

Site and Building Design Concepts

Corridor Design Strategies

Existing Road and Development Pattern

The Metacom Avenue corridor has been identified to be studied to investigate specific planning issues, including:

- **Traffic that deters safe walking and biking**
- **Traffic patterns that segregate neighborhoods**
- **Site and building designs that do not integrate with adjacent residential uses**
- **Site designs that do not benefit the environment**
- **A lack of clarity in the streetscape**

Metacom Avenue is a busy four-lane roadway serving a mix of local business, industry and residential areas adjacent to the road as well as acting as a conduit for regional north/south traffic. There are numerous driveways and local streets opening onto Metacom Avenue, interrupting the flow of traffic. There are few alternatives available to avoid this principal north south route as the alternative routes are congested (Main Street) or seem to be more circuitous (I-195) to take in order to get to/from a destination. This route is the only route available to local neighborhoods on the east side of the Town of Warren and to most of those neighborhoods fronting directly onto Metacom Avenue itself.

Commercial, retail and industrial uses are scattered throughout the corridor. This inconsistent mix of land uses and landscape character creates an incoherent development pattern, which lacks a clear relationship to the historical growth pattern of the town. In short it lacks any coherent “sense of place”.

The project area shows distinct characteristics, constraints, and opportunities throughout the corridor. Land use plays a significant role in establishing the character. The southern limit of the corridor (area adjacent to the Bristol Town line) is dominated by small structures with similarly related open space, creating a sense of intimacy. Of particular note is the increase in this intimacy as four travel lanes funnel down into two travel lanes upon entering Bristol. Immediately east and west of the corridor are large expanses of single-family (R-10) residential development. Although it is the predominant land use surrounding the corridor’s Business District, the R-10 District has managed to remain obscure from beyond the corridor.

Continuing north, the area between Laurel Lane and Vernon Street is comprised of larger structures (chain retail) typically defined by unarticulated facades, coarse architectural details, and extensive surface parking lots. A sense of apprehension takes over when



watching pedestrians traverse the sidewalk across numerous curb cuts or attempting to cross four travel lanes. Opportunities for internal connections between commercial establishments are lost with grade changes and chain link fences. An over-abundance of asphalt and sign clutter evokes nervousness in typical motorists, who may find themselves riding their brakes to locate their specific destination or perhaps even depressing the gas pedal to pass through this section quickly.

Moving north, the approach to Wightman's Farm/St. Thomas the Apostle Church reveals a medium to large-scale open space/agricultural environment. The pastoral quality of the farm animals, open fields and views of the Kickemuit River are unexpected, yet welcomed, after working your way past the Ocean State Plaza. Reductions in curb cuts, asphalt, and sign clutter would allow a sense of safety to permeate.

Finally, the northern limit of the corridor is dominated by an elongated roundabout with an isolated island of dense, older multi-family housing interspersed with pockets of commercial development. Unfortunately, the opportunity for a pedestrian-oriented environment has not been fully realized in this compact, mixed-use village area due to the prevalence of the single occupancy vehicle, blank/solid walls of commercial establishments detracting from the streetscape, and the absence of people on the street. The most unfortunate opportunity lost is the gateway into this village area and the Town of Warren overall.

Metacom Avenue is already a strong linear spine. This strong framework is rigid enough to provide clear direction, yet flexible enough to accommodate change. The existing built and natural environment already provides a sequence of events throughout the corridor, evident in the above description of the corridor's character. It is the clarification of concentrations of activity and development nodes that are interspersed throughout the spine that can provide organization/focus, variety and clarity—as well as pattern—to the pedestrian and motorist experience.

Unfortunately, the opposing street grid extending off Metacom Avenue (principal artery) is not aligned at signalized intersections, contributing to decreases in traffic flow. Access and egress to commercial establishments is haphazard at best, often stacking one upon the next. Although the primary function of principal arterials is through-travel, Metacom Avenue is constrained by adjacent land uses and tendencies for medium to short travel with numerous access points. This decreased flow of traffic, extended queuing at intersections, and back-up of vehicles pulling out onto Metacom Avenue contributes to motorist risk-taking and diminishes safety for both pedestrians and motorists.

The one-way traffic pattern of the northern end of the corridor not only isolates the residential component, it provokes a sort of 'thoroughfare' mentality along Arlington Street. The signalized intersection at Child Street helps control speeds along the southern section of



Arlington, although the access road at Rosa Boulevard (connecting to Metacom Avenue north at the Parker Mill) proves to be a conflict point for turning traffic v. through traffic.

Connections play a critical role in the utilization, vibrancy, and perception of a commercial corridor. Multi-modal users require very different amenities to facilitate their use of the corridor. Pedestrians require safe, convenient, and direct connections between principal building entrances and the public right-of-way, while bicyclists and public transit users also require safe and convenient connections. Secure and preferably sheltered storage/waiting areas are also desired for transit users.

The Metacom Avenue corridor has visibly transformed to an auto-oriented commercial corridor. Sidewalks and building entrances fade into expansive parking areas. Utility poles and signage obstruct pedestrian/bicycle flows in many locations. Crosswalks either don't exist or have faded over time. The absence of lighting, benches, shelters, bike racks, and buffers to the roadway contribute to the almost exclusive use of single-occupant vehicles.

The Town has expressed a desire to celebrate Metacom Avenue for its centrality to housing, shopping, school routes, and services. The corridor needs to be a vital, attractive place where people desire to live, work, shop, and recreate. The corridor already has much to offer in this respect, yet future development must enhance and extend this quality in the transformation of the corridor.

The corridor lacks a variety of clustered commercial and residential uses that generate activity all day long and into the evening and which are pedestrian-oriented and would encourage walking. Signage is oversized and oriented toward vehicular movement and not foot traffic. A sense of intimacy is lost with the absence of landscaping to frame the roadway and create a sense of enclosure. Another lost opportunity is the nonexistence of architectural elements to add interest at the pedestrian level.

Concept for Future Road and Development Pattern

Metacom Avenue does, and should continue to, serve the industrial, commercial and the residential development along its length. Strategic solutions to the traffic problems could include reductions in the number of private driveways and minor side streets that enter directly onto the roadway, better traffic management solutions at major intersections, incorporation of traffic management techniques to slow traffic and the incorporation of complete street concepts.

There are several current projects that are on-going within the corridor being undertaken by the Rhode Island Department of Transportation. The projects include a High Hazard Intersection Study within the corridor where the project is in the 'draft' Design Study Phase.



The priority of this project is focusing on adding turn lanes at major intersections to accommodate heavy turning traffic and to also improve signal timings and phasing to improve traffic flow and reduce the amount of delays when traversing through the corridor.

The other project is an ADA Sidewalk Improvement Project. This project is currently in the 90% design stage. Investigations as part of this project were performed to incorporate setback sidewalks and provide a landscape buffer between the roadway and the sidewalk. Due to grading issues and/or conflicts with existing features or right-of-way this was not feasible. The current project scope replaces the sidewalks in-kind, provides better accessibility to meet the American with Disabilities Act, and provides signal phasing and timing improvements. This project is anticipated for construction advertisement in the Fall 2011.

To achieve these objectives it is proposed that access to properties on Metacom Avenue be reduced for many of the establishments that have multiple driveways on Metacom Avenue and also a driveway on an adjacent sidestreet. Opportunities at reducing the number of openings on Metacom Avenue to reduce the number of turning movements/conflicting movements would improve traffic flow and safety and to some it would make the circulation system more efficient. To others it would provide an alternative for avoiding the frustration of entering into the Metacom Avenue congestion. In particular, businesses located adjacent to the intersections of Metacom Avenue with a sidestreet that is controlled by a signalized intersection should be considered to use the sidestreet entrance more for access. To reinforce this strategy all new development would be concentrated at the key locations served by the improved intersections, thus ensuring that major traffic generators be linked directly to the improved circulation system.

Preliminary Design Strategies

Several design strategies have been investigated that should be considered to help with traffic management while at the same time provide a corridor that will be more pedestrian friendly. The alternatives include the following:

A Two-Way Left Turn Lane

Balancing the conflict between safe, efficient traffic flow, access to abutting properties, and public opposition often becomes a limiting constraint on design and traffic operations improvement alternatives. One alternative to be considered is the concept of the two-way left-turn lane (2WLTL). The 2WLTL allows simultaneous left turns from the center lane by vehicles traveling in the opposite direction. Vehicles from either direction of traffic flow enter the center lane to make left turns, thus removing themselves from the through lanes. This increases the capacity of the through lanes, reduces vehicular conflicts, and enables



traffic to move more efficiently. In addition, the potential for rear-end, left-turn, and sideswipe accidents are reduced. The center lane can also be used to provide an emergency lane for traffic to bypass accidents and stalled vehicles and could allow emergency vehicles to more efficiently reach their destination. This is a solution that has been implemented in other parts of the country. This potential road diet concept would reduce the existing 4 lanes on Metacom Avenue to a 3 lane section consisting of a northbound lane, a southbound lane and a two-way left turn center lane.

This concept is usually effective with an Average Daily Traffic (ADT) volume of approximately 18,000 vehicles or less per day (vpd). Based on current information, Metacom Avenue currently experiences daily volumes exceeding 24,000 vpd. Based on feedback from many on the Steering Committee, it was expressed that if an alternative similar to this is implemented, many travelers using Metacom Avenue to travel to/from destinations on Aquidneck Island would possibly reconsidering alternative routes, in particular I-195. This alternative would also be considered with the concept of reducing some of the curb cuts thereby reducing conflicting turning movements.

The concern with this alternative is that redirection of traffic could also result in more traffic to the Main Street section of downtown Warren which could result in more congestion in that section of Town.

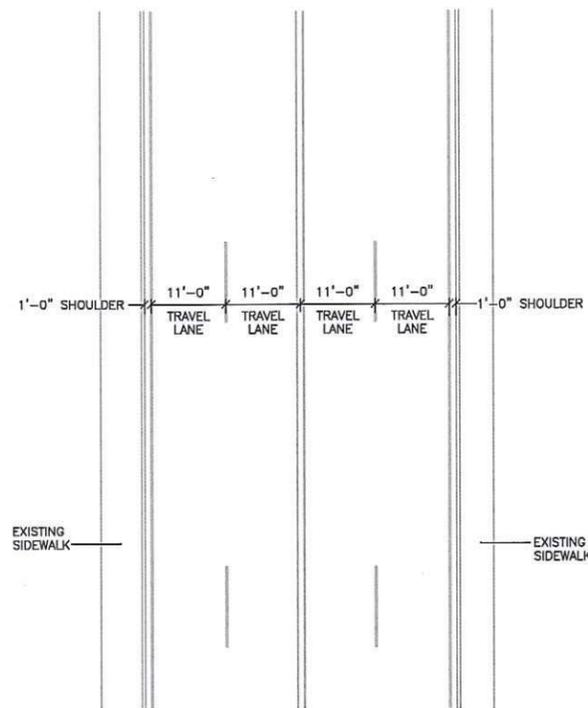
Before implementing this concept, it is recommended that a more detailed traffic study be performed to determine the effectiveness along the corridor and to also determine what the redistribution of traffic could be and what would the resulting impacts of the additional traffic be on the alternative routes. Figure 2.1.1 shows a cross section for the concept for implementation of a 2WLTL if it is deemed feasible.

Access Management

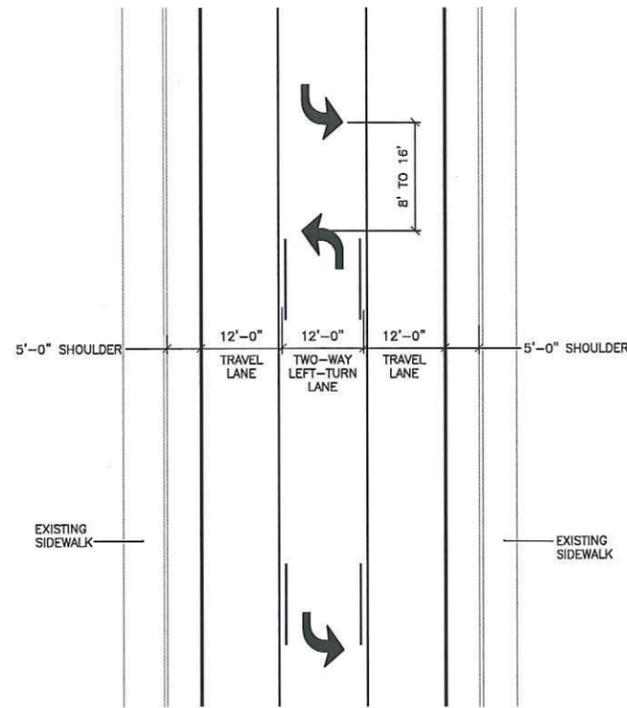
Access Management is the proactive management of vehicular access points to land parcels adjacent to all manner of roadways. Good access management promotes safe and efficient use of the transportation network. Access Management encompasses a set of techniques that state and local governments can use to control access to their roadways. The incorporation of good Access Management strategies provides an important means of maintaining mobility. It calls for effective ingress and egress to a facility, efficient spacing and design to preserve the functional integrity, and overall operational viability of street and road systems. Among the techniques that are considered that should be investigated for this corridor include:

- *Access Spacing*: This concept looks to increase the distance between traffic signals which will improve the flow of traffic on major arterials, reduce congestion, and improves air quality for a heavily traveled corridor such as Metacom Avenue. It was questioned as to

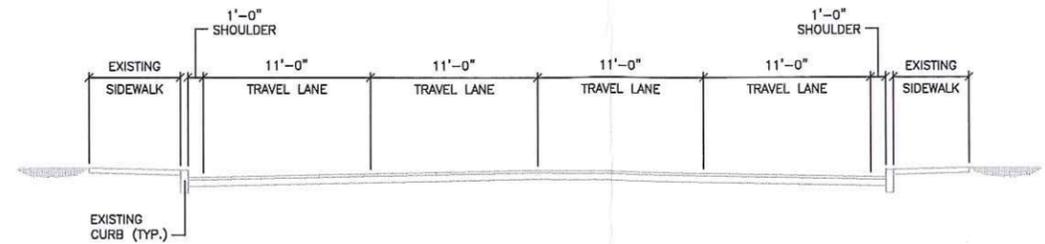




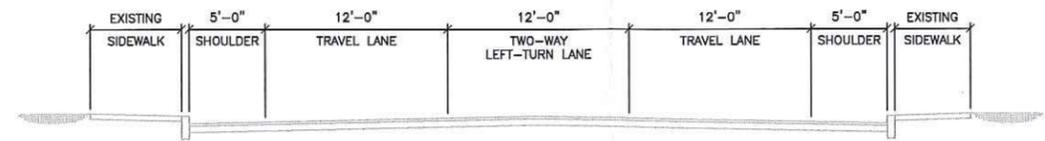
EXISTING LANE CONFIGURATION



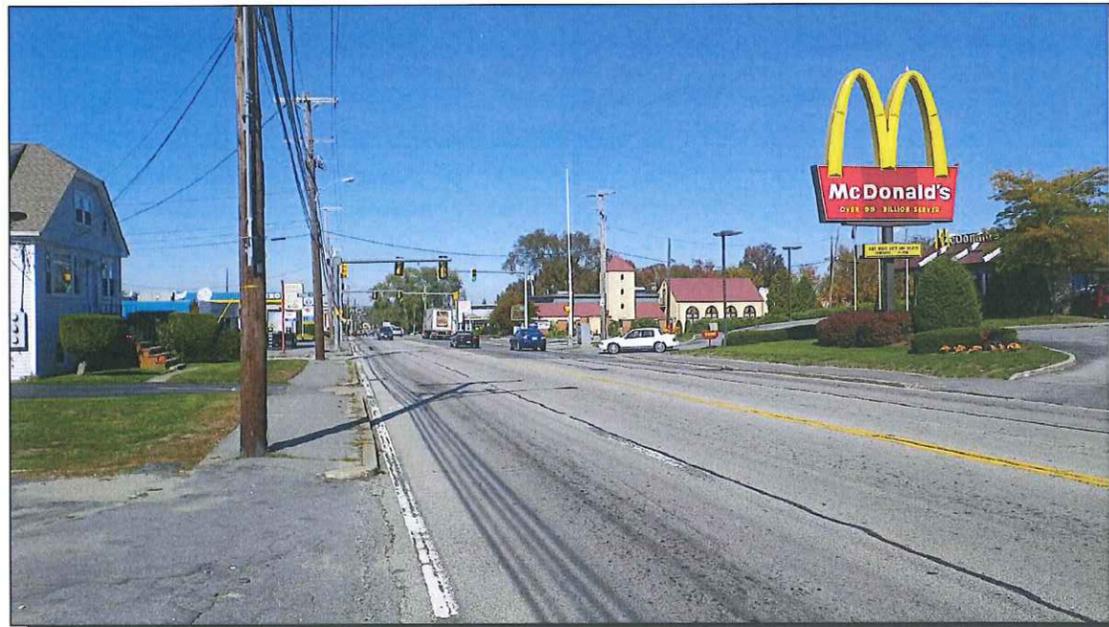
PROPOSED LANE CONFIGURATION



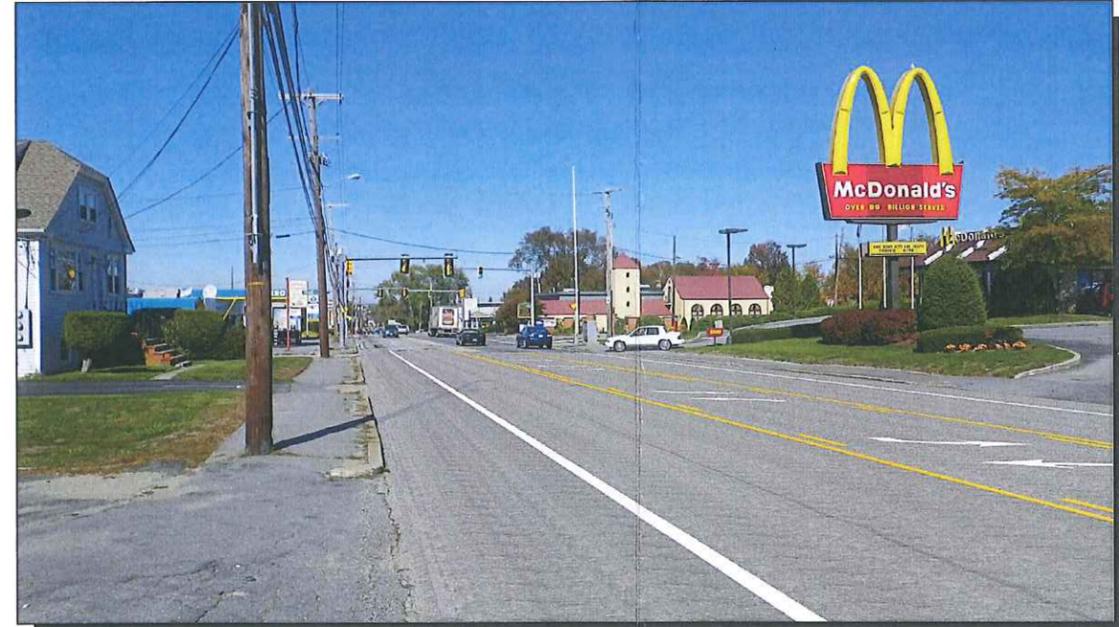
EXISTING TYPICAL ROADWAY SECTION



PROPOSED TYPICAL ROADWAY SECTION



EXISTING



PROPOSED CONCEPT

METACOM AVENUE
 TWO-WAY LEFT TURN LANE CONCEPT
 WARREN, RHODE ISLAND



- the need for whether all the signals were warranted along the corridor. Further warrant analysis studies to determine the need should be considered.
- *Driveway Spacing*: Fewer driveways spaced further apart allow for more orderly merging of traffic and presents fewer challenges to drivers.
 - *Safe Turning Lanes*: dedicated left- and right-turn and roundabouts keep through-traffic flowing.
 - *Street Connections*: In areas where adjacent parcels of land between sidestreets have similar uses and where physical constraints are impossible to overcome, opportunities to connect those parcels should be considered. This will allow less curb cuts onto the main road and will control the motorists to use the sidestreets for access onto the corridor.
 - *Roundabouts* – Roundabouts represent an opportunity to reduce an intersection with many conflict points or a severe crash history to one that operates with fewer conflict points and less severe crashes (sideswipes) if they occur. Roundabouts are traffic circles where approaching vehicles keep to the right and travel occurs counterclockwise around the circle. The value of roundabouts includes safety factors where they have shown a 40% decrease in vehicle collisions, 80% fewer injuries and 90% fewer serious injuries and fatalities. With the installation of a roundabout, points of conflicts between pedestrians and motor vehicles are significantly reduced if designed properly. At traditional intersections with stop signs or traffic lights, the most serious accidents are right-angle, left-turn, or head-on collisions that can be severe because vehicles may be moving fast and collide at high angles of impact. Roundabouts virtually eliminate these types of crashes.

The incorporation of roundabouts should be considered as a viable alternative in the future. With an Average Daily Traffic of approximately 24,000 vpd, it can be expected that a single lane roundabout would be needed along this corridor. The typical inscribed circle diameter for a one-lane roundabout is 130 feet. Currently due to right-of-way constraints, there is no intersection that this would seem feasible without significant property takings.

In areas of dynamic land development, it is important to develop access standards that achieve a balance between property access and functional integrity of the road system. Studies show that implementing access management provides increased roadway capacity, reduces crashes and shortens travel time through a corridor. All of the three benefits are essentially the result of minimizing or managing the number of conflict points that exist along a corridor. By reducing driveway and minor-street conflicts, traffic flows will flow more freely and be only influenced by the density of traffic on the roadway, weather, and integrity of the roadway. When street conflicts from driveways and side streets are introduced, the mainline flows result in an adjustment to travel speeds and sometimes lanes to avoid delays and conflicts introduced by the combination of slowing, turning, merging, entering, and stopped vehicles.



Complete Streets

The streets of cities and towns are an important part of the livability of our communities. The Complete Streets concept states that they should be designed for use by everyone, whether young or old, motorist or bicyclist, walker or wheelchair user, bus rider or shopkeeper. But similar to what is seen on many of our roadways, too many streets are designed only for speeding cars, or worse, creeping traffic jams.

In communities across the country, a movement is growing to “complete the streets”. States, cities and towns are asking their planners and engineers to build road networks that are safer, more livable, and welcoming to everyone. Instituting a complete streets policy ensures that transportation planners and engineers consistently design and operate the entire roadway with all users in mind - including bicyclists, public transportation vehicles and riders, and pedestrians of all ages and abilities. The streets of our cities and towns are an important part of our communities. They should be designed to allow children to get to school and allow parents to get to work or to go to the neighborhood stores. The streets ought to be designed for everyone – whether young or old, on foot or on bicycle, in a car or in a bus. By incorporating this concept, neighborhoods or segments of Cities and Towns are developing communities that are better for people to live, play, work, and shop.

In Rhode Island, legislation to incorporate mechanisms for implementing complete street concepts has been proposed. These legislations have been strongly supported by advocate groups but have not yet passed on the State level. However, several communities, including Newport, Portsmouth, Middletown and South Kingstown have passed and adopted Complete Street resolutions into their ordinances.

Complete Streets are streets designed and operated to enable safe access for all users including pedestrians, bicyclists, motorists, and public transportation users of all ages and abilities. Complete Streets concepts make it easy to cross the street, walk to shops, and bicycle to work. They also are designed to allow buses to run on time and make it safe for people to walk to and from bus stops.

To create complete streets, transportation agencies must change their approach to community road developments. By adopting a Complete Streets policy, communities will direct their transportation planners and engineers to routinely design and operate the entire right-of-way to enable safe access for all users, regardless of age, ability, or mode of transportation. This means that every transportation project will make the street network better and safer for drivers, transit users, pedestrians, and bicyclists.



The design of a Complete Street is unique and should be designed to respond to a community context. A complete street may include: sidewalks, bike lanes (or wide paved shoulders), special bus lanes, comfortable and accessible public transportation stops, frequent and safe crossing opportunities, median islands, accessible pedestrian signals, curb extensions, narrower travel lanes, roundabouts, and more. A complete street in a rural area looks different from a complete street in an urban area, but both need to be designed to balance safety and convenience for everyone using the road.

The previous design philosophy of developing incomplete streets – those designed with only cars in mind – limit transportation choices by making walking, bicycling, and taking public transportation inconvenient, unattractive, and, too often, dangerous. Changing policy so that our transportation system routinely includes the needs of people on foot, public transportation, and bicycles means that walking, riding bikes, and riding buses will be safer and easier.

Making these travel choices more convenient, attractive, and safe means people do not need to rely solely on automobiles. They can replace congestion-clogged trips in their cars with swift bus rides or heart-healthy bicycle trips. Complete Streets improves the efficiency and capacity of existing roads too, by moving people in the same amount of space via other alternative modes of transportation instead of the car. Incorporation of these concepts is vital to reducing congestion.

Complete Streets are particularly prudent when more communities are tightening their budgets and looking to ensure long-term benefits from investments. An existing transportation budget can incorporate Complete Streets projects with little to no additional funding, accomplished through re-prioritizing projects and allocating funds to projects that improve overall mobility. Many of the ways to create more complete roadways are low cost, fast to implement, and high impact. Building more sidewalks and striping bike lanes has been shown to create more jobs than traditional car-focused transportation projects.

The incorporation of Complete Streets has proven to result in many benefits including the following:

- Complete Streets improve safety. A Federal Highways Administration safety review found that streets designed with sidewalks, raised medians, better bus stop placement, traffic-calming measures, and treatments for disabled travelers improve pedestrian safety. Some features, such as medians, improve safety for all users: they enable pedestrians to cross busy roads in two stages, reduce left-turning motorist crashes to zero, and improve bicycle safety.
- Complete Streets encourage walking and bicycling for health. The Centers for Disease Control and Prevention recently named adoption of Complete Streets



- policies as a recommended strategy to prevent obesity. One study found that 43% of people with safe places to walk within 10 minutes of home met recommended activity levels; among individuals without safe place to walk, just 27% were active enough. Easy access to transit can also contribute to healthy physical activity: nearly one third of transit users meet the Surgeon General's recommendations for minimum daily exercise through their daily travels.
- Complete Streets can lower transportation costs for families. Americans spent an average of 18 cents of every dollar on transportation, with the poorest fifth of families spending more than double that figure. In fact, most families spend far more on transportation than on food. When residents have the opportunity to walk, bike, or take transit, they have more control over their expenses by replacing car trips with these inexpensive options.
 - Complete Streets foster strong communities. Complete Streets play an important role in livable communities, where all people – regardless of age, ability or mode of transportation – feel safe and welcome on the roadways. A safe walking and bicycling environment is an essential part of improving public transportation and creating friendly, walkable communities. A recent study found that people who live in walkable communities are more likely to be socially engaged and trusting than residents of less walkable neighborhoods. Additionally, they reported being in better health and happier more often.

Proposed Zoning Revisions and Vehicular Connections

The Metacom Avenue corridor development as described consists of commercial, retail and industrial uses are scattered throughout the corridor. This inconsistent mix of land uses and landscape character creates an incoherent development pattern. The traffic circulation system and the development strategies proposed coincide to create practical solutions that improve the sense of place, address the need for coordinated development and help solve the long term Metacom Avenue traffic capacity and congestion problems.

Critical initial actions necessary to further these intentions are initiating a comprehensive assessment of vehicular circulation links, implementing standards for roadway design considerations and promoting the appropriate revisions to the zoning ordinance.

Circulation linkages can be accomplished in various ways. In residential areas new public streets can be created to connect existing ones. In larger development parcels, a combination of public streets and new roadways within easements, such as the connector road between Seymour Street and Vernon Street can be devised. Links to side streets, while reducing curb cuts on Metacom Avenue, can be created to better control traffic access into the corridor. The



overall intention is that these alternatives provide options that avoid using Metacom Avenue or can reroute local traffic to well-designed major intersections to solve the traffic problem.

The adoption of a Complete Street Resolution should be considered. The implementation of this concept into future designs will result in safer roadways and roadways that will provide better alternatives for transportation than the car.

Access Management /Service Road Potential

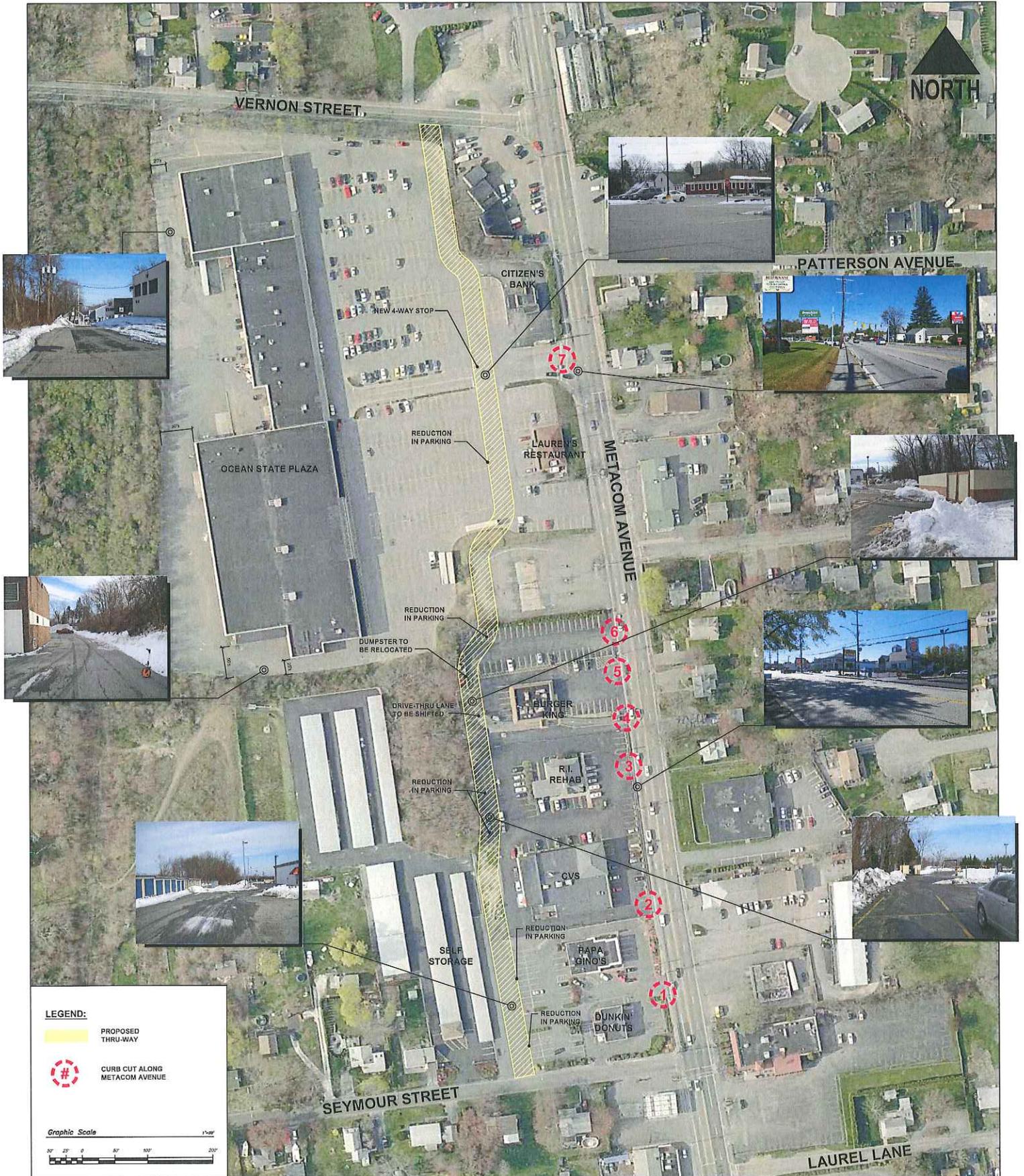
Opportunities for connecting ‘similar’ types of development should be incorporated where feasible into future development. The reduction of curb cuts onto Metacom Avenue should be instituted wherever feasible. An opportunity identified within the corridor exists between Vernon Street and Seymour Street. Parking in this area is expansive for many of the uses so reduction in parking may be allowed. Grade issues would need to be considered and redesign of the layout of some of the sites may be required. Currently there are 7 curb cuts within an 800 foot section of roadway creating many conflicting turning movements resulting in a less safe corridor. By reducing the curb cuts and implementing a connector road would result in less traffic on Metacom Avenue and would direct more traffic to the signalized intersections of Vernon Street and Seymour Street. Figure 2.1.2 identifies a potential route for the connector and the existing curb cuts that should be considered for reduction.

In addition to this location, several sites along the southern half of the corridor have been identified to have several access drives to their site that could be reduced in number. Also properties on the east side between Overhill Road and Laurel Avenue have been identified for potential connections between the parcels. The sites with multiple driveways and potential connections between parcels are shown on Figure 2.1.2B.

Low Impact Development/Best Management Practices

Low-impact development (LID) is a term used to describe a land planning and engineering design approach to manage stormwater runoff. As identified previously in the report, there is an extensive amount of impervious cover that should be considered to be reduced when future development is brought forward. The implementation LID concepts emphasize conservation and use of on-site natural features to protect water quality. This approach implements engineered small-scale hydrologic controls to replicate the pre-development hydrologic regime of watersheds through infiltrating, filtering, storing, evaporating, and detaining runoff close to its source.



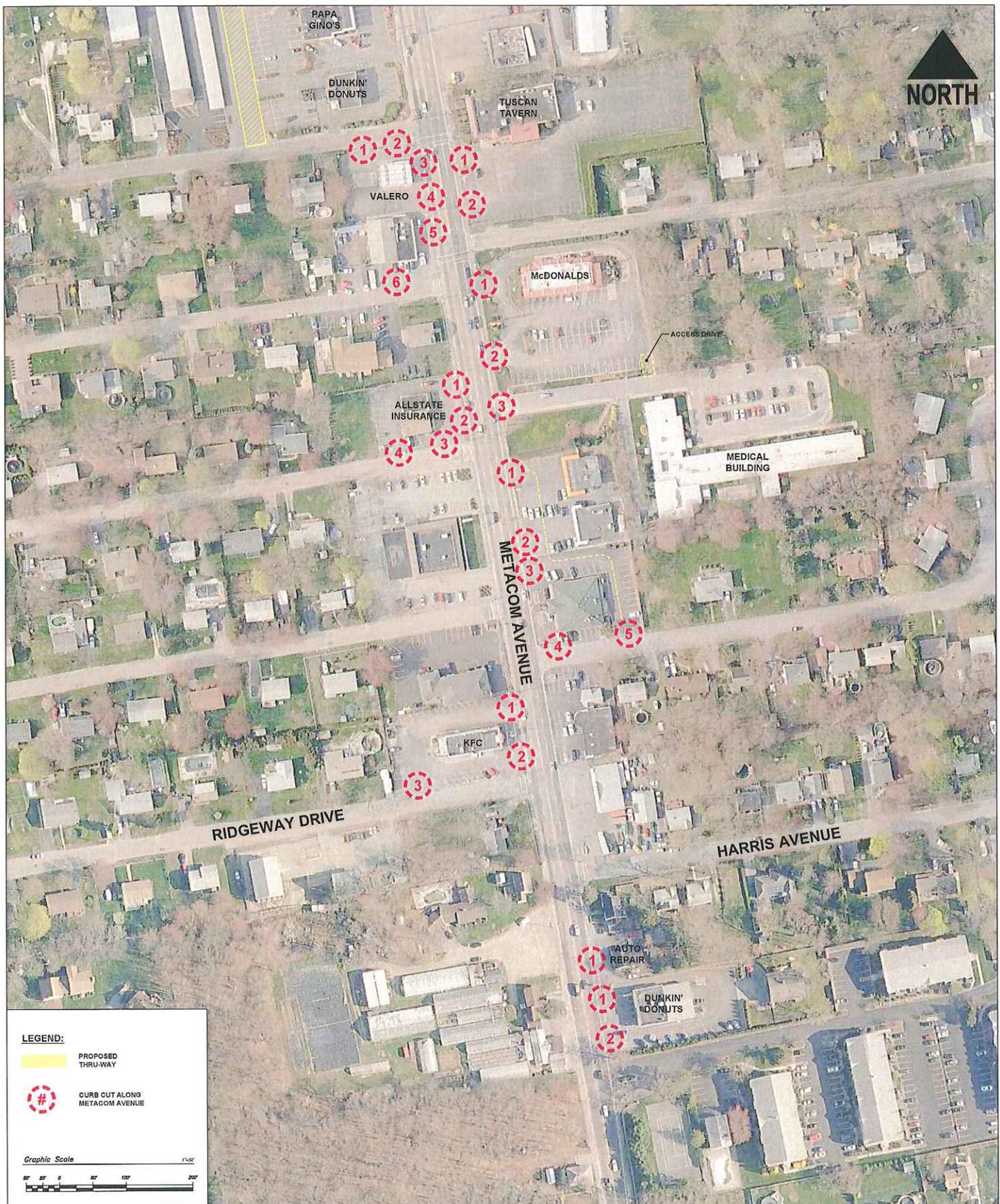


METACOM AVENUE CORRIDOR STUDY - WARREN, RHODE ISLAND

ACCESS MANAGEMENT OPPORTUNITY

FIG. 2.1.2





METACOM AVENUE CORRIDOR STUDY - WARREN, RHODE ISLAND

ACCESS MANAGEMENT OPPORTUNITIES

FIG. 2.1.2B

There are many variations on the LID practices. The appropriate alternative needs to be evaluated and determined for what is best for a given site. Many are practical for retrofit or site renovation projects, as well as for new construction. Frequently used practices include bio retention cells or rain gardens, Cisterns and rain barrels, green roofs, pervious concrete, also called "porous pavement", similar to Permeable paving, and grassed swales.

With the incorporation of the LID concepts the benefits include habitat protection, improved management of water quantity, reduction of impervious surfaces and runoff, groundwater recharge through infiltration, water quality improvements, aesthetic improvements and typically cost savings.

Metacom Mixed Use Zone

Mixed use zones within sections of the Business District along Metacom Avenue should be considered. In particular the land development between Seymour Street and Vernon Street is an opportunity. The mixed use zone should be considered that could provide opportunities for coordinated development that could sustain taller buildings and allow higher lot coverage than currently permitted. Additional vibrancy of development would be derived from the introduction of mixed use in these zones, in which commercial, retail and residential, development could co-exist. Further information on recommended zoning amendments is presented in Section 4.

These amendments to the zoning ordinance would be limited to the Metacom Avenue mixed use zones and new Metacom Avenue corridor commercial development is limited to this zone. Intervening zones fronting onto Metacom Avenue remain or become residential or open space use requiring that existing general or limited business zones be amended to R-10 zoning.

The proposed Metacom Avenue mixed use zones are to provide a more concentrated mixed-use development where the buildings and site design will develop a distinct character and “sense of place.”

- These locations are to be for the most conspicuous or showy buildings and the places for public activity. Where possible the commercial businesses would be visible from Metacom Avenue although ideally accessed from the intersecting major street.
- The major intersections at the focus of the special areas would be well designed to manage the traffic volume, have safe turning movements and provide key connections. In both of these conceptual designs they are shown as roundabouts.
- Optional additional routes connect development to the major intersections thus reducing Metacom congestion.



- Pedestrian circulation is critical to these areas as it is to the entire corridor. Sidewalks exist along Metacom Avenue and commercial development is organized for convenient and safe pedestrian circulation. Residential neighborhoods are linked to the commercial areas with convenient walkway systems. Bikeways could connect to recreational and natural areas outside the corridor.
- Buildings are moved closer to the main streets so that parking has to be located behind or to the side of the buildings. In order to encourage more efficient use of parking and access, shared parking for use at different times of the day or shared parking that can accommodate the customer visiting various adjacent businesses is proposed.
- The landscape is critical to the appearance of development and to improving environmental quality. Large street trees should line the streets. Parking lots, and other off-street paved areas, are to provide shade at least to Town minimum standards. Planting beds and lawns provide critical pervious surfaces and aesthetic enhancement. Vegetated buffers screen incompatible uses and structures.
- Buildings are designed for mixed use, with the intent of providing large enough structures for moderate sized businesses that could not be accommodated downtown but are not large enough to encourage “big-box” or large format development. Residential uses might be mixed with commercial and other business uses but at the edges of the mixed use zone that abuts a residential neighborhood building sizes will step down in height to conform to the residential scale and context.
- Architectural detail, lighting, and signage cannot be illustrated at this level of concept design but they would be critical to the visual quality of the development, creating identity and that important “sense of place.”

