



City of Homer

www.cityofhomer-ak.gov

Public Works

3575 Heath Street
Homer, AK 99603

publicworks@cityofhomer-ak.gov

(p) 907- 235-3170

(f) 907-235-3145

Memorandum 21-108

TO: Mayor Castner and Homer City Council
Through: Robert Dumouchel, City Manager
FROM: Janette Keiser, PE, Director of Public Works
DATE: June 9, 2021
SUBJECT: Mt. Augustine Road Drainage Improvement Project – Update

Issue: When we updated the City Council about this project, we reported the design was at 35% completion and we were exploring downstream impacts. We also indicated we were pursuing some groundwater research to, among other things, better understand the link between groundwater and surface water in the neighborhood. The purpose of this Memorandum is to provide a further update and request additional funding.

Background: The original intent of the project was to capture surface water flowing near the intersection of Mt. Augustine Road and the Sterling Highway and convey it to a “*naturally occurring ravine, gully, watercourse or runnel*”. There were two natural ravines in the neighborhood, one to the east and one to the west. The 35% design focused on the east, since that was a shorter distance from the intersection. This solution, which included 243 feet of culvert and two storm drains, was the basis for the estimated total project cost of \$115,694.

We explored in more detail what the impact would be on downstream properties if we introduced larger quantities of water into the eastern ravine. We originally thought we could up-size a handful of existing culverts and call it good. However, we’ve discovered there are more serious issues. The bottom line is that the eastern solution is not a viable option after all for multiple reasons:

1. The configuration of the existing eastern ravine is steep and deep near the Sterling Highway, but gradually morphs into a shallow, wider ditch/depression as the water winds its way to the bluff. This flow path is not always well-defined, sometimes deteriorating into sheet flow over the ground. Any additional water would likely overtop the flow path and flood adjacent property.
2. As new water flows over the bluff, it will increase bluff erosion. There is already a pronounced problem with bluff erosion, caused by the shallow groundwater aquifer in that area. As the groundwater at the bluff freezes and thaws, the soil at the edge of the bluff “melts” away. It’s like watching the edge of a sugar cube melt when it’s dipped into a cup of tea.

3. Even if we could successfully address these two issues, there is another issue, which is a clear “deal breaker”. The adjacent property downstream from the eastern ravine is privately owned and the owners are opposed to introducing more water on their property.

We looked to the west. The ravine to the west is well-defined; that is, steep and deep all the way to the bluff. It already accepts water from the Sterling Highway. Any new water introduced into it would stay within the ravine. The other advantage is that the drain line could be built as a “French drain”, which would increase the dewatering effect in the neighborhood.

The downside is that this second option is more expensive. It involves five storm drain manholes and over 1000 feet of 24” storm drain as well as a sluice directing water into the ravine. The total project cost for the Option #2 basic storm drain is estimated at \$277,657, over twice as much as the estimate for the eastern solution.

The other issue with Option #2 is that introducing additional flow into this ravine would exacerbate erosion in the ravine unless we took protective measures. We are exploring ways to mitigate adverse consequences. For example, we could “tight line” the additional drainage flow all the way down to the bluff and protect the discharge point, on the beach, with rock. Installing such a “tight line” would significantly increase the project’s cost. However, the work could be done in phases, with Phase 1 being the storm drain to the west, along Mt. Augustine Rd, and Phase 2 being the tight line in the western ravine.

What would the benefits of this project be? According to the experts, what is happening now is that surface water is flowing from north of the Sterling Highway under the road onto private property, where it eventually seeps into the soil and enters the shallow groundwater aquifer. This water is, along with naturally occurring groundwater and water injected into the soil through septic systems, increasing the pressure head in the aquifer. This increases the possibility of soil instability. The subject project would reduce the volume of water that causes this effect, thereby better protecting the whole neighborhood.

In fact, the benefits to the whole neighborhood are projected to be so pronounced that the Council may want to consider creating a Drainage District for the neighborhood to help pay for the solution

Service Provider	Option #1	Option #2
Nelson Engineering	\$13,000	\$23,852
Ability Survey	\$ 2,000	\$ 6,200
Coble Geophysical	\$5,000	\$15,000
<u>Construction estimate</u>	<u>\$100,055</u>	<u>\$232,605</u>
Total	\$112,182	\$277,657
Existing appropriation (Ordinance 20-85)	\$ 97,000	\$ 97,000
Balance Needed	\$15,182	\$180,657

Recommendations:

- (1) We recommend
 - a. Proceeding with the design and construction of Phase 1.
 - b. We continue to investigate Phase 2, the downstream “tightline” to better understand what is needed.

- (2) We further recommend the City explore the concept of creating a Drainage District to help fund the neighborhood-wide drainage improvements.