CANADA
DEPARTMENT OF MINES

HON. T. A. CRERAR, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER

BUREAU OF ECONOMIC GEOLOGY

GEOLOGICAL SURVEY

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF WINSLOW No. 319 SASKATCHEWAN

BY

B. R. MacKay, H. N. Hainstock & G. Graham

Water Supply Paper No. 217

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GROUND WATER RESOURCES OF PART OF THE RURAL MUNICIPALITY OF WINSLOW, NO. 319, SASKATCHEWAN

INTRODUCTION

Lack of rainfall during the years 1930 to 1934 over a large part of the Prairie Provinces brought about an acute shortage both in the larger supplies of surface water used for irrigation and the smaller supplies of ground water required for domestic purposes and for stock. In an effort to relieve the serious situation the Geological Survey began an extensive study of the problem from the standpoint of domestic uses and stock raising. During the field season of 1935 an area of 80,000 square miles, comprising all that part of Saskatchewan south of the north boundary of township 32, was systematically examined, records of approximately 60,000 wells were obtained, and 720 samples of water were collected for analyses. The facts obtained have been classified and the information pertaining to any well is readily accessible. The examination of so large an area and the interpretation of the data collected were possible because the bedrock geology and the Pleistocene deposits had been studied previously by McLearn, Warren, Rose, Stansfield, Wickenden, Russell, and others of the Geological Survey. The Department of Natural Resources of Saskatchewan and local well drillers assisted considerably in supplying several hundred well records. The base maps used were supplied by the Topographical Surveys Branch of the Department of the Interior.

Publication of Results

The essential information pertaining to the ground water conditions is being published in reports, one being issued for each municipality. Copies of these reports are being sent to the secretary treasurers of the municipalities and to certain Provincial and Federal Departments, where they can be consulted by residents of the municipalities or by other persons, or they may be obtained by writing direct to the Director, Bureau of Economic Geology, Department of Mines, Ottawa. Should anyone require more detailed information than that contained in the reports such additional information as the Geological Survey possesses can be obtained on application to the director. In making such request the applicant should indicate the exact location of the area by giving the quarter section, township, range, and meridian concerning which further information is desired.

The reports are written principally for farm residents, municipal bodies, and well drillers who are either planning to sink new wells or to deepen existing wells. Technical terms used in the reports are defined in the glossary.

How to Use the Report

Anyone desiring information about ground water in any particular locality should read first the part dealing with the municipality as a whole in order to understand more fully the part of the report that deals with the place in which he is interested. At the same time he should study the two figures accompanying the report. Figure 1 shows the surface and bedrock geology as related to the ground water supply, and Figure 2 shows the relief and the location and type of water wells. Relief is shown by lines of equal elevation called "contours". The elevation above sea-level

is given on some or all of the contour lines on the figure.

If one intends to sink a well and wishes to find the approximate depth to a water-bearing horizon, he must learn: (1) the elevation of the site, and (2) the probable elevation of the water-bearing bed. The elevation of the well site is obtained by marking its position on the map, Figure 2, and estimating its elevation with respect to the two contour lines between which it lies and whose elevations are give on the figure. Where contour lines are not shown on the figure, the elevations of adjacent wells as indicated in the Table of Well Records accompanying each report can be used. The approximate elevation of the water-bearing horizon at the well-site can be obtained from the Table of Well Records by noting the elevation of the water-bearing horizon in surrounding wells and by estimating from these known elevations its elevation at the well-site.[1] If the water-bearing horizon is in bedrock the depth to water can be estimated fairly accurately in this way. If the water-bearing horizon is in unconsolidated deposits such as gravel, sand, clay, or glacial debris, however, the estimated elevation is less reliable, because the water-bearing horizon may be inclined, or may be in lenses or in sand beds which may lie at various horizons and may be of small lateral extent. In calculating the depth to water, care should be taken that the water-bearing horizons selected from the Table of Well Records be all in the same geological horizon either in the glacial drift or in the bedrock. From the data in the Table

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[1] If the well-site is near the edge of the municipality, the map and report dealing with the adjoining municipality should be consulted in order to obtain the needed information about nearby wells.

of Well Records it is also possible to form some idea of the quality and quantity of the water likely to be found in the proposed well.

GLOSSARY OF TERMS USED

Alkaline. The term "alkaline" has been applied rather loosely to some ground waters. In the Prairie Provinces a water is usually described as "alkaline" when it contains a large amount of salts, chiefly sodium sulphate and magnesium sulphate in solution. Water that tastes strongly of common salt is described as "salty". Many "alkaline" waters may be used for stock. Most of the so-called "alkaline" waters are more correctly termed "sulphate waters".

Alluvium. Deposits of earth, clay, silt, sand, gravel, and other material on the flood-plains of modern streams and in lake beds.

Aquifer or Water-bearing Horizon. A water-bearing bed, lens, or pocket in unconsolidated deposits or in bedrock.

Buried pre-Glacial Stream Channels. A channel carved into the bedrock by a stream before the advance of the continental ice-sheet, and subsequently either partly or wholly filled in by sands, gravels, and boulder clay deposited by the ice-sheet or later agencies.

Bedrock. Bedrock, as here used, refers to partly or wholly consolidated deposits of gravel, sand, silt, clay, and marl that are older than the glacial drift.

Coal Seam. The same as a coal bed. A deposit of carbonaceous material formed from the remains of plants by partial decomposition and burial.

Contour. A line on a map joining points that have the same elevation above sea-level.

Continental Ice-sheet. The great ice-sheet that covered most of the surface of Canada many thousands of years ago.

Escarpment. A cliff or a relatively steep slope separating level or gently sloping areas.

Flood-plain. A flat part in a river valley ordinarily above water but covered by water when the river is in flood.

Glacial Drift. The loose, unconsolidated surface deposits of sand, gravel, and clay, or a mixture of these, that were deposited by the continental ice-sheet. Clay containing boulders forms part of the drift and is referred to as glacial till or boulder clay. The glacial drift occurs in several forms:

(1) Ground Moraine. A boulder clay or till plain (includes areas where the glacial drift is very thin and the surface uneven).

(2) Terminal Moraine or Moraine. A hilly tract of country formed by glacial drift that was laid down at the margin of the continental ice-sheet during its retreat. The surface is characterized by irregular hills and undrained basins.

(3) Glacial Outwash. Sand and gravel plains or deltas formed by streams that issued from the continental ice-sheet.

(4) Glacial Lake Deposits. Sand and clay plains formed in glacial lakes during the retreat of the ice-sheet.

Ground Water. Sub-surface water, or water that occurs below the surface of the land.

Hydrostatic Pressure. The pressure that causes water in a well to rise above the point at which it is struck.

Impervious or Impermeable. Beds, such as fine clays or shale, are considered to be impervious or impermeable when they do not permit of the perceptible passage or movement of the ground water.

Porvious or Permeable. Beds are pervious when they permit of the perceptible passage or movement of ground water, as for example porous sands, gravel, and sandstone.

Pre-Glacial Land Surface. The surface of the land before it was covered by the continental ice-sheet.

Recent Deposits. Deposits that have been laid down by the agencies of water and wind since the disappearance of the continental ice-sheet.

Unconsolidated Deposits. The mantle or covering of alluvium and glacial drift consisting of loose sand, gravel, clay, and boulders that overlie the bedrock.

Water Table. The upper limit of the part of the ground wholly saturated with water. This may be very near the surface or many feet below it.

Wells. Holes sunk into the earth so as to reach a supply of water. When no water is obtained they are referred to as dry holes. Wells in which water is encountered are of three classes.

(1) Wells in which the water is under sufficient pressure to flow above the surface of the ground. These are called Flowing Artesian Wells.

(2) Wells in which the water is under pressure but does not rise to the surface. These wells are called Non-Flowing Artesian Wells.

(3) Wells in which the water does not rise above the water table. These wells are called Non-Artesian Wells.

NAMES AND DESCRIPTIONS OF GEOLOGICAL FORMATIONS, REFERRED TO IN THESE REPORTS

Wood Mountain Formation. The name given to a series of gravel and sand beds which have a maximum thickness of 50 feet, and which occur as isolated patches on the higher parts of Wood mountain. This is the youngest bedrock formation and, where present, overlies the Ravenscrag formation.

Cypress Hills Formation. The name given to a series of conglomerates and sand beds which occur in the southwest corner of Saskatchewan, and rest upon the Ravenscrag or older formations. The formation is 30 to 125 feet thick.

Ravenscrag Formation. The name given to a thick series of light-coloured sandstones and shales containing one or more thick lignite coal seams. This formation is 500 to 1,000 feet thick, and covers a large part of southern Saskatchewan. The principal coal deposits of the province occur in this formation.

Whitemud Formation. The name given to a series of white, grey, and buff coloured clays and sands. The formation is 10 to 75 feet thick. At its base this formation grades in places into coarse, limy sand beds having a maximum thickness of 40 feet.

Eastend Formation. The name given to a series of fine-grained sands and silts. It has been recognized at various localities over the southern part of the province, from the Alberta boundary east to the escarpment of Missouri coteau. The thickness of the formation seldom exceeds 40 feet.

Bearpaw Formation. The Bearpaw consists mostly of incoherent dark grey to dark brownish grey, partly bentonitic shales, weathering light grey, or, in places where much iron

is present, buff. Beds of sand occur in places in the lower part of the formation. It forms the uppermost bedrock formation over much of western and southwestern Saskatchewan and has a maximum thickness of 700 feet or somewhat more.

Belly River Formation. The Belly River consists mostly of non-marine sand, shale, and coal, and underlies the Bearpaw in the western part of the area. It passes eastward and northeastward into marine shale. The principal area of transition is in the western half of the area where the Belly River is mostly thinner than it is to the west and includes marine zones. In the southwestern corner of the area it has a thickness of several hundred feet.

Marine Shale Series. This series of beds consists of dark grey to dark brownish grey, plastic shales, and underlies the central and northeastern parts of Saskatchewan. It includes beds equivalent to the Bearpaw, Belly River, and older formations that underlie the western part of the area.

WATER-BEARING HORIZONS OF THE MUNICIPALITY

The rural municipality of Winslow, No. 319, comprises an area of 324 square miles in west-central Saskatchewan. It consists of nine townships described as tps. 31, 32, and 33, ranges 19, 20, and 21, W, 3rd mer. Only townships 31 and 32, ranges 19, 20, and 21, an area of 216 square miles, were investigated by the field party and covered in this report. The centre of the area under discussion lies 32 miles west and 10 miles north of the town of Rosetown. A branch line of the Canadian Pacific railway traverses the northeastern part of the area and on it is located the village of Plenty.

The lowest elevation, 1,950 feet, occurs at Opuntia lake in the northeastern corner of the area under discussion. From this point the elevation rises to more than 2,400 feet above sea-level in parts of township 31, ranges 19 and 20. The ground surface in township 31, ranges 19 and 20, is hilly, being quite rugged in some sections, whereas that of the remainder of the municipality is undulating. A few, small, intermittent creeks occur in the northern part of the area, but no drainage systems have been particularly well developed. Kiyiu (or Eagle) lake, a swampy marsh in the southeastern part of township 31, range 21, covers approximately 3 square miles of this municipality. Moraine mantles a narrow area extending from the southeastern corner to the north-central part of the municipality. A large area in the vicinity of Opuntia lake and a small area around Kiyiu lake are mantled by glacial lake clays, which attain a thickness of approximately 40 feet. Boulder clay or till covers the remainder of the area. Ground water is more difficult to obtain in the areas that are covered by moraine and glacial lake deposits than in the part that is covered by boulder clay or till.

Water-bearing Horizons in the Unconsolidated Deposits

The shallow wells in the area under discussion obtain small supplies of water from deposits of sand and gravel that occur along small streams or draws, and from pockets of sand and gravel within the upper 40 feet of the drift. These deposits do not form a continuous water-bearing horizon. The deposits in the vicinity of the creeks and draws, however, are fairly extensive and a large supply of water is usually obtained from them. Where the water-bearing beds outcrop springs are common and the supply from them can be effectively increased by the use of collecting galleries.

Away from the creeks the water-bearing pockets are of scattered occurrence and many dry holes are dug in places before water is located. The water obtained from these deposits is of good quality and can generally be used for all farm purposes. The supply, however, depends upon the size of the water-bearing deposit encountered and upon the amount of annual precipitation. During periods of drought the supply is considerably decreased and may not be sufficient for local needs. In places where the supply from shallow wells is small the excavation of dugouts, or the construction of dams, is recommended as a means of retaining the run-off waters for stock use. Farmers are advised to test with a small auger before digging a shallow well, as by this means a water-bearing deposit may be encountered with a minimum amount of effort and expense.

The "A" boundary line on the accompanying map (Figure 1) outlines an area in which a number of wells obtain water at depths of 40 to 130 feet. The aquifers tapped by this group of wells are thought to be formed by pockets of sand and gravel in the glacial drift. These pockets are of common occurrence and no great difficulty should be encountered in obtaining water in this area. Since the aquifers are thought to be in the form of isolated pockets, dry holes may be sunk before a producing well is obtained, but few dry holes were recorded in this area. In some parts of the area the profile

of the aquifers appears to parallel the ground surface, so that by carefully studying the well records in conjunction with the well map it should be possible to ascertain the depth to which a well will have to be sunk to encounter water. Small fragments of coal were found in some of the wells in this area but the coal is thought to have been transported in the glacial drift and not to be part of the Belly River formation. The yield from most of the wells tapping this horizon is sufficient for local needs, but the supply from a few must be augmented by the use of dugouts. The water is hard, and generally under pressure, but does not contain such an excessive amount of mineral salts in solution as to render it unfit for drinking. However, the water from a few wells contains such a quantity of mineral salts in solution as to cause scour among stock.

The "B" boundary line on the accompanying map (Figure 1) outlines a small area in townships 32, ranges 19 and 20, in which a number of wells obtain water from an aquifer at depths of 76 to 160 feet below the surface, or at elevations of 1,920 to 1,980 feet above sea-level. It is doubtful if this water-bearing horizon will be encountered outside the outlined area. The horizon may not be continuous throughout the outlined area as a dry hole was drilled in sec. 17, tp. 32, range 19. This hole is 120 feet deep, but it is possible that it was not drilled deep enough to tap the aquifer. Coal was reported in some of the wells in this area, but it is assumed that it has been transported with the glacial drift and is not part of the bedrock. The water is hard, fairly abundant in quantity, suitable for all farm requirements, and is under some hydrostatic pressure.

In the southeastern part of township 32, range 19, and the northeastern part of township 31, range 19, it is difficult to obtain ground water. Two wells in the southeastern part of township 32, range 19, were drilled approximately 150 feet below the surface

to an elevation of 1,900 feet above sea-level, but obtained only an inadequate supply of hard water. Sufficient water for household needs can sometimes be obtained from shallow wells dug in the vicinity of sloughs or depressions. Providing a suitable supply for domestic needs can be obtained in a particular area dugouts are highly recommended, for the retention of run-off water for stock use. The shallow well, together with the dugout, should provide sufficient water for local requirements.

Water-bearing Horizons in the Bedrock

With the exception of a small area in the southeastern corner, which is underlain by the Bearpaw formation, the glacial drift in this municipality is underlain by the Belly River formation. The depth to bedrock varies considerably over short distances owing to the unevenness of the ground surface. In township 32, range 21, coal outcrops at an approximate elevation of 2,225 feet above sea-level, but in some parts of the municipality the drift mantling the bedrock is estimated to have a maximum thickness of 250 feet.

On sec. 6, tp. 32, range 21, a supply of soft water is obtained from a well 22 feet deep which encountered coal near its base. It is possible that the coal is part of the Belly River formation as coal outcrops at approximately the same elevation in section 14, but as deeper wells in the same vicinity do not encounter bedrock the coal is assumed to have been transported with the glacial drift. If it is part of the Belly River formation, however, the aquifer encountered is of small areal extent.

The "C" boundary line on the accompanying map outlines an area in which four wells derive their supply of water from the Belly River formation. These wells are drilled to depths ranging from 130 to 240 feet below the surface and the aquifer is tapped at elevations ranging from 2,050 to 2,135 feet above sea-level. The

coal encountered by some of these wells is definitely in the Belly River formation. The water from two of the wells is soft and under high pressure, whereas that from the two other wells is hard and under slight hydrostatic pressure, so that it is possible that two distinct water-bearing horizons may occur in this area, but until more information is available it is assumed that only one horizon is present. This horizon possibly extends to the west as a well in section 31 obtains water at an elevation of 2,094 feet, and it may also extend to the north and south, but extension eastward is limited. In any event, however, it should be possible to obtain water in this area if wells are drilled to the required depth. The supply from all the wells but one is more than sufficient for local needs and the water can be used for all farm requirements, with the exception of irrigation.

The "D" boundary lines on the accompanying map (Figure 1) outline two areas in which wells obtain water from the Belly River formation at depths varying from 135 to 362 feet, or at elevations ranging from 1,840 to 1,890 feet. The difference in the depth of the wells is largely due to the difference in surface elevation. The water-bearing horizon encountered by these wells appears to be continuous over the area outlined and it should be tapped by other wells sunk inside these boundary lines. This water-bearing horizon is thought to be of considerable areal extent as a well on sec. 32, tp. 31, range 19, draws the supply from a similar aquifer at an elevation of 1,852 feet above sea-level. It is also possible that the deeper wells in the area outlined by the "E" boundary line tap the same water-bearing horizon. These wells encounter an aquifer at depths ranging from 272 to 300 feet, or at elevations of 1,740 to 1,816 feet. If the bedrock is in the form of a large basin in this area the water-bearing horizons occurring in the areas outlined by the "D" and "E" boundary lines probably form one continuous aquifer. The hydrostatic pressure in all the wells in these areas is similar

and the water rises to levels 10 to 40 feet below the surface. The water from all the wells is soft and abundant in quantity. The supply of water from the wells in the area outlined by the "E" boundary line, however, is often considerably reduced by the fine sand that forms the aquifer, partly plugging the wells. The water can be used for drinking and for stock, but will probably be unsuitable for irrigation. Little difficulty should be experienced in obtaining an adequate supply of water from the bedrock in this municipality.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 31, Range 19

The ground surface throughout this township is quite hilly. In the northern part of the township the elevation rises from 2,100 feet at the northern boundary to 2,400 feet 2 miles south of the boundary. Throughout the remainder of the township the elevation varies from 2,300 to 2,400 feet above sea-level. The larger portion of the northeastern half of the township, and a small area in the southwestern area are mantled by moraine. The remaining portion of the township is covered by glacial till or boulder clay.

A few wells in this township tap scattered pockets of sand or gravel at depths ranging from 20 to 60 feet below the surface. On sections 1, 2, 11, and 13, there may be some continuity in the occurrence of the pockets, but over the remainder of the township no continuity can be established and dry holes will probably be dug before a water-bearing pocket is tapped. The supply from the shallow wells is small and it is not always sufficient for local needs. The water is highly mineralized and that from three wells is suitable only for stock use.

In the southwestern part of the township an area has been outlined by the "A" boundary line within which a number of wells tap aquifers at depths ranging from 60 to 130 feet below the surface, or at elevations of 2,210 to 2,280 feet above sea-level. It is not known if the deposits of sand and gravel tapped by these wells form a continuous water-bearing horizon, but they are more extensive in this area than in other parts of the township. If wells are sunk in the outlined area to the depths and elevations previously mentioned, water should be encountered. Where this water-bearing horizon outcrops in the northern 2 miles of the township, springs are of common occurrence. The horizon appears to thin out or

disappear towards the east as dry holes were dug to a depth of 150 feet and more in section 13. The supply of water from the majority of the wells tapping this water-bearing horizon is sufficient for local needs and the water is suitable for all farm purposes. The water from a few wells, however, is rather highly mineralized, but it is being used for drinking without any apparent ill effects. The springs in the northern area yield a large supply of water and on some farms water has been retained by dams and is used for stock. This method could also be used to advantage in other parts of the township. A well on the NW. $\frac{1}{4}$, section 16, tapped an aquifer at a depth of 330 feet below the surface, or at an elevation of 2,040 feet above sea-level. This well was drilled through a small seam of coal, so there is little doubt that the water is being obtained from the Belly River formation. The aquifer is a blue sand, but its areal extent is undefined. The 500-foot dry hole on section 22 appears to indicate that the aquifer does not extend in that direction. The supply of water available from the well is more than adequate for farm needs. The water is hard and although it is quite highly mineralized it is being used for all farm purposes.

Another aquifer in the bedrock is tapped at a depth of 320 feet, or at an elevation of 1,852 feet above sea-level, by a well on section 32, but the areal extent of this aquifer is also unknown. The supply of water from this well is abundant and the hydrostatic pressure is sufficient to cause the water to rise to a point 70 feet below the surface. The water is hard and is used for all farm purposes.

In the northeastern part of this township it is recommended that dugouts be used for the collecting and storing of run-off water for stock use. By using dugouts for stock and shallow seepage wells for domestic use a supply of water sufficient for local needs should be obtained in this part of the township.

Township 31, Range 20

The ground surface in the eastern part of this township is quite hilly, but throughout the remainder of the area it is rolling. The elevation rises from less than 2,100 feet above sea-level in the northeastern corner to more than 2,400 feet above sea-level in parts of sections 24 and 25, from where it decreases in a southwesterly direction to less than 2,200 feet at Kiyiu (or Eagle) lake. The greater part of the northeastern half of the township is mantled by moraine. With the exception of a small area surrounding Kiyiu lake, which is covered by glacial lake clays, the remainder of the township is overlain by boulder clay or glacial till.

A few wells are deriving small supplies of water from pockets of sand and gravel that occur at depths ranging from 5 to 60 feet below the surface. These pockets are of local distribution and no continuity is apparent in their occurrence. Dry holes may be dug before a water-bearing deposit is encountered. The water obtained, however, is usually suitable for all farm purposes.

The "A" boundary line on the accompanying map outlines an area in which the sand and gravel deposits appear to be more continuous, and wells sunk to depths ranging from 40 to 85 feet in this area should tap a water-bearing deposit. Dry holes may be dug, however, before a producing well is obtained, but the possibilities of obtaining an adequate supply of ground water are considerably better within this area than in other parts of the township. The majority of the wells tapping this water-bearing horizon yield a sufficient supply for local needs, but in a few wells the water is very highly mineralized and can be used only for stock.

Water will probably be rather difficult to obtain in the highland area along the eastern border and dry holes have already been put down to a depth of 120 feet on sections 23 and 24. In this area it is advisable to excavate dugouts for the collection of

run-off water for stock use. In the southern part of the township a few springs occur and they yield large supplies of usable water.

In this township it appears that if an adequate supply of water is not obtained within the upper 100 feet of the glacial drift it is useless to continue the hole, unless one is prepared to drill into the underlying Belly River formation. This formation has not been encountered in the township, but it is known to contain water-bearing horizons in the townships immediately to the north.

Township 31, Range 21

The ground surface throughout the township is gently rolling and slopes slightly towards the south, the elevation decreasing from approximately 2,300 feet in the northern part to less than 2,200 feet at Kiyiu lake. The township is mantled by boulder clay or glacial till, and glacial lake clays overlie the till in a small area in the vicinity of Kiyiu lake.

A few wells obtain small supplies of water from pockets of sand or gravel that occur within the upper 30 feet of the drift. These pockets are sparsely distributed and do not form a continuous horizon.

The main water supply in this township is obtained from sand and gravel deposits occurring at depths ranging from 40 to 100 feet below the surface. The area within which these pockets appear to form a fairly continuous horizon is outlined by the "A" boundary line on the accompanying map. There should be no great difficulty experienced in tapping a water-bearing pocket within the area, but since the underlying sand and gravel is assumed to be in the form of pockets rather than a continuous bed, dry holes may possibly be dug before a producing well is obtained. The water-bearing deposits are tapped in most of the wells at elevations ranging from 2,160 to 2,215 feet above sea-level. The supply of water from most of the wells is sufficient for local needs and the

water is under some hydrostatic pressure. The water from many of the wells is highly mineralized and termed "alkaline", but with few exceptions it is being used for drinking.

It is reported that small fragments of coal were encountered in some of the wells, but it is not thought that the wells tap bedrock aquifers. The coal was probably picked up by the ice-sheet and deposited with the glacial drift.

Should wells be drilled into the underlying bedrock it is possible that supplies of usable water will be obtained.

Township 32, Range 19

The elevation of the surface of this township rises from 1,950 feet at Opuntia lake to 2,100 feet above sea-level at the southern boundary. The surface is gently rolling. A small area in the southwestern corner is mantled by moraine, and the remainder of the township is covered by glacial till or boulder clay. Glacial lake clays overlie the boulder clay throughout the greater part of the township.

From the information at hand it appears improbable that adequate supplies of water will be obtained at shallow depth in this township. The glacial lake clays do not yield water. In the southeastern part of the township two wells obtain small supplies of water from pockets of sand at depths of 12 and 18 feet. These aquifers are not continuous. Two springs occur in section 24 and yield a fairly abundant supply of water. The other wells in the township are deeper than 75 feet. If adequate supplies of water for domestic use can be obtained at shallow depth it is advisable to excavate dugouts or construct small dams for the retention of run-off water for stock use, unless one is prepared to drill in excess of 75 feet in search of water.

A number of wells in the area outlined by the "B" boundary line on the accompanying map obtain water from an aquifer in the glacial drift that occurs at depths ranging from 76 to 160 feet below

the surface, or at elevations of 1,900 to 1,976 feet above sea-level. This water-bearing horizon does not appear to be continuous, as a hole was drilled to a depth of 120 feet in section 17 without obtaining water. It is possible, however, that this hole was not deep enough to reach the aquifer. The supply of water from the wells tapping this aquifer is adequate for local requirements and the water is under some hydrostatic pressure. The water is hard, but only slightly mineralized and it is suitable for domestic needs.

Two wells located on sections 3 and 10 apparently tap a common aquifer at a depth of approximately 150 feet, or at elevations of 1,885 and 1,905 feet, respectively. The supply from these wells is inadequate for local needs.

A well located on the W. $\frac{1}{2}$, section 8, appears to tap an aquifer in the Belly River formation at an elevation of 1,940 feet, or at a depth of 150 feet. It yields a large supply of soft, salty water that is too highly mineralized to be used for drinking. The areal extent of this aquifer is not known, but it is thought to be only local as this is the only well obtaining water from this elevation in the Belly River formation.

In the northern part of the township a few wells obtain water from a second water-bearing horizon in the Belly River formation. The area in which these wells occur is outlined by the "D" boundary line on the accompanying map (Figure 1). The aquifer is formed by sand; it appears to be continuous over the area outlined and may underlie a greater part of the township than is shown. It is encountered at depths of 135 to 205 feet or at elevations of 1,856 to 1,887 feet. It yields an abundant supply of soft, usable water that is under hydrostatic pressure. This water will probably be unsuitable for irrigation.

Four wells in the southwestern part of the township appear to have tapped a third water-bearing horizon in the Belly River formation. This horizon is encountered at depths ranging from 268

to 307 feet, or at elevations of 1,783 to 1,822 feet, and the area in which it has been tapped is outlined by the "E" boundary line. This horizon is formed by a very fine sand and it is possible that it is the same aquifer as that encountered by the wells in the area outlined by the "D" boundary line. The water is soft, and is suitable for domestic purposes as well as for stock. The water is under considerable hydrostatic pressure and the supply is fairly abundant.

Little difficulty should be experienced in obtaining a satisfactory supply of usable water from the lower part of the glacial drift and from the Belly River formation in this township.

Township 32, Range 20

The elevation in this township rises from approximately 2,050 feet in the eastern part to over 2,200 feet in the southwestern corner. To the west of the 2,100-foot contour line the land surface is quite rolling, but to the east of this line it is gently undulating. A small, intermittent creek flows in a northerly direction through sections 19, 30, and 31, and drains this part of the township, but over the remainder of the area there is no well-developed drainage system. Small areas in the northeastern, northwestern, and southwestern corners are mantled by glacial till or boulder clay, but the remainder of the township is covered by moraine.

A few wells in different parts of the township tap pockets of sand and gravel at depths of 20 to 70 feet in the glacial drift. The pockets are of local distribution and a continuous horizon does not exist. The supply from most of these wells is sufficient for local needs and the water can be used for all purposes. In the vicinity of the creek in the northwestern part of the township it should be possible to obtain small supplies of water at shallow depths.

A few wells in the area outlined by the "B" boundary line tap a water-bearing horizon in the glacial drift at depths of 98 to 156 feet below the surface, or at elevations of 1,900 to 1,935 feet above sea-level. There is insufficient information at hand to determine if this horizon is continuous over all the outlined area. It appears improbable that the extent of this horizon is much larger than shown on the map. With the exception of the well on section 15 the wells tapping this horizon yield a supply of water that is sufficient for farm requirements. The water is hard and suitable for drinking and it is under some hydrostatic pressure.

The first water-bearing horizon that is definitely known to be in the Belly River formation occurs in the area that is outlined by the "D" boundary line on the accompanying map (Figure 1). The wells tapping this aquifer vary from 200 to 362 feet in depth, depending upon the elevation of the land surface, and the aquifer is tapped at elevations varying from 1,852 to 1,893 feet above sea-level. The areal extent of this sand aquifer, other than outlined on the accompanying map, is not known. The water obtained is soft, abundant in quantity, suitable for drinking and for stock, and is under considerable hydrostatic pressure.

The "E" boundary line outlines an area in which a few wells tap what is believed to be a continuous aquifer in the Belly River formation. These wells range in depth from 272 to 300 feet and tap the water-bearing horizon at elevations of 1,785 to 1,816 feet above sea-level. It is possible that this horizon may be correlated with that occurring in the "D" area, but if it is a different horizon it may underlie a considerably larger part of the township than shown. A large supply of water is available from the wells tapping this horizon. The water is soft and is under considerable hydrostatic pressure, rising to a point 20 to 30 feet below the surface. It is used for drinking and for stock but will probably be unsuitable

for irrigation. Some trouble is experienced with the fine sand particles partly clogging the well casings. There should be no difficulty in obtaining an adequate supply of water from the bedrock in this township.

Township 32, Range 21

The ground surface in the western part of this township is quite flat, but in the eastern part it becomes quite undulating and rolling. The lowest elevation of 2,135 feet occurs in the northeastern corner of the township. From this point it rises to 2,300 feet in the central part, from where it decreases to the west and south. With the exception of a small area in the east that is mantled by moraine the township is covered by glacial till or boulder clay. The covering of glacial drift is quite thin in some localities and coal outcrops in sections 14 and 23, where it was mined for a short period. The drift appears to be thicker in the western and southern parts of the township.

A few wells in the western and eastern parts of the township tap small pockets of sand and gravel at depths up to 35 feet below the surface. These wells yield only small amounts of water, and are usually dug in the vicinity of sloughs or depressions. Dry holes will undoubtedly be dug before a water-bearing pocket is encountered and farmers contemplating digging a shallow well should test with a small auger, as by this means a water-bearing deposit may be located with minimum expense and effort. This type of well is readily affected by rainfall and during periods of continued drought the supply is considerably diminished.

The "A" boundary line on the accompanying map outlines an area in which a number of wells obtain their supply from sand aquifers at depths ranging from 45 to 115 feet below the surface, or at elevations of 2,185 to 2,255 feet above sea-level. No dry holes were recorded within this area and it is possible that the aquifers may

be continuous, although they are more probably formed by scattered deposits of sand. In any event no great difficulty should be experienced in obtaining water in the southern half of the township. The supply from a few wells in this area is not sufficient for local needs, but this may be due to the fact that the wells were not dug deep enough, or the aquifer may be thinner at these particular well sites. The water from most of the wells is being used for drinking as well as for stock, although in a few it is quite highly mineralized.

A few wells in the northern part of the township obtain water at depths of 68 to 120 feet below the surface, or at elevations of 2,120 to 2,170 feet above sea-level. These wells are thought to tap individual pockets of sand or gravel, rather than a continuous aquifer in the glacial drift. The aquifers may be of small areal extent and dry holes may be dug in the vicinity of producing wells. With the exception of the well on section 33 the others yield a supply of water that is suitable for drinking and sufficient for local needs. Fragments of coal were encountered in some of the wells, but it is thought to have been transported with the glacial drift, and the wells probably have not encountered the coal-bearing Belly River formation.

In the area outlined by the "C" boundary line a number of wells obtain water from the Belly River formation. Coal was encountered in some of these wells and is part of the formation. The wells range in depth from 130 to 240 feet and the aquifers are tapped at elevations of from 2,050 to 2,135 feet above sea-level. It is possible that some of the wells in the northern part of the township tap a water-bearing horizon in the bedrock. The aquifers in this outlined area are composed of coal and sand beds. The water from two wells is soft and that from two others is hard, and it is probable that two distinct aquifers have been tapped. The water is suitable and sufficient for farm requirements. No difficulty

should be experienced in obtaining satisfactory supplies of water in the northern part of this township at elevations approximating 2,050 feet above sea-level.

STATISTICAL SUMMARY OF WELL INFORMATION IN PART OF RURAL MUNICIPALITY OF WINSLOW, NO. 319, SASKATCHEWAN.

West of 3rd meridian	Township	31	31	31	32	32	32	Total No. in Municipality
	Range	19	20	21	19	20	21	
Total No. of Wells in Township		49	31	18	37	21	39	195
No. of wells in bedrock		3	0	0	12	13	5	33
No. of wells in glacial drift		46	31	18	25	8	34	162
No. of wells in alluvium		0	0	0	0	0	0	0
Permanency of Water Supply								
No. with permanent supply		32	29	18	31	21	39	170
No. with intermittent supply		0	0	0	0	0	0	0
No. dry holes		17	2	0	6	0	0	25
Types of Wells								
No. of flowing artesian wells		3	1	0	0	1	0	5
No. of non-flowing artesian wells		10	16	15	21	19	33	114
No. of non-artesian wells		19	12	3	10	1	6	51
Quality of Water								
No. with hard water		24	26	17	18	8	35	128
No. with soft water		8	3	1	13	13	4	42
No. with salty water		0	1	0	1	0	0	2
No. with "alkaline" water		9	11	10	3	1	9	43
Depth of Wells								
No. from 0 to 50 feet deep		30	16	9	10	3	14	82
No. from 51 to 100 feet deep		10	13	9	8	2	16	58
No. from 101 to 150 feet deep		6	1	0	8	2	6	23
No. from 151 to 200 feet deep		0	1	0	5	2	1	9
No. from 201 to 500 feet deep		3	0	0	6	12	2	23
No. from 501 to 1,000 feet deep		0	0	0	0	0	0	0
No. over 1,000 feet deep		0	0	0	0	0	0	0
How the Water is Used								
No. usable for domestic purposes		29	23	15	29	20	31	147
No. not usable for domestic purposes		3	6	3	2	1	8	23
No. usable for stock		32	29	18	31	21	39	170
No. not usable for stock		0	0	0	0	0	0	0
Sufficiency of Water Supply								
No. sufficient for domestic needs		32	29	18	31	21	39	170
No. insufficient for domestic needs		0	0	0	0	0	0	0
No. sufficient for stock needs		21	24	15	28	19	30	137
No. insufficient for stock needs		11	5	3	3	2	9	33

ANALYSES AND QUALITY OF WATER

General Statement

Samples of water from representative wells in surface deposits and bedrock were taken for analyses. Except as otherwise stated in the table of analyses the samples were analysed in the laboratory of the Borings Division of the Geological Survey by the usual standard methods. The quantities of the following constituents were determined; total dissolved mineral solids, calcium oxide, magnesium oxide, sodium oxide by difference, sulphate, chloride, and alkalinity. The alkalinity referred to here is the calcium carbonate equivalent of all acid used in neutralizing the carbonates of sodium, calcium, and magnesium. The results of the analyses are given in parts per million--that is, parts by weight of the constituents in 1,000,000 parts of water; for example, 1 ounce of material dissolved in 10 gallons of water is equal to 625 parts per million. The samples were not examined for bacteria, and thus a water that may be termed suitable for use on the basis of its mineral salt content might be condemned on account of its bacteria content. Waters that are high in bacteria content have usually been polluted by surface waters.

Total Dissolved Mineral Solids

The term "total dissolved mineral solids" as here used refers to the residue remaining when a sample of water is evaporated to dryness. It is generally considered that waters that have less than 1,000 parts per million of dissolved solids are suitable for ordinary uses, but in the Prairie Provinces this figure is often exceeded. Nearly all waters that contain more than 1,000 parts per million of total solids have a taste due to the dissolved mineral matter. Residents

accustomed to the waters may use those that have much more than 1,000 parts per million of dissolved solids without any marked inconvenience, although most persons not used to highly mineralized water would find such waters highly objectionable.

Mineral Substances Present

Calcium and Magnesium

The calcium (Ca) and magnesium (Mg) content of water is dissolved from rocks and soils, but mostly from limestone, dolomite, and gypsum. The calcium and magnesium salts impart hardness to water. The magnesium salts are laxative, especially magnesium sulphate (Epsom salts, $MgSO_4$), and they are more detrimental to health than the lime or calcium salts. The calcium salts have no laxative or other deleterious effects. The scale found on the inside of steam boilers and tea-kettles is formed from these mineral salts.

Sodium

The salts of sodium are next in importance to those of calcium and magnesium. Of these, sodium sulphate (Glauber's salt, Na_2SO_4) is usually in excess of sodium chloride (common salt, NaCl). These sodium salts are dissolved from rocks and soils. When there is a large amount of sodium sulphate present the water is laxative and unfit for domestic use. Sodium carbonate (Na_2CO_3) "black alkali", sodium sulphate "white alkali", and sodium chloride are injurious to vegetation.

Sulphates

Sulphates (SO_4) are one of the common constituents of natural water. The sulphate salts most commonly found are sodium sulphate, magnesium sulphate, and calcium sulphate ($CaSO_4$). When the water contains large quantities of the sulphate of sodium it is injurious to vegetation.

Chlorides

Chlorides are common constituents of all natural water and are dissolved in small quantities from rocks. They usually occur as sodium chloride and if the quantity of salt is much over 400 parts per million the water has a brackish taste.

Iron

Iron (Fe) is dissolved from many rocks and the surface deposits derived from them, and also from well casings, water pipes, and other fixtures. More than 0.1 part per million of iron in solution will settle as a red precipitate upon exposure to the air. A water that contains a considerable amount of iron will stain porcelain, enamelled ware, and clothing that is washed in it, and when used for drinking purposes has a tendency to cause constipation, but the iron can be almost completely removed by aeration and filtration of the water.

Hardness

Calcium and magnesium salts impart hardness to water. Hardness of water is commonly recognized by its soap-destroying powers as shown by the difficulty of obtaining lather with soap. The total hardness of a water is the hardness of the water in its original state. Total hardness is divided into "permanent hardness" and "temporary hardness". Permanent hardness is the hardness of the water remaining after the sample has been boiled and it represents the amount of mineral salts that cannot be removed by boiling. Temporary hardness is the difference between the total hardness and the permanent hardness and represents the amount of mineral salts that can be removed by boiling. Temporary hardness is due mainly to the bicarbonates of calcium and magnesium and iron, and permanent harness to the sulphates and chlorides of calcium and magnesium. The permanent hardness

can be partly eliminated by adding simple chemical softeners such as ammonia or sodium carbonate, or many prepared softeners. Water that contains a large amount of sodium carbonate and small amounts of calcium and magnesium salts is soft, but if the calcium and magnesium salts are present in large amounts the water is hard. Water that has a total hardness of 300 parts per million or more is usually classed as excessively hard. Many of the Saskatchewan water samples have a total hardness greatly in excess of 300 parts per million; when the total hardness exceeded 3,000 parts per million no exact hardness determination was made. Also no determination for temporary hardness was made on waters having a total hardness less than 50 parts per million. As the determinations of the soap hardness in some cases were made after the samples had been stored for some time, the temporary hardness of some of the waters as they come from the wells probably is higher than that given in the table of analyses.

Analyses of Water Samples from Part of the Municipality of Winslow, No. 319, Saskatchewan.

LOCATION						Depth of well, Ft.	Total dis'vd solids	HARDNESS			CONSTITUENTS AS ANALYSED						CONSTITUENTS AS CALCULATED IN ASSUMED COMBINATIONS										Source of water
No.	Qtr.	Sec.	Tp.	Rge.	Mer.			Total	Perm.	Temp.	Cl.	Alka-linity	CaO	MgO	SO_4	Na_2O	Solids	$CaCO_3$	$CaSO_4$	$MgCO_3$	$MgSO_4$	Na_2CO_3	Na_2SO_4	NaCl	$CaCl_2$	$MgCl_2$	
1.	NW.	29	31	20	3	50	3,680	1,350	1,100	250	18	470	340	198	2,375	1,156	3,897	470	187		590		2,620	30			⁎1
2.	SE.	30	32	20	3	248	1,780	40			117	760	30	11	582	897	1,850	54		23		720	860	193			⁎2
3.	NW.	4	32	21	3	48	1,464											(1)	(5)	(2)	(6)				(3)	(4)	⁎1
4.	NE.	6	32	21	3	22	2,106												(2)		(4)	(3)	(1)	(5)			⁎2?

Water samples indicated thus, ⁎1, are from glacial drift.
Water samples indicated thus, ⁎2, are from bedrock, Belly River formation.
Analyses are reported in parts per million; where numbers (1), (2), (3), (4) and (5) are used instead of parts per million, they represent the relative amounts in which the five main constituents are present in the water.
Hardness is the soap hardness expressed as calcium carbonate ($CaCO_3$).
Analyses Nos. 3 and 4, by Provincial Analyst, Regina.
For interpretation of this table read the section on Analyses and Quality of Water.

Water from the Unconsolidated Deposits

One sample of water from the glacial drift in the municipality of Winslow was taken for analysis, and the results of this analysis and of a sample analysed by the Provincial Analyst are listed in the accompanying table. These samples have a total dissolved solid content of 3,680 and 1,464 parts per million. These waters are excessively hard. Sample 1 contains large amounts of sodium sulphate (Glauber's salt) and magnesium sulphate (Epsom salts) in solution, and the water will have a laxative effect upon those not accustomed to its use. If water of better quality is available this water should not be used for drinking, but it is satisfactory for stock. The water represented by sample 3 is satisfactory for drinking as well as for stock, the laxative salts not being present in large quantities. Most of the waters from the glacial drift will probably be similar to the samples analysed, but some undoubtedly contain more mineral salts in solution, as they produce scour among stock. The waters from a number of wells in the area outlined by the "A" boundary line were reported as being "alkaline", but they are being used for drinking without any apparent ill effects. Considerable amounts of iron occur in some of the waters from the drift. Much of this iron can be removed by aerating and filtering the water.

Water from the Bedrock

One sample, No. 2, of water from the Belly River formation, was collected by the field party and a sample, No. 4, believed to be from the same formation, was analysed by the Provincial Analyst in Regina. Sample No. 2 appears to be fairly representative of the soft water that is obtained from the bedrock in this municipality. It has a total dissolved solid content of 1,780 parts per million and a total hardness of 40 parts per million. The salts of sodium are abundant and the water may have a "soda" or a brackish taste.

This water is suitable for drinking and for stock, but the relatively large amount of sodium carbonate in solution renders it unfit for irrigation. Sample No. 4 is from a shallow depth, it contains a greater amount of calcium and magnesium salts than does sample No. 2, and the water is much harder. The waters derived from the bedrock, which are reported as hard, are probably somewhat similar in composition to sample No. 4. They are satisfactory for stock use and unless sodium sulphate and magnesium sulphate occur in large amounts they are suitable for drinking.

WELL RECORDS—Rural Municipality of WINSLOW NO. 319, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
1	NE.	1	31	19	3	Dug	20	2,385	- 15	2,370	15	2,370	Glacial sand	Soft,clear		D, S	Sufficient for local needs.
2	SE.	2	"	"	"	Dug	20	2,380	- 17	2,363	17	2,363	Glacial sand and gravel	Soft,clear	42	D, S	Sufficient for local needs.
3	SW.	2	"	"	"	Dug	28	2,325	- 23	2,302	23	2,302	Glacial gravel	Soft,clear		D, S	Sufficient for local needs.
4	NW.	5	"	"	"	Bored	80	2,305	- 76	2,229	76	2,229	Glacial sand	Hard,clear	42	D, S	Insufficient for local needs.
5	E½	7	"	"	"	Bored	90	2,300	- 60	2,240	90	2,210	Glacial drift	Hard,clear, iron,"alka-line"	41	D, S	Sufficient for local needs.
6	SW.	9	"	"	"	Dug	126	2,312	-110	2,202	126	2,186	Glacial sand	Hard,clear		D, S	Sufficient for local needs.
7	SW.	10	"	"	"	Bored	80	2,345	- 76	2,269	76	2,269	Glacial sand and gravel	Hard,clear, iron,"alka-line"	42	D, S	Insufficient for local needs.
8	NW.	10	"	"	"	Bored	125	2,305	- 85	2,220	120	2,185	Glacial sand	Hard,clear, iron,"alka-line"	42	D, S	Sufficient for local needs.
9	SE.	11	"	"	"	Dug	27	2,385	- 24	2,361	24	2,361	Glacial gravel and sand	Soft,"alka-line"		S	Sufficient for local needs.
10	SE.	13	"	"	"	Dug	18	2,400	- 10	2,390	10	2,390	Glacial sand	Soft,clear		D, S	Sufficient for local needs.
11	SW.	13	"	"	"	Dug	17	2,395	- 15	2,380	15	2,380	Glacial sand	Hard,clear	42	S	Insufficient for local needs.
12	NW.	13	"	"	"	Dug	44	2,380	- 42	2,338	42	2,338	Glacial sand	Hard,clear, iron		D, S	Insufficient for local needs; also two 15-foot wells; one 280 feet and four 20-foot dry holes.
13	NE.	13	"	"	"	Dug	16	2,390	- 15	2,375	15	2,375	Glacial sand	Hard,clear		D, S	Insufficient for local needs; also a 150-foot dry hole.
14	SW.	14	"	"	"	Bored	120	2,400	-112	2,288	120	2,280	Glacial sand	Hard,clear, iron,"alka-line"		D, S	Insufficient for local needs.
15	SE.	15	"	"	"	Bored	130	2,390	-120	2,270	130	2,260	Glacial sand	Hard,clear, iron,"alka-line"		D, S	Sufficient for local needs.
16	SW.	16	"	"	"	Dug	100	2,360	- 86	2,274	100	2,260	Glacial gravel	Hard,clear, iron,"alka-line"		D, S	Sufficient for local needs.
17	NW.	16	"	"	"	Bored	126	2,352	-120	2,232	120	2,232	Glacial sand	Hard,clear, soda		D, S	Insufficient for local needs.
18	NW.	16	"	"	"	Drilled	330	2,370	-130	2,240	330	2,040	Belly River sand	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
19	SE.	18	"	"	"	Dug	68	2,300	- 50	2,250	68	2,232	Glacial drift	Hard,clear		D, S	Sufficient for local needs.
20	NE.	18	"	"	"	Bored	60	2,310	- 55	2,255	55	2,255	Glacial sand	Hard,clear, iron		D, S	Sufficient for local needs.
21	SW.	22	"	"	"	Drilled	500	2,400									Dry hole base in bedrock.
22	SW.	25	"	"	"	Bored	60	2,430	- 45	2,385	45	2,385	Glacial sand	Soft,clear	42	D, S	Insufficient for local needs; also 9 dry holes.
23	SE.	27	"	"	"	Dug	14	2,360	- 11	2,349	11	2,349	Glacial sand and gravel	Hard,clear		D, S	Sufficient for local needs.
24	NW.	27	"	"	"	Bored	100	2,300	- 70	2,230	100	2,200	Glacial sand	Hard,clear, iron		D, S	Sufficient for local needs.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WINSLOW NO.319, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
25	W½.	29	31	19	3	Dug	4	2,250	0	2,250	4	2,246	Glacial drift	Hard,clear, "alkaline"		S	Sufficient for local needs.
26	SW.	30	"	"	"	Dug	15	2,380	- 13	2,367	13	2,367	Glacial sand	Hard,clear		D, S	Insufficient for local needs.
27	NW.	30	"	"	"	Dug	3	2,310	+ 1	2,311	0	2,310	Glacial gravel	Hard,clear, iron,"alka-line"	42	D, S	Good yield.
28	NE.	30	"	"	"	Spring		2,295	0	2,295	0	2,295	Glacial sand	Hard,clear		D, S	Sufficient for local needs.
29		32	"	"	"	Drilled	320	2,072	- 70	2,002	220	1,852	Belly River sand	Hard,clear	42	D, S	Sufficient for local needs.
30	NE.	35	"	"	"	Dug	18	1,985	+ 3	1,988	18	1,967	Glacial sand	Soft,clear, soda	42	D, S	Sufficient for local needs.
31	NE.	35	"	"	"	Dug	25	1,985	+ 3	1,988	25	1,960	Glacial sand	Soft,soda, clear	42	D, S	Sufficient for local needs.
1	SE.	1	31	20	3	Dug	40	2,315	- 37	2,278	37	2,278	Glacial sand	Hard,clear	42	D, S	Sufficient for local needs.
2	NE.	1	"	"	"	Dug	25	2,295	- 19	2,276	23	2,272	Glacial sand	Hard,clear	42	D, S	Sufficient for local needs.
3	NE.	2	"	"	"	Dug	28	2,290	- 24	2,266	24	2,266	Glacial sand	Hard,clear	42	D, S	Sufficient for local needs; also a spring on this quarter.
4	NE.	4	"	"	"	Bored	80	2,290	- 76	2,214	80	2,210	Glacial sand	Hard,clear, iron,"alka-line"	42	D, S	Insufficient for local needs.
5	NW.	7	"	"	"	Bored	65	2,210	- 30	2,180	30	2,180	Glacial sand	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
6	SW.	9	"	"	"	Spring		2,250	+ 1	2,251	0	2,250	Glacial gravel	Soft, clear	42	D, S	Sufficient for local needs.
7	SW.	10	"	"	"	Bored	58	2,230	- 28	2,202	51	2,179	Glacial drift	Hard,clear		D, S	Sufficient for local needs.
8	NE.	13	"	"	"	Bored	85	2,310	- 60	2,250	85	2,225	Glacial sand	Hard,clear		D, S	Sufficient for local needs.
9	SE.	14	"	"	"	Bored	60	2,310	- 55	2,255	60	2,350	Glacial sand	Hard,clear		D, S	Insufficient for local needs.
10	SW.	14	"	"	"	Dug	12	2,290	0	2,290			Glacial sand	Soft,clear		S	Sufficient for local needs. Flowing well in pasture.
11	NE.	14	"	"	"	Bored	82	2,310	- 32	2,278	82	2,228	Glacial sand	Hard,clear, iron		S	Sufficient for local needs.
12	NE.	15	"	"	"	Dug	40	2,325	- 20	2,305	40	2,285	Glacial gravel	Hard,clear, iron,"alka-line"	42	S	Sufficient for local stock needs.
13	NE.	16	"	"	"	Dug	20	2,260	- 18	2,242	18	2,242	Glacial sand	Hard,clear, iron,"alka-line"	42	S	Sufficient for local stock needs.
14	SW.	16	"	"	"	Bored	65	2,240	- 55	2,185	65	2,175	Glacial sand	Hard,clear, iron			
15	SE.	19	"	"	"	Bored	65	2,270	- 47	2,223	65	2,205	Glacial drift	Hard,clear, iron,"alka-line"		S	Sufficient for local needs.
16	SW.	19	"	"	"	Bored	75	2,280	- 55	2,225	75	2,205	Glacial sand	Hard,clear, iron,"alka-line"		D, S	Insufficient for local needs.
17	SW.	22	"	"	"	Bored	50	2,320	- 45	2,275	50	2,270	Glacial sand	Hard,clear, iron	42	D, S	Insufficient for local needs.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WINSLOW NO. 319, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
18	NW.	23	31	20	3	Dug	40	2,380	- 34	2,346	34	2,346	Glacial sand and gravel	Hard,clear		D, S	Sufficient for local needs; also a 50-foot dry hole.
19	NW.	24	"	"	"	Bored	120	2,400									Dry hole base in glacial sand.
20	NE.	26	"	"	"	Dug	5	2,315	- 2	2,313	2	2,313	Glacial sand	Hard,clear		D, S	Sufficient for 16 head stock.
21	SW.	28	"	"	"	Drilled	200	2,330	- 35	2,295	65	2,265	Glacial sand	Hard,clear, iron,"alkaline"		D, S	Sufficient for local needs.
22	NW.	29	"	"	"	Bored	50	2,300	- 40	2,260	50	2,250	Glacial sand	Hard,iron, clear,		D, S	Insufficient for local needs. #
23	SE.	30	"	"	"	Bored	70	2,300	- 55	2,245			Glacial drift	Hard,clear, salty,iron, "alkaline"		D, S	Sufficient for local needs.
24	NW.	30	"	"	"	Bored	80	2,290	- 55	2,235	80	2,210	Glacial sand	Hard,clear, iron,"alkaline"		D, S	Sufficient for local needs.
25	SW.	31	"	"	"	Bored	65	2,265	- 45	2,220	65	2,200	Glacial sand	Hard,clear, iron,"alkaline"		D, S	Sufficient for local needs.
26	SW.	33	"	"	"	Bored	85	2,290	- 70	2,220	85	2,205	Glacial drift	Hard,clear, iron,"alkaline"		S	Sufficient for local needs.
27	NE.	35	"	"	"	Bored	32	2,125	- 18	2,107	18	2,107	Glacial sand	Soft,clear		D, S	Sufficient for local needs.
28	SW.	36	"	"	"	Bored	50	2,200	- 40	2,160	46	2,154	Glacial sand	Hard,clear, iron	42	D, S	Sufficient for local needs.
1	NE.	12	31	21	3	Bored	75	2,220	- 68	2,152	75	2,145	Glacial drift	Hard,clear, iron,"alkaline"	42	D, S	Sufficient for 6 head stock only.
2	NW.	14	"	"	"	Dug	50	2,220	- 40	2,180	50	2,170	Glacial sand	Hard,clear	42	D, S	Oversufficient for local needs.
3	NW.	14	"	"	"	Dug & test auger	72	2,220	- 40	2,180	72	2,148	Glacial sand	Hard,clear, iron,"alkaline"	41	D, S	Sufficient for 8 head stock.
4	NE.	15	"	"	"	Dug & Bored	46	2,230	- 24	2,206	28	2,202	Glacial drift	Hard,clear, iron,"alkaline"	41	D, S	Sufficient for 10 head stock
5	NW.	18	"	"	"	Dug	40	2,225	- 15	2,210	40	2,185	Glacial sand	Hard,clear, iron,"alkaline"	42	S	Sufficient for 25 head stock.
6	SE.	20	"	"	"	Bored	50	2,250	- 15	2,235	50	2,200	Glacial sand	Hard,clear, iron,"alkaline"	41	D, S	Oversufficient for local needs.
7	NE.	21	"	"	"	Bored	60	2,240	- 20	2,220	60	2,180	Glacial sand	Hard,clear	42	D, S	Sufficient for local needs.
8	NE.	22	"	"	"	Bored	90	2,240	- 30	2,210	90	2,150	Glacial drift	Hard,clear, iron,"alkaline"	41	D, S	Oversufficient for local needs.
9	NW.	24	"	"	"	Dug	85	2,300	- 60	2,240	85	2,215	Glacial sand	Hard,clear, iron	41	S	Oversufficient for 12 head stock.
10	NE.	24	"	"	"	Bored	100	2,290	- 25	2,265	90	2,200	Glacial sand	Hard,clear	42	D, S	Sufficient for local needs.
11	NW.	26	"	"	"	Bored	100	2,250	- 50	2,200	90	2,160	Glacial sand	Hard,clear, "alkaline" iron	41	D, S	Sufficient for local needs.

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(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WINSLOW NO.319, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
12	SW.	27	31	21	3	Dug	21	2,260	- 13	2,247	21	2,239	Glacial sand	Soft,clear	42	D, S	Sufficient for 12 head stock.
13	SE.	30	"	"	"	Dug	35	2,245	- 30	2,215	35	2,210	Glacial sand	Hard,clear, iron,"alka-line"	42	S	Sufficient for 10 head stock.
14	SE.	30	"	"	"	Bored	50	2,260	- 35	2,225	50	2,210	Glacial drift	Hard,clear, "alkaline"	41	D, S	Sufficient for 35 head stock.
15	NW.	33	"	"	"	Bored	65	2,270	- 25	2,245	65	2,205	Glacial gravel	Hard,clear, "alkaline"		D, S	Sufficient for 30 head stock.
16	SW.	36	"	"	"	Bored	85	2,290	- 65	2,225	75	2,215	Glacial sand	Hard,clear, iron	41	D, S	Sufficient for local needs.
17	NE.	36	"	"	"	Bored	32	2,281	- 30	2,251	30	2,251	Glacial sand	Hard,clear	40	D, S	Sufficient for 8 head stock.
1	SE.	1	32	19	3	Dug	12	2,100	- 6	2,094	6	2,094	Glacial sand	Hard,clear	42	D, S	Also an 18-foot well here, 5 feet of water.
2	SW.	1	"	"	"	Dug	12	2,095					Glacial drift				
3	NW.	3	"	"	"	Bored	155	2,040	-147	1,893	155	1,885	Glacial gravel	Hard,clear	42	D, S	Insufficient for local needs.
4	SW.	6	"	"	"	Drilled	280	2,075	- 60	2,015	280	1,795	Belly River sand	Soft,clear	42	D, S	Sufficient for local needs.
5	NW.	6	"	"	"	Drilled	285	2,080	- 90	1,990	285	1,795	Belly River sand	Soft,cloudy	42	D, S	Sufficient for local needs.
6	W½.	8	"	"	"	Bored	150	2,090	-100	1,990	142	1,948	Glacial sand	Soft,clear, salty	42	S	
7	W½.	8	"	"	"	Drilled	307	2,090	- 40	2,050	297	1,793	Belly River sand	Soft,clear	42	D	Sufficient for local needs.
8	NE.	8	"	"	"	Drilled	268	2,090			268	1,822	Belly River sand	Hard,clear	42	D, S	Sufficient for local needs.
9	NW.	9	"	"	"	Bored	180	2,100	-170	1,930	180	1,920	Glacial sand	Soft clear	42	D, S	Sufficient for local needs.
10	SW.	10	"	"	"	Bored	150	2,055	-120	1,935	150	1,905	Glacial drift	Hard,clear	42	D, S	Insufficient for local needs.
11	NE.	15	"	"	"	Bored	100	2,000									Dry hole in glacial drift.
12	NW.	16	"	"	"	Bored	120	2,050	-110	1,940	110	1,940	Glacial sand	Hard,clear	42	D, S	Sufficient for local needs.
13	SE.	17	"	"	"	Drilled	160	2,080	-130	1,950	145	1,935	Glacial sand	Hard,clear	42	D, S	Sufficient for local needs.
14	NE.	17	"	"	"	Bored	120	2,090									Dry hole base in glacial drift; several dry holes here.
15	NE.	20	"	"	"	Bored	99	2,075	- 69	2,006	99	1,976	Belly River sand and coal	Hard,iron, cloudy,"al-kaline"	42	D, S	Sufficient for local needs.
16	SW.	21	"	"	"	Bored	115	2,075	-100	1,975	115	1,960	Glacial sand	Soft,clear, iron	42	D, S	Sufficient for local needs; also a similar well.
17	SE.	22	"	"	"	Bored	76	2,025	- 31	1,994	60	1,965	Glacial gravel and sand	Hard,clear, iron	42	D, S	Sufficient for lodal needs.
18	SW.	22	"	"	"	Bored	92	2,050	- 82	1,968	82	1,968	Glacial sand	Hard,clear	42	D, S	Sufficient for local needs.
19	SW.	23	"	"	"	Dug	40	1,980	- 10	1,970	40	1,940	Glacial sand	Hard,clear, "alkaline"	42	D, S	Sufficient for local needs.
20	NW.	24	"	"	"	Dug	15	1,985	- 5	1,980	15	1,970	Glacial gravel	Soft,clear	42	D, S	Sufficient for local needs; also a spring.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WINSLOW NO.319, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
21	NE.	27	32	19	3	Bored	75	2,040	- 55	1,985	75	1,965	Glacial gravel	Hard,clear, iron	42	D, S	Sufficient for local needs.
22	NW.	28	"	"	"	Drilled	204	2,060			187	1,873	Belly River sand	Soft			Oversufficient for local needs.
23	NE.	28	"	"	"	Drilled	150	2,040	- 48	1,992	150	1,890	Belly River silt	Soft,clear	42	D, S	Sufficient for local needs.
24	SE.	30	"	"	"	Drilled	183	2,070	- 35	2,035	170	1,900	Belly River sand	Soft,clear	42	D, S	Sufficient for local needs.
25	NW.	30	"	"	"	Bored	87	2,080	- 47	2,033	87	1,993	Glacial sand	Hard,clear, iron	42	D, S	Sufficient for local needs.
26	E½.	31	"	"	"	Bored	96	2,080	- 30	2,050	96	1,984	Glacial sand	Hard,cloudy, iron,"alka-line"	42	D, S	Sufficient for local needs.
27	NW.	31	"	"	"	Drilled	205	2,085	- 30	2,055	205	1,880	Belly River sand	Soft,clear	42	D, S	Sufficient for local needs.
28	W½.	32	"	"	"	Drilled	200	2,085	- 60	2,025	200	1,885	Belly River sand	Soft,clear	42	D, S	Sufficient for local needs.
29	SW.	33	"	"	"	Drilled	135	2,000	- 37	1,963	135	1,865	Belly River silt	Soft,clear		D, S	Sufficient for local needs.
30	SW.	35	"	"	"	Bored	100	2,000	- 60	1,940	100	1,900	Glacial sand	Hard,clear	42	D, S	Sufficient for local needs.
1	NE.	4	32	20	3	Dug	24	2,130	- 14	2,116	24	2,106	Glacial sand	Hard,clear	42	D, S	Sufficient for local needs.
2	SW.	5	"	"	"	Bored	70	2,280	- 60	2,220	60	2,220	Glacial sand	Hard,clear, iron	42	S	Insufficient for 8 head stock.
3	SE.	7	"	"	"	Drilled	362	2,205	-132	2,073	350	1,855	Belly River sand	Soft,clear	42	D, S	Sufficient for local needs.
4	SW.	10	"	"	"	Dug	22	2,100	- 8	2,092	22	2,078	Glacial sand	Hard,clear	43	D, S	Sufficient for local needs.
5	SW.	12	"	"	"	Drilled	275	2,060	- 55	2,005	275	1,785	Belly River sand	Soft,clear	42	D, S	Sufficient for local needs.
6	SE.	14	"	"	"	Drilled	300	2,040	- 9	2,031	300	1,740	Belly River sand	Soft,clear		D, S	Sufficient for local needs.
7	E½.	15	"	"	"	Bored	135	2,070	-128	1,942	135	1,935	Glacial sand	Hard,iron, cloudy		D, S	Insufficient for local needs.
8	NW.	16	"	"	"	Drilled	272	2,088	- 20	2,068	272	1,816	Belly River sand	Soft,clear	42	D, S	Sufficient for local needs.
9	SE.	18	"	"	"	Drilled	265	2,125	- 30	2,095	242	1,883	Belly River sand	Soft,cloudy	42	D, S	Sufficient for local needs.
10	SE.	20	"	"	"	Drilled	258	2,110	- 20	2,090	258	1,852	Belly River sand	Soft,clear	42	D, S	Sufficient for local needs.
11	SW.	21	"	"	"	Drilled	285	2,085	- 15	2,070	285	1,800	Belly River sand	Soft,clear	42	D, S	Sufficient for local needs.
12	SE.	22	"	"	"	Bored	102	2,070	- 87	1,983	102	1,968	Glacial sand	Hard,clear, iron	42	D, S	Sufficient for local needs.
13	SW.	22	"	"	"	Bored	98	2,078	- 82	1,996	98	1,980	Glacial sand	Hard,iron, cloudy	42	D, S	Sufficient for local needs.
14	NE.	24	"	"	"	Bored	156	2,046	-116	1,930	156	1,890	Glacial gravel	Hard,clear, "alkaline"	42	D, S	
15	NW.	26	"	"	"	Drilled	285	2,075	- 10	2,065	285	1,790	Belly River sand	Soft,clear	42	D, S	Sufficient for local needs.
16	SW.	28	"	"	"	Drilled	294	2,090	- 17	2,073	294	1,796	Belly River sand	Soft,clear	42	D, S	Sufficient for local needs.
17	NW.	28	"	"	"	Drilled	270	2,110	- 53	2,057	270	1,840	Belly River sand	Soft,clear	42	D, S	Sufficient for local needs.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WINSLOW NO. 319, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
18	SE.	30	32	20	3	Drilled	248	2,115	- 23	2,092	248	1,867	Belly River sand	Soft, clear	42	D, S	Sufficient for local needs. #
19	NE.	30	"	"	"	Drilled	232	2,125	- 30	2,095	232	1,893	Belly River sand	Soft, clear	42	D, S	Sufficient for local needs.
20	NW.	31	"	"	"	Dug	30	2,115	+ 2	2,117	30	2,085	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
21	SE.	36	"	"	"	Drilled	200	2,085	- 35	2,050	200	1,885	Belly River	Soft, clear	42	D, S	Sufficient for local needs.
1	SW.	1	32	21	3	Bored	70	2,295	- 54	2,241	70	2,225	Glacial drift	Hard, clear, "alkaline"	39	S	Sufficient only for 10 head stock.
2	NE.	2	"	"	"	Bored	80	2,303	- 66	2,237	80	2,223	Glacial sand	Hard, clear	39	D, S	Sufficient for 22 head stock.
3	NW.	3	"	"	"	Bored	48	2,290	- 22	2,268	48	2,242	Glacial sand	Hard, clear	39	D, S	Sufficient for 50 head stock.
4	NW.	4	"	"	"	Bored	48	2,262	- 18	2,244	48	2,214	Glacial sand	Hard, clear	39	D, S	Sufficient for 30 head stock. #
5	NE.	5	"	"	"	Dug	35	2,234	- 27	2,207	35	2,199	Glacial gravel	Hard, clear	41	D, S	Sufficient for 20 head stock.
6	NE.	6	"	"	"	Dug	22	2,236	- 19	2,217	19	2,217	Glacial sand	Hard, clear	38	D, S	Sufficient for 20 head stock; also a similar well with soft water. #
7	SE.	6	"	"	"	Bored	50	2,269	- 25	2,244	50	2,219	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
8	SE.	7	"	"	"	Dug	25	2,259	- 16	2,243	25	2,234	Glacial sand	Hard, clear	39	S	Insufficient for local needs.
9	NE.	8	"	"	"	Bored	46	2,239	- 26	2,213	46	2,193	Glacial sand	Hard, clear	39	D, S, I	Sufficient for 8 head stock.
10	NE.	9	"	"	"	Bored	75	2,299	- 25	2,274	75	2,224	Glacial drift	Hard, clear	40	D, S	Sufficient for local needs.
11	NE.	10	"	"	"	Bored	70	2,307	- 30	2,277	70	2,237	Glacial drift	Hard, clear	40	D, S	Sufficient for 16 head stock.
12	NW.	12	"	"	"	Bored	70	2,290	- 50	2,240	70	2,220	Glacial drift	Hard, clear, "alkaline"	39	S	Sufficient for 25 head stock; also a 30-foot seepage well.
13	SE.	12	"	"	"	Bored	75	2,300					Glacial drift			N	Water never fit for use.
14	SE.	13	"	"	"		80	2,275					Glacial drift			N	Not usable; also a 20-ffot well.
15		14	"	"	"	Spring							Glacial drift				Located in coulee.
16	SE.	15	"	"	"	Bored	70	2,290			70	2,220	Glacial drift	Hard, clear, "alkaline"	40	S	Sufficient for 12 head stock.
17	NE.	16	"	"	"	Drilled	212	2,319			209	2,110	Belly River coal	Soft, clear	41	D, S	Sufficient for local needs.
18	SE.	17	"	"	"	Bored	45	2,280	- 20	2,260	45	2,235	Glacial gravelly sand	Hard, clear, iron, "alkaline"	39	D, S	Sufficient for local needs.
19	SW.	18	"	"	""	Dug	35	2,290	- 20	2,270	35	2,255	Glacial sand	Soft, clear	43	D, S	Sufficient for 10 head stock.
20	NW.	18	"	"	"	Bored	125	2,290	- 20	2,270	125	2,165	Glacial sand	Hard, clear, iron, "alkaline"	41	S	Sufficient for local needs; also a 20-foot seepage well.
21	SW.	19	"	"	"	Bored	95	2,295			95	2,200	Glacial sand	Hard, clear, iron, "alkaline"	41	D, S	Sufficient for 25 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of WINSLOW NO. 319, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
22	NW.	19	32	21	3	Bored	67	2,290	- 47	2,243	67	2,223	Glacial drift	Hard,clear, "alkaline"	43	S	Sufficient for only 4 head stock.
23	SE.	20	"	"	"	Drilled	90	2,298	- 4	2,294	90	2,208	Glacial drift	Hard,clear	42	D, S	Sufficient for local needs.
24	NW.	21	"	"	"	Bored	90	2,290	- 40	2,250	90	2,200	Glacial sand	Hard,clear	39	D, S	Sufficient for 50 head stock.
25	SE.	24	"	"	"	Drilled	142	2,214	- 72	2,142	142	2,072	Belly River coal & sand	Hard,clear, iron	39	D, S	Sufficient for 25 head stock.
26	SE.	26	"	"	"	Bored	77	2,180	- 33	2,147	77	2,103	Glacial drift	Hard,clear, iron		D	Sufficient for domestic needs.
27	SW.	27	"	"	"	Drilled	240	2,290	- 80	2,210	240	2,050	Belly River sand	Soft	39	D, S	Sufficient for local needs.
28	NE.	28	"	"	"	Drilled	120	2,275	- 20	2,255	120	2,155	Glacial drift	Hard,clear		D, S	Sufficient for 30 head stock.
29	NW.	28	"	"	"	Bored	105	2,275	- 35	2,240	105	2,170	Glacial sand	Hard,clear, iron		D, S	Sufficient for 150 head stock.
30	SW.	30	"	"	"	Bored	114	2,295			114	2,181	Glacial sand	Hard,clear, iron,"alkaline"		D, S	Sufficient for local needs.
31	SW.	31	"	"	"	Drilled	179	2,273	- 14	2,259	179	2,094	Belly River sand	Soft,cloudy	40	D, S	
32	NE.	33	"	"	"	Bored	97	2,250	- 90	2,160	97	2,153	Glacial sand	Hard,clear, "alkaline"	39	S	Sufficient for 30 head stock.
33	SW.	34	"	"	"	Bored	130	2,265	-112	2,153	130	2,135	Belly River coal	Clear	42	S	Sufficient for 15 head stock.
34	NE.	35	"	"	"	Bored	68	2,190	- 48	2,142	68	2,122	Glacial gravel	Hard,clear	39	D, S	Sufficient for 100 head stock.
35	NE.	36	"	"	"	Test-auger	75	2,135	- 15	2,120	75	2,060	Glacial drift				Apparently struck a good aquifer but well was never dug.

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(#) Sample taken for analysis.