

NORTH READING

A COMPLETE STREET INITIATIVE FOR MAIN STREET FINAL REPORT

Prepared for the Town of North Reading, Massachusetts
Prepared by The Cecil Group

October 28, 2015



Massachusetts Downtown Initiative

Summary	1
Project Overview.....	1
Process.....	1
Planning and Design Context.....	2
Recommendations.....	2
Options and Variations.....	3
Implementation Strategies.....	4
Existing Conditions Evaluation	6
Corridor Characteristics.....	6
Land Uses.....	7
Gateway Intersections.....	7
Vehicular Mobility.....	9
Pedestrian Mobility.....	11
Visual and Aesthetic Environment.....	12
Design Concepts	14
Alternative Approaches.....	14
“Paired Gateways” Design Concept.....	15
Roundabouts.....	15
Walking and Bicycling.....	16
Street Trees and Pocket Parks.....	16
Curb Cuts and Access Management.....	16
Concept Alternative.....	20
“T”-Shaped Intersection Design.....	20
Implementation Strategies	22
Actions.....	22
Resources and Tools.....	22
Appendix	A
A. Observations on Landscape Design Elements.....	A
Street Trees.....	B
Plantings and Sustainability.....	C
B. Public Workshop Summary.....	G

Figure 1: Main Street Aerial.....6

Figure 2: Existing Land Uses.....7

Figure 3: Existing Lowell Road Intersection8

Figure 4: Existing Winter Street Intersection9

Figure 5: Parking Lots along Main Street10

Figure 6: Curb Cuts and Access Management along Main Street10

Figure 7: Existing Sidewalk Conditions11

Figure 8: Existing Sidewalk and Crosswalk Conditions.....11

Figure 9: Streetlights and Overhead Wires12

Figure 10: Existing Signage Conditions13

Figure 11: Existing Edge Conditions13

Figure 12: “Paired Gateways” Diagram 14-15

Figure 13: Lowell Road Roundabout Diagram with Street Tree Varieties and Pocket Park.....17

Figure 14: Sections of Existing Conditions and Design Concept.....18

Figure 15: Perspective View of Existing Conditions and Design Concept19

Figure 16: Concept Alternative20



Summary

Project Overview

The Town of North Reading is engaged in the initial stages of a streetscape improvement program for a segment of Main Street (Route 28) with a particular focus on the segment between Northridge Drive and Rapier Brook. Main Street in this section is lined by a diverse collection of commercial and industrial uses and serves as an important north-south connector road within North Reading. As a regional roadway, Route 28 extends to Boston and northern communities, and serves as a link to important highway interchanges at I-95 and I-495.

The Town has initiated the improvement process with this study, with the goal of applying design concepts drawn from emerging practices for “complete streets”. This approach balances pedestrian, bicycle, and vehicle modes with the need for safer and greater walkability, sense of place, aesthetics and environmental sustainability. In part, this planning initiative has been organized to envision significant improvements to Main Street so that it will be more balanced in serving the needs of motorists, pedestrians and bicyclists. A related purpose is to illustrate methods to enhance the streetscape and aesthetic qualities of the corridor, contributing to the economic value of adjacent land and contributing to the civic image of North Reading.

There are substantial opportunities for improvement. Heavily travelled by vehicles, this segment of Main Street is lined by a number of auto-oriented uses, housing and other uses that are connected to Main Street by driveways and curb cuts that provide access to parking areas. This stretch of Main Street has limited sidewalk and crosswalks, and is not a friendly environment for pedestrians or bicyclists. The streetscape of lighting, landscaping and signage is the result of incremental improvements that are inconsistent with one another. There are notable instances of deterioration and poor quality conditions.

This study was prepared for the Town and its Community Planning Department through a grant from the Massachusetts Downtown Initiative, which is a program of the Department of Housing and Community Development (DHCD). The study was prepared The Cecil Group, a professional planning and design firm. This document outlines The Cecil Group’s existing analysis, recommendations, alternatives and implementation strategies to assist the Town of North Reading in advancing the complete streets strategies and techniques to Main Street. A Steering Committee assembled for this project provided input and advice during key steps in the planning process.

Process

The planning process involved three sequential steps:

- Review of existing conditions and opportunities - A review of existing conditions was undertaken including site visits and a photographic inventory of existing conditions. The planning team reviewed relevant Town plans, policies and zoning and used mapped information that the Town made available. The Steering Committee provided insights on key issues and site-specific conditions.
- Optional strategies - The planning team prepared a presentation and facilitated discussions regarding two different approaches that the Town might consider as it seeks to create a more complete street and successful district. A description of the community meeting held on October 15, 2015 and the community input can be found in Appendix C. Hosted by the Town of North Reading, over 50 members of the public participated in a session that discussed the issues, alternatives and vision for this portion of Main Street.
- Report - The team drew upon the input from participants in a public meeting, the Steering Committee and Town staff to assemble this *Report* which contains observations and guidance for the next steps in implementing improvements to Main Street.

Planning and Design Context

The complete street vision for the study area took into account a range of conditions and constraints which are described in more detail in the next section of the *Report*. Key aspects of the existing circumstances included:

- Relationship to other plans and initiatives - The Town has recognized the need to enhance the Main Street corridor in its Community Development Plan.
- Image and condition - The overall appearance of this portion of Main Street is inconsistent with a number of poorly maintained properties with an area that is dominated by auto-oriented uses.
- Congestion - The key intersections become congested at peak hours. Lowell Road and Winter Street provide key connections across Route 28, but are not aligned. As a result, both of their intersections with Main Street - and the segment between them - becomes congested.
- Lack of pedestrian and bicycle facilities - Sidewalks are incomplete and some are in poor condition, and there are no provisions for bicycles.
- Safety - Crosswalks are sparse and there are many curb cuts and driveways that promote left hand turns across approaching traffic.
- Relationship between land use, development and Main Street - The Town will be reconsidering the land uses, development potential, and zoning for the study area through a joint planning effort with the Metropolitan Area Planning Council in the near future.
- State ownership of the right-of-way - Main Street is owned and maintained by the Massachusetts Department of Transportation (MassDOT) and subject to its approval of any design and improvements.
- Accessibility - Portions of the corridor do not meet accessibility standards for people with handicaps including crosswalks and sidewalks.

Recommendations

The recommendations within the report include a series of fundamental changes that would achieve community goals and result in a more complete Main Street.

- Focus circulation improvements at the major intersections and the segment between Lowell Road and Winter Street - By improving traffic flows with adequate provisions for lanes and turning movements in the segment between Lowell Road and Winter Street, congestion can be eased while providing better conditions for pedestrians and bicyclists.
- Redesign the gateways intersections – The two major intersections can benefit by a redesign that better manages vehicular traffic, creates attractive gateways to the corridor, and provides a safe and attractive environment for pedestrians and bicycling. This might take the form of two roundabouts, subject to detailed study and evaluation.
- Use the available right-of-way to provide for all modes of transportation while enhancing the landscape – There is sufficient right-of-way to provide for dedicated bike lanes, sidewalks, and landscaping along with appropriate automobile travel and turning channels. Narrower lanes and other measures can be used to help slow traffic and better utilize the entire right-of-way.
- Provide continuous sidewalks along both sides of the entire corridor - Provide fully accessible sidewalks with crosswalks at every intersection along the entire corridor.

- Provide continuous bicycle connections with a “shared path” - Rather than providing on-street bicycle lanes, it would be better to provide a generous “shared path” that combines both bicycle and pedestrian circulation in a generous, paved way separated from the busy traffic lanes.
- Provide landscape and streetscape enhancements – The addition of appropriate shade and ornamental tree and shrub species will insert vibrancy and interest into the streetscape. A consistent program of streetscape amenities will foster streetscape activity and provide a distinct character to the corridor.
- Complete bicycling infrastructure – Make provisions for appropriate bicycle circulation at intersections and provide bike racks near destinations.
- Enhance the pedestrian realm – A more walkable and complete streetscape can be produced by implementing a consistent network of sidewalks that are adequately wide enough along Main Street, provide quality and signalized crosswalks, and provide better lighting that together create a safer and more attractive pedestrian experience.
- Provide better access management – The strategic consolidation reduction of excessive curb cuts and driveways will result in less congestion and safer conditions for motorists and pedestrians.
- Transform the streetlighting - Improved streetlighting with attractive fixtures and contemporary technologies can provide a safer, more attractive and more pedestrian-friendly environment.
- Relocate overhead utilities - Pursue funding that will allow utilities to be placed underground along this segment of Main Street, substantially improving the visual character of the area.
- Create overlooks at the brooks – Small overlooks and green spaces can be provided on the northern and southern ends of Main Street overlooking the brooks on either ends of this stretch. These can provide a respite for pedestrians and bicyclists along the corridor and provide a visual connection to these natural areas.
- Improve signage - Provide clear signage indicating the intersecting streets, and incorporate improved, appropriate standards for business signage to enhance the legibility and attractiveness of the corridor.
- Provide and invite special features - Special features should be encouraged such as sponsored landscapes, improvements on private property that complement the streetscape and perhaps public art, if opportunities arise.

Options and Variations

The recommendations in this *Report* provide a set of ideas that would result in the substantial transformation of Main Street. They express an initial vision, but there are other options or variations that the Town should consider as it advances this initiative and pursues detailed studies and designs. As a reference, this *Report* includes several alternative approaches and variations on the design concepts that were explored during the planning process and are included here for future reference and consideration. Specific optional strategies and variations in this *Report* include:

- Intersection design - The intersection of Main Street with Lowell Road and Winter Street could be configured as improved “T” intersections with changes in signalization, lane configurations, crosswalks and landscaping improvements.
- Symmetrical street cross section - The design could be based on a balanced street cross section with bicycle lanes and sidewalks on both sides of the vehicle travel lanes.

Implementation Strategies

Although this segment of Main Street is owned by the Commonwealth of Massachusetts, the complete street improvements envisioned in this *Report* must be advanced primarily by the advocacy and actions of the Town of North Reading. The following actions can be undertaken to help achieve the community goals and visions.

- Meet with MassDOT representatives to discuss this initiative and the implications relative to state priorities, requirements and procedures, and solicit conceptual support.
- Allocate funding to advance specific engineering and design studies to establish specific design recommendations and preliminary engineering including costs estimates to support funding and grant submittals.
- Meet with the legislative delegations to solicit understanding and support for the improvements.
- Identify and target appropriate funding or grant sources for the improvements.
- Secure funding, finalize the design and engineering and implement reconstruction and management of streetscape after reconstruction.
- Promote beneficial development patterns in concert with streetscape and circulation improvements through zoning, design guidelines or other Town actions.
- Create a Complete Streets Town policy and extend similar ideas to other parts of the Main Street corridor.

Existing Conditions Evaluation

Corridor Characteristics

Main Street, also known as Route 28, traverses North Reading in a north-south direction. It connects North Reading to Lawrence and other communities to the north and leads towards Boston to the south. Route 28 serves as an important north-south roadway in Greater Boston. It serves as an alternative route to I-93 and connects I-495 and I-95. As a result, it attracts significant commuter traffic during peak hours.

This study considered a specific segment of Main Street that includes the Lowell Road and Winter Street intersections and stretches between Northridge Drive and Rapier Brook. Lowell Road and Winter Street form a part of Route 62 that provides east-west connections within North Reading and to adjacent communities. Combined with traffic along Main Street, the study area forms an important segment of the Town’s vehicular mobility. The length of this segment of Main Street is about a half mile long and was identified as an area for focused improvement by the Town. Route 28 was identified as needing improvement in the the Town’s Master Plan. This segment can be walked in about ten to fifteen minutes or biked in three to five minutes.

The study area has limited crosswalks, incomplete sidewalk networks, no bicycle lanes, extensive surface parking lots and curb cuts. Traffic volumes effectively fill available lanes and intersections at peak times. When traffic is not congested, cars tend to speed along the straight stretch of Route 28.

There are numerous driveways and curb cuts that link businesses and parking lots to Main Street. Motorists stop at many locations to make left hand turns, waiting for a break in approaching traffic and delaying vehicles behind them. Conversely, motorists often wait to exit a property to turn onto Main Street because of the significant flows of traffic that they must negotiate.

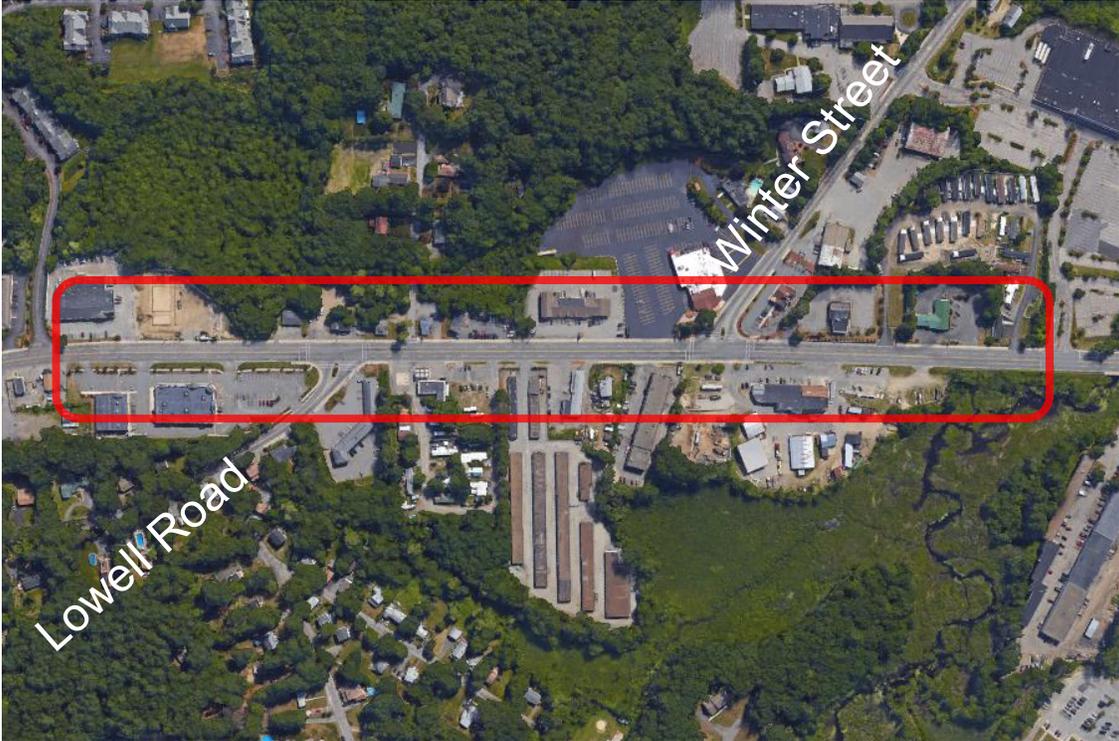


Figure 1: Aerial of existing conditions along Main Street. Outlined in red are the study area boundaries.
Aerial source: Google Earth

Land Uses

Uses along the corridor largely reflect the automobile-oriented character of Main Street. The corridor consists primarily of commercial and retail uses with some light industrial, storage and repair businesses. There is a scattering of housing, including an enclave of mobile homes. Commercial properties tend to have ample surface parking lots and include businesses such as restaurants, small shops, a pharmacy, auto repair shops, and a car wash. There is a vacant grocery store complex on the east side of the study area.

The Town will be reconsidering the land use regulations and development potential for the area with the intent of providing for higher and better utilization and economic value over time. As a result, the street corridor circulation and streetscape concepts must be adaptable to both existing conditions and potential future changes.

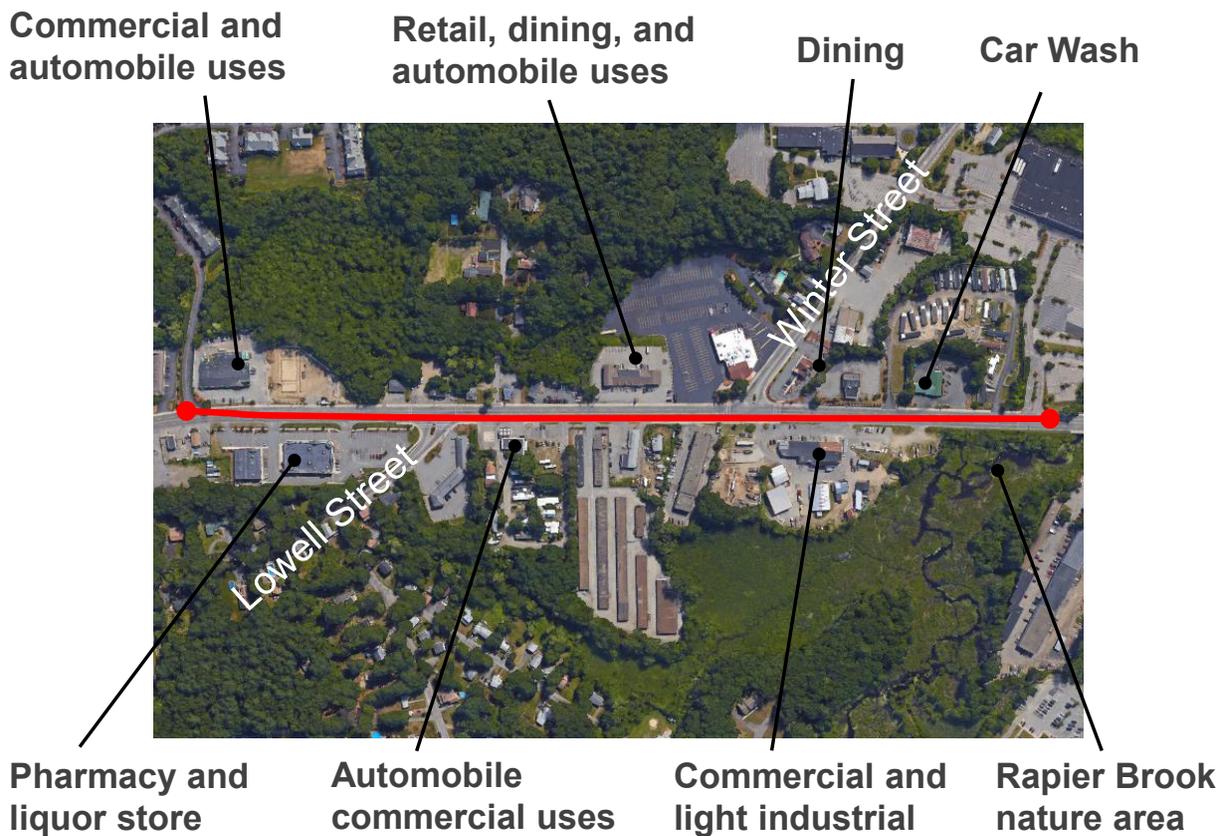


Figure 2: Aerial showing existing land uses on Main Street.

Source: Google Earth

Gateway Intersections

The intersections of Main Street with Lowell Road and Winter Street provide for vehicular circulation, but are not organized to promote pedestrian crossings or bicycle traffic. These have been termed “gateway intersections” because they are located at either end of the most heavily travelled segment of Main Street within the study area, due to their role in processing the traffic which is moving either east or west to, from or across Main Street.

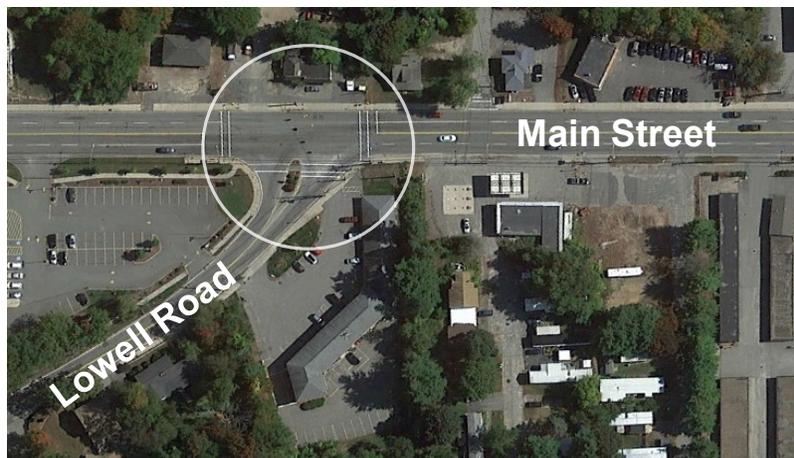
LOWELL ROAD

The intersection of Lowell Road and Main Street is a “T” intersection located on the northern end of the study area. The current conditions at this intersection, shown in Figure 3, accommodate four lanes of vehicular traffic on Main Street, with two lanes in each direction, and two lanes of vehicular traffic on Lowell Road, with one lane in each direction. Lowell Road meets with Main Street at an angle; there is a landscaped island on Lowell Road which separates eastbound and westbound traffic. The landscaping at this intersection is well maintained with plantings provided through a beautification sponsor and is an attractive entrance to Main Street.

During morning peak hours, southbound traffic is heaviest on Main Street going through the intersection and in the left turn lane from Main Street onto Lowell Road. In the evening peak hours, traffic is heaviest on Main Street moving northbound through the intersection, and turning right from Lowell Road onto Main Street. These traffic patterns mirror each other and reflect typical morning and evening commuting patterns into and out of major job centers in the region.

Crosswalks are present at all three crossing areas. Each crosswalk is equipped with a crossing signal that is activated at the touch of a button at each corner. The crossings, however, have minimal or worn down crossings where the street markings are no longer visible. Additionally, the crosswalk ramps are narrow and lack yellow tactile pavings which impede safe and reasonable mobility for those on wheelchairs or with strollers.

The Lowell Road crossing is significantly longer than the Main Street crossings, with the same crossing time. This makes crossing this segment more challenging for the elderly or children who may walk slower than a healthy adult. These crosswalks can be redesigned to accommodate all users. The crosswalks can be redesigned with adequate spacing, sufficient crossing time, wider sidewalks, and enhanced landscape to increase the safety and attractiveness of these crosswalks for pedestrians, and aware drivers of their presence.



*Figure 3: Aerial of existing conditions of the Main Street and Lowell Road intersection.
Source: Google Earth*

WINTER STREET

The intersection of Winter Street and Main Street is a “T” shaped intersection located on the southern end of the study area. The current conditions at this intersection, shown in Figure 4, accommodate four lanes of vehicular traffic on Main Street, with two lanes in each direction, and two lanes of vehicular traffic on Winter Street, with one lane in each direction. Winter Street meets with Main Street in an angled “T” shape with a center landscaped island on Winter Street. The landscaping at this intersection is well maintained with

thoughtful plantings that provide an attractive entrance to Main Street.

At morning peak hours, traffic is heaviest on Main Street going southbound through the intersection, and in the right turn lane from Winter Street onto Main Street. In the evening peak hours, traffic is heaviest on Main Street going northbound and southbound through the intersection. These traffic patterns mirror each other and reflect typical morning and evening commuting patterns into and out of major job centers in Boston.

Crosswalks are present at all three crossing areas. Each crosswalk is equipped with a crossing signal that is activated at the touch of a button at each corner. The crossings, however, have minimal or worn down crossings where the street markings are no longer visible in some parts. Additionally, the crosswalk ramps are narrow and lack yellow tactile pavings which impede safe and reasonable mobility for those on wheelchairs or with strollers.

The Winter Street crossing is significantly longer than the Main Street crossings, with the same crossing time. This makes crossing this segment more challenging for the elderly or children who may walk slower than a healthy adult. These crosswalks can be redesigned to accommodate all users. The crosswalks can be redesigned with adequate spacing, sufficient crossing time, wider sidewalks, and enhanced landscape to increase the safety and attractiveness of these crosswalks for pedestrians, and aware drivers of their presence.



*Figure 4: Aerial of existing conditions of the Main Street and Winter Street intersection.
Aerial source: Google Earth*

Vehicular Mobility

PARKING, CURB CUTS AND ACCESS MANAGEMENT

Main Street is lined almost entirely by commercial uses that are accessed almost exclusively by patrons in vehicles. Businesses along the corridor, therefore are surrounded by extensive surface parking lots that provide ample parking for patrons, but create an unattractive streetscape condition, as shown in Figure 5.

Multiple unshared business curb cuts create an excessive amount of curb cut locations along Main Street, as shown in Figure 6. While vehicular circulation and access must be considered in streetscape design, the number of curb cuts are debilitating to accessibility, pedestrian movement and safety, and safe vehicular circulation. Harnessing shared opportunities and reconfiguring curb cuts would allow for an efficient and accessible streetscape.

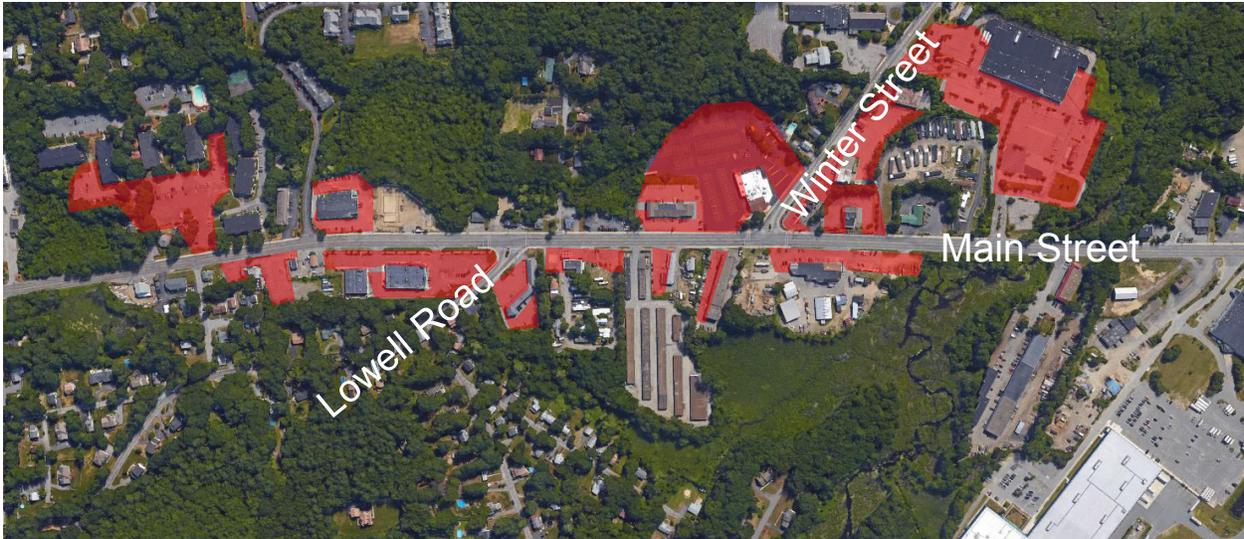


Figure 5: Land area dedicated for surface parking lots highlighted in red.
Aerial source: Google Earth



Figure 6: Arrows show curb cuts along this segment of Main Street south of Winter Street. Each property has its own dedicated curb cuts, creating a confusion and dangerous condition for drivers and pedestrians. By working together, property owners can reduce the amount of curb cuts along Main Street. This would improve vehicular access and increase pedestrian safety.
Aerial source: Google Earth

Pedestrian Mobility

SIDEWALKS AND CROSSWALKS

Sidewalks and crosswalks should provide accessibility for persons with handicaps. Accessibility issues along the existing streetscape stem from a variety of issues ranging from insufficient curb ramp locations, sidewalks lacking any buffering (Figure 7), faded crosswalk markings, disappearing curb locations, narrow sidewalks, a lack of consistent sidewalk materials, and sidewalks ending abruptly (Figure 8).



Figure 7: Sidewalks are immediately adjacent to speeding vehicles, with no landscape buffer. This condition creates an unattractive and unappealing walking experience for pedestrians, discouraging people to walk in the area.



Figure 8: Many sidewalks in the area end abruptly. This makes walking challenging or impossible for people on wheelchairs or with strollers.

Visual and Aesthetic Environment

STREETLIGHTS AND OVERHEAD WIRES

The western edge of Main Street is lined by an extensive network of overhead wires. The utility poles also serve as the street lighting supports. The overhead wires detract from the streetscape aesthetics and the lighting quality is typical of auto-oriented streets and arterials.



Figure 9: Overhead wires and highway-scaled light poles create visual blight along Main Street.

SIGNAGE

Business signage along Main Street is varied and at different scales depending on the use and type of business it serves, as shown in Figure 10. Color, size, scale, and placement are diverse and show no consistency throughout the corridor. Signage is an important element to create a consistent streetscape design that signals an identity for Main Street. Zoning changes can provide the guidelines to encourage a pedestrian-scaled signage style that is more consistent throughout the study area.

There is limited public signage along this segment of Main Street and is largely composed of route signs and street signs.

LANDSCAPING AND EDGE CONDITIONS

The existing plantings vary in type, quantity and quality within the properties that line Main Street. There are several locations where the site and landscape is in very poor condition and is not maintained, contributing to a negative visual quality and effecting the overall attractiveness and value of the corridor. There are several segments of mature street trees in various portions of the area. There are also individual trees and some landscaping within the public right-of-way, but there are no street trees directly associated with the street and sidewalk infrastructure.

Additionally, the edge condition between sidewalks and the roadway features landscaping in limited segments of the corridor, as shown in Figure 11. In areas with landscaped edge conditions, most are composed of very thin strips of green space with mulch, weeds, or unkempt ground covering. These conditions contribute to an

unattractive streetscape environment. Maintenance of existing conditions is a significant problem that needs to be addressed, such as the property shown in Figure 11.

The pocket islands at the intersections with Winter Street and Lowell Road are attractively landscaped and well maintained through a sponsorship program.



Figure 10: Existing signage along Main Street is inconsistent with a variety of colors, sizes, placement, and scale.



Figure 11: Existing edge condition along much of the corridor lacks attractive landscaping or tree plantings.

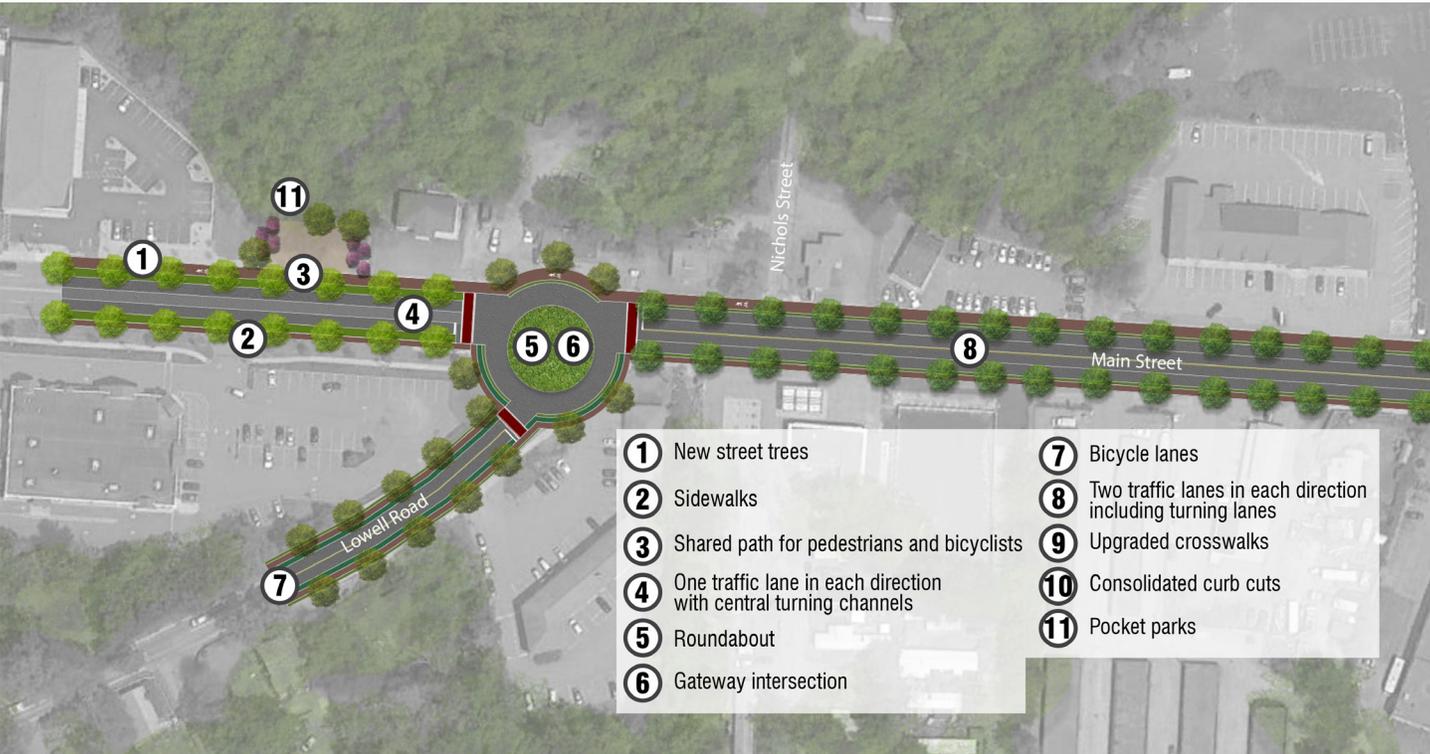
Design Concepts

Alternative Approaches

There are many ways to create an appropriate complete street environment along Main Street. The final design will depend on many detailed considerations and technical evaluations of traffic conditions to establish the most beneficial approach. During this process, preliminary concepts were explored that may accomplish the Town’s goals and indicate promising directions to explore in the future.

Two alternatives were prepared and considered during the planning process. One alternative called for retaining the existing roadway configuration of four lanes of traffic and “T”-shaped intersections, dubbed “Complete Corridor”, as shown in Figure 16. The second alternative calls for calming traffic by replacing the intersections with roundabouts, adding a shared path for pedestrians and bicyclists, and reducing the number of lanes from four lanes to three lanes on Main Street north and south of each of the new roundabouts. This second concept has several potential advantages and was favored as an initial concept by many of those involved in the planning process.

Figure 12: Design Concept Diagram
 Aerial source: Google Earth
 Diagram produced by: The Cecil Group



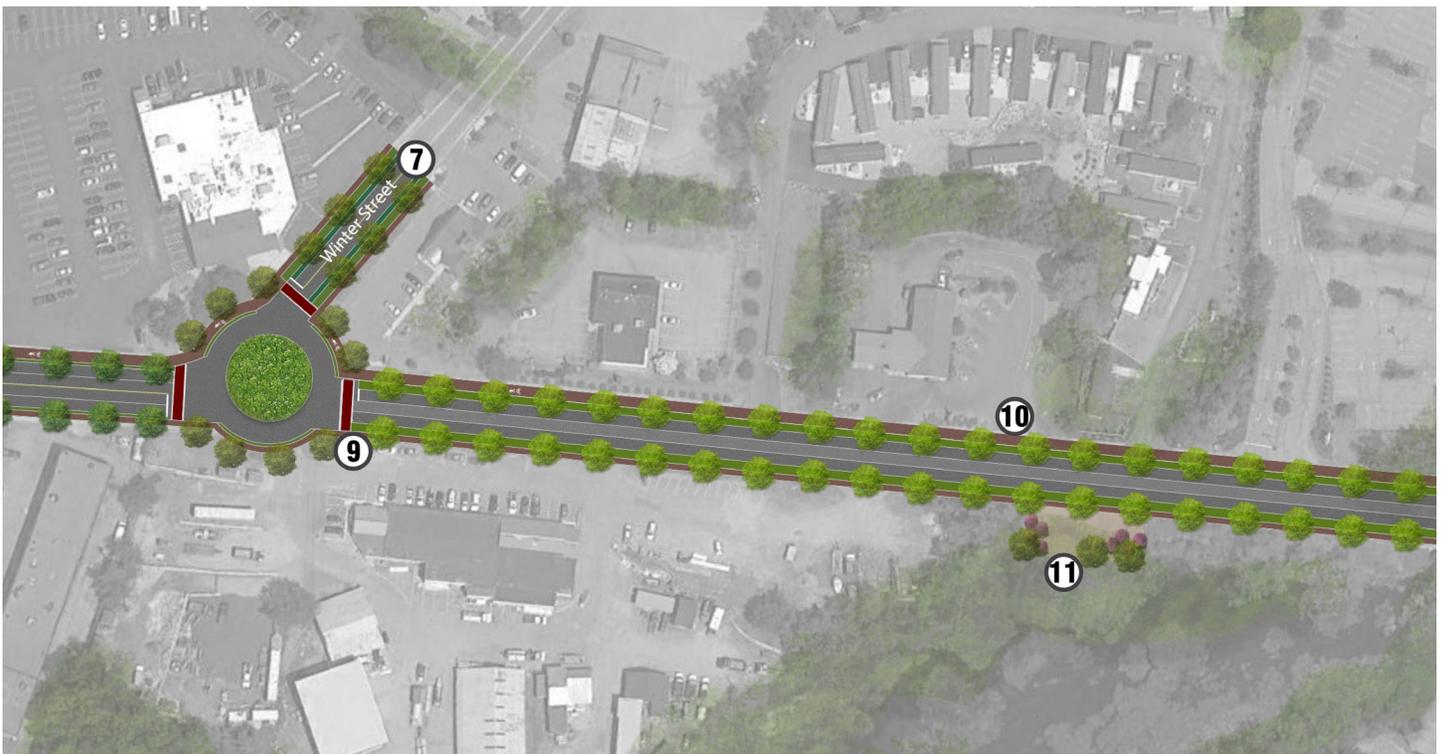
“Paired Gateways” Design Concept

This second alternative was dubbed “Paired Gateways”. The roundabouts might be able to operate as unsignalized intersections and serve to slow drivers as they approach this segment of Main Street. The segment of Main Street between the roundabouts would be composed of two lanes of traffic in each direction, and the roundabouts would both have dual lanes. The sections of the Main Street to the north and south of the roundabouts could taper to a three-lane cross section, with the middle lane serving as a left hand turn reservation, allowing through traffic to continue unimpeded. The entire Main Street segment would feature consistent landscaping, sidewalks, a shared path for bicycles and pedestrians, and traffic lanes narrower than the twelve-foot widths that has been often used as a standard in the past in the United States. The roundabout concept is shown in Figure 12.

ROUNDBABOUTS

The current “T”-shape intersections at Lowell Road and Winter Street would be replaced by a roundabouts. As a general rule, roundabouts can be efficient in promoting smooth traffic flows while also serving as a traffic calming measure and as a placemaking element from a streetscape perspective. The interior of the roundabouts can feature permanent and seasonal plantings that create a sense of place and branding for Main Street.

Main Street between the two roundabouts would feature two lanes of vehicle traffic in either direction, as shown in Figure 14. The roundabouts would be two lanes wide.



Although most of the property required to build the roundabouts lies within the public right-of-way, the acquisition of some private land would be required to implement this concept. However, the roundabouts could be designed to limit impacts on adjacent property owners and uses.

WALKING AND BICYCLING

A shared path for pedestrians and bicyclists could be located along the corridor's eastern side, with a sidewalk on the western side. The shared path would be wide enough for two-way bicycle traffic and pedestrians. The shared path would allow a safer bicycle path for bicyclists, since bicyclists and pedestrians would be separated from vehicular traffic by a landscape buffer. On-street bicycle lanes on Lowell Road and Winter Street would transition to the shared path at the roundabouts, as shown in Figure 13.

Crosswalks would be located at the three pedestrian crossing points at each roundabout, as shown in Figure 13. The crossings would be designed to provide a comfortable and safe crossing for pedestrians and bicyclists. Crossing signals activated by the push of a button could be installed at all crosswalk and could include tactile paving, flashing crosswalk signs, and signage to alert drivers of the presence of pedestrians at the roundabout.

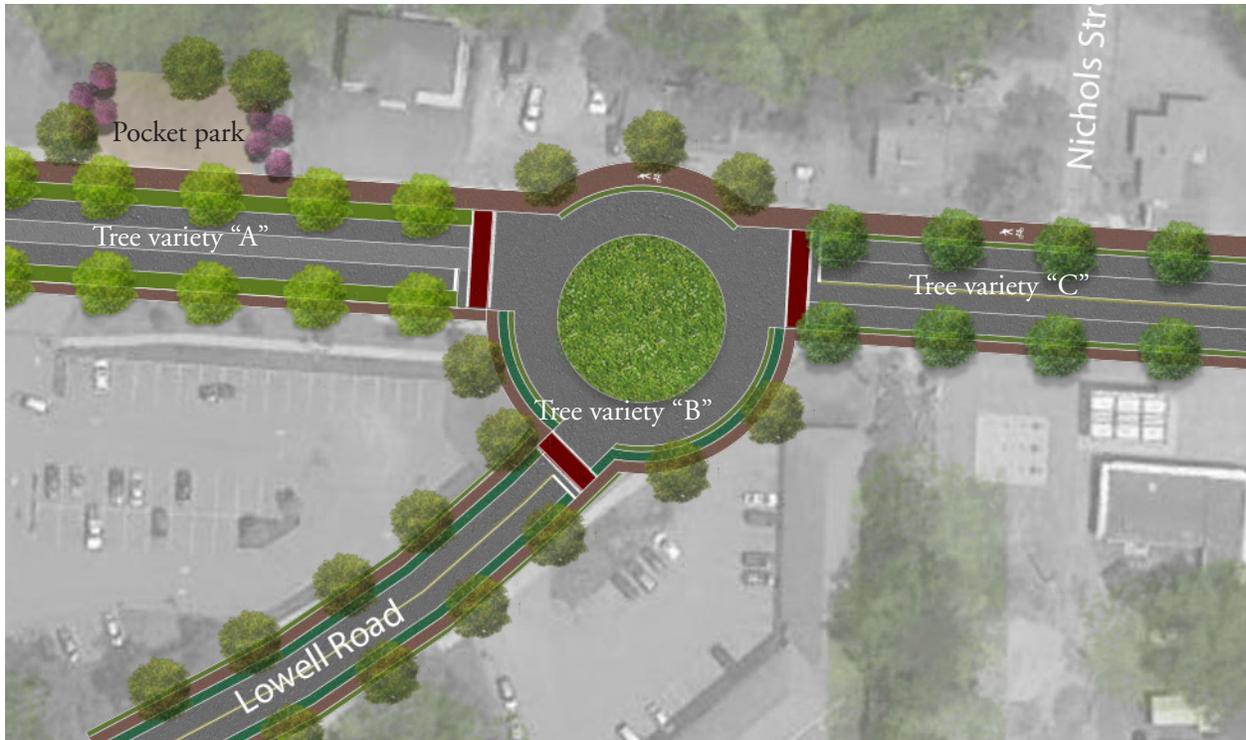
STREET TREES AND POCKET PARKS

Street trees would be planted along Main Street. The tree species would vary depending on the area, varying the appearance and feel of the corridor, as shown in Figure 13. One variety of street tree for the roundabouts and Lowell Road and Winter Street. A second variety of street tree for the segment of Main Street between the roundabouts, that would be more densely planted to provide more shade for pedestrians and bicyclists. A third variety would be for segments of the corridor beyond the roundabouts.

Along with the enhancement of street trees, the study has shown two small parcels of land that could be pocket parks or open space areas, as shown in Figure 12 and 13. These areas are located on the northern and southern ends of the corridor overlooking the two brooks that intersect Main Street. These areas have the potential to serve as gateway pocket parks to the more walkable Main Street center with various landscaping amenities that provide a respite area for walkers and bicyclists to stop and observe and enjoy the natural brook areas.

CURB CUTS AND ACCESS MANAGEMENT

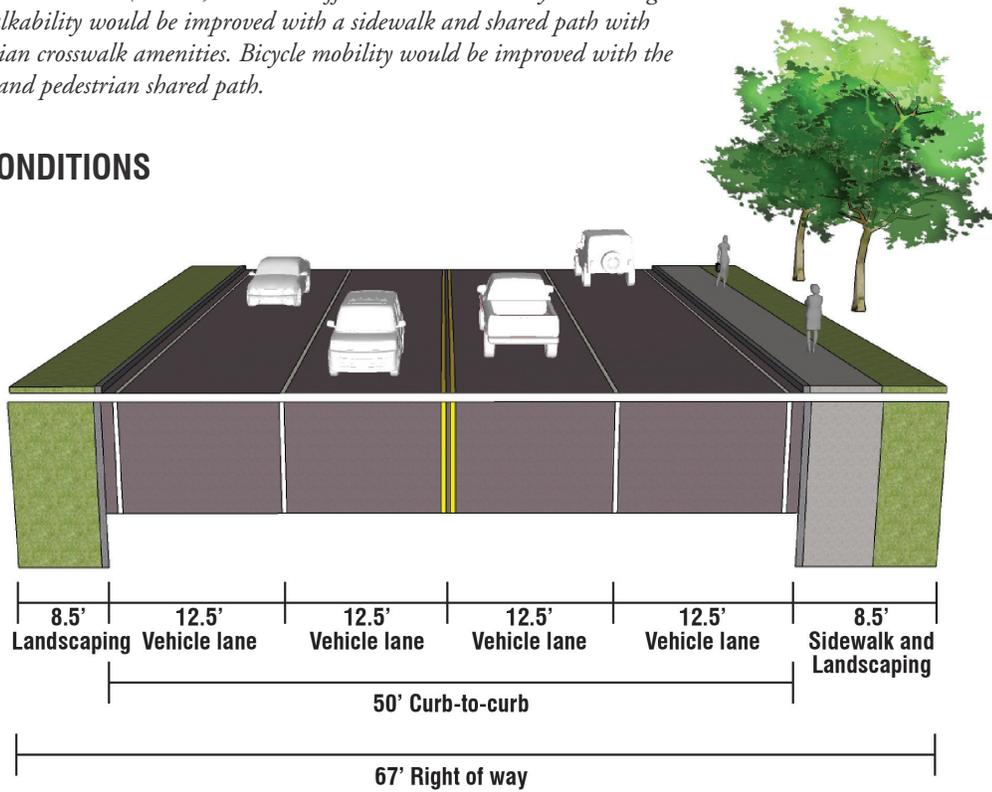
Excessive curb cuts are due in part to the large areas of surface parking lots and the uncoordinated development of commercial properties along Main Street. The study suggests limiting the amount of curb cuts by having property owners work together to consolidate entrances to properties. An access management plan that consolidates curb cuts and connects adjacent properties is recommended. Limiting the amount of curb cuts on Main Street improves vehicular circulation and safety, and the safety of pedestrians and bicyclists.



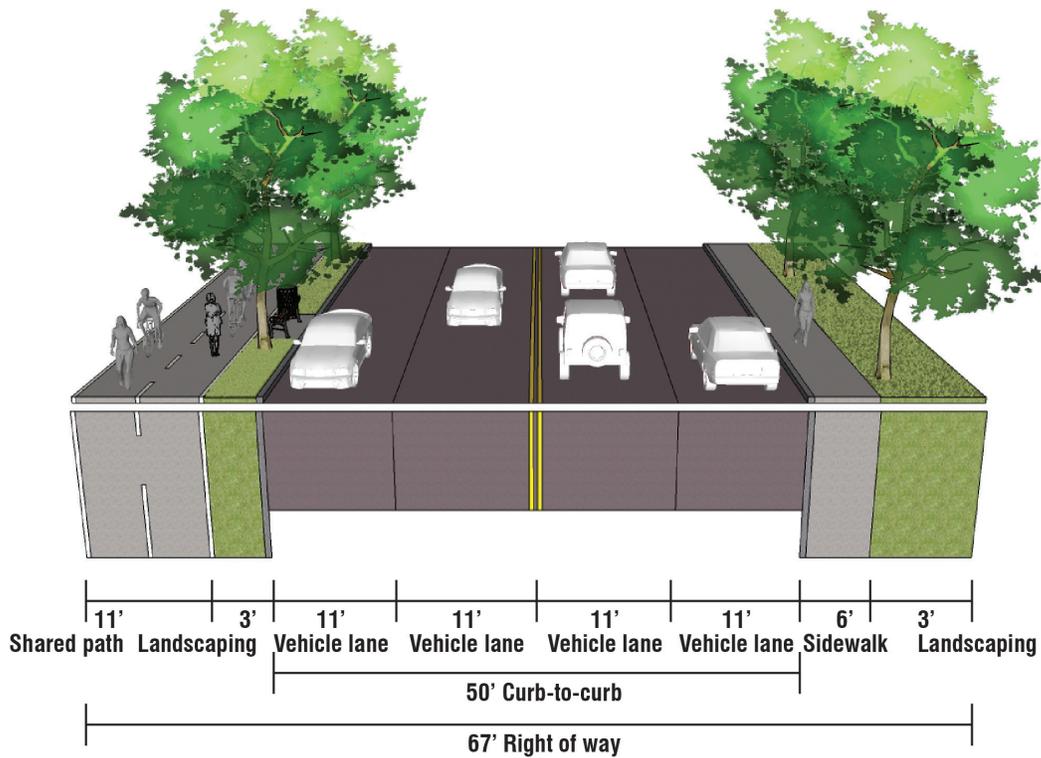
*Figure 13: Lowell Road roundabout with crosswalks in red, bike lanes in dark green, and sidewalks and shared path in light red. Vehicle traffic north of the Lowell Road roundabout has one lane of traffic in either direction with a center shared lane. Vehicle traffic south of the roundabout, the busiest segment of the corridor, has two lanes of traffic in either direction.
Aerial source: Google Earth*

Figure 14: Existing Main Street conditions (top). Main Street recommendations between the two roundabouts (bottom). Vehicle traffic would be slowed by narrowing vehicle lanes. Walkability would be improved with a sidewalk and shared path with adequate pedestrian crosswalk amenities. Bicycle mobility would be improved with the two-way bicycle and pedestrian shared path.

EXISTING CONDITIONS



DESIGN CONCEPT



EXISTING CONDITIONS



DESIGN CONCEPT



Figure 15: Existing Main Street conditions looking south towards the Winter Street intersection (top) with design recommendations below. Vehicle traffic would be slowed by narrowing vehicle lanes. Walkability would be improved with a sidewalk on the west side and a shared path on the east side of the street. Bicycle mobility would be improved with a two-way bicycle and pedestrian shared path on the east side of the street. Overhead wires and utility poles would be removed and placed underground, thus improving the appearance and character of the corridor. Street trees would beautify the corridor and provide shade for pedestrians and bicyclists, encouraging more walking and biking.

Concept Alternative



Figure 16: The alternative “Complete Corridor” streetscape calls for maintaining the “T”-shaped intersections, and maintaining two lanes of vehicle traffic in either direction throughout the corridor. Sidewalks would be placed on both sides, with on-street bicycle lanes on either side of Main Street.

Aerial source: Google Earth

“T”-SHAPED INTERSECTION DESIGN

An alternative to the “Paired Gateways” streetscape, is the “Complete Corridor” streetscape. Under this scenario, vehicle traffic would be maintained at two lanes in either direction with bicycle lanes on either side of the street. Street trees would be planted in a consistent fashion throughout the corridor, emphasizing the corridor as one unified streetscape design.

The ability to implement this approach would not require acquisition of additional right-of-way. There are also some advantages in regards to pedestrian circulation and accessibility associated with “T” intersections and more conventional approaches to the placement and design of crosswalks.

The relative benefits and drawbacks of this alternative and other approaches will need to be further considered in the next phases of North Reading’s initiative for Main Street.

Implementation Strategies

When the time comes to implement this streetscape initiative for Main Street, the Town must be prepared with an efficient means of funding, active leadership, and other resources to implement the community improvements and recommendations. The recommendations listed in this study cannot be achieved at once and should be thought through accordingly.

Actions

There are a series of actions that should be considered in the short term to set the stage for implementation of these recommendations. The actions that the Town of North Reading should consider are:

- Meet with representatives from the Massachusetts Department of Transportation (MassDOT) and the Town's legislative delegation to present the ideas in this *Report* and solicit support.
- Fund and undertake engineering and design studies to finalize the scope, character and cost of intended improvements, establish detailed cost estimates and phasing plans. These are often considered as "25%" plans, and are used for grants, funding and financing.
- Devote time and resources to secure state funding and allocate appropriate Town resources for improvements, including targeting multiple potential sources such as the state's MassWorks program, allocation of Chapter 90 infrastructure funds, and special legislative allocation in view of the importance of these improvements to the Town and region, and Town funding.
- Prepare final designs and implement construction.
- Sponsor a long-term circulation plan to determine complementary actions to provide for improved crossing movements and intersections at Lowell Road and Winter Street.
- Promote beneficial mixed-use development that can take advantage of the improved Main Street Corridor and its enhanced pedestrian orientation.
- Consider the creation of a Complete Streets Ordinance or policies to guide further infrastructure improvements consistent with the goals for Main Street.
- Research and align with the Metropolitan Area Planning Council (MAPC) initiatives for smart growth and complete streets for North Reading.
- Develop an understanding of the sustainable and complete streets initiatives implemented by other communities.

Resources and Tools

There are a series of programs and funding sources that can advance North Reading's Main Street initiative, ranging from policy and program support to financial support.

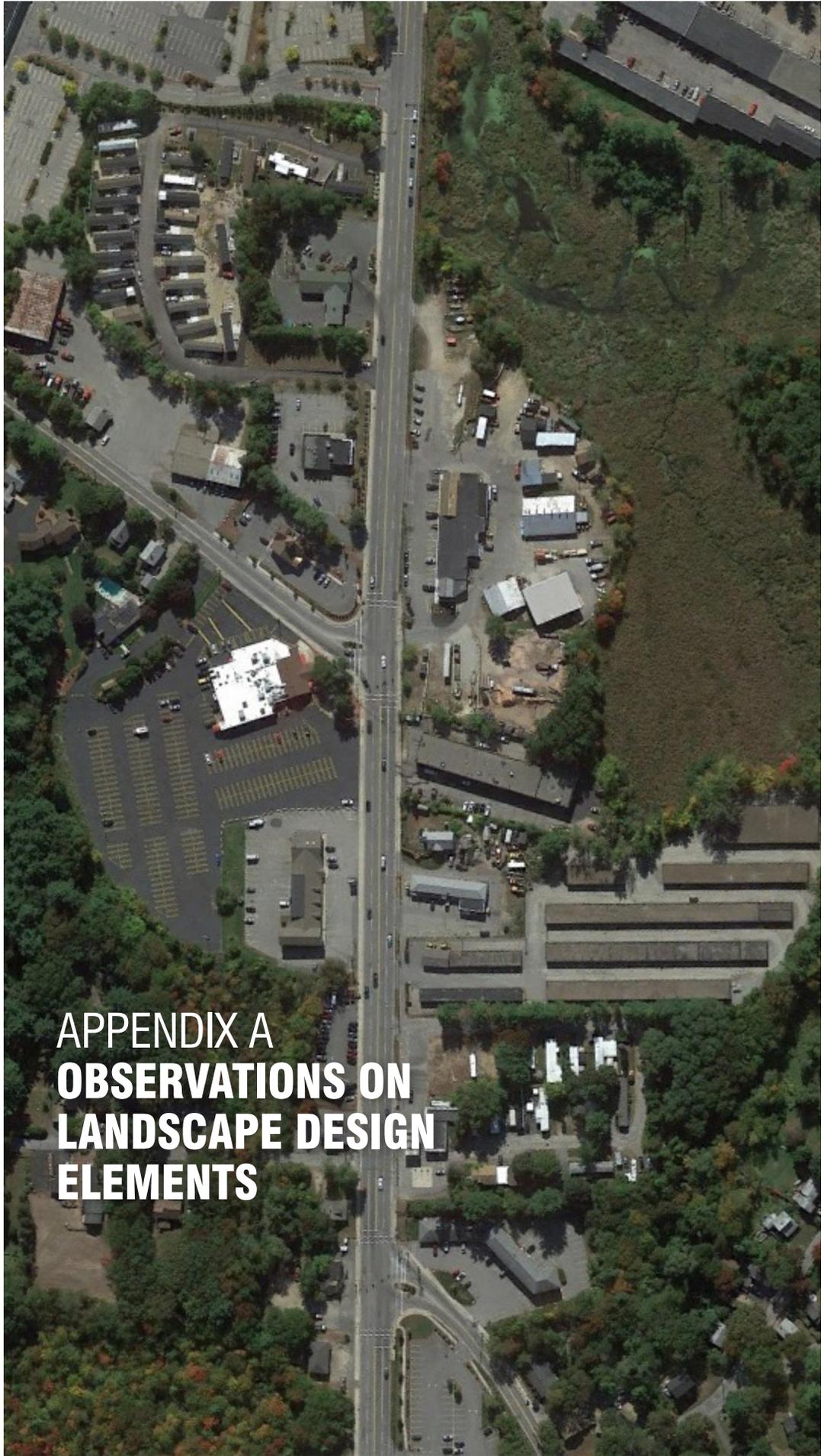
These include the following:

- MassWorks Infrastructure Program – This includes a number of formerly separate state funding programs, including the Public Works Economic Development Grant (PWED) program, which was created to invest in infrastructure that stimulates economic development. The level of grants has typically been one-half to over a million dollars.
- Massachusetts Chapter 90 Funding – These funds are allocated yearly to municipalities to fund road and bridge construction and maintenance projects.
- Community Preservation Act (CPA) – This legislation is an important funding source for

open space, historic preservation, and housing and recreation projects. With MAPC, North Reading can create and implement the CPA for development and assessment of open spaces and recreation to Rapier Brook and other potential open spaces in this study.

- Mass In Motion – This is a statewide movement that promotes opportunities for healthy and active places for people to live, learn, work and play. Funding from various health initiatives and foundations can help promote a complete streets approach for wellness
- Safe, Accountable, Flexible, Efficient Transportation Equity Act: a Legacy for Users (SAFETEA-LU) – This is a federally funded program for infrastructure improvements to highways and roads. It addresses many challenges related to safety, reducing traffic congestion, improving efficient freight movement, increasing connectivity and protecting the environment. The program covers several areas, including wayfinding/signage, bicycle safety and environmental and/or recreational stewardship.
- Recreational Trail Program (RTP) – This program provides funds to states to develop and maintain recreational trails and facilities, and could be used for the temporary realignment of the existing rail trail crossing.

The relative benefits and drawbacks of these strategies will need to be further considered.



**APPENDIX A
OBSERVATIONS ON
LANDSCAPE DESIGN
ELEMENTS**

A. Observations on Landscape Design Elements

STREET TREES

Street trees can become a transformational element along Main Street, serving multiple purposes. The following observations consider various factors that should be taken into account in forming a specific design plan.

VARIETY VERSUS UNIFORMITY

In the case of Main Street, there are distinct advantages associated with creating a more uniformly attractive streetscape environment. This can be accomplished by consistent use of the same tree species and varieties within the corridor. However this does not imply the use of be a single standard street tree. Rather, there should be consistent use of a limited number of street tree species and varieties along the distinct segments and places to create a coherent composition. There are at least three distinct zones that should be considered: the approaches to the major intersections along Main Street from the north and south, the segment between the intersections, and the two gateway intersections (Lowell Road and Winter Streets).

SPACING

Street tree spacing has a significant impact on the visual character of the street. The spacing should be chosen which helps define a the edge of the corridor with spacing that is fairly uniform and avoids major gaps. From a distance, the trees should help form a sense of enclosure and limit views of adjacent areas. However, as vehicles approach sites and businesses, the spacing should not impede safe sight lines or inappropriately obscure businesses and signage.

UTILITIES AND STREET TREES

The overhead utilities will constrain the growth patterns of street trees beneath them. This will influence the alignment and the choice of trees. It may be appropriate to have a different tree on the side of the street with overhead utilities than the side of the street that is free from this constraint.

SHAPE AND HABIT

The choice of trees should consider the overall shape of the trees and the form that they will take, which is termed their “habit”. Trees have been cultivated to take on a variety of shapes with a limited amount of pruning. Unless the setbacks from the street are significant, trees that have a relatively narrow and vertical shape are most practical, so that they are not trimmed by passing trucks. The vertical shaped trees include cultivars that are columnar or oval.

SPECIES AND VARIETIES

There are many appropriate varieties of native or non-invasive trees that serve well as street trees. The Town should consider the long-term opportunities associated with mature species and varieties such as maples and oaks. However, given the characteristics of the gateway intersections, the relationship with the natural wetlands and integration with overhead utilities, there are many colorful and interesting smaller trees that can be chosen for their appearance and decorative contributions. A few examples are indicated in the attached photographs to suggest how the species and varieties can be matched to the specific purposes and locations.

PLANTINGS AND SUSTAINABILITY

The choice of plantings and the associated curbing, paving, soils and drainage can directly contribute to environmental sustainability.

The design of the streetscape should include consideration of contemporary methods for filtering stormwater runoff and providing for low-maintenance plantings that will complement and support the nearby wetlands and drainage systems. The contemporary techniques include channeling stormwater runoff through natural planting beds using native species and varieties that are drought tolerant and require relatively little maintenance. The design of the underlying soils, gravel and drainage structures should be integrated into the design.

The overall aesthetic effect typically results in a picturesque, informal or natural appearance to bordering vegetation. This would benefit from the choices of grasses or shrubs that grow to a scale that will help diminish the views of large pavement areas and parked cars.

Because of the salty conditions that often occur because of winter road treatments, the choice of salt-tolerant species is recommended for roadside plantings. Various candidate plant species that are typically used in association with sustainable landscapes have been provided as examples.

STREET TREES



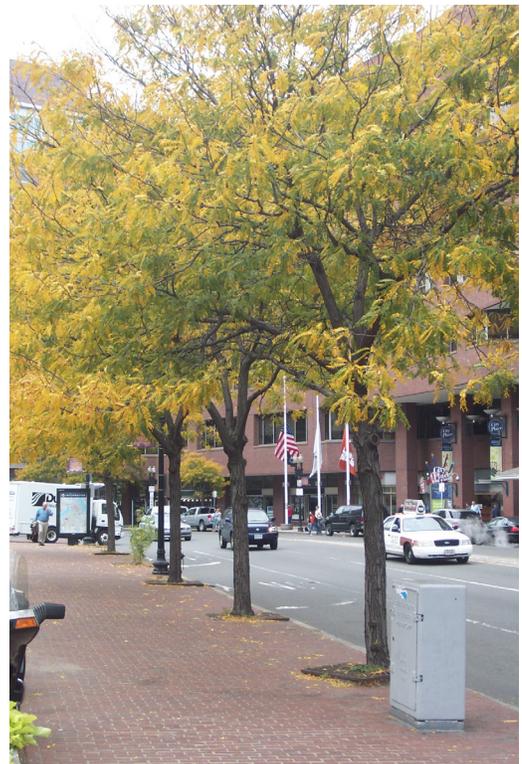
Acer rubrum 'Bowhall' - Bowhall Red Maple



Acer rubrum - Red Maple



Amelanchier laevis - Serviceberry



Gleditsia Triacanthos - Thornless Honeylocust

SHRUBS



Buxus microphylla - Boxwood



Deutzia gracilis - Slender Deutzia



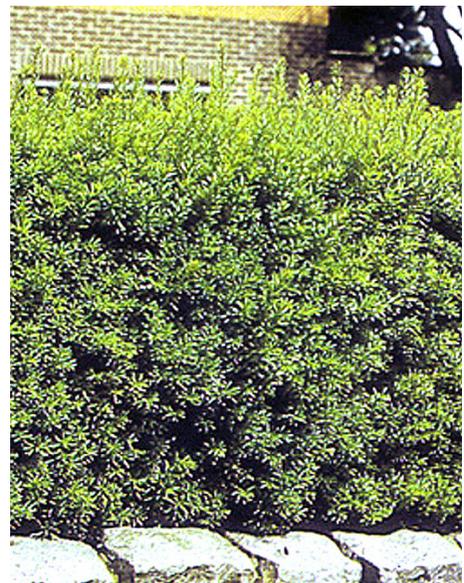
Euonymus alatus - Winged Euonymus



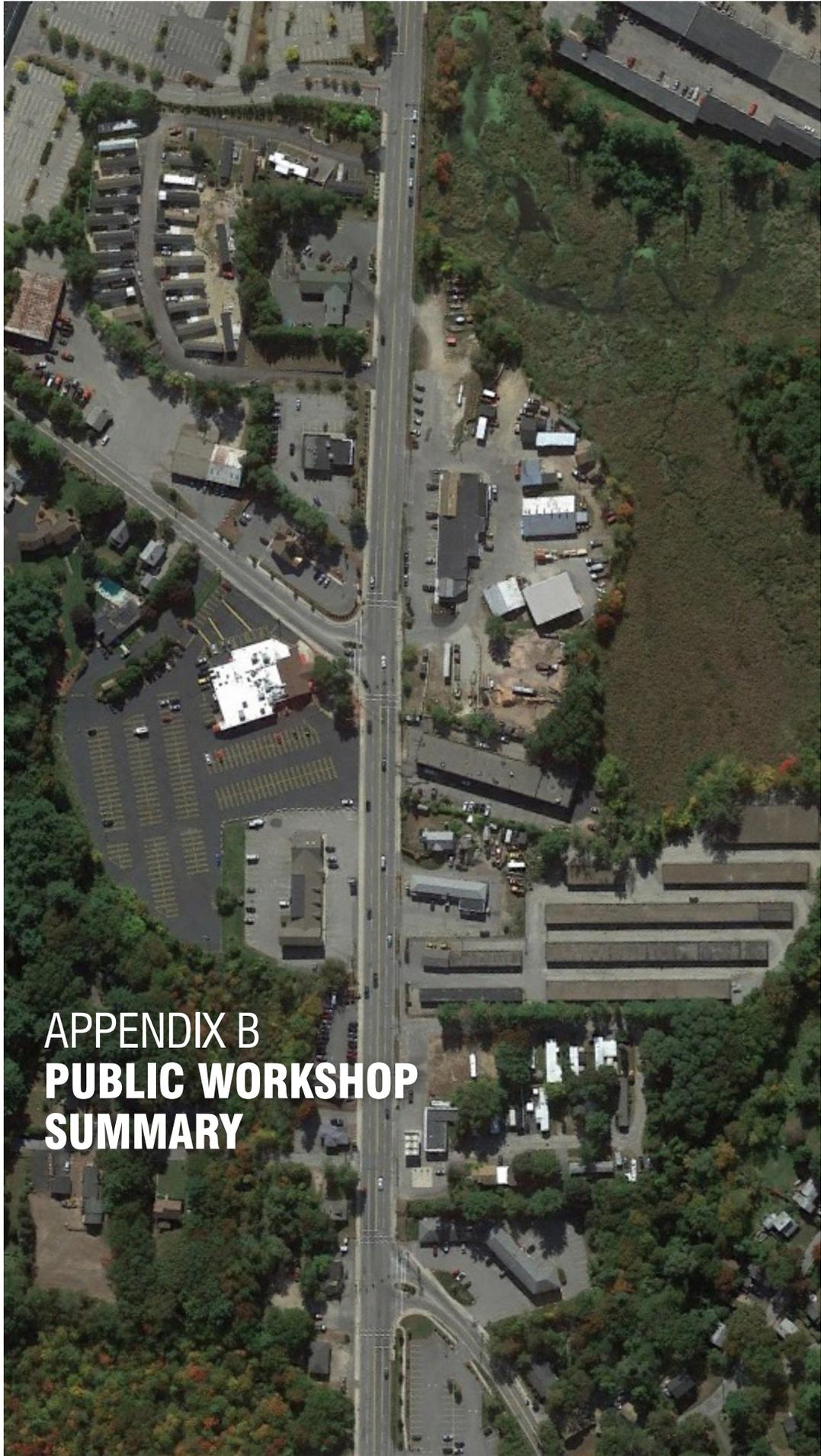
Ilex glabra - Compact Inkberry



Juniperus chinensis 'Hetzii Glauca' - Hetz Blue Juniper



Taxus x intermedia - Yew



**APPENDIX B
PUBLIC WORKSHOP
SUMMARY**

B. Public Workshop Summary

The community meeting was separated into three different sections: discussion of elements that make up a unique and successful streetscape, existing conditions streetscape presentation and a breakout group discussion of current conditions. The community was tasked with three separate tasks to inform The Cecil Group of existing conditions and potential future conditions of the streetscape: what is good about the existing conditions, what should be changed, and what the community would like to see in the future complete streets design.

MAIN STREET North Reading

Community Workshop - October 15, 2015

The Cecil Group

Baseline improvements for both options:

Like Dislike

- | | | |
|--------------------------|--------------------------|--------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Bike circulation |
| <input type="checkbox"/> | <input type="checkbox"/> | Bike parking |
| <input type="checkbox"/> | <input type="checkbox"/> | Brook green spaces |
| <input type="checkbox"/> | <input type="checkbox"/> | Crosswalks |
| <input type="checkbox"/> | <input type="checkbox"/> | Street lighting |
| <input type="checkbox"/> | <input type="checkbox"/> | Street trees |
| <input type="checkbox"/> | <input type="checkbox"/> | Traffic calming |

Option 1 (Complete Corridor):

Like Dislike

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Bike mobility- Bike lanes on both side of road. |
| <input type="checkbox"/> | <input type="checkbox"/> | Branding- Seasonal plantings and banners at intersections with Winter and Lowell streets. |
| <input type="checkbox"/> | <input type="checkbox"/> | Street trees- Continuous design and placements. |
| <input type="checkbox"/> | <input type="checkbox"/> | Traffic management- Two lanes of traffic in either direction consistent throughout corridor. |

Comments:

Option 2 (Paired Gateways):

Like Dislike

Bike mobility- Shared path on eastern side of road.
Branding- Rotaries mark gateways into Main Street.
Street trees- Design and placement between rotaries has a consistent, regular design. Tree placement elsewhere is more dynamic and varied.

Traffic management- Steady flow throughout and between the rotaries. North and south of the rotaries the street would narrow to one lane in either direction with a shared center lane.

Comments:

Additional comments:

PUBLIC WORKSHOP SURVEY RESULTS

North Reading

Baseline improvements	Like	Dislike
Bike circulation	24	5
Bike parking	19	6
Brook green spaces	29	1
Crosswalks	31	
Street lighting	30	
Street trees	31	
Traffic calming	30	1

Complete Corridor

Bike lanes both sides	15	12
Seasonal plantings/banners	20	3
Continuous street trees	25	1
Two traffic lanes throughout	14	9

Paired Gateways

Shared path	18	3
Rotary gateways	11	7
Dynamic street trees	16	1
Narrowing of lanes beyond rotary	9	9

Comments:

Bicycling

Like the shared path (4)

Concerned about the end points of the shared path. Where do bicyclists go? Is it safe? (3)

Shared path on both sides (2)

Bike lanes on both sides is unnecessary

Walking

Need safe crosswalks (3)

Less curb cuts is good (2)

Concerned about the safety of rotaries for pedestrians (2)

Create a pedestrian-only area

Handicap access is important

Open space

Create path loop around area

Vehicular

Like the rotaries. (7)

No rotaries, two lanes both ways is preferred. (3)

Create a center turn lane. (2)

Time traffic lights to match traffic patterns.

Prefer rotary option. Consider raised rotary if possible.

Rotaries are the future. European cities have switched to them with great results.

Speed limit needs to be lowered

Safety issues with lane narrowings

Development

Get property owners engaged and to redevelop their parcels, especially surface parking lots. (3)

Redevelop parking lots

Offer tax incentives to entice development

Government, Policy, and Zoning

Coordinate with state agencies to ensure lightpoles aren't in the center of sidewalk.

Stricter zoning laws to clean up commercial properties and signs

Facade improvement programs through tax incentives or rebates

Other comments

Address problems with the garage at 147-149 Main St (2)

Stricter zoning laws to clean up commercial properties and signs

Street could be like Main Street in Andover or new Market Street in

Lynnfield. Upscale area that attracts people with shops and restaurants.

Themed areas such as art, antique stores that draw people from outside town

Create a permanent farmers market

Get grant help from National Main Street Center

Businesses do not want to see traffic counts drop

Traffic calming measures impact on traffic counts

Preferences

Shared path over bike lanes

Seasonal plantings/banners

Continuous street trees

Narrowing of lanes beyond rotary

Rotaries

