CANADA
DEPARTMENT OF MINES

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BUREAU OF ECONOMIC GEOLOGY

GEOLOGICAL SURVEY

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF TOUCHWOOD No. 248 SASKATCHEWAN

BY

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

Water Supply Paper No. 99

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GROUND WATER RESOURCES OF THE RURAL MUNICIPALITY OF TOUCHWOOD, NO. 248, 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.

Pervious 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 Touchwood consists of five full townships described as tp. 25, ranges 16, 17, and 18, and tps. 26, and 27, range 18, parts of tp. 26, ranges 16 and 17, parts of two fractional townships described as tp. 27, ranges 17, and 18, and tp. 27, range 16, all W. 2nd mer. The district under discussion is approximately 268 square miles in area. It surrounds Gordon and Muskowekwan Indian reserves, Nos. 86 and 85, totalling an area of 65 square miles. The centre of the area lies 52 miles north and 10 miles east of the city of Regina.

With the exception of a small area in the southeastern corner of township 25, range 18, which is mantled by glacial till or boulder clay, the entire municipality is covered by moraine. The ground surface is rough and hilly, there being a difference of 575 feet in topographic relief. The maximum elevation of 2,460 feet is attained in the Gordon Indian reserve and the minimum elevation of 1,875 feet occurs in the southwestern corner of the municipality. The highland area is part of Little Touchwood hills. Numerous undrained depressions, in the largest of which are located Bittern, Mission, Wolf, and Brice lakes, occur throughout the municipality. Loon creek drains the western part of the area and many small ravines occur also in the western part. Only the upper part of the drift mantle has been prospected for water-bearing horizons and only a few wells have been sunk to depths exceeding 50 feet.

Water-bearing Horizons in the Unconsolidated Deposits

The majority of the wells in this municipality are either dug in the bottoms of dry sloughs or at the edge of undrained depressions. In years of normal rainfall the supply of water from these wells is usually sufficient for household needs and a few head of stock. In periods of drought, however, the supply of water is usually insufficient and must be

supplemented from other sources.

A number of wells tap small, scattered deposits of sand and gravel that occur as pockets in the weathered zone or upper 30 feet of the drift. These pockets cannot be correlated from place to place and are not continuous even over small areas. Dry holes will no doubt be encountered before a producing deposit is tapped. The supply from these deposits is more dependable than that from the wells that obtain their supply by seepage from sloughs, but it is generally no more than sufficient for local needs. The water from nearly all the wells is being used for drinking. Two wells of this class, one located on sec. 19, tp. 25, range 16, and the other located on sec. 30, tp. 27, range 18, have an oversufficient supply and are used by many farmers during periods of continued drought.

In isolated localities of the municipality a few wells tap sand and gravel deposits that occur as pockets at depths ranging from 40 to 112 feet in the glacial drift. Little correlation can be established in the occurrence of these deposits and no continuous water-bearing horizon exists. A small group of wells in township 25, range 18, and another small group in township 27, range 18, appear, however, to tap a fairly continuous horizon, but this fact cannot be definitely established. In any event it is not continuous over a very large area and dry holes will no doubt be encountered within short distances of producing wells. Dry holes have already been sunk to depths ranging from 50 to 300 feet in different parts of the municipality. The supply from the deeper producing drift wells is not so largely dependant on the amount of annual precipitation and it is usually sufficient for local needs. In most cases the water is being used for domestic as well as stock needs.

When a sufficient supply of water for domestic needs can be obtained from a shallow well, it would seem advisable to excavate a dugout for the retention of run-off water that

could be used for stock. By using large, deep, dugouts for stock the acute water shortage in this municipality should be alleviated to some extent. From the data available it does not appear advisable to sink a well below 30 feet in depth, unless finances permit drilling to depths in excess of 100 feet.

Water-bearing Horizons in the Bedrock

The Marine Shale series is thought to underlie the unconsolidated deposits throughout the township. The depth at which this bedrock would be encountered is not known, but it is in excess of 300 feet in certain localities.

No wells are known to be obtaining water from the bedrock, but a dry hole in sec. 20, tp. 25, range 18, is reported to have encountered bedrock at an approximate depth of 250 feet. It is thought, however, that bedrock lies at greater depth than that reported. Water would doubtless be encountered in places in the bedrock if wells were drilled into it, but because of the expense involved and the uncertainty of obtaining water that is not highly mineralized, deep drilling in this municipality is not warranted. Farmers are recommended to excavate dugouts or construct small dams, if suitable sites are present, and retain the run-off waters for stock use.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 25, Range 16

The difference in topographic relief in this township amounts to 150 feet and the ground surface is rough and rolling. The surface is mantled by moraine and undrained depressions are numerous.

The large majority of wells in this township are receiving their supply of water from the weathered zone of upper 20 feet of the glacial drift. In places the wells tap small pockets of sand and gravel and the yield is sufficient for farm needs, but many wells are dug in old slough bottoms or at the edges of undrained depressions, and the supply is small and easily affected by drought conditions; the wells become totally dry when drought conditions are severe, and water must be hauled. In years of normal rainfall, however, no great difficulty should be experienced in obtaining adequate supplies of water from the shallow wells. Many of these wells have been deepened as the water table lowers and a supply again obtained. The water from wells that tap sand and gravel pockets is usually of good quality and can be used for drinking, but in a number of places the water from wells that are dug beside sloughs can be used only for stock. This is due not to the large amount of mineral salts in solution, but to the water being contaminated by surface waters. Dugouts are recommended as a method of collecting and storing run-off waters for stock use.

A well located on the NE.$\frac{1}{4}$, section 10, is drilled 150 feet below the surface and taps an aquifer at an elevation of 2,000 feet above sea-level. The areal extent of this aquifer is not known, but it is possible that it may be tapped in this vicinity by other wells. The water is under sufficient pressure to rise to a point 50 feet below the surface. It is hard, contains a large quantity of mineral salts in solution and is used only for stock.

In the SW.¼, section 25, a well encountered an aquifer at a depth of 206 feet or at an elevation of 1,949 feet. This aquifer may be the same as that encountered by the well located on the NE.¼, section 34, and a general water-bearing horizon may occur at an elevation of 1,950 to 2,000 feet. The water from the well on section 25 was not used and that from the well on section 34 is suitable only for stock. Other wells may locate water at these elevations.

Township 25, Range 17

This township is also mantled throughout by moraine. The ground surface varies from gently undulating to rough and hilly. The elevation decreases from 2,200 feet in the northeastern corner to 1,875 feet in the southwestern corner.

A few wells tap scattered pockets of sand and gravel at shallow depth in the drift and obtain a sufficient supply of water for farm needs, but the majority of the wells in this township are dug in the bottoms, or along the edges, of slough basins. Many of these wells yield an intermittent supply and water must be hauled for stock use, but with the exception of years of abnormal drought, they usually yield a sufficient supply for domestic purposes. The sloughs and lakes are used extensively for stock during summer months. Dugouts for the retention of run-off water could be used to advantage in this township.

One well located on the NW.¼, section 22, obtains a fair supply of water from a depth of 50 feet below the surface. However, it is probable that this aquifer is formed by a local pocket of sand and may not be continuous over a large area. Although some of the waters are recorded as being "alkaline" they are with few exceptions being used for drinking without any apparent ill effects. No wells have been drilled to greater depths, but water can probably be encountered in sand and gravel deposits at depths of 300 feet or less.

Township 25, Range 18

The surface of this township is gently rolling and the elevation decreases from 2,000 feet in the northeastern corner to approximately 1,900 feet on the south and southwest. Loon creek and other, small, intermittent streams flow towards the south. Most of the township is mantled by moraine, but a small area, about 1½ miles in width, extending from the southeastern corner to the centre of the township, is mantled by boulder clay or glacial till. Most of the wells in the southeastern half of this township and a few in the northwestern half obtain water from scattered pockets of sand and gravel that occur within the upper 30 feet of the glacial drift. The pockets are not continuous and no widespread water-bearing horizon is present. Dry holes may be encountered before a producing pocket is tapped. A few wells that are dug in or near sloughs, yield small quantities of water that are usually only sufficient for domestic use. The water from shallow wells is almost invariably suitable for drinking and varies from moderately soft to hard.

Two wells located on section 34 tap an aquifer at elevations of 1,893 and 1,900 feet above sea-level. Four wells on sections 17, 19, 20, and 28 tap an aquifer at elevations of 1,868, 1,858, 1,868, and 1,872 feet, respectively, or at depths ranging from 48 to 112 feet, depending upon the surface elevation. This water-bearing horizon appears to be continuous over a considerable area in the northwestern part of the township and can doubtless be encountered by other wells. A dry hole, however, was drilled to a depth of 300 feet on section 20, so the extent of the horizon to the east may be limited. The water is hard, and contains a considerable amount of mineral salts in solution, but is being used for all farm purposes. The supply is sufficient for local needs and the water is under considerable pressure.

An 86-foot well, located on the NW.¼, section 18, encountered an aquifer at an elevation of 1,819 feet above sea-level, but a dry hole, 100 feet in depth, on the same quarter section, would suggest that the producing well taps a pocket of sand of small areal extent. On the SW.¼, section 18, a well drilled to a depth of 175 feet tapped a gravel aquifer at an elevation of 1,775 feet above sea-level. This aquifer may be of considerable areal extent, but its limits can not be defined due to paucity of information. The water is ample for local farm needs, under some pressure, hard in quality, and is being used for drinking as well as for stock.

Township 26, Range 16

This township is mantled by the moraine that forms Touchwood hills. The northwestern part of the township is very hilly and attains an elevation of slightly more than 2,450 feet. The southeastern part is more undulating and the elevation decreases to 2,150 feet above sea-level. This township report does not include the area that embraces the Gordon Indian Reserve.

The producing wells in this township are not over 25 feet in depth, and they tap small, scattered pockets of sand and gravel in the upper part of the drift. In approximately one-half the wells the supply is sufficient only for domestic needs. Dry holes may be encountered before a producing pocket is tapped. When a sufficient supply of water for household needs can be obtained from shallow wells dug beside undrained depressions, it appears advisable to use dugouts for the storage of run-off waters for stock use. By this method the water shortage in this township may be somewhat alleviated. It is probable that pockets of sand or gravel occur at depth in the drift and will yield moderate supplies of highly mineralized water, should they be tapped by wells.

Township 26, Range 17

The Gordon Indian reserve on the northeast limits the area of this township to 17 square miles. The surface of the township is very rolling and small, undrained depressions are common throughout. The difference in topographic relief amounts to 450 feet, but the highlands, or Little Touchwood hills, occur in the Indian Reserve, attaining a maximum elevation of over 2,500 feet above sea-level. The township is mantled by moraine.

There are only a few wells in the area under discussion and they show little correlation, and no general water-bearing horizon appears to be present. Most of the wells are dug in or near sloughs and, therefore, are directly affected by drought conditions. Some wells, however, apparently tap pockets of sand and gravel, as their supply is sufficient for local needs throughout the year. The water from some of these wells is highly mineralized and is suitable only for stock.

Along the southern part of the township three holes were sunk to depths of 60, 127, and 149 feet below the surface without encountering a water-bearing deposit. Drilling deep wells in this township is not warranted because of the expense and the uncertainty of encountering water at depth in the drift. Farmers are, therefore, advised to use shallow seepage wells for domestic use, and to excavate deep dugouts for the collection and storage of run-off waters for stock use.

Township 26, Range 18

This township is also covered by moraine, and the surface which is very rough is characterized by many hillocks and undrained depressions. The difference in topographic relief amounts to approximately 150 feet, the maximum elevation of 2,050 feet occurring in the northeastern corner and the minimum

elevation of 1,900 feet in the southwestern corner. Loon creek, a small, intermittent stream, drains the western part of the township. A few small lakes occur in the southeastern corner.

With few exceptions the wells in this township are dug in the bottoms of dry sloughs or near the edge of undrained depressions, and are easily affected by the amount of annual precipitation. About one-half of these wells yield sufficient water for local needs, but the supply from the remainder must be supplemented from other sources. It is probable that those wells that are yielding enough water for local needs tap small pockets of sand or gravel. The water from a few wells is not used for drinking. It is advisable to prospect with a small test auger before digging a shallow well, as by so doing a water-bearing pocket of sand or gravel may be encountered with a minimum amount of effort and expense.

It should be possible to locate water-bearing deposits of sand and gravel along the valley of Loon creek, but very little information regarding the deposits underlying the surface in this area is available. One shallow well on the SW.$\frac{1}{4}$, section 30, in Loon Creek valley, yields a supply that is more than sufficient for local needs, and during the drought period of 1930-1934 it was used by a number of farmers.

A well on the NW.$\frac{1}{4}$, section 6, encountered an aquifer at a depth of 80 feet, or at an elevation of 1,875 feet above sea-level. The area underlain by this aquifer is not known, but it is possible that it is of small extent and is formed by a pocket of sand. The yield is more than sufficient for farm needs, and the water is hard, under some hydrostatic pressure, and is described as "alkaline", but it is being used for drinking. The use of dugouts for the retention of run-off water for stock needs is recommended. It should not be difficult to obtain sufficient water for domestic needs from shallow dug wells.

Township 27A, Range 16

This fractional township consists of an area of 4 square miles and it is mantled by moraine. In years of normal precipitation numerous lakes and sloughs occur throughout the area.

Only one well was recorded in this area and it is dug near a slough. Its supply is sufficient for local needs. No difficulty should be experienced in obtaining small supplies of ground water at shallow depths from wells dug near the sloughs, or from those that tap sand or gravel pockets in the drift. Water-bearing deposits may also occur at depth in the drift.

Township 27, Range 16

Moraine mantles this township; the surface is rough and is characterized by many knolls and depressions. In years of normal precipitation small lakes and sloughs are numerous. The township comprises an area of 24 square miles, an area on the southeast being set aside for the Muskowekwan Indian reserve. Most of the wells in this township are less than 30 feet deep, so that the water-bearing horizons in the drift have not been fully tested.

No general or continuous water-bearing horizons can be outlined in this township. A large number of shallow wells have been dug in the vicinity of undrained depressions and are easily affected by the amount of rainfall, becoming dry in periods of drought. In years of normal precipitation their supply is usually sufficient for domestic needs. Dugouts are recommended as a method of collecting and storing water for stock use.

A few wells tap small, isolated pockets of sand or gravel that occur in the upper 30 feet of the glacial drift, and these wells, although affected by drought conditions, usually yield a sufficient supply for local needs. There does not appear

to be any correlation or continuity between the pockets, and dry holes will probably be encountered before a producing pocket is tapped. The water is usually hard and can be used for drinking, as it does not contain a high concentration of mineral salts in solution.

Three wells located on the SW.$\frac{1}{4}$, section 18, NE.$\frac{1}{4}$, section 26, and NE.$\frac{1}{4}$, section 28, are obtaining water from depths of 60, 78, and 44 feet, respectively. These wells tap pockets of sand and gravel below the weathered zone of the glacial drift and the aquifers do not appear to be continuous over a large area, as dry holes have been sunk to depths of 60 feet. The supply from the well on section 26 is more than sufficient for local needs. The supply from the well on section 28 is insufficient, and the water from the well on section 18 is too highly mineralized to be used even for stock, although the yield is fairly abundant. Similar deposits will probably be encountered in the drift.

Township 27, Range 17

This fractional township has an approximate area of 22 square miles. It is mantled by moraine and the surface of the portion of the area that lies to the north of Gordon Indian reserve is very hilly, whereas the remainder of the township is undulating. In years of normal rainfall small sloughs and lakes are fairly common throughout the area.

Most of the wells in this township are dug near sloughs and are shallow in depth. These wells do not encounter an aquifer and derive their water by direct seepage from the sloughs. The amount of water available decreases as the sloughs become dry and in the autumn and winter months the supply is only sufficient for domestic needs. A few wells encounter water-bearing deposits of sand or gravel at shallow depths in the moraine and yield a sufficient supply for local needs. These

deposits do not appear to be continuous and dry holes have been dug before a sand deposit was encountered. Springs occur on sections 17, 20, and 30, and they yield an adequate supply of hard water.

One well located on the NW.$\frac{1}{4}$, section 23, is obtaining water from a deposit of sand or gravel at a depth of 80 feet. This well yields sufficient water for local needs. The deposit, however, is probably confined to a very limited area as a dry hole was dug to a depth of 85 feet on the quarter section, to the west. A dry hole was also dug to a depth of 110 feet on the SE.$\frac{1}{4}$, section 33. Unless one is prepared to drill to depths in excess of 100 feet, it does not appear advisable to dig wells deeper than 30 feet in an attempt to locate water in this township. Most of the waters are recorded as being hard and they are generally suitable for drinking. The use of dugouts for the retention of run-off water for stock, and shallow wells for domestic use, is recommended in this township.

Township 27, Range 18

The elevation of this township varies from 1,960 to 2,100 feet above sea-level, and the ground surface is moderately undulating to hilly. The township is covered by moraine. Loon creek, a small intermittent stream, occurs in the south-central part of the area.

Most of the wells in the township have been dug near sloughs and vary from 6 to 30 feet in depth. In years of abundant rainfall many of these wells yield sufficient water for local needs, but in drought periods the supply is small. It is probable that those wells that yield a sufficient supply tap small pockets of sand or gravel, whereas the others are merely dug into the clay and derive their supply by direct seepage from the sloughs. A few of the wells that are dug near sloughs are used only for stock, but the water from most of them is suitable for drinking.

In isolated sections of the township a few wells tap sand and gravel deposits that occur at depths of 110 feet or less from the surface. On sections 30, 31, and 32 an aquifer appears present at an elevation of 2,010 to 2,028 feet above sea-level, but it is not known if it is continuous over this area. Dry holes have been dug to a depth of 120 feet in the township, so it is not continuous over a large area. The water possibilities at depth in the glacial drift are unknown, as no wells have been drilled in excess of 120 feet in depth. It is advised that deep dugouts be made for the collecting and storing of run-off water for stock use and that shallow wells be used for domestic supply.

Muskowekan Indian Reserve No. 85 and

Gordon Indian Reserve No. 86

No information pertaining to the wells or the ground-water resources of the Muskowekwan and Gordon Indian reserves was collected during the field season, but the ground-water conditions of these reserves should be similar to those of the adjacent townships of the Rural Municipality of Touchwood.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL MUNICIPALITY OF Touchwood, NO.248, SASKATCHEWAN

	Township	25	25	25	26	26	26	27A	27	27	27	Total No. in Municipality
West of 2nd mer	Range	16	17	18	16	17	18	16	16	17	18	
Total No. of Wells in Township		110	83	57	40	27	32	1	34	33	51	468
No. of wells in bedrock		0	0	0	0	0	0	0	0	0	0	0
No. of wells in glacial drift		110	83	57	40	27	32	1	34	33	51	468
No. of wells in alluvium		0	0	0	0	0	0	0	0	0	0	0
Permanency of Water Supply												
No. with permanent supply		70	51	35	22	15	25	1	24	25	41	309
No. with intermittent supply		30	27	1	2	4	6	0	0	0	3	73
No. dry holes		10	5	21	16	8	1	0	10	8	7	86
Types of Wells												
No. of flowing artesian wells		0	0	0	0	0	0	0	0	0	0	0
No. of non-flowing artesian wells		3	1	8	0	0	1	0	3	1	4	21
No. of non-artesian wells		97	77	28	24	19	30	1	21	24	40	361
Quality of Water												
No. with hard water		93	75	34	23	17	27	1	23	22	40	355
No. with soft water		7	3	2	1	2	4	0	1	3	4	27
No. with salty water		0	0	0	0	0	0	0	0	0	0	0
No. with "alkaline" water		13	23	5	11	5	14	0	6	8	14	99
Depths of Wells												
No. from 0 to 50 feet deep		107	83	41	40	23	31	1	24	30	44	424
No. from 51 to 100 feet deep		0	0	13	0	2	1	0	10	2	3	31
No. from 101 to 150 feet deep		1	0	1	0	2	0	0	0	1	4	9
No. from 151 to 200 feet deep		0	0	1	0	0	0	0	0	0	0	1
No. from 201 to 500 feet deep		2	0	1	0	0	0	0	0	0	0	3
No. from 501 to 1,000 feet deep		0	0	0	0	0	0	0	0	0	0	0
No. over 1,000 feet deep		0	0	0	0	0	0	0	0	0	0	0
How the Water is used												
No. usable for domestic purposes		87	75	36	23	17	26	1	23	19	38	345
No. not usable for domestic purposes		13	3	0	1	2	5	0	1	6	6	37
No. usable for stock		99	78	36	24	19	31	1	23	24	44	379
No. not usable for stock		1	0	0	0	0	0	0	1	1	0	3
Sufficiency of Water Supply												
No. sufficient for domestic needs		65	51	35	22	15	26	1	24	24	41	304
No. insufficient for domestic needs		35	27	1	2	4	5	0	0	1	3	78
No. sufficient for stock needs		21	23	18	12	11	17	1	11	15	28	157
No. insufficient for stock needs		79	55	18	12	8	14	0	13	10	16	225

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.

Water from the Unconsolidated Deposits

No samples of water from the glacial drift in the municipality of Touchwood were taken for analysis. The water from wells that are dug beside sloughs is as a rule moderately soft. It is suitable for stock and although it is not highly mineralized it is advisable to have the water examined for bacteria before using it for domestic purposes as it may be contaminated by surface waters. Generally, however, these waters are being used for drinking.

The waters from wells that tap small pockets of sand and gravel at shallow depth in the drift are quite hard. They vary considerably in the amounts of mineral salts contained in solution and in certain localities their high mineral salt content renders them unfit for drinking. They are suitable for stock use.

The water from the deeper wells is hard and appears to contain more mineral salts in solution. In general it is usable for both domestic and stock purposes, but the water from a well on the SW.$\frac{1}{4}$, sec. 18, tp. 27, range 16, was unfit even for stock.

Water from the Bedrock

At the present time no water is being derived from the bedrock in this municipality. Should water be obtained from an aquifer in the bedrock it will probably be soft and contain a high concentration of sodium salts. It may prove to be too salty for drinking and will doubtless be unfit for irrigation.

WELL RECORDS—Rural Municipality of TOUCHWOOD NO. 248, 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	SW.	2	25	16	2	Dug	3	2,040	0	2,040	0	2,040	Glacial gravel	Hard,clear		D, S	Sufficient for 30 head stock; also a spring.
2	NW.	3	"	"	"	Dug	8	2,150	- 4	2,146	4	2,146	Glacial gravel	Soft,clear		D, S	Sufficient for 43 head stock.
3	NW.	4	"	"	"	Dug	14	2,145	0	2,145			Glacial clay	Hard,clear		D, S	Intermittent supply.
4	SW.	5	"	"	"	Dug	14	2,080	0	2,080			Glacial clay	Hard		D, S	Sufficient for 20 head stock; also 4 seepage wells by sloughs.
5	NE.	5	"	"	"	Dug	14	2,100	0	2,100			Glacial clay	Hard,clear		D, S	Insufficient for local needs.
6	SW.	6	"	"	"	Dug	14	2,065	0	2,065			Glacial drift	Hard,clear, "alkaline"		D, S	Intermittent supply; several similar wells.
7	NW.	7	"	"	"	Dug	16	2,100	0	2,100			Glacial clay	Hard,clear		D, S	Sufficient for 8 head stock.
8	SW.	7	"	"	"	Dug	20	2,090	0	2,090			Glacial clay	Hard,clear, "alkaline"		S	Intermittent supply; three similar wells.
9	NE.	8	"	"	"	Dug	22	2,140	- 20	2,120	20	2,120	Glacial sand	Hard,clear, "alkaline"		S	Sufficient for 50 head stock.
10	SE.	9	"	"	"	Dug	14	2,125	- 10	2,115	14	2,111	Glacial gravel	Hard,clear		D, S	Insufficient for local needs; also a similar well.
11	SE.	10	"	"	"	Dug	14	2,110					Glacial clay	Hard,clear		N	Intermittent supply.
12	NE.	10	"	"	"	Drilled	150	2,150	- 50	2,100	150	2,000	Glacial drift	Hard,clear, iron,"alkaline"		S	Sufficient for 60 head stock; also a shallow seepage well.
13	SW.	11	"	"	"	Dug	5	2,100	0	2,100	0	2,100	Glacial gravel	Hard,clear		D, S	Oversufficient for 30 head stock.
14	NW.	12	"	"	"	Dug	20	2,100	0	2,100			Glacial clay	Hard,clear		S	Intermittent supply.
15	NW.	13	"	"	"	Dug	12	2,140					Glacial drift	Hard,clear		D, S	Intermittent supply.
16	NE.	14	"	"	"	Dug	16	2,100	0	2,100			Glacial sand	Hard,clear, "alkaline"		D, S	Insufficient for local needs.
17	SW.	14	"	"	"	Dug	13	2,150	- 7	2,143	7	2,143	Glacial gravel	Soft,clear		D, S	Intermittent supply.
18	SE.	16	"	"	"	Dug	7	2,125	- 3	2,122	3	2,122	Glacial sand	Soft,clear		D	Sufficient for domestic needs only; similar well for stock in winter.
19	SW.	16	"	"	"	Dug	6	2,120	- 5	2,115	5	2,115	Glacial sand	Hard,clear		D	Sufficient for domestic needs.
20	SW.	17	"	"	"	Dug	12	2,150	- 9	2,141	9	2,141	Glacial sand	Hard,clear		D, S	Sufficient for 13 head stock.
21	NW.	17	"	"	"	Dug	10	2,140	- 7	2,133	7	2,133	Glacial sand	Hard,clear, iron		D, S	Sufficiont for 70 head stock.
22	NE.	17	"	"	"	Dug	14	2,140									Dry hole, base in glacial drift; several holes, some with a small quality water.
23	SE.	17	"	"	"	Dug	5	2,150	- 3	2,147	3	2,147	Glacial gravel	Hard,clear		D	Sufficiont for domestic needs only.
24	SW.	18	"	"	"	Dug	20	2,100	0	2,100			Glacial clay	Hard,clear		S	Intermittent supply, 3 similar wells.
25	SE.	18	"	"	"	Dug	14	2,150	0	2,150			Glacial clay	Hard,clear, "alkaline"		S	Insufficient for local needs; also a seepage well for domestic use.
26	SE.	19	"	"	"	Dug	12	2,160	- 10	2,150			Glacial clay	Hard,clear		N	Intermittent supply; also a 12-foot well beside a slough.
27	NW.	19	"	"	"	Dug	18	2,165	- 14	2,151	18	2,147	Glacial clay	Hard,clear		D	Intermittont supply; also another similar well.

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 ROUGHWOOD NO.248, 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
28	NE.	20	25	16	2	Dug	10	2,140	- 6	2,134	6	2,134	Glacial gravel	Hard,clear		D, S	Oversufficient for local needs.
29	SE.	20	"	"	"	Dug	10	2,140	- 5	2,135	5	2,135	Glacial gravel	Hard,clear		D, S	Sufficient for 21 head stock.
30	SW.	21	"	"	"	Dug	6	2,125	- 3	2,122	3	2,122	Glacial gravel	Hard,clear		N	
31	NW.	21	"	"	"	Dug	7	2,150	- 3	2,147	3	2,147	Glacial gravel	Hard,clear, "alkaline"		D, S	Sufficient for 13 head stock.
32	NE.	22	"	"	"	Dug	12	2,175	0	2,175			Glacial clay	Hard,clear		D, S	Intermittent supply; also a slough well and a 20-foot dry hole.
33	SW.	23	"	"	"	Dug	12	2,150	0	2,150	8	2,142	Glacial gravel	Hard,clear		D, S	Sufficient for 14 head stock.
34	NW.	23	"	"	"	Dug	14	2,170	0	2,170			Glacial clay	Hard,clear, "alkaline"		S	Intermittent supply fed by slough;hauls water in dry years.
35	SW.	24	"	"	"	Dug	6	2,090	- 4	2,086			Glacial sand	Soft,clear		D	Intermittent supply;well beside slough.
36	NE.	24	"	"	"	Dug	10	2,155			10	2,145	Glacial sand	Soft,clear		D	Intermittent supply; well in slough used for stock.
37	SE.	24	"	"	"	Dug	14	2,135	- 6	2,129			Glacial sandy clay	Hard,clear		D, S	Intermittent supply,near slough.
38	SW.	25	"	"	"	Dug	6	2,155	- 3	2,152	3	2,152	Glacialgravel	Hard,clear, "alkaline"		D, S	Sufficient for 25 head stock; also a 206-foot drilled well,poor water.
39	SE.	27	"	"	"	Dug	6	2,190	0	2,190			Glacial drift	Hard,clear		D, S	Intermittent supply; near slough.Two similar wells.
40	SE.	28	"	"	"	Dug	6	2,185	- 4	2,181	4	2,181	Glacial yellow clay	Hard,clear		D	Sufficient for domestic needs only;also a well in a slough.
41	SW.	28	"	"	"	Dug	15	2,150	- 9	2,141	9	2,141	Glacial gravel	Hard,clear		D, S	Oversufficient for 30 head stock.
42	NW.	28	"	"	"	Dug	20	2,175	0	2,175			Glacial clay	Hard,clear		D, S	Intermittent supply;near slough several dry holes.
43	NW.	30	"	"	"	Dug	16	2,175	- 13	2,162	13	2,162	Glacial sand	Soft,clear		D, S	Oversufficient for 50 head stock.
44	SE.	30	"	"	"	Dug	14	2,135	- 12	2,123			Glacial sand	Soft,clear		D, S	Sufficient for domestic needs only.
45	NW.	31	"	"	"	Dug	7	2,170	- 5	2,165	5	2,165	Glacial gravel	Hard,clear, "alkaline"		D, S	Sufficient for 40 head stock.
46	SW.	31	"	"	"	Dug	12	2,185	- 8	2,177			Glacial sand	Hard,clear, "alkaline"		D, S	Sufficient for 25 head stock.
47	NW.	32	"	"	"	Dug	12	2,165	- 9	2,156			Glacial gravel	Hard,clear		D, S	Sufficient for 30 head stock.
48	NE.	32	"	"	"	Dug	14	2,185	- 6	2,179			Glacial clay	Hard,clear		D	Sufficient for domestic needs only;well in slough for stock use.
49	NW.	34	"	"	"	Dug	17	2,150	- 4	2,146			Glacial drift	Hard,clear		D, S	Oversufficient for 6 head stock.
50	SW.	34	"	"	"	Dug	18	2,190	0	2,190			Glacial clay	Hard,clear, "alkaline"		N	Intermittent supply;near slough.
51	NE.	34	"	"	"	Drilled	225	2,180	-142	2,038	225	1,955	Glacial sand	Hard,clear, "alkaline" iron		S	Oversufficient for 60 head stock; use a shallow well for house use.
52	SE.	34	"	"	"	Dug	12	2,195	- 8	2,187			Glacial sand	Hard,clear		D	Sufficient for domestic needs only; have several wells in sloughs.
53	NE.	36	"	"	"	Dug	12	2,145	0	2,145			Glacial clay	Hard,clear		D	Sufficient for domestic needs only;well in slough for stock.

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 TOUCHWOOD NO. 248, 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
54	NW.	36	25	16	2	Dug	27	2,160	- 25	2,135	27	2,133	Glacial sand	Hard, clear		D, S	Insufficient for local needs.
55	SW.	36	"	"	"	Dug	16	2,160	- 1	2,159			Glacial drift	Hard, clear		D, S	Intermittent supply; several similar wells.
1	NE.	1	25	17	2	Dug	20	2,070	- 10	2,060	10	2,060	Glacial clay	Hard, clear, "alkaline"		D	Sufficient for domestic needs only; several wells in sloughs.
2	SW.	1	"	"	"	Dug	12	2,010	0	2,010			Glacial sand	Hard, clear		D, S	Sufficient for 19 head stock; several wells in sloughs.
3	SE.	2	"	"	"	Dug	7	2,000	- 4	1,996			Glacial drift	Hard, clear, "alkaline"		D, S	Intermittent supply; near slough. Several similar wells.
4	NE.	4	"	"	"	Dug	9	1,960	- 8	1,952			Glacial drift	Hard, clear, "alkaline"		D, S	Intermittent supply in slough.
5	NW.	4	"	"	"	Dug	10	1,950	- 6	1,944			Glacial drift	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
6	NE.	5	"	"	"	Dug	18	1,945	- 16	1,929	16	1,929	Glacial clay	Hard, clear		D, S	Sufficient for domestic needs only; also spring in dugout for stock.
7	SW.	5	"	"	"	Dug	10	1,900	- 6	1,894	6	1,894	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
8	SE.	8	"	"	"	Dug	10	1,965	- 6	1,959	6	1,959	Glacial drift	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
9	NE.	9	"	"	"	Dug	20	2,000	- 10	1,990			Glacial drift	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
10	NW.	10	"	"	"	Dug	14	1,995	- 11	1,984			Glacial drift	Hard, clear, "alkaline"		D, S	Intermittent supply; in slough.
11	SE.	10	"	"	"	Dug	18	2,012	- 8	2,004			Glacial drift	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
12	SW.	12	"	"	"	Dug	14	2,045	- 7	2,038	7	2,038	Glacial gravel	Soft, clear		D, S	Sufficient for 30 head stock.
13	NE.	12	"	"	"	Dug	20	2,100	- 2	2,098			Glacial clay	Hard, clear		D, S	Insufficient for local needs; several wells are used.
14	SW.	13	"	"	"	Dug	12	2,080	0	2,080			Glacial drift	Hard, cloar, "alkaline"		S	Intermittent supply; near slough; two similar wells.
15	SW.	14	"	"	"	Dug	14	2,082	- 2	2,080			Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
16	NW.	14	"	"	"	Dug	24	2,095	- 17	2,078	17	2,078	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for local needs; one well 12 feet deep in slough.
17	NW.	15	"	"	"	Dug	15	2,094	- 5	2,089			Glacial drift	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
18	NE.	16	"	"	"	Dug	16	2,042	- 14	2,028			Glacial clay	Hard, clear, "alkaline"		D, S	Intermittent supply, near slough; use slough for stock also.
19	SW.	17	"	"	"	Dug	16	1,955	- 6	1,949			Glacial clay	Hard, clear		D, S	Sufficient for local needs.
20	NW.	18	"	"	"	Bored	20	1,925	- 10	1,915	10	1,915	Glacial sand	Soft, clear		D, S	Sufficient for local needs.
21	NW.	19	"	"	"	Dug	16	1,930	- 13	1,917	13	1,917	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
22	SW.	20	"	"	"	Dug	14	2,000	- 12	1,988			Glacial clay	Soft, clear		D	Intermittent supply; near slough.
23	NW.	20	"	"	"	Dug	16	2,035	- 2	2,033			Glacial drift	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
24	NE.	20	"	"	"	Dug	12	2,040	- 10	2,030			Glacial drift	Hard, clear, "alkaline"		D, S	Sufficient for domestic needs only; similar 16-foot well for stock use.
25	NE.	21	"	"	"	Bored	30	2,142	- 15	2,127			Glacial clay	Hard, clear, "alkaline"		D, S	Sufficient for domestic needs only.

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 TOUCHWOOD NO.248, 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
26	SW.	22	25	17	2	Dug	15	2,065	- 2	2,063			Glacial drift	Hard,clear		D, S	Sufficient for domestic needs only.
27	NW.	22	"	"	"	Bored	50	2,126	- 10	2,116	50	2,076	Glacial sand	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
28	SE.	22	"	"	"	Dug	10	2,095	- 7	2,088			Glacial drift	Hard,clear		D, S	Sufficient for domestic needs only.
29	NW.	23	"	"	"	Dug	12	2,150	0	2,150			Glacial clay	Hard,clear, "alkaline"		S	Intermittent supply; near slough; several similar wells.
30	SW.	24	"	"	"	Dug	14	2,140	0	2,140			Glacial clay	Hard,clear		D, S	Sufficient for 35 head stock; several wells in sloughs.
31	NW.	24	"	"	"	Dug	14	2,140	0	2,140			Glacial clay	Hard,clear		D, S	Intermittent supply; near slough;several similar wells.
32	NE.	24	"	"	"	Dug	12	2,140	7	2,133	7	2,133	Glacial gravel	Hard,clear		D, S	Sufficient for 20 head stock.
33	NE.	26	"	"	"	Dug	10	2,190	0	2,190			Glacial clay	Hard,clear		S	Sufficient for 40 head stock.
34	SW.	26	"	"	"	Dug	7	2,160	0	2,160			Glacial clay	Hard,clear		D	Intermittent supply; near slough.
35	SW.	27	"	"	"	Dug	14	2,125	- 10	2,115	10	2,115	Glacial sand	Hard,clear, iron		D	Sufficient for domestic needs only; seepage well for stock.
36	SW.	30	"	"	"	Dug	10	1,975	- 7	1,968	7	1,968	Glacial sand	Hard,clear		D, S	Sufficient for local needs.
37	NE.	31	"	"	"	Dug	12	2,050	- 9	2,041	9	2,041	Glacial sand	Hard,clear		D, S	
38	NE.	32	"	"	"	Borod	35	2,142									Dry hole; base in glacial clay; several other dry holes.
39	SW.	34	"	"	"	Dug	18	2,146	- 14	2,132			Glacial drift	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
40	SE.	34	"	"	"	Dug	50	2,140	0	2,140			Glacial clay	Hard,clear, "alkaline"		S	Intermittent supply; near slough; several similar wells.
41	NE.	34	"	"	"	Borod	35	2,210	- 12	2,198			Glacial clay	Hard,clear		D	Sufficient for domestic needs only; also a well in slough for stock.
42	NW.	36	"	"	"	Dug	8	2,160	- 4	2,156	4	2,156	Glacial drift	Hard,clear		D, S	Sufficient for 9 head stock.
43	NE.	36	"	"	"	Dug	8	2,165	- 4	2,161			Glacial sand	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
1	SE.	1	25	18	2	Dug	7	1,875	- 4	1,871	4	1,871	Glacial sand	Hard,clear, "alkaline"		D, S	Sufficient for 22 head stock.
2	NW.	1	"	"	"	Dug	30	1,882	- 15	1,867			Glacial drift	Hard,clear		D, S	Sufficient for local needs.
3	SE.	2	"	"	"	Borod	22	1,895	- 20	1,875			Glacial clay	Hard,clear		D	Sufficient for domestic needs only.
4	NE.	2	"	"	"	Dug	20	1,885	- 14	1,871	14	1,871	Glacial gravel	Hard,clear, iron,"alkaline"		D, S	Sufficient for local needs.
5	NW.	2	"	"	"	Bored	60	1,890									Dry hole; base in glacial blue clay; several other dry holes.
6	SW.	5	"	"	"	Dug	30	1,887									Dry hole; base in glacial clay.
7	NW.	6	"	"	"	Dug	20	1,900	- 17	1,883	17	1,883	Glacial gravel	Soft,clear		D, S	Oversufficient for local needs.
8	NE.	9	"	"	"	Dug	8	1,890	- 2	1,888	2	1,888	Glacial gravel	Hard,clear		D, S	Intermittent supply; near slough.

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

WELL RECORDS—Rural Municipality of TOUCHWOOD NO.248, 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
9	NE.	11	25	18	2	Dug	20	1,900	- 9	1,891	9	1,891	Glacial gravel	Hard,clear		D, S	Sufficient for local needs.
10	SW.	12	"	"	"	Dug	20	1,900	- 15	1,885	15	1,885	Glacial sand	Hard,clear		D	Sufficient for domestic needs only; seepage well for stock.
11	NE.	13	"	"	"	Dug	12	1,920	- 7	1,913	7	1,913	Glacial sand	Soft,clear		D, S	Sufficient for 35 head stock.
12	NE.	14	"	"	"	Dug	9	1,888	- 6	1,882	6	1,882	Glacial gravel	Hard,clear		D, S	Sufficient for local needs.
13	SW.	16	"	"	"	Dug	22	1,910	- 18	1,892	18	1,892	Glacial sand	Hard,clear, iron		D, S	Sufficient for local needs.
14	NW.	17	"	"	"	Bored	80	1,948	- 40	1,908	80	1,868	Glacial gravel	Hard,clear, iron,"alka-line"		D, S	Sufficient for local needs.
15	SW.	18	"	"	"	Drilled	175	1,950	-100	1,850	175	1,775	Glacial gravel	Hard,clear		D, S	Sufficient for local needs.
16	NW.	18	"	"	"	Bored	86	1,905	- 81	1,824	86	1,819	Glacial sand	Hard,clear, iron,"alka-line"		D, S	Insufficient for local needs; 10 dry holes; deepest 100 feet.
17	SE.	19	"	"	"	Drilled	112	1,970	- 37	1,933	100	1,870	Glacial gravel	Hard,clear		D, S	Sufficient for 40 head stock.
18	SW.	20	"	"	"	Drilled	300	1,965									Dry hole; base probably in Bearpaw.
19	NE.	20	"	"	"	Bored	52	1,920					Glacial sand	Hard,clear, iron		D, S	Sufficient for local needs.
20	SE.	21	"	"	"	Dug	12	1,892	- 10	1,882	10	1,882	Glacial clay	Hard,clear, "alkaline"		D, S	Insufficient for local needs; several dry holes.
21	NW.	22	"	"	"	Dug	30	1,935	- 28	1,907	28	1,907	Glacial sand	Hard,clear		D, S	Insufficient for local needs; also several similar wells.
22	NW.	24	"	"	"	Dug	30	1,942	- 22	1,920			Glacial drift	Hard,clear		D, S	Sufficient for 50 head stock.
23	SE.	26	"	"	"	Dug	20	1,950	- 18	1,932	18	1,932	Glacial sand and gravel	Hard,clear		D, S	Sufficient for local needs.
24	NE.	26	"	"	"	Dug	50	2,018	- 48	1,970	48	1,970	Glacial sand	Hard,clear		S	Insufficient for local needs; similar well for domestic use.
25	NE.	27	"	"	"	Dug	12	1,900	- 6	1,894	6	1,894	Glacial sand	Hard,clear		D	Sufficient for domestic needs only.
26	SE.	28	"	"	"	Bored	48	1,920	- 8	1,912	48	1,872	Glacial sand	Hard,clear, iron		D, S	Sufficient for 30 head stock; also a 35-foot well, 20 feet of water.
27	NE.	30	"	"	"	Dug	18	1,910	- 15	1,895	15	1,895	Glacial gravel and sand	Hard,clear		D, S	Sufficient for local needs.
28	NW.	32	"	"	"	Dug	20	1,960	- 18	1,942	18	1,942	Glacial drift	Hard,clear		D, S	Sufficient for domestic needs only.
29	NE.	32	"	"	"	Dug	42	1,960	- 17	1,943	42	1,918	Glacial drift	Hard,clear, iron		D, S	Sufficient for local needs.
30	SW.	34	"	"	"	Bored	60	1,960					Glacial sand	Hard,clear		D, S	Sufficient for local needs.
31	NW.	34	"	"	"	Bored	65	1,958	- 60	1,998			Glacial clay	Hard,clear, "alkaline"		D, S	Insufficient for local needs.
1	SE.	2	26	16	2	Dug	16	2,155	- 8	2,147	8	2,147	Glacial sandy clay	Hard,clear		D	Sufficient for local needs.
2	SW.	2	"	"	"	Dug	16	2,156									Dry hole; base in glacial clay; several dry holes.
3	NE.	3	"	"	"	Dug	14	2,190	- 10	2,180			Glacial sand	Hard,clear		D, S	Sufficient for local needs.

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(*) Sample taken for analysis.

WELL RECORDS—Rural Municipality of TOUCHWOOD NO.248, 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
4	SW.	3	26	16	2	Dug	20	2,155	- 16	2,139	16	2,139	Glacial sand	Hard,clear, "alkaline"		D, S	Sufficient for domestic needs only; also a seepage well.
5	SW.	7	"	"	"	Dug	14	2,210	- 10	2,200			Glacial clay	Hard,clear, "alkaline"		D, S	Sufficient for domestic needs only.
6	NW.	9	"	"	"	Dug	14	2,200	- 12	2,188			Glacial clay	Hard,clear, "alkaline"		D, S	Intermittent supply.
7	NW.	10	"	"	"	Dug	12	2,200	- 8	2,192			Glacial clay	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
8	SE.	12	"	"	"	Dug	12	2,110	- 10	2,100	10	2,100	Glacial clay	Hard,clear		D	Sufficient for domestic needs only.
9	SE.	13	"	"	"	Dug	10	2,156	- 4	2,152			Glacial sand	Hard,clear		D, S	Sufficient for local needs.
10	NE.	13	"	"	"	Dug	18	2,175	- 2	2,173	2	2,173	Glacial sand	Hard,clear		D, S	Sufficient for local needs; dry holes to 25 feet deep.
11	NW.	13	"	"	"	Dug	12	2,195	- 4	2,191			Glacial sand	Hard,clear		D, S	Sufficient for local needs.
12	NE.	14	"	"	"	Dug	25	2,225									Dry hole; base in glacial drift; 6 similar dry holes.
13	NW.	14	"	"	"	Dug	10	2,180	- 8	2,172			Glacial drift	Hard,clear, "alkaline"		D, S	Intermittent supply.
14	SE.	22	"	"	"	Dug	18	2,180	- 10	2,170			Glacial gravel	Hard,clear, "alkaline"		D, S	Sufficient for 50 head stock.
15	NE.	22	"	"	"	Dug	12	2,200	- 7	2,193			Glacial clay	Hard,clear, "alkaline"		D, S	Sufficient for local needs; also a similar well.
16	SE.	23	"	"	"	Dug	10	2,205	- 8	2,197	8	2,197	Glacial clay	Hard,clear, "alkaline"		S	Sufficient for local needs; also similar wells.
17	NW.	24	"	"	"	Dug	14	2,200	- 12	2,188	12	2,188	Glacial sand	Hard,clear		D	Sufficient for domestic needs only.
18	SE.	25	"	"	"	Dug	14	2,200	- 12	2,188			Glacial sandy clay	Hard,clear		D	Sufficient for domestic needs only.
19	NW.	25	"	"	"	Dug	10	2,192	- 8	2,184	8	2,184	Glacial sand	Hard,clear		D, S	Sufficient for domestic needs only.
20	SE.	27	"	"	"	Dug	16	2,210	- 8	2,202			Glacial sand	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
21	NE.	35	"	"	"	Dug	15	2,220	- 11	2,209	11	2,209	Glacial gravel	Soft,clear		D, S	Sufficient for 15 head stock.
22	NE.	36	"	"	"	Dug	20	2,185	- 10	2,175			Glacial gravel	Hard,clear		D	Sufficient for local needs.
1	NE.	2	26	17	2	Dug	15	2,170	- 10	2,160			Glacial drift	Hard,clear, "alkaline"		S	Sufficient for local needs.
2	SW.	3	"	"	"	Bored	149	2,200									Dry hole; base in glacial clay; also two dry holes 86 and 127 feet deep.
3	SW.	4	"	"	"	Dug	12	2,135					Glacial clay	Hard, "alkaline"		D, S	Intermittent supply.
4	SE.	6	"	"	"	Dug	20	2,062	- 10	2,052			Glacial clay			D, S	Sufficient for local needs.
5	NE.	6	"	"	"	Bored	60	2,100									Dry hole; base in glacial clay; dry holes 10 to 16 feet deep.
6	SW.	6	"	"	"	Dug	15	2,000	- 13	1,987			Glacial clay	Hard,clear		D, S	Intermittent supply near slough.
7	SW.	7	"	"	"	Dug	16	1,962	- 8	1,954	8	1,954	Glacial sand	Hard,clear		D, S	Sufficient for 25 head stock.
8	NE.	7	"	"	"	Dug	28	2,100	- 18	2,082	18	2,082	Glacial sand	Hard,clear		D, S	Sufficient for local needs.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of TOUCHWOOD NO.248, 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
9	SE.	8	26	17	2	Dug	10	2,143					Glacial clay	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
10	SE.	10	"	"	"	Dug	12	2,190	- 9	2,181			Glacial clay	Hard,clear, "alkaline"		D, S	Intermittent supply, in slough.
11	SW.	17	"	"	"	Dug	15	2,100	- 14	2,086	14	2,086	Glacial sand	Hard,clear, "alkaline"		N	Insufficient for local needs.
12	NW.	18	"	"	"	Dug	12	2,000	- 6	1,994	6	1,994	Glacial gravel	Soft,clear		D, S	Sufficient for local needs.
13	NE.	19	"	"	"	Dug	14	2,065	- 10	2,055			Glacial clay	Soft,clear		S	Intermittent supply.
14	SE.	30	"	"	"	Dug	20	2,060	- 10	2,050			Glacial clay	Hard,"alkaline",clear		D, S	Insufficient for local needs; several similar seepage wells.
15	NE.	30	"	"	"	Dug	12	2,110	- 8	2,102			Glacial clay	Hard,clear		D, S	Sufficient for 25 head stock.
16	NW.	30	"	"	"	Dug	20	2,085	- 18	2,067			Glacial clay	Hard,clear		D, S	Intermittent supply.
17	SW.	32	"	"	"	Dug	18	2,058	- 3	2,055			Glacial clay	Hard,clear		D, S	Sufficient for local needs; also other similar wells.
1	NE.	2	26	18	2	Dug	14	1,955	- 12	1,943	12	1,943	Glacial sand	Hard,clear, "alkaline"		D, S	Sufficient for domestic needs only.
2	NW.	6	"	"	"	Bored	80	1,955	- 63	1,892	80	1,875	Glacial sand	Hard,"cloudy", "alkaline"		D, S	Oversufficient for 20 head stock; also a seepage well.
3	SE.	8	"	"	"	Dug	16	1,965	- 12	1,953			Glacial drift	Soft,clear		D, S	Sufficient for domestic needs only.
4	SW.	10	"	"	"	Dug	12	1,990	- 9	1,981			Glacial drift	Soft,clear		D, S	Sufficient for local needs.
5	NE.	10	"	"	"	Dug	15	2,035	- 10	2,025			Glacial drift	Hard,clear, "alkaline"		D, S	Intermittent supply.
6	SE.	12	"	"	"	Dug	14	1,972	- 12	1,960	12	1,960	Glacial sand	Hard,clear		D, S	Sufficient for local needs.
7	NE.	12	"	"	"	Dug	14	2,000	- 10	1,990			Glacial clay	Hard,clear		D, S	Sufficient for local needs; also a seepage well in a slough.
8	NE.	14	"	"	"	Dug	12	2,040	- 2	2,038			Glacial drift	Hard,clear, "alkaline"		D, S	Intermittent supply; also an 8-foot dry hole.
9	NW.	14	"	"	"	Dug	12	2,048	- 3	2,045			Glacial drift	Hard,clear, "alkaline"		D, S	Intermittent supply.
10	SE.	20	"	"	"	Dug	16	1,975	- 8	1,967			Glacial sand	Hard,clear		D, S	Sufficient for local needs.
11	NE.	20	"	"	"	Dug	10	1,980	- 8	1,972			Glacial drift	Hard,clear, "alkaline"		S	Insufficient for local needs.
12	SW.	22	"	"	"	Dug	12	2,020	- 8	2,012			Glacial drift	Hard,clear		D, S	Sufficient for local needs.
13	NW.	22	"	"	"	Dug	12	2,020	- 9	2,011			Glacial drift	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
14	SW.	24	"	"	"	Dug	14	2,080	- 2	2,078			Glacial drift	Hard,clear		D, S	Intermittent supply.
15	SE.	24	"	"	"	Dug	6	2,022	- 4	2,018	4	2,018	Glacial gravel	Soft,clear		D, S	Sufficient for local needs.
16	NE.	24	"	"	"	Dug	18	2,058	- 14	2,044	14	2,044	Glacial sand	Soft,clear		D, S	Sufficient for local needs; also a seepage well.
17	NE.	25	"	"	"	Dug	11	2,065	- 6	2,059			Glacial drift	Hard,clear		S	Sufficient for local needs.
18	SE.	26	"	"	"	Dug	16	2,050	- 8	2,042			Glacial clay	Hard,clear, "alkaline"		D, S	Intermittent supply.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of TOUCHWOOD NO.248, 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
19	NE.	27	26	18	2	Dug	10	2,000	- 9	1,991			Glacial drift	Hard, clear, "alkaline"		D, S	Intermittent supply.
20	SW.	28	"	"	"	Dug	12	2,000	- 9	1,991			Glacial clay	Hard, clear, "alkaline"		D, S	Intermittent supply.
21	NW.	28	"	"	"	Dug	6	2,062	- 3	2,059	3	2,059	Glacial clay	Hard, clear		D, S	Sufficient for local needs.
22	SW.	30	"	"	"	Dug	10	1,970	- 4	1,966	4	1,966	Glacial gravel	Hard, clear		D, S	Oversufficient for local needs.
23	NE.	31	"	"	"	Dug	8	1,995	- 2	1,993	2	1,993	Glacial gravelly clay	Hard, clear, "alkaline"		S	Sufficient for local needs; also a similar well.
24	SE.	32	"	"	"	Dug	15	2,060	- 12	2,048			Glacial drift	Hard, clear, "alkaline"		D, S	
25	NE.	34	"	"	"	Dug	10	2,060	- 5	2,055			Glacial drift	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
26	NW.	36	"	"	"	Dug	20	2,030	- 4	2,026			Glacial drift	Hard, clear, "alkaline"		S	Sufficient for local needs.
27	SE.	36	"	"	"	Dug	12	2,068	- 11	2,057	11	2,057	Glacial gravel and sand	Hard, clear,		D, S	Sufficient for 15 head stock.
28	NE.	36	"	"	"	Dug	10	2,055	- 7	2,048			Glacial clay	Hard, cloudy		S	Sufficient for local needs.
1	SW.	1	27A	16	2	Dug	15	2,275	- 5	2,270			Glacial drift	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
1	NW.	7	27	16	2	Dug	12	2,300	- 6	2,294			Glacial drift	Hard, clear		D, S	Sufficient for 10 head stock.
2	NE.	9	"	"	"	Dug	12	2,320	- 8	2,312			Glacial drift	Hard, clear		D, S	Sufficient for domestic needs only; also 4 dry holes 30 to 60 feet deep.
3	NE.	16	"	"	"	Dug	10	2,260	- 5	2,255			Glacial drift	Hard, clear		D, S	Sufficient for local needs.
4	NW.	17	"	"	"	Dug	12	2,240	- 7	2,233			Glacial drift	Hard, clear, "alkaline"		D, S	Sufficient for domestic needs only.
5	SW.	18	"	"	"	Bored	60	2,275	- 30	2,245	54	2,221	Glacial sand	Hard, clear, "alkaline"		N	Good supply; also a 30-foot well; water not usable.
6	NW.	18	"	"	"	Dug	50	2,280									Dry hole; base in glacial drift.
7	SW.	19	"	"	"	Dug	14	2,220	- 12	2,208			Glacial drift	Hard, clear		D, S	Sufficient for local needs.
8	SW.	20	"	"	"	Dug	8	2,250	- 5	2,245			Glacial drift	Hard, clear		D, S	Sufficient for local needs.
9	NE.	21	"	"	"	Dug	20	2,190	- 16	2,174	16	2,174	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
10	NW.	22	"	"	"	Dug	30	2,204	- 15	2,189			Glacial drift	Hard, clear		D, S	Sufficient for local needs.
11	SW.	24	"	"	"	Dug	12	2,185	- 4	2,181			Glacial clay	Hard, clear, "alkaline"		D, S	Sufficient for 16 head stock only.
12	NW.	24	"	"	"	Dug	12	2,180	- 4	2,176	4	2,176	Glacial sandy clay			D	Sufficient for domestic needs only.
13	NE.	26	"	"	"	Bored	78	2,125	- 8	2,117	64	2,061	Glacial sand	Hard, clear, iron		D, S	Sufficient for 65 head stock; also two wells 77 feet deep.
14	SE.	28	"	"	"	Bored	10	2,220	- 5	2,215			Glacial drift	Hard, clear		D, S	Sufficient for local needs.
15	NE.	28	"	"	"	Dug	44	2,170	- 14	2,156			Glacial sand	Soft, clear		D, S	Insufficient for local needs.
16	SW.	28	"	"	"	Dug	12	2,175	- 9	2,166			Glacial drift	Hard, clear		D, S	Sufficient for local needs.

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(*) Sample taken for analysis.

WELL RECORDS—Rural Municipality of TOUCHWOOD NO.248, 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
17	NW.	29	27	16	2	Dug	18	2,118	- 8	2,110			Glacial clay	Hard,clear		D, S	Sufficient for 20 head stock.
18	SW.	30	"	"	"	Dug	20	2,125	- 10	2,115			Glacial drift	Hard,clear, "alkaline"		D, S	Sufficient for domestic needs only; also 5 dry holes over 60 feet deep.
19	SE.	31	"	"	"	Dug	14	2,122	- 8	2,114			Glacial clay	Hard,clear, "alkaline"		D	Insufficient for local needs.
20	NE.	31	"	"	"	Dug	20	2,112	- 17	2,095			Glacial clay	Hard,clear, "alkaline"		D, S	Sufficient for domestic needs only.
21	SW.	36	"	"	"	Dug	15	2,142	- 7	2,135			Glacial clay	Hard,clear, "alkaline"		D, S	Insufficient for local needs.
22	NE.	36	"	"	"	Dug	8	2,132	- 5	2,127			Glacial clay	Hard,clear		D, S	Insufficient for local needs.
1	SE.	5	27	17	2	Dug	12	2,100	- 4	2,096			Glacial clay	Hard,clear, "alkaline"		N	Poor supply.
2	SE.	6	"	"	"	Dug	8	2,050	- 5	2,045			Glacial clay	Soft,clear		D, S	Sufficient for local needs.
3	SE.	7	"	"	"	Dug	20	2,060	- 19	2,041			Glacial clay	Hard,clear, "alkaline"		D	Insufficient for local needs.
4	SW.	8	"	"	"	Dug	10	2,035	- 6	2,029	6	2,029	Glacial sand	Hard,clear		S	Sufficient for 30 head stock.
5	NE.	8	"	"	"	Dug	12	2,092	- 8	2,084			Glacial clay	Hard,clear		D, S	Sufficient for local needs.
6	SE.	17	"	"	"	Dug	16	2,092	- 12	2,080			Glacial clay	Soft,clear		D	Insufficient for local needs.
7	SW.	17	"	"	"	Dug	9	2,060	- 6	2,054			Glacial gravel	Hard,clear		S	Sufficient for 100 head stock.
8	NW.	17	"	"	"	Dug	12	2,030	- 6	2,024			Glacial sand	Hard,clear		D, S	Sufficient for local needs.
9	NW.	19	"	"	"	Dug	16	2,045	- 8	2,037			Glacial drift	Hard		S	Sufficient for local needs.
10	SW.	20	"	"	"	Bored	39	2,058	- 30	2,028			Glacial clay	Hard,clear		D, S	Sufficient for local needs; also a spring.
11	NW.	20	"	"	"	Dug	16	2,081	- 10	2,071			Glacial sand	Hard,clear		D, S	Sufficient for local needs.
12	NE.	21	"	"	"	Dug	16	2,120	- 14	2,106			Glacial clay	Hard,clear, "alkaline"		D, S	Insufficient for local needs.
13	SE.	22	"	"	"	Bored	14	2,218	- 12	2,206			Glacial clay	Hard,"alkaline"		N	
14	NE.	22	"	"	"	Bored	85	2,200									Dry hole; base in glacial drift.
15	NW.	23	"	"	"	Dug	80	2,190	- 70	2,120	80	2,110	Glacial drift	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
16	NW.	26	"	"	"	Dug	16	2,142	- 14	2,128			Glacial sand	Hard,clear		D, S	Insufficient for local needs.
17	NE.	27	"	"	"	Dug	12	2,146					Glacial clay	Hard,clear, "alkaline"		S	Insufficient for local needs.
18	SE.	28	"	"	"	Dug	12	2,106	- 10	2,096			Glacial drift	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
19	NE.	28	"	"	"	Dug	20	2,048	- 6	2,042			Glacial drift	Hard,clear, "alkaline"		D, S	Sufficient for local needs; also a 12-foot seepage well.
20	SE.	30	"	"	"	Dug	17	2,082	- 13	2,069	13	2,069	Glacial sand	Hard,clear		D, S	Insufficient for local needs; also a spring on this quarter.
21	SE.	31	"	"	"	Dug	12	2,056	- 10	2,046			Glacial clay	Soft,clear		D, S	Insufficient for 18 head stock.

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 TOUCHWOOD NO.248, 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	SE.	32	27	17	2	Dug	18	2,073	- 4	2,069			Glacial drift	Hard,clear		D, S	Sufficient for 30 head stock.
23	SE.	33	"	"	"	Bored	110	2,062									Dry hole; base in glacial drift; also 6 dry holes 30 to 60 feet deep.
24	NW.	35	"	"	"	Dug	16	2,162	- 12	2,150			Glacial sand	Hard,clear		D, S	Sufficient for local needs.
1	SE.	2	27	18	2	Dug	12	2,042	- 7	2,035	7	2,035	Glacial sand	Soft,clear		D, S	Sufficient for local needs.
2	NW.	2	"	"	"	Dug	20	2,040	- 12	2,028			Glacial sand	Hard,clear		D, S	Sufficient for local needs; also 2 dry holes 115 and 127 feet deep.
3	NE.	4	"	"	"	Dug	15	2,000	- 13	1,987	13	1,987	Glacial gravel	Hard,clear		D, S	Insufficient for local needs.
4	SW.	4	"	"	"	Dug	12	2,008	- 7	2,001	7	2,001	Glacial gravel	Hard,clear		D, S	Sufficient for local needs.
5	NW.	4	"	"	"	Dug	50	2,058	- 48	2,010			Glacial clay	Hard,clear, "alkaline"		N	
6	SE.	5	"	"	"	Dug	16	2,000	- 4	1,996	4	1,996	Glacial gravel	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
7	NW.	6	"	"	"	Dug	45	2,005	0	2,005			Glacial clay	Hard,clear		D, S	Intermittent supply, in slough.
8	SW.	7	"	"	"	Dug	16	2,000	- 11	1,989	11	1,989	Glacial sand	Hard,clear		D, S	Oversufficient for 40 head stock.
9	SE.	7	"	"	"	Bored	20	2,025	- 12	2,013			Glacial clay	Hard,clear, "alkaline"		D, S	Sufficient for domestic needs only.
10	NE.	7	"	"	"	Dug	26	2,026	- 2	2,024			Glacial drift	Hard,clear		D, S	Intermittent supply, in slough; also a number of dry holes to 80 feet deep.
11	NW.	8	"	"	"	Bored	110	2,042	- 50	1,992	50	1,992	Glacial sand	Hard,iron, clear, "alkaline"		S	Sufficient for local needs.
12	NE.	9	"	"	"	Dug	10	2,050	- 8	2,042			Glacial clay	Hard,clear, "alkaline"		D, S	Insufficient for local needs.
13	SE.	10	"	"	"	Dug	15	2,035	- 11	2,024			Glacial clay	Hard,clear		D, S	Sufficient for domestic needs only.
14	SE.	14	"	"	"	Dug	30	2,070	- 28	2,042			Glacial clay	Hard,clear		D, S	Sufficient for domestic needs only.
15	NE.	14	"	"	"	Dug	15	2,035	- 9	2,026			Glacial sand	Hard,clear		D, S	Sufficient for local needs.
16	NW.	15	"	"	"	Dug	10	2,016	- 5	2,011			Glacial sand	Hard,clear		D, S	Sufficient for local needs.
17	NE.	16	"	"	"	Dug	12	2,018	- 4	2,014			Glacial clay	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
18	NE.	18	"	"	"	Dug	20	2,028	- 16	2,012			Glacial clay	Hard,clear		D, S	Sufficient for domestic needs only.
19	SW.	20	"	"	"	Bored	60	2,038	- 56	1,982			Glacial clay	Hard,clear, "alkaline"		S	Intermittent supply; shallow seepage well for domestic use.
20	NW.	20	"	"	"	Bored	60	2,038					Glacial drift	Hard,clear, "alkaline"		S	Insufficient for local needs.
21	SE.	20	"	"	"	Dug	12	2,020	- 4	2,016			Glacial drift	Hard,clear		D, S	Sufficient for local needs.
22	NE.	20	"	"	"	Dug	25	2,035	- 20	2,015	20	2,015	Glacial sand	Hard,clear		D, S	Sufficient for 20 head stock.
23	NW.	21	"	"	"	Dug	14	2,030	- 8	2,022	8	2,022	Glacial gravel	Hard,clear		S	Sufficient for local needs.
24	NW.	22	"	"	"	Dug	12	2,054	- 4	2,050			Glacial clay	Hard,clear, "alkaline"		D, S	Sufficient for local needs.

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

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of TOUCHWOOD NO.248, 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	NE.	23	27	18	2	Dug	6	2,032	- 3	2,029	3	2,029	Glacial sand	Hard,clear, "alkaline"		S	
26	NW.	24	"	"	"	Dug	7	2,040	- 3	2,037			Glacial drift	Hard,clear		D, S	Sufficient for local needs.
27	NE.	24	"	"	"	Dug	10	2,030	- 4	2,026			Glacial gravel	Hard,clear		D	Sufficient for local needs.
28	SW.	25	"	"	"	Dug	7	2,125	- 4	2,121	4	2,121	Glacial sand	Hard,clear		D, S	Sufficient for local needs.
29	SE.	26	"	"	"	Dug	8	2,055	- 3	2,052			Glacial drift	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
30	NE.	26	"	"	"	Dug	22	2,058	- 14	2,044	14	2,044	Glacial sand	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
31	SW.	28	"	"	"	Bored	22	2,050	- 3	2,047	3	2,047	Glacial sand	Hard,clear		D, S	Sufficient for domestic needs only; several dry holes; one 120 feet deep.
32	NW.	28	"	"	"	Dug	12	2,050	- 4	2,046			Glacial drift	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
33	NW.	29	"	"	"	Dug	12	2,030	- 8	2,022			Glacial drift	Soft,clear		D, S	Sufficient for 60 head stock.
34	SE.	30	"	"	"	Dug	18	2,036	- 16	2,020			Glacial clay	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
35	NE.	30	"	"	"	Bored	50	2,078	- 35	2,043	48	2,030	Glacial sand	Hard,clear		N	Good supply.
36	SW.	30	"	"	"	Dug	9	1,995	- 7	1,988	7	1,988	Glacial sand	Soft,clear		D, S	Oversufficient for local needs.
37	NW.	30	"	"	"	Dug	18	1,995	- 15	1,980			Glacial sand	Soft,clear		D, S	Insufficient for local needs.
38	NE.	31	"	"	"	Bored	35	2,050	- 26	2,024	32	2,018	Glacial sand	Hard,clear		D, S	Sufficient for 25 head stock.
39	SW.	32	"	"	"	Bored	34	2,048	- 24	2,024	32	2,016	Glacial sand	Hard,clear		D, S	Sufficient for 15 head stock.
40	NE.	32	"	"	"	Bored	50	2,060					Glacial drift	Hard,clear		D, S	Sufficient for local needs.
41	SE.	34	"	"	"	Dug	12	2,030	- 8	2,022	8	2,022	Glacial sand	Hard,clear		D, S	Sufficient for 50 head stock.
42	SW.	36	"	"	"	Dug	8	2,038	- 4	2,034			Glacial sand	Hard,clear		D, S	Sufficient for local needs.
43	NW.	36	"	"	"	Dug	6	2,052	- 1	2,051	1	2,051	Glacial sand	Hard,clear		D, S	Sufficient for 45 head stock.

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.