



R&M ENGINEERING-KETCHIKAN, INC.
ENGINEERS GEOLOGISTS SURVEYORS

355 CARLANNA LAKE ROAD, SUITE 200, KETCHIKAN, ALASKA 99801
PHONE (907) 225-7817 FAX (907) 225-3441 EMAIL:RNMain@rmketchikan.com

Ketchikan Public Library Site Selection Site Consideration Issues

Skinner Motors Site

The Skinner Motors site is excellent in terms of sitework costs as the entire site is founded on bedrock. Building demolition would be the largest costs with the total anticipated cost range between \$150,000 \$200,000. Very little additional sitework would be required above that. It would be prudent to plan on some additional paving to match the new library grades but all of the site will require pavement so should not be criteria for selection.

Wastewater on the property is currently treated in a small aerated treatment plant that discharges treated wastewater into a common collector sewer. The sewer outfall discharges into Tongass Narrows across Chuck Pool's property. The outfall is owned and maintained by Maiers Enterprises. The outfall discharge permit renewal will require a homeowners association to take over the operation of the line. Maiers is currently working to get a homeowners association set up. A new wastewater treatment plant would need to be installed with a capacity between 3,000 gpd and 5,000 gpd. The construction costs for this type of system ranges between \$50,000 and \$75,000 depending on complexity. The type of system would be similar to that which serves the existing Walmart store and the Narrows Hotel which are small individual package secondary plants that have ADEC certification. The plants are typically installed with a UV light disinfection on the discharge end.

Potable water could be provided with one of two ways. Small water storage tanks could be constructed in the size of 10,000 to 20,000 gallons. There are existing tanks on the site that would be sufficiently sized for this use. Potable water would be trucked in on an as needed basis and stored in the tanks. This is much less expensive to build and avoids costly water treatment operation and testing. Delivered water is anticipated to cost \$1.50 per 3,500 gallon load and demand is anticipated between 500 and 1,500 per day. Annual costs would be in the \$20,000 range for delivered water. The alternative is the construction of a Class B public water system and to hire a certified operator. The water system would consist of filters, chlorination and/or UV disinfection. Most of the neighboring facilities including the Narrows Motel and the Pioneer Heights project (currently under construction) use trucked in water.

There will need to be a larger storage tank or several tanks to store water for fire protection. We anticipate that the required storage would be in the 50,000 gallon range. A diesel fired fire pump would be required to pressurize a sprinkler system in the event of a fire. Total additional cost for the fire suppression system is anticipated to be approximately \$200,000.

A conservative cost estimate for site development and infrastructure needs would be up to \$500,000.

Copper Ridge Site

This site is equipped with public utilities and storm drainage in the street, and has the least cost for utilities. The water and sewer were designed as part of the subdivision and are up to City of Ketchikan standards. Sufficient pressure for fire protection exists.

There was concern voiced that this site may have been filled with unsuitable material or possibly even debris. R&M excavated in four locations on the proposed site in March, 2010 to determine the nature of the fill material. Generally the fill consisted of uniformly graded shot rock taken from the hillside above. There were a few tree limbs and small wood pieces but generally was good shot rock material throughout. Bedrock was encountered in two holes and the other two were likely very close to rock. The investigation was in no means exhaustive but sufficient to document that there is a low probability of a large hidden cost due to improper fill. A more thorough investigation is recommended as part of a library design.

There is merit to the claim that the property was used as a "dump". R&M was contracted to prepare drawings for a landfill permit for development of the property. These permit drawings show placement of unsuitable fill on the northeast end of the property, well away from the proposed library site. There are no records that indicate that this portion of the property was permitted as a landfill.

The only concern that we do have in regard to the fill is differential settlement under the proposed library building. The street side of the property has shallower soils over bedrock, say 6 to 8 feet, with larger 25 to 35 foot fills out on the east-facing edge of fill. We recommend that consideration of the Copper Ridge site include a contingency to remove the rock under the building site and re-compact to specified criteria. This is typical of most sites that do not have inspected structural fills.

At our March discussion, I estimated \$50,000 for this work. After more thought, we anticipate that approximately 20 days would be required to perform this work using an excavator, several trucks and a vibratory roller for a total construction cost of approximately \$100,000 to \$200,000. If a daylight basement were designed into the building for records storage or mechanical systems the surplus rock removed from the basement could be used elsewhere on the site for grading. A basement would reduce the fill volumes and decrease the potential for differential settlement.

This site will need to have a plat alteration to adjust lot lines to increase the size of the proposed property. Subdivision costs are anticipated to be around \$5000.

A conservative cost estimate for site development and infrastructure needs would be up to \$200,000.

Heckman Street Site

The adjacent street is equipped with public utilities and storm drainage. A new water and sewer service would likely need to be cut into the street in Heckman to serve the back half of the property where the site is proposed. New services would likely be \$25,000 including repairs to the street. Sufficient pressure for fire protection exists. These utilities would be installed as required to subdivide the property into two parcels with the Library to occupy the currently undeveloped back half of the property. A subdivision would likely cost \$5000.

There is one drainage concern which is a fairly large stream that crosses the property and goes underground through a large culvert near the middle of the property. If the library were to be built over this stream, special consideration as to the culvert size, type and location would need to be designed. A concrete box culvert or plastic culvert encased in concrete would be recommended for longevity. There are also permitting considerations as some of the property appears to contain wetlands. Costs for these issues are likely in the \$100,000 range.



The site is generally raw land with a layer of organic soils underlain by glacial till deposit. All trees, roots and organic material will be disposed of offsite in a commercial waste area. The glacial till generally will not be appropriate for fill on the site and will require excavation and removal offsite as well. Site development will be the highest of the chosen sites, with total earthwork costs anticipated in the \$500,000 to \$600,000 range as follows:

Clearing and grubbing: \$20,000 - \$25,000

Unsuitable Excavation: 15,000 cubic yards x \$15/yd = \$225,000

Rock Embankment: 5000 cubic yards x \$20/yd = \$300,000

The quantities above are based on very broad assumptions and very limited site data but should be sufficient to determine a proper order-of-magnitude site development cost. We suggest a thorough geotechnical investigation and a site topographic survey to be conducted.

A conservative cost estimate for site development and infrastructure needs would be up to \$700,000.

Trevor Sande, P.E.

