Pilon, Janet

Subject: The dreaded LRT
Attachments: TRAIN CARS.docx

Subject: The dreaded LRT
Date: Thu, 24 Dec 2020 15:08:16 -0500
From: Mike Lacroix
To: Office of the Mayor <mayor@hamilton.ca>

Hello Mr. Mayor:

I was cleaning out my computer and came across the attached letter which I created back when Mr. Johnson was the city's head person for the LRT. Way back then I proposed the system indicated in the letter (which I hope you will review) to Mr. Johnson. While he like a lot of the concepts he made it clear that the city didn't have any control regarding the design, only Metrolinx who had already finalized the design and wasn't open to changes. I also heard that the Metrolinx design was dependent upon using vehicles from Bombadier in a deal with the Provincial government of the day. As we all know now the LRT has been scrapped due to its larger than expected costs but rumblings keep coming of it being resurrected. If there still is an opportunity to get an LRT then I think the city should be more involved in the design of the system so that it is a Hamilton design that meets Hamilton's needs and not Metrolinx's. As for what I propose in the letter, I am not saying that it is the best solution but I see it as better than the traditional on ground system that uses heavy train cars and require extensive road construction that will disrupt the businesses along the line. I would appreciate your thoughts on the proposal.

Best regards and Merry Christmas / Happy Holidays,

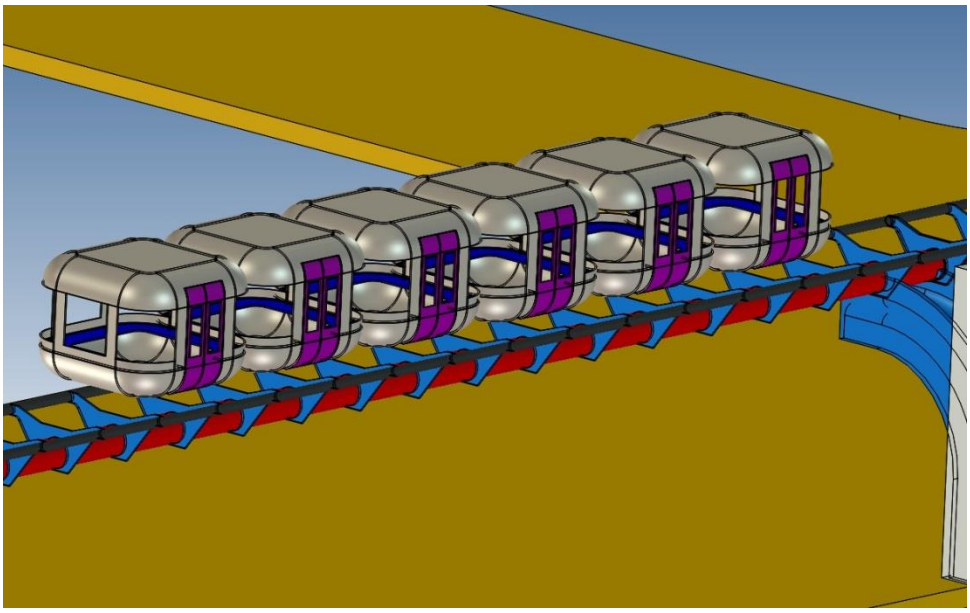
Mike Lacroix

TRAIN CARS (specs)

1. Size – 8’ x 8’ x6’ (L x W x H) – initial start values
2. Large windows for best viewing
3. Electric Drive system in each car (ensures train can keep going if one car fails)
4. Built in electrical storage (battery pack/flywheel device/Hydrogen fuelcell/Etc.)
5. Built in wireless charging system which eliminates the need for overhead wires and booms to power car.
6. Solar panels on roof to feed storage system
7. Regenerative and magnetic braking
8. Electrical storage system is capable of moving the cars up to 4 stops (minimum) before the storage system runs out of charge.
9. Each car can hold up to 16 passengers, 10 sitting, 6 standing (96 for 6 car train 48’ long)
10. Cars can easily be modified for special needs passengers such as those with wheel chairs, walkers, bicycles, scooters, etc.)
11. There will be integral heating and cooling for passenger comfort.

TRAINS (specs)

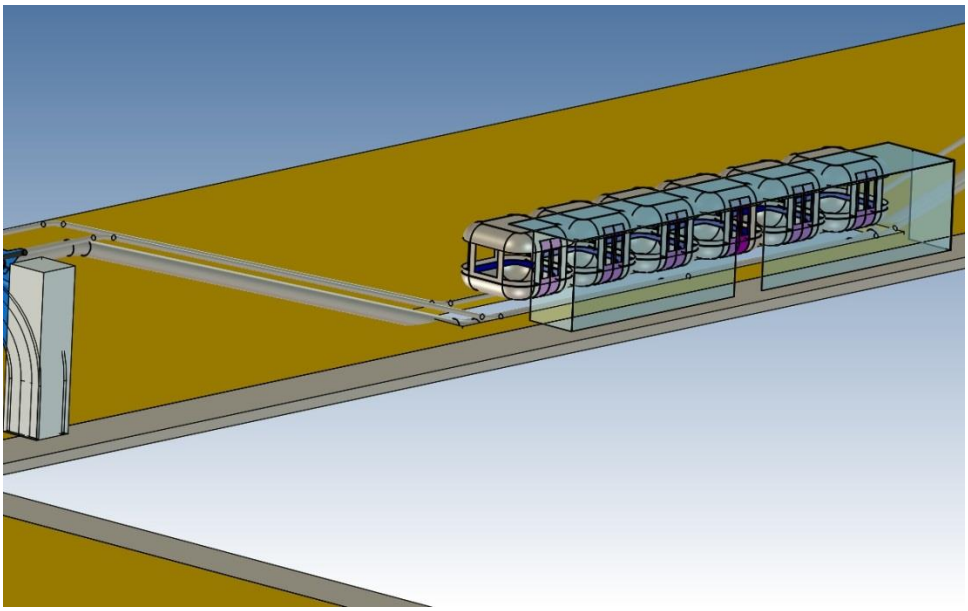
1. Each train to be 6 cars long but could be longer or shorter
2. Front car controls the following cars
3. Ability to travel up or down inclines like a regular bus which would allow LRT service from the lower city to the upper city. Train style designs cannot do that.



NOTE: This picture is to show the concept but does not reflect the actual design of the cars which is currently under development.

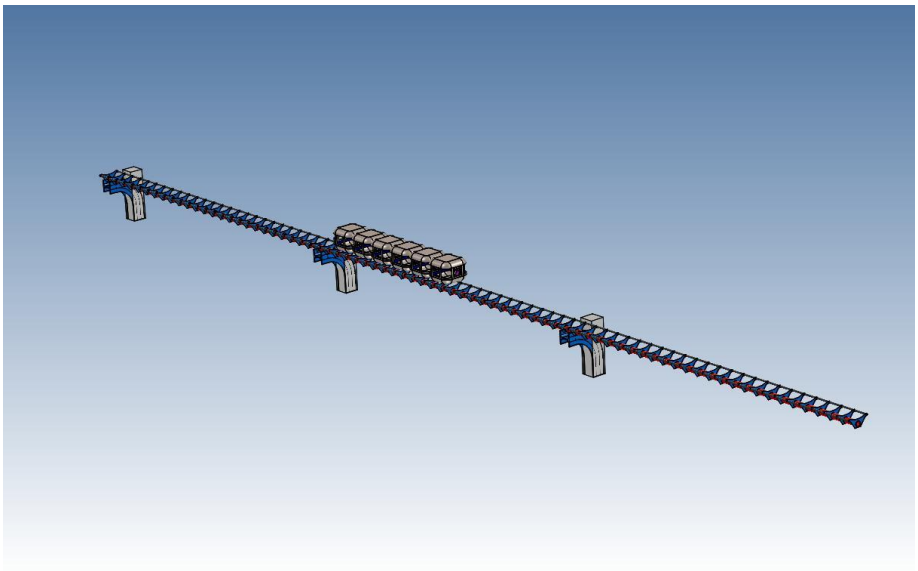
SYSTEM (specs)

1. Built using tried and true roller coaster design theory
2. Elevated semi-flat track
3. Trains typically ride on an elevated track and then drops to ground level at entry/departure stations/stops. Stations/stops can be at track level but that will incur more cost to ensure safe movement of passengers back to ground level or from ground level up to track level (typically done with elevators). Boarding and embarking the train at ground level is more cost effective and safer. It should be noted that the loading/unloading stations could also be at track level but would require raised platforms and a method to get people up and down from the platform besides the use of stairs (elevator perhaps).
4. Each station/stop will have a wireless power transmitter that will recharge the on board storage system in each car during the time the train is stopped for loading and unloading of passengers. Stop time as yet to be determined.
5. System can be run manually (drivers in every train) like the current bus system or can be automated such that the trains are controlled and monitored at a central location. Each has pros and cons.
6. Each line (believe 3 can be built, B-Line (Eastgate to Varsity Plaza using Main St. only), James from the harbour all the way to Rymal Rd. and Mohawk from the escarpment in the east to Upper Paradise) will have a terminus at one end of the line where the trains will be stored overnight or for maintenance. It should be noted that if the terminuses are designed as multipurpose buildings then the cost of building them will be spread out over more users.
7. The elevated system has the desirable qualities;
    a. The raised track will only impede traffic at the station stops which are in the curb lanes designated for parking anyway.
    b. By mounting the track on piers/poles it will not be necessary to tear up the road for the placing of new track except at the station/stops.
    c. Construction of the piers/poles will be quicker and over a small area resulting in less construction impact to traffic.
    d. By being elevated the system does not have to interface with the vehicle traffic controls, eg. Stop signals. With a ground level design the train must take control of the traffic control lights to make sure the light is green so it doesn't have to stop. That would require a very sophisticated control/signaling system.



Typical Station/stop. Note that it is possible to make the enclosed area so that it covers the train as well for better weather protection.

Below is picture showing a train running on the track between stations/stops.



Costs:

1. While the absolute cost of this type of system is not known at this time estimates were made based on the design and build of theme park steel rollercoasters. The cost of steel rollercoasters varies widely depending upon the complexity of the design (eg. Turns, loops, corkscrews, etc.). Fortunately this design is basically based on a “flat” design. Information gleaned from past

designs shows that the cost of designing and building 1 mile of track ranges from $1M to $10M installed. To allow some safety margins in the cost the value of $10M/mile was chosen. It should be noted that this cost includes the track, the station/stops and cars.

2. So in order to determine how much system length that will provide the amount of dollars being supplied by the province/Metrolinx was divided by the $10M/mile value. The result was that it would be possible to build 100 miles/160 kilometers. That is much larger than the 12 – 15 miles needed for just the B Line.
3. So based on item #2 it can be seen that Hamilton can get more bang for its buck with a system based on rollercoaster technology.

System Advantages:

1. The fact that each car has its own rechargeable power source means that the need for an overhead power wire is eliminated and with it the extension pole that keeps the car in contact with the wire.
2. By each car having its own power source (battery pack/flywheel device/Hydrogen fuelcell/Etc.) it means that individual cars can run the track under their own power. Thus when the rider usage is low the trains could be two or three cars or just single cars. Then when rush hour starts trains with up to 6 cars could be connected to handle more people per stop. The purpose of the system is to provide “rapid” travel which requires short times between trains at the stations/stops. If the trains are one size only, it doesn’t make financial sense to have short times between trains when the ridership is low as larger trains will just be moving empty space (unoccupied seats). But with one or two small car trains running at low ridership times there will be less empty seats. Cost to run the system will be lower.
3. The current system design being suggested (typical on ground rail) is limited to use on relatively flat layouts and is relegated to inclines of 7 degrees or less which means traversing up the escarpment doesn’t make sense as it would take miles of track to go that height. On the other hand, the light weight design of the cars and use of a rubber drive wheel means that the cars can travel on greater slopes like a typical automobile making travel up the escarpment easy and will allow the system to connect the upper and lower city.

Mike Lacroix

Hamilton, ON.