

CASE STUDY

# Ekwok Bridge

Ekwok, AK

## HISTORY

Ekwok Village is a small, remote village in Alaska located along the Nushagak River, 43 miles northeast of Dillingham, and 285 miles southwest of Anchorage. The village of 115 people is accessible only by air and the river. The name Ekwok means “end of the bluff,” and it is the oldest continuously occupied Yup’ik Eskimo village on the river. The village was used as a fish camp in the spring and summer during the 1800s, and as a base for berry-picking in the fall. Many of the earliest homes in Ekwok were located in a low, flat area near the riverbank. After a severe flood in the early 1960s, villagers relocated to higher ground at the current location.

## PROBLEM

As early as 2003, the village council realized that their landfill was at capacity. In addition, the existing landfill did not meet Federal Aviation Administration Standards, as it was too close to the runway, local housing, and the medical clinic. The community’s water source, a shallow aquifer, was also in danger of contamination due to the close proximity of the landfill.

A suitable site for the new landfill was found, just west of the village. Unfortunately, the new site was located on the opposite side of the Klutuk Creek, which was only accessible during winter with no existing crossing.

After a site was chosen, the challenge of funding the project began. Not only did the landfill site need to be funded, but there was also the question of an access road and a bridge to cross the creek. The Ekwok Village Council worked tirelessly for almost ten years to procure funding for the project, eventually receiving over \$5 million dollars from state and federal organizations.



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### PROJECT PARTNERS

#### Owner

Ekwok Village Council and the City of Ekwok

#### General Contractor

STG, Inc. – Anchorage, AK

#### Engineers

Bristol Engineering Services Corporation – Anchorage, AK

### PRODUCT

Sheet Pile: Z-shaped, ASTM A572 Gr. 50

Threaded Bar: #18 A615 Gr. 75

Waler: 157 linear feet of Double C12x20.7

Bent Plate Cap: 184 linear feet

### PROJECT TIME FRAME

June 2015 to June 2016

### SOLUTION

A bridge needed to be constructed over the Klutuk Creek to connect the Ekwok Village with the new landfill area. The village hoped that the bridge would eventually lead to the development of more roads and power lines that would connect Ekwok and other villages.

The project presented multiple challenges for Bristol Engineering Services Corporation, the engineering firm hired to work on the design. Heavy trucks were needed to transport materials to the site, and also allowed the firm to choose a modular pre-fabricated steel bridge to span the creek. As the bridge itself did not have to be constructed on site, this choice helped to keep costs at a minimum.

The original design called for a bin wall with a significant amount of rip rap. Restrictions on the volume of material that can be barged up the Nushagak River, and the extremely remote location of the jobsite, proved to be a challenge. It was prohibitively expensive to barge the required quantity of rock to the area.

The project's general contractor, STG, Inc., approached Nucor Skyline for assistance with a value-engineered design. The newly designed bridge abutment used 40 double Z-shaped steel sheet piles. These piles were 40 feet long, and were driven into the soil using a vibratory hammer. The soil behind the wall was excavated for installation of the deadman wall and the #18 tie rods. After installation, backfill was placed and compacted behind the abutment wall.

Working with and utilizing Nucor Skyline's sheet piles, STG was able to provide a value engineered savings of \$1.1M to the Ekwok Village Council, thus putting the total cost within their budget and making the project become a reality.

The sheet pile abutments reduced the need to drill, blast, and produce rip-rap rock, as well as eliminate four barge loads to the Village of Ekwok. This saved the project nearly two months during the course of construction.