

### Rock Description

This rock is from Owen Beach in Tacoma, Washington. I acquired it in February 2021 while visiting the beach. It is about 6 centimeters by 5 centimeters in size.

The rock is made up of about 2% biotite mica, 38% lithic fragments, and 60% mud matrix. The lithic fragments range in size from pebbles to very coarse sand. The rock is poorly sorted, since the grains come in many different sizes, and the clasts are angular and have low sphericity. Two of the pebble-sized lithic fragments (which are white and light grey in color and are toward the center and upper right of the rock in Figure 1 and are labelled in Figure 2) appear to contain plagioclase feldspar and mica, although it is difficult to tell the exact compositions of the lithic fragments since they are covered by the mud matrix in most areas. The matrix is a dark grey or brown color, and the lithic fragments range in colors, notably light grey, white, light brown, and dark grey. The presence of biotite mica is indicated by the sand-sized reflective black grains in the mud matrix.

This rock is a sedimentary rock, which is supported by the presence of the large clasts of lithic fragments and the matrix cementing these fragments together. The angular shape of the large clasts indicates that the rock is specifically breccia. During the formation of this rock, the grains were not transported very far, since rocks that have undergone longer periods of transport are usually well sorted and finer grained with rounded clasts. In contrast, the clasts of this rock are angular and come in varied sizes. The presence of biotite mica also indicates that the clasts were not transported very far, since biotite mica (a less resistant mineral) breaks down in transport. Thus, it was formed when the lithic fragments (formed by the weathering of other rocks) were deposited after very little transport from their sources and cemented together in a matrix. Given the geology of the region, the rock could be glacial in origin. In the Geologic Map of Tacoma published by J.E. Schuster et al, the area in which this rock was found is an area of glacial deposits.<sup>1</sup> Since glaciers can pick up a lot of varied material and glacial tills are not very well sorted, this poorly sorted breccia could possibly have been formed from the glacial deposition that took place in the area.

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1. Schuster, J.E., A.A. Cabibbo, J.F. Schilter, and I.J. Hubert. "Newly Published: Geologic Map of the TACOMA 1:100,000-SCALE QUADRANGLE," November 24, 2015.  
<https://washingtonstategeology.wordpress.com/2015/11/23/newly-published-geologic-map-of-the-tacoma-1100000-scale-quadrangle/>.

Figure 1: Photograph of the rock with dime for scale





Figure 2. Annotated Sketch with Dime for Scale

