

Extention of the subway from toronto to vaughan essay examples

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1. 0 Introduction

For every proposed project, one of the most important considerations is the how the project shall impact on the environment. Environmental assessment is normally done by the concerned bodies and the project declared fit.

However, if the proposed project has adverse effects on the environment, then, various considerations are put in place, including and not limited to relocating the project or completely stopping it. This paper puts into focus the environmental effects of the extension of the subway from Toronto to Vaughan. It describes the environments that shall be affected or might reasonably be affected, the potential effects, and the mitigation measures that can manage, minimize, prevent and avoid the environmental effects. The paper also highlights the advantages and disadvantages of this project to the environment.

1. 1 Classification

The environmental effects of the project can be classified into three categories. The first category deals with the displacement impacts, which entails the displacement of the existing features by the subway facilities. Within the project area, the existing features will directly be affected by the introduction of the subway facilities like tunnels, stations, ancillary facilities, and commuter facilities. The second category deals with the construction impacts, which are the short-term potential impacts that result from the construction activities. Finally, the third category deals with the operational impacts, which are the long-term effects that result from the operation and maintenance of the subway extension.

For simplicity, the degree of the influence of the activity or component on

the environment is classified as none, weak, moderate and strong. If there is no probability of any interaction or if the interaction has no significant impact, then it is classified as “ none”. For this category, there is no additional discussion. When there is a low probability of the interaction or if the interaction has low significance, then it is classified as “ weak”. For this category, a general discussion is provided; however, based on the anticipated low probability and significance, no follow up actions are required. When the probability of an interaction is moderate or there is moderate significance, then, it is classified as “ moderate”. For this category, there is a detailed discussion and the possible mitigation measures and commitments. Finally, when classified as “ strong”, then there is a high probability of an interaction or the significance of the interaction is high. Such issues are closely monitored or regulated by government agencies. A detailed analysis that quantifies the impacts and the mitigation measures is given. The following section highlights the different categories of the environmental impacts

2. 0 Displacement Impacts

Discussed herein are the permanent displacement impacts that shall result from the construction of tunnels, parking lots, station entrances, etc of the project.

2. 1 Soils

The project undertaking has no permanent displacement impacts associated to it. All the impacts are transient and are as a result of the construction.

2. 2 Ground Water

Within the construction area, there are no geodrains and other permanent

dewatering systems used, thus, no anticipation of long-term effects on ground water. The undertaking has no permanent displacement impacts associated with it. All the impacts relate to the construction and are transient.

2. 3 Surface Water

The subway extension alignment follows the divide between the West Don River subwatershed and the Creek subwatershed. The resulting effect is that the surface water is conveyed away from the proposed station locations. Other than the areas where the commuter parking lots and bus terminals are proposed, there is an increase in the impervious area, which mainly consists of entrance buildings. The displacement of the permanent facilities with impervious areas is most likely to affect the drainage characteristics of the subwatersheds.

Mitigation

Various considerations should be taken into account so as to address the water balance, the water quality and the water quantity. To offset the potential impacts, there is need for the implementation of the lot level conveyance controls in order to reduce the peak run-off rates.

Monitoring

A network of rainfall gauges is operated and maintained within the City of Toronto. The information obtained here can be used to determine the sewer sizes and the impacts on both the existing sewer system and the streams. The City also collects and analyses the water samples from the sewers for various management reasons.

2. 4 Communities and Ecosystems

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Community refers to the assemblage of all the species at a given place and time while ecosystem refers to all the organisms in a given place, which directly interact with the environment.

The Environmental Effects

The project is intended to avoid most of the communities and ecosystems located within its area. However, some of the terrestrial communities and ecosystems shall be displaced by the subway facilities. The vegetation within the study area shall be cleared. This vegetation is however, considered widespread, common, and secure locally and globally. The subway shall not displace any aquatic ecosystems or communities.

For the areas where the construction involves cut-and-cover, open excavation, and ground disturbance, the vegetation communities and ecosystems shall be displaced. There is the potential removal of the vegetation communities located within the footprint areas of the subway facilities. The predominantly cultural meadow communities are in their early stage of ecological succession and have been extensively disturbed in the past. They also have low wildlife inhabitant capabilities. The loss of these vegetation communities, however, will not have significant adverse effects on the environment.

Mitigation

The mitigation measures are limited given the area type, the significance, and the sensitivity of the vegetation that is to be displaced by the Subway Extension. At the design stage, efforts should be made to incorporate the vegetation communities into the subway design. For the areas where the removal of the vegetation is not necessary, there should be a construction

fencing in order to isolate the work area. If some suitable plant materials within the area are to be cleared, then, they shall be transplanted to the protected areas nearby. Where cut-and-cover construction is needed for the subway tunnel, it is important to place soil over the subway tunnel and restore the vegetation through induced or natural regeneration.

Monitoring

The health of the trees during the construction process shall be monitored by the TTC. It is also important to monitor the restored vegetation for at least one year to ensure their survival. In case it is identified that the tree health has failed or is failing, then, there shall be a replacement of such a tree with the identical species and growth.

2. 5 Population

Population refers to a group of individuals of the same species located in a given place at a particular time. Species, on the other side, are a group of related animals or plants with common features.

The Environmental Effects

Within the study area, there are ornamental vegetation and naturally occurring vegetation along City streets and within private lands. The vegetation provides home for small mammals and birds and at the same time perform other functions like soil stabilization, carbon cycling through respiration, provision of shade, and the aesthetic appeal.

For the cut-and-cover construction areas, there shall be the displacement of the ornamental and regenerating vegetation. There are no wildlife species of management concern within the project area. The birds' species have been identified within the study area. the species of concern within Toronto, as

identified by the TRCA, include Eastern Meadowlark, Eastern Wood-pewee, and the Black-capped Chickadee. These birds are widely distributed and are common in a wide range of habitats. Be that as it may, these birds still need protection from harm as the site clearing activities commence. The harming or the killing of migratory birds (also referred to as “ incidental take”) due to such actions as construction, the disturbance, and the destruction of the nests of migratory birds are prohibited.

2. 6 Air Quality, Noise, Vibration, Electromagnetic Interference, and Stray Current

The project has no permanent displacement impacts on the above quantities. Only transient impacts and localized impacts associated with the operation of the subway exist in some of the cases.

2. 7 Property and Buildings

It is approximated that only 40% of the subway alignment shall utilize the municipal road allowance. On the other hand, some sections of the alignment fall within private property. Besides, some portions of private property shall be needed so that bus terminus and station entrances can be accommodated. The acquisition shall involve full taking, partial taking, and Subsurface Easement.

Mitigation

In acquiring these properties, the City of Toronto needs to balance the community interests and the individual interests. The individual rights should be respected and protected, and, fair compensation should be provided to all. There should be negotiations in order to achieve a mutually satisfactory agreement between the concerned parties.

3. 0 construction impacts

Discussed herein are the major project elements, the construction techniques, and their impacts on environment.

3. 1 Soil

The assessment of the potentials for the adverse ground and surface feature displacements as the construction progresses deserves an engineering evaluation. Based on the evaluations, there shall be the preparation and implementation of the design and construction strategies that limit or completely eliminate the adverse effects. The project shall generate large volumes of surplus excavated material.

3. 2 Groundwater

From the available geotechnical data, it is seen that the Upper Sand or Silt deposits are very close to the surface and are more concentrated in the western limits of the Study Area. the mapping of the groundwater discharge areas depict that though Upper Sand/Silt deposits may be hydraulically connected, there are most likely chances that they are interrupted by the overlying Upper Till deposits. Potential impacts may therefore result in the recharge/discharge areas and the aquifers due to temporary dewatering activities. There may also be permanent changes to the subsurface drainage patterns.

Mitigation

The need for the temporary dewatering shall necessitate the use of earth pressure balance methods in tunneling and the use of pre-cast segmental concrete linings to limit the short-term and long-term water inflow. There

may also be limited temporary dewatering at cut-and-cover sections to form barriers to groundwater flow.

Monitoring

The construction of stations, which employs the cut-and-cover operations, requires dewatering so as to reduce groundwater pressure and to lower the levels of groundwater so that the construction can be carried out on a stable, undisturbed, and dry subgrade. In order to avoid the adverse effects like the settlement of buildings, destruction and disruption of natural habitat, and harmful alteration, the monitoring to be employed include piezometers or the Ground Water Monitoring Wells, and monitoring the amount of suspended Solids in the dewatering effluent.

3. 3 Surface Water

The construction activities may result in sediment-laden stormwater entering the watercourses, which then results in erosion and sedimentation.

The mitigation measures include, and not limited to, the construction of sediment control fences, sediment traps, straw bales, and interceptor swales and dykes.

The monitoring shall include the control measures for Sediment and erosion, which shall regularly be interpreted TTC to ensure that the measures are within proper working order.

3. 4 Air Quality

Dust emissions that are caused by the cut-and-cover activities are most likely to affect the air quality. Dust emissions can affect both commercial and residential locations. The dust level should therefore meet the required

standards.

The mitigation measures include the use of standard techniques for the construction industry. Such measures include, and not limited to, developing a comprehensive dust control process, covering or wetting the dry materials to avoid blowing of dusts and debris, and washing the streets within the work sites.

3. 5 Noise

The main source of noise will be the general construction and machine activities in the cut-and-cover excavation. During construction, noise and vibrations should be controlled so that their impacts on the neighboring community are minimized.

Noise control shall include, and not limited to, shielding, use of soundproof housings, use of effective silencers in the intake and exhaust on air equipment, and the use of mufflers on the internal combustion engines.

4. 0 Operation and Maintenance Impacts

4. 1 Noise and Vibrations

The wayside noise provides the basis for evaluating the impacts and determining the mitigation measures that can minimize the community disturbance.

There are various sources of noise, some of which are: subway noise emitted through the ventilation shafts; the bus terminus noise resulting from bus operations, vehicular activities and commuter parking; and electrical sub-stations noise resulting from the transformers within the sub-stations.

Mitigation measures include treating the vent shafts to lower the noise to

acceptable levels, construction of a sound barrier wall along the perimeter of the bus terminals, and the use of sound barriers and equipment orientation in electrical sub-stations.

Subway operations are most likely to generate ground-borne vibration. However, the vibrations are perceptible and do not result into damage to property. The reduction of the vibration includes development and installation of double tie system and the continuous floating slab, which reduces the groundborne sound and vibration levels.

4. 2 Electromagnetic Interference

Electromagnetic interference has adverse effects on computing devices like therapeutic equipment, monitoring, and microprocessor based patient diagnostic devices. The operation of the Subway shall have negligible effect on the existing uses within the study area. Thus, no mitigation measures shall be required.

4. 3 Stray Current

Stray currents occur on buried metallic structures and results into corrosion damages. The current, which causes the corrosion, has an external source to the affected structure. The negative return current that leaks into the ground and back to the traction power substation via parallel paths (ground and other metallic structures) is the main cause of the stray currents.

The mitigation measures help in minimizing the uncontrolled stray currents. Such measures include, and not limited to, the use of Low linear rail resistance, good rail bonding, high rail-to-earth resistance, and good water drainage.

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