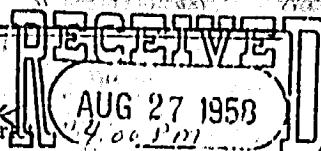


Vested Right
Water Right Number 548-3

1. Considered September 9, 19 70
2. Name of Applicant City of Milbank
3. Post Office Address Milbank, S.D.
4. Amount of Water claimed 2.10
5. Source of Water supply 3 springs and 1 deep well
6. Water to be used for Municipal
Acres to be irrigated _____
7. Water to be diverted and used in _____ Grant _____ County
about _____ miles _____ of _____
8. Proof of Publication Received _____
Not Received _____
9. Application Approved _____
Subject to _____
Not Approved _____
Action Deferred _____

10. Remarks:

"Vested Right" claimed
Vested Right for City of Milbank water system before 1955, in proper order, but
all fees have not been paid.

No. 548-3Water Division No. 3 Whetstone Creek
(Blanks to be filled by the Engineer for the W. R. C.)STATE WATER RESOURCES COMM.
PIERRE, SOUTH DAKOTA

APPLICATION FOR PERMIT

To Appropriate Water within the State of South Dakota

(NOTE—Draw a line through items not applicable.)

1. Name of applicant CITY OF MILBANK
Postoffice address MILBANK, County GRANT, State SOUTH DAKOTA

I. If a corporation MUNICIPAL CORPORATION

- (a) Name of same CITY OF MILBANK
(b) Date and place of incorporation _____
(c) Amount of capital stock _____
(d) Amount paid in _____
(e) Names and addresses of directors CITY COUNCIL

(NOTE—A certified copy of articles of incorporation must accompany the application.)

II. Method of accomplishing the work and financial resources of the applicant:

- (a) Method of accomplishing work (Whether by contract, employment of others, or by direct labor)
ALL FACILITIES ARE EXISTING

- (b) Cash on hand, \$ _____ (c) Treasury stock, \$ _____
(d) Bonds to be issued, \$ _____ (e) Other resources, \$ _____

2. Name of diversion work (1) SCHOOL SECTION SPRINGS (2) WHEATSEYER SPRING (3) MUSTA SPRINGS AND (4) WELL NO. 1

3. Amount of water claimed 2.1 cubic feet per second (1,800,000) GAL/DAY

4. Source of water supply 3 SPRINGS AND 1 DEEP WELL

5. Location of point of diversion (1) 1620' S 80°-53' W, NE Cor. Sect 15; (2) 2400' S 80°-51' W, NE Cor. Sect 15; (3) 2520' S 80°-37' W, NE Cor. Sect 15; (4) 1300' S 25°-02' W, NE Cor. Sect 15; All in T120N, R50W of 5th P. M. on bank of GRANT County.

6. Annual period or periods during which water is to be used ALL YEAR FROM JAN 1 THRU DEC 31

7. To be used for:

I. Irrigation or domestic use: Gravity, ^{and pumping} overhead sprinkling or combination system?

- (a) Number of acres to be irrigated _____ acres.

- (b) Legal subdivisions to be irrigated _____

(NOTE—A list of lands to be irrigated, giving each subdivision and fraction with acreage thereof, should be written here, or may be appended as a part of this application. Same must also be shown on accompanying map.)

- (c) Statement as to domestic use (giving location, etc.) FOR RESIDENTS AND OTHERS WITHIN THE CITY LIMITS OF MILBANK, SOUTH DAKOTA

II. Stockwatering, mining, manufacturing, agriculture, fire protection and public recreation:

- (a) Nature of use STOCKWATERING, FIRE PROTECTION AND PUBLIC RECREATION
Name any of the above uses claimed

- (b) Amount of power to be generated _____ horse power.

Amount claimed for engine cooling _____

- (c) Location of plant _____

- (d) Method of developing power _____

- (e) Point where water will be returned to stream _____

Map No. 416-3

8. Estimated cost of work: ALL WORK COMPLETED AND EXISTING

(a) Head Gates, \$.....

(b) Pumping plant, \$.....

(c) Fluming, \$.....

(d) Canal-earth, \$.....

Rock, \$.....

(e) Other structures

\$.....

Total, \$.....

9. Description of diversion works:

I. Nature of works: (Reservoir, dam, ditch, flume, pumping plant, etc.)

SHALLOW COLLECTION GALLERIES LOCATED AT THE SPRINGS AND A GRAVITY PIPE LINE TO THE CITY OF SIOUX FALLS, 1 DEEP WELL WITH PUMP

II. Dimensions of works:

(a) Dam: Height.....feet; length at bottom.....feet; length at top.....feet; thickness at bottom.....feet; thickness at top.....feet; slope at front water face.....; slope at back face.....material used in construction.....

(b) Reservoir: Capacity when filled.....acre feet. Surface area at highwater mark.....acres.

DEPTH AT OUTLET-Feet	SURFACE AREA AT EACH DEPTH AT OUTLET-ACRES	FEET	ACRE-Feet CAPACITY

(c)* Head gate: Width.....feet; height.....feet;

Material

(d) Canal: Total length.....miles.

LOCATION BELOW HEADGATE	DEPTH	BOTTOM WIDTH	WIDTH AT WATER-LINE	GRADE PER MILE
At.....Mile	feet	feet	feet	feet
At.....Mile	feet	feet	feet	feet
At.....Mile	feet	feet	feet	feet
At.....Mile	feet	feet	feet	feet
At.....Mile	feet	feet	feet	feet
At.....Mile	feet	feet	feet	feet

(Give dimensions where reductions in size are made.)

10. Time required for completion of work.....years.

11. Time required for complete application of water to the proposed beneficial use immediate years.

12. Choice of newspaper for publication of notice of intention to appropriate.....

GRANT COUNTY REVIEW

STATE OF SOUTH DAKOTA

County of Grant

SS.

I, Hilton E. Fischer, being first duly sworn on my oath depose and say: That my relation to the above described undertaking is that of owner, that I have read the above foregoing statement, examined the map accompanying the same, and that I know of my own personal knowledge that the matters therein stated and shown are true.

Signed

Hilton E. Fischer

Subscribed and sworn to before me this

15

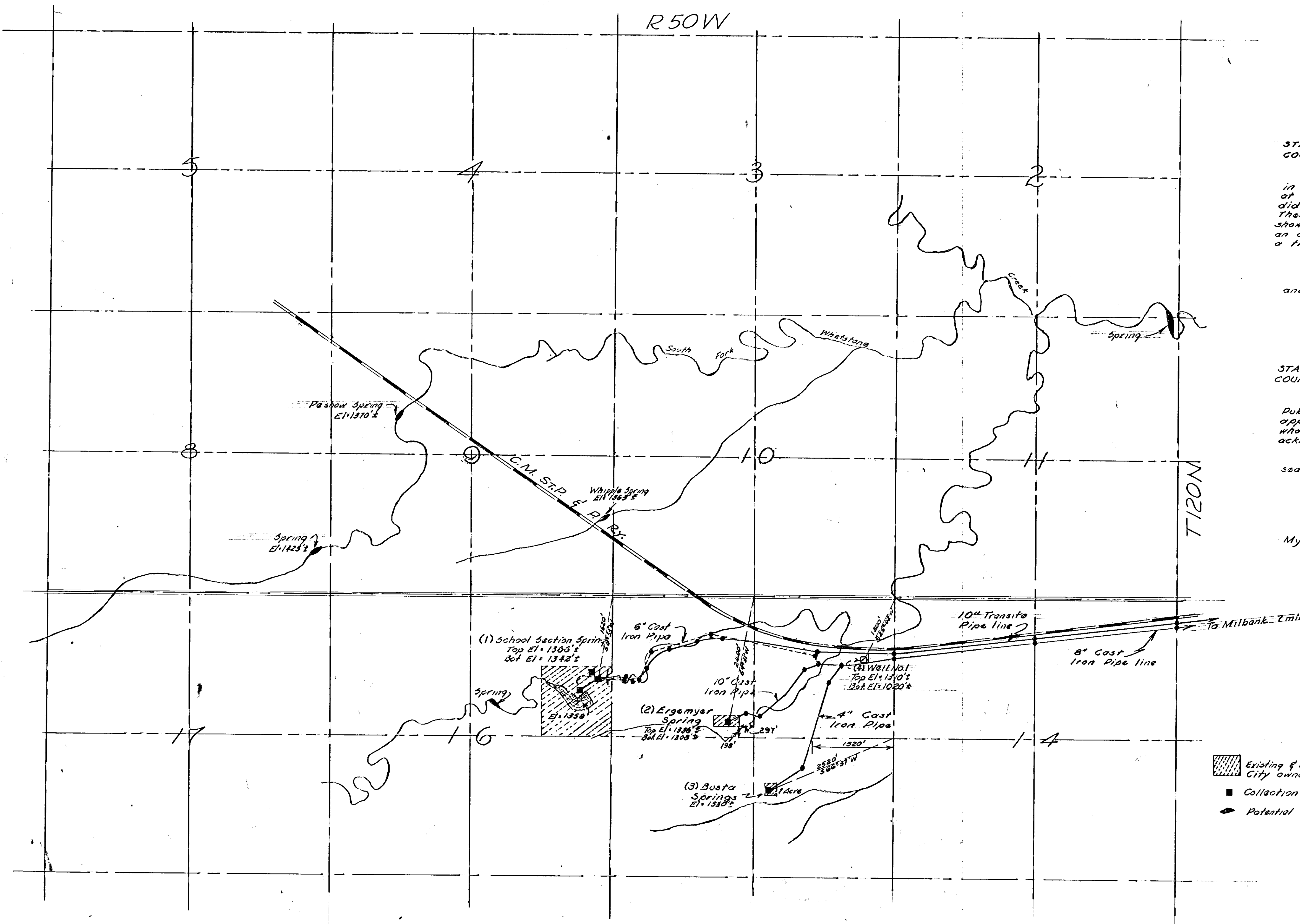
day of

April

1958

Robert E. Good
Notary Public (or other qualified officer.)

*Each diversion must have a headgate or measuring device.



SURVEYOR'S CERTIFICATE

STATE OF SOUTH DAKOTA S.S.
COUNTY OF BROOKINGS

I, Calvin Vaudrey, a Registered Land Surveyor, in the State of South Dakota, do hereby certify that, at the request of the City of Milbank, South Dakota, did survey the existing water facilities for City of Milbank. These facilities are located within the tracts of land as shown on the accompanying plat for which application for an appropriate water right is made and that this map is a true representation thereof.

In witness whereof, I have hereunto set my hand and seal this 2nd day of April, A.D. 1958

Calvin Vaudrey
Registered Land Surveyor

STATE OF SOUTH DAKOTA S.S.
COUNTY OF BROOKINGS

On this day, before me, the undersigned, a Notary Public within and for said State and County, personally appeared Calvin Vaudrey, known to me to be the person who executed the foregoing Surveyor's Certificate and acknowledged to me that he executed the same.

Witness My Hand, I have hereunto set my hand and seal this 2nd day of April, A.D. 1958

[Signature]
Notary Public

My Commission Expires _____

- Existing & Developed Supplies
City owned property
- Collection Galleries
- Potential Supplies

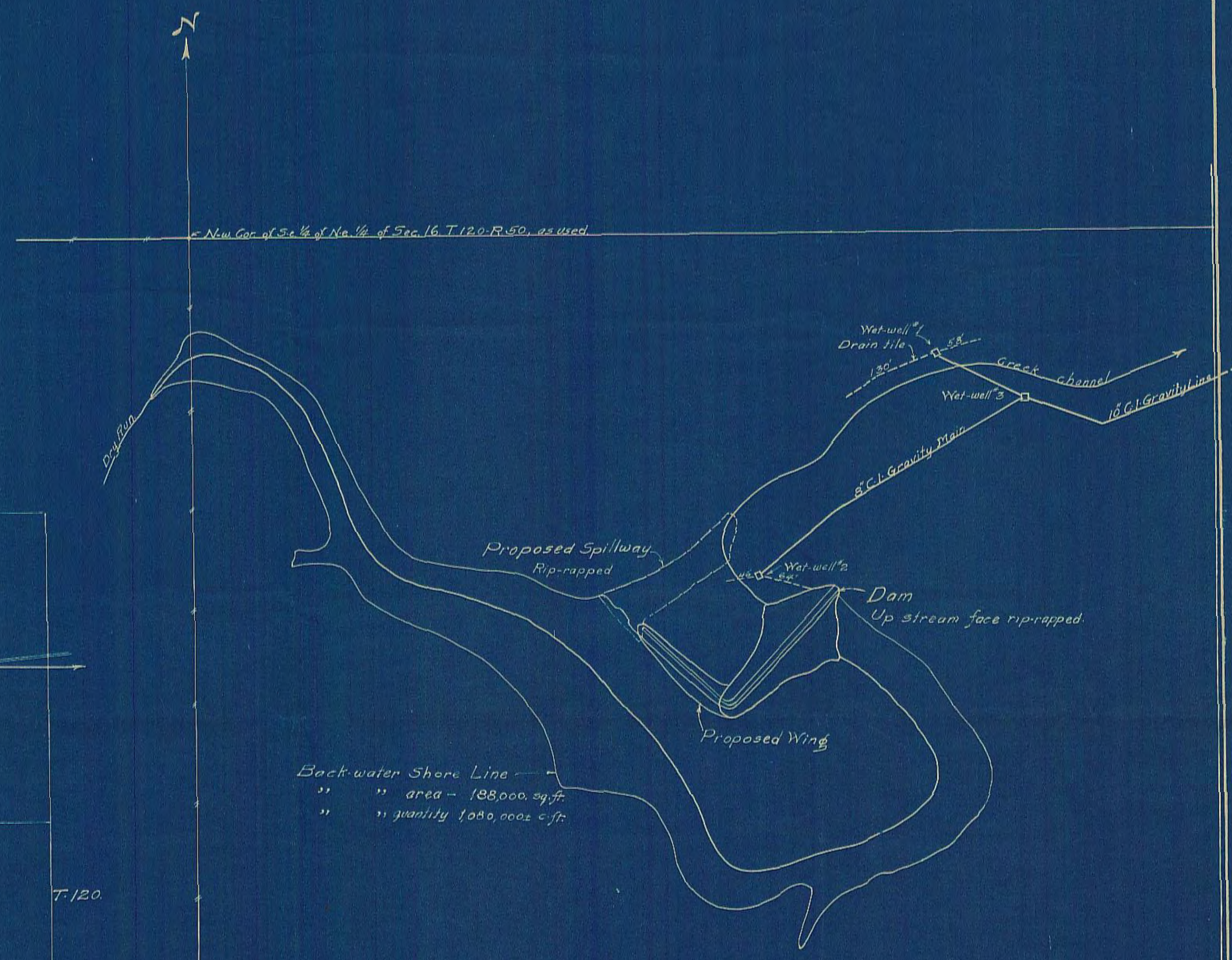
WATER RIGHTS MAP	
SHOWING DIVERSION LOCATION FOR PERMIT TO APPROPRIATE WATER EXISTING & FUTURE	
J. T. BANNER & ASSOCIATES, ENGINEERS, BROOKINGS, SOUTH DAKOTA	
APPROVED _____ DATE _____	FOR _____
APPROVED _____ DATE _____	FOR J. T. BANNER & ASSOCIATES
CHECKED BY _____ DATE _____	DRAWN BY _____ SHEET _____ OF _____



LOCATION & DRAINAGE AREA

Copied from map prepared by Dakota Engineering Co.

SCALE 1" = 1/2 MILE



GENERAL PLAN

SCALE 1" = 100'

The computed location is S. 17° 50' W. 19.50'
from the N.E. Cor. of Sec. 16, T. 120 N. R. 50 W. 5th pm.

STORAGE DAM-SITE No. 1 CITY OF MILBANK WATER SUPPLY

I hereby certify that this is a correct representation of the
Storage Dam-Site of the Milbank Water Supply

W. E. Hamlin
Registered Professional Engineer

Subscribed and sworn to before me this 7th day of April, 1934.

G. A. Whitmore

Notary Public
Chippewa County - Minnesota
Commission Expires - Aug. 20, 1936

"VESTED RIGHT" CLAIMER

Pierre, South Dakota, SEPTEMBER 11, 1970

State Water Resources Commission
By: Austin E. Jones
Chief Engineer, Executive Officer

Approved **SEPTEMBER 10** 19**70**, Recorded in Book **11** Page **181**

CONTINUOUSLY

Certificate of Construction Issued _____

Water License Issued _____ **SEPTEMBER 11, 1970**

STATE OF SOUTH DAKOTA

WATER LICENSE NO. . 54873.

(1) WHEREAS, On the 27th day of August A. D. 1958
the City of Milbank

made Water Right Application No. 548-3 for a Vested Right permit to use 2.1 cubic feet per second of the waters of School Section Springs, Ergemyer Spring, Busta Springs and Well No. 1 County of _____, State of South Dakota, for municipal purposes; and

(2) WHEREAS, On the 11th day of September, A. D. 19 70
 Vested Right Permit No. 548-3, with a date of priority of 1924, 1929, 1933 and 1934
 was issued to said applicant, recognized for the diversion of said water, and prohibited for the completion of construction of the water
 supply system therein described ~~except for the~~ for the ~~purpose of~~ and for the
 application to beneficial use of said water ~~except for the~~ for the ~~purpose of~~ and for the

and;

(3) WHEREAS, It is hereby certified that the applicant has complied with the provisions of the laws of the State of South Dakota relating to completion of the construction of the water supply system and is entitled to divert 2.1 cubic feet per second of water for beneficial use and,

(f) WHEREAS, It is hereby certified that the applicant has complied with the provisions of the laws of the State of South Dakota relating to the application of water to beneficial use of the following extent,
water is used for municipal purposes by the City of Milbank

(5) NOW, THEREFORE, By the virtue of the authority vested in us by the laws of the State of South Dakota, We hereby grant and confirm to _____
the City of Milbank

_____ South Dakota
_____ Vesting Right
the holder _____ and owner _____ of said permit No. 548-3 a water right, dating from 1924, 1929, 1933 and 1934
_____ 2.1 _____ cubic feet per second of the waters
of School Section Springs, Engemyer Spring, Busta Springs and Well No. 1
in the County of Grant _____ and State of South Dakota, or so much thereof as may be necessary for the
purposes hereinbelow mentioned, to be diverted at points in the SE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 16; in the SE $\frac{1}{4}$ NW $\frac{1}{4}$,
in the NW $\frac{1}{4}$ SE $\frac{1}{4}$ and NE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 15, T120N, R50W

and ~~XXXXXX~~ conducted through the City water distribution system

for this purpose of municipal use

Subject to any limitations listed in Water Right Permit No. 548-3 and subject to the laws of the State of South Dakota.

WITNESS, My hand and seal of our office at Pierre, South Dakota
this 11th day of September A. D.
Nineteen Hundred and Seventy

WATER RESOURCES COMMISSION

By:

Chief Engineer, Executive Officer - J.W. GRIMES

Form 15.

Permit No. 548-3

Water Diversion No. 3 WHETSTONE CREEK Water District

CERTIFICATE OF CONSTRUCTION

This is to Certify, That the City of Millbank

Vested Right 548-3 the holder _____ of
Permit No. 548-3, issued upon Application No. 548-3, bearing date of priority of 1924, 1929,
1933 & 1934 authorizing the diversion of 2.1 cu. ft. per second of the waters of _____
springs & Well #1 County of Grant, State of South Dakota at _____
points in the SE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 16; in the SE $\frac{1}{4}$ NW $\frac{1}{4}$, in the NW $\frac{1}{4}$ SE $\frac{1}{4}$ and NE $\frac{1}{4}$ NE $\frac{1}{4}$,
Section 15, T120N, R50W
_____, for municipal

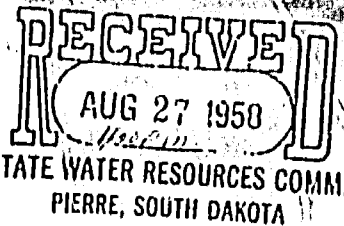
purposes, has 8 complied with the provisions of the laws of the State of South Dakota relating to proof of
completion of the works of diversion set out and described in said Permit; that said works are recognized as satisfactory
condition for diverting and conveying to the place of intended use 2.1 cu. ft. per second of water.

Date September 11, 1970

WATER RESOURCES COMMISSION

By:

J.W. GRINES, Executive Officer

Location No. 548-3Water Division No. 3Whetstone
Creek Water District

Proof of Application of Water to Beneficial Use

PETITION OF HOLDER

Ques. 1. State your name, residence, occupation and postoffice address.

Ans. CITY OF MILBANK, SOUTH DAKOTA - A MUNICIPAL CORPORATION

Ques. 2. If acting in behalf of a corporation, state its name, principal place of business (if a foreign corporation, give name and postoffice of statutory agent,) your position with reference to same, and your authority for appearing in its behalf.

Ans. Mayor of City of Milbank, South Dakota

Ques. 3. State date of posting and date of recording notice of appropriation.

Ans. (1) School Section Springs 1933, (2) Fregeau's Springs 1924, (3) Rusta Spring 1929
(4) Deep Well 1934

Ques. 4. State source of water supply and give exact location of point of diversion. SPRINGS AND DEEP WELL.
Ans. (1) 1620' S8°-53'W, NE Cor. Sec 16, (2) 2400' S9°-31'W, NE Cor NW¼ Sec 15; (3) 2520'
666°-27'-W NE Cor SE¼ Sec 15, (4) 1560' S25°-02'-W, NE Cor Sec 15, all in
T120N, R50W, of 5th Pl.

Ques. 5. Describe your works of diversion giving length and height of each dam and state amount of water they are capable of conveying from point of diversion to place of use, and give name of canal or ditch or other works by which water is conducted to such place of use, and date of completion of same.

Ans. Collection galleries located in springs, 1 existing retention dam and
1 deep well. transmitted to the city through a gravity pipe line. deep well
is pumped.

Ques. 6. State for what purpose water is used and describe place of use. (If for irrigation, name each subdivision in which used, and number of acres in each subdivision that have ACTUALLY been irrigated with said water.)

Ans. All municipal purposes within the City limits of the City of Milbank,
South Dakota

Ques. 7. If for other than irrigation purpose, state how applied, amount of horse power generated, etc.

Ans. Furnished through pipe line for domestic and other municipal purposes

Ques. 8. What is the minimum amount of water required for the use specified above?

Ans. variable with a minimum present use of about 1,500,000 gallons per day
or about 2.1 cfs.

Ques. 9. If you are not the person or representative of the corporation to whom above mentioned permit was originally issued, please state how ownership was acquired by present holder.

Ans. ---

Ques. 10. State when, how, in what amount and to what extent, the water diverted under above mentioned permit has been used.

Ans. January 1 through December 30, through gravity supply lines to the City of Ribank in the amount of 1,500,000 gal/day (21 cfs)

(Sign)

I hereby certify that the foregoing testimony was read to the above subscriber before its signing, that I believe him to be the person he represents himself to be, and that said testimony was subscribed and sworn to before me, at my office in Grant, County of MILBANK S.D.

State of South Dakota, on this 15 day of April A. D. 1958

Witnesses.

Notary Public, GRANT COUNTY, S. D.

My Commission expires Feb. 27, 1966

I, the undersigned, do hereby certify that I am a duly qualified elector residing in the immediate vicinity of the diversion works designated in the foregoing testimony, that I have no interest in the works, water or land above described, that I have read the foregoing testimony and that I know of my own personal knowledge that the matters therein stated are true.

Location No. _____

PROOF OF APPLICATION OF
WATER TO BENEFICIAL USE

PETITION OF HOLDER

Amount of Water _____ c. f. s.

Source _____

County _____

Purpose _____

Place of Use _____

Date of recording _____

Received and filed _____

548-3

Sources of Water for the City of Milbank, South Dakota

E. A. Rothermel, Consulting Geologist

Introduction

The following report is written to summarize the possible sources from which water may be developed to supply the City of Milbank, South Dakota. The information is taken from published reports on the geology of the area, from all information in the files of the State Geological Survey, from an examination of sets of samples from the wells drilled in Milbank, and from the estimator's personal knowledge of the area gained from a long acquaintance with this part of South Dakota. The summary is undertaken at the request of the City Council of Milbank.

Water in sufficient quantities to supply a city the size of Milbank must come from one or a combination of three types of reservoirs which occur in the vicinity: springs, outcrop quarts, and redrock lands. Each of these sources will be discussed separately in this report.

SPRINGS

The present supply comes largely from three sources located about 6 miles west of Milbank and a mile to a mile and a half west of the town of Twin Springs. These springs are

three of a line of springs which break out along the face of the eastern escarpment of the Prairie Hills upland at elevations between 1260 and 1274 feet above sea level. The water issues from a sand reservoir of glacial origin which lies on the shale bedrock supporting the highland. A slight slope to the north and probably east carries water to drain out of the reservoir forming the line of springs.

These springs have a fairly permanent flow so they did not dry up during the excessive drought of 1933, but the size of the flow indicates that the reservoir is not very thick. The flows, listed as from 20 to 200 gallons per minute, are probably the maximum these springs can be made to furnish.

An increased spring production will probably have to come from the development of new springs a sufficient distance from the present ones to avoid interference. Such springs should be at least a quarter to a half mile away. Better flows might be obtained by making artificial springs by opening the reservoir sand itself at or near the heads of the small draws. Just where and how this could be done cannot be set forth here as it would require a little prospecting and test drilling since Boulder city has slumped over the reservoir face all along the escarpment.

The Quaternary Outwash Reservoir

Though small areas of glacial outwash sands and gravels are found in the other forks of Quaternary Creek valley, the largest area, which could be most likely to furnish sufficient water for a city the size of Alameda, lies along

the north fork in a northwest-southeast belt across north-
eastern Grant County. It follows the north fork of Whetstone
Creek southward to its junction with the other two forks
and then continues southeast to the sand gravel hill known as
Mt. Tom. Lake Albert lies along its eastern border. A
major stem of outwash takes off from the junction of the forks
and extends northeastward down the main Whetstone valley to
Big Stone City.

At the junction of the Whetstone forks, from 4 to 8
square miles of valley bottom are underlain with gravel and
are of special interest to this project as they lie only 3
to 5 miles from Milbank. There are no drilling records on
the depth of these gravels but exposures above and below the
junction show from 10 to 17 feet of sand and gravel. If these
are near minimum figures for the thickness at the junction or
if the water table is high in this area, this should make an
excellent water reservoir. Another factor in its favor is
that it has a ready recharge from all three forks of Whetstone
Creek and a seepage recharge from the south. The level of
Lake Albert is roughly indicative of the water table in the
outwash.

Water from glacial gravels tends to be hard and becomes
harder on pumping. They are used by many municipalities in
South Dakota and other northern states, however, and unless
softer waters are available in abundance from other sources,
they make excellent city supplies.

Good Rock Supplies

Information on the bed rock possibilities in the Milbank area is very sketchy. Many wells have been drilled but there are few records of them on file, and those are sadly lacking in detail. By reading between the lines, however, it is possible to get a general picture of the underground situation which can be of some help in determining the more likely places and depths in which to look for the supplies needed.

Glacial Sands;-- Some 80% of the wells in Grant County draw from glacial sands at shallow depths. Some of these reservoirs are sand pockets in the boulder clay which covers the lowland section of the county to depths of 50 or 60 feet. Most such sand pockets are small but may be large enough to collect and hold volumes of water suitable for farm uses. Seldom are they large enough for even large farm operations or anything more than a little garden irrigation. There is usually a sand body at the bottom of the boulder clay, and sometimes this makes a sheet which gives good farm supplies. Some of these are under sufficient hydrostatic head to make artesian wells, but they usually cease flowing in a comparatively short time. One such sand reported in Milbank was nearly 30 feet thick but was not very extensive as it was not reported in nearby wells.

Waters from these sources usually are hard. Both carbonate (temporary hardness) and sulphate (permanent hardness) are present--the latter in proportions to be objectionable

particularly since it cannot be removed from the well during well drilling it would be well to watch for it. It is not known since there is always the possibility that the sand will be encountered that could be made useful.

Greenhorn Sand Band: - The first sand band was encountered in drilling in this area where in the Greenhorn formation and lies about 40 to 450 feet below the surface. This is very easily described by drillers as "cherty sand", "micaceous" sand, or "cherty rock". In the Alameda Railroad test wells drilled in 1937 (and other wells from which some sets of cuttings are on file) considerable lies beneath a crystalline limestone that is without doubt in the Greenhorn formation. Above and below it, characteristic sand is found, increased in speckled shale which is characteristic of all shale formations in beach lakes. In well #1 there are 40 feet of this sand (1 to 3 millimeters) which is similar to coarse grained, clean, and unconsolidated water sand. In well #2 samples are missing from the interval where this sand should be.

Other wells over the course report water from the chalk rock but give no details of the sand or the thickness of the sand present in. In some of these the water was under artesian head giving flows of a gallon or so per hour from 4-inch wells. There is no well history available on well #2 for long these flows lasted. There are no data on the well's capacity under compage.

As far as can be ascertained, this sand is quite widespread over the beach area and is not a local phenomenon.

"soft". This probably means a temporary hardness as it would be unusual to find water coming from a formation as soft as the Pleistocene that didn't carry high concentrations of calcium hardness. No chemical analyses of these waters are given in the files or reports available.

This is a sand that should be watched for and tested when drilling for city supplies. If the sample in the one well where samples were kept is characteristic of the formation, it could be a very useful either as a water supply or as an auxiliary to the deeper sands.

Basal Sand:- The granite, outcropping in the quarries five miles east of Milbank, underlies all of Grant County involved in this water problem. Any well drilled deep enough, between the quarries and the springs west of this granite, will encounter this granite. The granite itself is of no interest as a water reservoir since it is a very dense rock and cracks and fissures are not sufficiently abundant to make it a reservoir for the quantities of water needed. It therefore indicates the lower limit of profitable water prospecting. Drilling into this rock is extremely expensive and difficult and the chances of finding sufficient water for city supplies are nil.

The granite foundation is of interest, however, because on it rests a sand formation of varying thickness which underlies the entire county and in which the water is always under artesian pressure. In early days of drilling in this area the wells flowed, some apparently with considerable pressure. The most recent accounts available show it still under sufficient pressure to make some wells flow and to raise water in others.

to within 30 or 40 feet of the surface. The following measurements were made by H. D. Erickson in 1955 (Artesian Conditions in Northeastern South Dakota, H. D. Erickson, Report of Investigations No. 77, State Geological Survey, 1955).

Well	Depth	Elevation of well curb	Elevation of artesian head	Rate of flow
Stewart McFarland SE 18-120-49	334	1197	1197	.3
Gordon Bracht NW 27-120-49	427	1230	1230	2.3
Hubert Larson SW 7-120-48	295	1146	1101	

The flows are very small probably through a combination of things: first, the holes are small, 2-inch wells being the rule; second, the sand was not penetrated, their depths indicating that they reached only a short way into the sand; third, the common method of finishing artesian wells in South Dakota allows more water to leak outside the casing than goes through it. This leak sometimes reaches the surface but more often forces its way into underground sands like the one in the Greenhorn formation and in the glacial deposits described above.

While the top of the sand forms something of a plane, its thickness appears to vary considerably. The only well that left a complete record of it is the Milwaukee Railroad's test well in Milbank where 65 feet of clean coarse sand was penetrated, the upper half of which was unconsolidated and the lower half was

increasingly "tight" by siliceous cement. The granite was not reached but the amount of the mineral feldspar in the lower 15 feet indicated that the well bottom was not far from the granite surface. This well was 400 feet deep. A second well which seems to have at least come near penetrating the sand was drilled on the J. H. Remondy farm in Sec. 12, T. 20 N., R. 40 W. in 1899. It reported a "red rock" from 350 to 450 feet and bottomed at 625 feet. This would give a sand 50 feet thick.

An investigation of the granite in the vicinity of the quarries by Mr. Bruno Pavani showed that the granite surface is very uneven. Reliefs of 100 feet in a quarter section are common. While glacial action may have increased the relief somewhat in the outcrop areas, it is safe to assume that a similar relief will be found where the granite lies beneath the bed rock. These hollows are filled with sandy sediments belonging to the basal sand here being described, making the thickness of this basal sand quite variable, thin over the granite ridges and thick over the granite valleys. It also makes the materials vary because of their place of deposition. In protected locations there may be more fine material making the sand tight. In the deeper valleys in the granite much of the material will be wash from the granite hills containing feldspar and mica, with finer, cleaner sand near the top. To get the maximum thickness of sand, therefore, it would be necessary to place a well in one of the granite valleys. The only ways such locations can be found are by exploratory drilling or geophysical soundings. Some indications might be found in

a detailed investigation of the well depths and yielding conditions in areas where this sand was being used for water supplies.

Where the sand could be examined, namely, in the Milwaukee Railroad wells in Milwaukee, it was shown (1 to 3 millimeter grains), clean, and with grains well rounded and composed almost entirely of quartz for the upper 15 feet. This is an excellent water sand. Below that the composition of the sand was the same for another 20 feet but showed partial cementation by silt. The lowest 20 feet showed an increasing amount of feldspar and an increasing cementation. The last five feet were so well cemented that the engineer thought he was in the granite. Well samples, however, showed sand like that above it tightly cemented with silt and some iron to form a quartzitic rock. This is evidently granite which well cemented with silt and probably not far above the granite surface.

The top of the sand is encountered at about 200 feet below the surface of the ground in the vicinity of Milwaukee and a little over 100 feet deeper near Twin Brooks. Most of this difference is due to the fact that Twin Brooks lies about 100 feet higher than Milwaukee topographically. Wells near Milwaukee have been drilled as deep as 250 feet. North of Twin Brooks wells are reported as flowing from depths as shallow as 122 feet and as deep as 162 feet.

The only production record on this sand are static heads of flow. It is therefore impossible to make definite statements on its capacity under pumpage. The indicated

thickness and character of the sand could lead one to expect not less than 100,000 gallons per day, but the flows reported come nowhere near this figure. One well north of Twin Brooks reported a 7 gallons per minute flow, but all others varied between 1 and 2 gpm and some as low as $\frac{1}{2}$ gpm. Near Kilbuck one early well reported 45 gpm; a second, 30 gpm; and a third, 10 gpm. As pointed out above, there is no way of checking these figures as all artesian pressures have fallen a great deal and the well construction plays a very important role in the flow. So far as is known there have never been systematic pump tests on wells in this sand which would determine its capacity. It is certain, however, that more water could be pumped from it than was recorded as flows and properly cemented wells would probably give larger flows than those reported. It must also be remembered that the preceding figures are for 2-inch wells; and while increasing well diameter does not increase production at the rate usually expected, there is some increase of production with larger bore wells.

The water from this sand is quite usable as city supplies though it is rather high in dissolved solids. An analysis of this water from a well on the Peter Hubert farm one mile north and a half mile west of Kilbuck was made in the State Chemical Laboratory:

<u>Elements</u>	<u>Parts per Million</u>
Total Solids	2933.0
Silica	12.0
Iron & Aluminum	0.84
Calcium	27.0
Magnesium	1.36
Sulfate	1166.07
Chlorides	104.0

The low calcium and magnesium contents show that this water is not hard. It is used for laundry without "beating". The sulphate content, however, is high enough to give the water certain medicinal properties. It also gives it a taste which some have described as "plumb". It is not a serious drawback to its use, however, and it is a characteristic of artesian waters all over North Dakota.

Recommendations

From the above survey of the water reservoirs from which Hilbank will have to draw its supplies, it would seem advisable to investigate two sources if additional supplies are to be developed. These reservoirs are the Whitstone Outwash and the basal sand. Which of these sources should be used will depend on the economics of the construction and maintenance involved and the quality of water the citizens of Hilbank demand.

The Whitstone Outwash offers the more easily developed of the two since wells will not be more than 30 or 40 feet deep at most and all can be drilled in loose sands and gravels. A three-mile pipeline can carry the water to Hilbank. The water will be quite usable but will develop calcium hardness with pumping. The most serious drawback is the fact that Hilbank is higher than the outwash, necessitating pumping water uphill. This is more expensive transportation than the gravity flow the city is now using.

About four square miles around the junction of the forks of Whitstone Creek should be investigated. A ^{thoroughly} ~~thorough~~ ^{minimum}

of nine testholes should be drilled through the gravel in the outwash at proper locations and the holes carefully logged to determine the size and storage capacity of the reservoir. Pump tests should be made on one of these holes, using the others as observation wells to determine draw-down and capacity of the reservoir. The cost of construction and other engineering features of the development should be determined by your engineers.

The Basal Sand could be used without additional exploration if necessary so it will furnish some water anywhere it is encountered. If this method is to be pursued, it might be advantageous to drill a pilot hole to the granite, arranging to have an accurate log made so the well could be finished to the desired site and casing properly set and cemented.

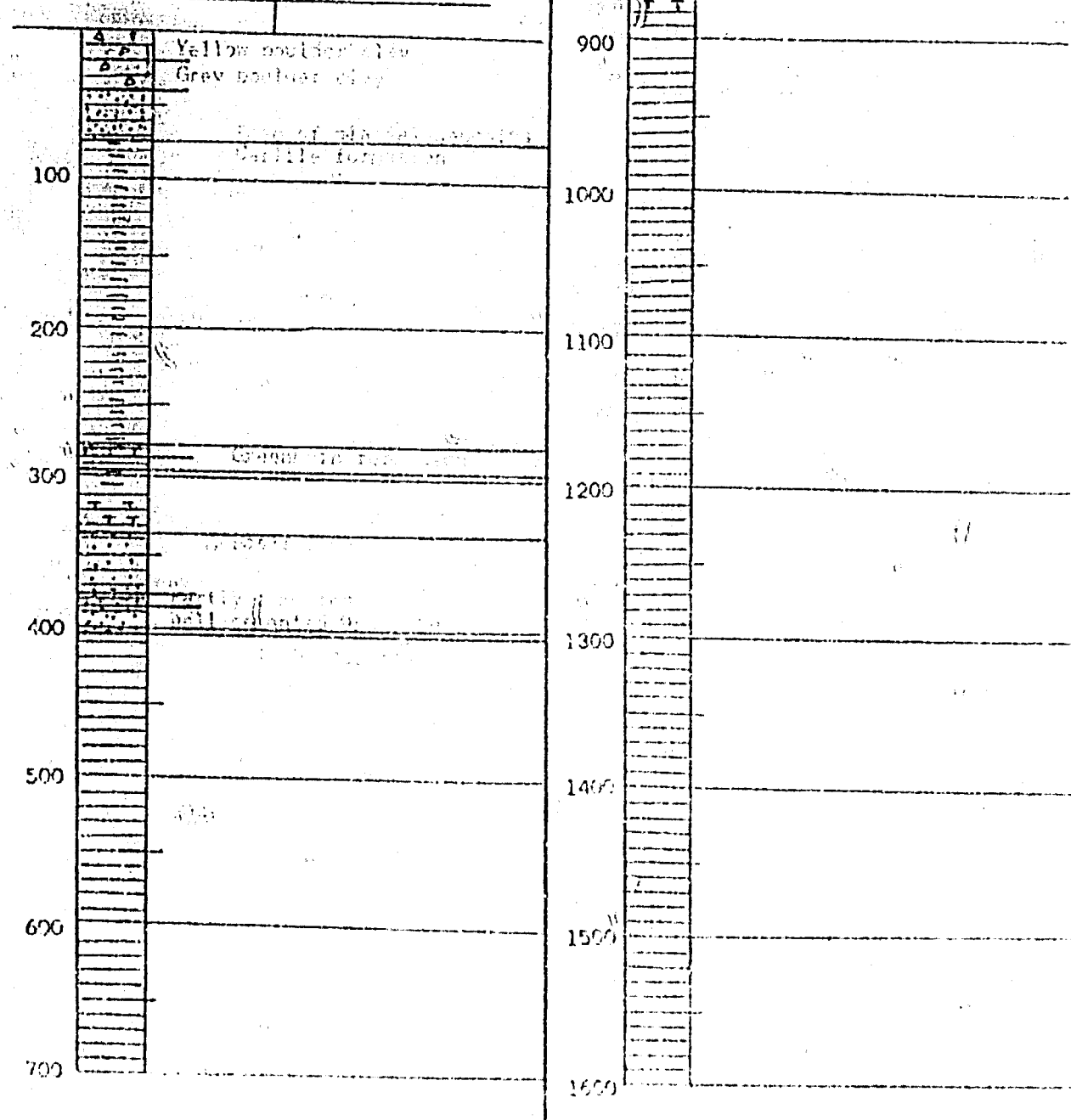
From the information available for this report it would seem that the area immediately south and immediately west of Hilbank would give the greatest thicknesses of sands and the largest production. Wells in sections 7 and 18, T. 120 N., R. 48 W. and section 15, T. 120 N., R. 49 W. reported the greatest depth and the largest productions. It is probable that similar conditions could be found in the west edge of town in section 12, T. 120 N., R. 49 W., and this would be nearest to the present pipeline. There is no apparent advantage in developing a well or well field as far away as Twin Brooks.

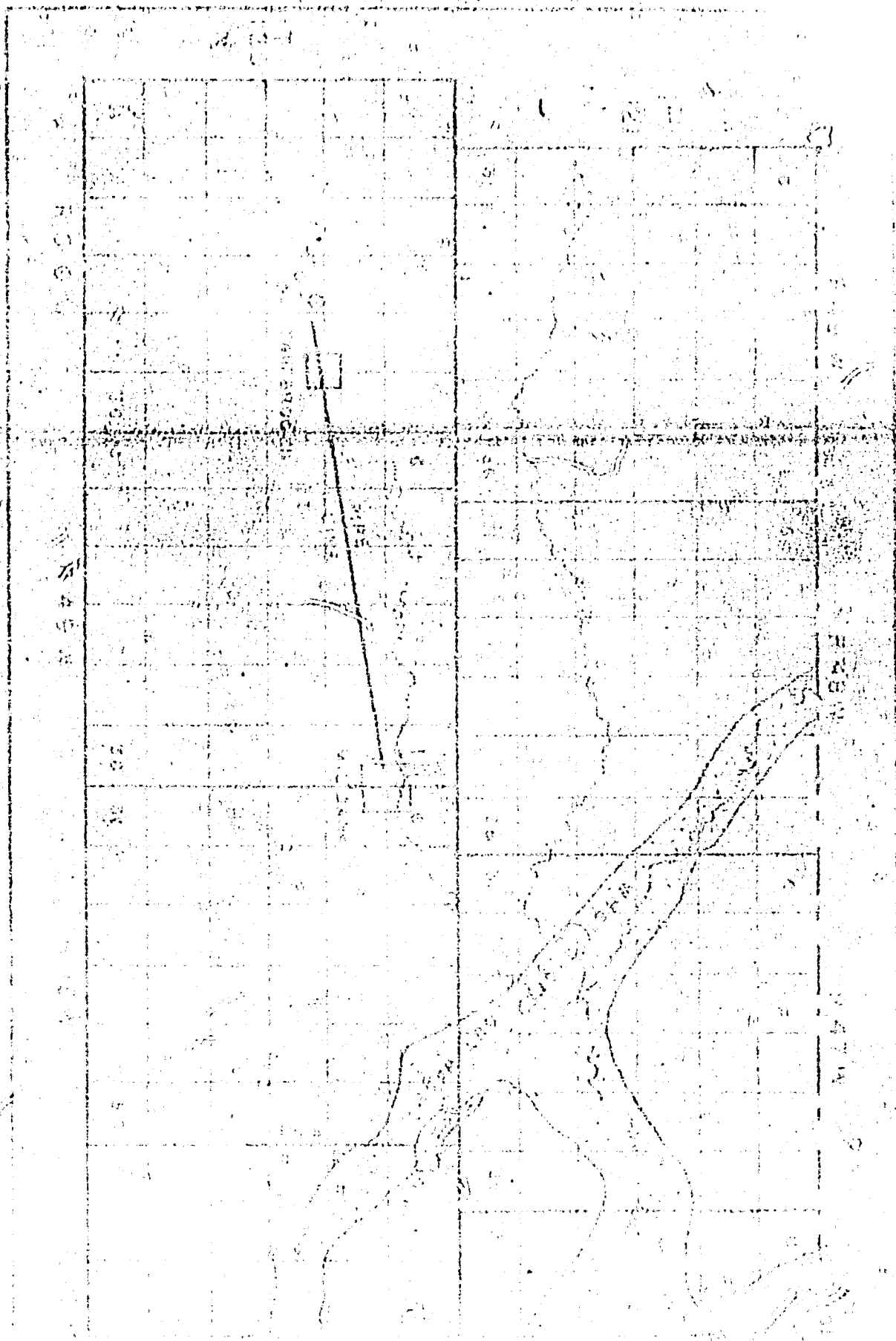
Such a well should be contracted for a 500 foot depth unless volcanic granite rock is encountered at a shallower depth. A geologist can be of considerable assistance in the drilling of such a well by determining the position of the various rock formations encountered, the location for casing seats, and the top of the granite.

If money and time are available for a more careful investigation, two possibilities are open: a small geophysical survey or an exploratory drilling program. There are geophysical companies with small seismographs who make soundings rather cheaply. If one of them could be hired, it would be possible to determine the top of the basal sand and the top of the granite along one or more lines, say one west, one north, and one south of Hilbank. From this data it would be possible to pick a well site that would give the maximum chance for a good well. The cost of such a survey would run into several thousand dollars, the exact amount depending on the extent of the survey.

An exploratory drilling program would involve drilling pilot holes in several likely places or in a definite pattern, each to the top of the granite. Each hole should be carefully logged and the sand reservoir shape and volume reconstructed from this information. Such a program would require a driller and a geologist. The costs again will depend on how extensive an area is to be covered and how many holes are to be drilled. As all wells would have to be between 400 and 500 feet deep, it could run into quite a drilling bill. In terms of a long-range water program to supply Hilbank it would be money well spent. Whether it is worth doing, however, will depend on how much the City has to spend on its water supplies. Unfortunately there is no magic to obtaining water for a city situated as in Hilbank. There is plenty to be had, but it cannot be obtained easily or cheaply.

STATE		COMPANY	
South Dakota		C. M. St. P. & P. R.	
County Grant		Farm Hillback	
Section 62		Total Depth 492 feet	
T 0	R 48	Contractor	
.....		Commenced	
.....		Completed 1937	
El. 1150		Remarks Correlated from samples furnished by the railroad	
Prod.		Casing record	





311 SO. MAIN STREET

Tait and Gruenwald

ATTORNEYS AT LAW

POST OFFICE BOX 149

Milbank, South Dakota 57252

August 30, 1969

F. STEARNS TAIT
MAX GRUENWALD

AREA CODE 605
TELEPHONE 332-11812

Mr. Walter P. Babin
general
548-3

Joe Grimes, Exec. Sec.
S. Dak. Water Resources Commission
Pierre, S. Dak.

RECEIVED
SEP 2 1969
STATE WATER RESOURCES COM. PIERRE, SOUTH DAKOTA

Dear Joe:

I have a matter as Milbank City attorney that I thought you might be able to shed some light on for me. Its a legal question but I long ago learned that you people who specialize in a given area most often have more legal knowledge in that specialty field then we do as general practitioners. Also, excuse my typing as our secretaries are gone for the weekend.

I enclose a plat of the north end of Milbank through which winds what is known as Whetstone Creek. Apparently, this creek is now causing some difficulty as tree trunks and other debris are laying in its channel, causing a partial damming and causing alarm of greater problems during the rainy season. The question raised by the city council is whose responsibility is it to clean out this channel, the city or the surrounding land owners? The flow of water is by no means continuous, in fact, it flows quite heavy during the spring runoff and thereafter it flows only very occasionally when we have a particularly heavy rain or several days of continuous rain. The channel itself is well defined.

I look at SDCL 1967 43-17-4 and it appears that perhaps this statute is applicable here. But one of the questions that is raised, does this Whetstone Creek qualify as a "stream" under this statute. I do find some California court case that says "A channel with definite beds and banks, carrying water in the winter and spring, may be a watercourse, although dry at other seasons of the year." But, I am wondering if you have found any other definitions of what constitutes a "stream" which is used here in S. D.?

Our city council meeting is this coming Tuesday night and we need an answer at that meeting. Consequently, I am wondering if you could give me a call on the Watts line sometime Tuesday with any ideas you may have on this subject. Thanks for any help you may be able to give, Joe. Best regards.

Yours very truly,

Max Gruenwald
Max Gruenwald

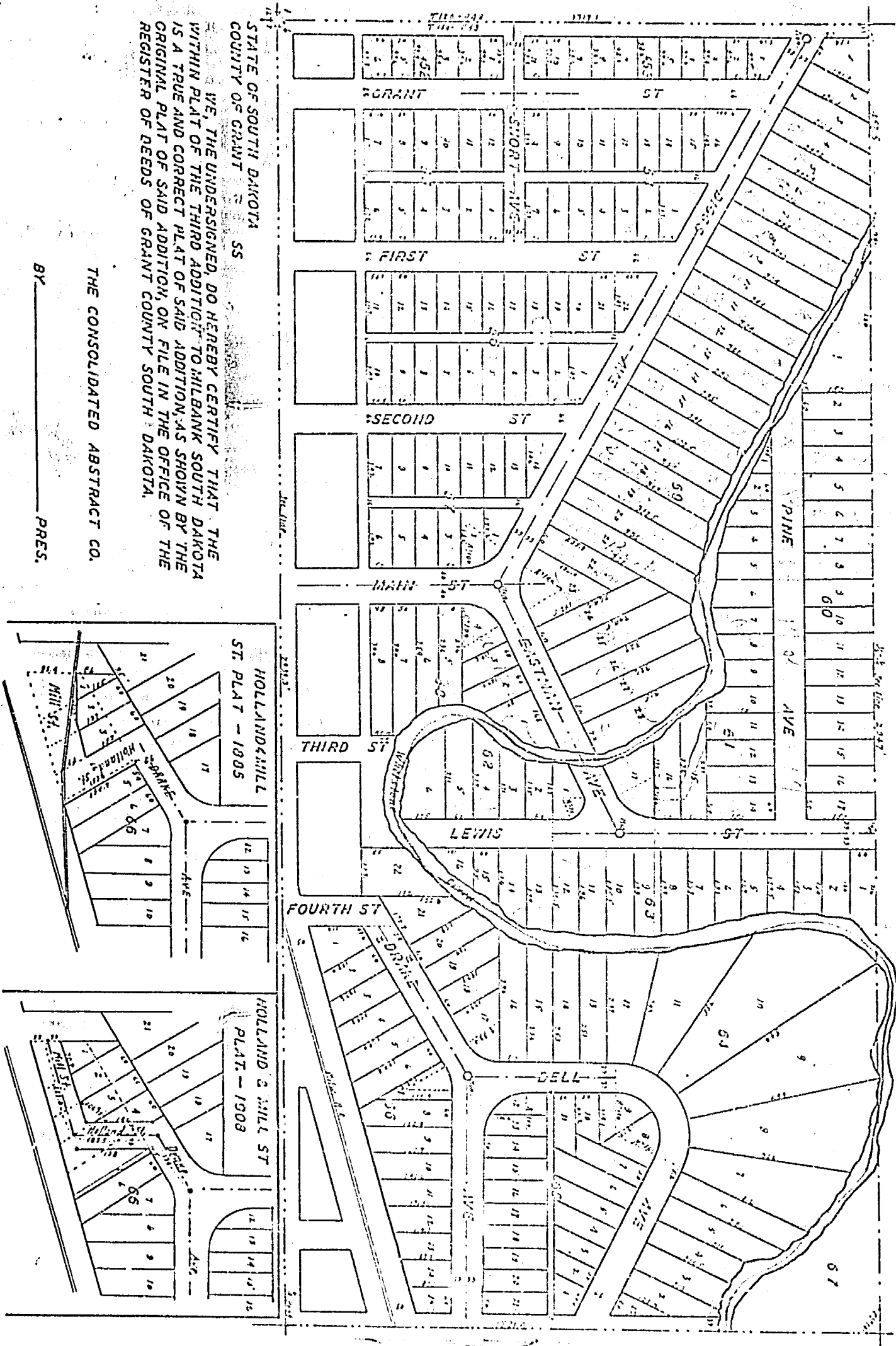
PLAT OF THE THIRD ADDITION TO MILBANK SOUTH DAKOTA

STATE OF SOUTH DAKOTA
COUNTY OF GRANT SS

WE, THE UNDERSIGNED, DO HEREBY CERTIFY THAT THE
WITHIN PLAT OF THE THIRD ADDITION TO MILBANK SOUTH DAKOTA
IS A TRUE AND CORRECT PLAT OF SAID ADDITION, AS SHOWN BY THE
ORIGINAL PLAT OF SAID ADDITION, ON FILE IN THE OFFICE OF THE
REGISTER OF DEEDS OF GRANT COUNTY SOUTH DAKOTA.

THE CONSOLIDATED ABSTRACT CO.

BY _____ PRES.



WATER RIGHT SITUATION - CITY OF MILBANK

On March 15, 1934, the City of Milbank submitted Water Right Application 16-3 asking for all the flows of a stream on land owned by the City of Milbank in Section 16, T120N, R50W. There is considerable correspondence in the file concerning this application, but this Water Right Application No. 16-3 was never acted upon by the State Engineer. This will be classified as a cancelled water right application by the Staff of the Water Resources Commission. However this file contains material of historical and record value and will be retained permanently in this office.

Water Right Application 548-3 was submitted by J.T. Banner and Associates for the City of Milbank as a "Vested Right" claim on August 27, 1958. This "Vested Right" claimed 1,500,000 gallons per day from School Section Springs, Ergemyer Spring, Busta Springs and Well No. 1. This "Vested Right" claim was not recorded by the Water Resources Commission, pending receipt of additional information and fees. The additional information has now been collected and upon payment of required fee of \$3.45, and after Commission consideration "Vested Right" claim No. 548-3 will be recorded in this Office and Water License No. 548-3 will be sent to the City of Milbank.

The City of Milbank Future Use Water Right Application No. 549-3 reserving up to 2.5 cubic feet per second ground water supplies in Sections 2, 3, 4, 5, 8, 9, 10, 11, 15, 16 and 17, all in T120N, R50W was approved by the Water Resources Commission on December 3, 1958. This application is now in proper form. As a matter of information, regular water right applications are required for each specific development, under a future use water permit.

Two new wells have been developed since 1955. No water right application has been made for these two wells. A water right application has been prepared for these two wells, No. 2 and 3. The enclosed two form 2's should be signed by a City Official before a Notary Public and the Form 2A should also be signed by the City Official. The required fee of eight dollars (\$8.00) should be submitted. This application will then be processed, including published public notice and the publishing costs are to be paid by the City of Milbank.

As a matter of information well No. 2, is under Future Use Permit No. 549-3 and well No. 3 is outside of the area specified in this Future Use Permit No. 549-3. This will leave the diversion rate of 1.83 c.f.s. available under the future use permit.

After this new application is processed, a later fee of \$12.00 will be required of the City of Milbank for inspection, filing and licensing fees.

The City of Milbank has submitted in proper form, a "Vested Right" claim on their Lake Farley Water Right. A fee of \$10.00 is required and after consideration by the Water Resources Commission, the "Vested Right" claim can be recorded and a water license issued.



DANNER ASSOCIATES, INC.
CONSULTING ENGINEERS & ARCHITECTS

Wyoming: Laramie, Cheyenne
South Dakota: Brookings, Rapid City

1024 6th Street, P.O. Box 298, Brookings, South Dakota 57006 Telephone 605/692-6342

January 5, 1977



Twin Brooks Alfalfa Mill, Inc.
Box 10
Twin Brooks, S. Dak. 57269

RE: Static Water Levels
City of Milbank Wells
Located in Twin Brooks

Gentlemen:

I am forwarding the information requested on the Milbank Municipal Wells located in Twin Brooks, S.D. Both wells are located in Twin Brooks proper.

West Twin Brooks Well

Drilled 1960

Static water level Feb. 4, 1961 - 56.58'

Water level after pumping 24 hrs. @ 200 gpm to 300 gpm = 70.83'

East Twin Brooks Well

Drilled July 1968

Static water level July 18, 1968 - 51'

Well pumped @ 306 gpm for 3 hrs. - Water level 71'

Well pumped @ 402 gpm for next 3 hrs. - Water level 77'

Well pumped @ 502 gpm for next 3 hrs. - Water level 86'

Well pumped @ 602 gpm for next 3 hrs. - Total of 12 hrs. -

Water level 95'

If you have any questions, please feel free to contact me.

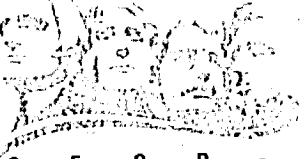
Sincerely yours,

H. D. Williams, P.E.

HDW/bas

cc: Dick Frederickson
Frederickson's, Inc.
Box 231
Hutchinson, MN 55350

South Dakota



GREAT FACES. GREAT PLACES.

DEPARTMENT OF WATER & NATURAL RESOURCES
Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

April 26, 1991

5-418-3

Ralph Stinson, Mayor
City of Milbank
PO Box 472
Milbank SD 57252

Dear Mayor Stinson:

The Water Management Board has validated the enclosed Vested Water Right No. (548-3). This validation gives legal status to the claim and is the final document for your vested right.

As long as you use the water beneficially, as stated in the validation, State Water Laws provide that you have a continuing right to use the water.

Very truly yours,

JOHN HATCH, Chief Engineer
Water Rights Division
605 773-3352

enclosure

SOUTH DAKOTA

VALIDATION OF VESTED WATER RIGHT CLAIM NO. 548-3

Date Claim Accepted For Filing August 27, 1958.

Date of Validation September 27, 1989.

Pursuant to SDCL 46-2A-17 the Water Management Board validated Vested Water Right Claim No. 548-3 for the City of Milbank, P O Box 472, Milbank, South Dakota 57252 with the following limitations, conditions and qualifications:

1. Vested Water Right No. 548-3 appropriates 2.1 cubic feet of water per second from three springs and Well No. 1. School Section Springs is located in the SE 1/4 NE 1/4, Section 16; Ergemyer Springs is located in the SE 1/4 NW 1/4, Section 15; Busta Springs is located in the NW 1/4 SE 1/4, Section 15 and Well No. 1 is located in the NE 1/4 NE 1/4, Section 15; all in T120N, R50W.
2. The appropriated water is used for supplying water for the City of Milbank and may not exceed the amount of water needed for beneficial use for municipal purposes.

The water is to be used during the following annual period:
January 1 - December 31
3. The priority dates of the Vested Water Right are: School Section Springs - January 1, 1924; Ergemyer Springs - January 1, 1929; Busta Springs - January 1, 1933 and Well No. 1 - January 1, 1934.
4. The water use system has been constructed and water has been applied to beneficial use.
5. Water Rights obtained in compliance with the laws of the State of South Dakota must not be unlawfully impaired by this appropriation.

WATER MANAGEMENT BOARD

By: _____

John H. Hatcher
Chief Engineer
Division of Water Rights
Dept. of Environment and Natural Resources

APR 26 1991

date