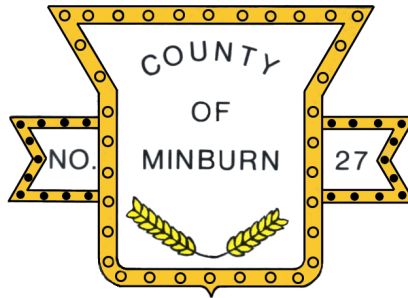


## County of Minburn No. 27

Part of the North Saskatchewan River Basin  
Parts of Tp 047 to 054, R 08 to 16, W4M  
Regional Groundwater Assessment

Prepared for



In conjunction with



Agriculture and  
Agri-Food Canada

Agriculture et  
Agroalimentaire Canada

Prairie Farm Rehabilitation  
Administration

Administration du rétablissement  
agricole des Prairies

Canada 

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(Revised November 1999)

### PERMIT TO PRACTICE

HYDROGEOLOGICAL CONSULTANTS LTD.

Signature \_\_\_\_\_

Date \_\_\_\_\_

**PERMIT NUMBER: P 385**

The Association of Professional Engineers,  
Geologists and Geophysicists of Alberta

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- A HYDROGEOLOGICAL MAPS AND FIGURES
- B MAPS AND FIGURES ON CD-ROM
- C GENERAL WATER WELL INFORMATION
- D MAPS AND FIGURES INCLUDED AS LARGE PLOTS

## 1 PROJECT OVERVIEW

### “Water is the lifeblood of the earth.” - Anonymous

How a County takes care of one of its most precious resources - groundwater - reflects the future wealth and health of its people. Good environmental practices are not an accident. They must include genuine foresight with knowledgeable planning. Implementation of strong practices not only commits to a better quality of life for future generations, but also creates a solid base for increased economic activity. **This report, even though it is regional in nature, is the first step in fulfilling a commitment by the County of Minburn No. 27 toward the management of the groundwater resource, which is a key component toward the well-being of the County, and is a guide for future groundwater-related projects.**

#### 1.1 About This Report

This report provides an overview of (a) the groundwater resources of the County of Minburn No. 27, (b) the processes used for the present project and (c) the groundwater characteristics in the County.

Additional technical details are available from files on the CD-ROM provided with this report. The files include the geo-referenced electronic groundwater database, maps showing distribution of various hydrogeological parameters, the groundwater query, and ArcView files. Likewise, all of the illustrations and maps from the present report, plus additional maps, figures and cross-sections, are available on the CD-ROM. For convenience, poster-size maps and cross-sections have been prepared as a visual summary of the results presented in this report. Copies of these poster-size drawings have been forwarded with this report, and are included as page-size drawings in Appendix D.

Appendix A features page-size copies of the figures within the report plus additional maps and cross-sections. An index of the page-size maps and figures is given at the beginning of Appendix A.

Appendix B provides a complete list of maps and figures included on the CD-ROM.

Appendix C includes the following:

- 1) a procedure for conducting aquifer tests with water wells;
- 2) a table of contents for the Water Well Regulation under the Environmental Protection and Enhancement Act; and
- 3) additional information.

The Water Well Regulation deals with the wellhead completion requirement (no more water-well pits), the proper procedure for abandoning unused water wells and the correct procedure for installing a pump in a water well.

## 1.2 The Project

**It must be noted that the present project is a regional study and as such the results are to be used only as a guide. Detailed local studies are required to verify hydrogeological conditions at given locations.**

The present project is made up of five parts as follows:

- Module 1 - Data Collection and Synthesis
- Module 2 - Hydrogeological Maps
- Module 3 - Covering Report
- Module 4 - Groundwater Query
- Module 5 - Training Session

This report and the accompanying maps represent Modules 2 and 3.

## 1.3 Purpose

This project is a regional groundwater assessment of the County of Minburn No. 27. The regional groundwater assessment provides the information to assist in the management of the groundwater resource within the County. Groundwater resource management involves determining the suitability of various areas in the County for particular activities. These activities can vary from the development of groundwater for agricultural or industrial purposes, to the siting of waste storage. **Proper management ensures protection and utilization of the groundwater resource for the maximum benefit of the people of the County.**

The regional groundwater assessment includes:

- identification of the aquifers<sup>1</sup> within the surficial deposits<sup>2</sup> and the upper bedrock;
- spatial definition of the main aquifers;
- quantity and quality of the groundwater associated with each aquifer;
- hydraulic relationship between aquifers; and
- identification of the first sand and gravel deposits below ground level.

Under the present program, the groundwater-related data for the County have been assembled. Where practical, the data have been digitized. These data are then being used in the regional groundwater assessment for the County.

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<sup>1</sup> See glossary

<sup>2</sup> See glossary

## 2 INTRODUCTION

### 2.1 Setting

The County of Minburn No. 27 is situated in east-central Alberta. This area is part of the Alberta Plains region. The County exists within the North Saskatchewan River Basin. The Vermilion River flows through the western and eastern parts of the County. The County boundaries follow township or section lines. The area includes some or all of townships 047 to 054, ranges 08 to 16, west of the 4th Meridian.

Regionally, the topographic surface varies between 580 and 740 metres above mean sea level (AMSL), with the lowest elevation occurring in the Vermilion River Valley in the northeastern part of the County.

### 2.2 Climate

The County of Minburn lies within the transition zone between a humid, continental Dfb climate and a semiarid Bsk climate. This classification is based on potential evapotranspiration values determined using the Thornthwaite method (Thornthwaite and Mather, 1957), combined with the distribution of natural ecoregions in the area. The ecoregions map (Strong and Legatt, 1981) shows that the County is located in the Aspen Parkland region, a transition between boreal forest and grassland environments.

A Dfb climate consists of long, cool summers and severe winters. The mean monthly temperature drops below  $-3\text{ }^{\circ}\text{C}$  in the coolest month, and exceeds  $10\text{ }^{\circ}\text{C}$  in the warmest month. A Bsk climate is characterized by its moisture deficiency, where mean annual potential evapotranspiration exceeds the mean annual precipitation.

The mean annual precipitation averaged from four meteorological stations within the County measured 407 millimetres (mm), based on data from 1961 to 1993. The annual temperature averaged  $1.7\text{ }^{\circ}\text{C}$ , with the mean monthly temperature reaching a high of  $16.4\text{ }^{\circ}\text{C}$  in July, and dropping to a low of  $-15.4\text{ }^{\circ}\text{C}$  in January. The calculated annual potential evapotranspiration is 510 millimetres.

### 2.3 Background Information

There are currently records for 3,329 water wells in the groundwater database for the County. Of the 3,329 water wells, 2,668 are for domestic/stock purposes. The remaining 661 water wells were completed for a variety of uses, including municipal, investigation, observation and industrial purposes. Based on a rural population of 3,405, there are 3.1 domestic/stock water wells per family of four. The domestic or stock water wells vary in depth from 2.1 metres to 183.0 metres below ground level. Lithologic details are available for 1,665 water wells.

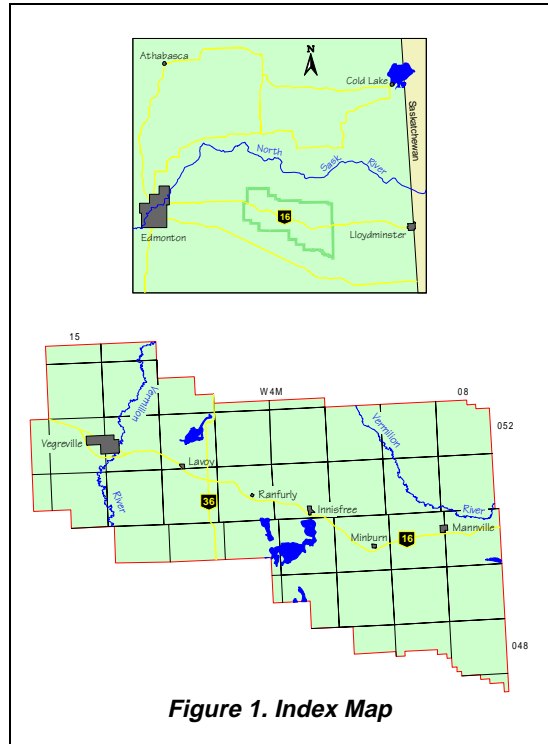


Figure 1. Index Map