



Northeast LRT Rail-with-Trail



A 3.0 KM YEAR-ROUND MULTI-USE TRAIL ADJACENT TO THE LIGHT RAIL TRANSIT SERVICE DOWNTOWN TO NORTHEAST EDMONTON

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**Paper prepared for the 2005
Transportation Association of Canada's
Sustainable Urban Transportation Awards**

March 31, 2005

Edmonton's Northeast LRT Rail-with-Trail

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ABSTRACT

Many abandoned rail lines have been converted to multi-use trails, however there are only a few trails in Canada adjacent to active rail systems. Extending from the east side of Downtown, Edmonton's Light Rail Transit (LRT) right-of-way includes a parallel, 3.0 kilometre long multi-use trail.

The asphalt trail is 4.0 metres wide for use by pedestrians, cyclists and other active modes, connecting Downtown with Northlands Park, Edmonton's principal indoor hockey venue and exhibition centre. Planning is underway to extend the trail an additional 4.1 kilometres to link to the North Saskatchewan River Valley trail system.

Edmonton's *Transportation Master Plan* (1999) highlighted the importance of providing a mix of travel options. A ten-year goal was to develop non-motorised facilities along rail and utility rights-of-way. City Council has since approved a 62 kilometre Multi-use Trail Corridor Network that will service all quadrants of the city. The trail corridors are equivalent to the arterial roadway system for vehicles, and form the backbone to the citywide trail system for year round use. The Rail-with-Trail along the LRT is the primary link to northeast Edmonton.

During the planning and design process, foremost tasks included conducting an independent safety audit, value engineering session and extensive review to safely integrate the multi-use trail with the surrounding roadway network and LRT operations. Similar case studies were researched, VISSIM simulation models utilised to examine different crossing options, and innovative signal timings developed to coordinate the trail crossing signal with both the roadway network and any approaching LRT vehicles.

Compatibility with LRT operations was a major consideration, ranging from trespassing concerns on the rails, delineating the adjacent rail and trail facilities, and discouraging unauthorised access to LRT stations. A broad project team was established including engineers, designers, signals experts, LRT drivers, maintenance and security personnel, each of whom contributed to design development.

Construction of Edmonton's Northeast LRT Rail-with-Trail occurred between 2002 and 2005. An opening took place August 29, 2002, that also celebrated installation of a community mural created during a local art festival. Other elements to beautify the corridor include tree planting, landscaping nodes and unique trail lighting.

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1.0 INTRODUCTION

1.1 *Multi-use Trail Description*

The City of Edmonton is developing a multi-use trail along its Northeast Light Rail Transit (LRT) right-of-way. The trail corridor provides direct access between Downtown and Northeast Edmonton for walking, cycling and other active transportation modes.

On land formerly owned by Canadian National (CN) Rail, the trail is generally aligned along CN's previous rail line, separate from the LRT tracks. The right-of-way is typically 40 metres in width and the LRT tracks are located in the centre. The City owns and operates both the LRT and the right-of-way, procuring additional lands as CN decommissions outlying service.

A 4.0 metre wide, asphalt multi-use trail has been constructed from 97 Street on the eastern edge of Downtown to Commonwealth Stadium, a distance of 1.5 km. Following design work and planning throughout 2004, the trail will continue an additional 1.5 km north in 2005 past Stadium Station towards Coliseum Station, which services Edmonton's principal hockey arena and the Northlands Park exhibition site.

Commencing in 2006, an additional 4.1 km of trail construction is planned to connect northward through to 137 Avenue and the North Saskatchewan River Valley. At the Downtown end, the trail will be completed across the former CN Bridge at 97 Street/105 Avenue when the former station lands site is developed. 105 Avenue has been identified as a "greenway" corridor with a multi-use trail complementing the adjacent residential, educational, commercial and industrial properties.



Looking southwest from 93 Street along the LRT RWT towards the Downtown Edmonton skyline

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1.2 *Rails-with-Trails*

Edmonton's Northeast LRT multi-use trail functions alongside an active rail service. There are many examples of Rails-to-Trails in Alberta, where an abandoned rail line is converted to a trail. However this is a Rail-with-Trail (RWT), and it is understood that there are only a few other RWTs in Canada.

Naturally, trail users need to respect a code of conduct within a rail right-of-way. The LRT is expected to stay on the rail and trail users are expected to stay on the trail!

The trail has been designed so that the smooth asphalt runs along the western property line of the right-of-way, enhanced by lighting and landscaping. Approximately 7-10 metres of rougher, granular surface and ballast separates the trail from the tracks. This area is used by LRT maintenance and security vehicles and is the no-go zone for trail users. Information signage has been installed stating "Use the Trail Stay off the Rail" as well as the standard LRT warnings of "No Trespassing" and "Keep off the Tracks".

Edmontonians have demonstrated that they are accustomed to respecting the right-of-way. Neither the former CN nor current LRT operations fenced the right-of-way at roadway crossings, relying on train drivers and security monitoring to report any trespassers. Now that the public is invited onto the right-of-way, the trail surface is proving to be their desired location. LRT drivers report that incidents of trespassing have reduced and that they appreciate knowing to expect people along the trail. Further discussion about trail and rail delineation is included in Section 2.4.

1.3 *Supporting Policies*

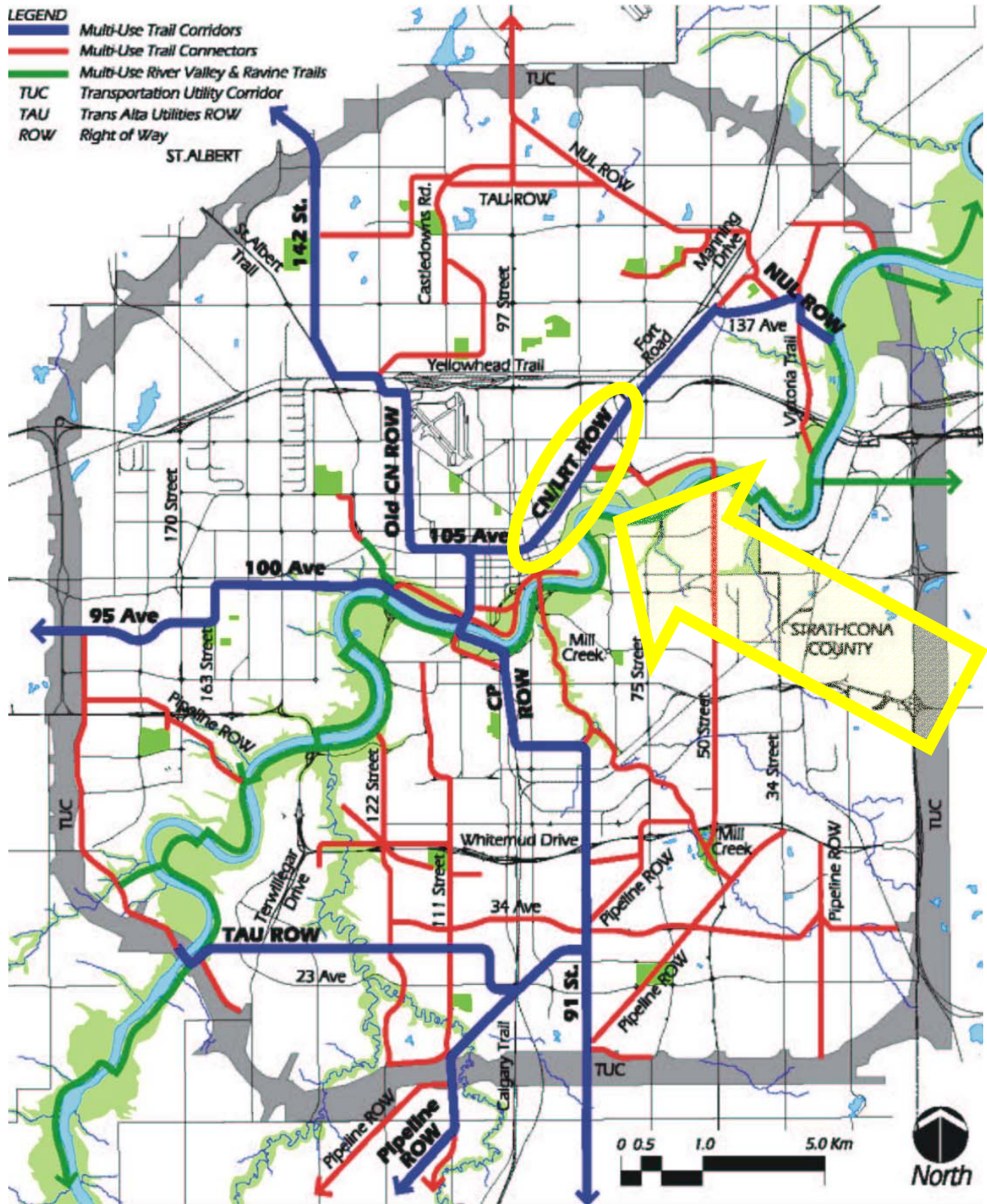
The *Transportation Master Plan* (1999) is the Transportation and Streets Department's framework to plan, manage and operate Edmonton's transportation system. The core mandate is to provide transportation options to move people and goods on an integrated system of roadways, public transit, pedestrian and bicycle facilities. One of many strategic priorities for the first ten years of Plan implementation was to develop non-motorised transportation facilities along rail and utility rights-of-way.

The *Multi-use Trail Corridor Study* was subsequently prepared, with the Northeast LRT trail forming a major component of the citywide Trail Corridor Network. Approved by City of Edmonton Council in 2002, this 62 km network of year round trail facilities connects all quadrants of Edmonton to Downtown and the North Saskatchewan River Valley.

Edmonton's Multi-use Trail Corridor Network is presented on the following page. The blue lines represent the principal trail corridors, which are supplemented by red, secondary connector routes. The network entails a ten-year implementation strategy, with approximately one quarter of the trail corridors completed to date.

Edmonton's Northeast LRT Rail-with-Trail

Multi-use Trail Corridor Network



Edmonton's Northeast LRT Rail-with-Trail is highlighted by the yellow arrow (CN/LRT ROW)

Edmonton's Northeast LRT Rail-with-Trail

2.0 DESIGN FEATURES

2.1 Safety Audit

The City of Edmonton commissioned an independent Safety Audit of the Northeast LRT trail corridor in 2003/4 to assist design development. Key areas for consideration included delineation of the trail and rail facilities, roadway crossings and personal security. A Value Engineering session was included to define trail alignment through the busy Commonwealth Stadium area, results of which will be realised in the 2005 construction.

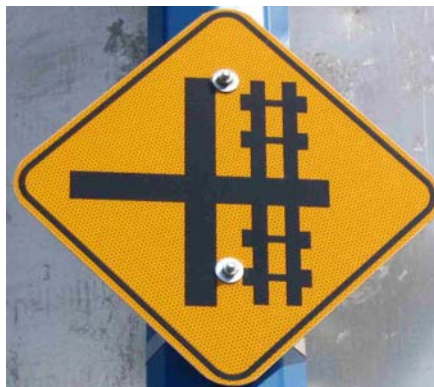
Road Safety Audits are increasingly popular for transportation design projects where all roadway users, including pedestrians and cyclists, are considered. Performing a Safety Audit on the RWT project was unique with the primary focus on non-motorised modes and the LRT, with secondary review of motor vehicle operations.

2.2 Roadway Crossings

Integrating the RWT with the surrounding roadway network involved several inventive measures. To alert trail users to intersecting roadways, gentle 60-degree reverse curves were incorporated into the trail that contrast with the otherwise uninterrupted, straight trail alignment. Signage consistent with the *Manual of Uniform Traffic Control Devices* warns trail users of both the roadway and the parallel rail.



Reverse curves forewarn upcoming intersection



Approaching intersection & adjacent rail sign

One design challenge was to introduce a trail crossing at an arterial roadway carrying 16,800 vehicles per day with existing railway gates, flashing lights and warning bells. An innovative new pedestrian actuated signal was installed and co-ordinated with the LRT gate arms. Approaching trains trigger the gates as well as the signal, which turns green-amber-red then returns to green once the gate arms have risen. Trail users are permitted into the pedestrian crosswalk when the signal turns red for vehicle traffic. Similarly, a trail user can activate the signal to cross when no LRT is present or when the LRT is more than thirty seconds away.

To evaluate signal operation, a VISSIM model was developed that simulated different trail crossing locations: adjacent to the LRT tracks and approximately 60 metres north at the nearest roadway intersection.

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2.3 VISSIM Simulation

The VISSIM model developed by the City of Edmonton confirmed minimal impact to roadway operation when adding a pedestrian signal adjacent to the LRT. In fact, the signal effectively controlled vehicle stopping locations away from the LRT tracks.

As depicted below, modelling the crossing one block north resulted in vehicle queues in the evening peak hour potentially backing up onto the tracks. (The maximum queue occurs when vehicles wait for two LRTs to pass each other.) Coupled with the improbability of trail users detouring away from the LRT right-of-way, the preferred crossing location was thus deemed to be adjacent to the tracks.

Installing a marked zebra crosswalk at the LRT tracks was considered, however the additional costs and operational modifications required for a signal were adopted. It is noted that on lower volume roadways, marked zebra crosswalks are providing adequate levels of protection. Similarly, marked crosswalks can also prove effective on high volume roadways, dependent on geometric and operational constraints.



VISSIM snapshot of 106 Avenue trail detour option and maximum northbound vehicle queue during PM peak hour on 95 Street – potential for vehicles to block LRT tracks

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2.4 Delineation between the Rail and Trail

Extensive consideration was given to whether a fence was required between the trail and the LRT tracks. Both the design and Safety Audit teams consulted a 2002 U.S. Department of Transportation study¹ of over sixty RWTs that indicated typical adequate setback widths of 7.6 metres, subject to site specific review. Narrower offsets to a minimum of 3.0 metres are cited as acceptable, considering safety requirements and physical separation as appropriate.

The openness of the unfenced rail right-of-way at all intersecting roadways provided historic evidence that the public did not actively trespass on the tracks. The private properties adjacent to the LRT right-of-way were securely fenced and did not pose as destinations likely to create desire lines across the tracks. Continuous fencing also raised personal security concerns with entrapment due to limited points for escape.

The Safety Audit recommended a minimum of 4.6 metres horizontal separation, preferably 7.6 metres. The 2005 trail construction includes sections of trail that are adjacent to storage tracks and 1.2 metre high fencing is included in these locations. Fencing is also necessary close to roadway intersections to prevent shortcutting across the tracks to the roadway. To reduce likelihood of trespassing on the tracks, the trail domain is well defined with overhead lights, landscaping and signage. The even rolling asphalt trail surface is also more desirable for non-motorised travel.



Informative signage poetry



Example of fenced section



Overhead halogen lighting

¹ *Rails-with-Trails: Lessons Learned – Literature Review, Current Practices, Conclusions* prepared by Alta Transportation Consulting for the U.S. Department of Transportation (2002)

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3.0 OTHER PROJECT HIGHLIGHTS

3.1 Trail Usage

The trail is for use by pedestrians, cyclists, skaters, joggers, persons with disabilities and other active transportation modes. Counts to monitor usage were conducted in the summer of 2004 to determine usage volumes. The calibrated daily estimate of cyclists crossing at 95 Street is circa 200, and by approximation there are 100 pedestrians at this location daily. As the trail connects to more communities, usage volumes are expected to increase.

3.2 Community Mural

As part of the first stage of multi-use trail construction in 2002, a graffiti mural was commissioned in collaboration with The Works art festival. The mural was installed on the portal structure west of 95 Street where the LRT transitions underground. Local graffiti artists prepared the mural live at the festival site, which was later supplemented by several blank panels for legal graffiti. Ward Councillors Jane Batty and Michael Phair opened the mural on August 29, 2002, and the artwork is progressing exceptionally. The original mural remains intact and is accompanied by the dynamic 'living mural' freestyle panels.



Graffiti mural created by seven community artists



Councillors add their tags at the mural opening

3.3 Park 'n' Bike Potential

Discussions are underway with Edmonton Transit to promote use of underutilised LRT station parking lots as Park 'n' Bike facilities. Commuters could drive to the station with their bicycles then cycle the remaining distance to Downtown along the trail. A cost-benefit review of bicycle parking lockers at stations is also under consideration.

3.4 City of Edmonton Contact Information

To discuss Edmonton's Northeast LRT Rail-with-Trail or for additional project information please contact Ms. Claire Stock, Transportation Engineer with the City of Edmonton at (780) 496-2407 or claire.stock@edmonton.ca