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Halifax Dutch Style Roundabout (DSR)

Introduction

HRM's Integrated Mobility Plan set the target to increase walking, biking, and public transit use by 30% by 2031. In Nova Scotia, transportation accounts for 27% of GHG emissions. Implementing the IMP should lower this by 2%.
The project location is also a part of HRM's Activity Transportation Network.

The intersection of South Park St. and University Av. should be updated, to increase pedestrian and cyclist safety, in order to help meet this target.

HRM's Activity Transportation Network

Design Checks Completed

Design Vehicle: It is necessary to design the diameter of roundabout in order to meet the requirements for the turning radius of large vehicles

Entry Width: The perpendicular distance between the left and right edge of the roadway. Lane widths should be greater than 4.2m and up to 6m for a single lane roundabout

Enter Angle: A wide entry angle will result in approaching vehicles entering the roundabout at high speeds, which will increase the risk of collision. A tight entry angle may cause side slip collisions between the circulating vehicle and the entering vehicles.

Fastest Path: The fastest speed that a vehicle could theoretically enter, cross and leave the roundabout without any restrictions. The fastest speed for our roundabout was 39.7km/h

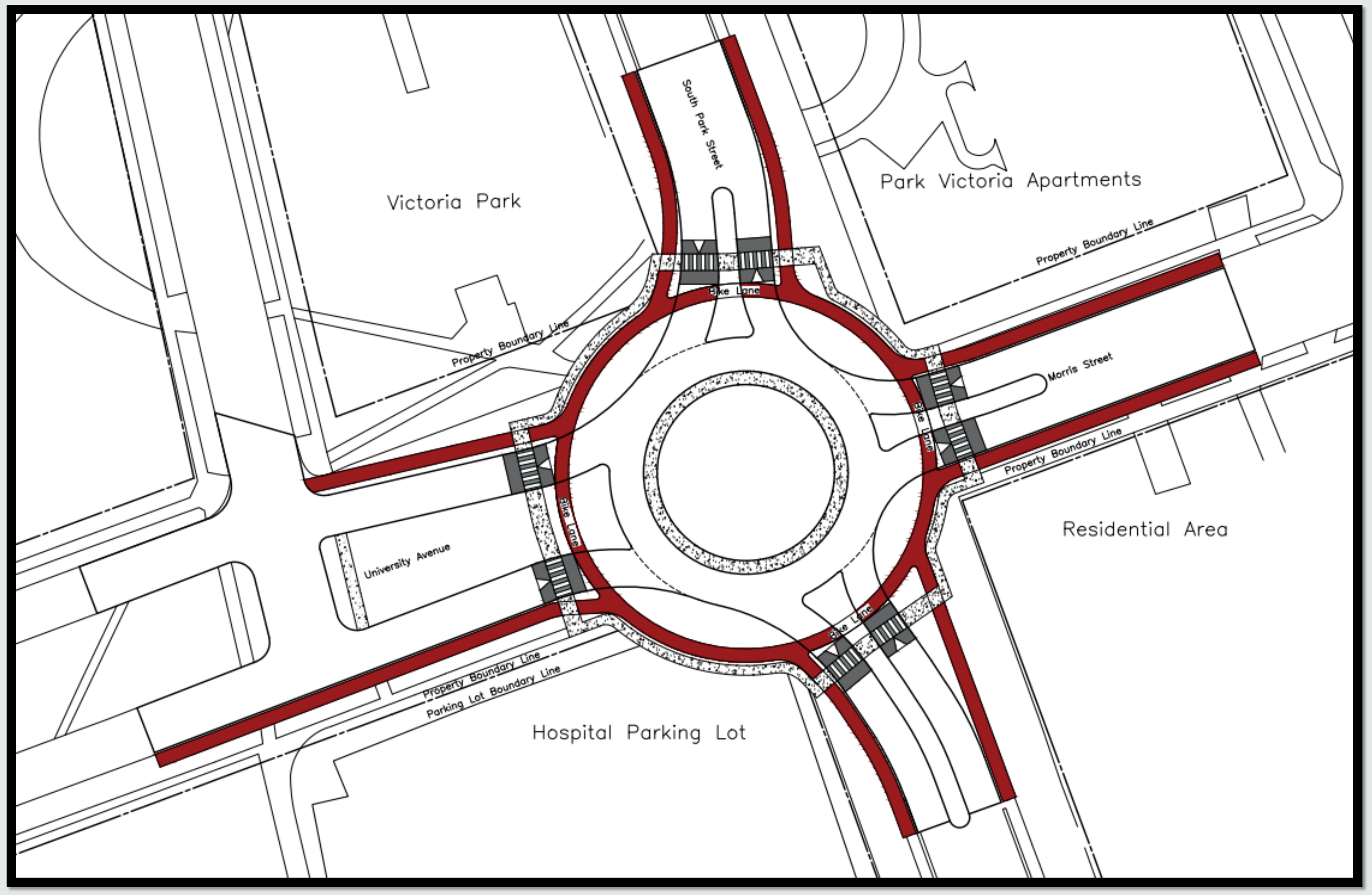
Details of Final Design

- Inscribed central dimeter of 30m (including 2m truck apron)
- Lane widths of 5m
- Bike lane width of 2m
- Crosswalk widths of 2.5m
- Sidewalk width of 1.5m

Design Process

Term 1
- DSR research
- Project constraints
- Traffic data collection
- 3 conceptual designs
- Class D cost estimate

Term 2
- PTV Vistro analysis
- Final design completion
- Design check completion
- Construction planning
- Sustainability analysis
- Class C cost estimate



Sustainability Analysis

Our calculations use delay times from the PTV Vistro analysis. They show an expected short-term drop of approximately 2% in green house gas (GHG) emissions and a possible 62% long-term drop in GHG emissions.

Construction Planning

Stage 1: Temporary Alignment
Stage 2: Quadrant 1 Construction
Stage 3: Quadrant 2 Construction
Stage 4: Quadrant 3 Construction
Stage 5: Quadrant 4 Construction
Stage 6: Final Alignment
Stage 7: Curbing
Stage 8: New Asphalt Paving

Cost Estimate

- Class C cost estimate was completed for the project.
- 25% contingency utilized
- 10% engineering contingency utilized
- Total project cost of $2.9 million

Class 'C' Cost Estimate		
Construction Costs	$	1,651,060
Fixed Costs	$	225,000
Subtotal	$	1,876,060
Contingency (25%)	$	2,345,075
Engineering Contingency (10%)	$	2,579,583
Property Acquisition	$	291,000
Total Project Cost	$	2,870,583

Conclusion and Recommendations

In conclusion, we designed a DSR with a Class C cost estimate of $2.9 million while considering construction management and sustainability.

Our group feels that are DSR design would be a good design alternative to use in this location given the discussed reasons. Since the DSR design is not currently used throughout Canada but had relatively positive feedback in the U.K, it could be a widely used intersection design if it works as proposed.

Thank You for viewing our poster and feel free to reach out to the team if you have any questions.

Acknowledgments

- Advisors: Paul Burgess & Dr. Nouman Ali
- Course Instructors: Dr. Yi Liu & Dr. Craig Lake
- Industry Contact: David MacIsaac

Key References

- Canadian Roundabout Design Guidelines
- HRM Design Guidelines
- HRM Integrated Mobility Plan
- NACTO Design Guide
- NCHRP Report 672
- Government of Canada Transportation Initiatives