Transportation Report to
SPC on Transportation and Transit
2018 October 04

ISC: UNRESTRICTED
TT2018-1054

Hyperloop Development and Testing in Calgary

EXECUTIVE SUMMARY

Hyperloop is a proposed mode of freight and passenger transportation that uses a vacuum tube system to propel pods at high speeds (over 1,000 km/h) over long distances. While the idea of using a vacuum tube to transport people and goods has been around for over a century, hyperloop has recently been made popular by Tesla and SpaceX founder Elon Musk, when he announced in 2012 that the hyperloop would be the "fifth mode of transport" (the others being: roadway, water, air and rail). Several hyperloop companies have emerged since Musk's 2012 announcement including Virgin Hyperloop One, Hyperloop Transportation Technologies (HTT), DGWHyperloop, and TransPod. There are no functioning hyperloops in service, and only two test tracks in the world – the Virgin Hyperloop One 500 m test track in the Nevada Desert and the SpaceX subscale model in Hawthorne, California.

In 2017, a hyperloop company approached The City of Calgary looking to establish a research office, and construct a 10 km test track in Alberta. The hyperloop company investigated several locations for tests tracks outside of Calgary city limits. Administration supports the development of a privately funded test track outside the city boundary due to the economic and research benefits that could arise from its development. However, due to the hyperloop technology still being in a conceptual/developmental stage, regional plans should not be changed to account for it, and the development of a test track within city boundaries is not recommended.

The decision to allow for the construction and operation of a hyperloop test track falls outside of The City of Calgary's jurisdiction. The Government of Alberta is in ongoing discussions with the hyperloop company regarding the company's interest in moving forward with a safe and suitable hyperloop test track location in the province.

If a hyperloop test track does move forward near Calgary, The City will be able to provide transportation data, staff expertise and can work to understand how The City can assist in its success. In reviewing the Hyperloop concept administration consulted with Calgary Economic Development, Innovate Calgary, University of Calgary, TransPod, Delta Loop, State of Nevada, City of Edmonton and the Provincial and Federal Governments.

ADMINISTRATION RECOMMENDATION:

That the SPC on Transportation and Transit recommend that Council receive this report for information.

RECOMMENDATION OF THE SPC ON TRANSPORTATION AND TRANSIT, DATED 2018 OCTOBER 04:

That Council receive Report TT2018-1054 for information.

PREVIOUS COUNCIL DIRECTION / POLICY

On 2017 September 11, Council unanimously approved Notice of Motion, NM2017-33, with the following direction:

ADOPT, Moved by Councillor Carra, Seconded by Councillor Pootmans, that Councillor Carra's Motion, NM2017-33 be adopted, after amendment, as follows:

Transportation Report to
SPC on Transportation and Transit
2018 October 04

ISC: UNRESTRICTED
TT2018-1054

Hyperloop Development and Testing in Calgary

NOW THEREFORE BE IT RESOLVED that Administration, in collaboration with Calgary Economic Development, Innovate Calgary and post secondary institutions and within existing budgets, support the development of a research centre and test track as the first steps in determining the viability of this technology and report on progress to the SPC on Transportation and Transit no later than Q2 2018

On 2018 June 25, Council approved a deferral report to defer the Hyperloop Development and Testing in Calgary report to no later than the 2018 October meeting of the SPC on Transportation and Transit.

BACKGROUND

Hyperloop

Hyperloop is a proposed mode of freight and passenger transportation that uses a vacuum tube system to propel pods at high speeds (over 1,000 km/h) over long distances. The hyperloop technology serves as a potential future alternative to high-speed rail (HSR). While the idea of using a vacuum tube to transport people and goods has been around for over a century, hyperloop has recently been made popular by Tesla and SpaceX founder Elon Musk, when he announced in 2012 that the hyperloop would be the "fifth mode of transport" (the others being: roadway, water, air and rail). Several hyperloop companies have emerged since Musk's 2012 announcement including Virgin Hyperloop One, Hyperloop Transportation Technologies (HTT), DGWHyperloop, and TransPod.

Hyperloop test tracks

There are no operating hyperloops in existence and currently only two test tracks in the world:

1. Virgin Hyperloop One's 500 m test track is in the desert 30 minutes north of Las Vegas. In conversations with the State of Nevada, this location was deemed acceptable as it did not endanger the public or property; in case of an accident, only the surrounding desert would be impacted. The Nevada government was supportive of the test track largely due to the private capital investment of over $120 million USD and the creation of 100 new jobs.

2. A 1.6 km subscale model (a six-foot outer diameter) has been constructed adjacent to SpaceX's headquarters in Hawthorne, California. Since 2015, SpaceX has hosted a university hyperloop pod competition, which challenges university teams to design and build the best / fastest transport pod and test it at the test track.

Proposed Hyperloop projects

1. In April 2018, HTT started construction of a 320 m test track near its research and development centre in Toulouse, France. It will be the first test track of Hyperloop in Europe. HTT are looking to build a commercial hyperloop in Abu Dhabi for Expo 2020.
2. In February 2018, Virgin Hyperloop One announced it is proposing building a 700 km hyperloop in India between Prune and Mumbai, which would connect around 26 million people. Virgin is looking to construct a 10 km test track in the area, prior to starting the full

line. Virgin Hyperloop One also reached an agreement in August 2018 with Spanish state-owned rail infrastructure company, Adif, to build a $500 million research centre in Spain.

3. TransPod has secured 50 million euros of funding and has put in an application to build a 3 km, 2 m diameter test track near Limoges, France.

INVESTIGATION: ALTERNATIVES AND ANALYSIS

Role of the Municipal Government

The City of Calgary has a limited role when it comes to the development of hyperloop technology for use over long distances. The Government of Alberta has jurisdiction over the use of any provincial highway right-of-way as well as intra-provincial short-line railway standards, while the Government of Canada has jurisdiction over federal railways and related standards.

Land

It is recommended that if a hyperloop test track is built, it is constructed in an isolated area, much like the Nevada test track.

Funding

The City will be able to provide transportation data and staff expertise. The decision to allow for the construction and operation of a hyperloop test track outside of Calgary falls outside of The City of Calgary's jurisdiction. The Government of Alberta and/or the Government of Canada would be largely responsible for hyperloop or other high speed intercity transit technologies.

Stakeholder Engagement, Research and Communication

Administration consulted with Calgary Economic Development, Innovate Calgary, University of Calgary, TransPod, Delta Loop, State of Nevada, City of Edmonton and the Provincial and Federal Governments. The stakeholder engagement, research and communication results are attached to this report.

Strategic Alignment

The only City document that references the hyperloop technology is the Future of Transportation report. The Calgary Transportation Plan looks at high speed rail connections to Edmonton.

Future of Transportation – The hyperloop technology is identified as a "medium impact" technology that is in the "concept / prototype stage". It was recommended that regional plans should not be modified for the technology, and The City should monitor developments with the technology.

Transportation Report to
SPC on Transportation and Transit
2018 October 04

ISC: UNRESTRICTED
TT2018-1054

Hyperloop Development and Testing in Calgary

Social, Environmental, Economic (External)

Hyperloop test tracks and research centres could attract specialized engineers and researchers in addition to the direct and indirect construction jobs.

Once proven, hyperloop technologies may provide significant travel time savings for people and businesses and could reduce CO2 emissions.

Financial Capacity

Current and Future Operating Budget:

The information contained in this report contains no decisions that would impact operational budgets.

Current and Future Capital Budget:

The information contained in this report contains no decisions that would impact capital budgets.

Risk Assessment

It was determined that a hyperloop test track should be outside city limits. Construction of a test track away from built up areas is consistent to what is occurring globally with other hyperloop test tracks.

REASON(S) FOR RECOMMENDATION(S):

The development of a privately funded test track outside the city boundary is supported by The City due to the economic and research benefits that could arise from its development. However, due to the hyperloop technology still being in a conceptual/developmental stage, regional plans should not be changed to account for it, and the development of a test track adjacent to a roadway or built up area is not recommended.

ATTACHMENT(S)

1. Hyperloop Stakeholder Engagement