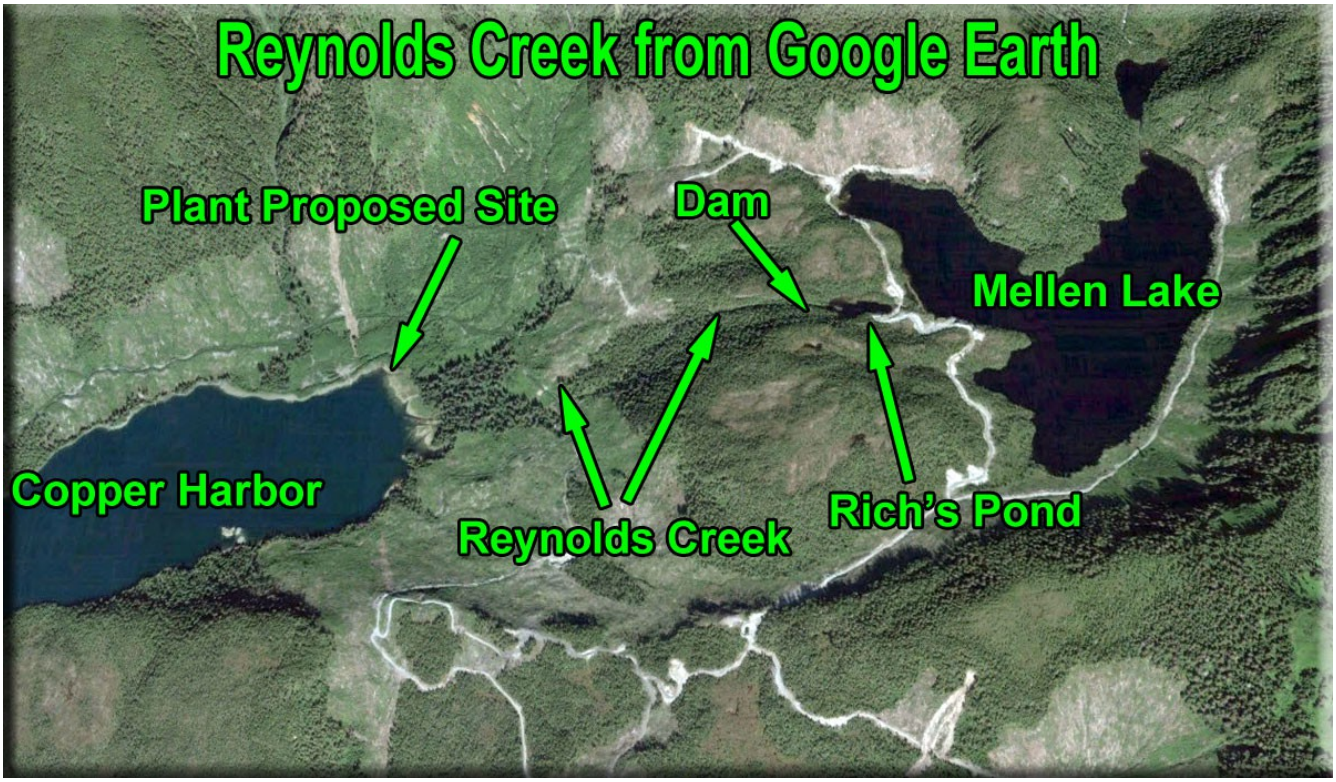
Reynolds Creek Hydroelectric Project

by Doug Linn

Reynolds Creek Hydroelectric is a plant under construction. The main water supply will be Mellen Lake, about 700 feet above the proposed plant site. Here are some of the specifications on the project:

- **28 Ft Long, 6 foot High diversion stucture at the outlet of Rich's Pond.**
- **Lake Mellen and Rich's Pond provide 600 acre feet of storage**
- **42 inch diameter, 3200 ft long Penstock (Depicted under construction)**
- **Powerhouse ... one 5 Megawatt Unit**
- **34 KV 12 mile long transmission line being built**
- **Approximately 750 feet of Head Pressure**
- **Ave Annual Energy Production is 19.3 millsion kilowatt hours**
- **Approximate Total Cost $22,750,000**

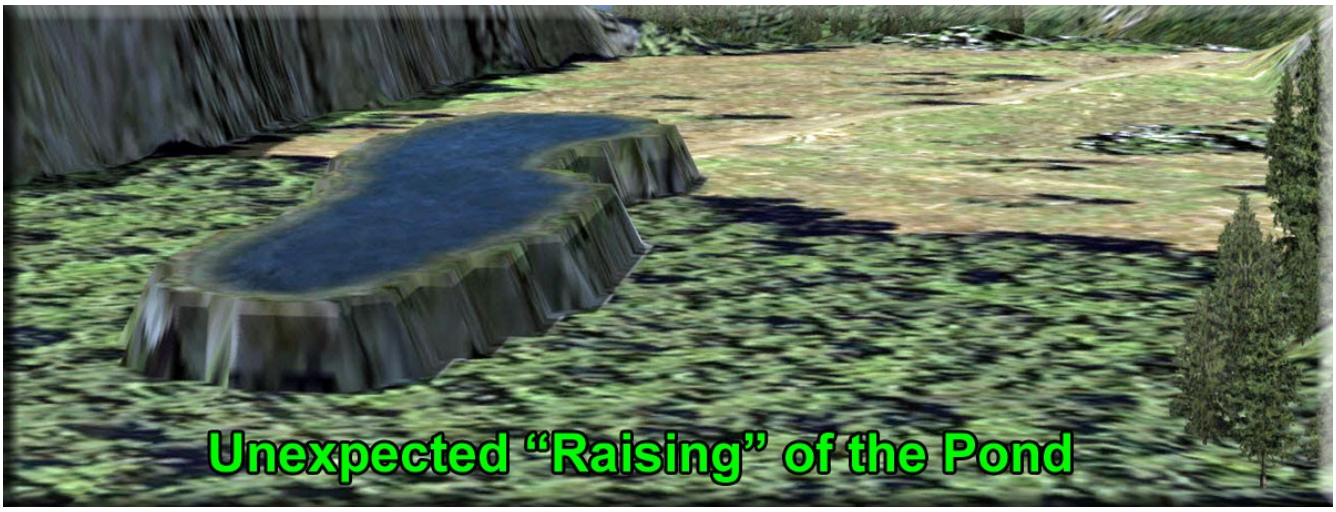
This was an interesting facility to build. It should have been very simple. A lake, draining into a "wide spot" called Rich's Pond, then a creek running down a mountain to the shoreline. Here's the Google Earth image:



You can see how the dam at the headwaters of Reynolds Creek would raise the height of Lake Mellen and merge with Rich's Pond.

Here is the terrain we had to start with:

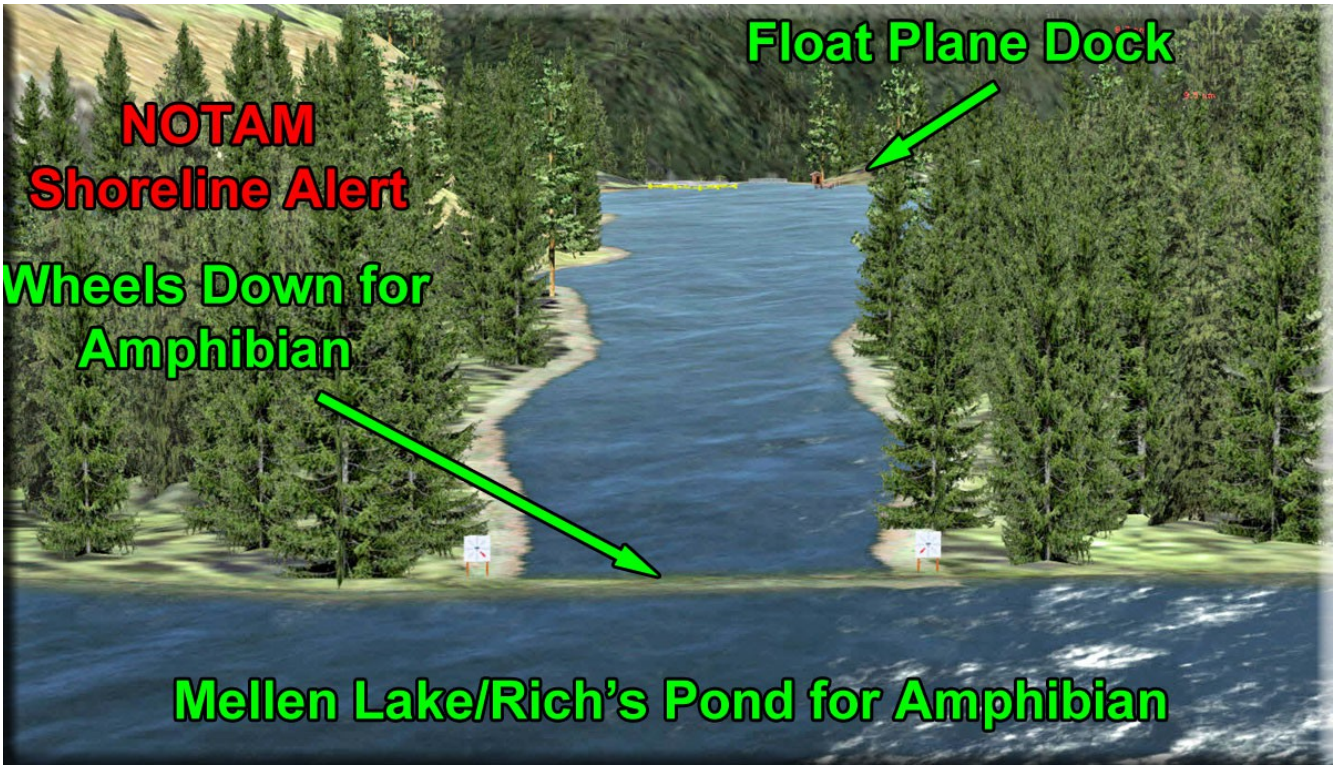
Notice the hill beyond Rich's Pond … it is 20 meters higher than Mellen Lake in the foreground. First a "flatten" was added, including the pond on the left (Rich's Pond). This gave us a nice flat area, getting rid of the hill, but the pond to the left now stood 20 meters above the terrain alone (the flatten would not let us lower the pond, instead, the pond raised up ABOVE the flatten.



Of course, this would not work at all. So another "flatten" was created that came around the right "edge" of the pond, leaving it intact, and removing any flattening to the left of it. When this "worked" we then created a lake to cover most of the new area, rounding the edges, then landscaping it with vegetation and adding a dam at the far corner.

This is the result:

You can see the original pond was left "elevated" where it was and our new pond now is at the level of Mellon lake. However Amphibians could not get to the dam. So we widened the entrance to Rich's Pond:



Now, an amphibian can land on Mellen Lake and taxi to the dock at the dam but must have wheels "down" going over a short shoreline. We could not remove the shoreline.

We then had to create a stream coming down the side of the mountain the lowering terrain. This was done by adding an object “marker” (a 20 foot stone wall) at different intervals down the mountain. We then created water polygon using those markers. Once the polygon was finished, an “elevation” was added to each of the marker points. The result is a stream coming down a mountain to a level area.

About halfway down the mountain was another small pond and a relatively flatten small area. A ground polygon was created to simulate a dug up, then covered over straight trench coming down from the dam to this area. It was decided this would be one of the two construction zones, so people could see that a trench was being dug and a penstock (42” PVC Pipe) was being buried.

A second water polygon was put in, using the same procedure, for the lower stream that goes from the upper construction zone down to the water.

Down at the shoreline area a flatten was made for the objects for the hydro plant and a sloped ground polygon was made going up the hill from the dock … that originally was a 30 meter high cliff that a truck could not get up. The result is this:

You can see Reynolds Creek meandering down the mountain, the road going up to the construction site, the powerplant to the lower left and the dock area to the lower right.

The Alaska Power Project is very interesting for a designer. It is not just "object placement". Because of the physics of how a hydroelectric plant works, the elevation must be created to "make it work." Each of these has posed its own challenges, and we learn as we make them. But I thought I would use this "readme" to give you an inside look at how some of this is done.

You can land an amphibian easily on Mellen Lake and taxi toward the dam, but you must have "wheels down" to cross the little shoreline into Rich's Pond. There is a helipad at the upper dam, another at the halfway construction zone and another down at the power plant. There is also a float plane dock that is located down by the power plant and an amphibian dock near the upper dam.

The Starting Positions for Reynolds Creek Hydro are here:

- **One Float Plan Dock: N55 12.9880 ... W132 36.4338 ... Head:312.7**
- **Amphibian* at Rich's Pond: N55 13.0732 ... W132 35.3161 ... Head: 66.5**
- **Helipad at Plant: N55 13.0396 ... W132 36.4081 ... Alt 5 Meters**
- **Helipad at Construction Area: N55 12.9974 ... W132 35.8100 ... Alt: 104m**
- **Helipad at Rich's Pond (Dam): N55 13.0544 ... W132 35.2994 ... Alt: 268m**

As you can see, there is a lot of “behind the scenery” things going on when these are created. I hope you enjoyed this readme so you can “see” how some of this is done. These do give a designer a specific challenge, but that is what keeps it “fun” for us. We hope you have as much fun flying to them and enjoying the journey.

Doug Linn / RTMM

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