Skeetawk Ski Area Project

UAA College of Engineering
University of Alaska Anchorage

Client: Hatcher Alpine Xperience, Max Schillinger, PE, PLS

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Project Team:

Apex Engineering

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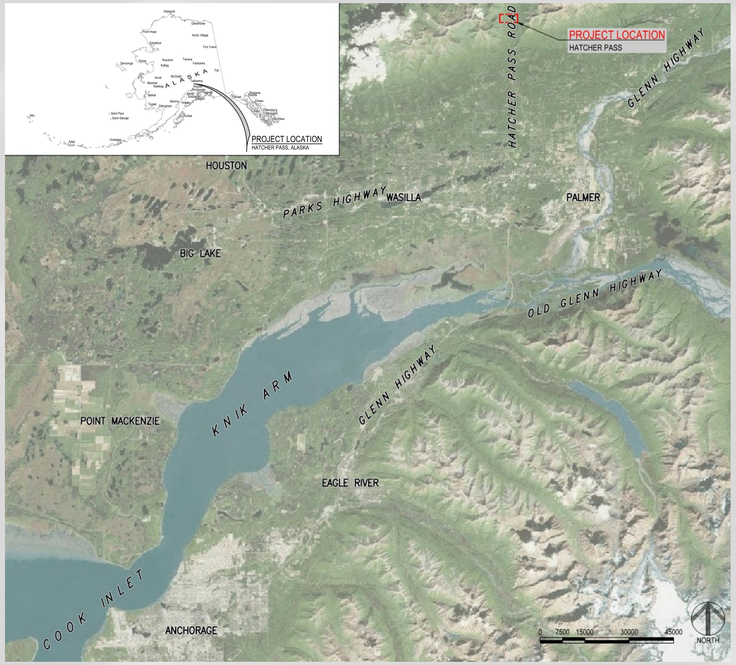
Abstract:

Hatcher Alpine Xperience (HAX) is a non-profit organization, funded and constructed by the community, with the intent to bring lift access downhill skiing, boarding and other alpine sports to Hatcher Pass. The new proposed ski area will be known as Skeetawk Ski Area (SSA) and is located approximately 52 miles North of Anchorage at mile 10.6 of Hatcher Pass Road. Currently, a snowcat shelter, parking area, lower ski runs (cleared and grubbed), and maintenance road for the first lift (Phase 1A) are constructed. Phase 1A lift construction and initial clearing and grubbing for the high-speed quad chair lift are underway, but in need of additional design support. Phase 2 of the SSA project will result in a 3rd chair lift from the top of the high-speed quad to the top of peak 6048' which currently has no estimated time of completion.

To help aid with these efforts, Apex Engineering, from the University of Alaska Anchorage College of Engineering, was tasked with designing a maintenance road for the Phase 1B high speed quad chair lift planned to be constructed in 2020, as well as designing water and wastewater systems for a future lodge that is still in the early planning stages.



Project Scope:

Water System

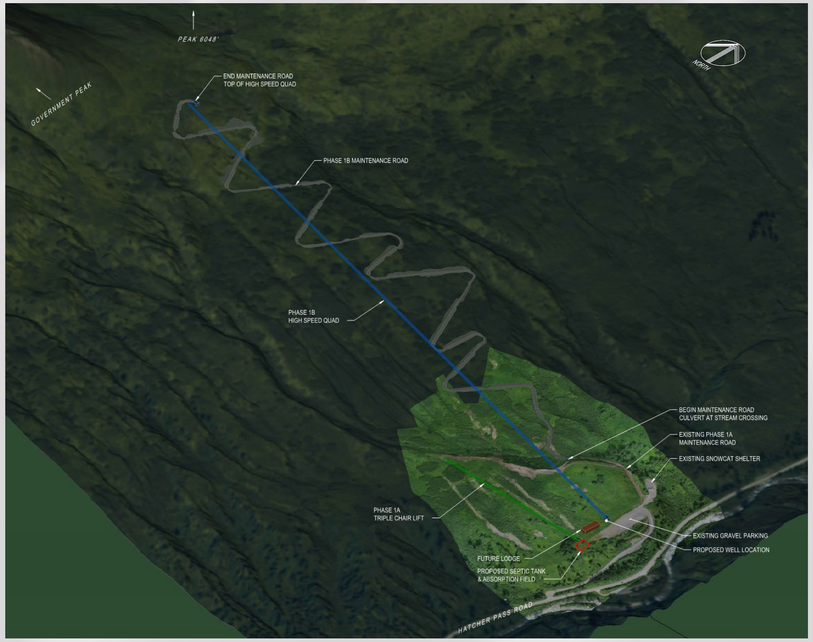
The water system source for the future lodge is limited to surface water, natural aquifer, or hauling water from the nearest filling station. Nearby surface water options are limited and test wells have yet to be performed. The lodge is assumed to have a 150-seat bar/restaurant, administrative offices, mechanical room, ski shop and rentals. Design needs to proceed with the assumption that a groundwater option is the most viable.

Wastewater System

The wastewater system for the future lodge requires onsite treatment. Again this is due to the lack of public sewer collection system availability. The lodge is expected to receive a maximum of 675 people per day. Possible onsite systems include expensive modular treatment packages, a traditional septic system with absorption field, or a holding tank to be hauled off when full. Design needs to proceed with the assumption that the septic system is the most viable with the constraint that the water table is high in the proposed location.

Maintenance Road

The maintenance road to be designed provides access for construction equipment to place concrete foundations for the ski lift towers. When complete it will be used for maintenance. The lift length is approximately ¼ mile long, however the existing grade averages 30%. The design vehicle is a concrete truck, which limits the turning radius and the grade uphill. Additionally HAX requested that the road be a single lane gravel road and that excavations be minimized, so the alignment of the road needs to be optimized.



Project Design:

Water System

Information is limited, but nearby well logs suggest an aquifer may exist at a depth of 100ft. Water quality, rechargeability, and pressure are unknown. A well will typically consist of a well casing, submersible pump with stainless steel screen, and a service line into the building below the frost line. The well casing is sealed near existing grade and at the aquifer layer using an impermeable material like bentonite clay to ensure there is little to no contamination. Depending on water pressure and quality, storage tanks and additional treatment may be needed. All of which is contingent on locating a successful test well within the SSA.

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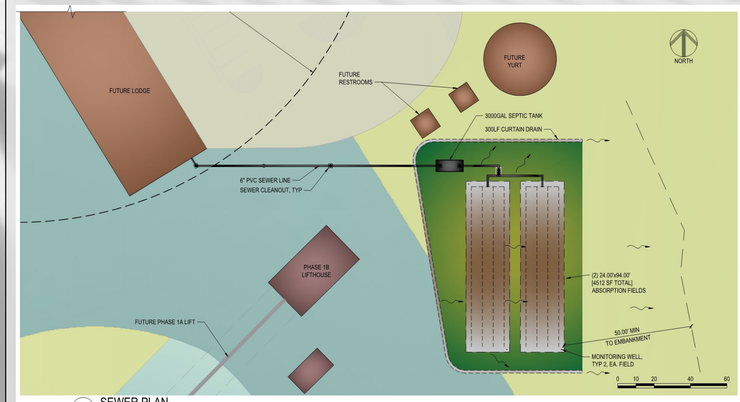
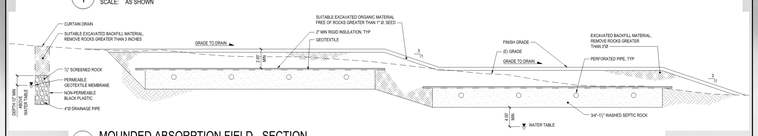
Project Design:

Wastewater System

The high-water table poses challenges for a septic tank and absorption field. High water leads to tanks erupting from the ground if not properly anchored as well as not allowing effluent to percolate properly. The native soil provides adequate bearing pressure to keep a 3000-gallon septic tank underground as well as provides a slow enough percolation time. To keep the absorption field out of the water table a mounded field approximately 4500 square feet is needed. The mounded system as well as the septic tank require insulation to protect it from seasonal frost as well. Due to the extremely high seasonal water table, a curtain drain is suggested to redirect subsurface water around the proposed absorption field. They work by providing a porous medium such as coarse gravel to direct ground water into a perforated pipe instead of through the absorption field.



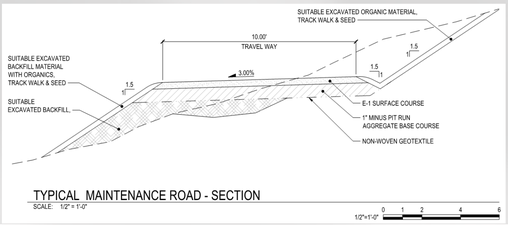
1 SEWER PLAN
SCALE: AS SHOWN



2 MOUNDED ABSORPTION FIELD - SECTION
SCALE: NOT TO SCALE

Maintenance Road

The design vehicle limits the road to a 50ft turning radius as well as a 15% maximum grade. The resulting road is a 10ft wide single lane, approximately 1.7 miles long with approximately 13 switchback turns. It's assumed that temporary turnaround areas will be constructed as needed for staging lift towers. Existing soils are relatively stable and due to the infrequency of traffic a minimal structural section is needed. Slope stability will consist of excavated soil containing organics scattered on cut/fill slopes, track-walked with equipment and seeded.



TYPICAL MAINTENANCE ROAD - SECTION
SCALE: 1/2" = 1'-0"

Additional Recommendations:

1. The water system should be revised when the well is located. A meter could be installed to help guide future growth for SSA facilities.
2. The high-water table observed should be formally confirmed during a seasonally high-water table with a percolation test. If the table is lower, the curtain drain could be eliminated or reducing the clearance between the table and the bottom of the absorption field a possibility with a waiver.
3. Allowing for more maintenance road excavation could reduce its length and the associated materials for constructing it.