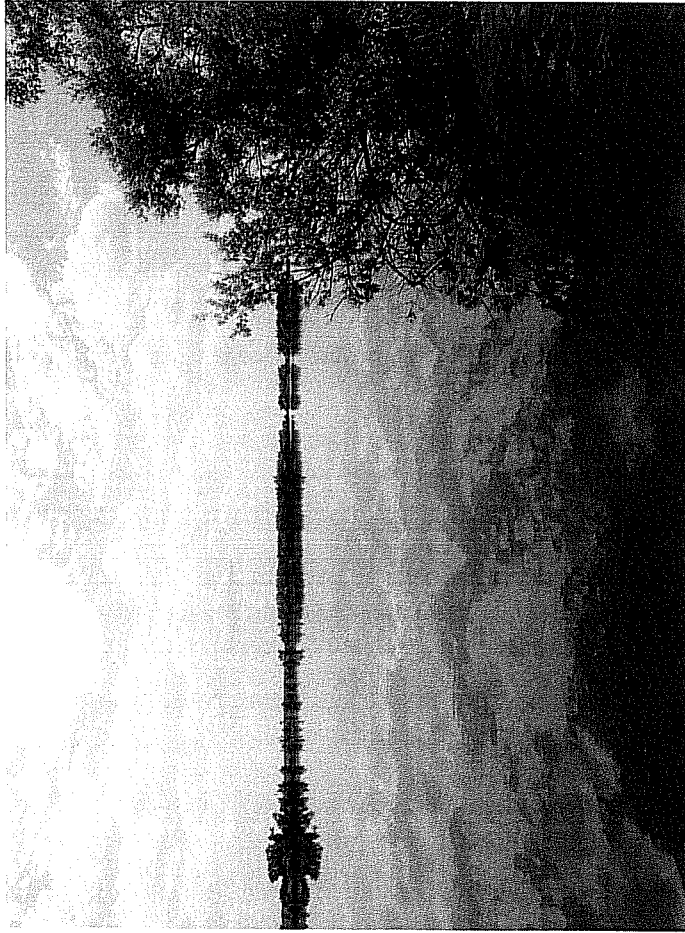
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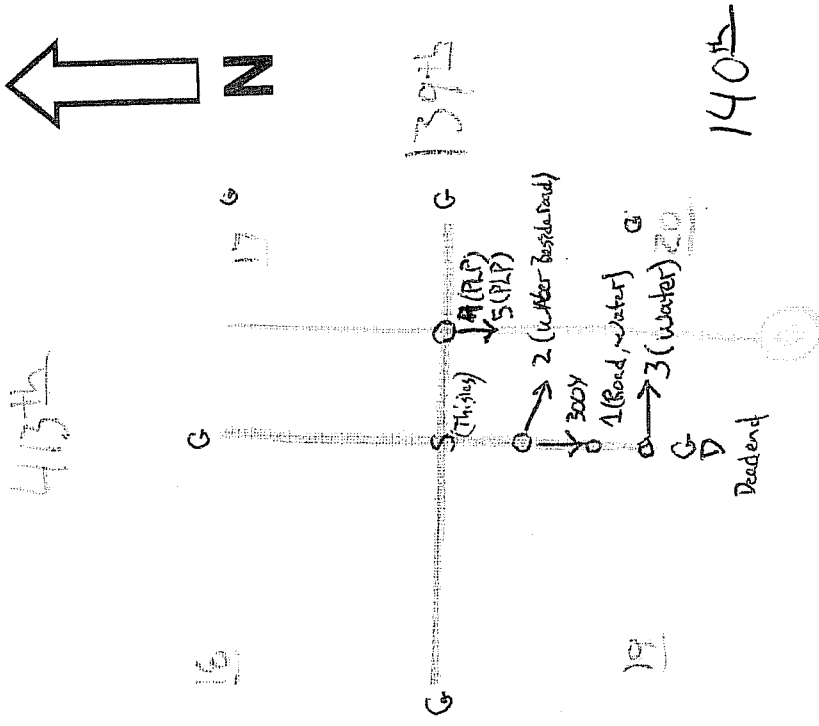






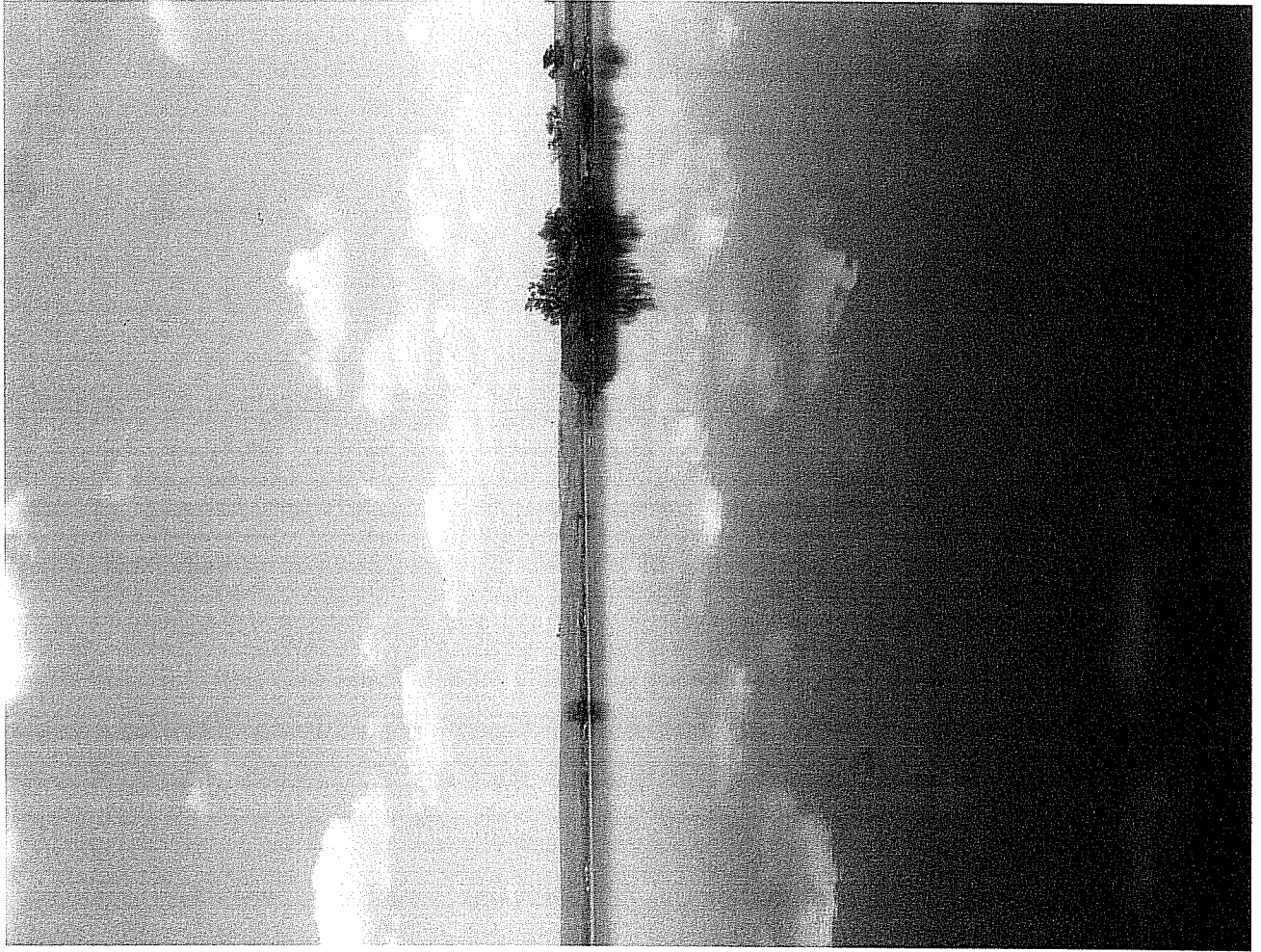


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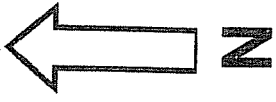
T-122-N / R-59-W  
Amsden Lake  
MP 258

Image #15



-25-

40th



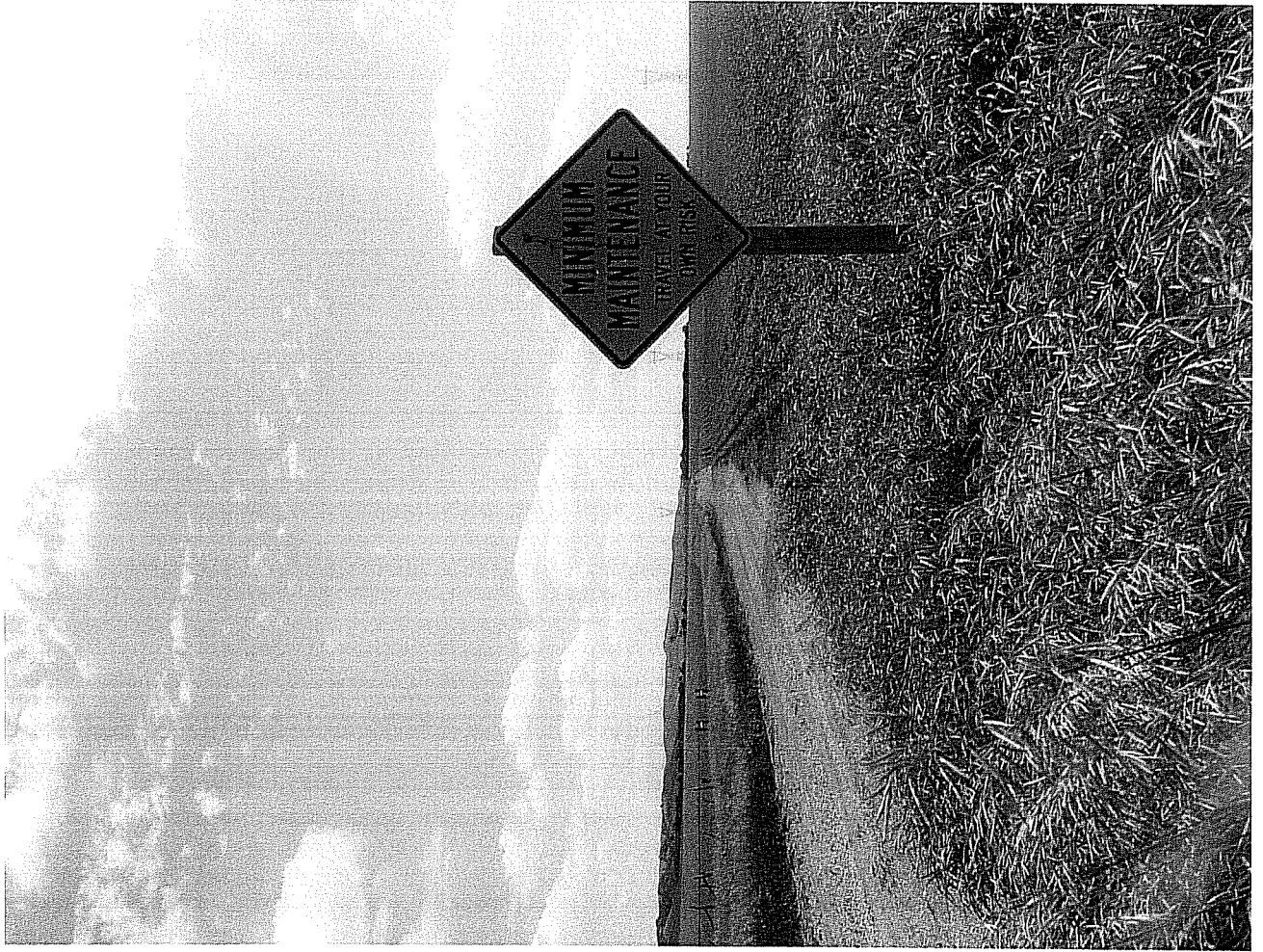
139th

140th

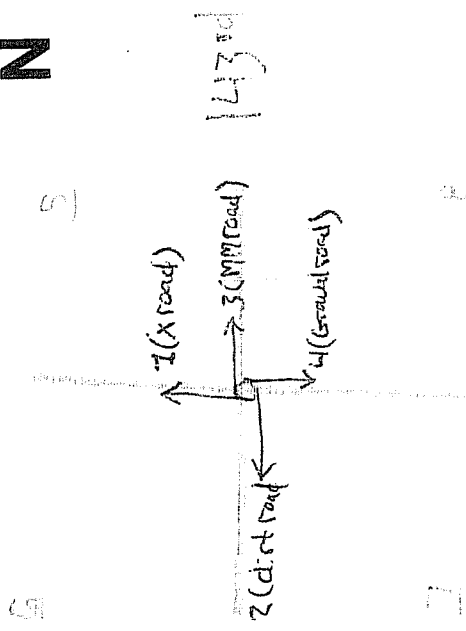
T-122-N / R-59-W  
Amsden Lake  
MP 258



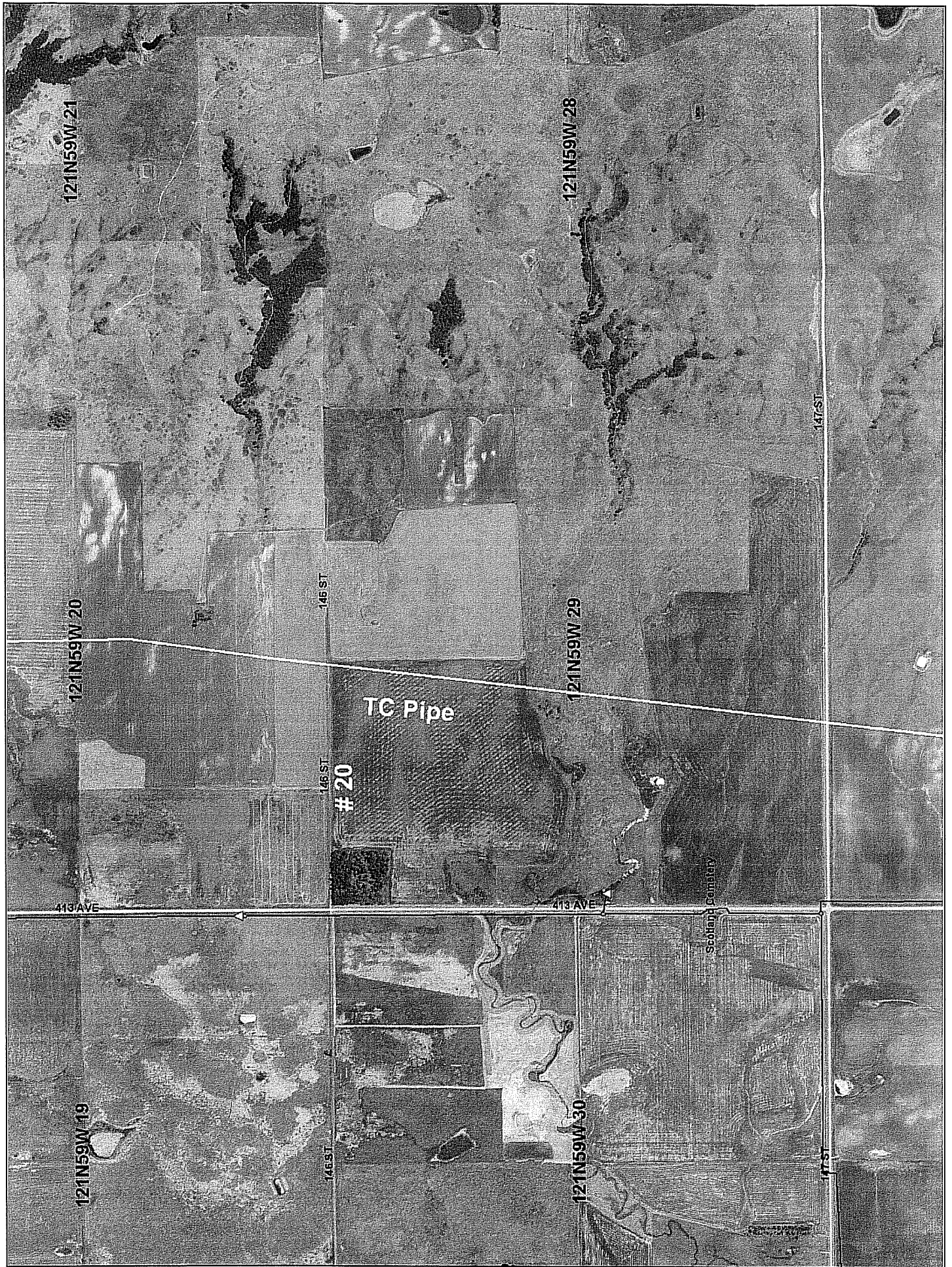




- 27 -



T-121-W / R-159-W  
MP 261







-29-

21334

19

20

1600 Road 343 Hills 46th  
6 Road Hills

30

29



T-121-N / R-59-W  
MP 264