

RESEARCH COUNCIL OF ALBERTA

Preliminary Report 63-2

SURFICIAL GEOLOGY OF THE  
VAUXHALL DISTRICT, ALBERTA

by

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## ILLUSTRATIONS

Preliminary Map 63-2. Surficial geology, Vauxhall district . . . in pocket

# SURFICIAL GEOLOGY OF THE VAUXHALL DISTRICT, ALBERTA

## Abstract

The surficial deposits of the Vauxhall district consist predominantly of till, mainly in the form of ground moraine. Approximately one-third of the map-area is covered by glacio-lacustrine materials, mostly consisting of thin loam and silty loam deposits. Sandy and gravelly alluvium is present in the Bow River valley, and aeolian sand is found in the southwest part of the area.

## INTRODUCTION

A survey of the Vauxhall district was carried out in the month of May, 1958, in order to determine the degree of variability of the surficial deposits. This information is intended for future use in irrigation engineering and practice.

The Vauxhall district is located in southern Alberta about 40 miles northeast of the city of Lethbridge in the centre of Alberta's irrigation region. The map area covers some 375 square miles between 50 degrees and 50 degrees 15 minutes north latitude and 112 degrees and 112 degrees 30 minutes west longitude, and encompasses the National Topographic Series Sheet 821/1.

The types and distribution of surficial deposits of the area are shown on the accompanying map on a scale of 1 inch to 2 miles.

## DESCRIPTION OF DEPOSITS

### Introduction

The Vauxhall area was glaciated by a Keewatin glacier which advanced over the area from a northerly direction. No signs of multiple glaciation were found in the district. The glacier that covered the area was of Wisconsin glacial age, as evidenced by freshness of topography and continuity of surface deposits with those of known Wisconsin age in other areas.

Surficial deposits of adjacent districts have not been mapped and, because of this, a detailed glacial history of the district cannot be set up.

### Bedrock

The bedrock of the district consists of unconsolidated Upper Cretaceous bentonitic sandstones and shales belonging to the Foremost and Oldman Formations. Coal beds are also found in places. All of the bedrock strata have a near horizontal attitude.

### Till

Till consists of unsorted deposits laid down directly from the glacier. In Vauxhall district it forms most of the surface deposits and underlies most other surface deposits. It consists of about equal parts of sand, silt and clay, the clay being plastic as it contains a high percentage of montmorillonite. Secondary gypsum crystals are common in the till in some places.

The till cover is predominantly thin, generally ranging from 20 to 40 feet, but occasionally thicker or thinner sections are encountered. The till near the surface is brown in color, but at a depth of between 20 and 30 feet it changes gradually or abruptly to grey. This color change is due to oxidation of iron oxides near the surface; the composition of the till otherwise remains the same. At depth the till may be more compact than at the surface because of load compaction by the overlying weight of the deposit. Occasional lenses of sand or gravel may be encountered in the till.

The gravel fraction of the till contains a high percentage of material derived from the Canadian Shield, such as granite and metamorphic rocks.

The surface of the till is level to gently undulating, and accordingly the deposit is classified as ground moraine. The main features of the ground moraine are small irregular knobs usually about 5 feet and rarely over 10 feet high and from 100 to 500 feet in diameter. These knobs are difficult to detect from the ground but show up well on aerial photographs. Undrained closed depressions are common on the ground moraine, but because of the semi-arid climate most of them do not contain water, except temporarily in springtime.

Crevasse fillings made predominantly of till are present in the district. Large sand and gravel pockets are encountered in them.

### Glacio-Fluvial Deposits

Glacial outwash deposits in the district are limited to a few small terrace-like deposits associated with some of the ice-walled channels. They are composed mainly of sand, although gravel pockets are present in places.

### Glacio-Lacustrine Deposits

Glacio-lacustrine deposits of the district are of two major types: deposits of glacier-impounded lakes and glacier-marginal lakes. Glacier-impounded lakes are lakes that have glacier ice forming most of the lakeshore and which also rest partly on ice. Such lakes do not have beaches and their deposits do not conform to topography. The majority of lacustrine deposits of the district belong to this category.

Glacier-marginal lakes are lakes that border on ice along only a small part of their shoreline. Deposits of such lakes conform to topography only in those places where the original lake was not adjacent to the ice. Lake deposits north of the town of Vauxhall in the vicinity of townships 13 and 14, range 16 are of this type.

All lacustrine deposits of the district overlie till or ground moraine. In mechanical composition the lacustrine deposits are all similar and may be classified as loam and silty or sandy loam. In places, sand may be the predominant material, as in the southwest corner of the map area. The thin lacustrine deposits have a more or less uniform composition, but the thicker deposits, especially those north of the town of Vauxhall (ice-marginal lacustrine deposits) are significantly more clayey near the surface than at depth. At depth they may grade into fine sand or into varved clays with a large percentage of very fine sand and silt.

Ice-rafted pebbles, although rare, are of widespread occurrence in the lacustrine deposits in the district.

The thin lacustrine deposits tend to be discontinuous; consequently they have been classified on the map by symbols indicating approximate percentage of area covered by lacustrine deposits and till.

### Alluvial Deposits

The Bow River valley in the district is bordered by extensive terraces and by slip-off slopes which are covered by alluvium. The alluvium, for the most part, is of a sandy composition, with pockets of gravel common in places. The alluvium rests on till or bedrock, depending on the depth of erosion before the deposition of this alluvium. Deposition of the alluvium took place from the end of glaciation to the present.

Recent alluvial deposits are limited to the bottom of the Bow River valley and small tributary channels.

### Recent Deposits

Aeolian sand occurs in the southwest corner of the map area, where it developed from lacustrine sand. No significant aeolian activity is taking place at present.



LEGEND

QUATERNARY  
RECENT

- 9 Alluvial: sand, silt and clay
- 8 Aeolian: sand and silt
- Colluvium: sand, silt and clay

PLEISTOCENE AND RECENT  
ALLUVIAL

- 6 Sand and gravel, some silt

PLEISTOCENE  
GLACIO-LACUSTRINE

- 5 Clay, silt and sand, over 75% of surface area
- 4 Clay, silt and sand, from 25% to 75% of surface area

GLACIO-FLUVIAL

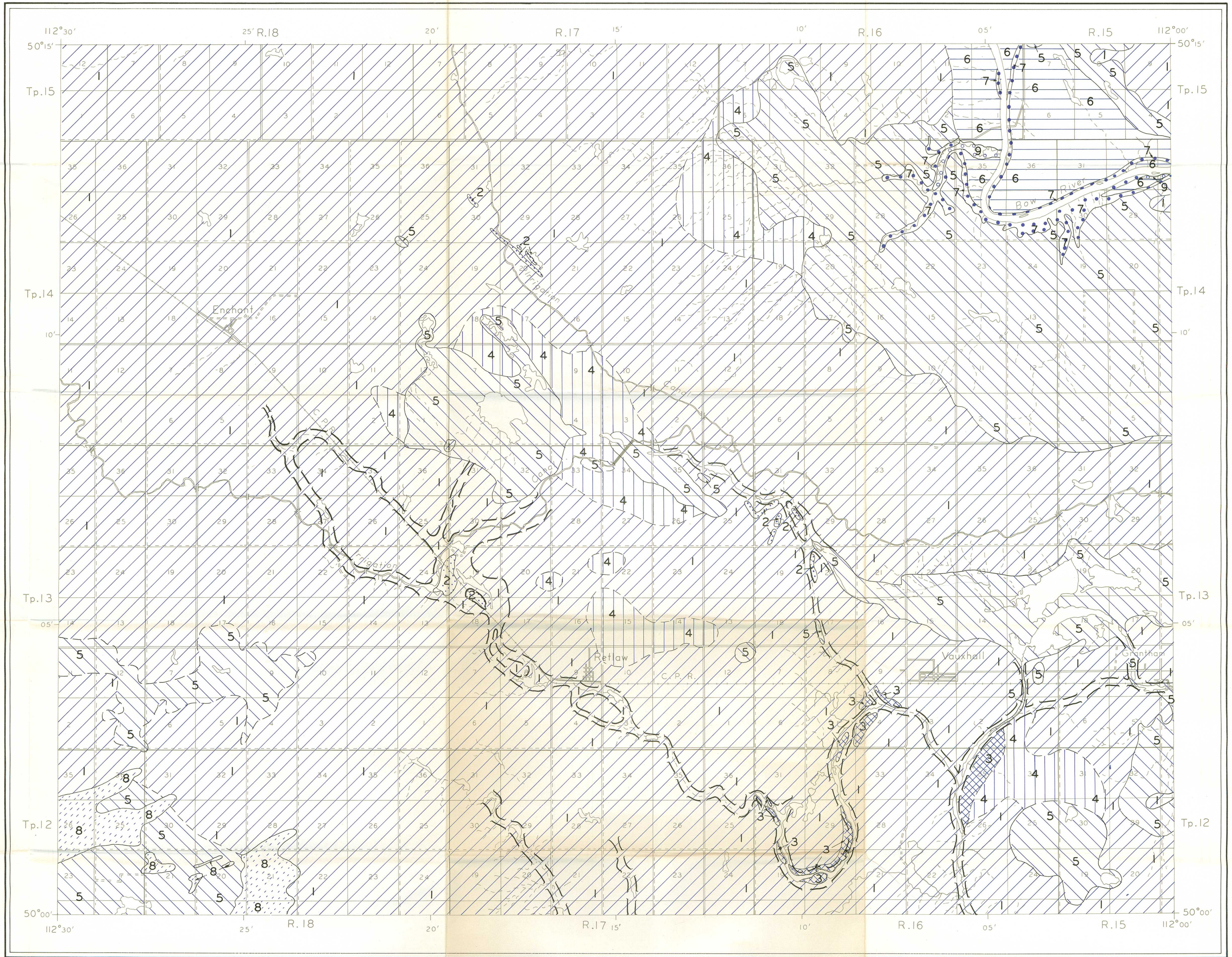
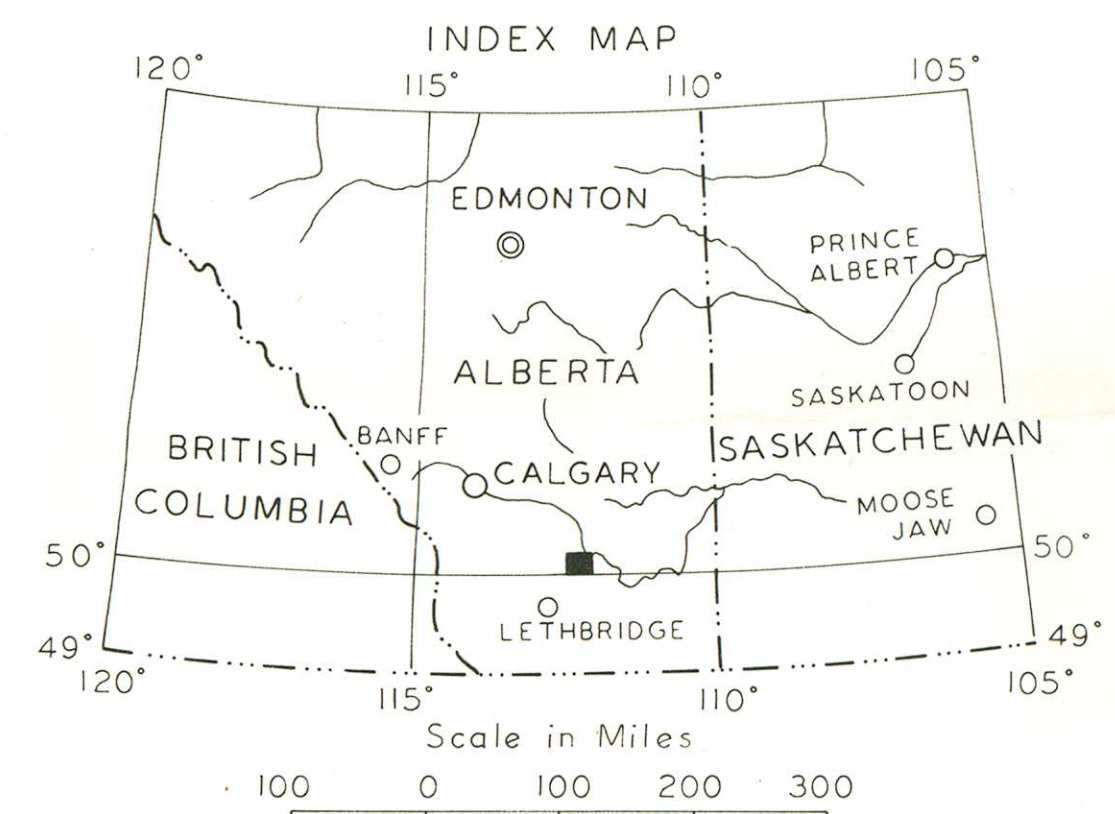
- 3 Outwash: mainly sand, some silt

GLACIAL

- 2 Crevasse filling: mainly till with local pockets of sand and gravel
- 1 Ground moraine: till-clay, silt, sand and boulders, some lenses of sand and gravel

- Ice-walled channel
- Geological boundary, definite
- Geological boundary, indefinite
- Geology by L.A. Bayrock and J.F. Jones
- Local road, well travelled
- Local road, not well travelled
- Railway
- Township boundary
- Section line

Cartography taken from Department of Lands and Forests, Alberta, Aerial Sheet Survey No. 82T, 1952



Map to be used in conjunction with Preliminary Report No. 63-2

PRELIMINARY MAP 63-2A SURFICIAL GEOLOGY  
VAUXHALL DISTRICT, ALBERTA

