UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

No. 157 Howard Street
Spokane 4, Washington

December 13, 1951

MEMORANDUM

To: A. A. Weissenborn, Executive Officer, DMEA
Field Team, Region II

From: E. J. Youngberg and W. P. Puffett, Geologists
U. S. Geological Survey

Subject: Columbia River Lime Co.
Bear River Quarry
Pacific County, Washington

LOCATION

The Bear River deposit is in the SW¼, sec. 21 and the [illegible], sec. 20, R. 10 W. and T. 20 N., W.M. on the Bear River which flows into Willapa Bay about 8 miles north of Ilwaco. The deposit is reached by 3½ miles of graveled and partially improved road from the Ilwaco-Megler highway. The junction is approximately 5 miles from Ilwaco, and is also the location of the limestone crushing plant. The dock facilities are approximately ~~five~~ [illegible] miles southeasterly along the highway and are on the Columbia River, a short distance west of the Megler-Astoria ferry dock.

GEOLOGY

The limestone bed outcrops on the nose of a low-lying northeasterly trending ridge which extends outward a short distance from higher ground towards a low-lying terrace which at some earlier time was a part of Willapa Bay. This terrace is at present only about five feet above high tide, and is at the elevation of the assumed 0 datum shown on the attached map.

The limestone body dips at 60° to the northeast and lies conformably upon shales and clays of Oligocene-Miocene age. The deposit is a fossiliferous limestone composed largely of gastropods and pelecypods. The voids between the fossils are filled with crystalline limestone and minor amounts of clay.

ORE RESERVES

The limestone has been explored by quarrying and a small amount of trenching which permitted the limits of the deposit to be determined with a fair degree of accuracy above the terrace level or 0 contour as shown on the attached map. The deposit can be expected to extend to the northwest and southeast under the alluvium of the terrace. However, these extensions have not been considered in calculating ore reserves.

The tonnage of limestone available above the 0 contour is calculated to be 85,554 tons. An additional tonnage of 29,100 tons is available by extending the ore limits ten feet below the 0 contour. Approximately ~~five~~ 5 feet of this depth will be below the level of Bear River at high tide. The total tonnage which will be produced from the deposit will depend largely upon the amount of limestone which can be recovered by open pit mining of the extensions of the deposit to the northwest and southeast below the terrace level and downward extensions below the water level of Bear River.

It is believed that the 85,000 tons of ore above the terrace level is sufficiently delineated to be considered positive ore. It is recommended the loan requirements be based upon this tonnage.

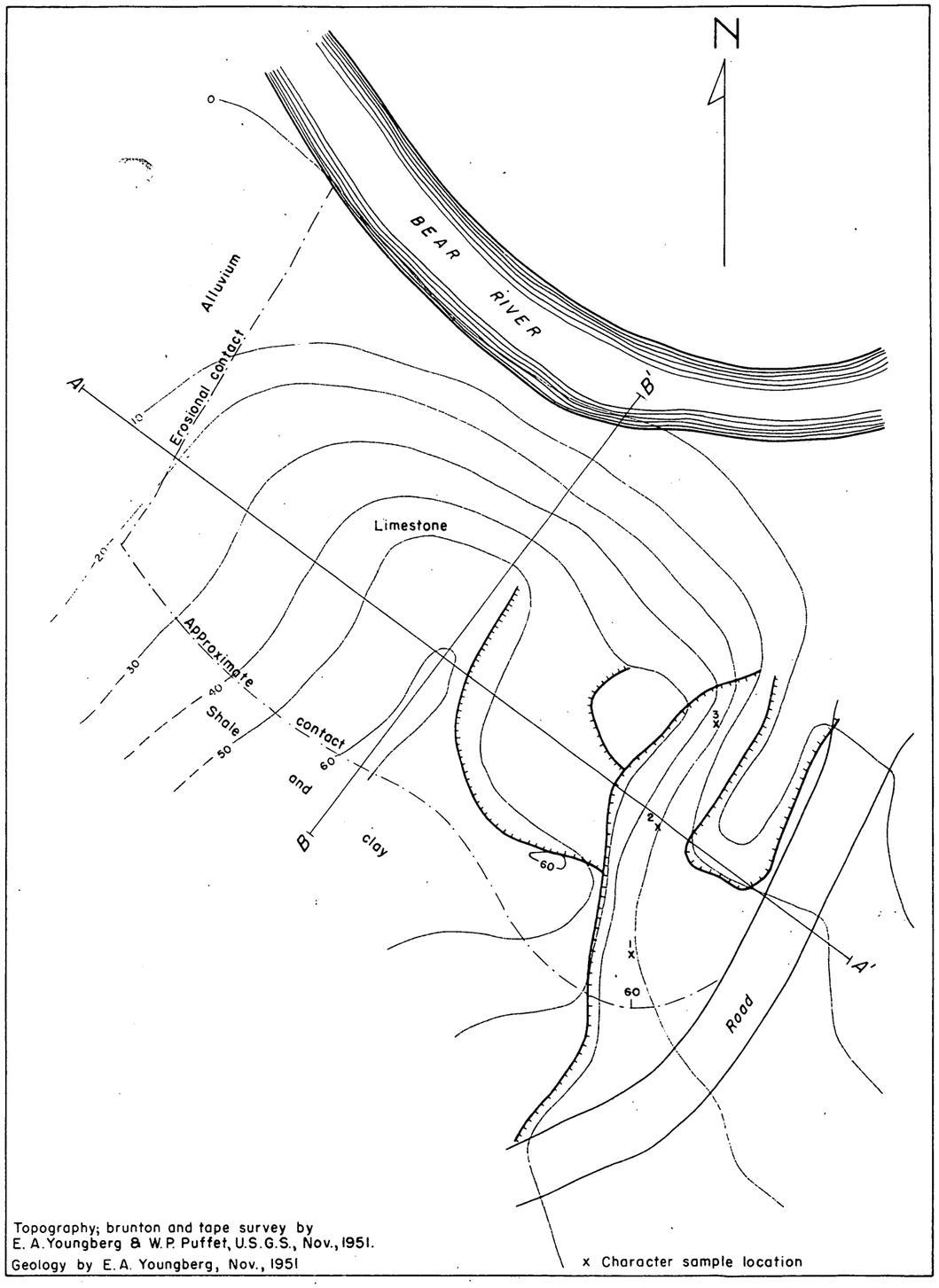
GRADE

The average grade of the limestone in the deposit believed to be approximately 93 percent as indicated by grab sampling from a stockpile of 2,000 tons of limestone at the plant. Several character samples were taken from the quarry face to determine the variation of the $CaCO_3$ content of the deposit. These samples are designated on the map as 1, 2, and 3, and are shown in the table below. Sample No. 3 was taken from a soft, impure horizon. This sample contained only 74.0 percent $CaCO_3$. The volume of this type of material appears to be small and is not expected to materially lower the average grade. Other areas of impure material may be encountered in the process of mining which, if properly blended with higher grade material, should not result in a limestone product which would not meet agricultural limestone standards.

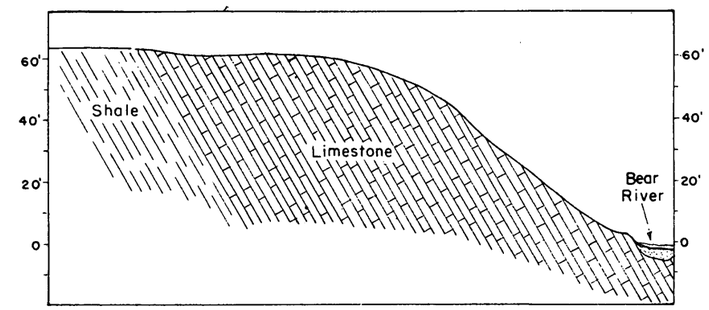
ANALYSIS OF BEAR RIVER LIMESTONE

Constituents	1	2	3	4	5	6	7
SiO_2	1.90	1.40	8.20	5.10	2.24	1.67	2.60
Al_2O_3					0.76		
Fe_2O_3					0.68	0.47	0.[illegible]
MgO					0.50		
$MnCO_3$						0.34	
CaO					53.02		50.44
$CaCO_3$	90.00	96.40	74.00	92.00		97.37	
Ignition loss					42.21		
Organic matter						0.41	

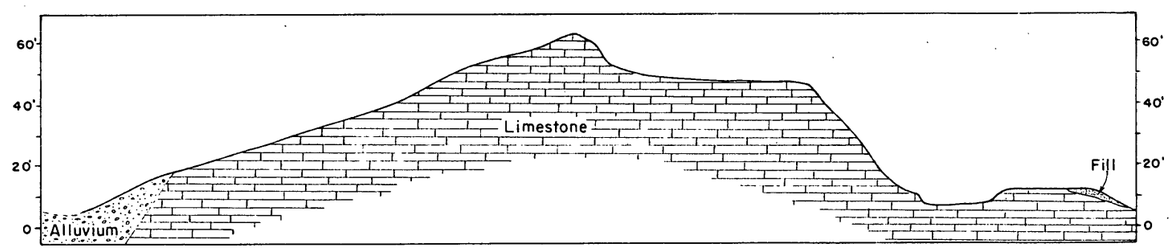
1. Character sample from face of quarry---see map.
2. Character sample from face of quarry---see map.
3. Character sample from face of quarry---see map.
4. Grab sample from stockpile at plant.
5. Sample by U.S.L.D. Sample 221 A. Market for Columbia River Hydroelectric Power using northwest minerals. U.S. Army Engineers, 1938.
6. Sample by Crown Willamette Paper Company. Market for Columbia River Hydroelectric Power using northwest minerals. U.S. Army Engineers, 1938.
7. Assayed by Bennetts Chemical Laboratory. Market for Columbia River Hydroelectric Power using northwest minerals. U.S. Army Engineers, 1938.



PLAN



VERTICAL SECTION B-B'



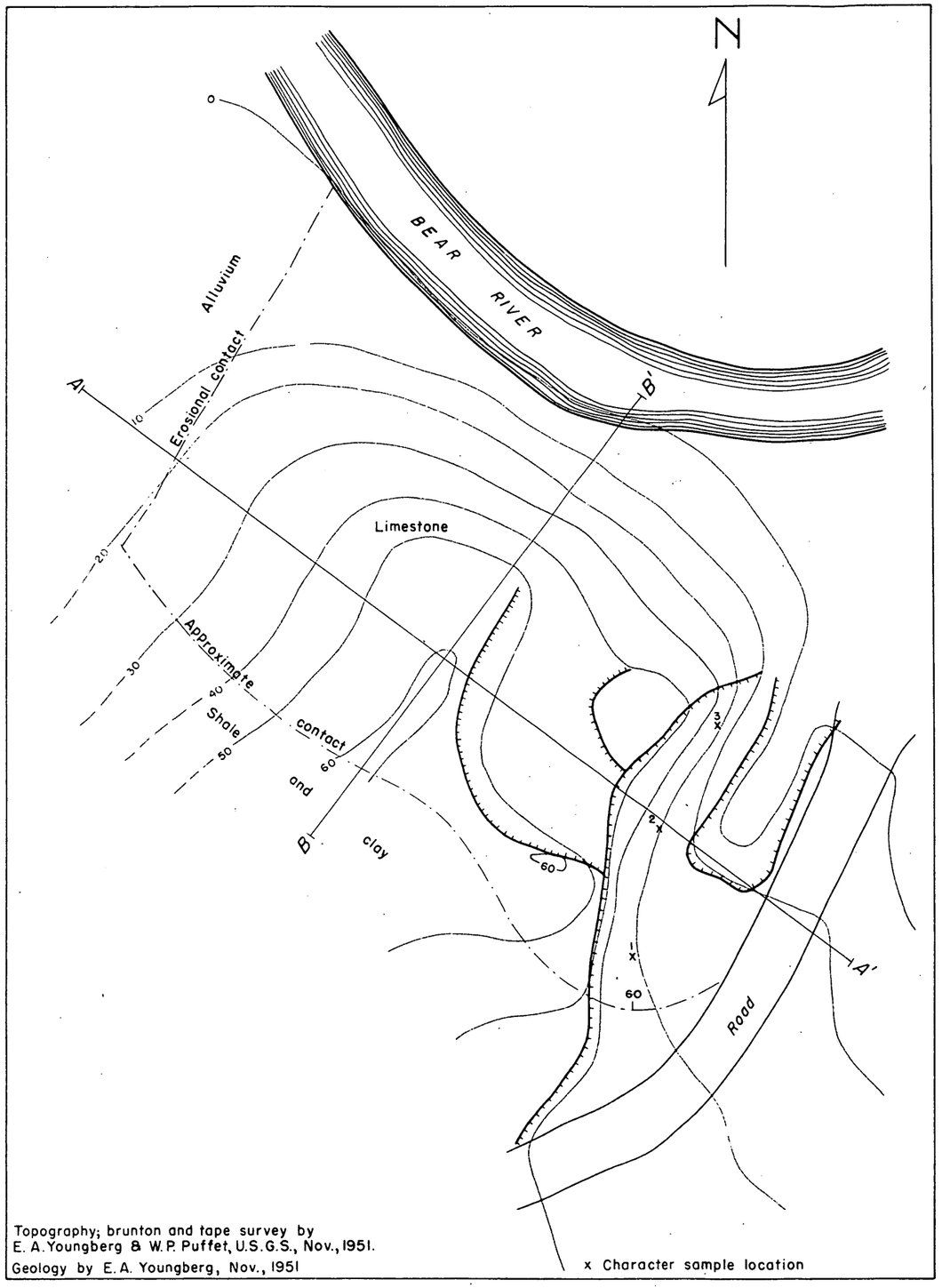
VERTICAL SECTION A-A'

BEAR RIVER QUARRY, COLUMBIA RIVER LIME COMPANY, PACIFIC COUNTY, WASHINGTON

0 50 100 150 200 feet

Contour interval 10 feet

DATUM ASSUMED



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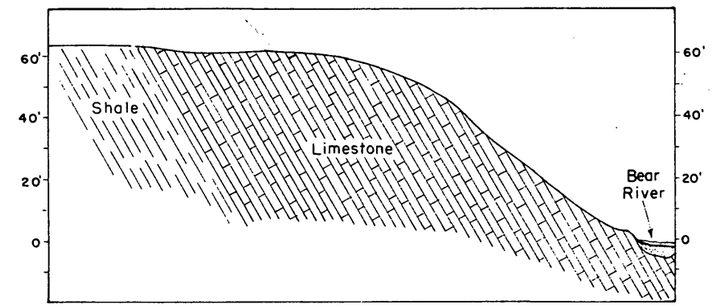
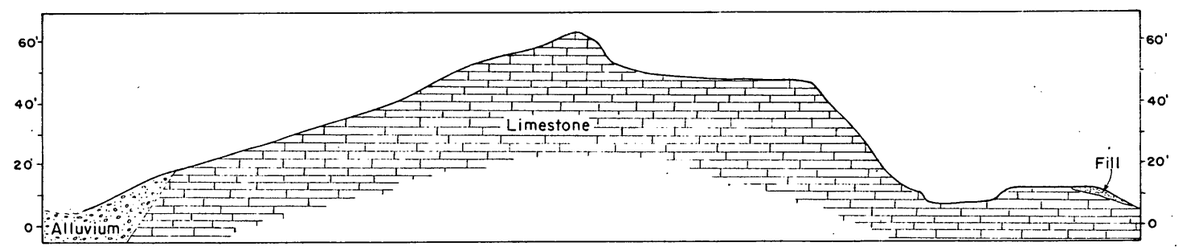


VERTICAL SECTION B-B'



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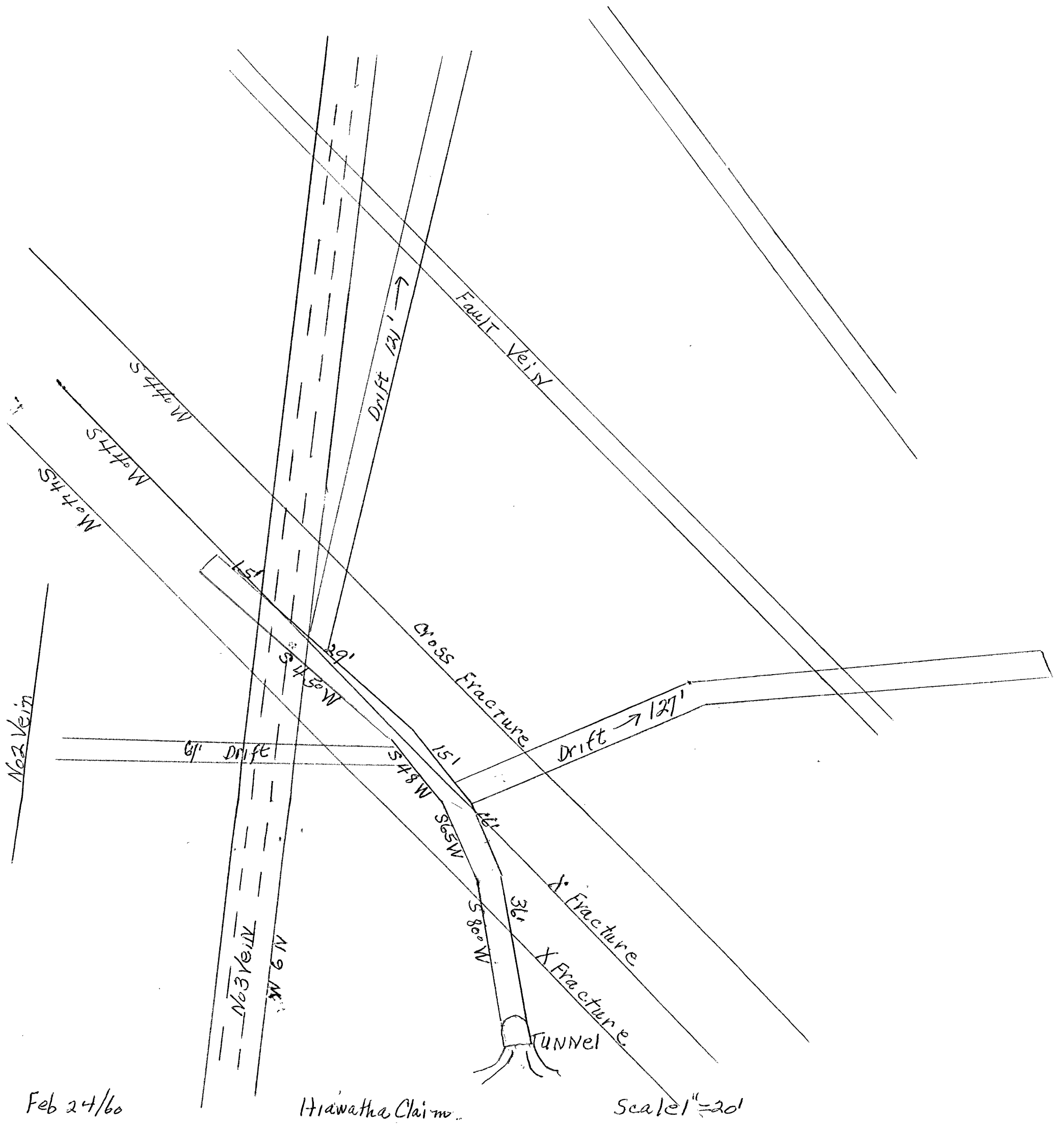
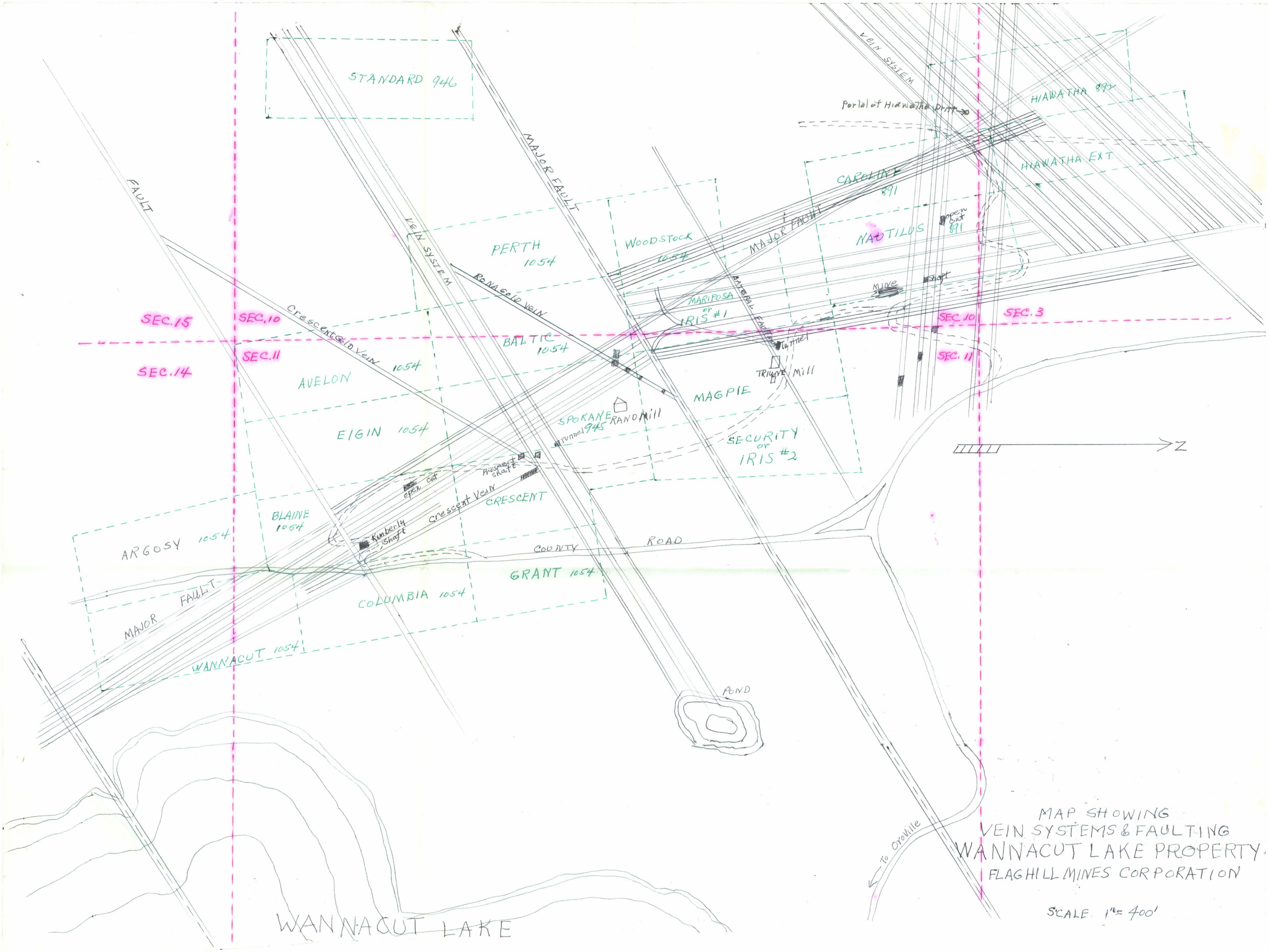


Schematic sketch of Drift work at ~~Hiatha~~ Hiawatha Claim



MAP SHOWING
VEIN SYSTEMS & FAULTING
WANNACUT LAKE PROPERTY.
FLAGHILL MINES CORPORATION

SCALE 1" = 400'