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GEOLOGICAL SURVEY OF CANADA  
WATER SUPPLY PAPER No. 216

PRELIMINARY REPORT  
GROUND-WATER RESOURCES  
OF THE  
RURAL MUNICIPALITY OF MARRIOTT  
NO. 317  
SASKATCHEWAN

By  
B. R. MacKay, H. N. Hainstock and G. Graham



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CANADA  
DEPARTMENT OF MINES  
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GEOLOGICAL SURVEY

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OF MARRIOTT  
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B.R. MacKAY, H.N. HAINSTOCK, and GEO. GRAHAM

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Figure 1. Map showing surface and bedrock geology that affect the ground water supply.

Figure 2. Map showing relief and the location and types of wells.

GROUND WATER RESOURCES OF PART OF THE RURAL MUNICIPALITY  
OF MARRIOTT, NO.317  
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 given 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.<sup>1</sup> 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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<sup>1</sup> 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.

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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 rests 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 Marriott, No. 317, comprises an area of 324 square miles, the centre of which lies 3 miles east and 17 miles north of the town of Rosetown. The area consists of nine full townships, described as tps. 31, 32, and 33, ranges 13, 14, and 15, W. 3rd mer. Of these only townships 31 and 32, ranges 13, 14, and 15, were investigated by the field party in 1935 and are discussed in this report. The Saskatoon-Calgary branch of the Canadian National railways traverses the southeastern corner of the area and the town of Zealandia is situated on this line to the south of sec. 2, tp. 31, range 13. A branch line of the Canadian Pacific railway runs in a general north-south direction near the centre of the area and on it are located the hamlets of Malmgren and Marriott. The municipality is also served by provincial highways Nos. 7 and 31.

The most prominent topographic feature of the area under discussion is the valley of Eaglehill creek. This creek enters the municipality near the southwestern corner of township 31, range 14, and leaves near the northeastern corner of township 31, range 13. In some parts of the area the valley is more than a mile wide, and the valley walls are fairly steep. In drought periods the creek becomes completely dry. A few, small, intermittent streams drain into Eaglehill creek. In general, the surface of the municipality is only slightly rolling but in a few areas it is rough and hilly. There is a maximum relief of over 525 feet, the elevation of the bottom of Eaglehill valley, where it leaves the municipality, being less than 1,825 feet above sea-level, and that of a small area in the northwestern corner being in excess of 2,350 feet above sea-level.

With the exception of the northwestern part of township 32, range 15, which is overlain by moraine, the area is mantled by boulder clay or glacial till. The boulder clay occurs at the surface in the western part of the area and along the valley of Eaglehill creek and elsewhere it is covered by glacial lake deposits. In the northern part of the area the glacial lake deposits are mainly sands, but in the southern part they are clays.

It has been impossible to outline any general or continuous water-bearing horizons in either the glacial drift or the underlying bedrock in this municipality. The water-bearing deposits in the glacial drift are discontinuous, and little information is available regarding the aquifers in the bedrock.

#### Water-bearing Horizons in the Unconsolidated Deposits

Since no general or continuous water-bearing horizons are thought to exist in the glacial drift, the water conditions in this area will be more readily understood if discussed under the different glacial deposits. Regardless of the type of glacial deposit the possibility of obtaining small quantities of water from wells sunk near sloughs, undrained depressions, and impounded waters, or in ravines, is fairly good. In years of normal rainfall such wells will often yield supplies adequate for domestic needs and a few head of stock. The water derived from these wells is usually moderately soft and not highly mineralized. Care should be taken to see that they do not become polluted by surface waters containing animal refuse, and the waters should be tested frequently for bacteria content.

The glacial lake sands and sandy silts that cover a large area in townships 32, ranges 13 and 14, and a smaller area in township 31, range 13, have proved a fair source of

supply in this municipality. A number of wells obtain water from these deposits at depths of 12 to 30 feet. The total thickness of the lake deposits is not known, but they are not thought to be less than 35 feet. The water-bearing horizons in the lake sands are not continuous, but over small areas they appear to be fairly productive. The yields from wells included in this group vary with the size of the deposit tapped and also with the amount of annual precipitation, and are readily affected by periods of prolonged drought. The quality of the water also varies considerably; a few wells yield water that is so highly mineralized that it can only be used for stock. Prospecting for water-bearing deposits should be done by means of a small auger before a well site is chosen. Time and expense can be saved if this procedure is followed.

The glacial lake clays that cover a large part of townships 31, ranges 13, 14, and 15, and also parts of townships 32, ranges 13, 14, and 15, yield little or no water. In these areas, however, wells have been sunk through the glacial lake clay to tap water-bearing deposits of sand and gravel in the underlying glacial till or boulder clay. The wells that tap these deposits are from 40 to 110 feet deep, but most of them are from 65 to 80 feet deep.

The water conditions in the area covered by boulder clay and that covered by moraine are somewhat similar, and both areas will be discussed together. The glacial till and boulder clay consist of: a few feet of top soil; a weathered zone of oxidized clay; and an unweathered zone of boulder clay that extends to the underlying bedrock. Where the till is covered by lake deposits the weathered zone is thin or absent, but at other places it is approximately 30 feet thick. In the moraine-covered area the water-bearing deposits in the weathered

zone of the drift appear to be more numerous than in the area covered by glacial till. The deposits are not sufficiently numerous to form a general horizon, and prospective well sites should be tested by means of a small auger before wells are dug or bored. The supply from such wells varies considerably, as does the quality of the water, but in normal years the supply is usually sufficient for local needs. The water from most of the wells is so highly mineralized as to render it unfit for drinking.

The unweathered zone of the drift is the source of water for most of the wells in this municipality. The water-bearing deposits are tapped at depths of 40 to 142 feet. One well located in sec. 27, tp. 32, range 15, 270 feet deep, is assumed to be deriving its supply from the drift. The water-bearing deposits in the unweathered zone of the drift do not appear to be continuous over large areas, but over small areas they appear to be of more than local areal extent. No dry holes were reported and it should be possible to obtain water easily. The supply from this source in some areas, however, is inadequate for local needs and it must be supplemented from other sources. The water is very hard, and that from most of the wells contains iron in solution. Some of the wells cannot be used for domestic purposes as the water is too highly mineralized. The water from other wells is being used, although it has a slight laxative effect.

It is improbable that water of better quality will be derived at depth in the drift as the well located in sec. 27, tp. 32, range 15, sunk 270 feet below the surface, produces water that is so highly mineralized that it can be used only for stock.

The use of dams for impounding surface water for stock requirements is advised in those localities where the topography

of the ground surface is favourable. A few dams have already been built and they have been found satisfactory. Where dams cannot be used, dugouts can be advantageously employed.

#### Water-bearing Horizons in the Bedrock

The Belly River formation is thought to immediately underlie the glacial drift throughout the area under discussion. The thickness of the drift is difficult to ascertain due to paucity of information. In township 32, range 13, coal was reported in section 17, at an elevation of 1,885 feet above sea-level, but it may have been transported with the unconsolidated materials by the ice, as the aquifer in the well is formed by gravel that lies 10 feet below the coal. A well located in sec. 8, tp. 31, range 13, encountered black sand at an elevation of 1,650 feet above sea-level, or 300 feet below the surface. Bedrock was probably penetrated for a depth of at least 100 feet in this well, but no exact contact of the drift and bedrock is recorded. In sec. 1, tp. 31, range 16, which is in the municipality directly to the west, bedrock was encountered at a depth of 252 feet, or at an approximate elevation of 1,733 feet above sea-level. In townships 30, ranges 13, 14, and 15, in the municipality directly south of Marriott, a number of wells tap bedrock aquifers, but none of the actual contacts are recorded and all that can be said is that bedrock was encountered in most of the wells at an elevation above 1,625 feet above sea-level. From the small amount of information recorded it appears probable that the bedrock will be encountered in most parts of the municipality of Marriott at an approximate elevation of 1,800 feet above sea-level. The pre-glacial bedrock land surface is probably very irregular and the depth to bedrock may vary considerably within short distances.

The areal extent of the aquifer tapped by the well in sec. 8, tp. 31, range 13, is unknown, but it should be tapped by other wells in the immediate vicinity. Wells located in the township directly south may tap the same or a similar aquifer, but the lack of evidence over the intervening area does not permit the outlining of a continuous aquifer. The hydrostatic pressure is sufficient to raise the water 150 feet above the aquifer in the well in sec. 8, tp. 31, range 13, and the supply is more than sufficient for local requirements. A second bedrock aquifer is tapped by a well in sec. 4, tp. 31, range 14, at a depth of 575 feet, or at an elevation of 1,375 feet above sea-level. The areal extent of this aquifer is not defined, but wells yielding water of similar quality are sunk to elevations of 1,430 and 1,500 feet above sea-level in township 30, range 13, and to 1,733 feet above sea-level in township 31, range 16. It does not appear probable that the same aquifer supplies the well in township 31, range 16, as supplies the other wells. The supply of water from the well in sec. 4, tp. 31, range 14, is abundant and the water is soft. It has been found quite satisfactory for all farm requirements, although the presence of sodium salts in solution may prevent its use for irrigation. It is quite possible that water can be obtained from the bedrock throughout the municipality.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 31, Range 13

The surface of this township is fairly level except where cut by Eaglehill valley, which trends from the centre of the western boundary towards the northeastern corner. The valley is almost a mile wide, and in some places it is at least 100 feet deep. During very dry years the creek becomes completely dry.

Ground water in this township is obtained from wells sunk in the glacial drift, and also from Eaglehill creek. Some water must also be hauled. Erosion along Eaglehill creek has caused the boulder clay or glacial till to be exposed at the surface, but over the remainder of the area the glacial till is concealed beneath a covering of glacial lake clays and sands. The glacial lake sands are confined to a narrow area on the north side of the valley. Their thickness is not known; the glacial lake clays are thought to be at least 30 feet thick.

Wells sunk near sloughs and depressions, and also in the valley of Eaglehill creek and its tributary ravines, obtain small quantities of water at shallow depths, usually within 30 feet of the surface. In most of these wells water-bearing deposits of sand and gravel are tapped, but in a few water is derived by direct seepage of water from the surface. These shallow wells are readily affected by drought conditions, and they become dry or their supply is noticeably decreased. The supply from the shallow wells that tap water-bearing deposits is usually sufficient for domestic purposes and a few head of stock, but it is noticeably affected by periods of continued drought. The water that is derived by direct seepage is usually moderately soft, but that from the other wells is hard. It should be satisfactory for all farm purposes. Before shallow

wells are dug it is advisable to prospect the proposed well site with a small test auger to see if water-bearing deposits exist in that location.

The glacial lake clays and sands do not appear to contain water-bearing deposits at shallow depths, and it is probable that the water obtained in these areas is derived from deposits of sand or gravel in the underlying glacial till or boulder clay. Most of the wells in this township obtain water from this source. The wells vary in depth from 50 to 108 feet, and the deposits that form the aquifers for the wells do not appear to show any continuity in occurrence. No dry holes are recorded, however, and it should be possible to obtain water from the till in most parts of the township. From a perusal of the well records, in conjunction with the accompanying map, it should be possible to estimate the depths at which water will probably be obtained. A few of these 50- to 108-foot wells do not yield a sufficient supply of water for local needs. The water is very hard and highly mineralized, but it is used for stock, and many of the wells are used for domestic purposes. One well, located in section 14, yields water of particularly good quality and many neighbouring farmers and the residents of the town of Zealandia haul water from this well.

A well located in the NE.  $\frac{1}{4}$ , section 8, obtains water from an aquifer located at an elevation of 1,650 feet above sea-level, or at a depth of 300 feet. The aquifer is formed by a dark-coloured sand, and it is thought that the water is obtained from the Belly River formation. Due to lack of data the areal extent of the aquifer cannot be outlined, but it should be tapped by other wells sunk to the required depths in this area. What is assumed to be a similar aquifer was tapped in the township immediately to the south. The supply

from the well is more than sufficient for farm needs, and although the water is very hard and contains considerable mineral salts in solution it is used for drinking with no apparent ill effects.

Soft water is obtained in the township to the south at elevations of 1,500 and 1,430 feet above sea-level and in the township to the west at 1,375 feet above sea-level, and it should be possible to obtain soft water in this township if wells are drilled to an approximately elevation of 1,400 feet above sea-level.

#### Township 31, Range 14

This township is covered throughout by boulder clay or glacial till, but with the exception of along Eaglehill creek the boulder clay is overlain by approximately 30 feet of glacial lake deposits. In parts of sections 24, 25, 33, 34, and 35, the glacial lake deposits are sandy, but elsewhere they are composed of clay. A large "alkali" marsh occurs in the western part of the township, and a drainage ditch was dug from it to Eaglehill creek.

The water supply in this township is obtained from Eaglehill creek, sloughs, and springs, and from wells sunk into the glacial drift and into the underlying bedrock. The water obtained from the creek and sloughs is used chiefly for stock, but that obtained from springs and wells is generally used for both drinking and stock.

The glacial lake clays are not thought to contain many water-bearing beds, and in the lake clay-covered areas the wells are assumed to tap pockets of sand and gravel in the underlying boulder clay.

A number of wells throughout the township obtain water at depths less than 30 feet, but most of these are found along Eaglehill creek. Before a shallow well is sunk, the prospective well site should be investigated for water-bearing deposits by means of a small auger. Wells sunk near sloughs or undrained depressions should yield small supplies of water. In years of normal precipitation this type of well usually yields a sufficient supply for domestic needs and a few head of stock, but in periods of continued drought the supply decreases and the well may become dry. The water from the shallow wells in this township varies considerably in quality, but it can generally be used for drinking as well as for stock.

Deposits of sand and gravel that occur in the glacial till or boulder clay that underlies the glacial lake clay form a second source of water supply. The wells tapping these deposits vary from 40 to 81 feet deep. Over small areas some continuity in the occurrence of the aquifers can be traced, but there does not appear to be a general horizon of large areal extent. No dry holes were recorded in this area, however, and water should be obtained without great difficulty, but dry holes may be dug as the water-bearing deposits are thought to be of scattered occurrence. With few exceptions the supply of water from these wells is sufficient for local needs, and although the water from a few wells contains a considerable amount of mineral salts in solution it is generally used for drinking as well as for stock. It may have a slight laxative effect on those not accustomed to its use.

A well in the NW. $\frac{1}{4}$ , section 4, drilled to a depth of 575 feet, tapped an aquifer in the bedrock at an elevation of 1,375 feet above sea-level. The aquifer is assumed to be in the Belly River formation, and although its areal extent is not known other wells drilled to the same elevation in this

vicinity should encounter it. The supply of water from the well in section 4 is abundant, and it is used for both drinking and stock. The water is soft, and it may prove to be injurious to vegetation if used for irrigation.

The overflow from springs can be retained by reservoirs, and the yield of the springs may sometimes be increased by digging out and cribbing the source, and by constructing small collecting galleries. The excavation of dugouts in locations where a maximum amount of surface water can be collected is advised. They should be at least 12 feet deep in order to retain a supply of water that will last throughout the winter months. Wells sunk near the reservoirs should yield sufficient water for domestic needs.

#### Township 31, Range 15

The surface of this township is slightly rolling and irregular. The elevation decreases from 2,100 feet above sea-level in the northwestern corner to 1,950 feet in the southeastern corner of the township. An intermittent stream has eroded a shallow valley along the northern part of the township. Boulder clay or glacial till mantles the township, but along the eastern and southern parts of the area the boulder clay is concealed by glacial lake clays.

Water supplies in this township are obtained altogether from wells sunk into the glacial deposits. The wells in the glacial lake clay covered area are assumed to be drawing their water from water-bearing deposits in the underlying boulder clay. The lake clays have not proved to be a source of well water.

A few wells, from 8 to 25 feet deep, dug near sloughs and low-lying areas obtain small quantities of water. In most instances they tap small deposits of water-bearing sand, but it should be possible to obtain water from wells by direct seepages

from sloughs. The supply from such wells would depend almost directly on annual precipitation, but in years of normal rainfall they should yield an adequate supply for domestic needs and a few head of stock. Before a shallow well is sunk, the prospective well site should be tested for water-bearing deposits by means of a hand auger.

Most of the wells in this township derive water from deposits of sand and gravel that occur in the glacial till or boulder clay. The depth of the wells varies from 45 to 142 feet, but most of them are from 60 to 80 feet deep. In a large part of the southeastern half of the township the water-bearing deposits appear to show some continuity, but no general water-bearing horizons are present throughout all of the township. The deposits do not appear to be as numerous in the northwestern part of the township, but no dry holes were recorded, and it appears reasonable to assume that it is possible to obtain water in the area with little difficulty. The presence, however, of a 97-foot well in section 31, a 100-foot well in section 27, a 130-foot well in section 4, and a 142-foot well in section 34, leads to the belief that the deposits occur at greater depths in these areas than elsewhere in the township. The supply from all but two wells is adequate for local needs, and that from a number of wells is more than sufficient. The water is generally very hard and contains a considerable amount of mineral salts in solution, including iron. It is generally used for drinking although it may have a slight laxative effect on those not accustomed to its use.

It should be possible to obtain water from the bedrock in this township, but no wells have been drilled into it. The depth to which wells would have to be drilled to encounter aquifers in the bedrock is not definitely known, but a well in

the township to the east is recorded as obtaining soft water at an elevation of 1,375 feet above sea-level, whereas a well in the township to the west, sunk to an elevation of 1,733 feet above sea-level, also obtains soft water.

#### Township 32, Range 13

Two ravines, containing intermittent streams, trend in a general east-west direction through the township. Except where cut into by these ravines the ground surface is fairly level. The streams drain into Eaglehill creek in township 32, range 12. Approximately the southern one-third of this township is overlain by glacial lake clays, whereas the remainder of the area is covered by glacial lake silts and sands. Boulder clay or glacial till is believed to underlie both the lake clays and the sands.

Water supplies in this township are obtained from wells sunk in the glacial drift, and also from springs and dams. The supply from the springs is used almost exclusively for stock raising purposes. Wells sunk in the glacial lake clays do not appear to obtain water at shallow depth unless they are dug near low-lying areas, or sloughs. It is advisable to test for water-bearing deposits with a small auger before sinking a well in this area. The deeper wells sunk in the area covered by the lake clay are probably tapping water-bearing deposits that occur in the boulder clay or glacial till that underlies the glacial lake clay. The wells vary from 60 to 110 feet in depth. The water-bearing deposits do not form a general horizon throughout the township, but three wells, in sections 3, 4, and 5, appear to tap a common aquifer. These three wells tap aquifers at depths of 60, 70, and 75 feet, or at elevations of 1,895, 1,885, and 1,885 feet above sea-level. The same aquifer may be supplying the 75-foot well in section 9,

but the water-bearing deposit is not thought to extend beyond the sections mentioned. No dry holes were recorded in the glacial lake covered area and it is probable that water will be obtained with little difficulty. The yield from this type of well is generally sufficient for local needs. The water is very hard and contains iron and other mineral salts in solution. The water from a few of the wells is used only for stock.

The glacial lake sands appear to be a much better source of water and a number of wells in this township obtain water from them within 30 feet of the surface. The lake sands should be tested for water-bearing deposits by means of a small auger before a well site is finally selected. The yield from the shallow wells is small, and that from a number is inadequate for local needs and must be supplemented by either a second well, by hauling, or by the use of waters impounded by dams. The quality of the water varies considerably and some of it is used only for stock.

A few wells obtain water from the deposits of sand and gravel in the glacial till that underlies the lake sands. These wells vary from 50 to 90 feet deep. The deposits that form the aquifers for this group of wells show some continuity over small areas, but it seems improbable that they form water-bearing horizons of large areal extent. No dry holes are recorded in this area, however, and it appears probable that water should be obtained with a minimum of difficulty, but since the deposits are in the form of pockets dry holes may be put down before a producing well is obtained. The supply from approximately half of the wells included in this group is insufficient for local needs. The water is hard, contains iron and other mineral salts in solution, and that from a few wells is unsuitable for domestic use.

The well located in the NE.  $\frac{1}{4}$ , section 17, is recorded to have encountered coal at a depth of 70 feet, or at an elevation of 1,885 feet above sea-level. The well was sunk to a total depth of 83 feet, or to an elevation of 1,872 feet above sea-level. The coal encountered may be in the Belly River formation, but it is more probable that it is in the drift and has been transported by glacial action. The depth to bedrock is not known in this area, but it is thought to be greater than 70 feet, and since the aquifer is formed by gravel the water is assumed to be derived from the glacial drift. The supply from the well is abundant, and the hydrostatic pressure is sufficient to cause the water to overflow the ground surface. The water is hard and fairly highly mineralized, but it is used for domestic purposes as well as for stock.

Locations for the construction of dams exist along the ravines and a few residents have erected dams. Sufficient water can often be impounded by a small dam to supply stock needs for a year. Shallow wells sunk near the impounded waters often yield a sufficient supply of water for domestic purposes.

#### Township 32, Range 14

Water in this township is obtained chiefly from wells sunk into the glacial drift. The supply from the wells is supplemented to some extent by water from a few intermittent streams, and from sloughs. It is not recorded if water is impounded by means of dams or collected and retained in dugouts, but it is probable that some of the residents have taken advantage of these means of conserving surface water. The surface of the township varies from gently undulating to quite rolling, and in some parts it is fairly hilly. Two ravines, which contain intermittent streams, trend in a west to east direction through the central and southeastern parts of the township.

Boulder clay or glacial till overlies a small area in the northwestern corner of the township, but elsewhere it is concealed by glacial lake deposits. The glacial lake deposits are composed mainly of sands, but in a narrow area along the western part of the township they consist of clays. The lake deposits are probably at least 30 feet thick and are underlain by boulder clay or glacial till.

The glacial lake sands appear to contain water-bearing deposits within 30 feet of the surface, but they do not form a continuous water-bearing horizon. The glacial lake clays are not water-bearing, but water is obtained from pockets of sand and gravel that occur in the upper part of the underlying boulder clay or glacial till. Seepage wells dug near sloughs and ravines should yield sufficient water for domestic needs and a few head of stock, and a fairly large number of wells of this type are found in this township. They are easily affected by continued drought, however, and may become dry. Most of the shallow seepage wells in this township yield a sufficient supply for local needs, but three wells in the southeastern part of the municipality yield inadequate supplies. The water is generally of better quality than that from deeper wells in the glacial drift, but the water from at least three of the seepage wells is so highly mineralized that it is used only for stock.

A few wells scattered throughout the township obtain water from water-bearing deposits in the glacial till that underlies the lake sands and clays. No continuity in the occurrence of the pockets is apparent, and they are thought to be of scattered distribution. The wells range in depth from 40 to 110 feet. No dry holes were recorded in this township, but they may be dug before a producing well is

obtained. The supply from this group of wells varies, but it is generally adequate for local needs. The water although hard and highly mineralized is used in most instances for drinking as well as for stock, but that from many of the wells had a slight laxative effect.

The topography in various parts of the township is suitable for the construction of dams. When an adequate supply of water cannot be obtained from wells, the use of dams or dugouts for the collection and retention of surface water for stock use is highly recommended. Shallow wells beside the impounded water should yield sufficient water for domestic needs.

#### Township 32, Range 15

The northwestern part of this township is covered by moraine, and the ground surface is rough and hilly. The remainder of the township is gently rolling and is mantled by boulder clay or glacial till. In the southeastern corner of the township the boulder clay is overlain by glacial lake clay. A small ravine, containing an intermittent stream, trends in a northwest to southeast direction through the central part of the area.

Water supplies in this township are obtained from wells sunk into the glacial drift. Springs, creeks, dams, and dugouts are used to supplement the supply from the wells.

The glacial lake clays are not thought to be water-bearing. Wells that are dug in the area covered by lake clays are assumed to tap water-bearing deposits in the underlying boulder clay.

The deposits of moraine and boulder clay are similar in composition. The upper 30 feet of the drift is weathered and consists of light-coloured clay. The remainder is unweathered and is formed by compact, dark-coloured clays.

Deposits of sand and gravel occur in both zones of the drift. A few wells tap water-bearing deposits in the weathered zone of the drift, and they are from 12 to 36 feet deep. The deposits that form the aquifers do not show any relationship in their occurrence and they do not form a continuous water-bearing horizon. Well sites should be investigated with a small test auger before a well is dug, in order to ascertain if water-bearing deposits are present. The supply from these wells varies and is not always sufficient for local needs. In such instances it must be supplemented by hauling or by the use of dams or dugouts. The water contains a fairly large amount of mineral salts in solution, but is usually suitable for domestic purposes. Small supplies of usable water can generally be obtained from shallow seepage wells dug beside ravines, undrained depressions, and artificial reservoirs. The supply from these wells is readily affected by drought conditions.

The deposits of sand and gravel that occur in the unweathered zone of the glacial drift also form a source of water supply. Wells that tap these deposits are from 40 to 117 feet deep. A well located in section 27 is 270 feet deep, however, and is assumed to be deriving its supply from the glacial drift. The aquifer may be near the contact of the drift and bedrock, but the water resembles that from the drift in quality. The deposits in the unweathered zone of the drift show some continuity in their occurrence over small areas, but they do not form water-bearing horizons of large areal extent. No dry holes were recorded, but the water-bearing deposits are thought to be of scattered occurrence. The water is highly mineralized, but is being used for stock and in most instances for domestic use also. The water from a well in section 16

was pronounced unfit for use by the Provincial Analyst, but it is being used at the present time. Little difficulty should be experienced in obtaining adequate supplies of water from the drift in this township.

Dams and dugouts can be advantageously employed to retain surface water for stock use. Shallow wells dug beside these impounded waters should yield usable water for domestic needs. The yield from springs can be appreciably increased by digging out and cribbing the spring or by the construction of small collecting galleries, and the overflow water can be conserved by the use of small reservoirs.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL  
MUNICIPALITY OF MARRIOTT, NO.317, SASKATCHEWAN

West of 3rd mer.	Township	31	31	31	32	32	32	Total No. in muni- cipality
	Range	13	14	15	13	14	15	
<u>Total No. of Wells in Township</u>		30	40	32	39	30	35	206
No. of wells in bedrock		1	1	0	0	0	0	2
No. of wells in glacial drift		29	39	32	39	30	35	204
No. of wells in alluvium		0	0	0	0	0	0	0
<u>Permanency of Water Supply</u>								
No. with permanent supply		30	40	32	38	30	35	205
No. with intermittent supply		0	0	0	1	0	0	1
No. dry holes		0	0	0	0	0	0	0
<u>Types of Wells</u>								
No. of flowing artesian wells		0	0	0	1	0	0	1
No. of non-flowing artesian wells		16	19	19	12	11	16	93
No. of non-artesian wells		14	21	13	26	19	19	112
<u>Quality of Water</u>								
No. with hard water		29	37	29	36	28	35	194
No. with soft water		1	3	3	3	2	0	12
No. with salty water		0	0	0	0	0	0	0
No. with "alkaline" water		10	12	8	19	9	11	69
<u>Depths of Wells</u>								
No. from 0 to 50 feet deep		12	27	7	26	25	17	114
No. from 51 to 100 feet deep		15	12	23	11	5	14	80
No. from 101 to 150 feet deep		2	0	2	2	0	3	9
No. from 151 to 200 feet deep		0	0	0	0	0	0	0
No. from 201 to 500 feet deep		1	0	0	0	0	1	2
No. from 501 to 1,000 feet deep		0	1	0	0	0	0	1
No. over 1,000 feet deep		0	0	0	0	0	0	0
<u>How the Water is Used</u>								
No. usable for domestic purposes		24	31	29	28	24	29	165
No. not usable for domestic purposes		6	9	3	11	6	6	41
No. usable for stock		30	40	32	38	30	33	203
No. not usable for stock		0	0	0	1	0	2	3
<u>Sufficiency of Water Supply</u>								
No. sufficient for domestic needs		30	38	32	36	30	35	201
No. insufficient for domestic needs		0	2	0	3	0	0	5
No. sufficient for stock needs		25	30	27	26	23	29	160
No. insufficient for stock needs		5	10	5	13	7	6	46

## 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 hardness 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 Marriott, No. 317, Saskatchewan

CATION			Depth of Well, Ft.	Total dis'vd solids	HARDNESS		CONSTITUENTS AS ANALYSED					CONSTITUENTS AS CALCULATED IN ASSUMED COMBINATIONS					Source of Water					
No.	Tr.	Sec. Tp.			Rge.	Mer.	Total	Perm. Temp.	Cl	Alka- linity	CaO	MgO	SO <sub>4</sub>	Na <sub>2</sub> O	Solids	CaCO <sub>3</sub>		CaSO <sub>4</sub>	MgCO <sub>3</sub>	MgSO <sub>4</sub>	Na <sub>2</sub> CO <sub>3</sub>	Na <sub>2</sub> SO <sub>4</sub>
1	SW.	30	31	14	3	1,023								(3)	(1)					(4)		æ1

Water samples indicated thus, æ1, are from glacial drift.

Analyses are reported in parts per million; where numbers (1), (2), (3), and (4) 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<sub>3</sub>).

Analysis No. 1, by Provincial Analyst, Regina.

For interpretation of this table read the section on Analyses and Quality of Water.

### Water from the Unconsolidated Deposits

No samples of water from the glacial drift in the municipality of Marriott, No. 317, were taken by the field party, but the results of one sample analysed by the Provincial Analyst at Regina are recorded in the accompanying table.

The water from wells that are dug near undrained depressions, sloughs, or impounded waters, is as a rule moderately soft. It is satisfactory for stock, and if it is not contaminated by water containing animal refuse it should be suitable for domestic uses. It is advisable to have the water from such sources frequently tested for bacteria content. In this municipality the water from this type of well should be found much superior to the highly mineralized water from the deeper wells in the drift.

The water from wells that tap small, shallow pockets of sand and gravel in the lake deposits, glacial till, and moraine usually varies from comparatively soft to very hard. The mineral salts in solution also vary considerably. The sample recorded in the accompanying table has a relatively low total dissolved solids content, and although  $MgSO_4$  (Epsom salts) is second in abundance, the water should be found satisfactory for domestic purposes. A few of the shallow wells yield water that contains a large amount of mineral salts in solution and they can be used only for stock, but most of the waters from shallow wells are used for domestic purposes as well as for stock. A number of springs in the area are used for stock. No doubt the water from some of them is quite suitable for domestic purposes also, although an oil-like scum, due to iron salts in solution, forms on the surface of the water from some of them.

The water obtained from the wells sunk into the lower part of the drift generally contains more mineral salts in

solution than that from the shallow wells, and it is harder.

No samples were analysed, but it is recorded that the water from a large number of wells is extremely laxative when used for drinking. The water from a 100-foot well located in the SW. $\frac{1}{4}$ , sec. 16, tp. 32, range 15, was pronounced unfit for humans or stock, but it is used for both. No doubt much of the water that is being used for drinking would not be used if water of better quality was available within reasonable hauling distance. The water from the deeper wells should be suitable for stock, but much of it should not be used for drinking. Many of the waters contain a considerable amount of iron in solution.

#### Water from the Bedrock

Only two wells in the municipality are thought to obtain water from aquifers in the bedrock. The water from the well located in sec. 8, tp. 31, range 13, is recorded to be hard, but it is quite suitable for domestic and stock use. No doubt the water from this well contains a fairly large amount of mineral salts in solution, but the salts are evidently not in sufficient concentration to render the water unsuitable for domestic purposes. The water from the well located in sec. 4, tp. 31, range 14, is recorded as soft, and the predominant mineral salts are probably  $\text{Na}_2\text{SO}_4$ ,  $\text{Na}_2\text{CO}_3$ , and  $\text{NaCl}$ . The water, if analysed, would probably be found quite satisfactory for domestic purposes as well as stock. Due to the sodium salts in solution, however, the water might have an injurious effect on vegetation if used for irrigation.

1  
WELL RECORDS—Rural Municipality of MARRIOTT NO. 317, SASKATCHEWAN

B 4-4  
R. 7526

WELL No.	LOCATION					TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE		PRINCIPAL WATER-BEARING BED			CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
	¼	Sec.	Tp.	Rge.	Mer.				Above (+) Below (-) Surface	Elev.	Depth	Elev.	Geological Horizon				
1	SE.	1	31	13	3	Drilled	138	1,955	- 78	1,877	138	1,817	Glacial gravel	Hard, iron, odorous, red sediment	43	S	Abundant supply; oversufficient for 50 head stock; 22-foot well used for drinking.
2	SE.	3	"	"	"	Bored	82	1,955	- 75	1,880			Glacial gravel	Hard, iron, red sediment		D, S	Sufficient for 8 head stock; laxative.
3	SW.	3	"	"	"	Bored	68	1,950	- 60	1,890			Glacial drift	Hard, iron, "alkaline" red sediment	44	D, S	Sufficient supply; laxative; bad taste.
4	SW.	4	"	"	"	Bored	90	1,950	- 70	1,880	90	1,860	Glacial gravel	Hard, clear, "alkaline"	42	S	Oversufficient; 40 head stock watered; 20-foot well for drinking.
5	N <sub>2</sub> W.	6	"	"	"	Bored	70	1,960	- 58	1,902	70	1,890	Glacial gravel	Hard, clear, iron, "alkaline" red sediment	48	S	Sufficient supply; waters 6 head stock; laxative.
6	NE.	8	"	"	"	Drilled	300	1,950	-150	1,800	300	1,650	Belly River black sand	Hard, clear, iron, "alkaline" red sediment	46	D, S	Oversufficient; waters 40 head stock.
7	NW.	10	"	"	"	Dug	87	1,955	- 78	1,877	87	1,868	Glacial gravel	Hard, iron, "alkaline" red sediment	48	D, S	Sufficient for 25 head stock.
8	SE.	10	"	"	"		80	1,950	- 60	1,890	80	1,870	Glacial drift	Hard, "alkaline"		S	Sufficient supply; at present not in use.
9	SW.	11	"	"	"	Bored	70	1,955	- 67	1,888			Glacial drift	Hard, iron, "alkaline" red sediment	44	D, S	Sufficient for 10 head stock.
10	SW.	14	"	"	"	Dug	60	1,955	- 56	1,899			Glacial sand	Hard, iron, red sediment	43	D, S	Oversufficient; excellent water used by neighbours and town of Zelandia.
11	SW.	16	"	"	"	Drilled	90	1,950	- 65	1,885	90	1,860	Glacial gravel	Hard		D, S	Sufficient; waters 25 head stock.
12	SE.	18	"	"	"	Drilled	108	1,950	- 94	1,856	108	1,842	Glacial coarse sand	Hard, iron	46	D, S	Oversufficient; supplies 80 barrels a day.
13	NW.	18	"	"	"	Dug	80	1,955	- 70	1,885			Glacial drift	Hard, iron, "alkaline" red sediment	46	D, S	Insufficient; waters 30 head stock.
14	SE.	22	"	"	"	Dug	60	1,900	- 40	1,860	60	1,840	Glacial sand	Hard, "alkaline"	46	D, S	Sufficient; waters 10 head stock.
15	NW.	22	"	"	"	Dug	12	1,875	- 6	1,869	12	1,863	Glacial fine sand	Hard, "alkaline"	46	D, S	Sufficient; waters 40 head stock.
16	NE.	22	"	"	"	Bored	80	1,860	- 75	1,785			Glacial drift	Hard, iron, "alkaline" red sediment	43	D, S	Sufficient; waters 10 head stock; 12-foot well by creek.
17	NW.	23	"	"	"	Bored	60	1,875	- 40	1,835	60	1,815	Glacial sand	Hard, iron, "alkaline" red sediment	44	D, S	Sufficient; waters 25 head stock.
18	SW.	24	"	"	"	Dug	45	1,930	- 35	1,895	45	1,885	Glacial drift	Hard, clear, iron, red sediment	44	D, S	Sufficient; yields 14 barrels at one pumping.
19	NW.	24	"	"	"	Bored	50	1,920	- 30	1,890	50	1,870	Glacial sand	Hard, clear	44	D, S	Sufficient; waters 20 head stock.
20	SW.	27	"	"	"	Dug	25	1,910	- 15	1,895	25	1,885	Glacial gravel	Hard, clear	46	D, S	Abundant supply; waters 10 head stock.
21	SE.	28	"	"	"	Dug	19	1,925	- 11	1,914	19	1,906	Glacial fine sand	Hard, clear	46	D, S	Sufficient; yields 30 barrels a day.

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 MARRIOTT NO. 317, SASKATCHEWAN

WELL No.	LOCATION					TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE		PRINCIPAL WATER-BEARING BED			CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
	¼	Sec.	Tp.	Rge.	Mer.				Above (+) Below (-) Surface	Elev.	Depth	Elev.	Geological Horizon				
22	NW.	28	31	13	3	Bored	60	1,960	- 56	1,904	60	1,900	Glacial fine sand	Hard, iron	46	D, S	Insufficient; yields 4 barrels a day.
23	SE.	32	"	"	"	Dug	30	1,960	- 20	1,940	30	1,930	Glacial sand	Hard	44	D, S	Oversufficient; yields 30 barrels a day, used for steam engines.
24	NE.	32	"	"	"	Dug	50	1,965	+ 46	1,919	50	1,915	Glacial drift	Hard	43	D, S	Insufficient; waters 16 head stock.
25	SE.	33	"	"	"	Dug	90	1,955	+ 50	1,905	90	1,865	Glacial gravel	Hard, cloudy	44	D, S	Oversufficient; waters 30 head stock.
26	NE.	34	"	"	"	Dug	10	1,950	0	1,950	"	"	Glacial sand	Soft, cloudy	46	S	Insufficient supply.
27	SW.	35	"	"	"	Dug	25	1,925	+ 20	1,905	25	1,900	Glacial sand	Hard, iron	46	D, S	Sufficient; waters 15 head stock.
1	SW.	4	31	14	3	Dug	18	1,875	+ 8	1,867	18	1,857	Glacial drift	Medium hard	42	S	Oversufficient; waters 50 head stock.
2	NW.	4	"	"	"	Drilled	575	1,950			575	1,375	Belly River formation	Soft, clear	41	D, S	Oversufficient; waters 30 head stock.
3	SE.	5	"	"	"	Dug	18	1,850	+ 8	1,842	18	1,832	Glacial drift	Medium hard	45	D, S	Sufficient; waters 30 head stock.
4	NE.	6	"	"	"	Bored	50	1,950	- 25	1,925	50	1,900	Glacial gravel	Hard, iron, "alkaline"	46	S	Sufficient; waters 25 head stock; 14-foot well supplies drinking water.
5	SE.	7	"	"	"	Dug	23	1,955	+ 13	1,942	23	1,932	Glacial gravel	Hard, clear	46	D, S	Oversufficient; waters 12 head stock.
6	NE.	8	"	"	"	Dug	30	1,955	- 25	1,930	"	"	Glacial sand	Medium hard iron	46	D, S	Insufficient; waters 30 head stock.
7	NW.	8	"	"	"	Dug	18	1,945	- 4	1,941	"	"	Glacial drift	Hard, "alkaline"	46	S	Insufficient; waters 30 head stock.
8	SE.	9	"	"	"	Bored	60	1,950	+ 30	1,920	60	1,890	Glacial drift	Hard	44	D, S	Oversufficient; waters 30 head stock.
9	SW.	9	"	"	"	Bored	64	1,950	- 44	1,906	64	1,886	Glacial drift	Soft, clear	46	D, S	Oversufficient; waters 30 head stock.
10	NW.	10	"	"	"	Bored	42	1,925	- 22	1,903	42	1,883	Glacial gravel	Hard, "alkaline"	46	S	Insufficient; supplies 12 head stock; laxative
11	NE.	12	"	"	"	Bored	70	1,950	- 65	1,885	65	1,885	Glacial fine sand	Hard, "alkaline", iron, red sediment	46	S	Insufficient; waters 8 head stock.
12	NW.	12	"	"	"	Drilled	60	1,955	+ 20	1,935	60	1,895	Glacial drift	Hard, "alkaline"		S	This well caved in; use to have sufficient supply for stock needs.
13	SW.	14	"	"	"	Dug	13	1,875	- 5	1,870	"	"	Glacial sand	Hard, clear	48	D, S	Oversufficient supply; ample for 100 head stock.
14	NE.	14	"	"	"	Dug	12	1,900	- 8	1,892	8	1,892	Glacial sand and gravel	Hard, clear	45	D, S	Sufficient supply; waters 30 head stock.
15	SE.	15	"	"	"	Spring							Glacial sand	Hard		S	Sufficient for 50 head stock.
16	NW.	16	"	"	"	Driven	44	1,960	- 28	1,932	44	1,916	Glacial drift	Hard, iron, reddish rust	42	D	School well; sufficient for requirements.
17	SW.	16	"	"	"	Dug	42	1,960	- 32	1,928	42	1,918	Glacial drift	Hard, iron, red sediment	45	D, S	Oversufficient; ample for 50 head stock.
18	SW.	17	"	"	"	Dug	40	1,955	- 37	1,918	37	1,918	Glacial sand	Hard, "alkaline"	45	D, S	Sufficient; waters 20 head stock.
19	SE.	18	"	"	"	Dug	48	1,955	- 38	1,917	48	1,907	Glacial drift	Hard, clear	42	D, S	Sufficient for 25 head stock.
20	SW.	18	"	"	"	Bored	60	1,960	- 50	1,910	60	1,900	Glacial drift	Hard, clear	43	D, S	Oversufficient; waters 25 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

MARRIOTT NO. 317, SASKATCHEWAN

WELL No.	LOCATION					TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE		PRINCIPAL WATER-BEARING BED			CHARACTER OF WATER	TEMP. OF WATER (in°F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
	¼	Sec.	Tp.	Rge.	Mer.				Above (+) Below (-) Surface	Elev.	Depth	Elev.	Geological Horizon				
21	SW.	19	31	14	3	Dug	60	1,975	- 50	1,925	60	1,915	Glacial drift	Medium hard, clear	46	D, S	Oversufficient; waters 30 head stock.
22	SW.	21	"	"	"	Dug	40	1,960	- 37	1,923	37	1,923	Glacial fine sand	Hard, clear	46	D, S	Sufficient; waters 40 head stock.
23	SE.	23	"	"	"	Spring							Glacial sand	Fairly soft			Abundant supply all year.
24	NW.	24	"	"	"	Dug	13	1,900	- 7	1,893	7	1,893	Glacial fine sand	Medium hard "alkaline"	45	D, S	Sufficient; supplies 3 to 4 barrels a day.
25	NE.	26	"	"	"	Dug	72	1,960	- 65	1,895	65	1,895	Glacial sand	Hard, clear	46	D, S	Insufficient; waters 24 head stock; nearby well 15 feet almost dry.
26	NE.	28	"	"	"	Bored	81	1,955	- 56	1,899	81	1,874	Glacial gravel	Hard, clear	46	D, S	Oversufficient; supplies 6 tanks a day; used for steam engines.
27	SW.	28	"	"	"	Bored	48	1,950	- 33	1,917	33	1,917	Glacial fine sand	Hard, clear	42	D, S	Sufficient supply.
28	NW.	29	"	"	"	Dug	40	1,960	- 20	1,940	40	1,920	Glacial sand	Hard, iron, "alkaline" red sediment	46	D, S	Sufficient; waters 45 head stock.
29	SW.	29	"	"	"	Dug	30	1,955	- 25	1,930	25	1,930	Glacial fine sand	Hard, "alkaline"	47	D, S	Insufficient for more than 7 head stock; slightly laxative; also springs but poor supply.
30	SE.	30	"	"	"	Bored	60	1,955	- 40	1,915	60	1,895	Glacial drift	Hard, iron, "alkaline"	46	D, S	Sufficient for 10 head stock.
31	NW.	31	"	"	"	Dug	40	1,990	- 32	1,958	40	1,950	Glacial drift	Hard, some "alkaline"	46	D, S	Sufficient; waters 12 head stock; laxative.
32	NE.	32	"	"	"	Dug	28	1,965	- 23	1,942	23	1,942	Glacial sand	Hard, clear	46	D, S	Sufficient; waters 11 head stock.
33	SW.	34	"	"	"	Bored	60	1,960	- 55	1,905	55	1,905	Glacial sand	Hard, clear	45	D, S	Sufficient; supplies 12 barrels a day.
34	NW.	34	"	"	"	Bored	68	1,960	- 23	1,937	68	1,892	Glacial fine sand	Hard, iron red sediment	45	D, S	Sufficient; waters 30 head stock.
35	NE.	34	"	"	"	Bored	100	1,965	- 30	1,935	100	1,865	Glacial drift	Hard, iron, "alkaline" red sediment	48	D, S	Oversufficient; waters 16 head stock.
36	SE.	35	"	"	"	Dug	28	1,965	- 13	1,952			Glacial drift	Hard, iron, red sediment	47	D, S	Sufficient supply; waters 22 head stock.
37	SW.	36	"	"	"	Dug	30	1,965	- 24	1,941			Glacial drift	Hard, cloudy yellow, odorous			Sufficient; waters 30 head stock. #
1	SW.	1	31	15	3	Dug	14	1,940	- 10	1,930	10	1,930	Glacial sand	Hard, clear	46	D, S	Oversufficient; waters 15 head stock.
2	NE.	2	"	"	"	Dug	60	1,970	+ 40	1,930	60	1,910	Glacial fine sand	Hard, clear, some "alkaline"	42	D, S	Oversufficient; waters 35 head stock.
3	NW.	2	"	"	"	Bored	60	1,980	- 44	1,936	60	1,920	Glacial sand	Hard, iron, red sediment	44	D, S	Sufficient; waters 12 head stock.
4	SW.	3	"	"	"	Drilled	65	1,950	- 50	1,900	65	1,885	Glacial sand	Hard, iron, red sediment	46	D, S	Sufficient; yields 5 barrels a day.
5	SE.	4	"	"	"	Bored	130	1,960	-120	1,840	130	1,830	Glacial sand	Hard, iron, some "alkaline"	45	D, S	Sufficient; supplies 12 barrels a day.
6	SW.	6	"	"	"	Dug	8	1,955	- 4	1,951	4	1,951	Glacial drift	Soft, clear	45	S	Insufficient; waters 4 head stock.
7	NE.	7	"	"	"	Dug	52	2,005	- 48	1,957	48	1,957	Glacial gravel	Hard, iron, red sediment "alkaline"	46	S	Sufficient for 10 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 MARRIOTT NO. 317, SASKATCHEWAN

B 4-4  
1860—10,000

WELL No.	LOCATION					TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE		PRINCIPAL WATER-BEARING BED			CHARACTER OF WATER	TEMP. OF WATER (in°F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
	¼	Sec.	Tp.	Rge.	Mer.				Above (+) Below (-) Surface	Elev.	Depth	Elev.	Geological Horizon				
8	NE	9	31	15	3	Dug	70	2,010	- 66	1,944	66	1,944	Glacial gravel	Hard, iron, "alkaline"	44	D, S	Abundant supply.
9	SE.	10	"	"	"	Dug & Bored	70	2,000	- 63	1,937	70	1,930	Glacial sand	Hard, iron	42	D, S	Oversufficient; waters 40 head stock.
10	NW.	12	"	"	"	Dug	60	1,980	- 59	1,921	60	1,920	Glacial gravel	Hard, clear	46	D, S	Insufficient; supplies 1 barrel a day.
11	SW.	13	"	"	"	Bored	64	1,960	- 46	1,934	64	1,916	Glacial gravel	Hard, clear, iron, red sediment	42	D, S	Sufficient; supplies 50 barrels a day.
12	SW.	14	"	"	"	Dug	60	2,000	- 40	1,960	60	1,940	Glacial gravel	Hard, clear	45	D, S	Oversufficient; ample for 50 head stock.
13	NE.	14	"	"	"	Dug	60	1,990	- 40	1,950	60	1,930	Glacial coarse sand	Medium hard	44	D, S	Oversufficient; used for steam engines.
14	NE.	16	"	"	"	Dug & Bored	100	2,025	- 98	1,927	100	1,925	Glacial drift	Hard, iron, red sediment	44	D, S	Sufficient; supplies 10 barrels a day.
15	SE.	16	"	"	"	Dug	100	2,020	- 90	1,930	100	1,920	Glacial sand	Hard, iron, red sediment	44	D, S	Just sufficient; waters 30 head stock.
16	SW.	16	"	"	"	Dug	25	2,015	- 15	2,000			Glacial drift	Hard, iron, odorous, red sediment "alkaline"	46	S	Sufficient; waters 10 head stock; laxative.
17	S½.	18	"	"	"	Bored	70	2,020	- 60	1,960	70	1,950	Glacial gravel	Hard, iron, red sediment	46	D, S	Sufficient; waters 15 head stock.
18	NE.	18	"	"	"	Bored	60	2,045	- 35	2,005	60	1,985	Glacial drift	Hard, iron, red sediment slightly "alkaline"	46	D, S	Sufficient; waters 10 head stock; slightly laxative.
19	SW.	19	"	"	"	Dug	60	2,060	- 56	2,004	56	2,004	Glacial gravel	Hard, iron	45	D, S	Sufficient for 25 head stock.
20	SW.	20	"	"	"	Dug	50	2,050	- 40	2,010	50	2,000	Glacial sand and gravel	Soft, clear	45	D, S	Sufficient; waters 30 head stock.
21	NE.	22	"	"	"	Bored	65	2,025	- 63	1,962	65	1,960	Glacial gravel	Hard, iron, red sediment	46	D, S	Sufficient for 30 head stock.
22	SE.	22	"	"	"	Dug	55	2,020	- 50	1,970	50	1,970	Glacial gravel	Hard, clear	44	D, S	Sufficient for 20 head stock.
23	NE.	23	"	"	"	Bored	60	1,995	- 40	1,955	60	1,935	Glacial gravel	Hard, iron, red sediment slightly "alkaline"	42	D, S	Abundant supply.
24	SE.	24	"	"	"	Bored	60	1,980	- 50	1,930	60	1,920	Glacial drift	Hard, iron, red sediment	46	D, S	Abundant supply; waters 14 head stock.
25	NE.	27	"	"	"	Bored	100	2,000	- 85	1,915	100	1,900	Glacial sand	Hard, iron, reddish rust	46	D, S	Sufficient; waters 15 head stock.
26	NW.	28	"	"	"	Dug	45	2,050	- 30	2,020	45	2,005	Glacial sand	Hard, clear	43	D, S	Sufficient; waters 10 head stock.
27	SE.	30	"	"	"	Dug	60	2,090	- 45	2,045	60	2,030	Glacial sand	Soft, clear	46	D, S	Sufficient; waters 18 head stock.
28	NW.	31	"	"	"	Bored	97	2,140	- 92	2,048			Glacial sand	Hard, clear, "alkaline"		D, S	Insufficient; waters 20 head stock.
29	SW.	32	"	"	"	Dug	10	2,060	- 8	2,052	8	2,052	Glacial sand	Medium hard	45	S	Small supply.
30	NE.	32	"	"	"	Bored	80	2,065	- 55	2,010	80	1,985	Glacial sand	Hard	43	D, S	Oversufficient; waters 20 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 MARIOTT NO. 317, SASKATCHEWAN.

WELL No.	LOCATION					TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE		PRINCIPAL WATER-BEARING BED			CHARACTER OF WATER	TEMP. OF WATER (in°F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
	¼	Sec.	Tp.	Rge.	Mer.				Above (+) Below (-) Surface	Elev.	Depth	Elev.	Geological Horizon				
31	NW.	34	31	15	3	Bored	142	2,050	- 70	1,980	142	1,908	Glacial gravel	Hard, iron, red sediment	42	D, S	Oversufficient; waters 50 head stock.
32	SW.	36	"	"	"	Dug	40	2,000	- 35	1,965	35	1,965	Glacial gravel	Hard, iron, "alkaline"	45	D, S	Sufficient; waters 25 head stock.
1	NE.	2	32	13	3	Bored	80	1,950	- 70	1,880	80	1,870	Glacial sand	Hard, iron	46	D, S	
2	NW.	2	"	"	"	Dug	30	1,920	- 21	1,899	21	1,899	Glacial sand	Hard, "alkaline"	46	D, S	Insufficient; waters 12 head stock.
3	SW.	2	"	"	"	Drilled	110	1,960	- 50	1,902	110	1,850	Glacial gravel	Hard, iron	46	D, S	Sufficient; waters 60 head stock.
4	NE.	3	"	"	"	Dug	60	1,955	- 40	1,915	60	1,895	Glacial drift	Hard, iron, "alkaline" red sediment	45	D, S	Oversufficient; waters 15 head stock.
5	S <sub>2</sub> .	4	"	"	"	Bored	70	1,955	- 65	1,890	65	1,890	Glacial drift	Hard, iron, red sediment	46	S	Sufficient; waters 25 head stock.
6	NW.	4	"	"	"	Dug	13	1,955	- 6	1,949	13	1,942	Glacial drift	Hard, iron, red sediment	46	D, S	Oversufficient; waters 16 head stock.
7	SE.	5	"	"	"	Bored	75	1,960	- 60	1,900	75	1,785	Glacial drift	Hard, iron, red sediment	46	D, S	Sufficient; waters 25 head stock.
8	NW.	6	"	"	"	Drilled	110	1,955	- 40	1,915	110	1,845	Glacial gravel	Hard, iron, "alkaline" red sediment	43	S	Sufficient; waters 40 head stock; very laxative.
9	NW.	7	"	"	"	Dug	20	1,950	- 10	1,940			Glacial sand	Soft, clear	43	D, S	Insufficient; supplies 2½ barrels a day. This well is spring fed; also 33-foot well.
10	NW.	9	"	"	"	Dug	16	1,950	- 13	1,937	13	1,937	Glacial sandy loam	Hard, slightly "alkaline"	47	D, S	Intermittent supply.
11	SE.	9	"	"	"	Dug	75	1,950	- 15	1,935	75	1,875	Glacial gravel	Hard, clear	43	D, S	Abundant supply; waters 150 head stock.
12	NW.	12	"	"	"	Bored	38	1,925	- 28	1,897	38	1,887	Glacial sand	Hard, clear	45	D, S	Insufficient; waters 20 head stock.
13	SE.	12	"	"	"	Bored	80	1,940	- 75	1,865	75	1,865	Glacial sand	Hard, iron, red sediment slightly "alkaline"	46	D, S	Insufficient; waters 8 head stock.
14	SW.	13	"	"	"	Bored	80	1,935	- 70	1,865	80	1,855	Glacial sand	Hard, iron, red sediment	46	D, S	Barely sufficient; waters 7 head stock.
15	SE.	13	"	"	"	Bored	35	1,925	- 30	1,895	30	1,895	Glacial sand	Medium hard clear	46	D, S	Insufficient; waters 8 head stock.
16	NE.	14	"	"	"	Dug	40	1,950	- 20	1,930	40	1,910	Glacial sand	Medium hard, clear	46	D, S	Sufficient; waters 100 head stock.
17	SE.	14	"	"	"	Bored	60	1,950	- 50	1,900	60	1,890	Glacial sand	Hard, slightly "alkaline"	43	D, S	Sufficient; waters 75 head stock.
18	SE.	15	"	"	"	Dug	30	1,955	- 24	1,931	24	1,931	Glacial fine sand	Medium hard clear	47	D, S	Insufficient; waters 9 head stock.
19	SE.	16	"	"	"	Dug	20	1,955	- 15	1,940	15	1,940	Glacial sandy loam	Soft, clear	45	D, S	Sufficient for 15 head stock.
20	SW.	16	"	"	"	Dug	48	1,950	- 44	1,906	48	1,902	Glacial drift	Medium hard, clear	46	D, S	Oversufficient; supplies 20 barrels a day.
21	SE.	17	"	"	"	Dug	40	1,950	- 36	1,914	36	1,914	Glacial sand	Medium hard, clear	46	D, S	Sufficient for 15 head stock.
22	NE.	17	"	"	"	Drilled	83	1,955	+ 3	1,958	83	1,872	Glacial drift?	Hard, iron, "alkaline" red sediment	40	D, S	Flows continuously.

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 No.	LOCATION					TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE		PRINCIPAL WATER-BEARING BED			CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
	¼	Sec.	Tp.	Rge.	Mer.				Above (+) Below (-) Surface	Elev.	Depth	Elev.	Geological Horizon				
23	SW.	18	32	13	3	Bored	90	1,960	- 87	1,873	87	1,873	Glacial sand	Hard, iron, "alkaline"	46	D, \$	Insufficient; waters 8 head stock; laxative.
24	NW.	18	"	"	"	Dug	26	1,965	- 23	1,942	23	1,942	Glacial sand	Hard, "alkaline"	46	D, S	Sufficient; waters 8 head stock.
25	SW.	20	"	"	"	Dug	20	1,950	- 18	1,932	18	1,932	Glacial sand	Hard	46	D, S	Insufficient; waters 4 to 5 head stock; also uses a dam.
26	NE.	23	"	"	"	Bored	75	1,935	- 15	1,920	75	1,860	Glacial drift	Hard, iron, "alkaline"	43	S	Oversufficient; waters 100 head stock; bad taste; used for steam engines.
27	NW.	23	"	"	"	Dug	20	1,935	- 15	1,920	15	1,920	Glacial drift	Hard, iron, slightly "alkaline"	46	D, S	Insufficient; just enough for drinking.
28	SE.	24	"	"	"	Bored	48	1,915					Glacial drift	Hard, iron, slightly "alkaline"		D, S	Sufficient; waters 50 head stock.
29	SW.	24	"	"	"	Dug	20	1,905	- 12	1,893	12	1,893	Glacial drift	Hard, iron	46	D, S	Insufficient; waters 20 head stock.
30	NW.	30	"	"	"	Bored	35	1,950	- 15	1,935			Glacial drift	Hard, "alkaline"	46	S	Insufficient; waters 12 head stock; laxative.
31	SW.	31	"	"	"	Bored	22	1,960	- 12	1,948			Glacial sand	Hard, black "alkaline"	45	N	Bitter taste; insufficient.
32	SW.	32	"	"	"	Dug	19	1,945	- 9	1,936			Glacial gravel	Hard, slightly "alkaline"	46	S	Sufficient; waters 10 head stock; laxative a similar well with soft water.
33	NW.	34	"	"	"	Dug	50	1,915	- 40	1,875			Glacial drift	Hard, clear, "alkaline"	46	S	Sufficient for 11 head stock; laxative.
34	NE.	34	"	"	"	Bored	18	1,910	- 10	1,900			Glacial sand	Soft	46	D, S	Sufficient for 10 head stock.
35	SE.	35	"	"	"	Bored	50	1,900	- 40	1,860			Glacial sand	Hard, clear, slightly "alkaline"	46	D, S	Insufficient; waters 8 head stock.
36	NW.	36	"	"	"	Dug	36	1,895	- 20	1,875	36	1,859	Glacial drift	Hard, iron, "alkaline" red sediment	47	S	Oversufficient; waters 35 head stock; second 40-foot well unfit for drinking.
1	SW.	1	32	14	3	Dug	18	1,960	- 9	1,951			Glacial sand	Soft, clear	46	D, S	Sufficient for 12 head stock.
2	SE.	2	"	"	"	Bored	70	1,960	- 60	1,900	70	1,890	Glacial sand	Hard, clear, "alkaline"		D, S	Insufficient; waters 40 head stock.
3	NW.	4	"	"	"	Dug	12	1,960	- 4	1,956			Glacial sand	Soft, clear	46	D	Oversufficient; used only for drinking.
4	SW.	4	"	"	"	Bored	62	1,955	- 37	1,918	62	1,893	Glacial fine sand	Hard, iron, red sediment slightly "alkaline"	45	D, S	Abundant supply; waters 65 head stock.
5	E½.	5	"	"	"	Bored	60	1,980	- 40	1,940	60	1,920	Glacial sand	Hard, iron	46	D, S	Sufficient; waters 15 head stock.
6	SE.	8	"	"	"	Bored	72	1,975	- 15	1,960	72	1,903	Glacial gravel	Hard	46	D, S	Oversufficient; watered 60 head stock; supplies 15 barrels a day.
7	SW.	9	"	"	"	Dug	25	1,965	- 15	1,950			Glacial drift	Hard	45	D, S	Abundant supply.
8	SE.	10	"	"	"	Dug	25	1,955	- 22	1,933			Glacial sand	Hard	46	D, S	Insufficient; waters 6 head stock.
9	SE.	11	"	"	"	Dug	14	1,955	- 8	1,947			Glacial sand	Hard, "alkaline"	46	S	Sufficient for 10 head stock.
10	SE.	12	"	"	"	Dug	23	1,955	- 4	1,951	23	1,932	Glacial drift	Hard, iron	45	D, S	Sufficient; waters 20 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.

7  
WELL RECORDS—Rural Municipality of MARRIOTT NO. 317, SASKATCHEWAN

B 4-4  
1860—10,000

WELL No.	LOCATION					TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE		PRINCIPAL WATER-BEARING BED			CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
	¼	Sec.	Tp.	Rge.	Mer.				Above (+) Below (-) Surface	Elev.	Depth	Elev.	Geological Horizon				
11	NE.	12	32	14	3	Dug	25	1,950	- 21	1,929	21	1,929	Glacial sand	Hard	45	D, S	Insufficient; waters 6 head stock.
12	SW.	14	"	"	"	Dug	20	1,960	- 16	1,944	16	1,944	Glacial sand	Hard, clear	46	D, S	Insufficient; waters 12 head stock.
13	SE.	14	"	"	"	Bored	40	1,955	- 35	1,920	35	1,920	Glacial sand	Hard, slightly "alkaline"	46	D, S	Sufficient for 6 head stock; also similar well.
14	SE.	15	"	"	"		60	1,960	- 15	1,945	60	1,900	Glacial gravel	Hard, iron, red sediment	46	D, S	Oversufficient; waters 40 head stock; laxative.
15	SW.	15	"	"	"	Dug	35	1,960	- 20	1,940	35	1,925	Glacial sand	Hard, slightly "alkaline"	46	D, S	Sufficient; waters 15 head stock.
16	SE.	16	"	"	"	Dug	24	1,975	- 20	1,955	20	1,955	Glacial sand	Hard, iron	47	D, S	Sufficient for 6 head stock.
17	NW.	19	"	"	"	Bored	31	2,075	- 26	2,049	26	2,049	Glacial gravel	Hard	46	D, S	Oversufficient supply; ample for 20 head stock.
18	SW.	24	"	"	"	Dug	25	1,950	- 23	1,927	23	1,927	Glacial sand	Hard, cloudy	46	D, S	Insufficient supply; 50-foot well, good supply; unfit for drinking.
19	NW.	24	"	"	"	Bored	40	1,950	- 35	1,915			Glacial drift	Hard	46	D, S	Insufficient; waters 8 head stock.
20	SE.	31	"	"	"	Drilled	110	2,060	- 55	2,005	110	1,950	Glacial sand	Hard, iron	46	D, S	Oversufficient; waters 30 head stock.
21	NE.	31	"	"	"	Dug	20	2,075	- 15	2,060			Glacial drift	Hard, iron	46	D, S	Sufficient supply.
22	NW.	31	"	"	"	Dug	16	2,100	0	2,100			Glacial drift	Hard, slightly "alkaline"		D, S	Sufficient; waters 10 head stock.
23	NE.	32	"	"	"	Bored	99	2,050	- 19	2,031	99	1,951	Glacial drift	Hard, "alkaline" oily	46	S	Just sufficient; waters 14 head stock; laxative.
24	SW.	32	"	"	"	Bored	75	2,050	- 2	2,048	75	1,975	Glacial sand	Hard, iron	43	D, S	Oversufficient; waters 50 head stock.
25	NW.	33	"	"	"	Bored	70	2,050	- 5	2,045	70	1,980	Glacial drift	Hard, "alkaline"	46	S	Abundant supply; laxative.
26	NW.	34	"	"	"	Bored	16	1,975	- 15	1,960	15	1,960	Glacial drift	Soft, clear	46	D, S	Insufficient supply.
27	NE.	36	"	"	"	Dug	20	1,970	- 10	1,960			Glacial drift	Hard, cloudy slightly "alkaline"	46	S	Sufficient; waters 12 head stock; sometimes black and bitter.
28	SE.	36	"	"	"		13	1,960	- 7	1,953			Glacial drift	Very hard, "alkaline"		S	Sufficient for 10 head stock; laxative.
1	NW.	2	32	15	3	Bored	72	2,045	- 50	1,995	72	1,973	Glacial drift	Hard	44	D, S	Sufficient for 4 head stock.
2	SE.	2	"	"	"	Bored	36	2,010	- 30	1,980	30	1,980	Glacial drift	Hard, iron, red sediment some "alkaline"	46	D, S	Sufficient; waters 15 head stock.
3	SE.	3	"	"	"	Bored	80	2,050	- 65	1,985	80	1,970	Glacial drift	Hard, iron, red sediment	46	D, S	Sufficient for 20 head stock.
4	NE.	5	"	"	"	Bored	108	2,140	-100	2,040	108	2,032	Glacial drift	Hard, slightly "alkaline"	46	D, S	Sufficient; waters 20 head stock.
5	SE.	6	"	"	"	Bored	108	2,110	- 88	2,022	108	2,002	Glacial sand	Hard, iron	46	D, S	Oversufficient; waters 20 head stock.
6	SE.	7	"	"	"	Dug	20	2,150	0	2,150			Glacial drift	Hard		D, S	Insufficient; waters 30 head stock; 2 other wells; one with soft drinking water.
7	NW.	7	"	"	"	Dug	34	2,170	- 19	2,151			Glacial drift	Hard, slightly "alkaline"	46	D, S	Sufficient; waters 25 head stock; supplies 15 barrels a day.

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 No.	LOCATION					TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE		PRINCIPAL WATER-BEARING BED			CHARACTER OF WATER	TEMP. OF WATER (in°F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
	¼	Sec.	Tp.	Rge.	Mer.				Above (+) Below (-) Surface	Elev.	Depth	Elev.	Geological Horizon				
8	SE.	9	32	15	3	Dug	50	2,100	- 35	2,065	50	2,050	Glacial sand	Hard	46	D, S	Oversufficient; waters 10 head stock.
9	SW.	10	"	"	"	Bored	90	2,100	- 87	2,013	87	2,013	Glacial sand	Hard, iron, red sediment	46	D, S	Sufficient; waters 10 head stock.
10	SW.	13	"	"	"	Bored	36	2,040	- 6	2,034	36	2,004	Glacial drift	Hard, slightly "alkaline"	46	D, S	Oversufficient; waters 25 head stock.
11	SW.	14	"	"	"	Bored	40	2,045	- 20	2,025	40	2,005	Glacial sand	Hard, slightly "alkaline"	46	D, S	Sufficient; waters 12 head stock.
12	NE.	14	"	"	"	Bored	75	2,075	- 65	2,010			Glacial sand	Hard, iron, red sediment	44	D, S	Oversufficient; waters 20 head stock.
13	SW.	15	"	"	"	Bored	90	2,070	- 75	1,995	90	1,980	Glacial drift	Hard, iron, red sediment	45	D, S	Sufficient; waters 20 head stock.
14	SW.	16	"	"	"	Drilled	100	2,140	- 90	2,050			Glacial drift	Hard	46	D, S	Unfit for man and stock.
15	SE.	17	"	"	"	Bored	100	2,155	- 84	2,071	100	2,055	Glacial drift	Hard, slightly "alkaline"	46	D, S	Sufficient; waters 15 head stock.
16	NW.	18	"	"	"	Dug	40	2,190	- 30	2,160			Glacial drift	Hard, iron	46	D, S	Sufficient; waters 25 head stock.
17	NE.	20	"	"	"	Dug	70	2,205	- 66	2,139			Glacial drift	Hard, iron	41	D, S	Insufficient; waters 25 head stock.
18	SE.	20	"	"	"	Bored	117	2,210	- 97	2,113	117	2,093	Glacial drift	Hard, "alkaline"	46	S	Sufficient supply.
19	NW.	20	"	"	"	Dug	70	2,235	- 60	2,175	70	2,165	Glacial sand	Hard, "alkaline"	46	D, S	Sufficient for 25 head stock.
20	SW.	21	"	"	"	Bored	70	2,170	- 65	2,105			Glacial drift	Hard	47	D, S	Sufficient for 10 head stock.
21	NE.	22	"	"	"	Bored	85	2,150	- 65	2,085	85	2,065	Glacial gravel	Hard	43	D, S	Sufficient; waters 25 head stock.
22	SE.	24	"	"	"	Bored	100	2,050	- 70	1,980	100	1,950	Glacial gravel	Hard, iron	45	D, S	Sufficient for 25 head stock.
23	NE.	24	"	"	"	Dug	10	2,095	- 2	2,093			Glacial gravel	Hard	42	D, S	Sufficient for 10 head stock; this well is spring fed.
24	SE.	27	"	"	"	Drilled	290	2,150	- 90	2,060	290	1,860	Glacial sand	Hard, iron, slightly "alkaline"	46	D, S	Sufficient supply; waters 40 head stock.
25	SE.	30	"	"	"	Dug	30	2,245	- 25	2,220			Glacial sand	Hard	46	D, S	Insufficient; waters 19 head stock.
26	SW.	30	"	"	"	Dug	44	2,250	- 14	2,236	44	2,206	Glacial drift	Hard, iron, "alkaline"	46	S	Sufficient; waters 18 head stock; bitter taste; second 22-foot well supplies drinking water.
27	NE.	31	"	"	"	Dug	18	2,300	0	2,300			Glacial drift	Medium hard	48	D, S	Insufficient supply.
28	SE.	31	"	"	"	Dug	12	2,310	- 3	2,307			Glacial sand and gravel	Hard	46	S	Sufficient for 30 head stock.
29	NW.	32	"	"	"	Spring							Glacial sand	Hard			Good for drinking.
30	NE.	35	"	"	"	Bored	45	2,200	- 35	2,165	45	2,155	Glacial sand	Hard, iron, red sediment	46	D, S	Sufficient; waters 13 head stock.
31	NW.	36	"	"	"	Bored	78	2,150	- 72	2,078			Glacial gravel	Hard		D, S	Not used at present; dam supplies water for stock.
32	SE.	36	"	"	"	Bored	78	2,150	- 74	2,076			Glacial gravel	Hard, iron, slightly "alkaline"	46	D, S	Just sufficient for 8 head stock; supplies 2 barrels a day.

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.