

ALASKA DISTRICT TRIP REPORT

Project: Denali Commission Mooring Points Phase 4

Description: Fort Yukon Trip Report

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George Kalli and Dee Ginter traveled to the Yukon River community of Fort Yukon, Alaska via commercial air to conduct a site visit and scoping meeting related to potential installation of barge mooring points in the community. The team was met by tribal members Gary Lawrence and Tina Herbert upon arrival and given a tour of the existing fuel and freight transfer sites. While in Fort Yukon the team also met with John Guerin and Tony Carol from the City of Fort Yukon and with Ben Stevens, executive director of the Council of Athabascan Tribal Governments. Two barge landing sites were investigated during the site visit. An overview of the community and barge landing sites is included as figure 1. Conducting a public meeting was offered; however, the community stated it wasn't necessary.



Figure 1: Fort Yukon Barge Landing Locations

GENERAL

Fort Yukon is located at the confluence of the Yukon and Porcupine rivers, about 145 air miles northeast of Fairbanks. The winters are long and harsh, and the summers are short but warm. After freeze-up, the plateau is a source of cold, continental arctic air. The Yukon River is ice-free from the end of May through mid-September. The community has a population of 583 according to the 2010 U.S. Census.

While in Fort Yukon, there was an ongoing Natural Resource Conservation Service (NRCS) project to relocate the main tank farm in the community. Brice Construction is the main contractor performing the relocation. The old and new locations for the tank farm are indicated in figure 1. Once construction is completed and the new tank farm is operational, the old tank farm will no longer be utilized. This negates the need for any mooring points in the vicinity of the old tank farm. The relocation was originally scheduled to be completed in September 2011.

Gary Lawrence informed us that there was an ongoing property boundary survey being conducted in the community. The Tanana Chiefs Conference (TCC) was completing the survey in relation to 14(c) Alaska Native Claims Settlement Act (ANCSA) land exchanges. Follow up discussions were conducted with Eric Stahlke, Cadastral Survey Manager for TCC. Eric Stahlke plans to provide us with drawings of property boundaries in the vicinity of the two barge landings when they become available.

According to Gary Lawrence, the NRCS installed finger dikes as an erosion control measure in 1994-95. Some of the finger dikes eroded away in a recent flood. The remaining finger dikes are upstream of the upstream landing. In the vicinity of the old tank farm, rock armored banks and gabion baskets have also been placed as erosion control methods. The NRCS has also purchased erosion threatened properties in Fort Yukon. Subsequent to the site visit, it was confirmed with NRCS that they have no future erosion control projects in Fort Yukon. They determined that relocating the tank farm was more economical than further erosion control measures.

Gary Lawrence told us that the highest rates of ongoing erosion are occurring between the two landing sites. An Erosion Information Paper from the Alaska Baseline Erosion Assessment, dated January 21, 2008, cited the Fort Yukon Comprehensive Plan as stating the estimated erosion was occurring at a rate of 10 to 15 feet per year. While it was evident on site that erosion was occurring, it did not currently appear to be 10 to 15 feet a year.

Yukon Cargo is a local barge operator in Fort Yukon. Yukon Cargo possesses a small barge that can accommodate up to 30,000 pounds. Gerald James (907-662-5292) is the owner. During our site visit, the barge was moored at the upstream landing.

Tony Carol is familiar with permafrost conditions in Fort Yukon through his work with the city's water and sewer systems. He informed us that Fort Yukon is underlain by continuous permafrost beginning at depths varying between 1 and 6 feet. He did not think that driving piles as mooring points, as done in other communities to date, would be an effective construction method in Fort Yukon. It would be difficult to drive the pile to the desired depth and piles driven to refusal would be subjected to frost jacking. Utility poles in Fort Yukon commonly experience up to ¾ inch of frost jacking per year. Tony recommended the use of concrete anchors in lieu of piles.

Because of the potential to encounter permafrost, the installation of freeze back piles as mooring points may be required in Fort Yukon. Freeze back piles are a special pile installation procedure that takes advantage of frozen ground and essentially freezes the pile into the ground. The piles can typically be a pipe pile or H-pile section, which allows for backfill to be placed around the pile. The piles are installed by drilling a hole in the permafrost slightly larger than the pile then installing the pile into the hole. Once the hole is drilled to the desired depth, the pile is inserted and imported clean sand slurry is backfilled around the pile. The permafrost then freezes the sand and the pile into the ground. Equipment required for this process is a large drill rig for drilling the hole, a loader to transport material to the site, and a pile driver to drive the pile into the drilled hole. If drilling shows permafrost to be absent, then cuttings from the hole shall be placed back into the drilled hole and a standard driven mooring point should be installed in the same hole.

Three active gravel sources operate in Fort Yukon.

Upcoming construction projects in Fort Yukon include construction of a biomass and power building.

DOWNSTREAM LANDING SITE

There is no ramp landing at this landing site. It simply consists of a gravel stream bank with a cleared, unimproved staging area adjacent to it (Photo 1). Barges moor broadside, parallel to the river, to offload cargo.

According to Gary Lawrence, the streambank along the staging area had recently been replenished with gravel (Photo 1) to replace portions of the bank that had been lost to erosion.

During our visit, the staging area was occupied by fuel storage tanks and a crane related to the tank farm relocation project (Photo 2).

Historically, barges operated by Crowley Marine have dropped off freight at this landing before continuing farther upstream to offload fuel. It generally takes a few hours to offload the needed freight. Deliveries average a few per year.

According to Gary Lawrence, the cleared area of the staging area is public property. Beyond the cleared area, however, the area is constrained on all sides by private property. The staging area is approximately 150 feet long.

An unimproved road leads from the downstream end of the clearing to Joe Ward Slough (Photo 3). Several skiffs were moored near the mouth of Joe Ward Slough during our visit. Gary Lawrence did not think that blockage of this road by a mooring line for the few hours freight is offloaded would be an unacceptable inconvenience to the community, especially since barge companies have been providing advance notice of their arrivals.

An existing tie-down cable was found near the vegetation line of the staging area near its downstream end. A broken tie-down cable was also found near the mouth of Joe Ward Slough. Another tie-down cable was found upstream of the landing area extending over the top of bank down to the river.

A below grade freeze back pile mooring point is recommended at the upstream end of the cleared staging area and 64 feet inland from the top of bank (Photos 4 and 5). Coordinates of this location are 66°34'15.20"N and 145°17'13.80"W. An additional below grade freeze back pile mooring point is recommended adjacent to the existing tie-down cable at the vegetation line of the staging area near its downstream end and 51 feet from the top of bank. GPS coordinates of this location are 66°34'16.50"N and 145°17'14.52"W.



Photo 1. Downstream Landing Site. Note lack of ramp and recently placed gravel to replenish bank material lost to erosion.



Photo 2. Tank Farm relocation equipment stored at Downstream Landing Site during site visit.



Photo 3. Access road from Downstream Landing Area to Joe Ward Slough



Photo 4. Corps employee standing at proposed location of upstream mooring point; view is toward the Yukon River



Photo 5. Corps employee standing at proposed location of upstream mooring point, view is upstream



Photo 6. Corps employee standing at proposed location of downstream mooring point; view is inland. Note existing tie-down cable adjacent to Corps employee.

UPSTREAM LANDING SITE

This landing consists of a series of small embayments separated by what remains of gravel finger dikes (Photo 7). Numerous skiffs and a small barge were beached along this landing site during our site investigation (Photo 7).

According to Gary Lawrence, the finger dikes (Photo 8) were constructed by the Native Village of Fort Yukon as an erosion protection measure. The dikes suffered damage during the last spring breakup with at least one being entirely eroded away.

The upland area along this landing site is a mixture of grassy and unvegetated vacant land (Photo 9). Brice Construction was using a portion of the landing area to store equipment and materials needed for the tank farm relocation project (Photo 10).

A utility pole immediately adjacent to the top of bank in the vicinity of this landing area indicates erosion (Photo 11).

The downstream end of this landing area is bound by a concrete plank constructed ramp (Photo 12). The ramp had been compromised by gravel washing out from underneath it. Previous discussions with barge companies indicated that use of this ramp is avoided.

During the time of our visit, a right-of-way for the fuel line to the tank farm was being cleared (Photo 13). It was approximately 55 feet upstream of the concrete ramp. The location of the future fuel header will be somewhere in the vicinity of this right of way.

An existing tie-down cable was found approximately 200 feet upstream of the concrete plank ramp. Several skiffs were tied off to this cable (Photo 14).

A gravel ramp angled into the river is located at the upstream end of this landing area. During the time of our visit, a small barge operated by Yukon Cargo was moored at the ramp (Photo 15). The barge was tied off to two small diameter pipes that were partially driven into the gravel ramp.

Previous consultation with barge companies resulted in the suggestion that one mooring point be placed 100 feet upstream of the concrete plank ramp with an additional mooring point placed 200 feet farther upstream.

A downstream, below grade freeze back pile mooring point installation is recommended 100 feet upstream of the concrete plank ramp and 70 feet inland from the top of bank (Photos 16 and 17). Coordinates of this location are 66°34'6.60"N and 145°17'2.22"W. An upstream, below grade freeze back pile mooring point installation is recommended at a location 200 feet upstream of the proposed downstream mooring point, 72 feet inland from the top of bank, and 40 feet downstream from the centerline of the adjacent finger dike (Photos 18 and 19). Coordinates of this location are 66°34'5.00"N and 145°16'59.40"W. At the time of our visit, there was some ongoing coordination regarding ANSCA 14(c) land transfers that could impact the ownership of the proposed upstream mooring point location. An alternate location for the upstream mooring point was also selected in case installation is not possible at the primary recommended site. This alternate location is 35 feet downstream from the proposed primary upstream location and 72 feet inland from the top of bank (Photo 20). Coordinates of this location are 66°34'6.09"N and 145°16'59.58"W.



Photo 7. Upstream Landing Site embayment with beached skiffs; small barge visible at far end, looking upstream



Photo 8. Finger dike at Upstream Landing Site, looking upstream



Photo 9. View of Upstream Landing Site, looking upstream



Photo 10. Brice Construction used portion of Upstream Landing Site



Photo 11. Utility pole adjacent to eroding streambank



Photo 12. Corps employee standing atop compromised portion of concrete plank ramp



Photo 13. Right-of-way for fuel line to new tank farm is visible beyond the personnel.



Photo 14. Upstream Landing Site, existing tie-down cable with moored skiffs



Photo 15. Small barge moored at upstream end of Upstream Landing Site



Photo 16. Corps employee standing at proposed location of downstream mooring point; view is downstream. Concrete plank ramp is visible beyond the stored materials.



Photo 17. Corps employee standing at proposed location of downstream mooring point; view is toward the Yukon River



Photo 18. Corps employee standing at proposed location of primary upstream mooring point; view is toward the Yukon River



Photo 19. Corps employee standing at proposed location of primary upstream mooring point; view is downstream



Photo 20. Corps employee standing at proposed location of alternate upstream mooring point; view is downstream

RECOMMENDATIONS

It is recommended that mooring points be installed at the Downstream Landing Site and the Upstream Landing Site as described in this report.

There is considerable uncertainty regarding the soil types and permafrost depths and locations. It is a good assumption that all mooring points in Fort Yukon will likely require pre-drilling prior to installation. If the ground is frozen, any backfill within or around the pile will need to be a clean sand slurry which will freeze, causing the ground to adhere to the pile. This sand is not available locally and will have to be imported. If the ground is not frozen, the piles can be installed with conventional methods.