

# 302 Corridor Plan: White's Bridge Road to Mineral Spring Road

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## Executive Summary

### Preface

The Route 302 Access Management and Corridor Plan has been developed to balance the needs of local access and regional traffic mobility. The study area of Route 302 from White's Bridge Road north to Mineral Spring Road, approximately 1.2 miles, will continue to experience increasing levels of traffic. This traffic is generated by both local commercial and residential development along the corridor, and regional commuter and seasonal travel to and from the Lakes Region.

To plan for this growth, Gorrill-Palmer Consulting Engineers, Inc. was retained by PACTS and the Town of Windham to examine the need for roadway improvements that will preserve the public investment in Route 302. The options considered in this plan include, but are not limited to, roadway widening, parallel access roads, and the use of access management principles to maximize mobility and safety while continuing to encourage the development of commercial properties.

The recommendations for this corridor and its related options should hold to a consistent design philosophy and a long-term phased implementation plan. This will allow the Town, PACTS and MaineDOT to provide planning in a consistent manner along the corridor as well as provide clear and predictable guidelines to Applicants wishing to do business in Windham.

### Recommendations

Based upon existing conditions, future land development potential, and an analysis and projection of traffic growth, the Route 302 North Access Management and Corridor Plan has the following recommendations:

#### Near-Term Improvements/Recommendations (Ongoing or Within Three Years):

- *Access Management Standards:* The most important and cost effective means of balancing the needs of local access and through-traffic mobility is to develop and implement an access management plan. This plan should manage the location and number of curb cuts, set a standard for curb cut widths, provide interconnections between adjacent sites, and promote the use of side/parallel streets where feasible and appropriate. This plan recommends that the Town of Windham adopt access management standards for all new development and redevelopment in the corridor. The specific access management recommendations are described within this report.
- *Restripe Route 302 as a Three-Lane Cross Section:* The current 44 foot paved width of Route 302 in the study area is currently striped with a single 12 foot wide travel lane in each direction with 10 foot wide paved shoulders. This overall width would allow for restriping of the roadway to provide a center two-way left-turn lane, a travel lane in each direction, and shoulders that could be used by bicyclists. This cross section would allow left turning vehicles

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on Route 302 to use the left turn lane and not restrict the movement of the through traffic. This would also assist left turning vehicles exiting the side streets / driveways to use the center turn lane to make a two stage left turn. This three lane cross section has been reviewed and approved by MaineDOT and FHWA (See approval letter in Appendix G). Pavement thicknesses were recently determined within the study area and the pavement thickness of the shoulders would need to be increased before the restriping could be done. This is included in the opinion of cost. Opinion of Cost: \$1,460,000.

- *Signalize Enterprise Drive / Route 302 intersection:* Full signalization of the intersection should be considered if warrants for signalization are met in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) and the MaineDOT approves the project. Signalization of this intersection will most likely require widening of Route 302 to provide for an additional northbound approach lane and an associated receiving lane. The need for this widening is dependant on the proposed trip generation of the proposed development on Enterprise Drive. This plan recommends the development of an impact fee or capital improvement district to appropriately distribute the costs of the capital improvement among all developments that create the need for intersection signalization and the associated northbound approach lane and receiving lane. Opinion of Cost: \$ 450,000
- *Construction of Sidewalk:* Construction of a sidewalk within this section of Route 302 needs to be considered carefully. It could be implemented immediately or as development occurs; however, the potential for future widening of Route 302 also needs to be considered such that sidewalks constructed in the next several years are not removed should Route 302 be widened in the future. This plan includes recommended standards and location for a sidewalk on both sides of Route 302 in this corridor. Opinion of Cost: \$ 1,896,000 (includes curbing and assumptions for subsurface drainage)
- *Transportation Demand Management (TDM):* This includes techniques that distribute traffic more evenly throughout the day and concentrates less traffic during the peak hours or somehow reduces the volume of traffic on the corridor during the peak hours. These are things that could be implemented anytime and would include: staggered work hours, carpooling/vanpooling, bus service, providing bicycle facilities, etc. This cost could vary considerably depending on the technique implemented. Management techniques such as adjusting work hours or carpooling/vanpooling may not cost anything. While initially the effect of these measures may be limited, the Town could heighten local awareness of these measures by participating in public awareness campaigns, participating in bus/shuttle opportunities and also incorporate consideration of these techniques into the Planning Board review process.

### Mid-Term Improvements/Recommendations (Ongoing or Within Five to Ten Years)

- *Alignment of Angler's Road with White's Bridge Road:* This project includes realigning Angler's Road across from White's Bridge Road. The resulting four-leg intersection would have more efficient operations than the current offset (i.e. 'T'-style) intersections. The Town of Windham acquired property on the east side of Route 302 across from White's Bridge Road to make public investment in the intersection's re-alignment possible. The town will be

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seeking State and Federal partnership on this project. Cost Estimate: To be determined by separate intersection improvement plan.

### Long-Term Improvements/Recommendations (Within Ten to Twenty Years)

- *Widening of Route 302 (beyond the three lane cross section):* The need for this improvement varies considerably based on land development in the area and how well access management techniques are implemented throughout the corridor. The current two-lane road is already operating marginally during peak periods. The existing wide shoulders do allow room for vehicles to maneuver around a left turning vehicle, but generally results in traffic slowing and speeding up again, which reduces capacity and increases the potential for crashes. With the implementation of the three lane cross section described previously, the corridor should operate better than it does today. Widening Route 302 to a five lane cross section would involve significant monetary investment. This includes the cost of acquiring additional right-of-way, stormwater runoff mitigation and the cost of construction. In addition, the widening could negatively impact properties along the corridor. For these reasons, *every effort should be made to avoid the five lane cross-section.* However, should volumes and capacity exceed a three-lane cross section, the five-lane cross section would be needed, which would include two through lanes in each direction and a center two-way left turn lane or a series of dedicated left turn lanes. Opinion of Cost: \$3,139,000 + an additional potential \$470,000 to \$704,000 for stormwater management (estimate does not including right-of-way acquisition).
- *Conversion of Center Turn Lane to a Raised Median:* When traffic volumes on Route 302 reach between 24,000 and 28,000 vehicles per day (as compared to the current 21,000 vehicles per day), a center turn lane configuration no longer provides optimal corridor mobility and safety. When this volume is attained, this plan recommends the Town consider the conversion of the center turn lane to a raised median. In addition to safety and mobility factors, a well landscaped median can add to the aesthetic quality of the corridor. Opinion of Cost: \$1,022,000.
- *Extension of Manchester Drive to Enterprise Drive:* To minimize impacts from additional development, and to remove a portion of local trips from the Route 302 corridor, it is recommended that Manchester Drive be extended northerly to White's Bridge Road and possibly continue further northerly to intersect Route 302 opposite Enterprise Drive. Although additional information such as survey, wetland exploration, identification of any ledge, etc. would be necessary to identify a realistic opinion of cost; an order of magnitude cost is approximately \$2,000,000 per mile. This would result in the link from the existing Manchester Drive to White's Bridge Road costing approximately \$1,100,000 and the link from White's Bridge Road to Route 302 opposite Enterprise Drive costing approximately \$1,600,000.

## Chapter 1 Introduction

### Project Background

The Windham commercial district situated on Route 302 is a regional center that attracts shoppers and workers from much of the Lakes Region area. At the same time, Route 302 is a commuter route between Greater Portland and towns as far away as Bridgton. Route 302 is a key roadway for recreational traffic traveling to the lakes and mountains of Maine.

The combination of these factors has created ongoing traffic growth along this roadway. Presently, Route 302 north of White's Bridge Road is a two-lane roadway with a limited amount of adjacent commercial and residential development. However, based on the amount of available land, development trends, and the above mentioned traffic growth, access management, capacity and safety are becoming issues along the corridor.

This plan is designed to proactively manage growth and capital improvements along the Route 302 corridor between White's Bridge Road and Mineral Spring Road. The successful implementation of the plan's goals and recommendations will help to preserve a balance between local access to commercial and residential properties, and the efficient movement of traffic in the region.

### Study Area

The study area, as defined on Figure 1 in Appendix B, consists of Route 302 from White's Bridge Road to Mineral Spring Road. The intersections included in the study are as follows:

- Route 302 at White's Bridge Road
- Route 302 at Angler's Drive (Signalized with White's Bridge Road)
- Route 302 at Enterprise Drive
- Route 302 at Mineral Spring Road (conceptually only - no turning movement counts)

### Project Goals

It is important to develop a set of goals to serve as a benchmark by which to evaluate the effectiveness and impact of various alternatives, and in particular a recommended set of improvements. These goals recognize the importance of balancing the needs along this corridor. For example, state and federal funding for this road necessitates the preservation of access for through traffic (including truck traffic) along Route 302, while at the same time local and recreational users of this road should feel comfortable passing through or patronizing local businesses. The goals are as follows (not listed in order of preference):

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- Make incremental strategic capital improvements that will provide efficient access, mobility and safety. Further protect these investments, and limit the need for additional improvements, through the application of Access Management and Transportation Demand Management techniques.
- Utilize proven strategies that maximize corridor mobility.
- Recognize the important economic development role of the business community along Route 302.
- Maintain or improve safety along the corridor.
- Improve facilities for other modes of travel, e.g. pedestrian, bicycle, and transit.

## Chapter 2 Existing Conditions

As mentioned previously, Route 302 is the commercial center of Windham and surrounding areas, serves as a major commuter route, and provides access to the lakes and mountains of Maine and New Hampshire.

The roadway is classified by both the Federal Highway Administration (FHWA) and MaineDOT as a principal arterial. The main purpose of an arterial is to move traffic between communities. As a result, mobility and safety are considered to be of paramount importance. At the same time, most of this section of Route 302 in Windham is within MaineDOT's Urban Compact Area. The Urban Compact Area provides access to more concentrated commercial and residential development. While FHWA and MaineDOT maintain oversight for this section of Route 302, the Town of Windham has the jurisdiction to develop and implement access management standards equal to or more restrictive than FHWA or MaineDOT (See Access Management on Page 17 for detailed discussion). General maintenance is the responsibility of the Town with capital improvements generally negotiated between all parties.

This section of Route 302 presently carries approximately 21,000 vehicles per day. The historic growth for this area is one-and-a-half to two percent per year; however, it is anticipated that immediate future growth will not be as aggressive due to less available developable property (regionally) and the slow economic environment. However, even with minimal growth (depending on the increase in the number of curb cuts, progress on access management, and growth within the corridor) this corridor could approach its capacity as a two-lane corridor in the next several years.

### Roadway Conditions

The study area is 7,900 feet (Approx. 1.2 miles) in length from Whites Bridge Road to the Assembly of God Church north of Mineral Spring Road. For the majority of this length, the roadway is a single 12 foot wide travel lane in each direction with a 10 foot wide paved shoulder. Traveling south to north, speeds along the study area vary from 30 mph near White's Bridge Road, 40 mph for the middle section of the study area, and 50 mph toward the northerly end of the study area.

Currently, there is no sidewalk from the intersection of White's Bridge Road northerly. The density of businesses and residences along that section of the corridor may not currently demand the need for a sidewalk, but as development occurs, a sidewalk will help to reduce vehicular traffic along the corridor and provide safe accommodations for pedestrians

As part of this study, pavement "core" samples were taken throughout the corridor in both the paved shoulder and travel way to identify the thickness of pavement. Based on the samples, the average pavement thickness in the paved shoulders is approximately 3.25 inches and the pavement

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thickness in the travel lane is approximately 6.5 inches. The importance of these depths is described in more detail in later chapters.

### Land Use

The corridor is largely commercial in nature with several side roads leading to residential neighborhoods. Zoning within the study area primarily consists of the C-1 (Commercial District I) zone, the C-2 (Commercial District II) zone and the ED (Enterprise Development District) zone. The potential developable areas for each zone within the study area are approximately: C-1 = 111.29 acres, C-2 = 14 acres (not including 15 acres of Manchester Properties currently under planning board review), ED = 25.58 acres; for a total potential developable acres of approximately 150.87 acres.

Past history (2004-2008) for the area of Route 302 between River Road and White's Bridge Road includes the following permitted uses / sizes:

<u>Use</u>	<u>Size (sf)</u>	<u>Acres</u>
Restaurant	9,766	3.14
Shopping Center	358,876	93.96
Office	43,734	17.02
Industrial Park	65,238	51.23
<u>Residential</u>	<u>17,576</u>	<u>N/A</u>
Total		165.35

As can be seen, the potential for development of 150.87 acres would be similar to the past development to the south of 165.35 acres.

### Data Collection

Gorrill-Palmer compiled turning movement counts from recent studies completed in the area as well as a count completed at Enterprise Drive during the summer of 2008 for the weekday PM peak hour. The raw counts are summarized on Figure 1 in Appendix A.

#### Peak Hour

Based on the turning movement counts, the peak hour for the corridor occurs between the times of 3:30 to 5:45 PM. This window of peak time is due to the fact that volumes are heavy and relatively stable throughout this period, so the peak "hour" is in actuality two to three hours, particularly during the summer months.

#### Traffic Volume

The MaineDOT published traffic volumes for Route 302 in the area vary from an average of 23,500 (year 2005) vehicles per day southeast of White's Bridge Road to an average of 20,320



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(year 2007) vehicles per day southeast of Mineral Spring Road. These volumes are an average number of vehicles for the year. During the non-peak months, these volumes would be expected to be lower (15 - 20%), and in the peak summer months these volumes would be expected to be higher (15 - 20%). Capacity of a two-lane highway includes consideration of many factors such as: traffic volumes, percent passing, time spent following, average travel speeds, terrain, volume of turning traffic etc. An in-depth study that is beyond the scope of this study would need to be performed to identify the exact level-of-service for this section of roadway; however, based on just the published volumes and the turning movement counts performed, this section of Route 302 is at approximately 50-75 % of its 32,512 AADT capacity, with the lower limit in off-season and the upper limit during peak season.

Historical data was obtained from the MaineDOT from 1997 to 2007. Based on this information, it appears that the roadway volumes along Route 302 have been increasing by approximately one-and-a-half to two percent per year; however, it is anticipated that immediate future growth will not be as aggressive due to less available developable property (regionally) and the slow economic environment.

### Intersections

The only signalized intersection within the corridor is at the intersection of Route 302 with White's Bridge Road / Angler's Road. This intersection operates poorly during the peak hours. Besides the high volume of traffic, the poor level of operation is a result of two primary flaws with the intersection geometrics. The first is that White's Bridge Road and Angler's Road are off-set from one another, which requires the two side streets to operate independantly during two separate phases, resulting in inefficient operations and wasted signal time. The second reason for the poor operations is the receiving length of the two northbound through lanes. The Route 302 northbound direction currently has two through lanes. Directly after going through the intersection, the two lanes are required to merge into one lane. Because the merge is so soon after going through the intersection, drivers are reluctant to use the two through lanes evenly, resulting in poor lane utilization. The Town has acquired the property necessary to align the two side streets and MaineDOT has this intersection identified as a project, which would include addressing both the off-set alignment as well as extending the two northbound receiving lanes. Figure 7 in Appendix B shows what the intersection might look like after the reconstruction.

The remaining intersections within the corridor are unsignalized. As is typical for corridors on a major arterial such as this, the intersections operate well overall, with left turns from the side roads operating at poor level of service (typically "F") during the peak hours of the day with left turns from Route 302 operating slightly better, but still typically low ("D" or "E").

### Design Volumes

Design volumes are the volumes used to determine the appropriate parameters for a specific design. They can vary from using Average Annual Daily Traffic (AADT) volumes, which is the average number of vehicles passing a particular point for the year, to peak hour volumes which is the peak number of vehicles in a specific hour. AADT is typically the standard used for determining the parameters for an overall roadway design while peak hour volumes are typically

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used for evaluating the specific needs of a particular intersection. As stated previously, the AADT for this corridor is currently approximately 21,000 vehicles per day. The raw hourly turning movement volumes collected by our office along the corridor are shown on Figure 1 of Appendix A for the weekday PM peak hour. Traffic volumes can vary seasonally throughout the year. The raw hourly volumes were adjusted both for an annual growth as well as seasonally to approximate the 2010 design hour volumes which are shown on Figure 2 of Appendix A for the weekday PM peak hour. AADT is more macroscopic in nature and is typically used for overall roadway design and to some degree considers seasonal fluctuation. Because intersections are typically the “bottle neck” of the corridor; designing infrastructure for a specific intersection, such as the number of lanes needed, is more microscopic and basing design on average conditions would lead to the intersection being over capacity fifty percent of the time. Building infrastructure based on the peak time of the year, such as the peak hour in the summer, would lead to excessive infrastructure that is not used for most of the year but still impacts the environment. Therefore, the typical standard for intersection design, both nationally and on a State level is to base design on the peak “30<sup>th</sup> hour”. This is the design volume that is only exceeded 29 hours out of the year. This combination of using AADT for overall roadway design and the “30<sup>th</sup> hour” volumes for specific intersections has proven to be a reasonable approach that accommodates most of the traffic without resulting in excessive infrastructure.

### Collision History

Gorrill-Palmer obtained the collision history for the Route 302 corridor from the MaineDOT for 2006-2008, the latest three-year period available. A location is classified as a High Crash Location (HCL) if it meets both of the following criteria:

1. Eight or more crashes over a three-year period, and;
2. A Critical Rate Factor (CRF) of 1.00 or greater for the same three-year period. A CRF compares the actual crash rate of each intersection or road segment to the Statewide crash rate of similar locations. A CRF less than 1.00 indicates a lower than average crash rate.

Based on the crash data, no locations within the study corridor were considered High Crash Locations.

**Pedestrians / Bicycles / Fatalities** - In addition to identifying high crash locations, Gorrill-Palmer Consulting Engineers also reviewed the corridor to identify if within that three year period there were crashes involving pedestrians / bicycles or fatalities. Based on the MaineDOT data, there were no crashes within the corridor that involved pedestrians, bicycles, or fatalities. The crash history is included in Appendix C of this report.

## Chapter 3 Transportation Improvement Options/Recommendations

### Overview

As identified in Chapter 2, this section of Route 302 is currently operating at approximately 50-75 % capacity. Two of the most significant controllable factors that can contribute to the decrease in capacity / mobility along the corridor is a combination of increased friction in the form of increased curb openings (number of driveways and roads), and inefficient locations of curb openings with associated turning movements. Another factor that also contributes to the decrease in capacity / mobility along the corridor, but is less controllable, is regional growth. As a result, the Town will need to be very aware of those factors it can control and plan for those that it cannot. As a result, capital improvements will need to be made to accommodate future growth along this corridor.

The recommendations in this chapter are designed to plan for the phasing of capital improvements as growth occurs in the corridor. Careful consideration is made to identify the least expensive options first, and share the cost fairly among public and private parties. Furthermore, this plan places considerable emphasis on the use of access management and transportation demand management technics that will, 1) protect the investments made in the roadway, and 2) lengthen the amount of time needed before conditions necessitate any additional capital improvements. In summary, the consistent and long-term application of these recommendations will achieve the goals stated in Chapter 1 of this plan.

### Summary of Recommendations

What follows is an in-depth discussion of the plan's recommendations. The time frames are approximate only because they are highly dependant on the number of curb cuts introduced into the corridor, the volume of turning movements introduced, regional and local growth and what combinations of techniques have previously been implemented. The concept drawings for many of the options are shown on the plans provided in Appendix B.

### Near-Term Improvements/Recommendations (Ongoing or Within Three Years)

Several options have been examined for the corridor, and are discussed as follows:

- *Access Management Plan:* This plan recommends the creation of access management standards that are particular to this section of Route 302. The specific access management recommendations are described in the Detailed Description of Recommendations later in this chapter and in Appendix E of this report. One important concept that should be noted is that the standards should provide the flexibility to help the Town and property/business owners address conditions on a site-by-site basis.

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The most important portions of any access management plan are reducing and strategically locating the number of curb cuts, reducing curb cut widths, providing interconnections between adjacent sites, and use of side/parallel streets where feasible and appropriate. The potential for proliferation of full-access driveways is a major concern along Route 302. Given the need to maintain mobility along this corridor, it is important for the Town to work with property owners and local businesses to make access management part of any development plan. The most important portions of any access management plan are reducing the number of curb cuts, reducing curb cut widths, providing interconnections between adjacent sites, and use of side/parallel streets where feasible and appropriate.

- *Restripe Route 302 as a Three-Lane Cross Section:* The plan recommends the reconfiguration of the existing roadway to provide a center turn lane for improved access, mobility and safety. The current width of Route 302 in the study area (approximately 44 feet) includes a single 12 foot wide travel lane in each direction and a 10 foot wide paved shoulder. This width would allow for restriping of the roadway to provide a 12 foot wide center two-way left-turn lane, an 11 foot wide single travel lane in each direction, and five foot paved shoulders that could be used by bicyclists. The existing wide shoulders do allow room for vehicles to maneuver around a left turning vehicle, but generally results in traffic slowing and speeding up again, which reduces capacity and increases the potential for crashes. The three lane cross section would allow left turning vehicles on Route 302 to use the left turn lane and not restrict the movement of the through traffic. This would also assist left turning vehicles exiting the side streets / driveways to use the center turn lane to make a two stage left turn.

The proposed three lane cross-section was reviewed and approved by MaineDOT. Although the study area for this corridor study stopped at Mineral Spring Road, the cross-section should be extended further north if possible, at a minimum to the Assembly of God Church. Because this alternative shifts through traffic laterally out to accommodate an additional turning lane in the center, the pavement thickness of the shoulder has to be acceptable to accommodate the traffic volume and weights of the vehicles. Based on recent pavement “core” samples taken along the corridor in both the shoulders and travel lanes, the shoulders will need additional pavement thickness (approximately 3 inches) before it can be used to accommodate vehicular traffic. Preliminary opinions of cost are provided in Chapter 4. Once the restriping has been done, we recommend that the Town request the MaineDOT to review and adjust the speed limits as appropriate. The MaineDOT is the only authority that has the jurisdiction to change the speed limits within this corridor.

- *Signalize Enterprise Drive:* This plan recommends full signalization of the intersection if and when the appropriate amount of traffic is generated by new development in the area (see warrant information in the Detailed Description of Recommendations, below). As noted by a property owner at the public meeting in July 2010, Enterprise Drive property owners are in a “Catch-22” situation with a potential signal at this intersection. There can be no traffic signal until there is enough development on Enterprise Drive contributing traffic to the intersection, but they are finding that businesses are reluctant to locate on Enterprise Drive because there is no traffic signal at Route 302. As a result of this situation, the funding for this capital

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improvement is of particular importance. Typically, the cost of signaling an intersection that is warranted due to proposed development on the side road or driveway is borne by the developer as part of a MaineDOT permit process. This would include any roadway widening required to accommodate the development and installation of a signal. However, this creates a “last one in” situation where a single developer bears the entire cost. If the signal is warranted due to the Town constructing a road that intersects Route 302, the cost of the installation and associated widening would typically be the responsibility of the Town and in some cases with contributions from MaineDOT and FHWA. Among the several options for Town funding, this plan recommends the development of a fair funding system that does not discourage investment by placing the burden on a single property owner. Funding options include “improvement districts” or impact fees for new development in the vicinity that would benefit from a signal at the Route 302 and Enterprise Drive intersection.

### Mid-Term Improvements/Recommendations (Ongoing or Within Five to Ten Years)

- *Alignment of Angler's Road with White's Bridge Road:* This project includes realigning Angler's Road across from White's Bridge Road. The resulting four-leg intersection would have more efficient operations than the current offset (i.e. 'T'-style) intersections. This project has been recommended for several years, and the MaineDOT and Town have completed property acquisition, and some preliminary engineering. While this project may take five to ten years to complete, it continues to be a high priority for improving mobility and safety in the corridor.
- *Extension of Sidewalk:* This plan recommends the construction of a sidewalk on both sides of Route 302. This recommendation should be continuously implemented as funding for bicycle and pedestrian improvements is available, and as a requirement for new development in the corridor. To take into account future widening of Route 302, the sidewalk should be located in accordance with the plans contained in Appendix B - Concept Plans.

### Long-Term Improvements/Recommendations (Ongoing or Within Ten to Twenty Years)

While these measures are anticipated to provide adequate roadway capacity to Route 302 for some time (ten to twenty years, even with additional development), the potential combination of left turn movements as well as high through volumes may contribute to an increase in crashes toward the long-term. Possible additional measures to address this are as follows:

- *Extension of Manchester Drive to Enterprise Drive:* To minimize impacts from additional development, and to remove a portion of local trips from the Route 302 corridor, it is recommended that Manchester Drive be extended northerly to White's Bridge Road and possibly continue further northerly to intersect Route 302 opposite Enterprise Drive.
- *Widening of Route 302:* The need for this improvement varies considerably based on the growth of the area and how well access management techniques are implemented throughout the corridor. The current two-lane section is already operating marginally during peak periods.

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With the implementation of the three-lane cross section described previously, the corridor should operate better than it does today.

Widening Route 302 to a five-lane cross section would require additional right-of-way, have impacts on the quality and quantity of stormwater, and could negatively impact properties along the corridor. For those reasons, *every effort should be made to avoid the five-lane cross-section*. However, should volumes and capacity exceed a three-lane cross section, the five-lane cross section may be needed, which would include two through lanes in each direction, shoulders, and a center two-way left turn lane or a series of dedicated left turn lanes.

- *Center Medians on Route 302 from White's Bridge Road to Enterprise Drive:* If traffic volumes continue to increase, even with the measures recommended in this report put in place, it may be necessary to construct a center median where the recommended center left-turn lane would be. Based on published studies and previous projects completed by our office, as traffic volumes approach 28,000 or more vehicles per day, the ability to safely make left turns is severely restricted. As such, center medians may be needed along this section. Again, it should be noted that this step is not likely to require significant investigations for twenty years, but should be retained as a long-term option for the Town should long-term growth pose safety and operational concerns.

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## Detailed Description of Selected Recommendations

### Access Management

The long-term proliferation of full-access driveways is a major concern along Route 302. Most of Route 302 within this study area is within the MaineDOT Urban Compact Area. This means that unless the proposed development is forecast to generate more than 100 trip ends during a peak hour, MaineDOT does not have review authority leaving jurisdiction for review and approval of driveways as the responsibility of the Town. This puts considerable responsibility for good access management and planning on the Town. It is recommended that the Town work with home owners and local businesses to make access management part of any site redevelopment plan as well as proposed site plans, in keeping with the new ordinance requirements and guidelines enclosed with this report. A copy of applicable sections of the latest Town Ordinance is provided in Appendix E.

Access management typically consists of several aspects, which are listed as follows:

- *Sight Distances:* MaineDOT requires minimum sight distances for driveways along state-aid roadways; however, for projects within the Windham urban compact, the Town of Windham maintains sight distance requirements for all new driveways. (It should be noted that projects generating over 100 peak hour trip ends require a traffic movement permit from MaineDOT, even if within the urban compact area.) The Town has recently adopted sight distance requirements (See Appendix E) that are similar to those which are based on the AASHTO publication *A Policy on Geometric Design of Highways and Streets* and MaineDOT Entrance Rules. It is recommended that these standards continue to be utilized for new curb cuts in the corridor.
- *Traffic Signals/Major Intersection Controls:* An issue that can occur on many corridors with a mixture of side streets and high-volume commercial driveways is that of intersection spacing. Each major intersection with signalized control should be assessed for potential queuing along Route 302 in order to minimize queues blocking driveways along the corridor. In addition, spacing between intersections is also an important consideration. In order to maintain movement of vehicles along Route 302 north of White's Bridge Road, MaineDOT requires traffic signal spacing ranging from 2,600 feet for 40 mph to 3,600 feet for 50 mph for locations outside the urban compact. At this point in time, the only location anticipated to require signalization in the near future is Enterprise Drive. However, any large development could trigger the need for signalization so this should remain a consideration as development occurs.
- *Spacing between Driveways/Corner Clearance:* Just as major intersections with traffic control devices should be placed to minimize impacts upon driveways in their vicinity, distances from driveways best serve traffic flow and safety needs when sufficiently spaced away from major intersections as well as other driveways. The Town has recently adopted spacing requirements (See Appendix E) similar to MaineDOT's Entrance Permit Regulations, which are based on the AASHTO publication *A Policy on Geometric Design of Highways and Streets*. However, these standards only apply to developments that receive subdivision or site plan review. It is

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recommended that the proposed standards in Appendix E apply to all developments in the corridor.

- *Spacing of Driveways along Three or Five-Lane Sections:* The arrangement of driveways is also potentially critical. For example, along some portions of Route 302 to the south of the study area, the proliferation of driveways on both sides of the street creates the potential of two vehicles headed toward each other within the two-way left turn lane. It is recommended that the standards in Appendix E be incorporated into the access management standards for the corridor to address this concern.
- *Number of Curb Cuts Per Lot:* Typically, the most-utilized aspect of access management is that of reducing the number of curb cuts or reducing potential turning movements at certain driveways. For example, if a small site has three full-access driveways, or worse, a single large curb cut with no clear delineation as to where vehicles should enter or exit, the potential for conflicts with other vehicles becomes significant. If the driveways are reduced to one or two, and appropriate signage is utilized, the ability for motorists to understand where they need to be will be made clear, and the potential for conflict significantly reduced. This can be a positive for owners since it can: make the access safer for their customers / clients; by eliminate a driveway that could allow additional parking; provide opportunity for additional landscaping. It is recommended that the existing curb cut requirements in Section 515 - Curb Cuts and Driveway Openings of the Land Use Ordinance be retained. In addition, this plan recommends that the town work with property and business owners in the corridor to consolidate the number of curb cuts where feasible. Some potential existing curb cuts that could be consolidated are identified in Appendix B - Concept Plans.
- *Double Frontage Lots:* If a parcel has frontage along multiple streets (in particular, public ways or high-volume commercial driveways), it is considered to have double frontage. Many communities and to an increasing extent, MaineDOT, now require that full access be provided to the lower-volume driveway or street, where traffic may come to the main roadway via traffic control if it is available. If an additional driveway is to be permitted along the main roadway, it can be restricted to right turns only in order to minimize potential turning conflicts. It is recommended that the standards provided in Section 800 - Site Plan Review be adopted for all developments along this corridor.
- *Driveway/Entrance Widths:* MaineDOT typically requires that a driveway be no more than 42 feet in width (not including radii). However, in the case of access to major traffic generators this width can be increased with inclusion of appropriate medians and traffic control devices. Ultimately, the driveway width should be based upon the needs of the site, as well as other factors such as pedestrian crossings and truck access. But in most cases, the width should not exceed the demonstrated need. It is recommended that standards for driveway widths contained in Section 515 of the Land Use Ordinance be retained for this corridor.
- *Consolidation of Roadways / Driveways:* Consistent with limiting the number of curb cuts along the corridor to reduce the number of conflict points, consolidation of driveways or even public accesses and roads has the same benefits. However, it can take several years to



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consolidate since it is typically done as part of a redevelopment of the property. It is recommended that standards are developed for the corridor that are similar to those in Appendix E, and that the Town continue to work with property owners and businesses in the corridor to consolidate driveways where appropriate.

- *Interconnection of Adjacent Properties:* This includes providing vehicular, pedestrian and bicycle connections between adjacent properties. This reduces the number of vehicles that need to turn onto Route 302 only to turn off at the next driveway. Providing this interconnection improves the capacity and safety of the corridor. It is recommended that standards be created to promote property interconnections in the corridor. In addition to those required for Site Plan Review, incentives should be created for those developments that only require a building permit. Draft standards are provided in Appendix E.

In summary, it is recommended that the Town of Windham evaluate each parcel along Route 302 through the approvals process when the site is developed, redeveloped, or required to get some form of permit from the Town. This will ensure that each site takes into account access management measures and does so in context with adjacent parcels. By doing this, fewer turning conflicts will take place, safety will improve, and the need for major changes such as medians along Route 302 will be delayed or eliminated.

### Transportation Demand Management

With the forecast of continuing growth in traffic for Windham, and constraints to various transportation funding mechanisms the current norm, alternative measures to keep traffic volumes from increasing will have greater importance. One significant group of measures has been typically clustered under the umbrella of Transportation Demand Management (TDM). TDM measures include many techniques, and what follows is a brief discussion of many of the most common techniques:

- *Staggered work hours:* Particularly for hourly employees, workers coming to and from a place of employment results in brief periods of time where roadways are often overwhelmed with traffic. Yet, it is unrealistic to redesign transportation infrastructure to accommodate brief periods of traffic surges. If employers can work with their employees to adjust work hours (perhaps from 7:30 to 4:30, or 9:00 to 6:00), peak periods can be extended, rather than intensifying the existing peak hour traffic volumes.
- *Carpooling/Vanpooling:* If drivers with similar hours commute to and from the same town, sharing rides can significantly cut down on peak hour traffic volumes. Ideally, if clusters of employers communicate with each other on worker needs, the potential for carpooling is increased. For larger employers with many workers from the same town, use of a vanpool with a driver may also be an option.
- *Bus Service:* Bus service is another transportation demand management technique. This technique could be especially helpful to connect the larger neighborhoods to the local businesses. An intra-town bus route that would allow residents and guests the opportunity to visit the downtown establishments without dealing with the traffic could be very beneficial and would help to slow the rate of growth on Route 302 traffic. This service could potentially even

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be seasonal, sponsored by hotels or local businesses similar to other southern Maine communities.

- *Secure Bicycle Facilities:* For some people with short commutes, one impediment to using a bicycle for a mode of transit is the lack of secured bicycle storage areas. Provision of such facilities can encourage workers interested in such travel modes particularly in the summer when traffic volumes are highest. Additional accommodations such as shower and changing room facilities are also beneficial in promoting walking and bicycling as viable modes of transportation.

Because employers may be skeptical at first, local agencies and municipalities can assist with incentives. For example, the Town of Windham, after determining that TDM measures are less costly than significant upgrades to local infrastructure, may elect to provide tax incentives, in the form of credits, to employers who volunteer the initiation of a TDM program. As time passes and more employers become involved, a consortium of employers can form groups to oversee TDM initiatives and coordinate them in the community.

While such measures were once relegated to large metropolitan areas, mandatory TDM requirements are already practiced in the City of Portland, and the MaineDOT has begun assessing fees for creation of various TDM programs in several regions of the state. Again, while there may be initial skepticism of such measures, in the long run they can ultimately save money, and help to preserve corridors such as Route 302 that are dealing with capacity constraints. In the end, the measures should be tailored to specific employers, as the impacts and ability to mitigate those impacts by a small employer would be different than a large one.

### Signalization of Enterprise Drive Intersection

Because signalizing an intersection has both positive and negative aspects, warrants have been established to ensure that the benefits of signalizing an intersection outweigh the negatives. These warrants are provided in the Manual on Uniform Traffic Control Devices (MUTCD). Before the Enterprise Drive intersection can be signalized, it will first need to meet warrants for signalization according to the MUTCD and be approved by the MaineDOT. The following is a brief step-by-step approach for doing a signal warrant analysis:

- Perform a minimum of 8 hours of traffic counts (typically 12 hours is done) on a weekday that typically captures the AM, noontime and PM peak hours at a minimum. This should include pedestrians and bicycles. These volumes need to be adjusted to “average” weekday volumes, typically through use of MaineDOT adjustment factors.
- Do an intersection condition diagram that includes the lane uses on each approach to the intersection.
- If development is proposed that would not have been included in the traffic count, that traffic needs to be added to the traffic volumes.
- Compare the adjusted volumes to the 8 signal warrants in the MUTCD. Those are: Eight Hour vehicle volume, Four Hour vehicle volume, Peak Hour, Pedestrian Volume, School Crossing, Coordinated Signal System, Crash Experience, and Roadway Network. The

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intersection should not be signalized if it does not meet at least one of the above warrants; however, meeting one of the warrants does not necessarily mean that a signal should be installed. MaineDOT typically prefers at least the Four Hour vehicle volume warrant be met before signalization is considered.

- Before a signal is installed, a capacity analysis should be done to identify if the existing number of lanes and lane uses are appropriate. It is not uncommon when signalizing an intersection to need to increase the number of approach lanes on the major street that previously had the right of way and was not required to stop.

### Extension of Manchester Drive

As development continues, primarily along the northwest side of Route 302 in the vicinity of the study area, even with proper access management techniques, additional traffic will utilize the corridor, increasing pressures on capacity and mobility. For some time now, the Town has been working with consultants and developers to construct a parallel roadway (Manchester Drive) along this side of Route 302 which currently begins at Route 35 west of Route 302 and continues northerly toward the Lowe's site.

Ideally, this roadway would be extended to White's Bridge Road as parcel development occurs along the planned corridor. Primary access points should be placed along this roadway instead of Route 302. Providing access from White's Bridge Road to Route 35 will likely remove local traffic from Route 302 and also improve safety, taking some pressure off driveways and access points to Route 302.

Further extension of Manchester Drive to Route 302 across from Enterprise Drive would also serve to preserve capacity along Route 302. It is recommended that the roadway have a two-lane cross-section, with auxiliary lanes as needed, and a minimum of a four-foot paved shoulder to allow for use by pedestrians or bicyclists wishing to access development parcels without resorting to the use of Route 302.

### Raised Center Medians from White's Bridge Road to Enterprise Drive

This report recommends the use of access management, transportation demand management, and other measures to maintain and improve operations along Route 302 from White's Bridge Road to Mineral Spring Road. The goal of these measures is to preserve a proposed three-lane cross section as long as possible, as the center two-way left-turn lane will maximize convenient access into existing and future businesses while limiting the amount of construction and environmental impacts.

However, as volumes continue to increase, and if the various measures recommended are unable to result in continued safety along the corridor, widening of Route 302 to provide a five lane cross section may need to be considered. This determination would be related to a future safety analysis of the corridor to determine if crash levels have noticeably increased from the current levels. If crash rates continue to increase, it may trigger the need for center medians. However, this strategy should be considered only when all other options have been exhausted, and safety remains a concern. Certain openings in the median could be provided at select locations for protected left

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turn movements. Since center medians can restrict left turn movements along the corridor, the issues of inappropriate u-turns must be addressed.

The medians themselves, as they would be twelve to fourteen feet in width, would provide opportunities for Town-maintained green-space or plantings. The nature of the plantings could range from seeding of wildflowers to detailed shrubbery. The placement of the medians, therefore, could result in a significant improvement on the visual aspect of the Route 302 corridor to act as a gateway treatment.

Again, it must be stressed that the goal of this Plan will be to minimize the impact to the corridor. But as the forecast volumes do indicate longer-term issues with the three-lane section, the Plan must accommodate potential changes to the section in order to preserve mobility and minimize safety concerns.

Route 302 is a State Highway on the National Highway System within the Town of Windham. As such the Federal Highway Administration, MaineDOT and the Town all have a stake in what happens along the corridor. If it was identified that there was a safety issue, it would most likely be a collaborative effort between the three entities in identifying when and where the raised center medians would be constructed.

## Chapter 4 Preliminary Opinion of Cost and Funding Opportunities

### Opinions of Cost

The preliminary opinions of cost are provided in this chapter. More detailed cost breakdowns are provided in Appendix F. All of the opinions of cost are based on the total 7,900 ft. length of the study area from Whites Bridge Road to the Assembly of God Church. However, approximately 600 feet of the corridor transition from the typical section to the lanes needed at the White's Bridge Road intersection, leaving approximately 7,300 feet of typical section.

#### Roadway Cross Section Improvements

As described in this plan, there are multiple roadway cross-sections proposed for this corridor depending on Annual Average Daily Traffic Volumes (AADT). Diagrams of the cross sections are included at the end of this chapter.

- **Three-Lane Cross Section** - This would involve using the existing 44 foot wide pavement width but reallocating this width to a 12 foot wide center two-way left turn lane (ctwltl), single 11 foot wide travel lane in each direction and 5 foot wide paved shoulders (Total pavement width 44 feet wide). Since a portion of the existing shoulders would now become travel lanes, the existing shoulder pavement buildup needs to be reinforced (thicker) to support the new demand. MaineDOT typically requires approximately six inches of pavement depth for the travel lanes with three inches typically for the shoulder depth. Based on recent "core" samples that were done for this corridor, the shoulders do have approximately three inches of pavement depth. The recommendation to add the required additional three inches of pavement depth is to remove the existing shoulder pavement, "box" cut out a portion of the existing shoulder gravel (1.5 inches) and replace it with pavement (4-5 inches) and then to provide an overlay (1.5 inches) over the entire width.
  - **Opinion of Cost.** \$200 per linear foot (Total corridor cost of approximately \$1,460,000).
  
- **Five-Lane Cross Section** - With proper access management and corridor planning, converting Route 302 to a three lane cross section should be sufficient for the next ten to twenty years. If the three lane cross section described above ever needs to be widened it will need to include not only the ctwltl, but two travel lanes and eight foot paved shoulder in each direction, for a total of a five lane cross-section (Total pavement width of 72 feet wide). This total 72 foot wide cross-section is wider than the existing 66 foot wide right-of-way, therefore, additional right of way will be needed.
  - **Opinion of Cost.** \$430 per linear foot (Total corridor cost of approximately \$3,139,000). Since it is well beyond the scope of this study, acquisition of right-of-way

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costs and costs associated with stormwater quality and quantity management is not included in this estimate. Based upon Gorrill-Palmer's experience with similar projects, the additional costs associated with widening Route 302 to a five-lane cross section would be significant.

- **Right-of-Way Acquisition.** Additional right-of-way would have to be acquired throughout the corridor; not only to accommodate the proposed pavement width but also utilities. Trees would need to be removed to accommodate clear zone requirements and the additional right-of-way acquisition may negatively affect properties along the corridor.
  - **Stormwater Management.** First, some of the widening would take place within sensitive watersheds and stormwater quality would need to be addressed to satisfy the Maine Department of Environmental Protection (DEP). Second, the widening could add approximately 4.7 acres of impervious area (without sidewalks), which would require stormwater quantity mitigation to satisfy DEP. It is impossible to identify at this level and scope of study, the extent of the stormwater/environmental mitigation that will be required. However, based on Gorrill-Palmer's past experience with roadway reconstruction, this could cost \$100,000 to \$150,000 per impervious acre, which at 4.7 acres is an additional \$470,000 to \$704,000 in mitigation costs, not including acquisition of right of way.
- **Raised Center Median** - As additional roadways and/or driveways are introduced along the corridor and traffic volumes continue to increase, it may be necessary for safety purposes to convert the ctwtl to a raised median and restrict left turn movements along the corridor to either signalized intersections or roundabouts (Total pavement width of 72 feet wide).
- **Opinion of Cost.** \$140 per linear foot (Total corridor cost of approximately \$1,022,000)

### Sidewalks

- **Sidewalk** - Currently there are no sidewalks from the intersection of White's Bridge Road north along the corridor. A sidewalk is recommended to promote pedestrian activity to existing and future uses within the planning area. We recommend that the sidewalk be factored in as improvements occur along the corridor, but recommend that it be constructed to accommodate the potential width of a five-lane cross section. This will reduce the cost of the sidewalk and avoid requiring reconstructing portions of the sidewalk during the widening of the existing cross-section. The proposed sidewalks are anticipated to fall outside the existing right of way, which means that additional property would need to either be acquired or an easement obtained. The opinion of cost does not include the cost for acquisition of property or easements.
- **Opinion of Cost.** \$240 per linear foot (Total corridor cost of \$1,896,000). This estimate assumes that the sidewalk is constructed as a single project, rather than

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incrementally as development occurs. As a result, this estimate does not include the additional cost that contractors would charge for multiple mobilization efforts. This opinion of cost also assumes the sidewalk is on both sides of Route 302, curbing will be needed along the corridor, and subsurface drainage will be provided.

### Intersection Improvements/Signalization

- White's Bridge Road/Anglers Road Intersection - This preliminary opinion of cost does not include improvements at the White's Bridge Road/Anglers Road signalized intersection. Prior to, and during this planning process, the Town of Windham has been conducting a parallel effort to acquire the necessary property and develop engineering plans for the intersection. At the same time, this plan is designed to work in conjunction with the final intersection improvements. For reference, the White's Bridge/Anglers Road intersection includes approximately 600 feet of improvements.
  - Opinion of Cost to be determined by parallel plan being undertaken by the Town of Windham
- Enterprise Drive/Route 302 - The extent of work required for the signalization of the intersection could vary significantly depending on the development proposed and what the cross-section of Route 302 is at the time of signalization. For the purposes of this plan, the opinion of cost for signalization of the intersection is based on the assumption that the starting cross-section is the three-lane cross section since signalization is anticipated in the next five years. Based on preliminary evaluation, if this intersection were to be signalized in the near future, at a minimum, the Route 302 northbound approach would need to be widened to provide for a thru and a thru/right lane. This also means providing an additional receiving lane for approximately 600 feet before merging to a single lane.
  - Opinion of Cost. \$ 375,000
- Parallel Roads/Extension of Manchester Drive. As discussed previously, the extension of Manchester Drive from Route 35 to White's Bridge Road and preferably further north would be a significant benefit to prolonging the capacity and maintaining the safety along the Route 302 corridor. As identified previously, there are a significant number of contributing factors (i.e. wetlands, ledge, purchasing right-of-way, etc.) to identify a cost for such a connector; however, a ball park figure of approximately \$2,000,000 per mile can be assumed to identify an order of magnitude. This does not include the cost of acquiring property.
  - Opinion of Cost. \$2,000,000 per mile. This would result in the link from the existing Manchester Drive to White's Bridge Road costing approximately \$1,100,000 and the link from White's Bridge Road to Route 302 opposite Enterprise Drive costing approximately \$1,600,000.

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## Funding Opportunities

Current forecasts for highway funding over the next several biannual cycles indicates that funding will not be available to implement any plan of significance along Route 302. As such, options will need to be phased, and other techniques/policies should be examined to delay or eliminate the need for implementation of the full array of options. Alternative funding sources that have worked in other communities that could be explored here include the following:

- Federal and State Grants - Since this is a State Highway on the National Highway System, Federal Highway Administration and MaineDOT have a vested interest in how it operates. Although funding is minimal at this time, these both may be sources for funding in the future.
- Impact Fees - This includes a per vehicle fee for forecast vehicles through the corridor that originated from any new development within the Town. Another option would be to charge this per vehicle fee to any development within the corridor.
  - This plan recommends that if impact fees are considered as a funding option, that the Town hire a qualified consultant to develop a fair and legally defensible impact fee system.
- TIF Districts - This would consist of the Town bonding improvements and using proceeds from additional tax revenues to pay off the bonds.
- Reimbursement - This would include new developments along the corridor expanding their required mitigation to include a slightly larger area and then being reimbursed as other development occurs along the corridor. This avoids spot improvements along the corridor.



