

Feasibility of an electric SEG fleet

Introduction

Electric vehicles are known for having zero GHG emissions and are much more environmentally friendly than gasoline- or diesel-powered vehicles. Electric vehicles have fewer moving parts, which makes maintenance costs minimal. With no engine there are no oil changes, tune-ups, or timing and there is no exhaust. Electric vehicles are also far more energy efficient than gasoline engines and they are very quiet in operation.

Recommendations for further research

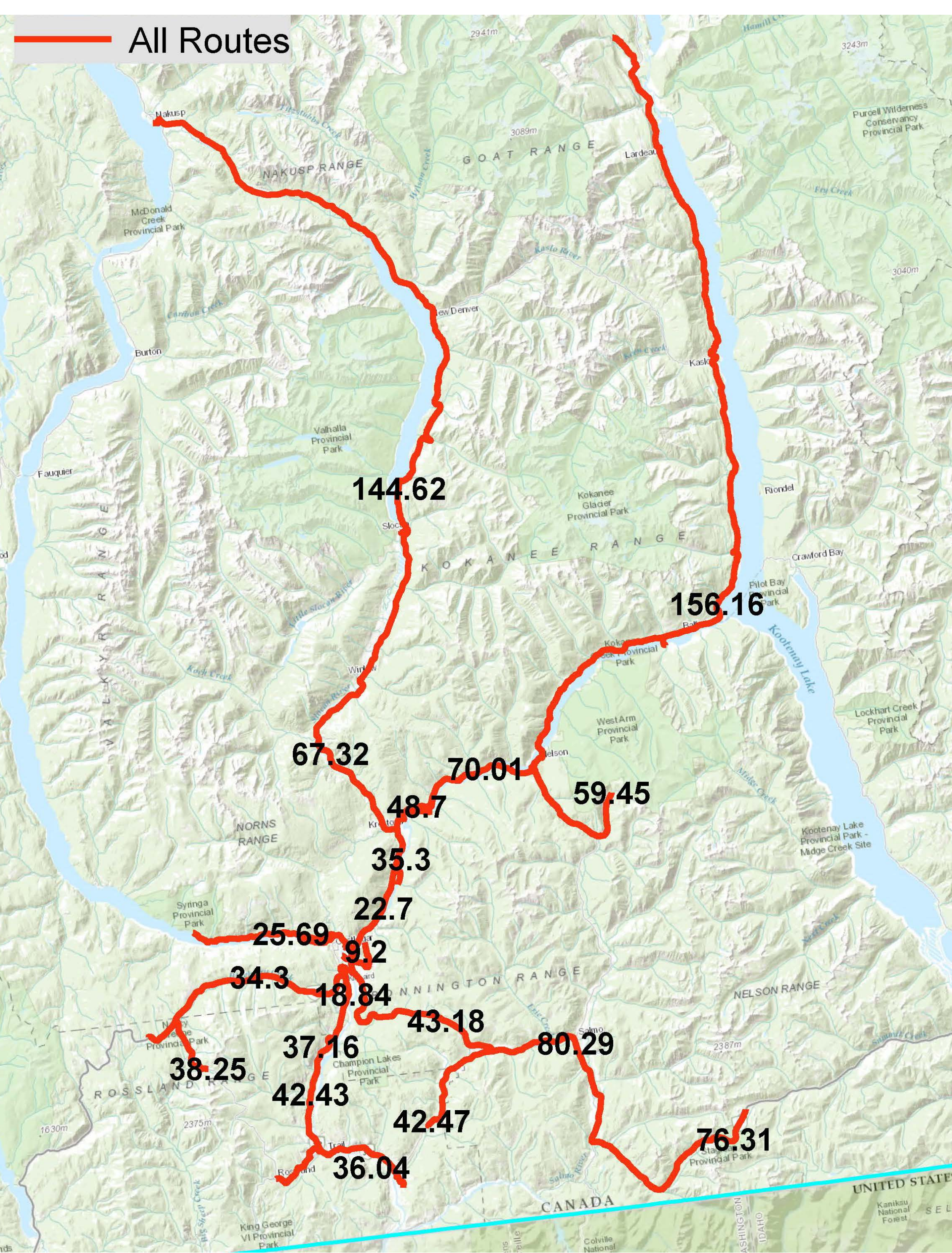
Since the EV isn't feasible, going down the Hybrid route is a definite option. Three of the SEG fleet aren't the 15-passenger van but include a Chevy suburban, dodge ram, and a ford f150. Those three vehicles burn an average of 15 L/100km. Hybrid replacements for these vehicles include a GMC Yukon Hybrid and two Chevy 1500 hybrids which average 11.1 L/100km, and cost under \$20,000 used.

Data Sources

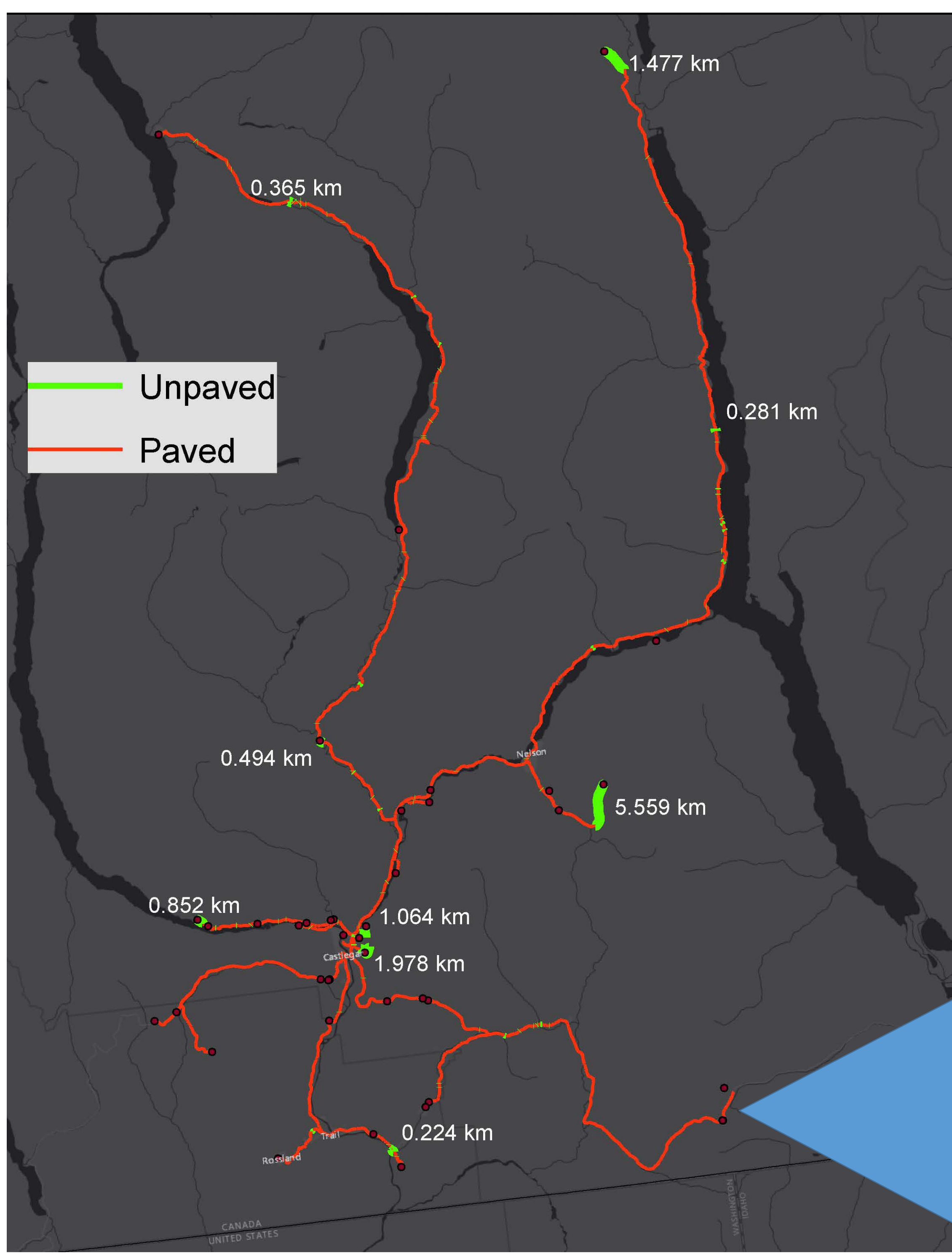
Lab Location – SEG Van Booking Form/Instructors
Roads layer - BCdata Catalog
Base Map - Arcmap



Example of the Road Condition During Spring Time



Length of lab routes in Km



Length of unpaved/rough/loose roads

Discussion

The EV I chose was the Hyundai Kona. The reason I chose the Kona as the most suitable vehicle is because it can go the most kilometres in one charge and it has the second highest ride height out of all the Electric vehicles available in BC. The Kona can hold five people

The total kilometres to the lab locations were 1466 km (Figure 2) and the total kilometres of rough/loose/unpaved was 27.58 km (Figure 3), that's only 2% of the total routes, but because some of the labs exceed 5 kilometres on the unpaved road, it would make it hard to get the electric vehicle up and if we were in a park and walk, it will take too long and waist time.

Statistics such as money spent on gas, carbon released, and van efficiency were gathered from all SEG programs, for one year. This showed that the whole of the SEG van fleet travelled 38,000 km's in one year. With an average MPG of 12 for the vans and \$1.25/L for gas, this amounts to over 10,000 dollars in gas and over 18 metric tons of Co2. Between all eight vehicles in the fleet that 4750km each. An oil change is required every 5000 km, so it's safe to say the vehicles get at least one oil change every year. According to RepairPal.com, oil changes average between 100-120\$ so that's \$880 a year in just oil changes per year. The Hyundai Kona doesn't require any oil changes and costs about \$19.50 to charge which lasts 415 km. By replacing one of the SEG fleet vehicles with the Kona it would save the college about \$1135 per year.

Unpaved roads are more susceptible to potholes and mud. The only vehicles that are all wheel drive were the Tesla model S, and Model X. both those vehicles exceed \$75,000 and the Model S doesn't have the ground clearance capable of going on an un paved road safely. Electric Vehicles also used tires that are harder and less grippy to maintain a low rolling resistance. This would make it hard to get out of the mud if we got stuck. And because there's no telling what the road will be like in the seasons during the school session, it would be a gamble every time.

Limitations and Assumptions

While gathering data, I had issues contacting some instructors to organize a time to meet. To overcome this issue, I met with some students that had gone on that lab and they were able to help me. Another constraining factor is fact that on the data BC catalogue, some of the layers seem incomplete and don't line up with other layers that should go hand in hand. This makes finding data hard and causes some doubtfulness in the accuracy of the data on that site, even though it's a government website.

Lots of labs were in the same location between Integrated Environmental Planning, Recreation, Fish and wildlife, and Forestry, so I felt that I didn't need to add every lab location to my map since some locations are shared and I assume they park in the same spot. I feel this is a fair assumption, because usually the lab is at the end of the road so they have to park there or they have a designated wide spot so the vehicles are out of the way. To choose a fitting electric vehicle, I did research and, on the BC Hydro website (bchydro.com) it had a list of electric cars available in BC. This was the only list of EVs that I could find and I knew of one EV that happened to not be on this list so I added it myself. Because of this I'm not sure if there are more that are not on this list, which means that there could be a more suitable vehicle

