

County of St. Paul No. 19

Part of the North Saskatchewan River Basin
Parts of Tp 055 to 062, R 03 to 13, W4M
Regional Groundwater Assessment

Prepared for



In conjunction with



Agriculture and
Agri-Food Canada

Prairie Farm Rehabilitation
Administration

Agriculture et
Agroalimentaire Canada

Administration du rétablissement
agricole des Prairies

Canada

Prepared by

hydrogeological consultants ltd.

1-800-661-7972

Our File No.: **97-102**

September 1998

(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

TABLE OF CONTENTS

1 PROJECT OVERVIEW.....	1
1.1 About This Report.....	1
1.2 The Project.....	1
1.3 Purpose.....	2
2 INTRODUCTION	3
2.1 Setting.....	3
2.2 Climate.....	3
2.3 Background Information.....	3
3 TERMS.....	5
4 METHODOLOGY.....	6
4.1 Data Collection and Synthesis.....	6
4.2 Spatial Distribution of Aquifers	7
4.3 Hydrogeological Parameters	8
4.3.1 Risk Criteria	8
4.4 Maps and Cross-Sections.....	9
4.5 Software.....	9
5 AQUIFERS.....	10
5.1 Background.....	10
5.1.1 Surficial Aquifers.....	10
5.1.2 Bedrock Aquifers	11
5.2 Aquifers in Surficial Deposits	12
5.2.1 Geological Characteristics of Surficial Deposits.....	12
5.2.2 Sand and Gravel Aquifer(s).....	13
5.2.2.1 Chemical Quality of Groundwater from Surficial Deposits.....	14
5.2.3 Upper Sand and Gravel Aquifer	14
5.2.3.1 Aquifer Thickness.....	14
5.2.3.2 Apparent Yield.....	15
5.2.4 Lower Sand and Gravel Aquifer	15
5.2.4.1 Apparent Yield.....	15
5.3 Bedrock.....	16
5.3.1 Geological Characteristics.....	16
5.3.2 Aquifers	17
5.3.2.1 Chemical Quality of Groundwater.....	18
5.3.3 Continental Foremost Aquifer.....	19
5.3.3.1 Depth to Top.....	19

5.3.3.2 Apparent Yield.....	19
5.3.3.3 Quality	19
5.3.4 Lea Park "Aquitard"	20
6 GROUNDWATER BUDGET	21
6.1 Aquifers in Surficial Deposits.....	21
6.1.1 Hydrographs	21
6.1.2 Quantity of Groundwater	22
6.1.3 Recharge/Discharge.....	22
6.2 Bedrock Aquifers	23
7 POTENTIAL FOR GROUNDWATER CONTAMINATION	25
7.1.1 Risk of Contamination Map	26
8 RECOMMENDATIONS.....	27
9 REFERENCES	29
10 GLOSSARY	30

LIST OF FIGURES

Figure 1. Index Map	3
Figure 2. Generalized Cross-Section (for terminology only)	5
Figure 3. Geologic Column	5
Figure 4. Cross-Section A – A'	11
Figure 5. Bedrock Topography.....	12
Figure 6. Amount of Sand and Gravel in Surficial Deposits.....	13
Figure 7. Apparent Yield from Water Wells completed through Sand and Gravel Aquifer(s).....	13
Figure 8. Total Dissolved Solids in Groundwater from Surficial Deposits.....	14
Figure 9. Apparent Yield for Water Wells Completed through Upper Sand and Gravel Aquifer	15
Figure 10. Apparent Yield for Water Wells Completed through Lower Sand and Gravel Aquifer	15
Figure 11. Bedrock Geology	16
Figure 12. Apparent Yield for Water Wells Completed in Upper Bedrock Aquifer(s)	17
Figure 13. Total Dissolved Solids in Groundwater from Upper Bedrock Aquifer(s).....	18
Figure 14. Apparent Yield for Water Wells Completed through continental Foremost Aquifer.....	19
Figure 15. Apparent Yield for Water Wells Completed through Lea Park "Aquitard"	20
Figure 16. Hydrographs 392 and 241	21
Figure 17. Recharge/Discharge Areas between Surficial Deposits and Upper Bedrock Aquifer(s)	23
Figure 18. Recharge/Discharge Areas between Surficial Deposits and continental Foremost Aquifer.....	24
Figure 19. Risk of Groundwater Contamination	26

APPENDICES

- 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**