

**Improving Safety in a Historic Downtown Area of Winnipeg Through
Infrastructure Renewal**

Richard Tebinka, M.A.Sc., P.Eng., Winnipeg Regional Manager, MMM Group Limited

Scott Suderman, P.Eng., Streets Planning Engineer, City of Winnipeg Public Works
Department

Kenn Rosin, M.Sc., P.Eng., Senior Project Manager, MMM Group Limited

Paper prepared for presentation at the
Transportation Safety and Security Session
of the 2015 Conference of the
Transportation Association of Canada
Charlottetown, PEI

ABSTRACT

The North East Exchange District in downtown Winnipeg includes part of the Exchange District National Historic Site, a nationally recognized area with numerous warehousing, financing, and grain trade buildings dating from 1880 to 1913. Several of these buildings have been converted from traditional warehouses to loft style residential units over the past 30 years and there are a number of building expansions and redevelopment proposals in the area that are in the conceptual phase. Currently existing streets have wide pavements with narrow sidewalks that reflect the historical land use.

As the area resident and employee population grows, there will be increased needs for updated and upgraded infrastructure, roads, pedestrian and cyclist facilities, parking, loading, and services. The streets of the North East Exchange are getting livelier, driven in particular by a number of new restaurants opening just south of the study area.

MMM Group Limited was retained by the City of Winnipeg to develop a 10-year detailed and prioritized plan for infrastructure improvements in the North East Exchange District. These improvements included a number of safety-related components including:

- a) Improved walkability and accessibility for pedestrians which includes redesigning and reallocating rights-of-way to reflect a pedestrian first approach and support on street parking to support the redevelopment.
- b) Providing public transit amenities that are accessible and available.
- c) Improvements to bicycle facilities to provide safe cycling environment.
- d) Ensure the design conforms to Crime Prevention Through Environmental Design (CPTED) principles.

The purpose of this paper will be to highlight the key safety components of the plan and how it will capitalize on every opportunity to create safe, inviting and liveable streets to support the revival of the North East Exchange District.

INTRODUCTION

The North East Exchange District study area includes part of the Exchange District Historic Site, a nationally recognized area with numerous warehousing, financing, entertainment, and grain trade buildings dating from 1880 to 1913. Several of the buildings have been converted from traditional warehouses to loft style residential units over the past 30 years, and there are a number of building expansions and redevelopment proposals in the area that are in the conceptual phase.

There has been significant development in the North East Exchange District, with additional development currently under construction or planned for in the near future. The infrastructure throughout the Exchange District is aging and the continuing growth and redevelopment of the area is putting a strain on the existing infrastructure. As the resident and employee population grows, there will be increased need for updated and upgraded municipal services infrastructure, roads, pedestrian and cyclist facilities, transit, parking and loading in order to accommodate the growth and existing activity in the.

BACKGROUND INFORMATION

Study Area

The study area (Figure 1) is bounded by Main Street to the west, the Disraeli Freeway and Galt Avenue to the north, the Red River to the east, and John Hirsch Place to the south.

The principal aesthetic resources in the study area are the buildings – heritage and modern – and the riverbank. The District also has excellent proportions to support street life: short blocks and well-proportioned buildings and roadway widths create comfortable sized ‘rooms’ on the street. Where they occur, pedestrian level lighting and tree planting further reinforce the human scale of the sidewalks in the District.

That being said, the aesthetic quality of the streets in the study area is extremely varied. The streets at the north end have received no pedestrian improvements. Some, such as Galt Avenue, even lack sidewalks. Many of the streets in the northern portion of the study area have poor lighting levels compared to current standards.

In the south end, John Hirsch Way, Market Avenue, and Rory Street were streetscaped in the early 1980s. These locations have street trees, heritage-style pedestrian lighting, site furnishings, planting beds, unit pavers in the sidewalks, and curb extensions (‘bump outs’) at intersections. All of these features add a “pedestrian-friendly” element to the street, but are due for renewal in order to bring them to current design standards. Waterfront Drive succeeds in creating a street as “place”, due to its unique and consistently applied palette of materials and streetscape elements and extensive, well maintained annual and perennial planting. Its success breaks down north of James Avenue due to discontinuity of the riverside route and adjacent land uses that are visually unappealing and functionally irrelevant to pedestrians. There is also room to improve visual access and the sense of connection to the river from Waterfront Drive.

Safety Considerations

The Exchange District has been in transition over the last decade with redevelopment of buildings into residential and commercial space plus infill development on vacant lands/surface parking lots. Issues raised by City officials, planners, area property owners, residents, employees, and visitors to the area include a concern over safety due to some buildings having little activity, especially on evenings and weekends, poor lighting in some areas, and the cost of redevelopment if the adjacent infrastructure cannot support increased densities and activity. In some cases this is perception more than reality; discussions with Winnipeg Police Services indicate that crime levels are not high in the area, with two exceptions:

- Break ins at a metal fabricator in the area; raw materials are stolen and then typically sold back to the manufacturer a short time later.
- Vehicle break-ins, primarily during concert events and other performances at area venues.

One of the outcomes of this study is the set out a priority list of infrastructure upgrades that will ease the burden on development proposals and therefore possibly spur additional development in the area for residential units and commercial space. This includes improving lighting levels to meet current standards, improved pedestrian and cycling infrastructure, and streetscaping features.

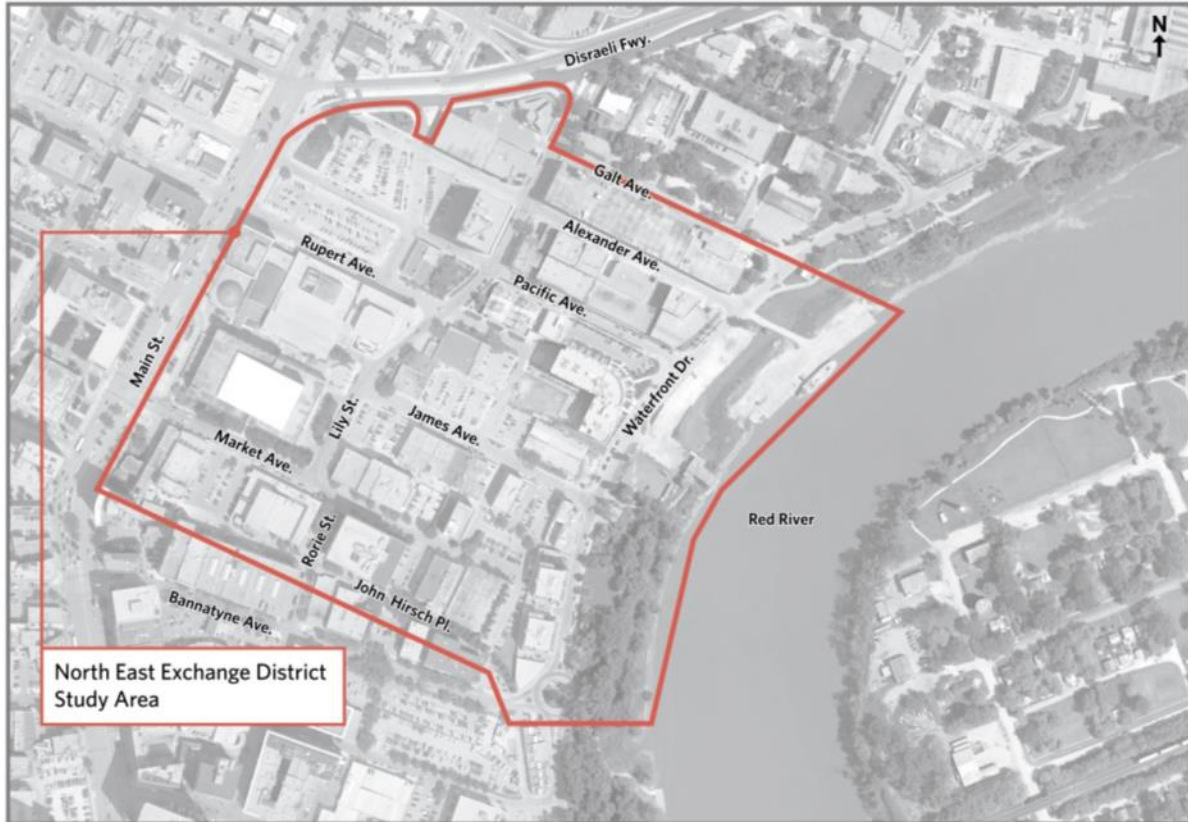


Figure 1: Study Area

PROJECT OBJECTIVES

The objectives of the plan are to:

- Ensure the rights-of-way are compatible with the anticipated land use.
- Ensure all planned surface works are coordinated with planned underground improvements.
- Ensure the area is walkable and accessible.
- Provide recommendations to improve the “rideability”, drainage and condition of the pavement for the streets in the area.
- Ensure public transit amenities are accessible and available.
- Identify any improvements to bicycle parking or facilities.
- Ensure the design conforms to crime prevention through environmental design (CPTED) principles.

PUBLIC ENGAGEMENT

Public engagement and consultation played an essential role in this project. All public engagement activities were guided by International Association for Public Participation (IAP2) principles, with the goal of facilitating meaningful and inclusive public participation. Key components of the engagement/consultation program included:

- A project webpage
- Key stakeholder meetings
- A Public Information Display Session (PIDS)
- A study area walkabout and community conversations
- A public open house
- An online survey

While public input discussed a wide variety of changes that were considered desirable, a high percentage identified safety related items, including 93 percent noting that sidewalks required improvements or enhancements, 88 percent noting the same for cycling pathways, and 93 percent for street lighting.

EXISTING CONDITIONS

Land Use

Land use in the North East Exchange District is mixed, including public buildings, industrial, commercial, and residential, as well as park space and surface parking. There are several clusters of land use, with the public buildings located in the southwest corner, industrial buildings in the northeast corner, and residential on the east side of the study area. Commercial and office space is scattered throughout the area.

Figure 2 illustrates recent and proposed development in the North East Exchange District.

Historic Sites and Buildings

A number of buildings in the North East Exchange District are designated as historical buildings, both municipally and nationally. In addition, a portion of the study area falls within the Exchange District National Historic Site.

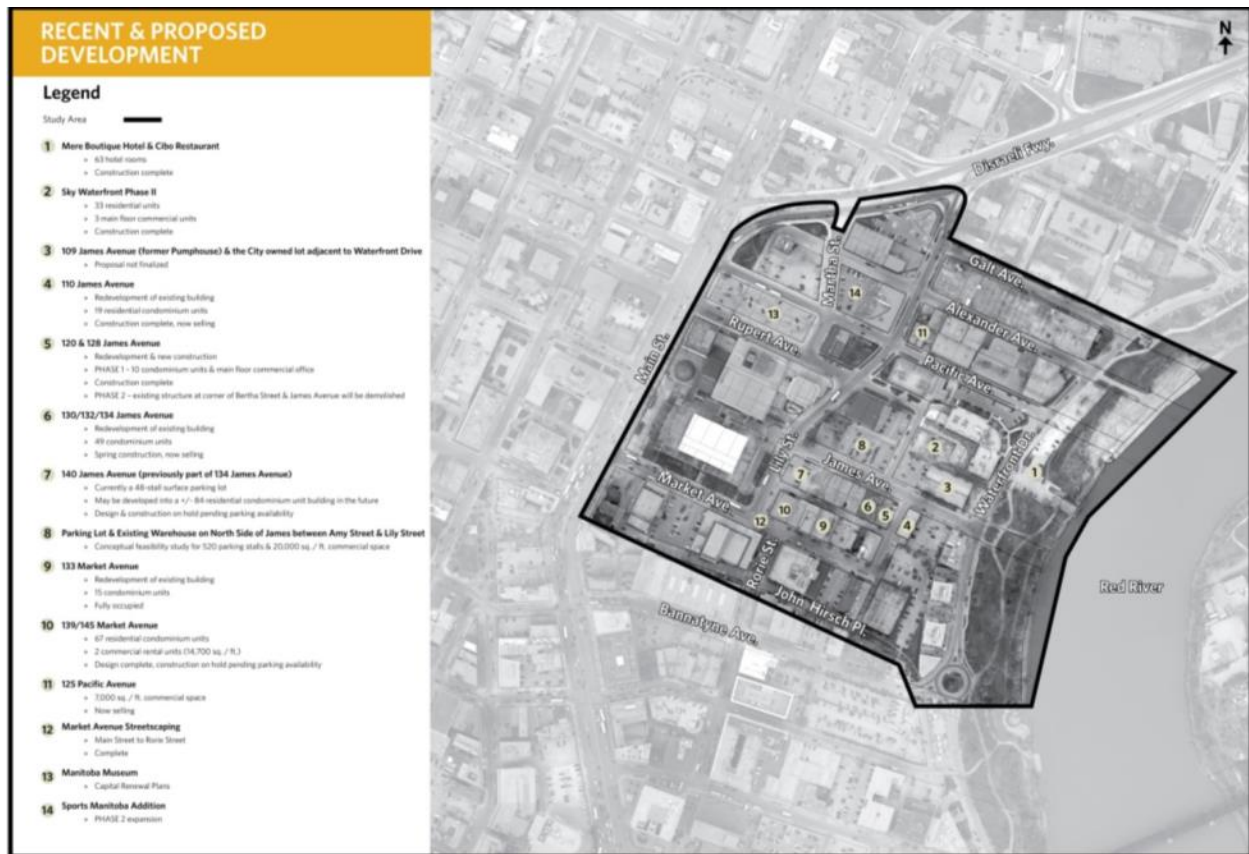


Figure 2: Recent and Proposed Development

Tree Canopy

There were only 66 trees in the entire study area within public rights-of-way, of which three are marked for potential removal due to unsatisfactory growing conditions or location. Street trees number approximately 30, and are limited to Market Avenue, John Hirsch Place and parts of Lily Street – all locations where streetscape work has been completed in the last 25 years. Recommendations on tree canopy additions/enhancements were included as part of the study. Enhancing the tree canopy was considered to be one way to improve walkability for pedestrians within the study area.

Pavement Condition Assessment and Recommended Treatment

A surface pavement condition assessment was performed on all of the streets within the study area. The type of pavement was identified, the pavement condition (good, fair, poor), and the recommended treatment for the street (if any). Additionally, the sequence of construction for each street was identified.

The configuration of each street’s right-of-way was reviewed to determine the most appropriate use that would support development and enhance pedestrian and cycling activity. In two cases right-of way changes were recommended, in one case a reduction along James Avenue to allow more space for a planned development, and an increase along a portion of Amy Street to allow for an enhanced pedestrian facility along the corridor.

The street repairs/upgrades are anticipated to be supportive of future development/redevelopment efforts by reducing off-site costs that were required in any event.

Of the 26 road segments examined, 11 were classified as in poor condition (42 percent), seven segments in fair condition (27 percent), two between poor and fair (eight percent), and six in good condition (23 percent).

Utilities

The existing City of Winnipeg utilities, plus utility infrastructure from six other utility companies were reviewed to determine where and when renewals or upgrades were planned within the next 10 years in order to coordinate the work with planned street works. Upgrades and renewals that would also support development/redevelopment efforts in the North East Exchange District were a key component of this review.

Personal Safety Review (CPTED Analysis)

Crime prevention through environmental design (CPTED) is a multi-disciplinary approach to deterring criminal behavior through environmental design. CPTED strategies rely on the ability to influence potential offender decisions that precede criminal acts. By altering the physical design of communities, criminal activity can be deterred by making the legitimate user feel welcome. These physical alterations range from small scale changes, such as the strategic placing of features to encourage increased legitimate activity where criminal activity has occurred, to extensive changes including the alteration of the built form of an entire neighbourhood.

For the purposes of this study, a street by street analysis was undertaken based on the following four CPTED strategies:

Natural Surveillance: decreases apprehension by taking steps to increase the perception that people can be easily seen ('eyes on the street'). Natural surveillance is promoted by designing features that maximize visibility and foster positive social interaction among legitimate users. Potential offenders feel increased scrutiny and limitations on their escape routes. Design features include pedestrian and bicycle traffic, window and doorway placement, landscaping and lighting.

Territorial Reinforcement: promotes social control by using design features that define public, semi-public and private property. An environment designed to clearly delineate private space does two things. First, it creates a sense of ownership. Owners have a vested interest and are more likely to challenge intruders or report them to the police. Second, the sense of owned space creates an environment where "strangers" or "intruders" stand out and are more easily identified. By using design features including buildings, fences, pavement, signs, lighting and landscape to express ownership and define public, semi-public and private space, territorial reinforcement occurs.

Natural Access Control: limits the opportunity for crime by taking steps to clearly differentiate between public routes and private areas. Natural access control features decrease the opportunity for crime by creating the perception of unacceptable risk when attempting access to private areas. Design features include placement of entrances and exits, fencing, lighting and landscape to limit access and control traffic flow.

Maintenance: maintenance is an expression of ownership and care. Deterioration of a property indicates less ownership involvement, which can result in more vandalism: if a window is broken and remains un-fixed for a length of time, vandals will break more windows. Crime is more prevalent in areas that are not maintained and as a result legitimate users do not feel safe and do not want to frequent those areas. Well maintained areas are characterized by trash-free sidewalks, trimmed trees and healthy vegetation, no graffiti and no visible signs of damage.

Table 1 provides a summary of the street by street analysis that was undertaken based on the above CPTED strategies.

As part of the review, a review of light levels was undertaken, which was one of the inputs for the rankings summarized in Table 1.

It was found that portions of four streets had sub-standard lighting levels. As an example, Figure 3 illustrates the current lighting situation on Galt Avenue, looking east from Lily Street. The street appears dim and uninviting. Lighting upgrades have been recommended for the four streets in question; Figure 4 is a rendering illustrating the forecast lighting levels with the upgrading lighting system.

Other measures are also recommended that are intended to make the street more inviting and safer for all users. An example, again using Galt Avenue, is provided later in this paper.

Table 1: CPTED Review

	NATURAL SURVEILLANCE			TERRITORIAL REINFORCEMENT			NATURAL ACCESS CONTROL			MAINTENANCE		
	good	moderate	poor	good	moderate	poor	good	moderate	poor	good	moderate	poor
John Hirsch	✓				✓		✓					✓
Rorie - John Hirsch to Market	✓			✓			✓			✓		
Market - Bertha to Rorie	✓			✓			✓			✓		
Market - Rorie to Lily	✓			✓			✓			✓		
Waterfront - Bannatyne to Galt	✓			✓			✓			✓		
Lily - Market to James	✓			✓								
Lily - James to Galt	✓			✓			✓			✓		
Bertha - Market to Bannatyne	✓			✓					✓			✓
Bertha - Market to James	✓			✓	✓				✓			✓
Elgin - Lily to Bertha		✓				✓			✓			✓
James - Lily to Waterfront	✓			✓		✓	✓		✓	✓		
Amy - James to Rupert		✓		✓		✓			✓	✓		
Rupert - Main to Lily			✓	✓				✓	✓	✓		
Rupert - Lily to Amy			✓	✓				✓	✓	✓		
Martha - Rupert to Pacific			✓		✓				✓	✓		
Martha - Disraeli to Alexander			✓		✓				✓	✓		
Pacific - Main to Lily		✓	✓		✓			✓	✓	✓		
Pacific - Lily to Waterfront		✓	✓		✓			✓	✓	✓		
Alexander - Main to Waterfront			✓		✓			✓	✓	✓		✓
Galt - Lily to Waterfront			✓			✓			✓	✓		✓



Figure 3: Galt Avenue – Current Conditions



Figure 4: Galt Avenue – Upgraded Lighting

TRANSPORTATION NEEDS ASSESSMENT

In order to determine the multi-modal transportation needs in the study area, an assessment of pedestrian, cycling, transit and vehicular facilities was undertaken. Comments from stakeholders included concerns over the lack of pedestrian and cycling facilities, to provide facilities that offer greater protection from vehicle conflicts.

Pedestrian Facilities Needs Assessment

Walkability is emerging as the most important measure of success in urban design, for its contribution to property values, economic activity, health, security, and vibrancy.

Specific recommendations for pedestrian facilities within the North East Exchange District include:

- Widen sidewalks wherever feasible.
- Provide a high standard of accessibility.
- Ensure a rational distribution of green space and street trees.
- De-clutter sidewalks.
- Improve legibility through wayfinding and interpretive information points, focused on routes into and through the District (Waterfront Drive, Market Avenue, and Lily Street).
- Develop a lighting plan that aids in security, coherence and wayfinding, and highlights heritage qualities.

Figure 7 illustrates the results of monitoring pedestrian activity for daytime workers, daytime visitors, and evening/weekend visitors. The blue lines are primary routes; the green are secondary routes.

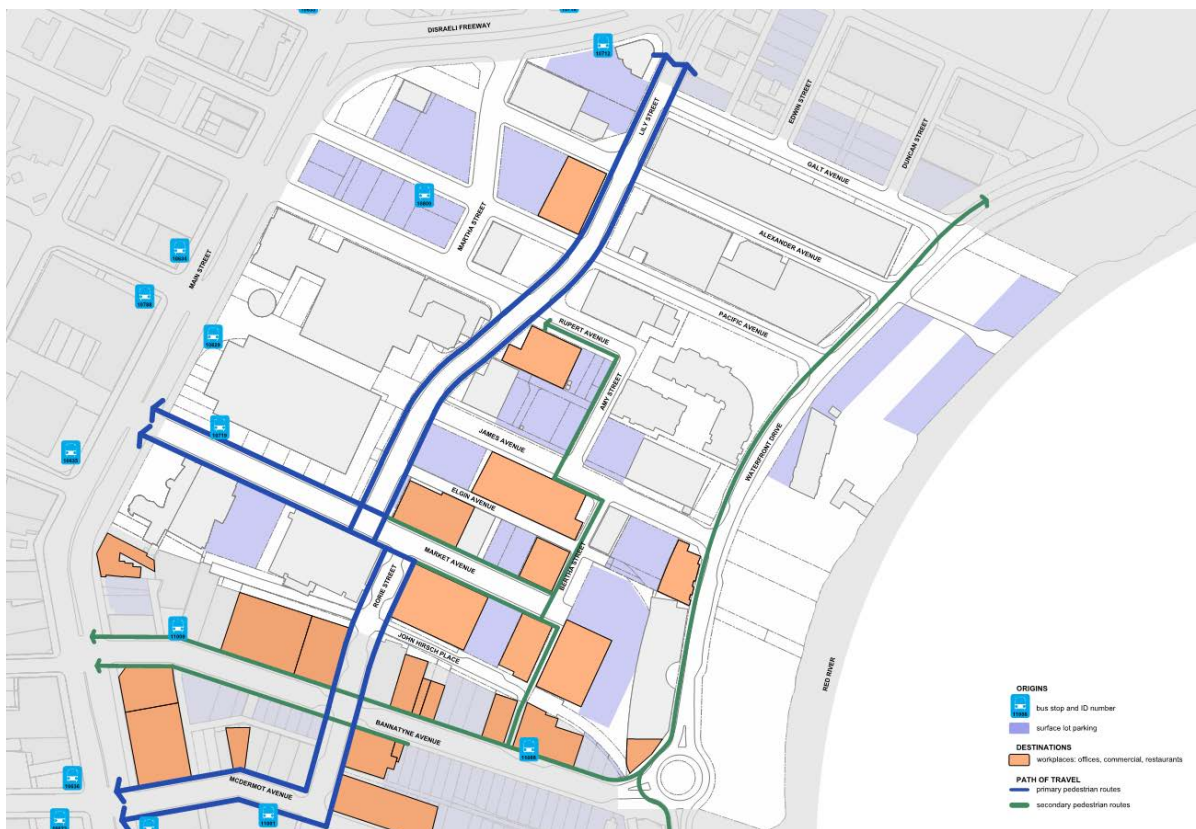


Figure 7: Pedestrian Activity – Worker Origins and Destinations

Cycling Facilities Needs Assessment

There are currently a limited number of designated cycling routes/facilities within the North East Exchange District, but low traffic volumes, short blocks and a grid pattern street layout all

support cycling. Waterfront Drive is designated as a proposed low traffic cycling route and both Bannatyne Avenue and McDermot Avenue are designed as bike lanes adjacent to the study area.

Clustered bike parking is proposed in a few key locations featuring good surveillance and proximity to major destinations.

Improving wayfinding in the District will help direct cyclists to appropriate cycling routes and facilities within or adjacent to the area.

Transit Facilities Needs Assessment

Winnipeg Transit currently has two stops within the North East Exchange District and was contacted to discuss future transit requirements for the North East Exchange District. Transit does not have any plans to change the routing within the study area. Any recommended changes to the street network should maintain the existing transit stops and routes and ensure appropriate sight lines and turning radii for buses at intersections. Bus stops should also be easily accessible for pedestrians and cyclists.

Vehicular Needs Assessment

Traffic Operations

All streets within the study area are two-lane undivided roadways with speed limits of 50 km per hour. There are no traffic signals located within the study area (there is one traffic signal on the edge at Main and Market, and a second at Main and James, however, it does not connect to streets within the study area itself) and all intersections are two-way or all-way stop sign controlled.

Traffic Safety

Based on site visits, review of available speed studies, and analysis of collision data, there are no existing traffic operational or collision issues within the North East Exchange District.

Loading and Delivery

Goods and services deliveries occur on a daily basis in the North East Exchange District. The majority of deliveries are made in smaller delivery vans and trucks. These vehicles are permitted anywhere and typically use the existing loading zones and off street parking facilities within the study area to make their deliveries. No changes are recommended to the existing loading zones in the North East Exchange District as part of this study.

Parking

There are approximately 240 on-street parking spaces available in the North East Exchange District, although all 240 are not available at all times. There are 175 two-hour pay station parking spaces with payment required between 9:00 a.m. and 5:30 p.m. from Monday to Saturday. The remaining 65 available parking spaces are time-restricted and are either no-parking zones or loading zones during posted hours.

There are also nine public surface parking lots within the study area. The surface parking lots contain a total of 616 available parking spots including both daily and monthly parking. Some existing on-street parking spaces will be lost due to the recommendations in this study, as a

result of new curb extensions at intersections, and some will be added. However, the net number of on-street spaces will remain approximately the same as existing (240).

PRELIMINARY DESIGN ELEMENTS

The preliminary design for each street was developed based on the characteristics of the individual street and reviewed to ensure that the design addresses the following criteria:

- *Safety*
- *Traffic Performance*
- *Pedestrian / Cyclist Facilities*
- *Transit Opportunities*
- *Property Acquisition*
- *Neighbourhood Impacts*
- *Landscaping / Streetscaping Opportunities*
- *Ease of Construction Staging*
- *Construction Costs*

Design Criteria

The design criteria for the study area transportation network were developed based on the City of Winnipeg's *Transportation Standards Manual*, *Accessibility Design Standards*, and *Standard Construction Specifications*. As well, various design criteria elements were developed using the Transportation Association of Canada's *Geometric Design Guide*.

Project Aesthetics

Aesthetics refers to the total visual impression of the streets in the North East Exchange District. As part of the preliminary design, the intent is to create a streetscape network that is harmonious, well-proportioned and appealing. These qualities add significantly to the street's capacity to support social and economic activity in the District.

Right-of-Way Cross-Section Plans

The components described in the above two sections were incorporated into the preliminary design for improvements to the rights-of-way in the study area and recommended cross-sections and plans.

The typical cross-sections for the streets located in the Northeast Exchange District have been designed to maximize sidewalk widths for pedestrian friendly access throughout the area and incorporate project aesthetics concepts. Wherever possible, the cross-section contains one lane of traffic in each direction with parking and a sidewalk on both sides. Figure 8 illustrates a typical cross-section for a street in the area.

However, where the right-of-way width does not permit the typical cross-section, parking lanes would be removed to maintain sufficient area for sidewalks.

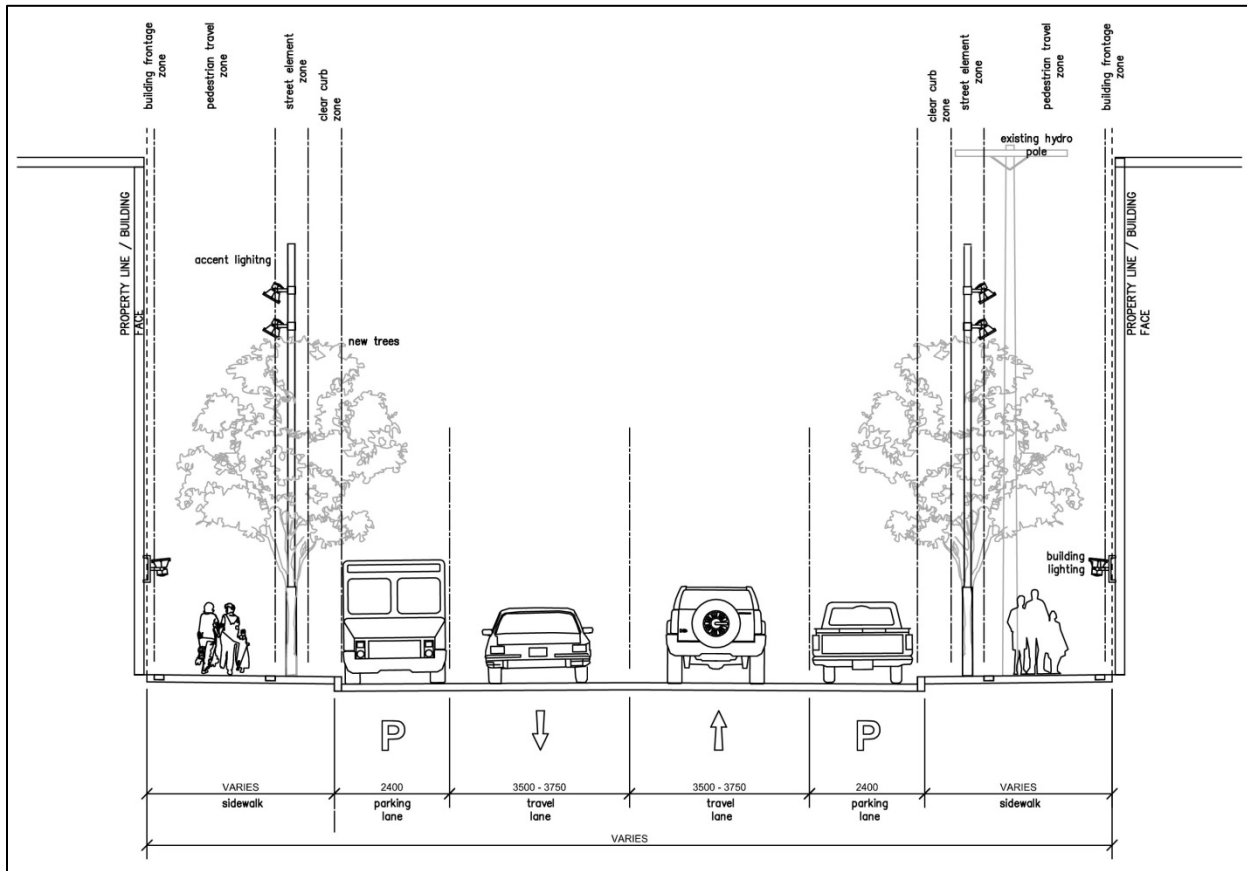


Figure 8: Typical Street Cross-section

RECOMMENDED IMPROVEMENTS AND IMPLEMENTATION PLAN

Recommended Improvements

The recommended improvements to the rights-of-way in the North East Exchange District were prepared for all streets in the study area.

An implementation plan was then developed to prioritize the improvements over a ten year time frame. This plan was based on the results of a prioritization analysis, an assessment of construction staging options, and funding availability.

7.2 Prioritization Criteria

Prioritization criteria were developed to assist in determining the time frame within which the improvements for each street should be implemented. These criteria were based on the Project Goals and Performance Measures. The prioritization criteria included:

- **Supports Development:** Does the street improvement support proposed development and redevelopment sites in the area?
- **Pedestrian / Cycling Connectivity:** How important is the need for an improved pedestrian and cycling environment on each street segment in the study area?
- **Street Importance:** How important is the street improvement for the overall study area?
- **Pavement Improvement:** Based on the pavement condition rating, what is the level of need on each street segment in the study area?
- **Safety / Security:** Based on the CPTED analysis of the study area, how important is the need to address existing safety and security concerns on each street segment?
- **Illumination:** How important is the need for improved illumination levels on each street segment in the study area?

A priority level for each criterion was given to each street section in the study area to determine a timeframe for improvement during the 10-year time frame. Table 2 contains the results of this prioritization analysis.

The above assessment was utilized, along with a review of construction staging issues and the availability of funding, to develop the Implementation Plan.

10-Year Implementation Plan

Based on the results of the prioritization analysis described in the previous section, an assessment of construction staging options, and funding availability, a 10-year plan for all right-of-way improvements was prepared. A recommended yearly implementation schedule and cost estimate was developed and is summarized in Table 3. That plan is illustrated on Figure 9.

Table 2: Street Section Priority Assessment

Street Section	Supports Development	Ped & Cycle Environment	Street Importance	Pavement Improvement	Safety/ Security	Illumination	Overall Ranking
John Hirsch	○	●	◐	●	◐	◐	4
Rorie – John Hirsch to Market	○	◐	●	◐	○	○	5
Market – Bertha to Rorie	◐	●	●	●	○	○	3
Market – Rorie to Lily	◐	●	●	●	○	○	3
Waterfront – Bannatyne to Galt	◐	●	●	○	○	○	4
Lily – Market to James	●	●	●	●	○	○	2
Lily – James to Galt	●	●	●	●	○	○	2
Bertha Walkway – Market to Bannatyne	○	●	◐	○	◐	◐	5
Bertha – Market to James	●	●	◐	○	◐	●	3
Elgin – Lily to Bertha	●	●	●	●	◐	●	1
James – Lily to Waterfront	●	●	●	●	○	○	2
Amy – James to Rupert	◐	◐	○	●	◐	◐	5
Rupert – Main to Lily	◐	◐	◐	●	●	○	4
Rupert – Lily to Amy	○	◐	○	○	●	◐	5
Martha – Rupert to Pacific	◐	○	○	◐	●	◐	5
Martha – Disraeli to Alexander	○	◐	○	●	●	◐	4
Pacific – Main to Lily	◐	○	○	○	●	●	4
Pacific – Lily to Waterfront	●	◐	○	●	●	●	2
Alexander – Main to Waterfront	○	○	○	◐	●	●	4
Galt – Lily to Waterfront	○	○	○	◐	●	●	4

Low Priority ○ Medium Priority ◐ High Priority ●

Table 3: 10-Year Implementation Schedule

Year	Roadwork	Streetscaping	Lighting	Engineering & Contingency	Estimated Total Cost
2014	\$489,000	\$757,750	\$407,500	\$614,000	\$2,268,250
2015	\$487,000	\$309,750	\$114,750	\$338,000	\$1,249,500
2016	\$78,750	\$168,250	\$797,000	\$386,000	\$1,430,000
2017	\$72,500	\$264,000	\$643,500	\$364,000	\$1,344,000
2018	\$475,500	\$305,000	\$213,000	\$367,000	\$1,360,750
2019	\$524,250	\$310,000	\$169,750	\$371,000	\$1,375,000
2020	\$327,000	\$386,500	\$270,000	\$364,000	\$1,347,500
2021	\$527,750	\$248,000	\$282,000	\$391,000	\$1,448,750
2022	\$808,500	\$492,500	\$0	\$482,000	\$1,783,000
2023	\$668,500	\$410,500	\$82,500	\$431,000	\$1,592,500
Total	\$4,458,750	\$3,652,250	\$2,980,000	\$4,108,000	\$15,199,000

OPERATIONAL STRATEGIES

Funding Recommendations

In order to implement the recommended 10-year improvement plan described in this paper, a sustainable level of annual funding is a critical success factor. Winnipeg's Departments of Planning, Property and Development, and Public Works, as well as the CentreVenture Development Corporation, are all anticipated to play a part in ensuring that there is an appropriate annual funding level to enable implementation of the improvement plan.

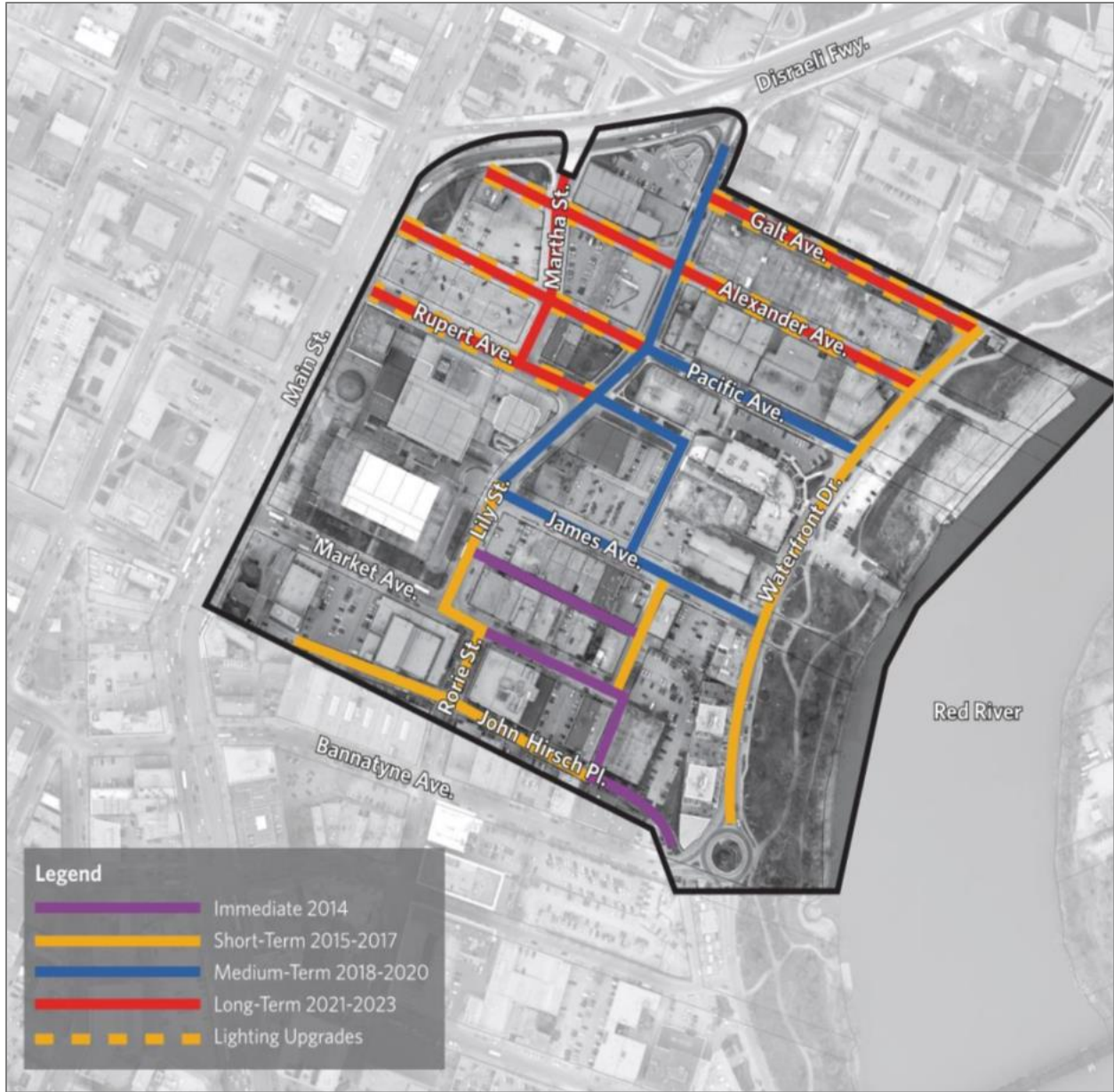


Figure 9: Recommended Implementation Plan

Maintenance Recommendations

Streets, Sidewalks and Cycling Facilities

For the recommended treatments for the area, the City’s standard warranty periods will be used following substantial performance of the work as follows:

- **Reconstruction:** Two-year warranty period
- **Rehabilitation:** One-year warranty period
- **Preservation:** One-year warranty period

Streetscaping

Streetscape elements are vulnerable to damage from snow clearing, de-icing salts, wear, freeze thaw cycles, vehicles and vandalism. Generally, the use of durable, standardized and replaceable materials within the public right-of-way is the best way to simplify operation and maintenance. Figure 10 illustrates the proposed changes, using Galt Avenue as an example.

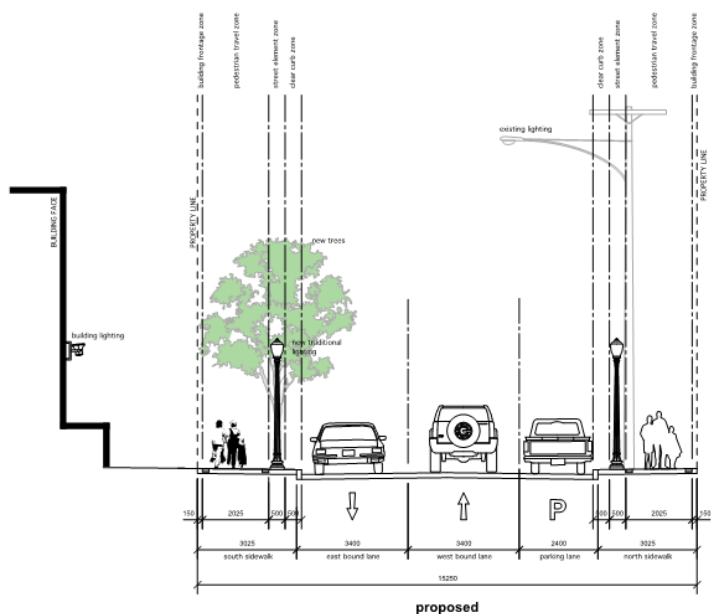
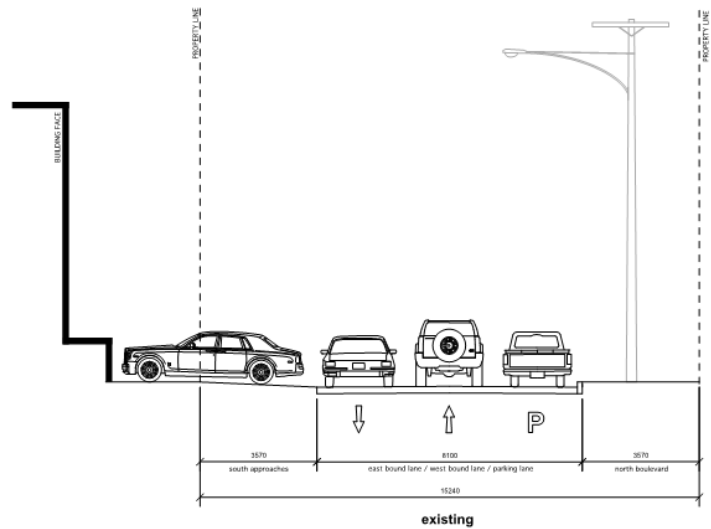
Figure 10: Galt Avenue Plan

Pedestrian Level Lighting

It is recommended that the City manage the operation and maintenance of the pedestrian level lighting within the study area. This will clarify who is responsible (the City or Manitoba Hydro) within the area rather than on a street by street basis.

Coordination of Street and Utility Work

As part of the detailed design component for each street improvement, it will be necessary to coordinate with the Water & Waste Department. Wastewater sewers and water mains have a finite capacity, and higher development densities as a result of new development plans in the study area will require an assessment of whether existing capacities can provide service for increased loading. If additional capacity is required, it is recommended that such works be undertaken prior to any street improvements. Such coordination will also be necessary with other utilities such as Manitoba Hydro, MTS, Shaw, etc.



REFERENCES

1. MMM Group Limited, *North East Exchange District Engineering Study*, City of Winnipeg Public Works Department; February 2015.
2. Stakeholder Meeting with Const. Glen Kostyk, Winnipeg Police Services, February 19, 2014.