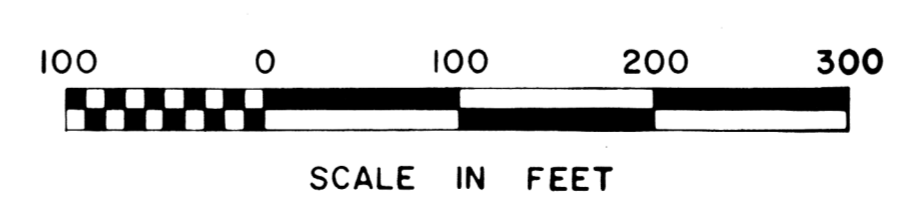


GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES

LEGEND

- QUATERNARY**
- 5 RECENT ALLUVIUM: silt, sand, gravel
 - 4 ALLUVIUM: silt, sand, gravel
 - 3 TALUS
- CENOZOIC**
- 2 LIMESTONE: thick-bedded, dolomitic, sandy in part, fine-grained, grey to dark grey
 - 1 LIMESTONE: thin-bedded, dark grey, argillaceous
- PALAEZOIC**
- Bedding $\frac{26}{30}$
 - Jointing $\frac{40}{45}$
 - Schistosity $\frac{23}{50}$
 - Edge of outcrop $\frac{23}{50}$
 - Geological boundary (approximate) $\frac{23}{50}$
 - Area where frozen ground encountered within 18 inches of ground surface (July 17, 1964) \textcircled{F}
 - Magnetic declination: 34° (approximate)



Descriptive Notes

In the vicinity of Upper Seaplane dam site Flat River has the appearance of a relatively young stream flowing rapidly in relatively straight lines parallel to the jointing and bedding of adjacent bedrock. Two former channels of the river, one of which passes through Seaplane Lake, occur about 2 and 3 miles northwest of the site. Upstream from the site the river appears older as it flows in a slow meandering fashion through a broad, swampy valley similar to the upper reaches of Coal River.

At the site Flat River is flowing in an easterly direction along the toe of a steep rock bluff which rises to a height of more than 400 feet from the left (north) side of the river. A level, alluvium-covered terrace some 300 feet in width occurs along the right side of the river. Beyond this ground surface slopes steeply upward beyond the limit of the map-area. Bedrock is exposed in several slide scars on this slope.

Overburden consists of Recent alluvium, alluvium and talus. The Recent alluvium which covers the narrow flood plains along the sides of the river consists of sand and gravel containing boulders up to 12 inches in diameter. The material forming the bars exposed in the river during low water consists essentially of boulders. The alluvium covers the terraces above the flood plains along both sides of the river. It consists of silt, sand and fine-grained gravel which are believed to have been deposited by the river when it flowed at a higher elevation. Talus is the result of the mechanical disintegration of adjacent bedrock. The size and shape of the rock fragments depends upon the type of bedrock from which they were derived. At the site the material constituting the talus varies from sand-size particles to large boulders several feet in diameter. Fragments derived from schistose bedrock are thin and platy. The thickness of overburden on the abutment slopes should nowhere exceed 10 feet. The depths to bedrock of 44 to 73 feet obtained from the seismic investigations are believed correct and indicate bedrock surface drops off steeply beneath the river.

Most of bedrock exposed at the site consists of thin-bedded, dark grey to black, argillaceous limestone interbedded with fine-grained, grey, massive limestone in beds up to 10 feet in thickness. The thick-bedded limestone is exposed only in the left abutment. In general the bedding strikes in a north direction and dips at angles from 31 to 63 degrees east. Thus it closely parallels the proposed centre line of the dam and dips upstream. Schistosity and jointing are the most prominent bedrock structures. Schistosity is common in the thin-bedded limestone. In general it strikes in a southeast direction and dips steeply to the southwest. It intersects the centre line at about 45 degrees and dips into the right abutment. The surface of the more schistose rocks is usually soft and highly weathered. The jointing is irregular. Open fractures up to 6 inches in width frequently occur along the joints on rock surface. If these extend to any depth they would increase the permeability of the rock mass. The most competent rock at the site is the thick-bedded limestone exposed in the left abutment. The proposed centre line has been located so that these rocks could form part of the foundation and abutments of the dam and at the same time advantage would be taken of the shortest distance between the abutments.

There is a shortage of construction materials at both Upper and Lower Seaplane sites. The floor of a former channel of Flat River about 2 miles north could be investigated for fine material. Granitic rocks exposed about 5 miles east of the Lower site might be processed to produce rock till, riprap or aggregate. The presence of a large spring issuing from the limestone along the left side of the river immediately downstream from the site as well as numerous seeps in the left abutment suggests groundwater may be encountered when bedrock at the site is excavated. Frozen soil was encountered in several of the shot holes along the seismic lines. The frost line usually occurred within 18 inches of ground surface. The thickness of the overlying moss and organic material varied from 12 to 18 inches.

MACKENZIE RIVER DRAINAGE BASIN
SITE NO. 19
UPPER SEAPLANE DAM SITE
TO ACCOMPANY TOPICAL REPORT NO. 118
GEOLOGY BY E. B. OWEN, 1964