Barrhaven Light Rail Transit (Baseline Station to Barrhaven Town Centre) and Rail Grade-Separations Planning and Environmental Assessment Study

Executive Summary

Introduction/Overview

Extending Light Rail Transit (LRT) to Barrhaven is contemplated in the City of Ottawa's current Transportation Master Plan (TMP, 2013) as part of the Ultimate Rapid Transit and Transit Priority Network, with implementation anticipated beyond the 2031 horizon year. In June 2018, City Council approved a motion directing staff to undertake the Barrhaven Light Rail Transit (LRT) Environmental Assessment (EA) Study for conversion of existing Southwest Transitway between Baseline Station and Barrhaven Town Centre from Bus Rapid Transit (BRT) to LRT facility. Completion of this study will bring the Barrhaven area to the same level as other suburban communities in Ottawa with regards to LRT planning, as part of the Stage 3 LRT program. This is the last LRT segment identified in the City's 2013 TMP requiring EA approval.

This study focused on implementing LRT within the rapid transit corridor previously identified and protected through the 1997 Southwest Transitway EA study (Baseline Station to Strandherd Drive) (McCormick Rankin) and the 2006 Southwest Transitway Extension EA study (Strandherd Drive to Cambrian Road) (TSH). This study also examined options for implementation of a Train Storage and Servicing Facility (TSSF), a new Park and Ride lot, and pedestrian and cycling facilities to support rapid transit service.

It should be noted that through the course of this study Baseline Station was renamed to Algonquin Station. To avoid confusion, Baseline Station remains the name used for the Station as it was shown on public consultation documents throughout the project lifecycle.

Environmental Assessment Process

The project planning phase for the Barrhaven LRT commenced in accordance with Ottawa City Council's direction of June 27, 2018 (Motion No. 72/8) and the EA Scope of Work subsequently approved by Ottawa Transportation Committee on October 3, 2018 (Motion No. 35/1).

This study was carried out in accordance with the Province of Ontario's Transit Project Assessment Process (TPAP) which has since been renamed to the Transit and Rail Project Assessment Process (February 2024) as prescribed in Ontario Regulation 231/08 of the Ontario *Environmental Assessment Act*. The regulation prescribes an EA process facilitating public consultation, documentation, and provincial approval. The process is documented in an Environmental Assessment Report (EPR) which is submitted to the Minister of the Environment, Conservation and Parks (MECP) for approval following a mandatory 30-day public review. The Minister has 35 days to render a decision whether the project can proceed. If the Minister does not render a decision by the end of the 35th day, the project is considered approved. Should

there be requests to elevate the scale of the EA, the scope of those requests is limited to matters of provincial importance, related to the natural environment or cultural heritage values or interests, or the project may have negative impact on constitutionally protected Aboriginal and treaty rights.

In accordance with the regulation, this EPR will be placed on public record for comment and review prior to MECP approval. If there are concerns of provincial interest that cannot be resolved, a written objection may be made and sent to the Minister for consideration.

Study Process

The Study process reconfirmed the project needs and opportunities, documented existing conditions, evaluated alternative solutions and alternative designs to arrive at a Preferred design, with public and stakeholder consultation undertaken throughout. On November 25, 2020, Ottawa City Council approved the Preferred Design for the Barrhaven Light Rail Transit (LRT) extension from Baseline Station to Barrhaven Town Centre that incorporated an elevated LRT guideway located immediately west of the Woodroffe Avenue Right-of-Way between Algonquin College and the Nepean Sportsplex. One of the impacts of this plan was the removal of 100 low-cost residential housing units situated within a required 20 metre wide strip of land between Knoxdale and West Hunt Club Roads – a section of Right-of-Way referred to throughout the Study as the 'Pinch Point'.

An outcome to Committee and Council's approval of the Preferred Design included direction to establish a task force and working group on affordable housing to address the displacement of 100 privately owned rental units for the properties located with municipal mailing addresses of: 1, 3, 5, 19 and 23 Cheryl Road, 1668 Woodroffe Avenue and 5 Majestic Drive (Recommendation #5). The task force and working group on affordable housing was initiated prior to the issuing of the Notice of Commencement of the TPAP on October 23, 2021.

The task force explored numerous options to mitigate the housing loss, including modifying the LRT alignment to eliminate the loss of housing altogether. Accordingly, the Study Team prepared a functional design plan shifting the LRT alignment to the median of Woodroffe Avenue between north of Knoxdale Road and the Nepean Sportsplex Station (the "Pinch Point"). The new median LRT alignment requires reconstruction of Woodroffe Avenue through the Pinch Point to accommodate the elevated guideway and support piers. It is important to note that the functional design for the remainder of the corridor remains unchanged.

On June 8, 2022 the median LRT alignment was subsequently approved by Transportation Committee and Council and directed staff to finalize the functional design for the revised alignment and conduct public consultation on the design change and report back to Committee and Council with the outcome prior to re-initiating the TPAP.

Following consultation and refinement of the median elevated LRT alignment the Recommended Plan was presented and approved by the City of Ottawa Transportation Committee on April 27, 2023 and Council on May 10, 2023. The modification to the design has been captured and described beginning in **Section 6.7** of this EPR. Sections preceding **Section 6.7** have not been edited so as to maintain the transparency and accuracy of the process

followed over a number of years to finalize the EA study's Recommended Plan. As part of the revised design, the existing conditions have been revisited and are documented in **Annex 18, Appendix B**. The remainder of the EPR remains unchanged, consistent with the majority of the Recommended Plan remaining unchanged from what was presented and approved by Committee and Council in 2020.

New City of Ottawa Official Plan

During the process of revising the design, the City adopted a new Official Plan (2022). Subsequently, the Infrastructure Master Plan and Transportation Master Plan have also undergone process of updating and have significantly completed drafts since the documentation of the existing conditions written at the outset of the EA study in 2018. The Recommended Plan has been reviewed to ensure consistency with these new planning documents and is described in **Section 6.8**.

Existing Conditions

The Study Area extends from Baseline Station in the north to Barrhaven Town Centre in the south.

The Official Plan designations from both the 2013 and new 2022 versions were considered through the EA study. Areas around Baseline Station (renamed to Algonquin) and Barrhaven Town Centre are recognized as areas for high density developments, a range of mixed use functions within easy access to transit. Station locations are identified as areas for future focused development and intensification. The Study Area north of Hunt Club Road recognizes Woodroffe Avenue as a Mainstreet Corridor. The Study Area south of West Hunt Club Road to Fallowfield Road recognizes the Greenbelt area and support for Agricultural Resource Area, and Greenbelt Facility. Greenspaces cross the Study Area throughout.

The VIA Rail Smiths Falls Subdivision also crosses the Greenbelt whereby the Southwest Transitway, Woodroffe Avenue and Fallowfield Road all cross at-grade.

Existing environmental conditions for the Study Area were established through a combination of document review and field investigation. Major issues identified which guided planning and design of the project included:

- Geotechnical conditions –a large part of the Study Area includes sensitive soils and groundwater conditions which influence alternative designs, constructability, and project cost.
- Land use and development constraints –part of the Study Area includes established residential communities. New infrastructure must be compatible and address potential impacts such as noise, vibration, the visual environment, community access and property requirements.
- National Capital Commission Greenbelt –new infrastructure needs to address the visual environment, property (including farm infrastructure) and access impacts and enable pathway/eco-passage connectivity.
- Transportation conditions –The Southwest Transitway and Woodroffe Avenue carry large volumes of transit and automobile traffic and there are key pedestrian/cycling linkages in

the Study area. New infrastructure will need to support future travel demand for all modes and address safety, capacity and accessibility requirements.

Pre-planning Activities

The following activities were undertaken during the pre-planning phase:

- Data collection to establish the existing conditions for the Study Area and inform subsequent evaluations;
- Re-confirm the project need and opportunity;
- Re-confirm the Preferred Solution identifying the transit project;
- Develop and complete a comprehensive evaluation of alternative designs and Train Storage and Servicing Facility (TSSF) locations;
- Consultation and engagement including three (3) public open houses, 16 consultation group meetings and several individual stakeholder meetings;
- Presentation and approval of the Recommended Plan at City of Ottawa Transportation Committee and Council; and
- Preparation of the Environmental Project Report.

Recommended Plan (Project Description)

The Recommended Plan incorporates:

- 10 kilometres of twin-track, fully segregated electric LRT including;
  - 2.4 kilometres on an elevated structure within the Woodroffe Avenue corridor.
  - 7.6 kilometres converted from bus to rail within the existing Southwest Transitway corridor between Nepean Sportsplex and Barrhaven Town Centre, including 1.7 kilometres of an open-cut trench at the southern end of LRT line.
- 7 LRT stations;
  - Three new LRT stations: Tallwood, Knoxdale and Nepean Sportsplex.
  - Converting four existing Bus Rapid Transit (BRT) stations to LRT stations: Fallowfield, Longfields, Strandherd and Barrhaven Centre.
- Improved and new facilities for pedestrian and cyclists along the corridor, including a pedestrian bridge connecting to the Nepean Sportsplex over Woodroffe Avenue;
- Reconstruction of Woodroffe Avenue from north of Knoxdale to the southern Nepean Sportsplex intersection including modification to five intersections (Knoxdale, Majestic, West Hunt Club, Sportsplex North, Sportsplex South) conforming to the City's Protected Intersections Design Guidelines;
  - Inclusion of uni-directional cycle tracks on both sides of Woodroffe Avenue between Knoxdale Avenue and West Hunt Club Road; and
  - Corridor Landscaping.
- Three new bridges over the VIA Rail line at Woodroffe Avenue, the Southwest Transitway (LRT) and Fallowfield Road;
- Three new below-grade separating structures at Berrigan Drive, Marketplace Avenue and Chapman Mills Drive;
- A light rail TSSF near the VIA Rail overpass at Greenbank Road (1005 and 1045 Greenbank Road);

- A bus-to-rail transfer terminal and 250 space park-and-ride facility at the Barrhaven Town Centre; and
- Signalization at Woodroffe Avenue and the entrance to Baseline Station, and the relocation of a northbound bus stop to far-side at Norice Street as interim transit priority measures.

From approximately 200m north of the Knoxdale/Medhurst intersection to the Nepean Sportsplex south entrance, Woodroffe Avenue will require reconstruction to accommodate the elevated LRT alignment within the median. The functional design for roadway reconstruction reflects a reduction in total traffic lanes (from six to four) through this segment by reallocating the existing transit-only lanes to a wider median needed to support the elevated LRT. The roadway functional design also reflects current best practices and City design standards for Complete Streets, with wider sidewalks and separated cycling facilities (cycle tracks). It also includes five protected signalized intersections (Knoxdale, Majestic, West Hunt Club, Sportsplex North, Sportsplex South) with Smart-channels for right-turns at some locations to meet traffic operations requirements and a wide median to provide road safety barriers around piers.

South of Nepean Sportsplex to Barrhaven Town Centre, the LRT would follow the existing Southwest Transitway corridor, with grade separations over the VIA Rail line. A new signalized intersection at Woodroffe Avenue will provide access to the integrated Fallowfield Station. The Park and Ride at the Barrhaven Centre Station could be integrated with the future development plans for the Barrhaven Town Centre area.

The TSSF will be located on City-owned land in the north-east corner of the Greenbank-Highbury Park intersection. The location is near the end of the LRT line, which will reduce deadhead train mileage, operating cost and non-revenue service time.

Impact Assessment Mitigation and Monitoring

A comprehensive analysis/assessment was undertaken to identify the impacts on the social, natural and physical environments based on implementation of the Recommended Plan. Where potential effects were predicted, mitigation measures are recommended including monitoring, where applicable.

Environmental implications and mitigation measures include:

Noise and Vibration

A noise and vibration assessment and subsequent addendum to capture any changes resulting from the modification to the preferred design were completed to evaluate the potential impacts of the project on the surrounding noise sensitive land uses. Operational noise impacts due to the LRT project are not expected to be significant as noise levels along the alignment are dominated by area road traffic. At-source noise control measures in the form of a noise screen along elevated portions of the guideway is not warranted based on current guidelines. Should there be changes to the guidelines and best management practices in the future or changes in LRT design, it is recommended that noise control measures be reviewed at detailed design. The proposed Fallowfield Road re-alignment to the north will move the road away from nearby receptors, thus reducing road noise levels for residents on the southside. The activity and traffic patterns around existing bus stations and proposed LRT stations are expected to remain similar

to the current stations, with the exception of Barrhaven Centre Station which will be reconstructed to include a new bus terminal and Park and Ride lot.

The TSSF is located 100 metres from the nearest sensitive receiver. Inspections and servicing activities will be undertaken indoors, thereby reducing the impact of noise on the adjacent community. Nevertheless, it is recommended that a detailed stationary noise analysis be undertaken during detailed design to confirm mitigation needs. Measures could include equipment silencers, noise walls or berms around the perimeter of the property. Walls and/or landscaped berms could also be built as needed to reduce visual and noise impacts.

Vibration impacts due to the project are not expected to be significant although, if required, appropriate mitigation such as ballast mats/track isolation and resilient track fasteners can be implemented. This can be confirmed during detailed design and continued discussion with the LRT office of lessons learned through Stage 1 and 2 implementation.

The expected impacts from construction of the project will be limited to isolated and local surface construction generating an increase in occasional minor ground vibrations, emissions and dust, as well as intermittent noise. In all cases, air quality, noise and ground vibrations are not expected to be overly disruptive to commonly occurring regular activities and can be mitigated through standard best practices during construction.

Visual Impacts and Privacy

The project will change the existing views within the corridor and offer new views and vistas across the NCC Greenbelt from the facility and rail grade-separations. The rail grade-separations have been designed to minimize embankment heights and use long open spans to allow for light penetration and views underneath the structures.

The elevated section from Baseline Station to the Nepean Sportsplex will become a new view from the surrounding land uses. Detailed landscape plans will be required throughout the corridor and will include preserving, to the extent possible, existing vegetation and provide new opportunities to mitigate views of the elevated facility to the surrounding community. Where the project includes elevated sections, opportunities to program the space under the guideway for community benefiting uses including parks and recreational pathways or greening will be explored.

The elevated facility is located 40 metres to 60 metres from existing residences along Beechcliffe Street. Opportunities to include landscape buffering, public space and/or more transit-oriented land uses will be explored to minimize impacts to privacy.

Natural Environment

The LRT alignment, while largely within an urban context, does cross the NCC Greenbelt between West Hunt Club Road and Fallowfield Road.

The project includes three existing water crossings: one at the north end of the Greenbelt that provides drainage from the agricultural fields to storm systems under and along Woodroffe Avenue and West Hunt Club Road; and two crossings of Black Rapids Creek closer to Fallowfield Station. Impacts to fisheries and aquatic habitat, as well as water quality, can be

avoided using standard design and construction practices such as adhering to in-water timing restrictions and by implementing erosion and sediment control measures.

The project will require the removal of some vegetation along the edge of the Tallwood Woods, an urban woodlot. A detailed tree conservation report and landscape plan will be required prior to project implementation to minimize the impact to trees and identify areas where new trees could be provided.

There is potential for the project to interact with urban and rural species, as well as Species at Risk. The need for more targeted species/inventories is documented in future requirements and with the application of mitigation measures, potential impacts can be reduced or eliminated following all federal and provincial permitting requirements. In addition, the project will need to adhere to the City of Ottawa Protocol for Wildlife Protection during construction. Stations will be designed following the City of Ottawa's guidelines for bird-safe design.

Climate Change

Electric LRT will have a positive effect on climate change when compared to the effects of the current diesel bus service that operates in the corridor today. The reliability and convenience of LRT will also encourage residents to switch from single-occupancy vehicle trips to transit. In addition to electric propulsion, which reduces greenhouse gases, particularly sulphur and nitrogen oxides and other contaminants, LRT also reduces the number of vehicles required to carry large volumes of passengers. The rail grade separations will also eliminate vehicle idling and congestion associated with the existing at-grade crossings while waiting for trains to pass, thus contributing to a cleaner local environment in the community.

There are also activities that can be done during construction to minimize the project's negative impacts on the environment such as: waste reduction/re-use/diversion measures; sourcing local materials where possible; minimizing tree removals; and other best management practices to reduce temporary noise and air quality impacts. The LRT design includes measures to increase its resiliency to the effects of climate change: stormwater management strategies that consider extreme weather events; landscaping plans that include additional shelter and rest elements to shield facility users from extreme heat; and developing maintenance plans throughout the lifecycle of the facility, including snow and ice management strategies.

Approvals, Monitoring and Commitments to Future Work

The following future commitments will be undertaken as part of the next phases of the project:

- Additional consultation with the Royale Equestrian Centre and NCC regarding the new entrance to the centre at 2191 Woodroffe Avenue resulting from the grade-separation of Woodroffe Avenue and LRT.
- Section 82 determination under the *Impact Assessment Act* based on requirement for federal lands.
- Federal Land Use, Design and Transaction Approval (FLUDTA) from NCC due to the requirement for federal lands.
- Other Federal Approvals to be confirmed including those required under the *Species at Risk Act* and *Fisheries Act* and O.Reg. 406/19 On-site and excess soil management.

- Provincial Approvals to be confirmed including: Environmental Compliance Approval, Permit to take Water, those under the *Endangered Species Act*, *Heritage Act*, *Public Lands Act*, *Conservation Authorities Act*.
- Possible EA under Hydro One Class EA process.
- Municipal Approvals to be confirmed including: Road Modification Approval, Road Cut Permit, Temporary Encroachment Permit, Noise By-Law Exemption and Tree Protection By-Law.

Monitoring plans (**Section 7)** will be developed and reviewed by the appropriate agencies prior to implementation. Construction and post construction monitoring will be required (**Section 9.6**).

In addition, monitoring may be required as part of the permit and approval process detailed above.

Under the Environmental Assessment Act, the proponent is required to monitor compliance of the implementation of mitigation measures as identified in the EPR. The City of Ottawa will prepare a monitoring plan in accordance with subsection 9.2.8 of Ontario Regulation 231/08 to verify the effectiveness of the mitigation measures. The monitoring plan will be designed prior to the start of construction and will outline roles and responsibilities related to agency reviews and implementation of the monitoring report.

Financial Implications

The Class C estimate (2023 dollars) to design and implement the Barrhaven LRT and three rail grade-separations is $4.019 billion.

The project can be constructed in phases:

- Phase 1: Baseline Station to Fallowfield Station ($2.717 billion). It includes rail grade-separations (at Woodroffe Avenue, Southwest Transitway and Fallowfield Drive) and the expansion of the maintenance facility at Moodie Drive to initially support Phase 1 extension.
- Phase 2: Fallowfield Station to Barrhaven Town Centre ($1.302 billion). It includes the new TSSF.

Rail grade-separations of Woodroffe Avenue, Southwest Transitway and Fallowfield Road may be undertaken in advance of the LRT extension at an estimated cost of $535 million. This cost is included in the estimate for Phase 1.

The Class C estimate (2023 dollars) to design and implement a new signalized protected intersection at the entrance to the Baseline Station, and the relocation of an existing bus stop at Norice Street, is $2 million.

This near-term improvement measure can be funded through the City’s transit priority program.

Public Consultation / Input

Consultation with stakeholders occurred through the Agency Consultation Group (ACG), Business Consultation Group (BCG), and Public Consultation Group (PCG). Stakeholders include Indigenous Communities, government agencies, Ottawa Housing, National Capital Commission (NCC), VIA Rail, CN Rail, Rideau Valley Conservation Authority (RVCA), City’s Accessibility Advisory Committee (AAC), Barrhaven Business Improvement Area (BIA),

developers, landowners, business groups, school boards, community associations and special interest groups. Consultation with the general public occurred primarily through three open houses and through the project website, e-mail, and additional meetings as required, such as with affected property owners. A project website (www.ottawa.ca/barrhavenlrt) was established to share information on the study's progress.

Major feedback included: support for advancing the project; concerns about the impact on rental housing units, noise and visual impacts from the elevated facility, and avoiding traffic impacts to Woodroffe Avenue during and post construction; support for pedestrian and cycling facilities, making use of the space under the guideway, providing more parking, and the grade separations at the VIA rail crossings; a desire to limit impacts on the NCC Greenbelt and green spaces; and, impact on water quality.

These issues were assessed during the development of Recommended Plan and are described as part of the description of the Recommended Plan.