



GEOLOGY OF THE WHITEHOUSE CREEK AREA
 (92B/13f, g)

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INTRODUCTION

The Whitehouse Creek area (Figure 1) overlaps the Mount Richards area on the northwest and represents a continuation of the Sicker mapping project. Some of the mapping was done in 1978 and 1979 but most was done during four weeks in 1981. The principal object of the study is to relate the Sicker rocks north of the Chemainus River to the section established on Mount Richards.

Physiographically the area includes the widening valley of the Chemainus River, the north footslope of Big and Little Sicker Mountains, and the extreme southeast footslope of Mount Brenton. The valley narrows to a notch in the west part of the area. Within it the river has been incised through thick drift and, along most of the included length, deeply into

LEGEND

NANAIMO GROUP

- 4d Sandstone dyke
- 4c Siltstone and shale
- 4b Sandstone
- 4a Conglomerate and grit

INTRUSIVE ROCKS

- 3 Hornblende shonkinite
- 2 Quartz feldspar porphyry

SICKER GROUP

- 1d Quartz-mica schist
- 1c Siltite and fine quartzite
- 1b Hornblende trachyte
- 1a Mafic trachyte; chlorite schist

Symbols

- Outcrop; outcrop area + 
- Geological contact - - - - - 
- Bedding; schistosity 
- Orientation of sandstone dyke 
- Trend and plunge of minor fold; combined with bedding 
- Direction of overriding (vergence) on minor folds 
- Fault 

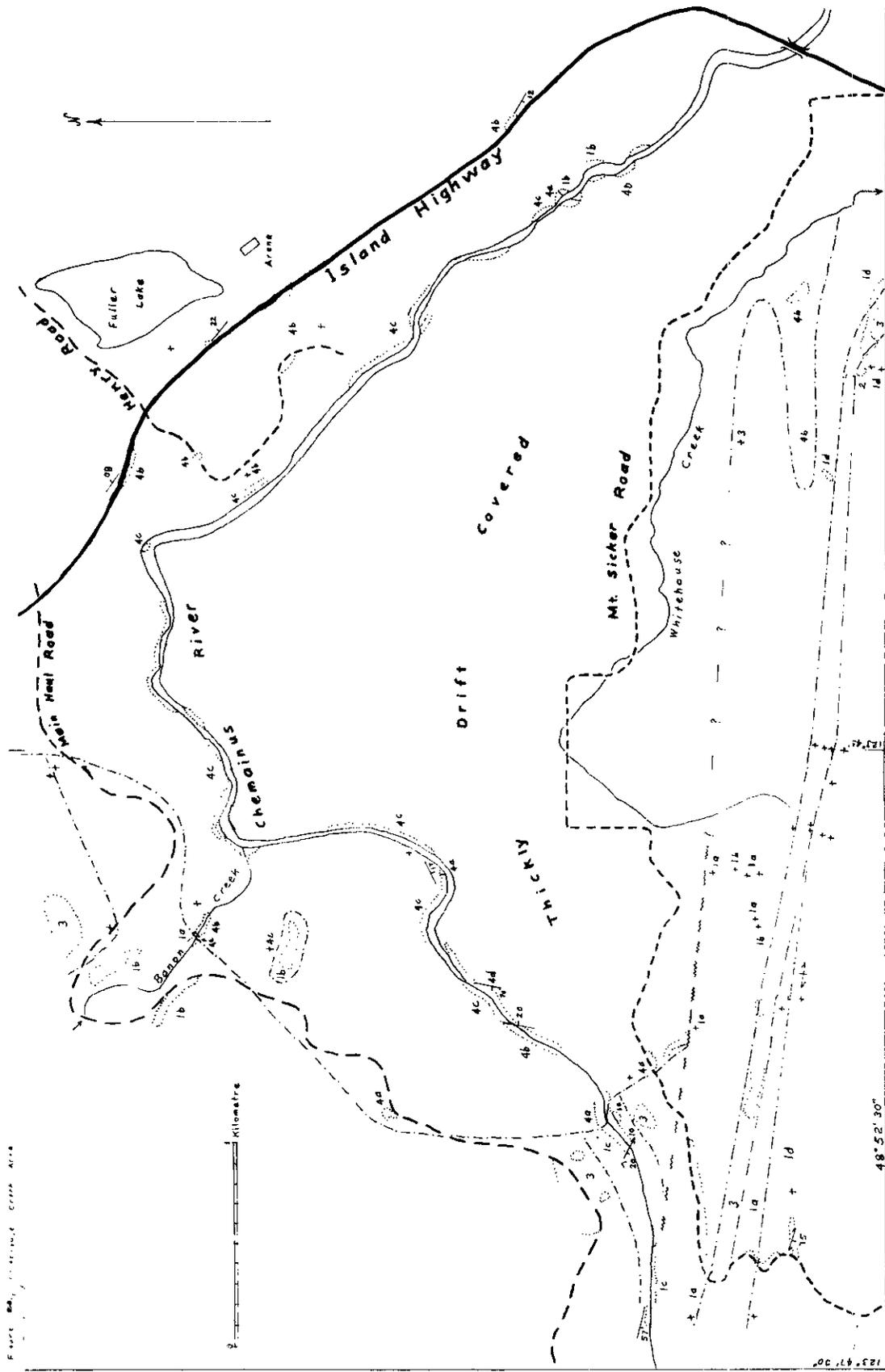


Figure 1. Whitehouse Creek area.

bedrock. In summer it is possible to walk long stretches of the river on bedrock pavement and gravel bars, crossing where necessary by rock-hopping or wading. Two canyons in the west part are inaccessible but the section between them can be reached with the aid of a rope.

Thick drift in the valley extends up the slope of Big Sicker Mountain, and outcrops are mostly confined to a few exposures in watercourses and road cuts. Most of this slope is covered by tall timber, and airphotos are virtually useless. Mapping here was done by altimeter and compass traverses using a contour map at 1:2500 obtained through the courtesy of Serem Limited.

GENERAL GEOLOGY

Volcanic and sedimentary rocks of the Paleozoic Sicker Group have been intruded by small bodies of quartz feldspar porphyry, deformed, then intruded by larger bodies of hornblende shonkinite. The thick Lower Mesozoic section seen elsewhere on Vancouver Island is missing from this area, and the older rocks are directly and unconformably overlain by clastic sedimentary rocks of the Upper Cretaceous Nanaimo Group. The Nanaimo beds form a lobe extending some distance up the ancestral Chemainus River valley.

SICKER GROUP

Trachyte characterized by medium to coarse-grained hornblende phenocrysts is the dominant Sicker rock north of the Upper Cretaceous lobe. It is similar to a band of hornblendic trachyte traced through the Mount Richards area. Outcrops are massive and erosion-resistant, forming low hills and ridges. The outcrop area south of Banon Creek is interpreted as a hill in the pre-Nanaimo surface. The inlier in the lower Chemainus River may be a similar hill or it may represent tilting on a post-Nanaimo fault. Coarse volcanic breccia occurs in the area of hornblendic trachyte in Banon Creek both near the Nanaimo contact and at the base of a transmission pylon east of the creek. It is probable that the hornblendic phase was repeated several times in the volcanic sequence, so the Banon Creek unit cannot be positioned in the sequence from the present mapping.

Mildly deformed sedimentary rocks are exposed in the Chemainus River upstream from the Nanaimo Group basal conglomerate. They consist of dark grey to black argillite, chert-like siltites, and fine-grained light grey quartzite. The siltites are more or less banded in white and shades of grey. A few tuffaceous beds are intercalated. These rocks resemble the upper, sedimentary part, of the Sicker Group in the Cowichan Lake area to the west and are probably somewhat younger than unit 1d of the Mount Richards area. Mafic volcanic rocks appear to overlie these beds in a small bluff south of the Nanaimo contact, but this section is complicated by faulting and the mafic rocks do not occur in an equivalent stratigraphic position in the river bed.

A belt of volcanic rocks occurs south of the Sicker and Nanaimo sedimentary rocks. The volcanic rocks are mostly mafic, though a few thin bands of the hornblendic phase are intercalated. The rocks are variably chloritized and slightly to completely schistose. A hornblende band appears to overlie the Sicker beds in the right bank of the river near the southwest limit of mapping, but the contact is sheared and is close to a projected fault. The position of these mafic volcanic rocks in the Sicker sequence is uncertain.

Unit 1d has been traced along Crofton and Breen Ridges, north of Mount Richards, across the flats, and along the north slope of Big Sicker Mountain to the mine road. Where least deformed, the rock is a white to light grey siltite. Most of it is schistose, and the intensity of schistosity increases northward; the outcrops shown on Figure 1 are white to light brown quartz-mica schists. This schist belt is interpreted to be a diffuse fault zone. The largest single movement apparently occurred in the siltites at the contact with the mafic volcanic rocks but the total movement was distributed over a considerable thickness of rock. Bands of chlorite schist indicate that some movement took place in the volcanic rocks. An undisturbed shonkinite dyke angles across the contact, consequently the movement is pre-shonkinite.

INTRUSIVE ROCKS

A few small dykes of quartz feldspar porphyry occur in the schist belt, and are schistose along with the siltites, but none have been found to the north.

Three, or possibly four, bodies of shonkinite (mafic hornblende syenite) were found in the map-area. One extends out of the area to the north and appears to be a stock. A second appears to be a thick sheet dipping gently westward up the Chemainus River. It rests on Sicker sedimentary rocks and is overlapped by Nanaimo sedimentary rocks. A small outcrop south of Whitehouse Creek may represent a faulted segment of this sheet or perhaps a completely separate body. A relatively narrow dyke angles through the schist belt in the south part of the area and appears to be an extension of the much thicker body that underlies Crofton Ridge.

NANAIMO GROUP

The Nanaimo beds are well exposed along the walls and bed of the Chemainus River and sporadically elsewhere. The early sedimentation varied from place to place. Along the west edge of the lobe there is a thick, coarse basal conglomerate. In Banon Creek this conglomerate thins to 30 metres. In both places it is overlain by sandstone which fines upward. In the river near the highway, 4.5 metres of hard grit (granule conglomerate and poorly sorted sandstone) overlies the Sicker rocks. The sandstone and grit are overlain by a thick section of dark grey siltstones and black shales, which in turn are overlain by fine-grained sandstone which is exposed along the highway. South of Banon Creek siltstone

appears to rest directly on the Sicker inlier. In the Chemainus River south of Banon Creek, a 5-metre grit bed has a discordant strike and rests on rumpled siltstone; it may be the basal unit thrust northwest over the younger beds.

Fossiliferous sandstone dykes cut the siltstones in two places: just above the discordant grit bed, south of Banon Creek in Chemainus River at the place marked 4d. The attitude symbol is for the largest dyke, one which is 20 to 30 centimetres thick. Others are as thin as 5 centimetres and curved. One was seen to bifurcate upward.

STRUCTURAL GEOLOGY

Pre-shonkinite and post-Nanaimo episodes of faulting occurred. In addition the Sicker sedimentary rocks (1c) have been folded and the dip of the Nanaimo beds suggests that the area has been tilted eastward. The overall dip of the Sicker beds is to the south-southwest. A syncline-anticline pair indicate overriding or vergence to the north. A shear zone on the flank of the anticline dips 32 degrees south and is probably a thrust. The timing of this folding and faulting is unclear but it is probably pre-Nanaimo.

The sense of movement in the schist belt is unclear. If the mafic volcanic rocks to the north are correlative with those on Mount Richards then at least a component of the movement was north side up. However, the mafic volcanics may be intercalated in the sediments in this area.

A significant post-Nanaimo fault is indicated by the abrupt termination of the basal conglomerate and by a large notch in the river wall. A major component of the movement had to be south side up. Not enough work has been done to indicate its westward extension, and to the east it passes under extensive glacial cover.

The Nanaimo-Sicker contact has been offset 30 metres to the left on a tight vertical fracture which angles across the river bed. A possible thrust in the Nanaimo beds has been noted above. And because the basal grit is not repeated there may be a fault along the south side of the Sicker inlier in the Chemainus River.

ECONOMIC GEOLOGY

No significant mineralization was found. Pyrite occurs in the schist belt and in the mafic volcanic rocks. The shonkinites contain sporadic grains of chalcopyrite.

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