

***Integrated Transportation and Urban Design Master Planning  
A Case Study for the Village of Binbrook ON***

E. M. (Ted) Gill, P. Eng., MCIP  
Principal, Transportation  
Stantec Consulting Ltd.  
1400 Rymal Road East  
Hamilton ON L8W 3N9  
Canada

Dave Zimmer, BLA, OALA  
Planner – Urban Design  
Planning and Development Department  
City of Hamilton  
777 Hwy 8  
Stoney Creek ON

Paper prepared for presentation at the Urban Transportation Planning and Research  
Session of the 2003 Annual Conference of the Transportation Association of Canada  
St. John's, Newfoundland and Labrador

## **Abstract**

The Village of Binbrook, located in the southwest portion of the newly amalgamated City of Hamilton in southwestern Ontario, is a standalone community of under 1,000 people separated from the Hamilton urban area by 6 km of rural countryside. The Official Plan for the City, and a Secondary Plan for the Binbrook urban area, set out that the community will grow to an ultimate population of about 15,000 people, and dedicated water and sewer mains between Hamilton and Binbrook have been built to serve that population.

The City of Hamilton commissioned a Transportation Master Plan to be prepared by Stantec Consulting Ltd., with the original intent being that the study be coordinated with an Urban Design Guidelines Study for the Village core to be undertaken by Planning staff of the City. City and consultant staff involved in the project determined very early on that a completely integrated approach should be adopted to realize a number of benefits, including: integration of public involvement events and contacts; efficient iterations of successive transportation and urban design alternatives; and, a richer and more adoptable product because of the synergies of one approach continually informing the other and vice versa.

Interactions with the public and other stakeholders have been integrated throughout the study, including public information centres held in the same location on the same day with planned overlaps. Challenges met by the study approach included: effectively dealing with the competing interests of heavy truck traffic through the core of the village versus the desire for a historical and pedestrian-oriented design of the four corners in the village core; balancing the desire for on-street and off-street parking and centre median treatments with the need for left-turn storage lanes at the four corners traffic signal; and, establishing suitable roadway cross-sections to accommodate pedestrians, cyclists, vehicles, and urban design features throughout the community.

The integrated study approach was unique, and resulted in a plan that recognized and resolved competing transportation and urban design issues in the Village of Binbrook.

## Introduction

The Village of Binbrook is located in the southwest portion of the newly amalgamated City of Hamilton in southwestern Ontario, as shown on Figure 1. It is a standalone community of under 1,000 people separated from the Hamilton urban area by 6 km of rural countryside.



Figure 1: Location Map

The Official Plan for the former Region of Hamilton-Wentworth (now the City of Hamilton) set out that the Binbrook Urban Area would grow to an ultimate population of about 15,000 people. The main reasons for the designation of a significant urban area separated from the contiguous Hamilton-centred urban area were to provide a smaller rural-type alternate lifestyle community, and to compensate the former Township of Glanbrook for locating the landfill in the southwest corner of the community. Dedicated water and sewer mains between Hamilton and Binbrook have been built to serve the future population of 15,000 people, and they have been sized and constructed to service only the Binbrook Urban Area, and not land located between the Binbrook and Hamilton Urban Areas.

The Official Plan for the former Township of Glanbrook, adopted in 1985, set out that, "The Township shall encourage the Provincial government, through the Ministry of

Transportation and Communications, and in consultation with the Township to investigate, in conjunction with the Council, the need, feasibility and location of a by-pass around the Binbrook Urban Settlement Area at such a time as the existing Highway No. 56 is foreseen as a negative element in the growth of this Settlement Area."

The main north-south roadway through the centre of Binbrook is former Highway 56, transferred to the former Regional Municipality of Hamilton-Wentworth in 1998. Road 56 links Hamilton and connections to the Queen Elizabeth Way to communities to the south in Haldimand County and to Lake Erie and the Niagara Peninsula. Regional Road 56 through Binbrook is the only road link to the Glanbrook landfill, and is one of the main routes between Stelco Steel operations in Hamilton and in Nanticoke on the shores of Lake Erie. As such, the volumes of trucks on Regional Road 56 are significant.

A Secondary Plan for the Binbrook Urban Area, as shown on Figure 2, was prepared and approved as an amendment to the Glanbrook Official Plan in 1999, and the development principles (in part) were set out as follows:

- (a) Binbrook Village shall be comprehensively planned and developed as an integrated and sustainable community with an identifiable, separate, distinct and unique identity
- (g) The Township shall consider appropriate alternative development standards for all types of development, streets and servicing.
- (o) The Township shall encourage the provision of adequate and appropriately located natural, passive and active open space, parkland and recreational areas to serve the local community. Links shall be encouraged to be established between open space/recreation areas to provide for pedestrian and bicycle movement.
- (t) External access to Binbrook Village shall be from Regional Road 56, Binbrook Road and Fletcher Road. No new access shall be permitted through the Rural Area of the Township adjacent to Binbrook Village.
- (u) Binbrook Village shall provide for the development of an efficient, practical and safe road pattern.

What is most interesting in the approved Secondary Plan is that a Road 56 By-Pass was for all intents and purposes ruled out (see item (t) above). This meant that any urban design and transportation master planning undertaken for the Binbrook Urban Area would have to have regard to the fact that the core of the community would be bisected by Road 56, notwithstanding that the Community Core is designated as the four corners, i.e. the intersection of Road 56 and Binbrook Road. The choice of location of the Community Core is well supported by the fact that the historic Binbrook Village was established there in the mid-1800's, and there still many examples of built heritage in the core dating from that era.

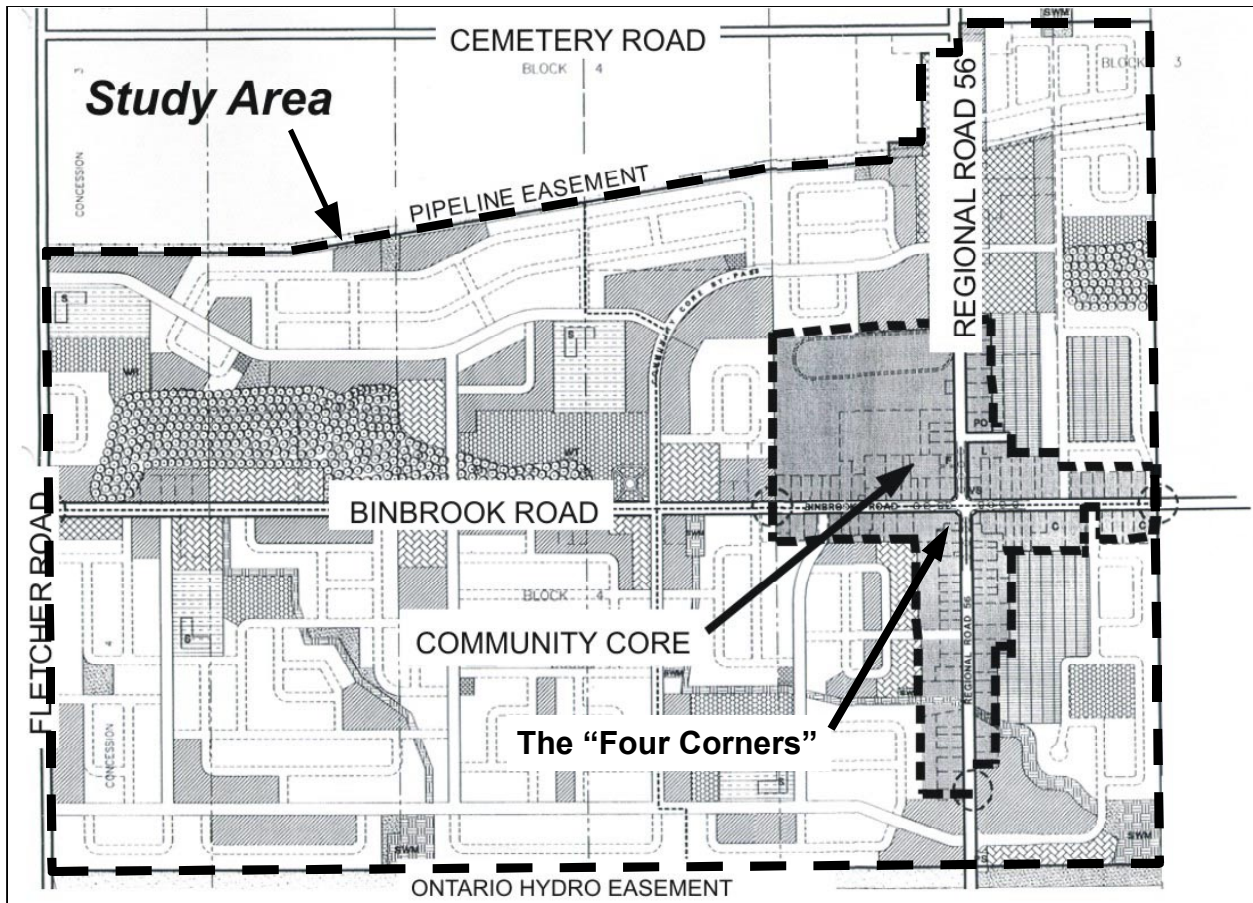


Figure 2: Binbrook Village Secondary Plan

### Integrated Master Planning

In May 2002, the City of Hamilton initiated the Transportation Master Plan for the Binbrook Village Secondary Plan, and Stantec Consulting Ltd. in Hamilton was retained as the consultant for the study. The purpose of the study was to identify transportation improvements required to implement the requirements of the Binbrook Village Secondary Plan. The elements of the study included review of road rights-of-ways, traffic lane requirements, pedestrian and cyclist on-street and off-street movement, and alternative cross-sections and design elements.

At about the same time, a study to develop Urban Design Guidelines for the Binbrook Community Core was initiated by the Long Range Planning and Design Division of the Planning and Development Department. In-house staff, including urban designers and landscape architects, are undertaking the study.

It quickly became apparent to both study teams that an innovative and integrated approach should be utilized for both studies. It was decided that joint Public Information Centres (PIC's) would be adopted for both study schedules, and the first PIC was held on June 13, 2002. An Urban Design Workshop/Charette was held early in the day, with

representatives from the transportation study team present, and the PIC was held later in the day with display panels and representatives from both study teams present. The purpose of the first PIC was to set out existing conditions, generate discussion, seek input, and collect design ideas.

One of the key outcomes of PIC #1 was that many people were concerned with the compatibility of continued use of Regional Road 56, especially by trucks, with the pedestrian-friendly concepts being touted for the Community Core. Members of the two project teams dealt with this conundrum over the course of the summer and early fall of 2002 in preparing design concepts and roadway alternatives. Policy direction was sought and was received on the potential to revisit the Secondary Plan as it related to the potential for a Regional Road 56 By-Pass around the Community Core, and direction was that the Secondary Plan would not be revisited. As a result, on-road and off-road design concepts for the Community Core were developed to recognize and mitigate this reality.

### Design Alternatives

Although design alternatives were developed for the various roadway elements of the entire Secondary Plan, this discussion is focused on the Community Core. Based on traffic projections for Regional Road 56 and Binbrook Road, it was determined that upon full development of the Binbrook Urban Area, the main roadways through the Community Core may be at or over effective capacity, if current travel trends continued. It was determined jointly between the two study teams that planning in the Community Core would be predicated on an ultimate three-lane roadway cross-section (one through lane in each direction plus left-turn lane or median) for both main roads, in order to provide for the Community Core Vision set out in the Secondary Plan, and to accommodate space for pedestrians, cyclists, and on-street parking. This decision was supported by the conclusion that current travel trends may be reduced by long-term changes to the regional road network (i.e., Highway 6 New, Red Hill Creek Expressway, Mid-Peninsula Freeway), shifts in mode choice (i.e., ride-sharing, transit, walking, cycling), and changes to employment in the community (i.e., home offices, retirement-based community).

Design alternatives were developed to maximize space for landscaped boulevards and medians, sidewalks, and parking. In order to encourage consolidation of accesses, alternatives for roadway cross-sections were developed that included strategically placed left-turn lanes and medians. Alternatives for cross-sections that incorporated continuous centre left-turn lanes were also developed, but it was recognized that such alternatives would not encourage land consolidation and use of consolidated access points. Urban design alternatives were developed that built on the opportunities presented by the former, including such features as massing the buildings along the front property lines, and providing parking in the rear.

The design alternatives for the two studies were presented to the public at the second PIC on October 24, 2002. The PIC included a presentation, in addition to the traditional open house format. The issue of compatibility between the continued use of Regional Road 56 through the Community Core and the pedestrian-friendly vision for the Community Core was hotly debated. In the end, it was recognized that if the Secondary Plan were to be implemented as originally planned, the design concepts put forward by the two project teams would support the pedestrian-friendly vision of the Community Core to the greatest degree possible.

At this point, the transportation and urban design teams felt it was necessary to prepare functional plans of the alternatives at the key intersections in the community core and of the transition from two to four through lanes at the community core's northern boundary. The functional designs were used to examine the fit between the approved right-of-way widths, the transportation elements and the urban design elements being proposed.

Modifications were made to the gateway concept located at the northern boundary of the community core to reflect the geometrics of the transition from two to four lanes with a centre median.

At the signalized intersection of the four corners, the functional design highlighted the issues of the need to accommodate trucks turning at this intersection, which will have a significant impact on the sidewalks and corner radii that can be provided. In fact, accommodating trucks may potentially impact a heritage, commercial building on one corner. Currently trucks in a right-turn lane that will be removed in the future drive over the concrete sidewalk. Balancing the urban design and transportation elements in the design of the four-corners intersection will be a challenge due to the competition in space and function to provide:

- Wider sidewalks to accommodate pedestrian travel and streetscape amenities
- Reduced curb radii and sidewalk "bump-outs" at the four corners along with short pedestrian crossing widths
- Left-turn lanes with medians
- On-street parking lanes set back from the corner
- Bike lanes
- Sufficient room for heavy truck movements
- Integrity of the existing commercial buildings

This study will recommend to staff that a context-sensitive design be prepared based on a field review using actual trucks to drive the intersection in order to test the proposed layout. A fine balance will need to be struck between accommodating turning trucks, designing for pedestrian safety and providing pedestrian space.

### Preferred Alternatives

Preferred alternatives were selected for the Transportation Master plan using the following evaluation criteria:

- Traffic operations and capacity
- Transportation safety
- Impact on trucks
- Pedestrian opportunities
- Streetscape opportunities
- Capital costs
- Maintenance costs
- Mobility of residents and businesses
- Indirect property impacts

The transportation and urban design teams worked together on the evaluation, recommending alternatives that tended to support the pedestrian and streetscape objectives of the Secondary Plan with some increase in capital costs.

The third PIC was held on May 8, 2003, and preferred alternatives for the Urban Design Concepts and Guidelines and the Preferred Transportation alternatives were presented. Notwithstanding that many in the community were still concerned that truck traffic would not be diverted from the four corners via a by-pass road or through some other method, the reaction from those present was quite positive. An example of the preferred alternative for the main roadways intersecting at the four corners is illustrated below in Figure 3.

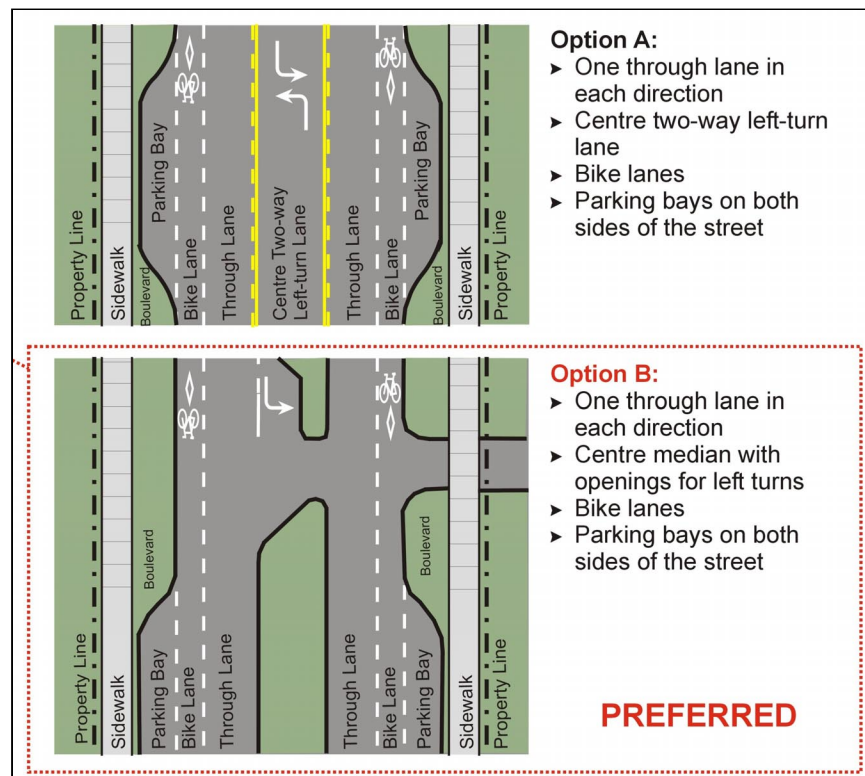


Figure 3: Example of the Transportation Master Plan concepts in the Community Core and the preferred option



This preferred transportation concept was carried forward in the development of an urban design concept for the community core, as illustrated in Figure 4.

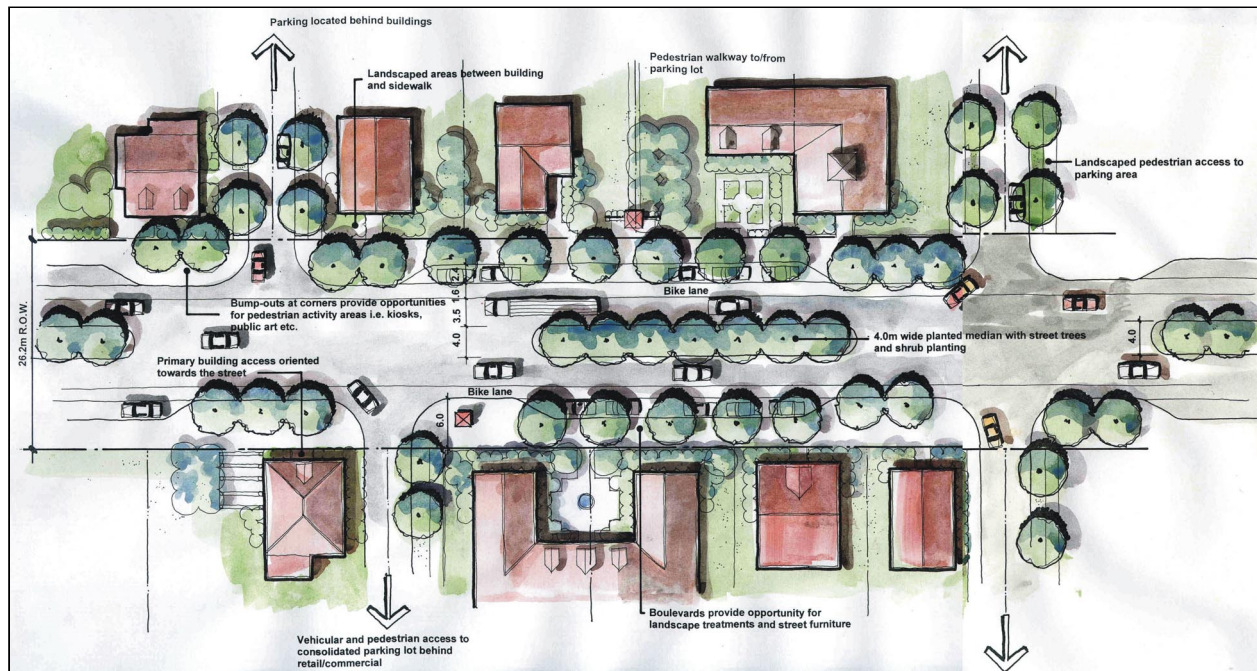
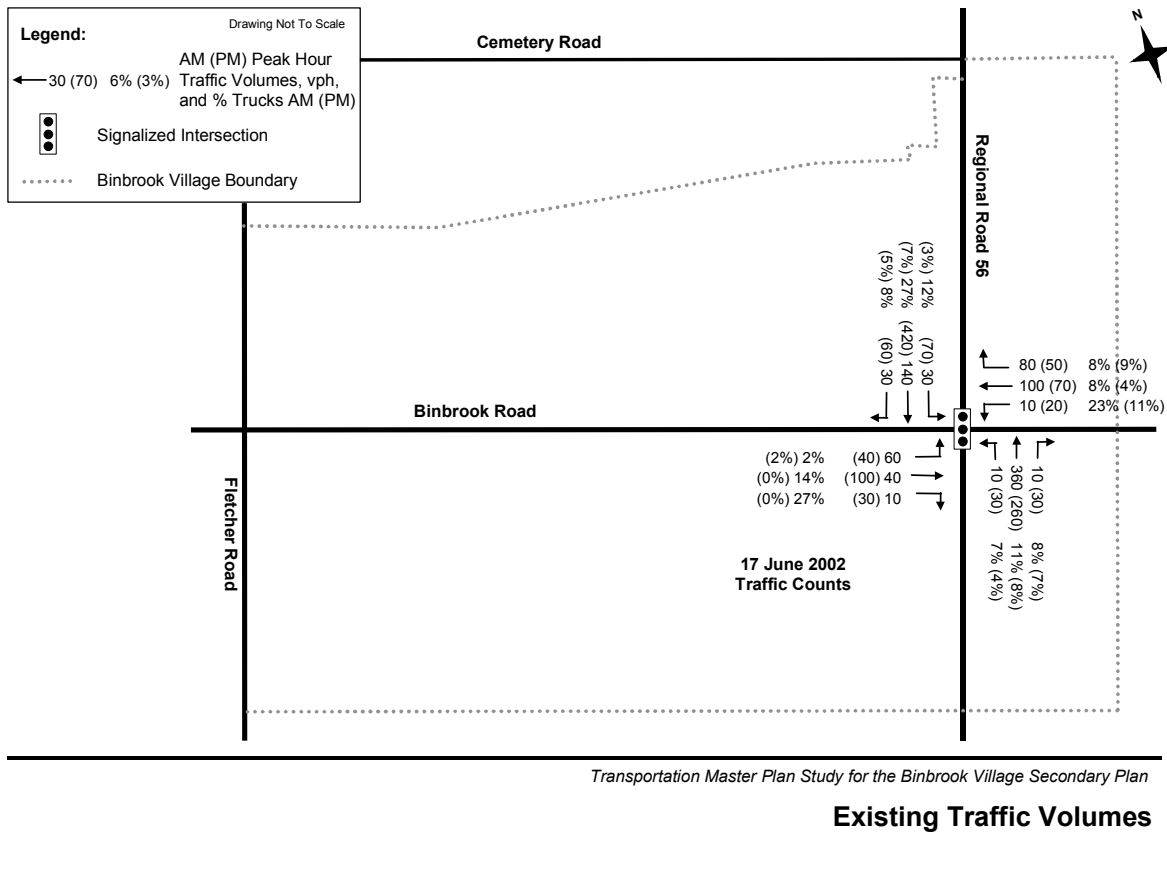


Figure 4: Urban Design concept in the Community Core

A sample evaluation for the portion of former Hwy 56 within the community core is shown in Table 1. The preferred alternative for both former Highway 56 and Binbrook Road, the two main roads intersecting at the four corners, is for a 26 m ROW with two through lanes, a median with left-turn openings, bike lanes and on-street parking bays. The anticipated higher maintenance costs would be offset by the lower overall collision potential with the median, the potential to reduce truck speeds and the ability to better support the Binbrook Village policies supporting pedestrian and streetscape environments. It is recognized that in promoting the concept, the mobility of residents/businesses would be restricted in the interim until such time that common accesses can be implemented, but some mitigation of mobility could be provided by the design of opportunities to make U-turns.

<b>Table 1</b>		
<b>Regional Road 56 Community Core Alternatives</b>		
	<b>Option A</b>	<b>Option B</b>
<b>Phase:</b>	Phases 1 and 2	Phases 1 and 2
<b>ROW:</b>	26 m	26 m
<b>Basic Cross Section:</b>	2 through lanes	2 through lanes
<b>Median Treatment:</b>	2WLTL	median with left-turn openings
<b>Bikeway Types:</b>	bike lanes	bike lanes
<b>On-street Parking:</b>	parking bays	parking bays
<b>Evaluation Criteria</b>		
Traffic Operations/Capacity	Two through lanes will provide the same capacity and LOS—no differences between the alternatives	
Transportation Safety	The 2WLTL will facilitate continuous turns mid-block resulting in a relatively high number of conflict points between through traffic and turning traffic and the location of the turns will be less predictable thus having a higher collision potential	The median will encourage common access driveways to more than one property, reducing the number of access points and conflict points between through traffic and turning traffic and the location of the turns will be predictable thus having a lower collision potential
Impact on Trucks	Three adjacent lanes of pavement will likely induce higher travel speeds, including truck speeds	The two travel lanes will be visually interrupted by the landscaped median and will likely induce lower travel speeds, including trucks
Pedestrian Opportunities	The 2WLTL can be used by pedestrians to cross one direction of through traffic at a time but is not a refuge	The median will provide a refuge mid-block for pedestrians crossing one direction of traffic at a time
Cycling Network Opportunities	As per the <i>Design Guidelines for Bikeways</i> , a bike lane is recommended—no differences between the alternatives	
Streetscape Opportunities		The median will provide opportunities for landscape treatments within the pavement area improving the overall aesthetics of the street. The amount of median that can be provided will depend on the ability to encourage common access driveways to more than one property
Capital Costs	The cost of the additional pavement for the 2WLTL and the cost of the irrigation system required for the median are similar—differences between alternatives are insignificant	
Maintenance Costs	The 2WLTL will require pavement marking maintenance	The landscape treatment in the median will cost more to maintain depending on the materials used. Higher maintenance landscape materials are expected in the Community Core with an irrigation system required
Mobility of Residents/Businesses	The 2WLTL will provide flexibility in the location of accesses to adjacent residential and business properties.	The median with left-turn lane openings will limit the location of accesses to adjacent residential and business properties mitigated somewhat by opportunities for U-turns.
Indirect Property Impacts	The proximity of the sidewalk and pavement to adjacent buildings will be the same—no differences between the alternatives	
<b>Preferred Alternative:</b>	<b>26 m ROW with 2 through lanes, median with left-turn openings, bike lanes and on-street parking bays:</b> The higher maintenance costs are offset by the lower overall collision potential with the median, the potential to reduce truck speeds and the ability to better support the Binbrook Village policies supporting pedestrian and streetscape environments. The mobility of residents/businesses will be restricted in the interim until such time that common accesses can be implemented. Some mitigation of mobility can be provided by the design of opportunities to make U-turns. Supporting the Binbrook Village policies on streetscape and pedestrian environments are key to creating a vibrant Community Core.	

As a reference point, existing traffic volumes at the four corners in the morning and afternoon peak hours are illustrated below. The percent trucks is illustrated, and one can get an appreciation for the concerns of the residents, with afternoon peak hour truck volumes southbound through the four corners accounting for 27 percent of the total. Notwithstanding that the truck percentage is more usually 10-12 percent, there are heavier volumes on a regular basis.



At PIC#3, a number of urban design concepts were presented that were specific to the community core of Binbrook, while at the same time having regard to the integration of urban design concepts with the preferred transportation alternatives. A number of examples are set out below.

Figure 5 sets out the design principles related to parking in the community core. Both on-street parking in parking bays and off-street parking in lots located at the rear of existing and new development are being promoted. The concept of parking at the rear lends itself to supporting the transportation principle of minimizing the number of accesses. Figures 6 to 8 illustrate how different development concepts for one, two and three-lot developments could be planned to consolidate accesses and provide for parking at the rear of the buildings.

# ***Design Objectives:***

## **Traffic and Parking:**

- Minimize potential pedestrian and vehicular conflicts through well defined streets and parking lot access for vehicles and pedestrians
- Incorporate planted medians as a traffic calming strategy
- Provide on-street parking
- Consolidate parking lot entrances to reduce potential vehicle and pedestrian conflicts
- Provide traffic calming opportunities through the use of planted medians
- Parking lots to be located to the rear of existing and proposed development
- Incorporate bicycle lanes throughout the core area to provide a connection to adjacent neighbourhoods

## **Aesthetics:**

- Create a “green village” core with an emphasis on street trees and landscaping
- Create a village sense of scale
- Provide opportunities for specialty landscaping and seasonal interest
- Integrate public landscape spaces with private development
- Incorporate public art to promote the cultural and heritage aspects of the Village of Binbrook
- Select quality materials for landscape construction to further emphasize a village character and maintain visual continuity



Figure 5: Urban design objectives regarding traffic and parking in the community core

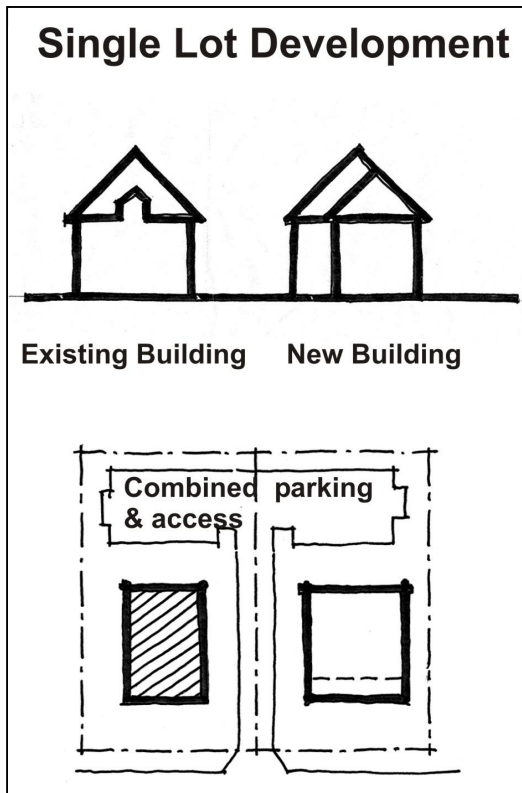


Figure 6: Key principles of lot consolidation and lot development in the Community Core, including creating common accesses and placing parking to the rear—Single lot development

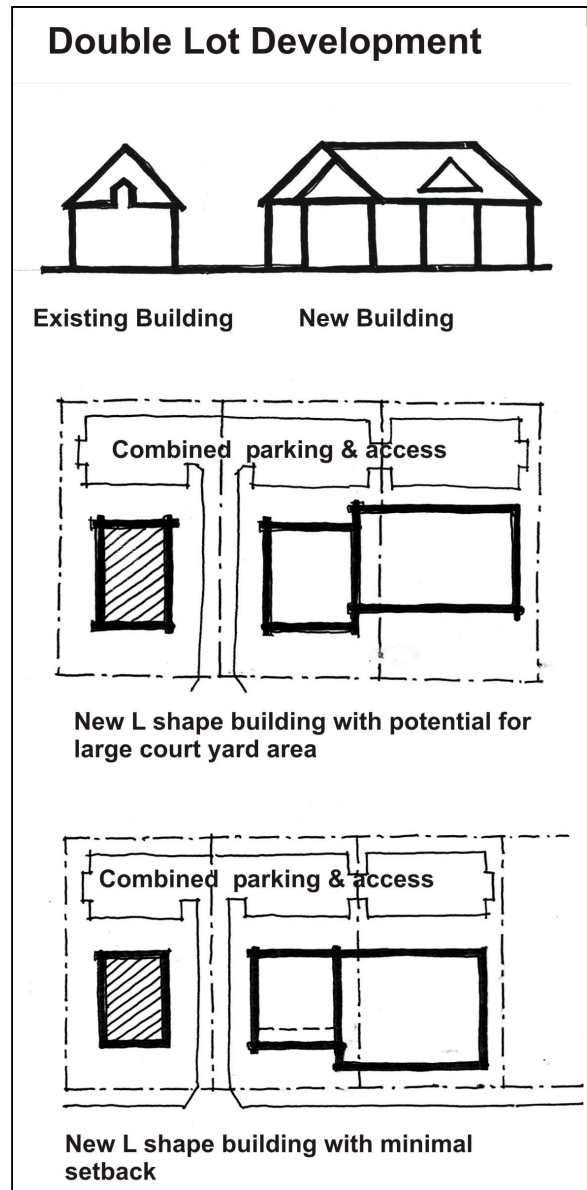


Figure 7: Key principles of lot consolidation and lot development in the Community Core, including creating common accesses and placing parking to the rear—Double lot development

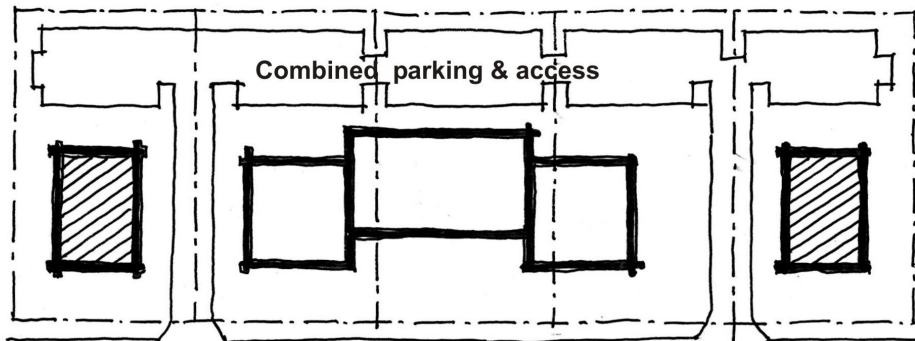
## Triple Lot Development



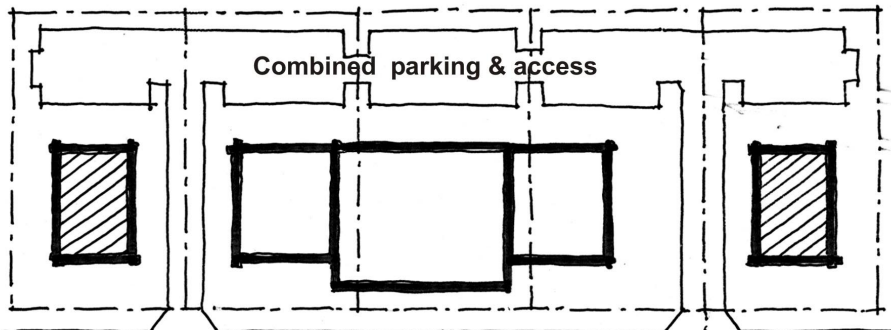
Existing Building

New Building

Existing Building



U shape building with emphasis on the ends of the building. Provides opportunity for potential for interior court yard area.



Reverse U shape building with minimum setback area provides emphasis on the centre of the building

Figure 8: Key principles of lot consolidation and lot development in the Community Core, including creating common accesses and placing parking to the rear—Double lot development

One of the significant constraints to orderly redevelopment at the four corners is the existing location of a heritage structure dating back to the 1800's that was once a hotel. In a perfect world, the road allowances for the two main roads at the four corners would have been set to avoid the structure, but in fact, the heritage building encroaches on the existing rights-of-way. The urban design team prepared three alternative concepts to deal with the situation, having regard to the future transportation and urban design concepts that had been developed for the four corners. The concepts are illustrated in Figures 9 to 12.

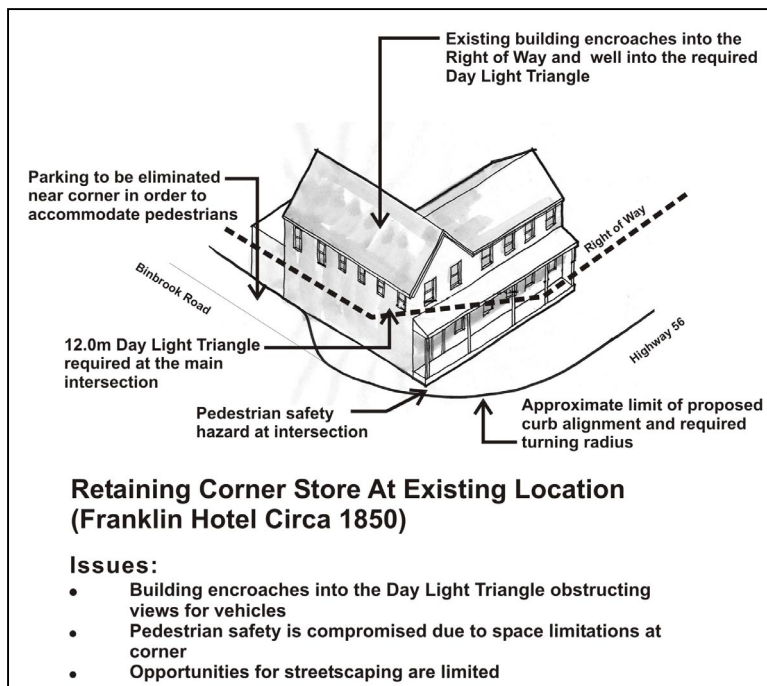


Figure 9: Alternative design strategies for the treatment of development on one of the “four corners”—Retaining the Corner Store at the existing location

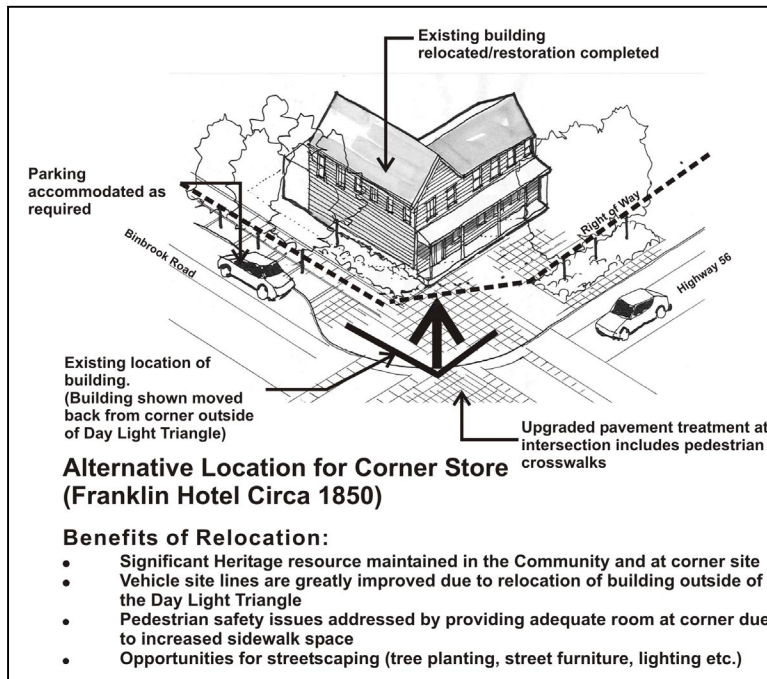


Figure 10: Alternative design strategies for the treatment of development on one of the “four corners”—Moving the Corner Store to a new location

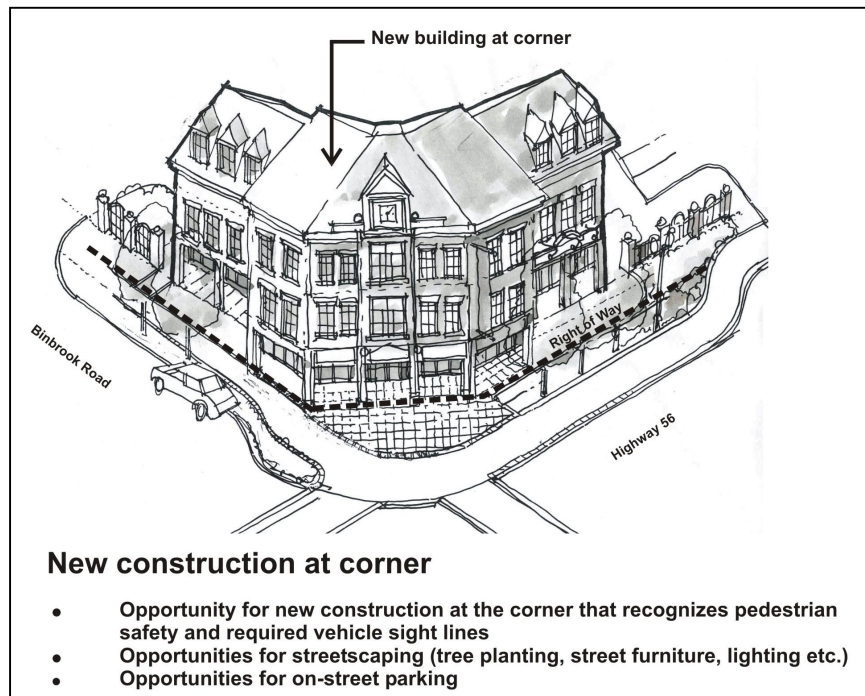


Figure 11: Alternative design strategies for the treatment of development on one of the “four corners”—New construction



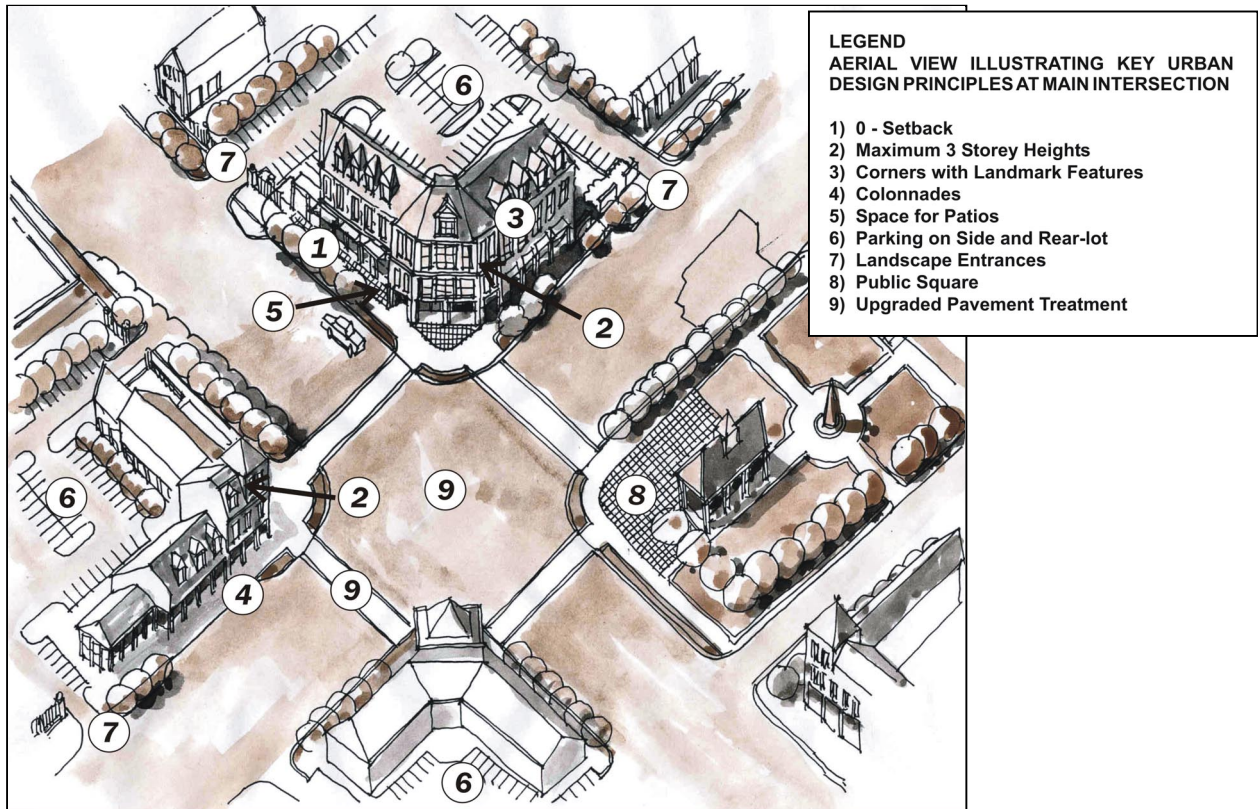


Figure 12: Urban Design concept of the “four corners”

Another example of integrating the transportation and urban design components is illustrated in Figures 13 to 15. The enhancement of pedestrian amenities is translated into shorter crossing distances at road crossings, and separation of pedestrians from moving traffic through the provision of wider sidewalks, boulevards, and parking bays.

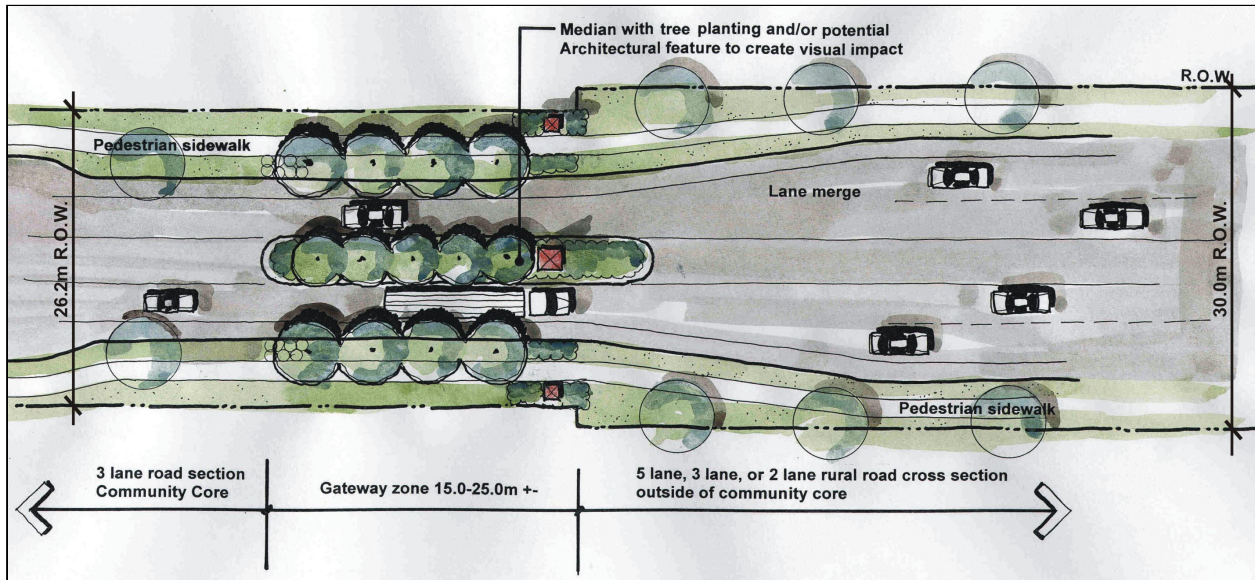


Figure 13: Gateway concept at the two-to-four lanes transition with median

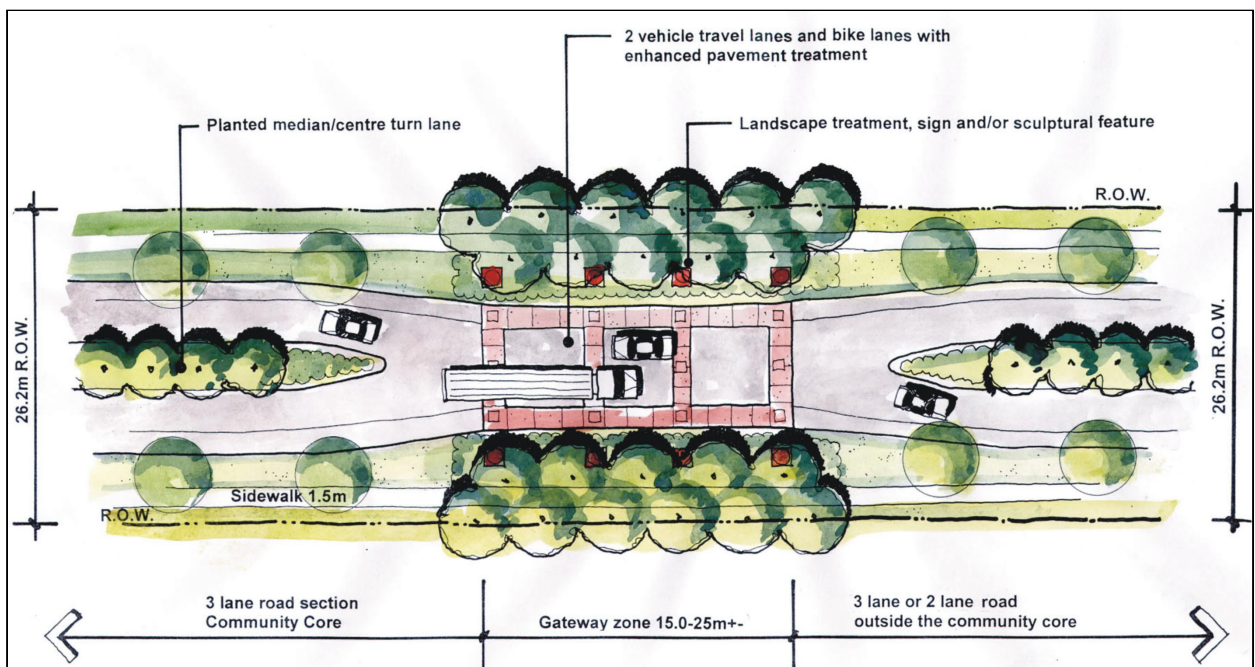


Figure 14: Gateway concept for a two-lane cross-section

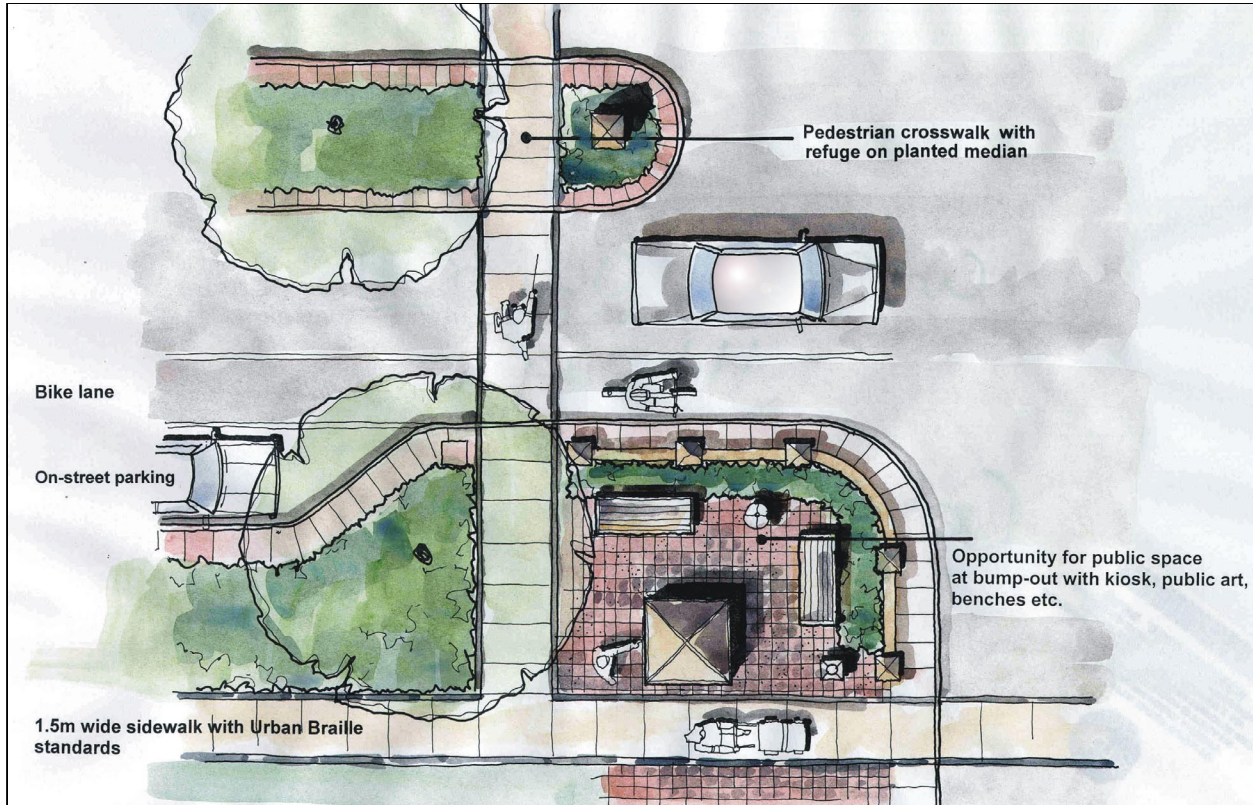


Figure 15: Proposed concept of a curb “bump-out” to reduce pedestrian crossing distance and provide boulevard area for amenities

## Conclusions

An integration of the transportation master plan and urban design guidelines for Binbrook Village resulted in the following benefits to the studies:

- PICs were held at the same time and place, lessening the demand on members of the public to attend two sets of PICs
- Transportation alternatives that would have had a detrimental effect on the pedestrian and community core objectives of the Secondary Plan were screened from further consideration early in the study
- The opportunities to provide streetscape and pedestrian amenities within the right-of-way were identify jointly
- Transportation elements support the future vision for the community core such as combined accesses to rear parking areas of future commercial properties. This was illustrated well by the urban design concepts for this type of development
- Additional trade-offs will have to be made during the design phase of the four corners intersection to balance the pedestrian-oriented streetscape design elements and roadway user safety with the need to provide for the movement of heavy trucks. The two study teams are in agreement that fieldwork to prepare a context sensitive design at this location would be beneficial.