


# TOWN WIDE TRANSPORTATION STUDY

## TECHNICAL MEMORANDUM II

*Analysis of Existing Conditions*
*Future 2025 Conditions*
*Recommended Transportation System Improvement Program*
*Transportation System Improvement Program Cost Summary*

**SUBMITTED TO:**
*Town Manager*
*Town of Scarborough*
*P.O. Box 360*
*Scarborough, Maine 04070-0360*

**SUBMITTED BY:**
*William J. Bray, P.E.*
*235 Bancroft Street*
*Portland, Maine 04102*

**IN ASSOCIATION WITH:**
*Gorrill-Palmer Consulting Engineers, Inc.*

**SUBMITTAL DATE:**
*March 18, 2005*

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March 21, 2005

Ronald W. Owens
Town Manager
Town of Scarborough
PO Box 360
Scarborough, ME 04070

RE: Technical Memorandum II
Scarborough Town Wide Transportation Study

Dear Ron:

Traffic Solutions and Gorrill-Palmer Consulting Engineers, Inc. is pleased to present the Town of Scarborough with Technical Memorandum II for the Scarborough Town Wide Transportation Study. This memorandum provides a comprehensive discussion and recommendations for present and future transportation issues in the Town and is compiled in the following manner:

- Section I: Analysis of Existing Conditions (originally submitted in February of 2004)
- Section II: Future 2025 Conditions
- Section III: Recommended Transportation System Improvement Program
- Section IV: Transportation System Improvement Program Cost Summary

In addition, a fifth section is provided which contains all relevant Figures for the study.

We look forward to presenting this information to the Town.

Sincerely,

Traffic Solutions

William J. Bray, P.E.

Gorrill-Palmer Consulting Engineers, Inc.

Thomas L. Gorrill, P.E., PTOE
President

Enclosure

TLG/WJB/jjb/JN704/Owens03-21-05.doc

# Executive Summary

## Project Need

Scarborough, with a population of less than eight thousand people in 1970 and with a current population of greater than seventeen thousand, is one of the fastest-growing municipalities in Maine. Its close proximity to Portland, direct access to both Interstates 95 and 295, and significant coastal property has made it uniquely desirable.

The resulting growth in vehicular and other modal demand on the local transportation network has meant that roadways once designed for rural areas must accommodate the needs of a busy suburban area with commuter, retail, seasonal, academic and freight activity.

As a result, many key transportation locations now face congestion during peak operational periods, and higher traffic volumes also impede the activity of other modes of transportation, such as bicycle and pedestrian.

Understanding the desire to preserve mobility, the safety of the transportation system for all users and the character of Scarborough, the Town authorized a townwide transportation study.

## Project Goals

Key to the success of the study is its ability not only to identify deficiencies in the local transportation system, but to create a comprehensive plan of improvements to provide for future growth in the Town while preserving its character. The goals are as follows:

- Identify existing deficiencies in the transportation network for vehicular, pedestrian, and bicycle travel.
- Complete analysis of current conditions to determine the extent of the deficiencies.
- Forecast long-term traffic growth in Scarborough to determine future traffic volumes. (2025)
- Identify deficiencies in the transportation network based on future volumes.
- Complete determinations of what future improvements will be required to accommodate future volumes.
- Provide preliminary opinions of probable construction cost for the improvements to the Town's transportation network.
- Provide recommendations for funding options to the Town plan.

# Section I: Existing Conditions

Submitted to the Town February 25, 2004, Section I (Tech Memo I) provided a detailed summary of existing conditions for the Town. Turning movement counts were conducted at forty-nine locations during the summer of 2003. In addition, automatic traffic recorders (ATR's) were placed at two locations in order to document fluctuations in traffic volumes during the course of a weekday. Volumes were adjusted with the addition of traffic from proposed developments in the Town to represent current design volumes.

Capacity analysis was completed for each study intersection, with the determination that several signalized locations currently operate with deficient conditions. Of these, the most significant deficiencies were noted for the following locations:

- Oak Hill (Route 1/114/207)
- Dunstan Corner (Route 1/Payne/ Broadturn
- Route 114/County Road
- Route 114/Saco Street/Beech Ridge Road

In addition, several unsignalized intersections were determined to experience significant delay and/or vehicle queuing. Of these, the most significant deficiencies were noted for the following intersections:

- Pleasant Hill Road/Highland Avenue
- Payne Road/Spring Street
- Route 114/Running Hill Road
- Route 114/Spring Street
- Broadturn Road/Holmes Road
- Beech Ridge Road/Holmes Road

A safety analysis was also completed as part of the Technical Memorandum I. The report identified sixteen locations considered High Crash Locations by MaineDOT. The collisions from 1999 through 2001 were collected and compiled into diagrams. Along with the capacity analyses, these locations are examined so that future recommendations can be made. The sixteen locations are as follows:

- Route 114 from Route 1 to HS Drive
- Route 114 at Running Hill Road
- Route 114 at Mussey Road
- Route 114 at Payne Road
- Running Hill Road from New Road to Green Road
- Running Hill Road from New Road to So. Portland.
- Payne Road between Regal Pines Road and Scottow Hill Road
- Payne Road at Haigis Parkway/Exit 42
- Mussey Road at Spring Street
- Hearne Road at Ash Swamp Road
- Spring Street from So. Po. to Payne Rd.
- Black Point Road from Route 1 to Thornton Road
- Broadturn Road from Martin Road to Route 1
- Route 1 from Fairfield Road to Westwood Avenue
- Route 1 at Old Blue Point Road
- Route 1 from Orchard Road to Pine Point Road

Inventory for other modes of traffic was also completed, largely for pedestrian and bicycle amenities. The inventory included, but was not limited to sidewalks, paved shoulders, pedestrian traffic signals, and walking paths/trails.

In addition to inventory, pedestrian volumes were examined at the various intersections in the Townwide study. Based on these volumes, pedestrian activity tended to be highest in the following locations:

- Dunstan Corner
- Route 77/Ocean Avenue
- Route 77/Black Point Road
- Black Point Road/Fogg Road
- Pine Point Road/East Grande Ave.

Scarborough's access management criteria were were compared to those of MaineDOT. Recommendations included:

- Use of guidelines, not standards.
- Removal of references to acceleration/deceleration lanes.

# Section II: Future 2025 Conditions

The second technical memorandum examined future 2025 traffic volumes, completed analysis, and set forth to compile an improvement plan for the town's transportation system. The goal of this section was to determine what deficiencies would exist in the Town's transportation network based on long-term traffic growth.

Forecasts were completed utilizing the PACTS Travel Demand Model (a.k.a. the TRIPS Model.) The model provides comprehensive system of determining future traffic volumes, by utilizing historical growth patterns, traffic from future development, and levels of forecast congestion. In addition, the model utilized long-term employment forecasts as well as information provided in the U.S. Census. The 2003 information was input to this model along with the other information to result in 2025 forecast volumes, which were then utilized for future analysis.

Analysis was completed for the 2025 forecast volumes for each of the study intersections to determine where future deficiencies in the transportation network would occur. As volumes at intersections were forecast to typically increase between twenty and thirty percent, locations with capacity deficiencies increased significantly over 2003 conditions. Fifteen of the unsignalized intersections and ten of the signalized intersection approaches operate at a level of service 'F.' As a result, delays through some portions of Scarborough, particularly along the Route 1 corridor, were forecast to result in such extensive delays that traffic diversions could be an undesired result.

# Section III: Recommended Transportation System Improvement Program

The goal of the memorandum was to provide the Town with a guiding document for making long-term improvements to its transportation system, including bicycle and pedestrian facilities. The design criteria used in development the improvement program included the following:

- Existing and future intersection mobility
- Identification of high crash locations
- Other modal travel corridors
- Access management
- Proximity of adjacent neighborhoods
- Commercial centers
- Points of interest
- Community facilities
- Roadway classification
- Environmental constraints
- Land acquisition
- Cost of improvement

The goal of the improvement program was to utilize existing roadways and travel corridors wherever possible.

Improvements to existing intersections and roadway corridors were completed throughout the study area, and included, but were not limited to, the following:

- Restriping of approaches
- Construction of additional lanes
- Realignment of approaches
- Signal installation
- Widening/construction of paved shoulders
- Construction of sidewalks
- Installation of pedestrian signals
- Crosswalks

The improvements are summarized in the Appendix following Section IV in Figures 1 through 33.

As part of an examination of future roadway alternatives, four "new" corridor improvement alternatives were prepared and run in the TRIPS model to determine their ability to divert traffic from existing roadways. The proposed "new" corridors are identified as follows:

- Haigas Road Connector: A roadway providing direct access from Holmes Road to Haigas Parkway in the vicinity of the existing MTA Exit 42 interchange.
- Mussey Road Connector: A roadway beginning at Green Acres Lane and running parallel to Route 114, terminating across from the future Gallery Boulevard.
- Scarborough Downs Connector Road: A full-service roadway providing connection from Scarborough Downs to Payne Road and Route 1.
- Route 114 Overlap: A bypass road that would provide a direct connection from Route 114 in the vicinity of McLellan Road (Gorham) and terminate at the current intersection of Route 114 and Running Hill Road.

Preliminary investigations of these potential roadways indicate that by far the most utilized roadway alternative would be the Route 114 overlap. The Hagias Road Connector would also provide for noticeable diversions from nearby streets, particularly from Route 1.

In addition to these four "new" corridors, two other more modest changes were made to the transportation network, which are as follows:

- Gallery Boulevard: Associated with a private commercial development, this public roadway would provide direct access from Mussey Road east of Route Spring Street to Payne Road.
- Dunstan Corner: Payne Road would be shifted northerly away from Broadturn Road.

The Boulevard, while providing access for the commercial sites, would also shift traffic away from Spring Street and would provide Spring Street traffic with a signalized access to Payne Road.

The changes to Dunstan corner, which would increase lane storage, address access management issues and improve overall signal coordination, would dramatically reduce vehicular queues and delay through this portion of the Route 1 corridor.

Oak Hill, or the intersection of Route 1, Route 114, and Black Point Road, currently experiences significant congestion, a situation that will only be exacerbated by future increases in traffic. As this is already a very expansive intersection with at least one lane per vehicular movement, widening this location to provide for adequate capacity in the future would result in an intersection not in character with the Town. In addition, land impacts would be significant. Therefore, the Project Team endeavored to create a new travel network in the Oak Hill area that would accommodate future volumes while eliminating the need to widen Oak Hill itself. The proposal would be a system of intersections and corridors that would do the following:

- Route 114 would be one way from Route 1 to the Hannaford Drive.
- Black Point Road would be one way from Route 1 to Eastern Road.
- A new connector road would be constructed, connecting Commerce Drive at Route 1 to Black Point Road at Eastern Road.
- A new connector road would provide access from Hannaford at Route 1 to East Road.

The changes to Oak Hill would actually result in a narrowing of all approaches

to the intersection, reductions in delay to the Route 1 corridor, and an enhanced environment for users of other travel modes. The improvements are shown in the Appendix following Section IV in Figures 20-21g.

The needs of other transportation modes have resulted in the Project Team creating proposed bicycle and pedestrian facility recommendations, which include the following:

- Completion of the Eastern Trail.
- Provision of bicycle and pedestrian facilities (shoulders/sidewalks) on Town roadways of significance.
- Future development standards that integrate other modal provisions into the local approvals process.
- Town standards for bicycle and pedestrian facility design, including:
  - Crosswalk markings
  - Signing
  - Pedestrian signal hardware/ software
  - Lighting.
- Bicycle-pedestrian facility maintenance programs, including:
  - Traffic sign inspection program
  - Pedestrian signal inspection
  - Sidewalk repair

# Section IV: Transportation System Improvement Program Cost Summary

Following the determination for improvements to be made to the Town's transportation network, the Project Team completed preliminary opinions of probable construction cost to provide the Town with a sense of the magnitude of these improvements.

The opinions were based on MaineDOT standard unit prices, and reflect current unit pricing. As projects extend into the future, costs will increase.

Based on the opinions, the Team completed the following totals:

**Intersection Improvements:**

| | |
|---|---|
| Vehicular Improvement Cost: | $14,858,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $13,795,000.00 |
| Total Cost: | $28,653,000.00 |

**Corridor Improvements:**

| | |
|---|---|
| Vehicular Improvement Cost: | $4,250,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $24,220,000.00 |
| Total Cost: | $28,470,000.00 |

Although these totals represent a sizeable sum of money, it would integrated into a long-term Improvement Plan that could derive its funding from several sources, ranging from federal, state, and local transportation dollars to off-site improvements associated with private development. With the improvements in place, the Town of Scarborough will have a comprehensive transportation network that serves the needs of its residents and businesses well into the future.

# Table of Contents

## Section I: Existing Conditions



(Note: Figures 4 and 5 in Section V)

# Section II: Future Traffic Conditions

# Section III: Recommended Transportation System Improvement Program

(Note: Figures in Section V)

# Section IV: Transportation System Improvement Cost Summary

## INTRODUCTION

This memorandum is the first of two being prepared for the Scarborough Transportation Study. The content includes a summary of year 2003 roadway and intersection traffic conditions, an assessment of pedestrian/bicycle facilities and, finally, a thorough review of current Town access management rules and regulations.

Traffic data was gathered at each major intersection within the community during the summer of 2003. The traffic data was then summarized and processed with required adjustments to reflect "peak" travel conditions for 2003. The adjusted traffic data was then used to complete analyses of traffic mobility for each study intersection.

The Maine Department of Transportation's Accident Records Section provided the most recent three-year collision summary for all public roads and intersections within the community. This data was summarized and a thorough review completed for all identified high "crash" sites for the roadway system.

The assessment of pedestrian/bicycle facilities included the location and conditional evaluation of all existing town-wide pedestrian facilities. Both pedestrian sidewalks and traffic control equipment was field rated as to performance and serviceability. The single town bicycle corridor, Pine Point Road, was field inspected to verify bicycle lane striping and signing provisions. Additionally, all major road corridors in the community were traveled and "spot" measurements collected to determine the barriers and restrictions for possible expansion of the bicycle network.

Finally, an in-depth review of the Town's ordinances and rules governing access management was completed. The review also provides a comparison of recommended access management standards adopted by federal, state and other municipalities.

## EXISTING 2003 TRAFFIC

### Traffic Data Collection Program

Vehicle turning movement counts were conducted at forty-nine "major" intersections during the summer months of 2003. (Refer to Appendix A for a listing of the actual locations and traffic count periods.) Both vehicular and pedestrian traffic data was gathered manually at all locations during the PM commuter hours (3:30 to 6:00pm). A limited sample study was also completed at five locations for the AM commuter hours (7:00 to 9:00am) and the peak travel periods on Saturday and Sunday (11:30am to 1:30pm). All traffic entering each intersection was recorded in 15-minute intervals between the noted hours. (Appendix B contains copies of the individual traffic count cards for each location.) The locations of the study area intersections are illustrated on Figure 1.

Additionally, seven-day automatic traffic recorder counts were conducted on Payne Road near the Nonesuch River and on Route 114 west of Running Hill Road for the purpose of determining both daily and hourly variations in traffic.

**Summary of Manual Traffic Data**

Each manual traffic count was individually summarized and a peak hour of traffic selected for each traffic count (AM peak, PM peak, Saturday peak and Sunday peak) period. Table 1, which compares the "peak" vehicular traffic data collected at nine locations, was developed to support the determination of a system wide peak hour of traffic.

As depicted in the table, traffic data collected during the PM peak hour is significantly greater than the sample data collected at five of the same locations in the AM peak hour. For example, the total volume of traffic recorded in the AM peak hour at Route 114/Payne Road is 1,736 vehicles and the comparative PM peak hour volume is 2,918 vehicles.

At three of the five locations, where weekend traffic data was collected, the peak traffic volumes recorded on Saturday exceed the comparative weekday PM peak hour condition. At one of the three locations, the Route 1/Broadturn Road/Pine Point Road intersection, the actual recorded difference between the PM peak and Saturday peak volumes is less than 50 vehicles out of more than 3,000 total vehicles. At the remaining two locations, which are entry intersections to two public beach areas, the difference is far more significant.

**Summary of Automatic Traffic Recorder (ATR) Counts**

Figures 2 and 3 graphically present the average hourly variations in traffic for both locations; Route 114 and Payne Road, where seven-day automatic traffic counts were conducted. (Additionally, summary charts and graphs are attached as Appendix C.) The summary charts clearly show that the PM peak hour traffic condition is the peak weekday travel condition. On Route 114, the PM peak hour occurs between 4:00 and 5:00pm, when nearly 1,600 vehicles crossed the counting tubes. The average volume recorded during the AM peak hour for the same location was less than 1,400 vehicles. At the second location, Payne Road at the Nonesuch River, the volume of traffic recorded in the afternoon peak hour is significantly greater (1,800+ vs. 1,000) than the average volume recorded during the morning peak commuter hour. Further summarization of the data shows the average weekday daily traffic volumes are more than nine percent higher than the average daily Saturday and twenty-six percent higher than the average daily Sunday traffic volumes on Payne Road. The difference recorded at the Route 114 count station shows a greater percentage difference (15%) on Saturday and a similar difference (25%) between the weekday and Sunday daily traffic volumes, as was recorded at the Payne Road count location.

The manual and automatic traffic recorder count data further supports the conclusion that the weekday PM peak hour traffic condition is the "peak" travel condition for the Town of Scarborough's roadway network.

**"Peak" Traffic Volume Adjustments**

There are two, yet very distinct and separate adjustments that are required in developing estimated "peak" 2003 hourly travel forecasts for each of the study intersections. Those adjustments include: (1) traffic balancing between closely spaced intersections and (2) other development traffic impacts.

**Table 1**
**"Peak" Traffic Volume Comparison**

| Intersection/Approach | Weekday AM "Peak Volume | Weekday PM "Peak" Volume | Saturday "Peak" Volume | Sunday "Peak" Volume |
|---|---|---|---|---|
| 1. Route 1/Broadturn Rd.& Pine Point Rd. | | | | |
| - Route 1 SB | 538 | 1730 | 1455 | 1391 |
| - Route 1 NB | 1199 | 868 | 1052 | 943 |
| - Broadturn Rd. | 426 | 184 | 185 | 187 |
| - Pine Point Rd | 426 | 382 | 516 | 541 |
| **TOTAL:** | **2589** | **3164** | **2874** | **2686** |
| 2. Route 1/Payne Rd. & Harlow St. | | | | |
| - Route 1 SB | 482 | 1435 | 1002 | 886 |
| - Route 1 NB | 1816 | 1107 | 1369 | 1297 |
| - Payne Rd. | 125 | 544 | 426 | 418 |
| - Harlow St. | 52 | 83 | 77 | 85 |
| **TOTAL:** | **2475** | **3169** | **2874** | **2686** |
| 3. Pine Point Rd., East Grande Ave. & Jones Creek Dr. | | | | |
| - Pine Point Rd. | -- | 354 | 397 | 562 |
| - Pine Point Beach | -- | 80 | 112 | 140 |
| - East Grande Ave. | -- | 215 | 355 | 339 |
| - Jones Creek Dr. | -- | 128 | 126 | 155 |
| **TOTAL:** | **--** | **777** | **990** | **1196** |
| 4. Payne Rd., Haigis Parkway & MTA Exit 42 | | | | |
| - Payne Rd NB | 379 | 252 | -- | -- |
| - Payne Rd SB | 249 | 832 | -- | -- |
| - MTA Exit 6 | 435 | 495 | -- | -- |
| - Haigis Parkway | 260 | 297 | -- | -- |
| **TOTAL:** | **1323** | **1873** | **--** | **--** |
| 5. Route 1, Route 114 & Blackpoint Rd. | | | | |
| - Route 1 NB | -- | 1290 | 1115 | 946 |
| - Route 1 SB | -- | 1425 | 1039 | 1008 |
| - Route 114 | -- | 576 | 365 | 362 |
| - Black Point Rd. | -- | 787 | 609 | 589 |
| **TOTAL:** | **--** | **4078** | **3128** | **2905** |
| 6. Route 77/Higgins Beach | | | | |
| - Route 77 NB | -- | 215 | 247 | 300 |
| - Route 77 SB | -- | 226 | 268 | 355 |
| - Higgins Beach | -- | 112 | 140 | 191 |
| **TOTAL:** | **--** | **553** | **655** | **846** |

| | | | | |
|---|---|---|---|---|
| 7. Route 1/Pleasant Hill Rd. | | | | |
| - Route 1 NB | 485 | 446 | -- | -- |
| - Route 1 SB | 576 | 667 | -- | -- |
| - Pleasant Hill Rd. | 514 | 740 | -- | -- |
| **TOTAL:** | **1575** | **1853** | **--** | **--** |
| 8. Route 114/Payne Rd. | | | | |
| - Payne Rd. NB | 656 | 565 | -- | -- |
| - Payne Rd. SB | 264 | 1269 | -- | -- |
| - Route 114 EB | 581 | 407 | -- | -- |
| - Route 114 WB | 235 | 677 | -- | -- |
| **TOTAL:** | **1736** | **2918** | **--** | **--** |
| 9. Route 22, Saco St. & Beech Ridge Rd. | | | | |
| - Route 22 EB | 582 | 242 | -- | -- |
| - Route 22 WB | 121 | 794 | -- | -- |
| - Saco St. | 506 | 401 | -- | -- |
| - Beech Ridge Rd. | 177 | 385 | -- | -- |
| **TOTAL:** | **1386** | **1822** | **--** | **--** |

**Figure 2: Route 114 North of Running Hill Road: August 11-15, 2003**

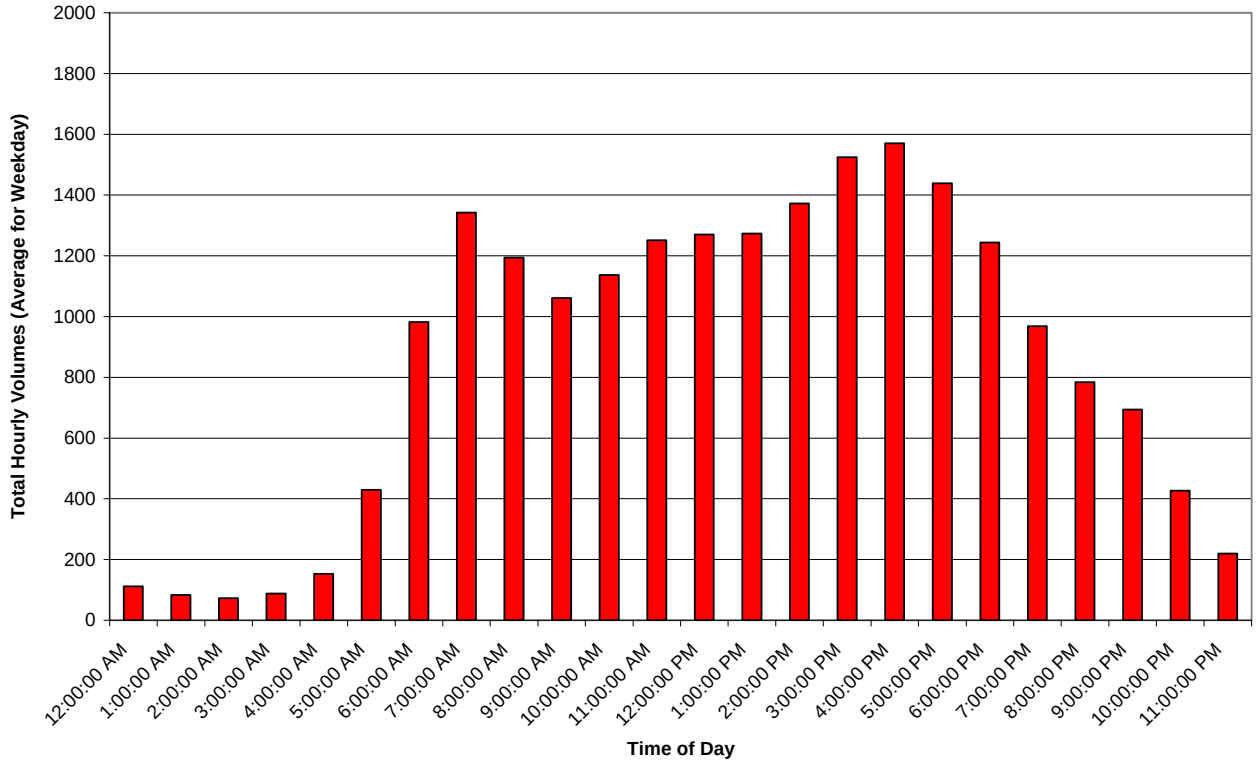
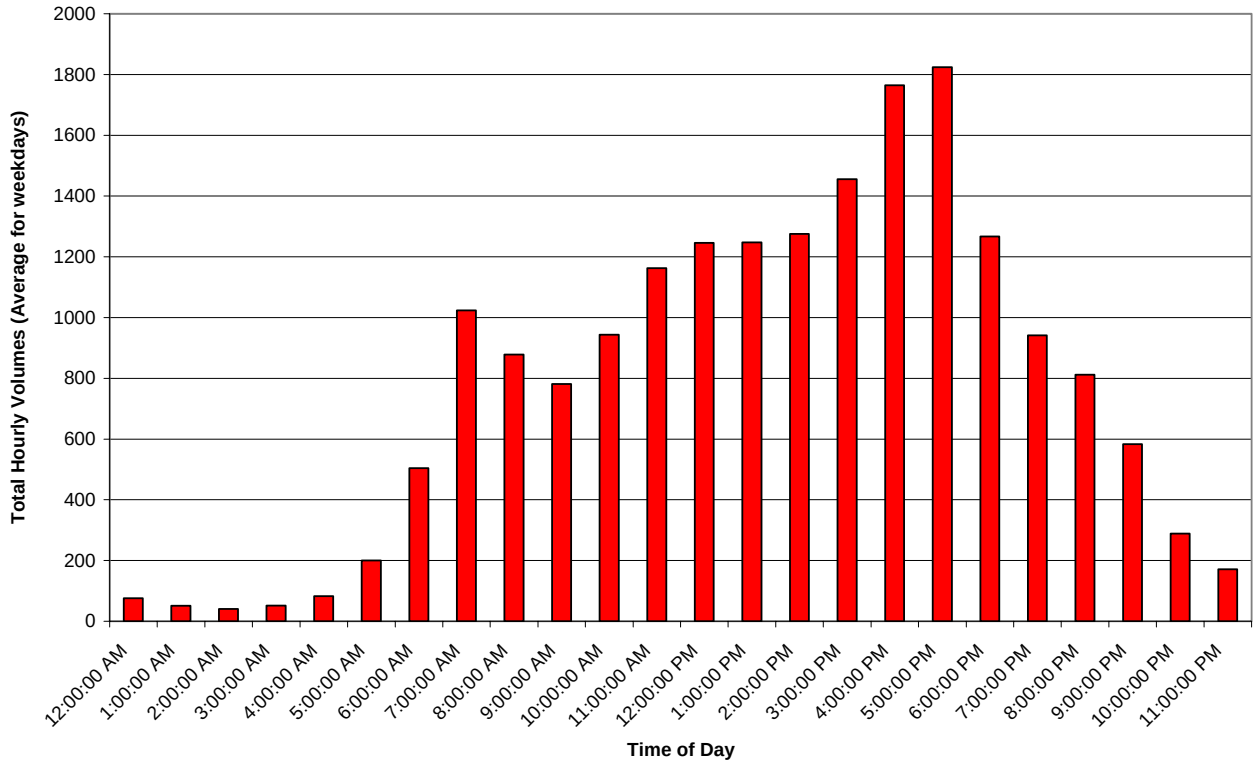



**Figure 3: Payne Road South of Mussey Road: August 4-11, 2003**



## Traffic Volume Balancing

Traffic data recorded at intersections that are closely spaced oftentimes requires an adjustment that balances or equalizes the volume of traffic between each location. For example, the difference in through traffic volumes at the two Dunstan Corner intersections, prior to the adjustment, was in excess of 200 vehicles. This difference in traffic volumes was hand adjusted by increasing one side of the intersection by half the difference and decreasing the other side by a similar amount. This balancing adjustment was completed for eight area locations, which are listed as follows:

1. Dunstan Corner intersections
2. Eight Corners intersections
3. Payne Road, Bridges Drive and Holmes Road intersections
4. Payne Road, Route 114 to Wal-Mart intersections
5. Payne Road, Spring Street (E) to Spring Street (W) intersections
6. Route 1, Town Hall to Commerce Drive intersections
7. Route 114, Route 22, Saco Street, Beech Ridge Road intersections
8. Black Point Road, Fogg Road and Highland Avenue intersections

## Other Development Traffic Adjustments

Traffic generated from development projects that are under construction, yet not opened, as well as projects for which applications have been filed with the State and/or local Planning Board, must be included in the development of "peak" 2003 traffic conditions. The following list of projects and their traffic impacts were added to the base 2003 "peak" traffic data to estimate 2003 "peak" travel conditions for the study intersections:

1. Enterprise Business Park
2. Windward Heights Subdivision
3. Sam's Club Fueling Station
4. Ballantyne Adult Community
5. Scarborough Professional Building
6. Sullivan Tire Retail Center
7. Sudzie Car Wash
8. Shady Pine Motel
9. Mercedes-Benz Center
10. Walter C. Nielsen Business Park
11. New Road Subdivision
12. Scarborough High School (does not affect PM peak hour)

Figures 4 and 5, illustratively present the forecasted 2003 "peak" travel conditions at each of the 49 study intersections.

**Historical Traffic Comparison**

The Portland Comprehensive Transportation Study (PACTS) in 1988 conducted a comprehensive traffic study of the Maine Mall/Portland Jetport area. The study scope involved the collection of peak traffic data at a number of intersections within the Town of Scarborough. In total, peak traffic data was gathered at twelve intersections in the Town of Scarborough that match the same locations where current 2003 traffic data was gathered. Table 2 (below), compares the volume of entering intersection traffic as presented in the 1988 report and the most recent traffic data collected in 2003.

**Table 2**
**Historical Traffic Data Comparison**

| | **Total Intersection Volume – PM Peak Hour** | | |
|---|---|---|---|
| **Intersection** | **1988 Traffic** | **2003 Traffic** | **Percent Difference** |
| 1. Payne Road/Mussey Road | 1,045 | 1,831 | 75.2% |
| 2. Payne Road/Route 114 | 1,788 | 2,918 | 63.3% |
| 3. Payne Road/Spring Street(W) | 1,948 | 3,524 | 80.9% |
| 4. Mussey Road/Route 114 | 648 | 1,434 | 121.3% |
| 5. Mussey Road/Spring Street | 660 | 1,433 | 117.1% |
| 6. Route 22/Saco Road & Beech Ridge Road | 1,197 | 1,822 | 52.2% |
| 7. Route 22/Route 114 | 1,749 | 2,124 | 21.4% |
| 8. Route 114/Running Hill Road | 1,441 | 1,580 | 9.6% |
| 9. Oak Hill Intersection | 3,087 | 4,078 | 32.1% |
| 10. Route 1/Sawyer Road | 2,168 | 2,889 | 33.3% |
| 11. Route 1/Pine Point Road | 3,037 | 3,164 | 4.2% |
| 12. Route 1/Payne Road & Harlow Street | 2,734 | 3,169 | 15.9% |
| **TOTAL:** | **21,502** | **29,966** | **39.4%** |

The change in traffic growth between 1988 and 2003 ranges from a high of 121% at the Route 114/Mussey Road intersection and a low of 4.2% at the Route 1/Pine Point Road/ Broadturn Road intersection. The average change in traffic for the twelve intersections is 39.4%, which represents an annual growth rate of approximately 2.3%. ***The reader is cautioned that both sets of data (1988 and 2003) are single-day information; therefore, the actual comparative value of the two points of data is limited.***

## TRAFFIC SAFETY ASSESSMENT

The Maine Department of Transportation (MDOT) provides, upon request, traffic accident data for all public roadways and intersections within a designated geographic area. The accident data summaries are typically presented for the latest three-year time period, which presently includes the years 1999 through 2001. MDOT's reporting system includes specific information on the number of collisions for each location, percent of injuries, a critical rate factor (which is a value that compares the frequency of accidents at a specific location with a statewide average for a

similar location) and a number of general characteristics that include: time of day, road condition, month of the year, day of the week, etc. The MDOT, in assessing the present safety condition of an intersection or roadway link, considers any location where **both** of the following criteria are met a high crash location:

- ***8 or more crashes over three years***
- ***A reported Critical Rate Factor of 1.00 or greater***

Traffic collision reports were requested from MDOT for all roadways and intersections exclusive of the Maine Turnpike (Route I-95). A detailed review of the data shows there are presently 16 locations in the Town of Scarborough that meet and/or exceed MDOT's minimum criterion for identification of a high crash location. Each location is identified in Table 3 accompanied with the reported number of collisions and the measured Critical Rate Factor:

**Table 3**
**1999 through 2001 Crash History Summary**

| Location | Number of Crashes | Critical Rate Factor |
|---|---|---|
| 1. Route 114 between Route 1 and High School Drive | 17 | 4.84 |
| 2. Route 114 @ Running Hill Road | 16 | 2.10 |
| 3. Route 114 @ Mussey Road | 30 | 5.80 |
| 4. Route 114 @ Payne Road | 36 | 1.23 |
| 5. Running Hill Road between New Road and Green Road | 8 | 1.25 |
| 6. Running Hill Road between New Road and So. Portland City line | 11 | 1.15 |
| 7. Payne Road between Regal Pines Road and Scottow Hill Road | 13 | 1.77 |
| 8. Payne Road @ Haigis Parkway/Exit 42 | 32 | 1.35 |
| 9. Mussey Road @ Spring Street | 36 | 9.78 |
| 10. Hearne Road @ Ash Swamp Road | 10 | 8.33 |
| 11. Spring Street between South Portland City line and Payne Road | 8 | 1.37 |
| 12. Blackpoint Road between Route 1 and Thornton Road | 15 | 1.36 |
| 13. Broadturn Road between Martin Road and Route 1 | 9 | 1.25 |
| 14. Route 1 between Fairfield Road and Westwood Avenue | 10 | 1.28 |
| 15. Route 1 @ Old Blue Point Road | 13 | 1.45 |
| 16. Route 1 between Orchard Road and Pine Point Road | 24 | 1.27 |

Detailed collision diagrams were prepared for each of the reported 16 locations. The reports depict the general type and location of each reported collision for the identified roadway segment or intersection. Other information highlighted include the date, time of week and day, road conditions, apparent contributing factors causing the collision, lighting and weather conditions, etc. (Copies of the collision diagrams for each "high-crash" location are attached as Appendix D.)

The following probable cause summary has been prepared for each high crash location based upon the detailed information presented in the noted vehicle collision diagrams and an extensive field review of present roadway conditions:

**Route 114 between Route 1 and High School Drive**

Ten of the 17 total collisions reported for this location involved vehicles turning left to or from the Exxon Station, which is located on the southwest corner of the Route 1/Route 114 intersection. Nine of the 10 collisions occurred during busy commuter or high school discharge hours when the Route 114 eastbound travel lanes approaching Route 1 are generally fully occupied with queued vehicles. There are a total of three approach lanes designated for eastbound Route 114, which further increases the difficulty in attempting to cross to or from the Exxon Station. Three of the remaining seven collisions reported for this section of Route 114 involved traffic turning left to/from Burger King. The remaining four collisions noted for this segment occurred randomly throughout the roadway link.

**Route 114 at Running Hill Road**

Eight of the reported 16 crashes happened on the Running Hill Road approach of the intersection. Vehicle operators, attempting to turn right from Running Hill Road onto westbound Route 114, are struck from behind as they enter the intersection. The collision report filed for each individual crash suggests that the majority of these incidents occur after the first vehicle starts forward and then abruptly stops because an acceptable vehicle gap does not exist in the Route 114 westbound traffic stream. Four additional crashes occurred on Route 114, again, as a result of a rear-end collision. Travel speeds of vehicles traveling in either direction along Route 114 appear, based upon field observations, to be excessive, which significantly adds to the difficulty in attempting to turn to or from the Running Hill Road approach of the intersection. Vehicle sightlines from the Running Hill Road approach are more than acceptable in either direction.

**Route 114 at Mussey Road**

Virtually all of the collisions reported for this location occurred prior to completion of the recent traffic improvements at the intersection. The MDOT reports that the sequenced traffic signals at the intersection were activated in August 2000. Six of the 30 reported traffic accidents for the intersection occurred after this date. The intersection, based upon the "after improvement" statistics, does meet the criteria of a high crash location.

**Route 114 at Payne Road**

The most prevalent crash type occurring within this very busy intersection is "angle" crashes involving through traffic on either Payne Road or Route 114 being struck by vehicle operators "running" a red light from an opposing traffic movement. There were a total of 13 accidents of this type. Field observations during busy peak commuter hours generally confirms that a somewhat high frequency of vehicle operators continue through the intersection on a red signal indication. Another significant crash type involves through vehicles traveling easterly on Route 114 colliding with traffic turning left from westbound Route 114 onto Payne Road. There were eight collisions reported with this designation. Based upon field observations, it would appear that the westbound left-turn vehicle operator has extreme difficulty seeing the eastbound through vehicle when vehicles are queued in the eastbound dual left-turn lanes. Another significant accident pattern (occurring within the intersection) involves through traffic on Payne Road being

struck by operators traveling eastbound on Route 114. A number of "rear-end" collisions (7 total accidents) occur throughout the intersection, which is generally considered typical for a busy traffic signalized intersection. The remaining eight accidents occur randomly within the intersection and do not meet any definable accident pattern.

**Running Hill Road between New Road and Green Road**

Three of the eight collisions reported for this location involved vehicle/deer collisions. Warning signs indicating the possible presence of deer in the road do not exist within this section of road. Vehicle speed was reported as a contributing factor on three additional collisions. Running Hill Road is clearly posted with 35mph signs, however, advance warning signs noting dangerous horizontal curves are missing traveling east on Running Hill Road. The remaining two collisions occurred randomly along the section of road.

**Running Hill Road between New Road and the South Portland City Line**

Five of the 11 crashes involved excessive vehicle speed. In three of the collisions, the vehicle left the road and struck a fixed object. Four additional crashes are labeled "rear-end" collisions when a vehicle was attempting to turn into a driveway and the following vehicle struck the turning vehicle. It is possible, although difficult to ascertain from the collision reports, that vehicle speed of the following vehicle may have been a contributing factor in these collisions as well. Roadside vegetation within the road right-of-way limits vehicle sight distance throughout the section of road. A curve warning sign for westbound traffic is missing in the general vicinity of house #122.

**Payne Road between Regal Pines Road and Scottow Hill Road**

Nine of the 11 reported accidents occurred during the winter months on reported ice or snow covered roads. The vertical grade of Payne Road, just prior to and through the noted section, is very steep which certainly compounds winter travel conditions. Driver speeds were also identified as contributing factors leading to the collision. In each case, the vehicle driver was traveling at an unsafe speed for the current road conditions.

**Payne Road/Haigis Parkway/Exit 42 MTA**

Fourteen of the 32 reported crashes involved vehicles turning left from either the Payne Road approach or the Exit 42 MTA approach colliding with opposing through traffic. The existing traffic signal system does not provide separate protected signal indications for left-turn traffic movements within the intersection. The number of vehicles turning left during peak travel periods is somewhat significant on the noted approaches, which greatly increases the probability of a vehicle crash. Eight of the remaining 18 crashes were "angle" collisions involving traffic exiting the Maine Turnpike Exit 42 colliding with through traffic on Payne Road. A closer inspection of the filed collision reports shows that the majority of the "angle" crashes occurred when vehicles approaching the intersection from Exit 42 failed to stop for a red light and struck through vehicles traveling through the intersection on Payne Road. Vehicle approach speeds appear to be a possible contributing factor to the higher than expected incidence of "angle"

collisions. Seven of the remaining 18 collisions listed for the intersection were "rear-end" collisions involving vehicles attempting to turn left and being struck from behind.

**Spring Street at Mussey Road**

Twenty-six of the reported 36 vehicle collisions occurred before activation of the recently installed traffic signal improvements. Six of the 10 crashes occurring after installation of the sequenced traffic signals were "angle" collisions involving drivers running a red light activation. This exceptionally high frequency of "angle" collisions is somewhat alarming in that properly operating traffic signals are supposed to eliminate or significantly reduce "angle" collisions within an intersection. In-field observations would suggest that the operating speed of approaching vehicles, during off-peak periods, appears to be somewhat above a safe operating speed.

**Ash Swamp Road at Hearne Road**

Eight of the 10 reported crashes were "angle" collisions involving through vehicles on Ash Swamp Road being struck by vehicles entering the intersection from either approach of Hearne Road. The posted speed limit of both roads is 40mph, which requires vehicle sightlines of at least 400 feet from the side street approaches. The sightlines looking east from either approach of Hearne Road are restricted due to over growth of brush and small trees in the defined vehicle sight triangle.

**Spring Street between the South Portland City Line and Payne Road**

Five of the eight collisions were "rear-end" crashes involving vehicles queued for the traffic signal at Payne Road. Two of the remaining collisions were "angle" crashes at the entrance drives to Fairfield Inn and Scarborough Court. Vehicle sight distance is severely restricted within this section of Spring Street due to the abruptness of the I-95 overpass. Warning signs advising motorists of the possible stopped traffic ahead do not presently exist prior to the crest of the MTA bridge structure. Spring Street is presently not posted for speed, which certainly does not encourage safe operating speeds of approaching motorists.

**Blackpoint Road between Route 1 and Thornton Road**

Seven of the 15 collisions reported for this section of highway were directly caused from motorists attempting to turn left to or from the Mobil Service Station. Blackpoint Road, in the general location of the Mobil Service Station, is striped with three Route 1 approach lanes, similar to the Route 114 approach. Attempting to turn across three approach lanes during busy peak commuter hours is very difficult and generally very unsafe. Five of the seven accidents occurred during either peak commuter hours or high school discharge hours. An additional five "rear-end" collisions were reported to occur in the eastbound lane, which may have been indirectly caused by vehicles waiting to turn into the Mobil Service Station. The traffic accident reports are inconclusive in this regard. The five remaining crashes occurred over this short section of Blackpoint Road. The present roadway striping does not extend back a sufficient distance to properly transition vehicles into the three approach lanes. It was noted, based upon

field inspection, that vehicle sight distance looking right from Thornton Road is severely restricted due to a small spruce tree and the back slope of the adjoining property.

**Broadturn Road between Martin Road and Route 1**

Three of the nine reported traffic collisions occurred on snow or ice conditions, although vehicle speeds was not specifically mentioned as a contributing factor. Two additional crashes occurred when a motorist had mechanical problems. The remaining four crashes occurred randomly throughout the section of roadway. The in-field inspection did note that vehicle sight distance looking left from Martin Road is restricted due to a number of small bushes. Exiting from the Mobil Service Station, near Route 1, the sightline to the left is partially limited, again, due to bushes and small trees. Broadturn Road appears to be very abruptly super elevated around the sharp horizontal curve, which might be a contributing factor in the number of winter road accidents.

**Route 1 between Fairfield Road and Westwood Avenue**

Eight of the 10 reported crashes were "rear-end" crashes involving northbound Route 1 traffic. Seven of the eight accidents occurred during peak commuter hours, most likely as a result of vehicle queues extending back from the Oak Hill intersection. Winter road conditions were a factor reported for only one of the eight crashes. The apparent contributing factor listed by the police officer at the scene was driver inattention.

**Route 1 at Old Blue Point Road**

Six of the 13 crashes involved drivers attempting to turn left from Route 1 to Old Blue Point Road being struck from behind. There were three additional "rear-end" collisions that occurred when a motorist attempted to turn right from Old Blue Point Road onto Route 1 northbound. The remaining four crashes occurred randomly within the intersection. A flashing warning beacon presently is mounted over the intersection warning approaching drivers of the safety concerns of the intersection. Route 1 is presently striped with four through lanes with no exclusive travel lane for left-turning traffic.

**Route 1 between Orchard Road and Pine Point Road**

"Rear-end" collisions are the predominate type of crash occurring within this section of roadway. Five "rear-end" crashes occurred in the southbound Route 1 travel lanes. In each case, it would appear that a vehicle was stopped attempting to make a left turn into one of the adjacent businesses. There were three additional "rear-end" crashes that occurred in the northbound lanes randomly throughout the road segment. Six accidents involved vehicles turning left from Route 1 striking a vehicle approaching in the opposite direction. Five "angle" collisions occurred when vehicles exiting from a number of the adjacent businesses were struck by a through vehicle traveling either north or south on Route 1. Route 1, throughout this section, is striped with four through travel lanes. There are no special provisions provided for left-turning traffic. The Dunstan Plaza presently has five uncontrolled access points on Route 1. Emergency fire apparatus leaving the Scarborough Fire Station provide very limited warning to approaching

vehicles. Their emergency entry into the Route 1 traffic stream is identified via a post mounted red caution light in each direction that flashes when activated.

## TRAFFIC MOBILITY SUMMARY

### Unsignalized Intersection Capacity

Capacity analyses were performed for each of the twenty-four unsignalized study intersections to determine level of service under "peak" 2003 traffic loadings. The analyses were completed using the Highway Capacity 2000 Version 4-1c software package. Levels of Service rankings are similar to the academic ranking system, where an "A" is very good with little delay and an "F" represents very poor conditions. At an unsignalized intersection if the Level of Service falls below "D" further evaluation should be completed as to whether sequenced traffic signals or additional travel lanes are warranted. The following table summarizes the relationship between delay and level of service for unsignalized intersections:

**Level of Service Criteria for Unsignalized Intersections**

| Level of Service | Total Control Delay (sec/veh) |
|---|---|
| A | Up to 10.0 |
| B | 10.1 to 15.0 |
| C | 15.1 to 25.0 |
| D | 25.1 to 35.0 |
| E | 35.1 to 50.0 |
| F | Greater than 50.0 |

The results of the analysis are presented in the following Table 4:

**Table 4**
**Year 2003 – Unsignalized Intersection**
**CAPACITY SUMMARY**

| Intersection/Approach | Total Delay (seconds) | Level of Service | 95% Vehicle Queue (Length in Vehicles) |
|---|---|---|---|
| 1. Route 77/Ocean Avenue | | | |
| - Ocean Ave. Lt. | 14 sec. | A | 1 veh. |
| - Ocean Ave. Rt. | 10 sec. | A | 1 veh. |
| - Route 77 SB Lt. | 8 sec. | A | 1 veh. |
| 2. Route 77/Blackpoint Road | | | |
| - Route 77 | 22 sec. | C | 5 veh. |
| - Blackpoint Road EB Lt. | 9 sec. | A | 1 veh. |
| 3. Blackpoint Road/Fogg Road | | | |
| - Fogg Road | 17 sec. | C | 2 veh. |
| - Blackpoint Road EB Lt. | 9 sec. | A | 1 veh. |
| 4. Blackpoint Road/Highland Avenue | | | |

| | | | |
|---|---|---|---|
| - Highland Avenue Lt. | 54 sec. | F | 2 veh. |
| - Highland Avenue Rt. | 19 sec. | C | 4 veh. |
| - Blackpoint Road EB Lt. | 9 sec. | A | 1 veh. |
| 5. East Grande Avenue/Pine Point Road | | | |
| - Island Left-turn Lane | 19 sec. | C | 1 veh. |
| - Pine Point Road Lt. | 8 sec. | A | 1 veh. |
| 6. Pine Point Road/Ross Road | | | |
| - Ross Road | 20 sec. | C | 2 veh. |
| - Pine Point Road WB Lt. | 9 sec. | A | 1 veh. |
| 7. Pleasant Hill Road/Route 77 | | | |
| - Pleasant Hill Road | 17 sec. | C | 3 veh. |
| - Route 77 NB Lt. | 8 sec. | A | 1 veh. |
| 8. Pleasant Hill Road/Fogg Road | | | |
| - Fogg Road | 11 sec. | B | 1 veh. |
| - Pleasant Hill Road WB Lt. | 8 sec. | A | 1 veh. |
| 9. Pleasant Hill Road/Highland Avenue | | | |
| - Pleasant Hill Road EB | 181 sec. | F | 8 veh. |
| - Pleasant Hill Road WB | 15 sec. | C | 3 veh. |
| - Highland Avenue NB | 14 sec. | B | 3 veh. |
| - Highland Avenue SB | 24 sec. | C | 6 veh. |
| 10. Payne Road/Mussey Road | | | |
| - Mussey Road | 447 sec. | F | 107 veh. |
| - Payne Road SB Lt. | 9 sec. | A | 1 veh. |
| 11. Payne Road/Spring Street (E) | | | |
| - Spring Street WB Lt. | 485 sec. | F | 5 veh. |
| - Spring Street WB Rt. | 18 sec. | C | 3 veh. |
| - Payne Road SB Lt. | 14 sec. | B | 3 veh. |
| 12. Payne Road/Bridges Drive | | | |
| - Bridges Drive | 85 sec. | F | 3 veh. |
| - Payne Road NB Lt. | 13 sec. | B | 1 veh. |
| 13. Payne Road/Beech Ridge Road/Scottow Hill Road | | | |
| - Scottow Hill Road | 21 sec. | C | 1 veh. |
| - Beech Ridge Road | 15 sec. | C | 1 veh. |
| - Payne Road NB Lt. | 8 sec. | A | 1 veh. |
| - Payne Road SB Lt. | 8 sec. | A | 1 veh. |
| 14. Route 114/Running Hill Road | | | |
| - Running Hill Road | 212 sec. | F | 31 veh. |
| - Route 114 EB Lt. | 11 sec. | B | 1 veh. |
| 15. Route 114/Spring Street | | | |
| - Spring Street | 143 sec. | F | 21 veh. |
| - Route 114 EB Lt. | 9 sec. | A | 1 veh. |
| 16. Route 114/Cumberland Way | | | |
| - Cumberland Way Lt. | 53 sec. | F | 2 veh. |
| - Cumberland Way Rt. | 16 sec. | C | 1 veh. |

| | | | |
|---|---|---|---|
| - Route 114 EB Lt. | 10 sec. | A | 1 veh. |
| 17. Route 114/Maple Street | | | |
| - Maple Street | 22 sec. | C | 2 veh. |
| - Route 114 EB Lt. | 10 sec. | A | 1 veh. |
| 18. Broadturn Road/Burnham Road | | | |
| - Burnham Road NB | 12 sec. | B | 1 veh. |
| - Burnham Road SB | 15 sec. | B | 1 veh. |
| - Broadturn Road EB Lt. | 8 sec. | A | 1 veh. |
| - Broadturn Road WB Lt. | 7 sec. | A | 1 veh. |
| 19. Broadturn Road/Holmes Road | | | |
| - Holmes Road NB | 10 sec. | A | 3 veh. |
| - Holmes Road SB | 24 sec. | C | 7 veh. |
| - Broadturn Road EB | 12 sec. | B | 4 veh. |
| - Broadturn Road WB | 11 sec. | B | 3 veh. |
| 20. Beech Ridge Road/Holmes Road | | | |
| - Beech Ridge Road NB | 11 sec. | B | 3 veh. |
| - Beech Ridge Road SB | 12 sec. | B | 4 veh. |
| - Holmes Road EB | 11 sec. | B | 3 veh. |
| - Holmes Road WB | 48 sec. | E | 10 veh. |
| 21. Ash Swamp Road/Hearn Road | | | |
| - Ash Swamp Road EB | 7 sec. | A | 2 veh. |
| - Ash Swamp Road WB | 7 sec. | A | 2 veh. |
| - Hearn Road NB | 7 sec. | A | 2 veh. |
| - Hearn Road SB | 7 sec. | A | 2 veh. |
| 22. Route 1/Old Blue Point Road | | | |
| - Old Blue Point Road | 24 sec. | C | 2 veh. |
| - Route 1 SB Lt. | 12 sec. | B | 2 veh. |
| 23. Route 1/Maple Street | | | |
| - Maple Street | 158 sec. | F | 4 veh. |
| - Route 1 NB Lt. | 19 sec. | C | 1 veh. |
| 24. Haigis Parkway/Scottow Hill Road | | | |
| - Scottow Hill Road | 11 sec. | B | 1 veh. |
| - Haigis Parkway WB Lt. | 8 sec. | A | 1 veh. |

Traffic delays on the side-street approaches at ten of the twenty-four unsignalized intersections are representative of Level of Service “E” of “F” conditions. The level of delay at these ten intersections range from more than 450 seconds at the Payne Road/Spring Street (E) intersection to a low of 53 seconds for traffic on Cumberland Way at Route 114. Traffic delay on one approach of two multi-way stop controlled intersections (Pleasant Hill Road/Highland Avenue and Holmes Road/Beech Ridge Road) also experience levels of delay below Level of Service “D” standards.

In evaluating the significance of the Level of Service for the side-street approaches, it is important to review the length of vehicle queue. For example, the level of service for the side street may exceed Level of Service D conditions, yet the volume of traffic on that approach or traffic movement may be a very minor volume of traffic. Conversely, when the length of vehicle queue

is very long it is safe to assume that the volume of traffic on the side-street approach is somewhat significant. The 95th percentile vehicle queue at four of the ten deficient intersections (Route 114/Spring Street, Route 114/Running Hill Road and Holmes Road/Beech Ridge Road) exceed 10 vehicles in length, or approximately 200 to 250 feet. There were two additional intersection approaches (Pleasant Hill Road/Highland Avenue and Holmes Road/Broadturn Road) where the length of vehicle queue was between 5 and 8 vehicles, or 150 to 200 feet in length.

**Signalized Intersection Capacity**

Capacity analyses were completed for each of the twenty-five signalized study intersections to determine level of service under "peak" 2003 traffic loadings.

The analyses were completed with the Synchro Version 5 signal analysis software, with certain locations (Dunstan Corner and County Road areas) analyzed in SimTraffic, Version 6. This software allows analysis to account for signal coordination, as well as proximity to other signalized locations. Levels of service rankings are similar to the academic ranking system where an 'A' is very good with little control delay and an 'F' represents very poor conditions. A level of service 'D' and higher is desirable for a signalized intersection.

The following table summarizes the relationship between control delay and level of service for a signalized intersection:

**Level of Service Criteria for Signalized Intersections**

| Level of Service | Control Delay per Vehicle (sec) |
|---|---|
| A | Up to 10.0 |
| B | 10.1 to 20.0 |
| C | 20.1 to 35.0 |
| D | 35.1 to 55.0 |
| E | 55.1 to 80.0 |
| F | Greater than 80.0 |

In addition to the delay and level of service information, queuing information for each approach has been presented. In some circumstances, a signalized intersection operating at an acceptable level of service may have extensive queues which do not clear an intersection during the course of a signal phase, potentially interfering with operations at adjacent signalized (or unsignalized) locations. It is important to note that the queues noted in the table are the longest queues reported for a given approach.

The Synchro software is adequate for analysis of most signalized locations. However, the software is of limited value where signalized intersections are in close proximity, such that traffic from one intersection may queue into another (commonly described as spillback), interfering with overall system operation. In the situations such as Dunstan Corner, where proximity was important, the SimTraffic animated model was utilized to account for issues of spillback. Where SimTraffic was utilized, the intersection was noted with an asterisk.

**Table 5**
**Year 2003 – Signalized Intersection**
**CAPACITY SUMMARY**

| Intersection/Approach/Movement | Total Delay (seconds) | Level of Service | 95% Vehicle Queue (Length in Vehicles) |
|---|---|---|---|
| Route 1/South Gate Road | | | |
| Route 1 NB | 2 | A | 4 veh. |
| Route 1 SB | 3 | A | 8 veh. |
| South Gate WB | 19 | B | 2 veh. |
| Route 1/Pleasant Hill Road | | | |
| Route 1 NB | 4 | A | 2 veh. |
| Route 1 SB | 33 | C | 10 veh. |
| Pleasant Hill WB | 15 | B | 12 veh. |
| Route 1/Haigis Parkway | | | |
| Route 1 NB | 16 | B | 11 veh. |
| Route 1 SB | 48 | D | 34 veh. |
| Haigis EB | 32 | C | 9 veh. |
| Lincoln WB | 27 | C | 6 veh. |
| Route 1/Willowdale Road | | | |
| Route 1 NB | 12 | B | 11 veh. |
| Route 1 SB | 18 | B | 21 veh. |
| Enterprise EB | 18 | B | 8 veh. |
| Willowdale WB | 10 | B | 2 veh. |
| Route 1/Scarborough Downs | | | |
| Route 1 NB | 3 | A | 3 veh. |
| Route 1 SB | 6 | A | 11 veh. |
| Scarborough Downs EB | 25 | C | 2 veh. |
| Route 1/Commerce Drive | | | |
| Route 1 NB | 10 | A | 13 veh. |
| Route 1 SB | 8 | A | 16 veh. |
| Orion Center EB | 26 | C | 1 veh. |
| Commerce WB | 9 | A | 2 veh. |
| Route 1/Sawyer Road | | | |
| Route 1 NB | 7 | A | 12 veh. |
| Route 1 SB | 10 | B | 17 veh. |
| Sawyer EB | 16 | B | 2 veh. |
| Sawyer WB | 15 | B | 2 veh. |
| Route 1/Oak Hill | | | |
| Route 1 NB | 62 | E | 21 veh. |
| Route 1 SB | 64 | E | 25 veh. |
| Gorham Road EB | 44 | D | 14 veh. |
| Black Point Road WB | 51 | D | 18 veh. |
| Route 1/Town Hall | | | |
| Route 1 NB | 6 | A | 9 veh. |
| Route 1 SB | 17 | B | 26 veh. |
| Town Hall EB | 20 | B | 4 veh. |
| Ward WB | 26 | B | 1 veh. |
| Route 1/Hannaford | | | |
| Route 1 NB | 4 | A | 2 veh. |
| Route 1 SB | 16 | B | 19 veh. |
| Hannaford Drive | 23 | C | 9 veh. |

**Table 5 Continued**
**Year 2003 – Signalized Intersection**
**CAPACITY SUMMARY**

| Intersection/Approach/Movement | Total Delay (seconds) | Level of Service | 95% Vehicle Queue (Length in Vehicles) |
|---|---|---|---|
| Route 1/Portland Farms Road | | | |
| Route 1 NB | 12 | B | 9 veh. |
| Route 1 SB | 13 | B | 22 veh.** |
| Scarborough Commons EB | 16 | B | 2 veh. |
| Portland Farms WB | 16 | B | 4 veh. |
| Route 1/Hillcrest Avenue | | | |
| Route 1 NB | 10 | B | 8 veh. |
| Route 1 SB | 10 | B | 16 veh. |
| Green Acres EB | 29 | C | 6 veh. |
| Hillcrest WB | 20 | C | 5 veh. |
| Route 1/Broadturn Road (Dunstan Corner)* | | | |
| Route 1 NB | >80 | F | 18 veh. |
| Route 1 SB | 10 | A | 19 veh. |
| Broadturn EB | 43 | D | 7 veh. |
| Pine Point WB | 26 | C | 9 veh. |
| Route 1/Payne Road (Dunstan Corner)* | | | |
| Route 1 NB | 32 | C | 18 veh. |
| Route 1 SB | >80 | F | 66 veh. |
| Payne EB | 44 | D | 23 veh. |
| Harlow WB | 40 | D | 4 veh. |
| County Road/Saco Street* | | | |
| Saco NB | 31 | C | 11 veh. |
| Saco SB | >80 | F | 37 veh. |
| County EB | 17 | B | 7 veh. |
| County WB | 77 | E | 59 veh. |
| County Road/Gorham Road* | | | |
| Gorham NB | 35*** | D | 52 veh. |
| County EB | 7 | A | 7 veh. |
| County WB | 20 | C | 14 veh. |
| Gorham Road/Beech Ridge Road* | | | |
| Beech Ridge NB | 17 | B | 5 veh. |
| Beech Ridge SB | 40 | D | 11 veh. |
| Gorham EB | 8 | A | 9 veh. |
| Gorham WB | >80 | F | 79 veh. |
| Payne Road/Cummings Road | | | |
| Payne NB | 10 | A | 13 veh. |
| Payne SB | 19 | B | 18 veh. |
| Cummings WB | 22 | C | 9 veh. |
| Payne Road/Wal-Mart | | | |
| Payne NB | 9 | A | 9 veh. |
| Payne SB | 2 | A | 3 veh. |
| Retail EB | 22 | C | 2 veh. |
| Wal-Mart WB | 31 | C | 9 veh. |

*Results obtained from SimTraffic output, based on an average of five runs.
**Southbound LT movements frequently blocked by southbound through queues.
***Does not account for delays in rolling queues; actual delays may be longer.

**Table 5 Continued**
**Year 2003 – Signalized Intersection**
**CAPACITY SUMMARY**

| Intersection/Approach/Movement | Total Delay (seconds) | Level of Service | 95% Vehicle Queue (Length in Vehicles) |
|---|---|---|---|
| Payne Road/Sam's Club | | | |
| Payne NB | 3 | A | 3 veh. |
| Payne SB | 3 | A | 3 veh. |
| Sam's Club EB | 24 | C | 5 veh. |
| Sewall Gas WB | 23 | C | 2 veh. |
| Payne Road/Gorham Road | | | |
| Payne NB | 24 | C | 8 veh. |
| Payne SB | 21 | C | 13 veh. |
| Gorham EB | 24 | C | 9 veh. |
| Gorham WB | 45 | D | 15 veh. |
| Payne Road/Scarborough Downs | | | |
| Payne NB | 11 | B | 10 veh. |
| Payne SB | 17 | B | 22 veh. |
| Holmes EB | 21 | C | 4 veh. |
| Scarborough Downs WB | 19 | B | 3 veh. |
| Payne Road/Exit 42/Haigis Parkway | | | |
| Payne NB | 19 | B | 6 veh. |
| Payne SB | 16 | B | 16 veh. |
| Exit 42 EB | 20 | C | 9 veh. |
| Haigis WB | 30 | C | 10 veh. |
| Mussey Road/Gorham Road* | | | |
| Gorham NB | 28 | C | 15 veh. |
| Gorham SB | 23 | C | 8 veh. |
| Mussey EB | >80 | F | 29 veh. |
| Mussey WB | 4 | A | 7 veh. |
| Mussey Road/Spring Street* | | | |
| Spring NB | 16 | B | 7 veh. |
| Spring SB | 30 | C | 8 veh. |
| Mussey EB | 2 | A | 4 veh. |
| Mussey WB | 10 | B | 8 veh. |

*Results obtained from SimTraffic output, based on an average of five runs.

As can be seen from the previous tables, most signalized intersections in Scarborough currently operate at an acceptable level of service. However, several locations do experience deficient operations. The areas of concern are discussed below:

**Route 1 at Route 114 (Oak Hill)**

The intersection of Route 1 at Route 114 has some of the highest hourly total entering volumes in Scarborough. In addition to significant delay, queues at this location often exceed storage lengths, resulting in the inability of turning traffic to maneuver into an appropriate lane.

**Route 1 at Broadturn Road and Payne Road (Dunstan Corner)**

Another location with deficient operations is the Dunstan Corner area, consisting of Route 1 at Payne and Broadturn Roads. Vehicles heading northbound and southbound on Route 1

experience a level of service ‘F’ at this location, with extensive queuing as a result. A significant contribution to the issues at this location are the proximity of the intersections to each other. As a result, queuing from one intersection impacts another, creating a bottleneck for the Route 1 corridor.

**County Road at Beech Ridge Road and Gorham Road and Gorham at Beech Ridge**

Northbound and westbound movements typically experience deficient levels of service at these three intersections. At times, queues on Gorham Road northbound reach almost to the intersection with Beech Ridge Road. In addition, the intersection of County Road and Beech Ridge Road typically consists of single-lane approaches, resulting in significant delay and queuing at this location. It is important to note that queuing and delays are the reverse during the AM peak hour, as southbound and eastbound traffic is heaviest during this period.

**Mussey Road at Gorham Road and Spring Street (Eight Corners)**

Overall, these two intersections operate at an acceptable level of service. However, eastbound traffic on Mussey Road at Gorham Road appears to queue significantly due to the inability of left-turning traffic to access Gorham Road. However, field observations indicate that this movement appears to operate with lower delay than the model may indicate, largely due to motorists driving around left-turning vehicles.

## PEDESTRIAN FACILITIES ASSESSMENT

### Pedestrian Volumes

Total pedestrian volume information was gathered at each of the forty-nine study intersections concurrent with collection of the vehicular traffic data. A summary of that effort is presented in Table 6.

**Table 6**
**"Peak" Pedestrian Traffic Volumes**

| Intersection | Time Period/Volume | | | |
|---|---|---|---|---|
| | AM Weekday | PM Weekday | Saturday | Sunday |
| 1. Burnham Road/Broadturn Road | - | 0 | - | - |
| 2. Broadturn Road/Holmes Road | - | 0 | - | - |
| 3. Route 1/Pine Point Road/Broadturn Road | - | 35[(1)] | 26[(2)] | 6 |
| 4. Route 1/Payne Road | - | 41[(1)] | 18 | - |
| 5. Route 1/Old Blue Point Road | - | 16 | - | - |
| 6. Route 1/Haigis Parkway | - | 3 | - | - |
| 7. Route 1/Willowdale Road | - | 8 | - | - |
| 8. Route 1/Scarborough Downs Road | - | 0 | - | - |
| 9. Route 1/Commerce Drive | - | 4 | - | - |
| 10. Route 1/Sawyer Road | - | 5 | - | - |
| 11. Route 1/Town Hall | - | 2 | - | - |
| 12. Oak Hill Intersection | - | 9 | 6 | 9 |
| 13. Route 1/Hannaford Drive | - | 18 | - | - |
| 14. Route 1/Maple Street | - | 2 | - | - |
| 15. Route 1/Green Acres | - | 0 | - | - |
| 16. Route 1/Pleasant Hill Road | - | 7 | - | - |
| 17. Highland Avenue/Blackpoint Road | - | 8 | - | - |
| 18. Route 77/Blackpoint Road | - | 38 | - | - |
| 19. Route 77/Pleasant Hill Road | - | 4 | - | - |
| 20. Pleasant Hill Road/Highland Avenue | - | 2 | - | - |
| 21. Route 114/Maple Avenue | - | 17 | - | - |
| 22. Route 114/Spring Street | - | n/a | - | - |
| 23. Route 114/Mussey Road | - | 1 | - | - |
| 24. Mussey Road/Spring Street | - | 0 | - | - |
| 25. Payne Road/Cummings Road | - | 8 | - | - |
| 26. Spring Street (E)/Payne Road | - | 13 | - | - |
| 27. Payne Road/Wal-Mart | - | 13 | - | - |
| 28. Route 1/Sam's Club | - | 5 | - | - |
| 29. Payne Road/Route 114 | 0 | 5 | - | - |
| 30. Payne Road/Mussey Road | - | 0 | - | - |

| | | | | |
|---|---|---|---|---|
| 31. Payne Road/Bridges Drive | - | 0 | - | - |
| 32. Payne Road/Scarborough Downs/Holmes Road | - | 0 | - | - |
| 33. Payne Road/Haigis Parkway | 0 | 0 | - | - |
| 34. Payne Road/Beech Ridge Road/Scottow Hill Road | - | 3 | - | - |
| 35. Beech Ridge Road/Holmes Road | - | 0 | - | - |
| 36. Haigis Parkway/Scottow Hill Road | - | 0 | - | - |
| 37. Route 114/Running Hill Road | - | 5 | - | - |
| 38. Route 114/Beech Ridge Road | - | 0 | - | - |
| 39. Route 22/Saco Street/Beech Ridge Road | - | 5 | - | - |
| 40. Route 114/Route 22 | - | 2 | - | - |
| 41. Route 1/Portland Farms Road | - | 10 | - | - |
| 42. Pleasant Hill Road/Fogg Road | - | 0 | - | - |
| 43. Blackpoint Road/Fogg Road | - | 24 | - | - |
| 44. Route 114/Cumberland Way | - | 2 | - | - |
| 45. Route 77/Ocean Avenue | - | 39 | 67 | 76 |
| 46. Pine Point Road/Jones Creek Drive/East Grande Avenue | - | 59 | 94 | 108 |
| 47. Pine Point Road/Ross Road | - | 21 | - | - |
| 48. Route 1/Southgate Drive | - | n/a | - | - |
| 49. Ash Swamp Road/Hearn Road | - | 0 | - | - |

**(1) 12-hour count period**
**(2) 4-hour count period**

Pedestrian activity at all but two of the forty-nine intersections (Route 77/Ocean Avenue and Pine Point Road/Jones Creek Drive/East Grande Avenue) was generally found to be exceptionally low during all "peak" traffic count periods. At fourteen locations there were zero pedestrians counted during the traffic count period and the recorded volume was less than five at an additional nine locations. The average volume of pedestrians recorded at the two "beach" entrance locations was in excess of 70 or approximately 30 pedestrians per hour.

**Sidewalk Inventory**

Public sidewalks, which range in width from two and one-half feet to more than eight feet in width, are provided on all, or segments of, sixty-nine streets. The majority of the sidewalks, especially in the most recently developed residential subdivisions, are constructed with bituminous asphalt and are designed with a grass esplanade and curb barrier that separates the sidewalk from the public travel way. Generally, handicapped accessible ramps are provided at each intersection and driveway apron. Figures 6 and 7 depict the location of all public sidewalks.

The "drive-by" inventory, which was conducted for each sidewalk, noted several segments of sidewalk where the pavement condition has deteriorated to an unacceptable condition. Table 7 provides a summary of the inventory results, which includes the street name, block identification, side of street, sidewalk condition (three separate categories: good, fair and poor condition) and a

number of general notes. The field inventory identified eleven sections of sidewalk on three separate streets where the sidewalk was determined to be in poor condition. Six of the eleven sections were found on Pine Point Road, where the sidewalk is narrow, 4 ½ feet or less, and the pavement surface is in extremely poor condition. Additionally, placement of mailboxes, private property hedges and public utility poles severely limit the useable walking surface of the sidewalk. Four segments of sidewalk along U.S. Route 1 were also found to have sidewalks in very poor condition. One location was at the South Portland end of Route 1 and the remaining three segments were near the Dunstan Corner area. The asphalt sidewalk on Marcia Street was also determined to be in very poor condition. The bituminous asphalt is severely cracked and there are a number of areas where the sidewalk has lifted due to tree roots.

The field survey noted twelve streets where the "cape-cod" asphalt berm extended through the ADA ramp, which limits the accessibility of the ramp. Handicapped accessible ramps are not provided on one of the intersection corners on Bridle Street, Enterprise Business Park, Equestrian Way, Portland Farms Road, Route 1 at Millbrook Lane and Summerfield Road. Additionally, there are numerous locations (refer to summary table) where private shrubs, mail boxes, utility poles, traffic signal equipment, etc. block or severely restrict the useable sidewalk width.

**Table 7**
**Scarborough Transportation Study**
**SIDEWALK INVENTORY**

| Street Name | Block Identification | Side of Street | Sidewalk Width | Sidewalk Condition | General Comments |
|---|---|---|---|---|---|
| Abigail Way | | North | 5’ | Good | None |
| Arbor View Rd | | South | 5’ | Good | None |
| Barnswallow Ct | | East | 5’ | Good | None |
| Bornheimer Place | | North | 5’ | Good | None |
| Bridle Ct | | North | 5’ | Good | Asphalt berm ADA barrier at Orchard, no ADA ramp other corner |
| Camperdown Elm Dr | | East | 5’ | Good | None |
| Carriage Way | Surrey to End | Both sides | 5’ | Good | None |
| Clearwater Cir | | South | 4.5’ | Good | Asphalt berm ADA barrier at Circle & Black Point |
| Commerce Dr | Route 1 to Evergreen Farm | South | 5’ | Good | None |
| Coralburst Ln | | North | 5’ | Good | None |
| Coulthard Farms Rd | | West | 5’ | Good | None |
| Crossing Dr | | Both sides | 5’ | Good | None |
| Cumberland Way | | East | 5’ | Good | None |
| Downeast Ln | Dead-end to 800’ | North | 5’ | Good | None |
| Drake Ln | End of road to 150’ from Piper Rd | East | 5’ | Good | None |
| East Grande Ave | Pine Point to OOB | West | 5’ | Fair | No. of utility poles, signs block sidewalk |
| Edgewood Rd | | South | 5’ | Good | None |
| Elbridge Oliver Way | | East | 5’ | Good | None |
| Enterprise Business Park | | North | 5’ | Good | No ADA ramp at right-turn lane intersection |
| Equestrian Way | | South | 5’ | Good | Asphalt berm ADA barrier at Steeple Chase, other corner no ADA access |

| | | | | | |
|---|---|---|---|---|---|
| Evergreen Farm Rd | | North | 5’ | Good | None |
| Fowler Farm Rd | | West | 5’ | Good | None |
| Foxcroft Cir | Route 1 to Circle | North | 4’ to 5’ | Fair | None |
| Frederick Thompson Dr | | East | 5’ | Good | None |
| Glendale Cir | Kerryman to Broadturn | South | 5’ | Good | Asphalt berm ADA barrier at Kerryman |
| Glendale Dr | | North | 5’ | Good | None |
| Grandview Dr | | West | 5’ | Good | None |
| Hannaford Dr | | North | 6’ | Good | None |
| Haystack Cir | | South | 5’ | Good | None |
| Heather Ln | | South | 5’ | Fair | None |
| Hillside Ave | | North | 4.5’ | Good | Sidewalk connection to Tudar & Pine Ledge |
| Honeysuckle Ln | | North | 5’ | Good | None |
| Jameco Mill Rd | | North | 5’ | Good | None |
| Judge Hasty Ln | | East | 5’ | Good | None |
| Juneberry Rd | | West | 6’ | Good | None |
| Kerryman Cir | | East | 5’ | Good | Asphalt berm ADA barrier at Glendale Circle |
| Lilac Ln | | North | 5’ | Good | None |
| Magnolia Ln | | West | 5’ | Good | None |
| Marcia St | | North | 5’ | Poor | None |
| Meeting House Rd | | South | 5’ | Good | None |
| Middle School Dr | Connects to Library | East | 5 to 6’ | Good | None |
| Mulberry Rd | | North | 6’ | Good | None |
| Orchard St | Dunstans Landing to Surrey Ln | Both sides | 5’ | Good | None |
| Phinneas Ln | | West | 5’ | Good | Asphalt berm ADA barrier at Woodview |
| Pine Ledge Dr | | North | 4.5’ | Good | None |
| Pine Point Rd | Depot to East Grande | South | 4.5’ | Poor | At East Grande autos parked on sidewalk |
| Pine Point Rd | Snowberry to Ocean View | North | 4.5’ | Poor | Utility poles & mail boxes block sidewalk |
| Pine Point Rd | Ocean View to Seavy Landing | North | 4.5’ | Poor | Utility poles & hedges block sidewalk |
| Pine Point Rd | Seavy Landing to Eagles | North | 4.5’ | Poor | Utility poles, hedges & mail boxes block sidewalk |

| | | | | | |
|---|---|---|---|---|---|
| | Nest | | | | |
| Pine Point Rd | Eagles Nest to School | North | 4.5’ | Fair | None |
| Pine Point Rd | School to Scarb. Marsh | North | 4.5’ | Fair | Minor blocking with mail boxes |
| Pine Point Rd | Route 1 to Dunstans Landing | South | 4.5’ | Poor | Mailboxes limit sidewalk width |
| Pine Point Road | Opp. Bickford to Snowberry | North | 4.5’ | Poor | None |
| Pitch Fork Ln | | South | 5’ | Good | None |
| Pleasant Hill Rd | Fowler Farm to Tenny Ln | North | 5’ | Good | None |
| Portland Farms Rd | | North | 5’ | Fair | Curb extends through ADA ramp, no ADA ramp other corner |
| Pumpkin Ln | | West | 5’ | Good | None |
| Raven Terrace | | West | 5’ | Good | None |
| Ridgeway Rd | | West | 5’ | Good | None |
| Route 1 | So. Portland to Kenosha | West | 4 to 5’ | Poor | None |
| Route 1 | VIP Dr to Route 114 | West | 5’ | Good | None |
| Route 1 | Sunset to VIP Dr | West | 5’ | Good | None |
| Route 1 | Route 114 to Town Hall | West | 4’ | Good | None |
| Route 1 | Town Hall to Sawyer | West | 5’ | Good | None |
| Route 1 | Sawyer to Millbrook | West | 5’ | Good | No ADA ramp at Millbrook |
| Route 1 | South of Dolloff to Payne | West | 3 to 5’ | Fair | None |
| Route 1 | Payne to Broadturn | West | 5’ | Fair | None |
| Route 1 | Broadturn to Dunstan Ave | West | 3.5’ to 7’ | Fair | Mast arm at Broadturn blocks sidewalk |
| Route 1 | Pine Point to Harlow | South | 3’ to 5’ | Good | Utility poles & signs limit sidewalk to 12” or less |
| Route 1 | Church to Pine Point | East | 3’ to 4’ | Poor | Utility poles & signs limit sidewalk to 24” or less |
| Route 1 | Old Blue Point to Church | East | 3.5’ | Fair – Poor | None |
| Route 1 | Queens Dr to Saco Line | West | 2.5’ to 4’ | Poor | None |
| Route 1 | Dunstan Ave to Queens Dr | West | 2.5’ to 4’ | Fair | None |

| | | | | | |
|---|---|---|---|---|---|
| Route 114 | Adjacent to Oaks Apartments | North | 4’ | Fair | None |
| Route 114 | Wentworth School to Route 1 | South | 8’ | Good | Sidewalk is poor at High School |
| Sawyer Rd | Oakdale Dr to opp. Juneberry | North | 5’ | Good | None |
| Serenity Dr | | South | 5’ | Good | None |
| Snowberry Dr | | East | 5’ | Good | None |
| Steeple Chase Dr | | West | 5’ | Good | Asphalt berm ADA barrier at intersection |
| Summerfield Rd | | West | 5’ | Good | Curb extends through ADA ramp, no ADA ramp other corner |
| Tanglewood Cir | | East | 4.5’ | Good | None |
| Tenny Ln | | East | 5’ | Good | None |
| Tiger Lily Ln | | East | 5’ | Good | None |
| Tudar Ln | | East | 4.5’ | Good | None |
| Val Terrace | | West | 4.5’ | Fair | None |
| Wedgewood St | | South | 5’ | Good | None |
| Wiley Recreation Park Rd | | East | 5’ | Good | None |
| Windsor Pines Dr | | North | 5’ | Good | None |
| Woodspell Rd | | East | 5’ | Good | None |
| Woodview Rd | Phinneas to Fogg | North | 4.5’ | Good | Asphalt berm ADA barrier at Fogg Rd |

**Pedestrian Traffic Signal Inventory**

Pedestrian actuated traffic signals presently exist at five major intersections within the Community. At each location, the pedestrian signal crossings are limited to either one or two legs of the intersection. The same pedestrian signal hardware and operation is used at each location. Pedestrians are asked to depress a push button, which activates a specific traffic signal phase providing for approximately 5 to 7 seconds of ***WALK*** timing followed by a varying length of flashing ***DON'T WALK*** time. Each pedestrian signal is a standard 12-inch signal head with symbols for the walk and don't walk intervals. Pedestrian crosswalks and push button signs are provided at each location, although, the text of the signs varies from one location to the next.

The pedestrian signal hardware and the operation of each pedestrian system were checked at each intersection in accordance with applicable standards presented in the Manual on Uniform Traffic Control Devices (MUTCD). The pertinent standards used to review the existing pedestrian systems are presented as follows:

- *Pedestrian push button detectors should be easy to use and conveniently located near each end of the crosswalks.*
- *Signs shall be mounted adjacent to or integral with pedestrian push button detectors.*
- *Walk interval should be at least 7 seconds in length.*
- *Flashing don't walk interval shall be sufficient to allow a pedestrian walking at 4ft/sec to reach the center of the farthest lane.*

The in-field assessment of each intersection, where pedestrian signals exist, is presented as follows:

1. **Route 1/Portland Farms Road and Office Complex**
   Pedestrian signals are provided for pedestrians crossing the north leg of Route 1 and the Office Complex approach of the intersection. The length of the walk interval for the Route 1 crossing is 6 seconds followed by a flashing don't walk time of 14 seconds. Existing times for pedestrians crossing the Office Complex driveway are 5 seconds of walk time and 7 seconds of flashing don't walk time. Pedestrian push buttons and required signing are present on each end of the two pedestrian crossings. It would appear that the pedestrian push button on the southeast side of the Office Complex driveway calls the Route 1 pedestrian crossing versus the crossing at the Office Complex driveway. This should be checked and corrected immediately. The walk intervals for both crossings are less than the desirable standard. The flashing don't walk interval exceeds the standard for both crossings.

2. **Route 1/Hannaford Drive**
   Pedestrian signals are provided exclusively for pedestrian crossing Hannaford Drive. Twelve-inch signal housings with symbol features are provided on both ends of the marked crosswalk with pedestrian push button/signs. The walk interval is 6 seconds followed by a flashing don't walk interval of 19 seconds. The push button on the southerly side of the intersection does not work when depressed. The walk interval is one second less than the MUTCD standard. The flashing don't walk interval exceeds by one second, the minimum timing for a crosswalk distance of 95 feet.

3. **Route 1/Blackpoint Road/Route 114**

There are two pedestrian crossings within this intersection: 1) crossing the southern approach of Route 1 and 2) crossing the Route 114 leg of the intersection. The pedestrian signal equipment in all cases consists of 12-inch signal housings with symbol features. Pedestrians must activate the pedestrian signals by depressing pedestrian push buttons found on the three ends of the marked crosswalks. Pedestrians crossing Route 1 are provided a 6-second walk interval followed by a 14 second flashing don't walk time. Pedestrians crossing Route 114 are presented with similar walk and flashing don't walk times. Each push button was found to operate correctly and required push button signs exist at each location. The pedestrian signal housing in front of Amatos Store is not properly aligned with the crosswalk and should be relocated as necessary to align it with the painted crosswalk. The pedestrian push button and sign located adjacent to Burger King is not mounted on the same pole as the pedestrian signal housing. Relocation of the equipment to the same pole would be desirable. The walk times for both crossings should be increased to 7 seconds and the flashing don't walk times for Route 1 and Route 114 should be increased by 2 seconds and 1 second, respectively, to meet the minimum times.

4. **Route 1/Town Hall/Ward Street**

A single pedestrian crossing is provided for pedestrians crossing the Town Hall driveway. Pedestrian signal hardware includes 12-inch walk signals with push buttons and required signing. When tested, both push buttons were found to be correctly operating providing 6 seconds of walk time and 16 seconds of flashing don't walk time. The northerly pedestrian signal head is mounted on a pole nearly 25 feet away from the crosswalk presenting a very awkward alignment for pedestrian visibility. The walk interval should be increased to 7 seconds, as required by the MUTCD standard.

5. **Route 1/Pine Point Road/Broadturn Road**

Pedestrian facilities are provided across three (south, east and west approaches) of the four legs of this intersection. Standard 12-inch signal housings with push button actuation are provided for each crossing. Recorded timing for each crossing is as follows: 5 seconds of walk, 13 seconds flashing don't walk for Broadturn Road, 5 seconds of walk, 13 seconds of flashing don't walk for Pine Point Road and 5 seconds of walk, 15 seconds of flashing don't walk for the Route 1 crossing. The push button housing located on the north side of Route 1 at Broadturn Road is broken and should be replaced. The pedestrian information sign located on the south side of Pine Point Road is damaged and should be replaced. The walk intervals for all three crossings should be increased to the standard 7 seconds.

## Walking Paths/Trails Inventory

The field survey identified a number of unmarked/unimproved recreational trails and a limited number of marked/improved trails and walking paths throughout the Town. Table 8 provides a summary of the survey findings. A number of the unmarked/unimproved trails appear to be used by all-terrain vehicles and/or snowmobiles. The largest number of these trails is located in the westerly sections of the Town where the density of homes is considerably less. There are a few unmarked/unimproved paths that provide connections to/from residential areas to public facilities (i.e. schools, parks, scenic vistas, etc.). Figures 5 and 6 highlight, along with the sidewalk information, the location of the walking path/trail information.

**Table 8**
**Scarborough Transportation Study**
**Walking Paths/Trails**

| Street Name | Location | Material | Comments |
|---|---|---|---|
| Broadturn Rd | West of Burnham Rd | Dirt | Unmarked ATV trail following CMP line |
| Burnham Rd | South of Broadturn Rd | Dirt | Unmarked ATV trail following CMP line |
| Castle Terrace | End of road | Dirt | ATV trail – unmarked |
| Chestnut Dr | End of road | Dirt | ATV trail – unmarked |
| Church St | End of road | Dirt | Connection to Ryefield Drive |
| Coach Lantern Ln | End of road | Dirt | ATV trail – unmarked |
| Coulthard Farms Rd | End of road | Stonedust | Connection to Wiley Recreation Park |
| Cranberry Pines | End of road | Dirt | ATV trail – unmarked |
| Cumberland Way | End of road | Grass path | Unmarked trail |
| Downeast Rd | Connection to Eastern Rd | Path | Unmarked trail |
| Dunstan Landing Rd | End of road | Asphalt/dirt | Trail within Marsh area |
| Eagles Nest Dr | End of road | Grass trails | Number of trails in Marsh area lead to/from Pine Point area |
| Eastern Point Trail | | Gravel/asphalt | None |
| Glendale Cir | Near Kerryman Cir | Dirt | ATV trail – unmarked |
| Haystack Cir | End of road | Stonedust | Connection to Wiley Recreation Park |
| Holmes Rd | Near Mitchell Hill Rd | Dirt | Partially marked ATV/Snowmobile trail |
| Holmes Road | Near Broadturn Rd | Dirt | ATV/Snowmobile trail – unmarked |
| Jameco Mill Rd | Connection to Maple Ave | Asphalt | None |
| Jasper St | End of road | Dirt | ATV trail – unmarked |
| Laurel Ridge Rd | End of road | Dirt | Unmarked ATV/ Snowmobile trail |
| Longmeadow Rd | Near Springbrook Ln | Dirt | Partially marked ATV/Snowmobile trail |
| Meeting House Rd | End of road | Path | None |
| Middle School | Parking lot area | Dirt/grass | Unmarked paths connecting to Sawyer Road area |
| Old Blue Point Rd | Crossing at Windsor Pines Drive | Path | Connecting to Peterson Sports Complex |
| Piper Rd | Connecting sidewalk to Drake Ln | Asphalt | None |
| Piper Rd | Route 77 into Private Way | Gravel, dirt & wood path | None |
| Pond View Dr | End of road | Dirt | ATV trail – unmarked |
| Primrose Ln | End of road | 4’ Asphalt | Connection to Peterson Complex |
| Prouts Neck Area | General Area | n/a | A number of internal walkways throughout area |
| Route 1 | Portland Farms Rd to Hillcrest Ave | Dirt/asphalt | Follows edge of road |

| | | | |
|---|---|---|---|
| Sandy Point Road | At cul-de-sac | Path | Unmarked trail to marsh |
| Scabbard Rd | Connection to Fairway Dr | Asphalt | 5' asphalt sidewalk |
| W. Beech Ridge Rd | End of road | Dirt | ATV/Snowmobile trail – unmarked |

The most prominent of the ten improved walking paths/trails, is the Eastern Trail System. The Eastern Trail System traverses a combination of paved public streets and a portion of the gravel section of Eastern Avenue as it cris-crosses from east to west and north to south through the Town of Scarborough. The trail is marked in both directions of travel at all major intersections with signs. The Eastern Trail System begins on the north near the South Portland City line on Highland Avenue and follows Highland Avenue to Blackpoint Road to Eastern Avenue. At Eastern Avenue, it turns south and travels along the unimproved portion of Eastern Avenue to Evergreen Farms Road, along Evergreen Farms Road to Commerce Drive to the intersection of U.S. Route 1. The trail then turns south onto Route 1 to Haigis Parkway for a short distance to Scottow Hill Road. The trail follows Scottow Hill Road to Beech Ridge Road and then along Beech Ridge Road to the intersection of Holmes Road. The trail then turns west onto Holmes Road to the intersection of Broadturn Road. The trail turns southwest onto Broadturn Road crosses Route 1 onto Pine Point Road and follows Pine Point Road to East Grande Avenue and connects through to the Town of Old Orchard Beach.

Major marked trail opportunities are provided within the Scarborough Marsh area, with designated trail connections to neighborhood streets and automobile parking areas. The Prouts Neck Area of the Town of Scarborough also has numerous marked and unmarked trails, although the entire area is posted as private. The recently constructed Piper Shores Retirement Facility, located near Route 77, constructed an off-road trail along the main entrance roadway as well as providing connecting sidewalks within the retirement facility complex.

## BICYCLE FACILITIES INVENTORY

The Town of Scarborough's on-road and off-road bicycle system is presently limited to a single route. Pine Point Road is striped and signed as a bicycle route from the intersection of U.S. Route 1 to the general vicinity of Depot Road. "Spot" measurements of roadway widths were gathered for each major arterial and collector road to determine potential pavement width barriers that preclude expansion of the on-road bicycle system. The Maine Department of Transportations' minimum standard for "on-road" bicycle routes are four-foot paved shoulders on non-curbed road sections and five-feet where curb barriers are used. Table 9, as follows, presents the recorded information:

**Table 9**
**Roadway Cross-Section Width**

| Roadway Name | Roadway Cross-Section |
|---|---|
| 1. Route 22 | |
| - West of Saco Street | 1 foot shoulders, 11.5 foot travel lanes |
| 2. Holmes Road | |
| - East of Broadturn Road | 1 foot shoulders, 11 foot travel lanes |
| - East of Beech Ridge Road | 1 foot shoulders, 10 foot travel lanes |
| - West of Payne Road | 4 foot shoulders, 11 foot travel lanes |

| | |
|---|---|
| 3. Route 114 | |
| - West of Beech Ridge Road | 2 foot shoulders, 11 foot travel lanes |
| - West of Running Hill Road | 1.5 foot shoulders, 12 foot travel lanes |
| - West of MTA Bridge | 8 to 10 foot shoulders, 12 foot travel lanes |
| - East of Spring Street | 1 foot shoulders, 11.5 foot travel lanes |
| - At High School | 3.5 to 8 foot shoulders, 12 foot travel lanes |
| 4. Running Hill Road | |
| - At Route 114 | 2 foot shoulders, 11.5 foot travel lanes |
| - East of New Street | 1 foot shoulders, 10 foot travel lanes |
| - At South Portland Town line | 1 foot shoulders, 10 foot travel lanes |
| 5. Broadturn Road | |
| - East of Burnham Road | 1 foot shoulders, 11 foot travel lanes |
| - East of Holmes Road | 1 foot shoulders, 11 foot travel lanes |
| - East of Hearn Road | 1 foot shoulders, 10 foot travel lanes |
| - West of Route 1 | 1 foot shoulders, 10 foot travel lanes |
| 6. Payne Road | |
| - At Spring Street (E) | No shoulders, 5 travel lanes |
| - North of Bridges Drive | 5 to 6 foot shoulders, 11 foot travel lanes |
| - South of Haigis Parkway | 1 foot shoulders, 11 foot travel lanes |
| - South of Scottow Hill Road | 1 foot shoulders, 11 foot travel lanes |
| - North of Route 1 | 1 foot shoulders, 10 foot travel lanes |
| 7. Route 1 | |
| - South of Pleasant Hill Road | |
| - North of Maple Street | No shoulders, (5) 12 to 14 foot travel lanes |
| - South of Oak Hill | No shoulders, (5) 12 to 15 foot travel lanes |
| - North of Commerce Drive | 10 foot shoulders, 13 foot raised island, (4) 12 to 13 foot travel lanes |
| - South of Haigis Parkway | 4 foot shoulders, (5) 12 to 16 foot travel lanes |
| - North of Old Blue Point Road | 1 foot shoulders, (4) 10 to 11 foot travel lanes |
| 8. Route 77 | |
| - North of Pleasant Hill Road | 2 foot shoulders, 12 foot travel lanes |
| - South of Ocean Avenue | 2 foot shoulders, 11 foot travel lanes |
| - North of Blackpoint Road | 2 to 3 foot shoulders, 11 foot travel lanes |
| 9. Highland Avenue | |
| - South of Pleasant Hill Road | 5 to 6 foot shoulders, 13 foot travel lanes |
| - North of Blackpoint Road | 1 foot shoulders, 11 foot travel lanes |
| 10. Pleasant Hill Road | |
| - East of Route 1 | 1 and 10 foot shoulders, 12 foot travel lanes |
| - West of Chamberlain Road | 2 foot shoulders, 11 foot travel lanes |
| - East of Highland Avenue | 2 to 4 foot shoulders, 11 foot travel lanes |
| - East of Fogg Road | 1 foot shoulders, 11 foot travel lanes |
| - West of Route 77 | 1 foot shoulders, 11 foot travel lanes |
| 11. Black Point Road | |
| - East of Thornton Road | 3.5 and 6.0 foot shoulders, 12 foot travel lanes |
| - West of Highland Avenue | 5 foot shoulders, (2) 11 foot travel lanes and (1) 13 foot travel lane |

| | |
|---|---|
| - West of Route 77 | 7 foot shoulders, 11 foot travel lanes |
| - At Scarborough Beach | 3.5 foot shoulders, 11 foot travel lanes |
| 12. Haigis Parkway | |
| - East of Payne Road | 8 foot shoulders, 12 foot travel lanes |
| - West of Scottow Hill Road | 8 foot shoulders, 12 foot travel lanes |
| - West of Route 1 | 4 to 8 foot paved shoulders, (3) travel lanes |

As shown in the table, only a limited number of roadway segments meet the MDOT bicycle route criteria for either category of roadway design. Bicycle routes could be presently considered on a very short section of Route 114, somewhat lengthy sections of Payne Road, Route 1 and Blackpoint Road, and the entire length of Haigis Parkway.

## ACCESS MANAGEMENT CRITERIA

The Town's access management criteria standards as presented in paragraphs seven through fourteen of the Site Plan Ordinance were reviewed and compared to the Maine Department of Transportation Entrance and Driveway Rules. The following summarizes that assessment.

### Standards V. Guidelines

The Towns ordinance generally uses the word "shall" when describing access management criteria. While access management criteria should be adhered to whenever possible, there are some times when engineering judgment suggests an alternative to the criteria. The Town may want to consider adopting "guidelines" rather than "standards" or "rules" to allowing for flexibility on those occasions where it may be appropriate.

### Separation from Adjacent Driveways

The Town has a standard of 200 feet between driveways; however the Town's standard does not make it clear how the measurement is to be made nor does it change with the speed. MDOT has standards based upon the center to center distance between driveways. The acceptable distance is a function of speed, ranging from 90 feet in a 25 mph zone to 525 feet in a 55 mph zone. For a mobility corridor, or a roadway that MDOT has designated as critical to intercity travel, the minimum acceptable spacing is 125 feet.

### Separation from Adjacent Street Intersections, Signalized and Unsignalized

While the Town does not have explicit language regarding spacing of driveways from signalized and unsignalized intersections, the rules regarding standard driveway spacing could be utilized to enforce a spacing issue. MDOT allows for 100 feet clearance from an unsignalized driveway and 125 feet clearance from a signalized driveway.

### Number of Driveways Serving a Site

The Town does not have explicit language regarding the number of driveways serving a site. MDOT language is such that a site along a mobility corridor is allowed a single driveway. In addition, if a site is at the intersection of a minor roadway with a mobility corridor, MDOT typically requires that the driveway be placed on the minor street so as to minimize access points along the mobility corridor.

## Sight Distance

There are two types of sight distance typically referred to when examining potential driveway placements. The first type is stopping sight distance, which is the distance for an oncoming motorist to come to a complete stop when a vehicle is observed exiting a driveway or side street. This distance is considered the minimum distance in terms of safety. The second type is intersection sight distance, or the distance often required of a motorist when exiting a driveway or side street to enter the traffic stream and accelerate without causing the oncoming traffic to slow by more than 10 mph. This distance is typically longer than the stopping sight distance, as it must account for the time is takes for a motorist to fully access the roadway.

MDOT has two measures of sight distance. The standard measurement applies to non-mobility roadways and all roadways within an urban compact. The higher standard applies to a mobility corridor, where it is considered desirable to have a distance that requires an oncoming driver to slow to no less than 85% percent of the posted travel speed before reaching the accelerating driver who exited the driveway or side street. These standards are shown in the following table:

**Sight Distance Standards for Driveways**

| Posted Speed (mph) | Town Standard (ft.) | MDOT Typical Standard (ft.) | MDOT Mobility Standard (ft.) |
|---|---|---|---|
| 20 | - | 155 | 225 |
| 25 | 160 | 200 | 300 |
| 30 | - | 250 | 380 |
| 35 | - | 305 | 480 |
| 40 | 275 | 360 | 580 |
| 45 | 325 | 425 | 710 |
| 50 | 350 | 495 | 840 |
| 55 | 425 | 570 | 990 |
| 60 | - | 645 | 1,150 |

## Driveway Grades

The Town's standard allows for an overall fifteen percent driveway grade, unless on an arterial, where a five percent maximum is required for the first 25 feet of the driveway. MDOT standards typically require three percent for the first 75 feet on a driveway.

## Driveway Width

The Town has a variable driveway width that ranges from a minimum width of 15 feet for a small housing subdivision to a maximum of 35 feet in the case of large housing subdivisions or commercial/industrial sites. MDOT rules typically allow for a maximum width of 42 feet, to allow for a single entrance lane of 12 feet, two exit lanes of two feet, and a divider island of six feet.

## Driveway Angles

Town rules allow for a minimum driveway angle of 60 degrees and a maximum angle of 90 degrees. MDOT rules request that the angle be as near perpendicular as feasible, but does not specify a

minimum. However, MDOT typically does not allow for entry angle of less than 75 degrees, particularly onto an arterial.

**Acceleration/Deceleration Lanes**

Acceleration and deceleration lanes are typically utilized for high-volume, high speed roadways such as I-95 and the Maine Turnpike. However, the local roadways in Scarborough do not typically satisfy speed and access concerns making such designs feasible. We would recommend the Town consider removal of references to such designs in the Town's standards, replacing them with utilization of MDOT's Design Guide for left turn and right turn lanes.

**Intersection Lighting**

The Town's standards defer to the Design Standards for Commercial Districts. For driveways with significant activity onto major roadways, MDOT typically requires lighting fixtures be used and placed such that lighting levels provide 0.6 to 1.0 foot candle illumination, with maximum to minimum lighting ratios of not more than 10:1 and an average to minimum light level of not more than 4:1.

## SUMMRARY OF EXISTING DEFICIENCIES

- Sixteen locations in the Town of Scarborough meet and/or exceed the Maine Department of Transportation's criteria for identification of a high crash location. Their locations are presented as follows:

    1. Route 114 between Route 1 and High School Drive
    2. Route 114@ Running Hill Road
    3. Route 114 @ Mussey Road
    4. Route 114 @ Payne Road
    5. Running Hill Road between New Road and Green Road
    6. Running Hill Road between New Road and So. Portland City line
    7. Payne Road between Regal Pines Road and Scottow Hill Road
    8. Payne Road @ Haigis Parkway/Exit 42
    9. Mussey Road @ Spring Street
    10. Hearne Road @ Ash Swamp Road
    11. Spring Street between South Portland City line and Payne Road
    12. Blackpoint Road between Route 1 and Thornton Road
    13. Broadturn Road between Martin Road and Route 1
    14. Route 1 between Fairfield Road and Westwood Avenue
    15. Route 1 @ Old Blue Point Road
    16. Route 1 between Orchard Road and Pine Point Road

- The intersection mobility analysis completed for each of the twenty-four unsignalized study intersections identified ten locations that currently experience excessive delay. Their locations are identified as follows:

    1. Beech Ridge Road @ Holmes Road
    2. Route l @Maple Street
    3. Blackpoint Road @ Highland Avenue
    4. Pleasant Hill Road @ Highland Avenue
    5. Payne Road @ Spring Street{E}
    6. Payne Road @ Bridges Drive
    7. Route 114 @ Running Hill Road
    8. Route 114 @ Spring Street
    9. Route 114 @ Cumberland Way
    10. Payne Road @ Mussey Road

- The intersection mobility analysis completed for the twenty-five intersections with sequenced traffic signals identified six locations that presently experience excessive traffic delay on one or more approaches. The location of each deficient intersection is identified as follows:

    1. Oakhill
    2. Route l/Broadturn Road/Pine Point Road
    3. Route 1/Payne Road/Harlow Street
    4. County Road/Saco Street
    5. Gorham Road/Beech Ridge Road
    6. Mussey Road/Gorham Road

- The Town wide sidewalk inventory revealed ten segments of sidewalk on three streets where the sidewalk condition was rated as poor. The locations are presented as follows:

    1. Marcia Street
    2. Pine Point Road, Depot to East Grande
    3. Pine Point Road, Snowberry to Ocean View
    4. Pine Point Road, Seavy Landing to Eagles
    5. Pine Point Road, Route 1 to Dunstans Landing
    6. Pine Point Road, Opposite Bickford to Snowberry
    7. Route 1, So Portland City line to Kenosha
    8. Route 1, Church to Pine Point
    9. Route 1, Queens to Saco City line
    10. Route 1, Old Blue Point to Church

- Minor pedestrian signal hardware problems were identified at each of the five signalized intersections where pedestrian actuated signals exist. The noted deficiencies are explained in detail in the Pedestrian Traffic Signal Inventory section presented on page 29.

- The Town's existing Access Management provisions are somewhat vague and in some instances outdated when compared with current suggested standards. A detailed discussion of each standard is presented on page 34.

# Future 2025 Conditions

## Introduction

In order to determine what improvements should be undertaken to create an effective long-term transportation plan, understanding future traffic volumes and patterns should be undertaken. Section II provides discussion on the following items:

- Forecasting 2025 traffic volumes
- Capacity analysis, unsignalized and signalized
- Corridor mobility

## Overview of the PACTS Travel Demand Model

The PACTS Travel Demand Model (the Model) was used to develop traffic volume forecasts for the Scarborough Transportation Plan. Kevin Hooper Associates, PACTS Model consultant, performed the analyses.

The PACTS Travel Demand Model (the Model) is used to evaluate traffic patterns in the PACTS region, and to forecast traffic impacts resulting from changes in population, employment, land use, and roadway improvements. The Model covers a 28-municipality area from Kennebunkport in the south, Standish to the west, New Gloucester to the north and Brunswick to the northeast. Each municipality is divided into a number of traffic analysis zones (TAZ). More TAZs are used when more detail is desired. Scarborough has 47 TAZs; the entire model has 720 TAZs.

The Model is actually two models: a Base Year 2000 representing actual conditions, and a Base Year 2025 representing forecasted conditions. PACTS staff and model consultant, in conjunction with PACTS member municipalities, developed Year 2025 population, employment and household forecasts at the TAZ level. The roadway and transit networks for the Base Year 2025 were modified from the Year 2000 actual conditions by adding projects that are already funded (but not yet built) or that have a very high probability of being funded and built.

The Model has four inputs: population, households, employment and the transportation network (roadways and transit routes). The principal Model output to be used in the development of the Scarborough Transportation Plan is a detailed matrix of the origin and destination of all the trips to and from each TAZ. All of the Model's outputs are calibrated against actual traffic counts that were collected for more than 500 locations throughout the Model area.

The Model operates in three modules that are described below. Each of the modules contains a number of parameters whose value must be set by the Model operator. The parameters provide the necessary flexibility to make changes to the model to reflect actual conditions in the model area.

- Trip generation – determines how many trips will be made. Trips are produced based on the number and size of households and number of automobiles. Trips are attracted by places of employment, with the number of trips varying

depending on the type of employment. The number of trips produced must balance with the number of trips attracted.

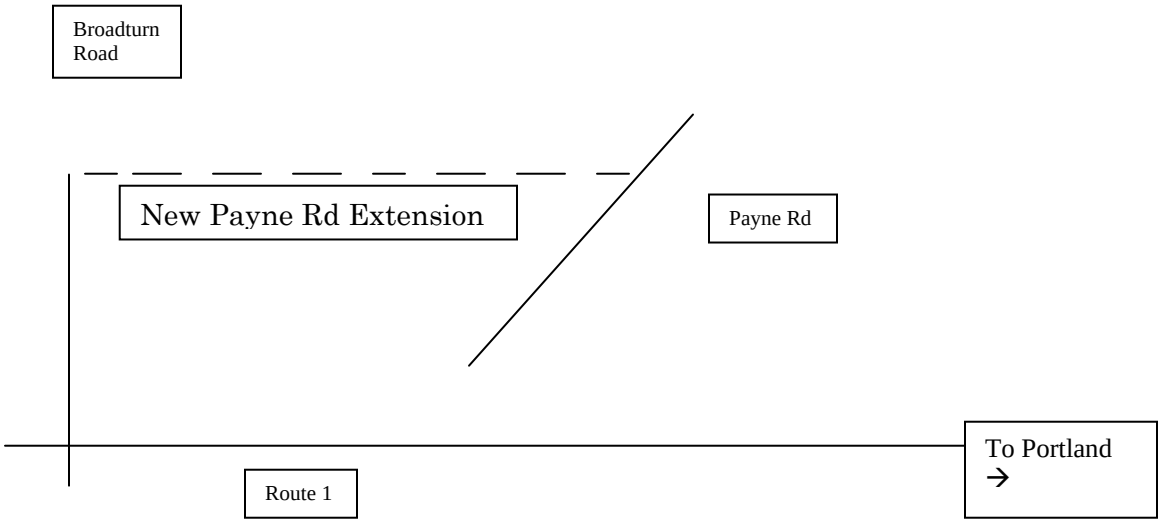
- Trip distribution – determines where the trips will go and how the trips will be divided amongst the TAZ.

- Trip assignment –assigns the trips to specific routes through an interactive process that considers distance, the dollar value of time, and the time needed to travel a particular route.

The following discussion provides a simple example of how the Model may be used. It also contains the existing and forecasted demographic inputs and the number of PM peak-hour vehicle trips for Scarborough.

## Example of How the Model is Used

Example Scenario – Make a new connection of Payne Road between the existing Payne Road and Broadturn Road as depicted in the line diagram below:




In this example, the Base Year 2000 and Base Year 2025 models would be run to determine the traffic flows around the Route 1/Broadturn Road and Route 1/Payne Road intersections. The New Payne Road Extension would then be added to the Base Year 2025 and the model would be rerun to determine the effects of this new road.

Table 1 shows the existing and forecasted demographic inputs to the Model. Table 2 shows one Model output for the Town of Scarborough – the number of vehicle trips made during the PM peak-hour (4:00 p.m.–5:00 p.m.)

**Table 1 – Existing and Future Demographics**

| | Town of Scarborough | | 28-Municipality Model Area | |
|---|---|---|---|---|
| | **Year 2000** | **Year 2025** | **Year 2000** | **Year 2025** |
| Population | 16,970 | 24,176 | 297,308 | 352,324 |
| Households | 6,462 | 9,551 | 121,131 | 147,794 |
| Employment | 13,593 | 18,130 | 229,081 | 271,877 |

**Table 2 – Number of Vehicle Trips Made During the PM Peak Hour**

| | | | |
|---|---|---|---|
| **In Year 2000** | To Scarborough | To Outside Scarborough | Total |
| From Scarborough | 2,243 | 6,692 | 8,935 |
| From Outside Scarborough | 6,571 | | |
| **Total** | 8,814 | | |
| **In Year 2025** | To Scarborough | To Outside Scarborough | Total |
| From Scarborough | 3,366 | 8,631 | 11,996 |
| From Outside Scarborough | 8,497 | | |
| **Total** | 11,863 | | |
| **Growth (2000 to 2025)** | To Scarborough | To Outside Scarborough | Total |
| From Scarborough | 50% | 29% | 34% |
| From Outside Scarborough | 29% | | |
| **Total** | 79% | | |

## Year 2000 and 2025 Employment Forecasts

This section describes the methodology and process used in assigning and forecasting employment for Scarborough (and each municipality within the PACTS model area).

The 2000 employment assignment and 2025 employment forecast for Scarborough (and the entire PACTS region) were developed using a top down, econometric approach, and on municipal knowledge as to where future development is most likely to occur. The econometric approach has a national employment driver as part of its base assumptions and is based on the Regional Economic Model, Inc. (REMI). The University of Southern Maine's Center for Business and Economic Research (CBER) developed the county control forecasts. County control totals were developed for each of four employment types – manufacturing, trade, services and residual – and were used in assigning employment to individual municipalities. The four employment types are based on their expected traffic generation and are:

- Manufacturing: manufacturing;
- Trade: retail trade;
- Residual: includes mining, construction, agriculture, forestry, fishing, transportation, public utilities and wholesale trade; and
- Services: includes finance, insurance, real estate, local state and federal government and military.

*Using different data sources and total employment*

Within the context of this study (and the PACTS Model), employment is defined as total employment and includes wage and salaried employees, sole proprietors and the self-employed. To fully capture total employment data it was necessary to use three different data sources listed below. Mathematical relations were developed to allow for combining the different data sets.

- The University of Southern Maine's Center for Business and Economic Research (CBER) captures total employment by type at the county level.
- The Maine Department of Labor ES 202 statistics capture wage and salaried employment by type by municipality.
- Dunn & Bradstreet employment data captures (most) employment by type and by location.

Three assumptions were made in developing the employment forecasts:

1. Job growth will occur primarily in planned locations where public infrastructure is available, such as downtowns, interstate interchanges, and business parks.
2. Although manufacturing continues to decline, the plants left behind will provide attractive locations for commercial redevelopment.
3. Only the service economy is expected to grow. To account for growth in other sectors of the economy, such as a planned big box development, jobs were transferred from elsewhere within the municipality.

***Step 1: Generating the County Control Forecasts***

The 2000 and 2025 county control forecasts were obtained from the University of Southern Maine's Center for Business and Economic Research (CBER) and is listed in Table 3 below. The different data sources (described above) made it necessary to also develop a Year 2000 control.

**Table 3 -- County Control Forecasts for Employment**

| | Manufacturing | Trade | Residual | Services | Total | Total Net Change | Total % Change |
|---|---|---|---|---|---|---|---|
| **Cumberland County 2000** | 16,912 | 41,842 | 37,029 | 123,020 | 218,803 | | |
| **Cumberland County 2025** | 12,941 | 41,539 | 36,286 | 163,750 | 254,516 | 35,713 | 16.3% |
| **York County 2000** | 13,409 | 19,573 | 12,901 | 44,753 | 90,636 | | |
| **York County 2025** | 10,933 | 19,670 | 14,607 | 61,159 | 106,369 | 15,733 | 17.4% |

***Step 2: Disaggregating the County Control Forecasts into Baseline Municipal Shares***

The county level net change in each type of employment and total employment from 2000-2025 was assigned to each municipality based on the average of its share of the county's jobs in 1981, 1990, 2000 and 2002. The shares were calculated from Maine Department of Labor ES 202 data factored up to match the CBER/REMI control totals. Annual averages were used for the ES 202 data. Shares of average annual employment, rather than growth rates by decade, were used so as not to produce negative numbers. See example below.

Example: Scarborough 2025 Forecast of Residual Employment. Example is for just residual employment.

$$\left[\frac{ScarEmp1981}{County1981}+\frac{ScarEmp1990}{County1990}+\frac{ScarEmp2000}{County2000}+\frac{ScarEmp2002}{County2002}\right]/4 = Scar\ Share\ of\ County\ Growth$$

$$\left[\frac{1,784}{24,229}+\frac{2,958}{32,564}+\frac{3,542}{37,029}+\frac{3,737}{36,321}\right]/4 = 9.08\%$$

$$ScarShareofCountyGrowth*CountyGrowth = ScarEmpGrowth2000to2025$$
$$.0908*(163,750-123,020) = 3,698$$

$$ScarEmpGrowth2000to2025 + ScarEmp2000 = ScarEmp2025$$
$$3,698+3,542 = 7,240$$

***Step 3: Adjusting Baseline Municipal Results***

The baseline municipal results were based on historical data and, therefore, did not necessarily capture proposed/future planned large developments (e.g., Great Island Development in Scarborough), large employment reductions (e.g., Sappi Paper Mill in Westbrook), or a change in municipal focus on what location(s) would best be suited for development.

PACTS staff worked with officials from each municipality to determine the size and location of any of these potential changes not represented in the historical data. Based on this information, where appropriate, employment types and locations were shifted within a municipality. In some cases, changes in municipal totals were also made; there were less of this type of change because adding employment to one municipality required subtracting it from another to stay within the CBER/REMI county control totals.

Due to its declining trend, forecasting manufacturing employment required special treatment that is briefly outlined. The REMI manufacturing control total was disaggregated based on the location of the region's largest manufacturers as determined by Dunn & Bradstreet data. Based on the relatively low trip generation rates of manufacturing employment, this was deemed an appropriate approach. PACTS staff conferred with municipal officials to ensure that this approach reasonably captured all significant manufacturers.

***Step 4: Finalizing Employment Disaggregation***

Throughout the process, results were examined for reasonableness and extreme results with adjustments made if required. Before finalizing the employment disaggregation, a final check for reasonableness and extreme results was made and a final consensus by municipal officials was reached.

## Year 2025 Population Forecast

This section describes the process used in forecasting and assigning population for Scarborough (and each municipality within the PACTS region.) Population is a by-product of the employment forecast, therefore, the methodology and process used in developing the municipal baselines were essentially the same as those used in the Year 2000 and 2025 Employment Forecasts Section. The only exceptions relevant to the Scarborough Transportation Plan were that: (1) U.S. Census data for 2000 precluded

the need to use multiple data sources and the need to develop a Year 2000 control total, and (2) there were no shifts in forecasted population between municipalities. Population was assigned to individual municipalities based on the average growth rate for three periods of time: 1980-1989, 1990-1999 and 2000-2002.

Three assumptions were made in developing the forecasts:

1. At the regional level, the economy will continue to be the primary driver of population growth.
2. At the community level, the best predictor of future growth is the recent past.
3. There is a dynamic relationship between municipal and regional growth: for example, if growth limits are imposed on a particular municipality that growth will occur elsewhere in the region.

***Step 1: Generating the County Control Forecasts***

The 2025 county control forecasts were obtained from two sources. For Cumberland County, the control was generated by the University of Southern Maine's Center for Business and Economic Research (CBER), using REMI. At the time that they were developed, the CBER/REMI forecasts did not reflect the 2000 Census. This factor resulted in the York County 2025 forecast appearing to be low relative to Cumberland County's forecast and to recent growth patterns. An alternative York County control forecast was developed using the method described in an addendum. (The forecasts developed for this study were done after the release of the 2000 U.S. Census population data.)

**Table 4 – County Control Forecasts for Population**

| Area | Census 2000 | 2025 Forecast | Net Change | % Change |
|---|---|---|---|---|
| Cumberland County | 265,612 | 315,910 | 50,298 | 19% |
| York County | 186,742 | 229,454 | 42,712 | 23% |
| **Total** | **452,354** | **547,389** | **93,010** | **21%** |

***Step 2: Disaggregating the County Control Forecasts into Baseline Proportional Municipal Assignments***

The net change in population from 2000-2025 was proportionally assigned to each municipality based on the average of its share of the county's growth between 1980 and 1989, 1990 and 1999, and 2000 and 2002 as described in the example below:

$$\left[\left[\left(\frac{\Delta Scar80-90}{\Delta County80-90}\right)*\Delta County00-25\right]+\left[\left(\frac{\Delta Scar90-00}{\Delta County90-00}\right)*\Delta County00-25\right]+\left[\left(\frac{\Delta Scar00-02}{\Delta County00-02}\right)*\Delta County00-25\right]\right]/3=$$

$$\left[\left[\left(\frac{1{,}171}{27{,}349}\right)*50{,}298\right]+\left[\left(\frac{4{,}452}{22{,}477}\right)*50{,}298\right]+\left[\left(\frac{672}{3{,}558}\right)*50{,}298\right]\right]/3=7{,}205$$

The municipality's share of the forecasted county population growth was then added to the municipality's Year 2000 population to arrive at the baseline 2025 forecasted population as shown on the following page:

$$Scar Share of County Growth + Scar 2000 Population = Scar 2025 Forecast Population$$

$$7{,}205 + 16{,}970 = 24{,}175$$

*Calculating Growth in the Current Decade*

To calculate the growth between 2000 and 2002, population estimates were developed for 2002 using a rate of growth based on the construction of new municipal housing units in 2000 and 2001. These estimates were controlled by the U.S. Census Bureau's published 2002 population estimates for York and Cumberland Counties. The Census estimates report the components of population change separately – births, deaths, domestic migration, and international migration. Domestic migration, reflected by residential building construction, is the most volatile factor in the estimate.

Residential building permit data was collected for 2000 and 2001 from the U.S. Census Bureau at http://censtats.census.gov/bldg/bldgprmt.shtml. For each municipality, single-family permits by unit and multi-family permits by unit were totaled separately. To translate permit data into municipal population estimates, the units were multiplied by the municipality's average household size for the appropriate housing type as reported by the 2000 Census:

single family units x average household size of ownership units + multi-family units x average household size of rental units
= town population growth for 2000-2002

The resultant estimates represent the maximum number of new residents that could be accommodated in a particular town based on added housing capacity and average household size by housing type in 2000. The true number will necessarily be higher or lower due to a number of factors:

- Births and deaths
- Vacancy rates
- Loss of existing units due to demolition, fire, code violations, and other factors
- Seasonal use of new housing units
- Mobile home placements
- Non-completion of units for which permits were issued
- Declines in average household size since the 2000 Census
- Absorption of new units by households already living in the municipality
- Changes in the group quarters population

The municipality's share of the county's uncontrolled growth was calculated using the following formula:

*Uncontrolled town population growth for 2000-2002/Uncontrolled county population growth for 2000-2002*
*= Town's share of county's population growth*

To control the town estimates, each town share was then applied to the county's growth for 2000-2002 as reported by the U.S. Census Bureau:

**Table 5 – County Controls for Population Growth 2000-2002**

| County | Net population increase, 2000-2002 |
|---|---|
| Cumberland County | 3,471 |
| York County | 8,745 |

***Step 3: Adjusting Baseline Municipal Results***

Baseline results were examined for reasonableness. This check included considering limitations on growth imposed by building permit caps in 18 York and Cumberland County communities. For each of these communities, the maximum number of new units possible over the next 25 years was multiplied by its average household size in 2000 to identify the maximum number of new residents that could be accommodated. This number was compared with the forecasted increase in population. In some cases, however, because multi-family units and grandfathered subdivisions are excluded from the cap, the number of possible housing units that could be constructed in the future is unknown. In only one municipality – Scarborough – did the 2025 forecasted increase exceed the maximum number of residents possible under its building-permit cap. PACTS staff and town officials reached consensus on an appropriate forecast number for Scarborough.

## Year 2025 Land Use Forecasts and Roadway Network Assumptions

***Land Use Forecasts***

The Model's consideration of land use is largely restricted to the level of employment and the number of households resulting from municipal level land use regulations, policies and planning. To that end, the land use input is reflected in the household and employment forecasts, which were developed with municipal input.

***Future Roadway Network Assumptions***

As described previously, the future base roadway/transit network consists of the existing roadway/transit network plus those projects that are already funded (but not yet built) or that have a very high probability of being funded and built. The following list of network modifications, which impact the Town of Scarborough, were used from the PACTS Base Year 2025 Model:

- Regional open-toll plaza system on the Maine Turnpike. The exact location of the toll plaza has yet to be determined.
- Gorham Village Southwest Bypass connecting Route 114 (South Street) to Route 25 west of the Village. The presence of this bypass causes a relatively minor increase in PM peak hour traffic volumes on Gorham Road (Route 114) and Running Hill Road. The effects are relatively minor because the overlap of Routes 22 and 114 (County Road) remains a severely congested, two-lane roadway in the assumed future base condition. This bottleneck constrains any additional diversion of traffic to this area and to the use of the Gorham Bypass.
- Auxiliary lane on I-295 between Exits 4 and 3
- Improvements to the I-295 Exit 3 ramp and immediate surrounding area
- I-295 Connector in Portland
- Widening of the Maine Mall/Payne Road Bridge
- Widening of the intersection of Spring Street and Cummings Road in Westbrook

***Future 2025 Traffic Forecasts***

Future 2025 travel forecasts were developed for two "no-build" roadway configurations for each of the forty-nine study intersections. One traffic model assignment assumed completion of the Gorham Village Southerly Bypass roadway and the second traffic assignment was run without the noted road project. Comparison of both travel model outputs shows that the Gorham Village Southerly Bypass roadway has virtually no impact on future 2025 traffic forecasts within the Town of Scarborough. The future 2025 traffic forecasts for both "no-build" conditions are compared to existing 2003 traffic conditions in the following tables:

**Intersection: Payne Road & Beech Ridge Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Payne | | | |
| | Left | 90 | 111 | 108 |
| | Thru | 331 | 491 | 494 |
| | Right | 8 | 21 | 21 |
| Southbound | | | | |
| | Left | 4 | 17 | 17 |
| | Thru | 464 | 636 | 631 |
| | Right | 14 | 29 | 38 |
| Eastbound | | | | |
| | Left | 11 | 18 | 17 |
| | Thru | 6 | 26 | 23 |
| | Right | 84 | 97 | 96 |
| Westbound | | | | |
| | Left | 9 | 21 | 20 |
| | Thru | 24 | 104 | 85 |
| | Right | 6 | 23 | 24 |
| | Total | 1051 | 1594 (52%) | 1574 (50%) |

**Intersection: Payne Road & Haigis Parkway**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Payne | | | |
| | Left | 31 | 86 | 81 |
| | Thru | 241 | 336 | 342 |
| | Right | 2 | 31 | 31 |
| Southbound | | | | |
| | Left | 77 | 91 | 97 |
| | Thru | 492 | 596 | 573 |
| | Right | 293 | 337 | 333 |
| Eastbound | | | | |
| | Left | 212 | 306 | 307 |
| | Thru | 181 | 314 | 299 |
| | Right | 128 | 218 | 240 |
| Westbound | | | | |
| | Left | 6 | 12 | 12 |
| | Thru | 256 | 392 | 392 |
| | Right | 86 | 99 | 101 |

| | | | | |
|---|---|---|---|---|
| | Total | 2005 | 2818 (41%) | 2808 (40%) |

**Intersection:** **Payne Road & Holmes Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Payne | | | |
| | Left | 147 | 169 | 174 |
| | Thru | 504 | 683 | 687 |
| | Right | 10 | 14 | 14 |
| Southbound | | | | |
| | Left | 38 | 53 | 53 |
| | Thru | 729 | 838 | 824 |
| | Right | 35 | 70 | 70 |
| Eastbound | | | | |
| | Left | 82 | 94 | 94 |
| | Thru | 19 | 36 | 36 |
| | Right | 22 | 25 | 17 |
| Westbound | | | | |
| | Left | 16 | 58 | 58 |
| | Thru | 64 | 250 | 250 |
| | Right | 22 | 91 | 91 |
| | Total | 1618 | 2381 (41%) | 2368 (40%) |

**Intersection:** **Payne Road & Bridges Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Payne | | | |
| | Left | 2 | 2 | 2 |
| | Thru | 606 | 855 | 859 |
| | Right | 0 | 0 | 0 |
| Southbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 800 | 920 | 906 |
| | Right | 566 | 705 | 698 |
| Eastbound | | | | |
| | Left | 33 | 98 | 98 |
| | Thru | 1 | 1 | 1 |
| | Right | 2 | 5 | 5 |
| Westbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| | Total | 2011 | 2587 (29%) | 2570 (28%) |

**Intersection:** **Payne Road & Mussey Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Payne | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 449 | 614 | 619 |

| | | | | |
|---|---|---|---|---|
| | Right | 109 | 163 | 163 |
| Southbound | | | | |
| | Left | 14 | 16 | 16 |
| | Thru | 1116 | 1283 | 1267 |
| | Right | 0 | 0 | 0 |
| Eastbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| Westbound | | | | |
| | Left | 260 | 370 | 373 |
| | Thru | 1 | 1 | 1 |
| | Right | 3 | 4 | 4 |
| | Total | 1953 | 2452 (26%) | 2444 (25%) |

**Intersection: Payne Road & Gorham Road (SR 114)**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Payne | | | |
| | Left | 91 | 105 | 100 |
| | Thru | 453 | 636 | 645 |
| | Right | 36 | 41 | 41 |
| Southbound | | | | |
| | Left | 178 | 236 | 234 |
| | Thru | 902 | 1037 | 1024 |
| | Right | 216 | 300 | 282 |
| Eastbound | | | | |
| | Left | 149 | 197 | 192 |
| | Thru | 287 | 396 | 391 |
| | Right | 60 | 69 | 69 |
| Westbound | | | | |
| | Left | 244 | 281 | 281 |
| | Thru | 409 | 470 | 477 |
| | Right | 105 | 150 | 148 |
| | Total | 3130 | 3918 (25%) | 3884 (24%) |

**Intersection: Payne Road at Sam's Club**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Payne | | | |
| | Left | 59 | 68 | 68 |
| | Thru | 631 | 864 | 866 |
| | Right | 37 | 43 | 43 |
| Southbound | | | | |
| | Left | 48 | 55 | 55 |
| | Thru | 1166 | 1512 | 1479 |
| | Right | 135 | 155 | 155 |
| Eastbound | | | | |
| | Left | 91 | 105 | 105 |
| | Thru | 2 | 2 | 2 |

| | | | | |
|---|---|---|---|---|
| | Right | 97 | 112 | 112 |
| Westbound | | | | |
| | Left | 30 | 35 | 35 |
| | Thru | 1 | 1 | 1 |
| | Right | 39 | 45 | 45 |
| | Total | 2336 | 2997 (28%) | 2966 (27%) |

**Intersection:** **Payne Road at Walmart**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Payne | | | |
| | Left | 37 | 43 | 43 |
| | Thru | 606 | 839 | 841 |
| | Right | 95 | 109 | 109 |
| Southbound | | | | |
| | Left | 241 | 277 | 277 |
| | Thru | 1106 | 1451 | 1418 |
| | Right | 22 | 25 | 25 |
| Eastbound | | | | |
| | Left | 59 | 68 | 68 |
| | Thru | 15 | 17 | 17 |
| | Right | 59 | 68 | 68 |
| Westbound | | | | |
| | Left | 180 | 207 | 207 |
| | Thru | 8 | 9 | 9 |
| | Right | 97 | 112 | 112 |
| | Total | 2525 | 3225 (28%) | 3194 (26%) |

**Intersection:** **Payne Road and Spring Street (south)**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Payne | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 852 | 1060 | 1065 |
| | Right | 24 | 134 | 133 |
| Southbound | | | | |
| | Left | 224 | 487 | 486 |
| | Thru | 1429 | 1643 | 1610 |
| | Right | 0 | 0 | 0 |
| Eastbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| Westbound | | | | |
| | Left | 20 | 128 | 128 |
| | Thru | 1 | 1 | 1 |
| | Right | 227 | 497 | 498 |
| | Total | 2778 | 3951 (42%) | 3922 (41%) |

**Intersection:** **Payne Road and Spring Street (north)**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Payne | | | |
| | Left | 302 | 454 | 453 |
| | Thru | 774 | 1098 | 1104 |
| | Right | 0 | 0 | 0 |
| Southbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1137 | 1370 | 1343 |
| | Right | 328 | 403 | 404 |
| Eastbound | | | | |
| | Left | 489 | 664 | 667 |
| | Thru | 1 | 1 | 1 |
| | Right | 516 | 735 | 728 |
| Westbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| | Total | 3548 | 4726 (33%) | 4701 (32%) |

**Intersection: SR 22 (County Road) and SR 114 [easterly intersection]**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | SR 114 | | | |
| | Left | 830 | 1026 | 1026 |
| | Thru | 1 | 1 | 1 |
| | Right | 9 | 11 | 11 |
| Southbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| Eastbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 223 | 286 | 266 |
| | Right | 549 | 631 | 611 |
| Westbound | | | | |
| | Left | 6 | 7 | 7 |
| | Thru | 606 | 792 | 792 |
| | Right | 0 | 0 | 0 |
| | Total | 2225 | 2755 (24%) | 2715 (22%) |

**Intersection: SR 22 (County Road) and Saco Street**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Saco | | | |
| | Left | 25 | 38 | 38 |
| | Thru | 320 | 429 | 443 |
| | Right | 29 | 48 | 47 |
| Southbound | | | | |
| | Left | 56 | 78 | 82 |

| | | | | |
|---|---|---|---|---|
| | Thru | 228 | 306 | 308 |
| | Right | 131 | 155 | 138 |
| Eastbound | | | | |
| | Left | 70 | 81 | 84 |
| | Thru | 160 | 234 | 212 |
| | Right | 12 | 17 | 17 |
| Westbound | | | | |
| | Left | 45 | 70 | 77 |
| | Thru | 539 | 684 | 702 |
| | Right | 209 | 240 | 212 |
| | Total | 1824 | 2380 (30%) | 2360 (29%) |

**Intersection:** **SR 114 and Beech Ridge Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Beech Ridge | | | |
| | Left | 26 | 50 | 49 |
| | Thru | 112 | 174 | 177 |
| | Right | 15 | 23 | 23 |
| Southbound | | | | |
| | Left | 123 | 174 | 174 |
| | Thru | 146 | 210 | 218 |
| | Right | 1 | 1 | 1 |
| Eastbound | | | | |
| | Left | 5 | 6 | 6 |
| | Thru | 530 | 610 | 596 |
| | Right | 20 | 36 | 31 |
| Westbound | | | | |
| | Left | 40 | 58 | 60 |
| | Thru | 812 | 995 | 997 |
| | Right | 262 | 321 | 331 |
| | Total | 2092 | 2658 (27%) | 2663 (27%) |

**Intersection:** **SR 114 and Running Hill Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | SR 114 | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 702 | 835 | 819 |
| | Right | 4 | 11 | 11 |
| Southbound | | | | |
| | Left | 176 | 212 | 208 |
| | Thru | 489 | 579 | 569 |
| | Right | 0 | 0 | 0 |
| Eastbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| Westbound | | | | |
| | Left | 3 | 21 | 21 |

| | | | | |
|---|---|---|---|---|
| | Thru | 1 | 1 | 1 |
| | Right | 365 | 517 | 546 |
| | Total | 1741 | 2177 (25%) | 2176 (25%) |

**Intersection:** **Broadturn Road and Burnham Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Burnham | | | |
| | Left | 1 | 5 | 5 |
| | Thru | 23 | 39 | 38 |
| | Right | 15 | 26 | 26 |
| Southbound | | | | |
| | Left | 17 | 32 | 30 |
| | Thru | 51 | 97 | 103 |
| | Right | 7 | 19 | 30 |
| Eastbound | | | | |
| | Left | 1 | 4 | 4 |
| | Thru | 50 | 58 | 65 |
| | Right | 1 | 4 | 3 |
| Westbound | | | | |
| | Left | 42 | 48 | 50 |
| | Thru | 302 | 368 | 362 |
| | Right | 20 | 25 | 25 |
| | Total | 530 | 725 (37%) | 741 (40%) |

**Intersection:** **Broadturn Road and Holmes Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Holmes | | | |
| | Left | 4 | 5 | 5 |
| | Thru | 59 | 108 | 108 |
| | Right | 11 | 33 | 33 |
| Southbound | | | | |
| | Left | 82 | 112 | 106 |
| | Thru | 226 | 285 | 296 |
| | Right | 194 | 224 | 214 |
| Eastbound | | | | |
| | Left | 11 | 26 | 20 |
| | Thru | 122 | 140 | 150 |
| | Right | 88 | 101 | 101 |
| Westbound | | | | |
| | Left | 22 | 35 | 51 |
| | Thru | 89 | 130 | 135 |
| | Right | 11 | 57 | 47 |
| | Total | 919 | 1256 (37%) | 1266 (38%) |

**Intersection:** **Beech Ridge Road and Holmes Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Beech Ridge | | | |

| | | | | |
|---|---|---|---|---|
| | Left | 22 | 82 | 64 |
| | Thru | 69 | 132 | 132 |
| | Right | 2 | 4 | 4 |
| Southbound | | | | |
| | Left | 31 | 67 | 66 |
| | Thru | 59 | 76 | 74 |
| | Right | 87 | 126 | 134 |
| Eastbound | | | | |
| | Left | 28 | 55 | 54 |
| | Thru | 114 | 177 | 170 |
| | Right | 7 | 23 | 23 |
| Westbound | | | | |
| | Left | 56 | 64 | 64 |
| | Thru | 506 | 611 | 611 |
| | Right | 3 | 15 | 15 |
| | Total | 984 | 1432 (46%) | 1411 (43%) |

**Intersection:** **SR 114 (Gorham Road) and Mussey Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | SR 114 | | | |
| | Left | 56 | 73 | 73 |
| | Thru | 376 | 451 | 451 |
| | Right | 11 | 13 | 13 |
| Southbound | | | | |
| | Left | 197 | 285 | 285 |
| | Thru | 282 | 441 | 441 |
| | Right | 1 | 1 | 1 |
| Eastbound | | | | |
| | Left | 8 | 11 | 11 |
| | Thru | 72 | 125 | 125 |
| | Right | 56 | 79 | 79 |
| Westbound | | | | |
| | Left | 17 | 20 | 20 |
| | Thru | 159 | 225 | 225 |
| | Right | 407 | 468 | 468 |
| | Total | 1642 | 2192 (33%) | 2192 (33%) |

**Intersection:** **SR 114 (Gorham Road) and Spring Street**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | SR 114 | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 444 | 544 | 544 |
| | Right | 254 | 347 | 347 |
| Southbound | | | | |
| | Left | 1 | 1 | 1 |
| | Thru | 335 | 516 | 516 |
| | Right | 0 | 0 | 0 |
| Eastbound | | | | |

| | | | | |
|---|---|---|---|---|
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| Westbound | | | | |
| | Left | 288 | 360 | 360 |
| | Thru | 1 | 1 | 1 |
| | Right | 1 | 1 | 1 |
| | Total | 1325 | 1771 (34%) | 1771 (34%) |

**Intersection:** **Spring St and Mussey Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Spring | | | |
| | Left | 1 | 2 | 2 |
| | Thru | 183 | 274 | 274 |
| | Right | 70 | 132 | 132 |
| Southbound | | | | |
| | Left | 119 | 137 | 137 |
| | Thru | 203 | 276 | 276 |
| | Right | 24 | 45 | 45 |
| Eastbound | | | | |
| | Left | 12 | 37 | 37 |
| | Thru | 194 | 274 | 274 |
| | Right | 5 | 9 | 9 |
| Westbound | | | | |
| | Left | 80 | 111 | 111 |
| | Thru | 552 | 698 | 698 |
| | Right | 104 | 120 | 120 |
| | Total | 1547 | 2115 (37%) | 2115 (37%) |

**Intersection:** **Great Island Road and Mussey Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Great Island | | | |
| | Left | | 0 | 0 |
| | Thru | | 1 | 1 |
| | Right | | 0 | 0 |
| Southbound | | | | |
| | Left | | 235 | 235 |
| | Thru | | 1 | 1 |
| | Right | | 103 | 103 |
| Eastbound | | | | |
| | Left | | 82 | 82 |
| | Thru | | 462 | 462 |
| | Right | | 0 | 0 |
| Westbound | | | | |
| | Left | | 0 | 0 |
| | Thru | | 827 | 827 |
| | Right | | 237 | 237 |
| | Total | | 1948 | 1948 |

**Intersection:** **SR 114 (Gorham Road) and Cumberland Way**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | SR 114 | | | |
| | Left | 0 | 1 | 1 |
| | Thru | 734 | 914 | 914 |
| | Right | 40 | 46 | 46 |
| Southbound | | | | |
| | Left | 47 | 54 | 54 |
| | Thru | 594 | 810 | 810 |
| | Right | 0 | 1 | 1 |
| Eastbound | | | | |
| | Left | 0 | 1 | 1 |
| | Thru | 1 | 4 | 4 |
| | Right | 0 | 1 | 1 |
| Westbound | | | | |
| | Left | 32 | 37 | 37 |
| | Thru | 1 | 4 | 4 |
| | Right | 31 | 36 | 36 |
| | Total | 1480 | 1909 (29%) | 1909 (29%) |

**Intersection:** **SR 114 (Gorham Road) and Maple Avenue**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | SR 114 | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 676 | 777 | 777 |
| | Right | 27 | 31 | 31 |
| Southbound | | | | |
| | Left | 58 | 67 | 67 |
| | Thru | 550 | 761 | 761 |
| | Right | 0 | 0 | 0 |
| Eastbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| Westbound | | | | |
| | Left | 9 | 18 | 18 |
| | Thru | 1 | 1 | 1 |
| | Right | 113 | 167 | 167 |
| | Total | 1435 | 1823 (27%) | 1823 (27%) |

**Intersection:** **US 1 and Pleasant Hill Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | SR 114 | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 390 | 566 | 566 |
| | Right | 206 | 275 | 275 |

| | | | | |
|---|---|---|---|---|
| Southbound | | | | |
| | Left | 505 | 619 | 619 |
| | Thru | 339 | 390 | 390 |
| | Right | 0 | 0 | 0 |
| Eastbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| Westbound | | | | |
| | Left | 325 | 332 | 332 |
| | Thru | 1 | 1 | 1 |
| | Right | 541 | 645 | 645 |
| | Total | 2308 | 2829 (23%) | 2829 (23%) |

**Intersection:** **US 1 and Hillcrest Ave & Green Acres**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | SR 114 | | | |
| | Left | 9 | 10 | 10 |
| | Thru | 1209 | 1528 | 1528 |
| | Right | 24 | 48 | 48 |
| Southbound | | | | |
| | Left | 43 | 89 | 89 |
| | Thru | 1666 | 1950 | 1950 |
| | Right | 3 | 14 | 14 |
| Eastbound | | | | |
| | Left | 132 | 152 | 152 |
| | Thru | 10 | 15 | 15 |
| | Right | 13 | 15 | 15 |
| Westbound | | | | |
| | Left | 148 | 198 | 198 |
| | Thru | 25 | 29 | 29 |
| | Right | 176 | 206 | 206 |
| | Total | 3458 | 4254 (23%) | 4254 (23%) |

**Intersection:** **US 1 and Portland Farms Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | US 1 | | | |
| | Left | 10 | 12 | 12 |
| | Thru | 1010 | 1362 | 1362 |
| | Right | 100 | 115 | 115 |
| Southbound | | | | |
| | Left | 144 | 166 | 166 |
| | Thru | 1583 | 1885 | 1885 |
| | Right | 18 | 21 | 21 |
| Eastbound | | | | |
| | Left | 17 | 20 | 20 |
| | Thru | 1 | 1 | 1 |
| | Right | 11 | 13 | 13 |

| | | | | |
|---|---|---|---|---|
| Westbound | | | | |
| | Left | 106 | 127 | 127 |
| | Thru | 2 | 2 | 2 |
| | Right | 85 | 98 | 98 |
| | Total | 3087 | 3822 (24%) | 3822 (24%) |

**Intersection: US 1 and Maple Avenue**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | US 1 | | | |
| | Left | 41 | 69 | 69 |
| | Thru | 1161 | 1569 | 1569 |
| | Right | 0 | 0 | 0 |
| Southbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1712 | 2001 | 2001 |
| | Right | 18 | 74 | 74 |
| Eastbound | | | | |
| | Left | 8 | 19 | 19 |
| | Thru | 1 | 1 | 1 |
| | Right | 23 | 27 | 27 |
| Westbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| | Total | 2965 | 3761 (27%) | 3761 (27%) |

**Intersection: US 1 and Oak Hill Terrace**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | US 1 | | | |
| | Left | 127 | 146 | 146 |
| | Thru | 1022 | 1460 | 1460 |
| | Right | 0 | 0 | 0 |
| Southbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1304 | 1500 | 1500 |
| | Right | 399 | 491 | 491 |
| Eastbound | | | | |
| | Left | 206 | 262 | 262 |
| | Thru | 1 | 1 | 1 |
| | Right | 221 | 254 | 254 |
| Westbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| | Total | 3281 | 4115 (25%) | 4115 (25%) |

**Intersection: US 1 and SRs 114 and 207**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | US 1 | | | |
| | Left | 230 | 307 | 307 |
| | Thru | 935 | 1374 | 1374 |
| | Right | 346 | 446 | 446 |
| Southbound | | | | |
| | Left | 330 | 381 | 381 |
| | Thru | 1131 | 1331 | 1331 |
| | Right | 77 | 89 | 89 |
| Eastbound | | | | |
| | Left | 104 | 120 | 120 |
| | Thru | 266 | 321 | 321 |
| | Right | 229 | 269 | 269 |
| Westbound | | | | |
| | Left | 343 | 424 | 424 |
| | Thru | 268 | 308 | 308 |
| | Right | 202 | 257 | 257 |
| | Total | 4461 | 5627 (26%) | 5627 (26%) |

**Intersection: US 1 and Ward Street**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | US 1 | | | |
| | Left | 48 | 55 | 55 |
| | Thru | 1365 | 1850 | 1850 |
| | Right | 1 | 1 | 1 |
| Southbound | | | | |
| | Left | 3 | 3 | 3 |
| | Thru | 1630 | 1915 | 1915 |
| | Right | 68 | 78 | 78 |
| Eastbound | | | | |
| | Left | 82 | 94 | 94 |
| | Thru | 0 | 0 | 0 |
| | Right | 58 | 67 | 67 |
| Westbound | | | | |
| | Left | 4 | 5 | 5 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| | Total | 3260 | 4069 (25%) | 4069 (25%) |

**Intersection: US 1 and Sawyer Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | US 1 | | | |
| | Left | 37 | 75 | 75 |
| | Thru | 1382 | 1828 | 1828 |
| | Right | 0 | 0 | 0 |
| Southbound | | | | |
| | Left | 0 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| | Thru | 1647 | 1923 | 1923 |
| | Right | 40 | 48 | 48 |
| Eastbound | | | | |
| | Left | 33 | 49 | 49 |
| | Thru | 1 | 1 | 1 |
| | Right | 48 | 120 | 120 |
| Westbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| | Total | 3189 | 4045 (27%) | 4045 (27%) |

**Intersection:** **US 1 and Commerce Drive**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | US 1 | | | |
| | Left | 4 | 5 | 5 |
| | Thru | 1344 | 1824 | 1824 |
| | Right | 29 | 33 | 33 |
| Southbound | | | | |
| | Left | 121 | 139 | 139 |
| | Thru | 1574 | 1923 | 1923 |
| | Right | 1 | 1 | 1 |
| Eastbound | | | | |
| | Left | 13 | 15 | 15 |
| | Thru | 0 | 0 | 0 |
| | Right | 1 | 1 | 1 |
| Westbound | | | | |
| | Left | 15 | 17 | 17 |
| | Thru | 9 | 10 | 10 |
| | Right | 59 | 68 | 68 |
| | Total | 3170 | 4036 (27%) | 4036 (27%) |

**Intersection:** **US 1 and Scarborough Downs Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | US 1 | | | |
| | Left | 29 | 33 | 33 |
| | Thru | 1359 | 1813 | 1813 |
| | Right | 0 | 0 | 0 |
| Southbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1611 | 1955 | 1955 |
| | Right | 63 | 126 | 126 |
| Eastbound | | | | |
| | Left | 41 | 72 | 72 |
| | Thru | 1 | 1 | 1 |
| | Right | 19 | 59 | 59 |
| Westbound | | | | |
| | Left | 0 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| | Total | 3124 | 4060 (30%) | 4060 (30%) |

**Intersection: US 1, Willowdale Road, and Enterprise Drive**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | US 1 | | | |
| | Left | 42 | 75 | 75 |
| | Thru | 1051 | 1426 | 1426 |
| | Right | 31 | 36 | 36 |
| Southbound | | | | |
| | Left | 39 | 45 | 45 |
| | Thru | 1520 | 1844 | 1844 |
| | Right | 31 | 96 | 96 |
| Eastbound | | | | |
| | Left | 226 | 260 | 260 |
| | Thru | 0 | 0 | 0 |
| | Right | 162 | 186 | 186 |
| Westbound | | | | |
| | Left | 14 | 16 | 16 |
| | Thru | 0 | 0 | 0 |
| | Right | 39 | 45 | 45 |
| | Total | 3155 | 4029 (28%) | 4029 (28%) |

**Intersection: US 1 and Haigis Parkway**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | US 1 | | | |
| | Left | 125 | 180 | 184 |
| | Thru | 923 | 1177 | 1171 |
| | Right | 12 | 14 | 14 |
| Southbound | | | | |
| | Left | 35 | 40 | 40 |
| | Thru | 1432 | 1647 | 1652 |
| | Right | 257 | 378 | 358 |
| Eastbound | | | | |
| | Left | 175 | 289 | 285 |
| | Thru | 52 | 60 | 60 |
| | Right | 82 | 94 | 86 |
| Westbound | | | | |
| | Left | 32 | 37 | 37 |
| | Thru | 82 | 94 | 94 |
| | Right | 75 | 86 | 86 |
| | Total | 3282 | 4096 (25%) | 4067 (24%) |

**Intersection: Haigis Parkway and Scottow Hill Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Haigis | | | |

| | | | | |
|---|---|---|---|---|
| | Left | 53 | 123 | 103 |
| | Thru | 370 | 472 | 476 |
| | Right | 0 | 0 | 0 |
| Southbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 339 | 435 | 424 |
| | Right | 3 | 30 | 30 |
| Eastbound | | | | |
| | Left | 4 | 28 | 25 |
| | Thru | 1 | 1 | (1) |
| | Right | 31 | 62 | 62 |
| Westbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| | Total | 802 | 1152 (44%) | 1122 (40%) |

**Intersection:** **US 1 and Southgate Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | US 1 | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1030 | 1338 | 1338 |
| | Right | 14 | 26 | 26 |
| Southbound | | | | |
| | Left | 5 | 7 | 7 |
| | Thru | 1448 | 1665 | 1665 |
| | Right | 0 | 0 | 0 |
| Eastbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| Westbound | | | | |
| | Left | 28 | 41 | 41 |
| | Thru | 1 | 1 | 1 |
| | Right | 25 | 29 | 29 |
| | Total | 2552 | 3108 (22%) | 3108 (22%) |

**Intersection:** **US 1, Payne Road, and Harlow Street**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | US 1 | | | |
| | Left | 292 | 397 | 397 |
| | Thru | 853 | 1096 | 1096 |
| | Right | 19 | 22 | 22 |
| Southbound | | | | |
| | Left | 32 | 37 | 37 |
| | Thru | 1406 | 1617 | 1617 |
| | Right | 10 | 20 | 20 |
| Eastbound | | | | |

| | | | | |
|---|---|---|---|---|
| | Left | 14 | 17 | 17 |
| | Thru | 15 | 17 | 17 |
| | Right | 493 | 605 | 605 |
| Westbound | | | | |
| | Left | 46 | 53 | 53 |
| | Thru | 7 | 8 | 8 |
| | Right | 30 | 35 | 35 |
| | Total | 3217 | 3924 (22%) | 3924 (22%) |

**Intersection:** **US 1, Pine Point Road (SR 9), and Broadturn**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | US 1 | | | |
| | Left | 48 | 56 | 56 |
| | Thru | 786 | 1020 | 1019 |
| | Right | 52 | 62 | 62 |
| Southbound | | | | |
| | Left | 404 | 513 | 510 |
| | Thru | 1340 | 1541 | 1536 |
| | Right | 198 | 240 | 243 |
| Eastbound | | | | |
| | Left | 103 | 136 | 138 |
| | Thru | 39 | 50 | 50 |
| | Right | 40 | 98 | 98 |
| Westbound | | | | |
| | Left | 46 | 53 | 53 |
| | Thru | 59 | 116 | 115 |
| | Right | 277 | 414 | 413 |
| | Total | 3392 | 4299 (27%) | 4293 (27%) |

**Intersection:** **US 1 and Old Blue Point Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | US 1 | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 750 | 976 | 976 |
| | Right | 13 | 39 | 39 |
| Southbound | | | | |
| | Left | 235 | 304 | 304 |
| | Thru | 1115 | 1282 | 1282 |
| | Right | 0 | 0 | 0 |
| Eastbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| Westbound | | | | |
| | Left | 7 | 28 | 28 |
| | Thru | 1 | 1 | 1 |
| | Right | 97 | 146 | 146 |
| | Total | 2219 | 2777 (25%) | 2777 (25%) |

**Intersection:** **Ash Swamp Road and Hearn Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Hearn | | | |
| | Left | 2 | 9 | 9 |
| | Thru | 33 | 104 | 104 |
| | Right | 8 | 9 | 9 |
| Southbound | | | | |
| | Left | 1 | 1 | 1 |
| | Thru | 41 | 54 | 54 |
| | Right | 4 | 9 | 9 |
| Eastbound | | | | |
| | Left | 1 | 5 | 5 |
| | Thru | 25 | 52 | 52 |
| | Right | 4 | 15 | 15 |
| Westbound | | | | |
| | Left | 26 | 32 | 32 |
| | Thru | 57 | 145 | 145 |
| | Right | 4 | 7 | 7 |
| | Total | 206 | 442 (114%) | 442 (114%) |

**Intersection:** **Pine Point Road (SR 9) and Ross Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Pine Point | | | |
| | Left | 24 | 33 | 33 |
| | Thru | 468 | 644 | 644 |
| | Right | 0 | 0 | 0 |
| Southbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 393 | 470 | 470 |
| | Right | 28 | 48 | 48 |
| Eastbound | | | | |
| | Left | 29 | 62 | 62 |
| | Thru | 1 | 1 | 1 |
| | Right | 51 | 81 | 81 |
| Westbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| | Total | 995 | 1340 (35%) | 1340 (35%) |

**Intersection:** **Pine Point Road (SR 9), Jones Creek, Depot, and East Grand**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | East Grand | | | |
| | Left | 164 | 212 | 212 |
| | Thru | 38 | 44 | 44 |

| | | | | |
|---|---|---|---|---|
| | Right | 13 | 14 | 14 |
| Southbound | | | | |
| | Left | 3 | 3 | 3 |
| | Thru | 30 | 35 | 35 |
| | Right | 50 | 58 | 58 |
| Eastbound | | | | |
| | Left | 81 | 93 | 93 |
| | Thru | 48 | 53 | 53 |
| | Right | 225 | 273 | 273 |
| Westbound | | | | |
| | Left | 41 | 45 | 45 |
| | Thru | 39 | 43 | 43 |
| | Right | 9 | 10 | 10 |
| | Total | 741 | 883 (19%) | 883 (19%) |

**Intersection:** **SR 77 and Black Point Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Black Point | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 189 | 217 | 217 |
| | Right | 135 | 155 | 155 |
| Southbound | | | | |
| | Left | 185 | 213 | 213 |
| | Thru | 146 | 168 | 168 |
| | Right | 0 | 0 | 0 |
| Eastbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| Westbound | | | | |
| | Left | 65 | 78 | 78 |
| | Thru | 1 | 1 | 1 |
| | Right | 223 | 256 | 256 |
| | Total | 945 | 1089 (15%) | 1089 (15%) |

**Intersection:** **Black Point Road and Fogg Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | SR 207 | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 368 | 423 | 423 |
| | Right | 11 | 13 | 13 |
| Southbound | | | | |
| | Left | 138 | 170 | 170 |
| | Thru | 442 | 508 | 508 |
| | Right | 0 | 0 | 0 |
| Eastbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |

| | | | | |
|---|---|---|---|---|
| | Right | 0 | 0 | 0 |
| Westbound | | | | |
| | Left | 20 | 23 | 23 |
| | Thru | 1 | 1 | 1 |
| | Right | 103 | 118 | 118 |
| | Total | 1084 | 1257 (16%) | 1257 (16%) |

**Intersection: Black Point Road and Highland Avenue**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Black Point | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 460 | 529 | 529 |
| | Right | 13 | 16 | 16 |
| Southbound | | | | |
| | Left | 190 | 252 | 252 |
| | Thru | 555 | 638 | 638 |
| | Right | 0 | 0 | 0 |
| Eastbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| Westbound | | | | |
| | Left | 25 | 39 | 39 |
| | Thru | 1 | 1 | 1 |
| | Right | 265 | 329 | 329 |
| | Total | 1510 | 1805 (20%) | 1805 (20%) |

**Intersection: SR 77 and Ocean Avenue**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Ocean | | | |
| | Left | 41 | 47 | 47 |
| | Thru | 1 | 1 | 1 |
| | Right | 71 | 92 | 92 |
| Southbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| Eastbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 151 | 174 | 174 |
| | Right | 64 | 74 | 74 |
| Westbound | | | | |
| | Left | 91 | 105 | 105 |
| | Thru | 135 | 191 | 191 |
| | Right | 0 | 0 | 0 |
| | Total | 555 | 685 (23%) | 685 (23%) |

**Intersection: SR 77 and Pleasant Hill Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Pleasant Hill | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| Southbound | | | | |
| | Left | 176 | 202 | 202 |
| | Thru | 1 | 1 | 1 |
| | Right | 94 | 108 | 108 |
| Eastbound | | | | |
| | Left | 59 | 69 | 69 |
| | Thru | 144 | 196 | 196 |
| | Right | 0 | 0 | 0 |
| Westbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 131 | 180 | 180 |
| | Right | 100 | 138 | 138 |
| | Total | 706 | 895 (27%) | 895 (27%) |

**Intersection: Pleasant Hill Road and Fogg Road**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Pleasant Hill | | | |
| | Left | 50 | 58 | 58 |
| | Thru | 140 | 198 | 198 |
| | Right | 0 | 0 | 0 |
| Southbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 204 | 241 | 241 |
| | Right | 22 | 25 | 25 |
| Eastbound | | | | |
| | Left | 29 | 34 | 34 |
| | Thru | 1 | 1 | 1 |
| | Right | 59 | 86 | 86 |
| Westbound | | | | |
| | Left | 0 | 0 | 0 |
| | Thru | 1 | 1 | 1 |
| | Right | 0 | 0 | 0 |
| | Total | 506 | 644 (27%) | 644 (27%) |

**Intersection: Pleasant Hill Road and Highland Avenue**

| | PM Peak Hour | 2003 Traffic | 2025 w/Gorham Bypass | 2025 w/o Gorham Bypass |
|---|---|---|---|---|
| Northbound | Pleasant Hill | | | |
| | Left | 28 | 44 | 44 |
| | Thru | 148 | 230 | 230 |
| | Right | 12 | 24 | 24 |
| Southbound | | | | |
| | Left | 235 | 270 | 270 |

| | | | | |
|---|---|---|---|---|
| | Thru | 266 | 366 | 366 |
| | Right | 38 | 44 | 44 |
| Eastbound | | | | |
| | Left | 19 | 22 | 22 |
| | Thru | 94 | 108 | 108 |
| | Right | 24 | 31 | 31 |
| Westbound | | | | |
| | Left | 88 | 133 | 133 |
| | Thru | 112 | 158 | 158 |
| | Right | 123 | 145 | 145 |
| | Total | 1187 | 1575 (33%) | 1575 (33%) |

Traffic growth within the Community is expected to increase by an average annual rate of more than 1% per year at nearly all of the forty-nine study intersections. Only four intersections: Blackpoint Road/Route 77, Blackpoint Road/Fogg Road, Blackpoint Road/Highland Avenue and Pine Point Road/Jones Creek Road experience annual traffic increases of 1% or less. Generally, the average annual growth in traffic at the majority of the study intersections ranges from greater than 1% per year to more than 2% per year. The forecasted growth in traffic at two study intersections: Payne Road/Beech Ridge Road and Ash Swamp Road/Hearne Road, will exceed 2.5% per year. Peak hour increases in traffic are expected to exceed 1,000 vehicles at three intersections: Oak Hill, Payne Road/Spring Street (South) and Payne Road (North). The Oak Hill intersection, which experiences the highest volume of peak hour traffic in 2003, will maintain that distinction with 2025 peak hour traffic volumes in excess of 5,600 vehicles.

# Future Intersection Mobility Summary

## Unsignalized Intersection Capacity

Capacity analyses were performed for each of the twenty-four unsignalized study intersections to determine level of service based on estimated 2025 traffic conditions (with the Gorham By-Pass). The analyses were completed using the Highway Capacity 2000 Version 4-1e software package. Levels of Service rankings are similar to the academic grade system, where an "A" is very good with little delay and "F" represents very poor conditions. The following tables summarize the relationship between delay and level of service for both an unsignalized intersection.

**Level of Service Criteria for Unsignalized Intersections**

| Level of Service | Total Control Delay (sec/veh) |
|---|---|
| A | Up to 10.0 |
| B | 10.1 to 15.0 |
| C | 15.1 to 25.0 |
| D | 25.1 to 35.0 |
| E | 35.1 to 50.0 |
| F | Greater than 50.0 |

The results of the analyses are presented in the following tables:

## Year 2025 Unsignalized Intersection Capacity Summary

| Intersection/Approach | Total Delay (seconds) | Level of Service | 95% Vehicle Queue (vehicles) |
|---|---|---|---|
| 1. Route 77/Ocean Avenue | | | |
| - Ocean Ave Lt. | 16 sec. | C | 1 veh. |
| - Ocean Ave Rt. | 11 sec. | B | 1 veh. |
| - Route 77 SB Lt. | 8 sec. | A | 1 veh. |
| 2. Route 77/Blackpoint Road | | | |
| - Route 77 | 39 sec. | E | 10 veh. |
| - Blackpoint Road EB Lt. | 9 sec. | A | 1 veh. |
| 3. Blackpoint Road/Fogg Road | | | |
| - Fogg Road | 22 sec. | C | 3 veh. |
| - Blackpoint Road EB Lt. | 9 sec. | A | 1 veh. |
| 4. Blackpoint Road/Highland Avenue | | | |
| - Highland Avenue Lt. | 205 sec. | F | 6 veh. |
| - Highland Avenue Rt. | 30 sec. | D | 7 veh. |
| - Blackpoint Road EB Lt. | 11 sec. | B | 1 veh. |
| 5. East Grande Avenue/Pine Point Road | | | |
| - Island Left-turn Lane | 25 sec. | C | 2 veh. |
| - Pine Point Road Lt. | 9 sec. | A | 1 veh. |
| 6. Pine Point Road/Ross Road | | | |
| - Ross Road | 60 sec. | F | 7 veh. |
| - Pine Point Road WB Lt. | 9 sec. | A | 1 veh. |
| 7. Pleasant Hill Road/Route 77 | | | |
| - Pleasant Hill Road | 29 sec. | D | 7 veh. |
| - Route 77 NB Lt. | 9 sec. | A | 1 veh. |
| 8. Pleasant Hill Road/Fogg Road | | | |
| - Fogg Road | 13 sec. | B | 1 veh. |
| - Pleasant Hill Road WB Lt. | 8 sec. | A | 1 veh. |
| 9. Pleasant Hill Road/Highland Avenue | | | |
| - Pleasant Hill Road EB | 310 sec. | F | 69 veh. |
| - Pleasant Hill Road WB | 32 sec. | D | 6 veh. |
| - Highland Avenue NB | 19 sec. | C | 4 veh. |
| - Highland Avenue SB | 73 sec. | F | 13 veh. |
| 10. Payne Road/Mussey Road | | | |
| - Mussey Road | 500+ sec. | F | 100+ veh. |
| - Payne Road SB Lt. | 10 sec. | B | 1 veh. |
| 11. Payne Road/Spring Street (E) | | | |
| - Spring Street WB Lt. | 500+ sec. | F | 100+ veh. |
| - Spring Street WB Rt. | 500+ sec. | F | 83 veh. |
| - Payne Road SB Lt. | 153 sec. | F | 33 veh. |
| 12. Payne Road/Bridges Drive | | | |
| - Bridges Drive | 500+ sec. | F | 41 veh. |
| - Payne Road NB Lt. | 16 sec. | C | 1 veh. |
| 13. Payne Road/Beech Ridge Road/Scottow Hill Road | | | |
| - Scottow Hill Road | 500+ sec. | F | 48 veh. |
| - Beech Ridge Road | 500+ sec. | F | 100+ veh. |
| - Payne Road NB Lt. | 10 sec. | B | 1 veh. |
| - Payne Road SB Lt. | 9 sec. | A | 1 veh. |
| 14. Route 114/Running Hill Road | | | |
| - Running Hill Road | 500+ sec. | F | 100+ veh. |
| - Route 114 EB Lt. | 12 sec. | B | 2 veh. |
| 15. Route 114/Spring Street | | | |
| - Spring Street | 500+ sec. | F | 100+ veh. |
| - Route 114 EB Lt. | 11 sec. | B | 0 veh. |
| 16. Route 114/Cumberland Way | | | |
| - Cumberland Way Lt. | 216 sec. | F | 6 veh. |
| - Cumberland Way Rt. | 20 sec. | C | 1 veh. |
| - Route 114 EB Lt. | 11 sec. | B | 1 veh. |

**Year 2025 Unsignalized Intersection Capacity Summary - Continued**

| | | | |
|---|---|---|---|
| 17. Route 114/Maple Street | | | |
| - Maple Street | 71 sec. | F | 9 veh. |
| - Route 114 EB Lt. | 11 sec. | B | 1 veh. |
| 18. Broadturn Road/Burnham Road | | | |
| - Burnham Road NB | 14 sec. | B | 1 veh. |
| - Burnham Road SB | 20 sec. | C | 2 veh. |
| - Broadturn Road EB Lt. | 8 sec. | A | 1 veh. |
| - Broadturn Road WB Lt. | 7 sec. | A | 1 veh. |
| 19. Broadturn Road/Holmes Road | | | |
| - Holmes Road NB | 13 sec. | B | 3 veh. |
| - Holmes Road SB | 113 sec. | F | 19 veh. |
| - Broadturn Road EB | 18 sec. | C | 4 veh. |
| - Broadturn Road WB | 16 sec. | C | 4 veh. |
| 20. Beech Ridge Road/Holmes Road | | | |
| - Beech Ridge Road NB | 19 sec. | C | 4 veh. |
| - Beech Ridge Road SB | 21 sec. | C | 6 veh |
| - Holmes Road EB | 20 sec. | C | 4 veh. |
| - Holmes Road WB | 238 sec. | F | 74 veh. |
| 21. Ash Swamp Road/Hearn Road | | | |
| - Ash Swamp Road EB | 9 sec. | A | 3 veh. |
| - Ash Swamp Road WB | 10 sec. | A | 3 veh. |
| - Hearn Road NB | 9 sec. | A | 3 veh. |
| - Hearn Road SB | 9 sec. | A | 2 veh. |
| 22. Route 1/Old Blue Point Road | | | |
| - Old Blue Point Road | 500+ sec. | F | 68 veh. |
| - Route 1 SB Lt. | 18 sec. | C | 4 veh. |
| 23. Route 1/Maple Street | | | |
| - Maple Street | 500+0 sec. | F | 23 veh. |
| - Route 1 NB Lt. | 30 sec. | D | 2 veh. |
| 24. Haigis Parkway/Scottow Hill Road | | | |
| - Scottow Hill Road | 22 sec. | C | 2 veh. |
| - Haigis Parkway WB Lt. | 9 sec. | A | 1 veh. |

Expected traffic delays on the side-street approaches at fifteen of the twenty-four intersections are forecasted to experience traffic conditions representative of Level of Service "F" conditions. The level of delay will exceed 500 seconds, or more than eight minutes, at eight of the 15 deficient intersections.

In evaluating the significance of the determined level of vehicle delay on the side-street approach, a review of the length of vehicle queue on that approach must also be completed. Excessive vehicle delay in combination with long vehicle queues on a side-street approach typically reflects poor or deficient intersection operating conditions. The vehicle queue will exceed 10 vehicles in length on at least one of the side-street approaches at eleven of the twenty-four unsignalized intersections.

## *Signalized Intersection Capacity*

The Project Team completed operational analysis for the signalized intersections in the Scarborough Townwide study.

The analysis was based on forecast volumes determined in the PACTS TRIPS model, and are those utilized for the existing conditions analysis. The Project Team utilized the Synchro software package for the majority of locations. However, in the case where interconnected traffic signals were of significance, particularly at Dunstan Corner where spillback is common, the volumes were analyzed with the SimTraffic package, an animated model that provides detailed summaries of traffic behavior.

Similar to the unsignalized analysis, the results for the signalized intersections were based on the Level of Service rankings. These rankings follow the 'A' through 'F' ranking criteria, where 'A' represents a minimal level of delay, and an 'F' represents extensive delay. The following table summarizes the level of service criteria for a signalized intersection:

**Level of Service Criteria for Signalized Intersections**

| Level of Service | Control Delay per Vehicle (sec) |
|---|---|
| A | Up to 10.0 |
| B | 10.1 to 20.0 |
| C | 20.1 to 35.0 |
| D | 35.1 to 55.0 |
| E | 55.1 to 80.0 |
| F | Greater than 80.0 |

The results of the analysis are presented in the following tables:

**Year 2025 – Signalized Intersection Capacity Summary**

| Intersection/Approach/ Movement | No-Build Conditions | |
|---|---|---|
| | Delay (sec.) | LOS |
| Route 1/South Gate Road | | |
| Route 1 NB | 4 | A |
| Route 1 SB | 5 | A |
| South Gate WB | 19 | B |
| Route 1/Pleasant Hill Road | | |
| Route 1 NB | 28 | C |
| Route 1 SB | 16 | B |
| Pleasant Hill WB | 24 | C |
| Route 1/Haigis Parkway | | |
| Route 1 NB | 42 | D |
| Route 1 SB | >80 | F |
| Haigis EB | >80 | F |
| Lincoln WB | 32 | C |
| Route 1/Willowdale Road | | |
| Route 1 NB | 17 | B |
| Route 1 SB | 27 | C |
| Enterprise EB | 52 | D |
| Willowdale WB | 16 | B |
| Route 1/Scarborough Downs | | |
| Route 1 NB | 5 | A |
| Route 1 SB | 11 | B |
| Scarborough Downs EB | 29 | C |
| Route 1/Commerce Drive | | |
| Route 1 NB | 19 | B |
| Route 1 SB | 11 | B |
| Orion Center EB | 40 | D |
| Commerce WB | 18 | B |
| Route 1/Sawyer Road | | |
| Route 1 NB | 15 | B |
| Route 1 SB | 16 | B |
| Sawyer EB | 25 | C |
| Sawyer WB | 22 | C |

## Year 2025 – Signalized Intersection Capacity Summary - Continued

| Intersection/Approach/ Movement | No-Build Conditions | |
|---|---|---|
| | Delay (sec.) | LOS |
| Route 1/Town Hall | | |
| Route 1 NB | 10 | A |
| Route 1 SB | 26 | C |
| Town Hall EB | 31 | C |
| Ward WB | 36 | D |
| Route 1/Oak Hill | | |
| Route 1 NB | >80 | F |
| Route 1 SB | >80 | F |
| Gorham Road EB | 80 | E |
| Blackpoint Road WB | >80 | F |
| Route 1/Hannaford (Oakhill Terr.) | | |
| Route 1 NB | 6 | A |
| Route 1 SB | 21 | C |
| Hannaford Drive EB | 37 | D |
| Proposed Connector WB | N/A | N/A |
| Route 1/Portland Farms Road | | |
| Route 1 NB | 15 | B |
| Route 1 SB | 14 | B |
| Scarborough Commons EB | 23 | C |
| Portland Farms WB | 29 | C |
| Route 1/Hillcrest Avenue | | |
| Route 1 NB | 14 | B |
| Route 1 SB | 17 | B |
| Green Acres EB | 30 | C |
| Hillcrest WB | 37 | D |
| Route 1/Broadturn Road (Dunstan Corner)* | | |
| Route 1 NB | >80 | F |
| Route 1 SB | 21 | C |
| Broadturn EB | 48 | D |
| Pine Point WB | 78 | E |
| Route 1/Payne Road (Dunstan Corner)* | | |
| Route 1 NB | 42 | D |
| Route 1 SB | >80 | F |
| Payne EB | >80 | F |
| Harlow/Driveway WB | 45 | D |
| County Road/Saco Street* | | |
| Saco NB | 71 | E |
| Saco SB | >80 | F |
| County EB | 27 | C |
| County WB | >80 | F |
| County Road/Gorham Road* | | |
| Gorham NB | 64 | E |
| County EB | 26 | C |
| County WB | 48 | D |
| Gorham Road/Beech Ridge Road* | | |
| Beech Ridge NB | 50 | D |
| Beech Ridge SB | >80 | F |
| Gorham EB | 12 | B |
| Gorham WB | >80 | F |

*Results obtained from SimTraffic output.

**Year 2025 – Signalized Intersection Capacity Summary - Continued**

| Intersection/Approach/ Movement | No-Build Conditions | |
|---|---|---|
| | Delay (sec.) | LOS |
| Payne Road/Cummings Road | | |
| Payne NB | 29` | C |
| Payne SB | 50 | D |
| Cummings WB | 55 | D |
| Payne Road/Wal-Mart | | |
| Payne NB | 2 | A |
| Payne SB | 6 | A |
| Retail EB | 26 | C |
| Wal-Mart WB | 49 | D |
| Payne Road/Sam's Club | | |
| Payne NB | 7 | A |
| Payne SB | 4 | A |
| Sam's Club EB | 34 | C |
| Sewall Gas WB | 24 | C |
| Payne Road/Gorham Road | | |
| Payne NB | 43 | D |
| Payne SB | 40 | D |
| Gorham EB | 36 | D |
| Gorham WB | 46 | D |
| Payne Road/Scarborough Downs | | |
| Payne NB | 30 | C |
| Payne SB | 43 | D |
| Holmes EB | >80 | F |
| Scarborough Downs WB | 74 | E |
| Payne Road/Exit 42/Haigis Parkway | | |
| Payne NB | 28 | C |
| Payne SB | 38 | D |
| Exit 42 EB | 52 | D |
| Haigis WB | 73 | E |
| Mussey Road/Gorham Road | | |
| Gorham NB | 36 | D |
| Gorham SB | 49 | D |
| Mussey EB | 71 | E |
| Mussey WB | 6 | A |
| Mussey Road/Spring Street | | |
| Spring NB | 29 | C |
| Spring SB | 37 | D |
| Mussey EB | 4 | A |
| Mussey WB | 21 | C |
| Route 114/Spring Street | | |
| 114 NB | <1 | A |
| 114 SB | <1 | A |
| Spring WB | >80 | F |

As can be seen by the preceding tables, of the 26 intersections analyzed, eleven have one or more approaches operating at a level of service 'E' of 'F'. These deficiencies will be addressed with improvements and discussed in Section III.

# Future Corridor Mobility Summary

For several key corridors in the town, delay will result in extensive travel times. As a result, the corridors will cause more emissions and result in the potential for increased diversions to minor (and largely residential) streets. The Project Team complete time-travel analysis based on the SimTraffic simulations. The following is a discussion for each corridor:

## Route 1 from Green Acres to Haigis Parkway

Based on the SimTraffic results, a southbound vehicle will require thirteen minutes to travel from Green Acres Lane through Haigis Parkway, for an average speed of eleven miles per hour, a 30 percent decrease in speed from the existing speed of approximately sixteen miles per hour. Much of this delay is attributable to the Oak Hill intersection.

## Dunstan Corner

Utilizing SimTraffic, the Project Team determined that northbound or southbound vehicles at Dunstan Corner currently take almost five minutes on average during summer conditions, or an average of five miles her hour. Without improvements, the time would balloon to almost twelve minutes for southbound traffic and seventeen minutes for northbound traffic, or between one and two miles per hour by 2025. It should be noted that as walking speed is typically four miles per hour, pedestrians would be traveling more than twice as quickly as Route 1 traffic.

## County Road from Saco Street to Route 114

Westbound traffic (the outbound direction destined for Gorham) on County Road currently takes about four minutes to go through the Saco Street and Route 114 intersections, or a travel speed of fifteen miles per hour. By 2025 and without improvements, the travel time would increase significantly to thirteen minutes, or approximately four miles per hour. This is approximately the speed of a pedestrian.

# Recommended Transportation System Improvement Program

## Introduction

The recommended Transportation System Improvement Program is a fully comprehensive and coordinated program of improvements that appropriately addresses roadway and intersection deficiencies and provides for a Town wide system of other modal improvements that encourage non-vehicular travel within the Community. The design criteria considered in the development of the recommended Transportation System Improvement Program included:

- Existing/Future intersection mobility
- Identification of High Crash Locations (HCL's)
- Other modal travel corridors
- Access management
- Proximity to adjacent neighborhoods
- Commercial centers
- Points of interest
- Community facilities
- Roadway classification
- Environmental constraints
- Land acquisition
- Cost of improvement

The Project Team in developing the final series of corridor and intersection improvement strategies attempted, where possible, to accommodate the future transportation needs of the Community by first assessing low cost transportation management improvements versus recommending construction of new corridor alternatives. However, a number of new corridor alternatives were considered and a thorough discussion and analysis of each is provided in the following text. A similar theme was used in preparing the Other Modal recommendations, where the Plan strives to maximize use of the existing infrastructure versus suggesting construction of new facilities.

## Intersection Improvement Recommendations

What follows is a summary of the improvement plans for each applicable intersection in the Townwide study. The concepts for these improvements are included in Section V.

### Selection Criteria

The Project Team utilized several methods for determining the need for intersection improvements, as follows:

- Capacity: If a location had existing or future volumes forecast to operate at a level-of service 'E' or 'F', this location would be considered for improvements. In

the case where a movement with a low volume (i.e. less than a vehicle per minute or signal cycle) operates at a low level of service, it was sometimes determined that retiming or geometric changes were not warranted. In some cases, such as Payne Road at Mussey Road, improvements to the level of service would have required significant roadway widening, and it was determined that this was not desirable.

- Queuing: For certain locations, such as Eight Corners or Dunstan Corner, queuing between closely spaced intersections resulted in operational deficiencies, even if the geometry suggested otherwise. In such cases, roadways were widened or intersections relocated in order to provide for acceptable operations.
- Safety: Improvements could be triggered by a location with a safety deficiency, such as Payne Road at MTA Exit 42. In these situations, crash patterns may dictate roadway widening, approach grades, or in some cases, signalization.
- Alignment: In certain locations, poor alignments may require correction in order to minimize the potential for safety problems as traffic continues to increase. Fogg Road at Black Point Road and Broadturn Road at Ash Swamp Road are pertinent examples.

## Proposed Improvements

**Payne Road at Cummings Road (Sheet 1)**

- Widen Payne Road to Six Lane Section between Spring and Cummings
- Widen Cummings Approach to Provide Two Right Turn Lanes
- Add Asphalt Sidewalk to east side of Payne
- Signal Modifications
- Modify Island on Cummings Approach
- Extend Right Turn Lane for Payne SB

**Payne Road at Spring Street (Sheet 2)**

- Widen Payne Road to Six Lanes North of Intersection
- Construct Right Turn Lane for Payne NB
- Install Traffic Signal and Construct Three-Lane Approach for Gallery Boulevard
- Add Asphalt Sidewalk
- Convert Spring Street approach to Right Turn Only

**Payne Road at Sam's Club (Sheet 3)**

- Add Asphalt Sidewalk to east side of Payne
- Signal Modifications, Including Pedestrian Provisions

**Payne Road at Wal-Mart (Sheet 4)**

- Construct Right Turn Lane for Payne NB
- Add Asphalt Sidewalk to east side of Payne
- Signal Modifications, Including Pedestrian Provisions

**Payne Road at Route 114 (Sheet 5)**

- Add Asphalt Sidewalk to east side of Payne, WB Route 114 approach
- Signal Modifications, Including Pedestrian Provisions
- Construct Left Turn Lane for Route 114 WB
- Construct Two Through Lanes on 114 EB for receiving traffic
- Construct Flush Concrete Islands on three approaches
- Construct Additional Left Turn Lane for Payne SB onto Route 114

**Payne Road at Mussey Road (Sheet 6)**

- Construct Exclusive Left and Right Turn Lanes for Payne NB
- Realign Mussey Road Approach with Ashley Road
- New Traffic Signal, Including Pedestrian Provisions
- Construct Flush Concrete Island for Payne SB
- Construct Paved Shoulders on all approaches

**Payne Road at Bridges Drive (Sheet 7)**

- Convert Bridges Drive to One-Way WB
- Construct Exclusive Right Turn Lane for Payne SB
- Construct Paved Shoulders for all approaches

**Payne Road at Holmes Road (Sheet 8)**

- Construct Flush Concrete Island on Payne approaches
- Construct Paved Shoulders on all approaches
- Construct Exclusive Left Turn Lane for all approaches
- Construct Exclusive Right Turn Lane on three approaches
- Install New Signal, Including Pedestrian Provisions

**Payne Road at Haigis Parkway and Exit 42 (Sheet 9)**

- Construct Flush Concrete Island for Haigis WB and Payne NB
- Extend Exclusive Right Turn Lane for Payne SB
- Signal Modifications, Including Pedestrian Provisions
- Construct Exclusive Left Turn Lane for Haigis WB
- Extend Right Turn Lane for Haigis WB
- Construct Paved Shoulders for all approaches
- Construct Exclusive Right Turn Lane for Haigis EB
- Extend Left Turn Lane for Payne SB

**Payne Road at Beech Ridge Road/Scottow Hill Road (Sheet 10)**

- Construct Exclusive Left Turn Lane for Payne NB
- Realign Approach for Scottow Hill WB
- Construct Concrete Island for Payne SB
- Construct Paved Shoulders on all approaches

**County Road at Saco Street (Sheet 11A)**

- Construct Exclusive Left Turn Lanes on all approaches
- Construct Exclusive Right Turn Lanes for Saco SB and County WB
- Construct Flush Concrete Island on all approaches
- Signal Modifications, Including Pedestrian Provisions
- Construct Paved Shoulders on all approaches

**Route 114 at Saco Street (Sheet 11B)**

- Install New Signal, Including Pedestrian Provisions
- Construct Four Lane Section Route 114 EB approach
- Construct Raised Island on Beech Ridge
- Construct Concrete Island on Saco, 114 WB approaches
- Construct Exclusive Left Turn Lane on Saco SB approach
- Construct Exclusive Right Turn Lane on Route 114 WB
- Construct Paved Shoulders on all approaches

**County Road at Route 114 (Sheet 11C)**

- Construct 600' Right Turn Lane for County EB
- Construct Paved Shoulders on all approaches
- Remove Slip Lane for County EB
- Upgrade Signal, Including Pedestrian Provisions
- Construct Raised Island for Route 114 approach
- Extend Two Approach Lanes to Beechridge
- Extend Through Lanes to Beechridge

**Route 114 at Running Hill Road (Sheet 12)**

- Construct Flush Concrete Island on Route 114 NB, Running Hill WB approach
- Construct Paved Shoulders on all approaches
- Construct Exclusive Left Turn Lane for Route 114 SB
- Realign Running Hill Road
- Install New Signal, Including Pedestrian Provisions

**Eight Corners (Sheet 13)**

- Provide Exclusive Left Turn Lane for Mussey Road WB to Spring Street
- Construct Concrete Island for Mussey WB at Spring
- Install New Signal at Route 114/Spring Street, Including Pedestrian Provisions
- Signal Modifications, Including Pedestrian Provisions
- Construct Paved Shoulders
- Construct Sidewalk on east side of Spring
- Construct Exclusive Right Turn Lane for Mussey EB at Route 114

**Route 1 at Old Blue Point Road (Sheet 14)**

- Widen Route 1 to Provide two Lanes in each direction
- Install New Signal, Including Pedestrian Provisions
- Widen Old Blue Point Road
- Construct Sidewalks on Route 1
- Construct Flush Concrete Island for Route 1 NB approach

**Route 1 at Dunstan Corner (Sheet 15A)**

- Construct Raised Island for Payne EB approach
- Construct Exclusive Left Turn Lane for Pine Point approach
- Signal Modifications, Including Pedestrian Provisions
- Provide Exclusive Right Turn Lane for Pine Point approach
- Relocate Payne Road approach
- Construct New Payne Road
- Remove Signal at existing Payne intersection
- Construct Sidewalks on both sides of Route 1

- New Traffic Signal at new Payne intersection
- Construct dual right turn lanes for Payne approach

**Route 1 at Pine Point Road and Harlow Street (Sheet 15B)**

- Construct One-Way Street from Harlow to Pine Point

**Route 1 at South Gate (Sheet 16)**

- Signal Modifications, Including Pedestrian Provisions

**Route 1 at Haigis Parkway (Sheet 17)**

- Construct Concrete Island for Lincoln WB approach
- Construct Exclusive Left Turn Lane for Lincoln WB and Haigis EB
- Construct Exclusive Right Turn Lane for Route 1 SB
- Construct Sidewalk on both sides of Route 1

**Route 1 at Willowdale Road (Sheet 18)**

- Extend Left Turn Lane for Route 1 NB
- Signal Modifications, Including Pedestrian Provisions
- Construct Left Turn Lane for Enterprise Drive
- Construct Right Turn Lane for Route 1 SB
- Construct Sidewalk on both sides of Route 1

**Route 1 at Scarborough Downs (Sheet 19)**

- Signal Modifications, Including Pedestrian Provisions
- Construct Sidewalk on both sides of Route 1

**Route 1 at Commerce Drive (Sheet 21A)**

- Construct Right Turn Lane for Route 1 NB
- Construct Sidewalks on both sides of Route 1
- Signal Modifications
- Restripe for Dual Left Turn Lane from Commerce approach

**Route 1 at Sawyer Road (Sheet 21B)**

- Construct Sidewalk (Commerce Way to Ward Street)
- Extend Left Turn Lane for Route 1 NB
- Remove Slip Lane for Route 1 NB
- Signal Modifications
- Extend Right Turn Lane for Sawyer approach
- Construct Paved Shoulders on Sawyer Road

**Route 1 at Ward Street (Sheet 21C)**

- Extend Left Turn Lane with restriping for Route 1 NB
- Signal Modifications
- Construct Sidewalk on east side of Route 1

**Route 1 at Black Point Road/Route 114 (Sheet 21D)**

- Remove Right Turn Lane onto Black Point Road
- Signal Modifications
- Construct Shoulders/Sidewalks to Hannaford Drive on Route 114
- Construct Sidewalks on all approaches
- Reconstruct Route 114
- Remove Right Turn Lane onto Route 114
- Reconstruct Black Point Road

**Route 114 at Hannaford Drive (Sheet 21E)**

- Reconfigure Intersection
- Construct exclusive left and right turn lanes for Route 114 NB approach
- Construct Sidewalks to School
- Install New Signal

**Route 1 at Hannaford Drive (Sheet 21F)**

- Construct By Pass Road
- Install New Signal
- Construct Raised Island for Hannaford approach
- Construct additional lane for Hannaford approach
- Extend Right Turn Lane for Route 1 SB
- Construct Flush Concrete Island for Route 1 SB approach
- Construct Sidewalk for Route 1, Hannaford

**Black Point Road at Eastern Road/New Road (Sheet 21G)**

- Construct New Road
- Install New Signal
- Construct Sidewalks to Route 1
- Construct exclusive lanes for all movements

**Route 1 at Portland Farm Road (Sheet 22)**

- Construct Sidewalk on both sides of Route 1
- Signal Modifications

**Route 1 at Green Acres (Sheet 23)**

- Construct Sidewalk on Route 1
- Signal Modifications
- Restripe Green Acres, Hillcrest to have dual left turn movements

**Route 1 at Pleasant Hill Road (Sheet 24)**

- Construct Sidewalk on both sides of Route 1 to South Portland
- Construct flush Concrete Island for Route 1 NB approach
- Upgrade traffic signal
- Construct Exclusive Left Turn Lane for Route 1 SB

**Beech Ridge Road at Holmes Road (Sheet 25)**

- Construct Concrete Island for Beech Ridge Road approaches
- Construct Exclusive Left Turn Lane for Beech Ridge Road approaches

- Install New Signal
- Construct Paved Shoulders on all approaches

**Broadturn Road at Holmes Road (Sheet 26)**

- Construct Exclusive Right Turn Lane for Holmes SB
- Construct Paved Shoulders on all approaches

**Pleasant Hill Road at Highland Avenue (Sheet 27)**

- Construct Concrete Island for Pleasant Hill NB approach
- Construct Exclusive Left Turn Lane for Pleasant Hill SB
- Install New Signal
- Construct Exclusive Right Turn Lane for Highland Avenue WB
- Construct Paved Shoulders for all approaches

**Route 77 at Pleasant Hill Road (Sheet 28)**

- Construct Exclusive Right Turn Lane for Pleasant Hill SB
- Modify Island for Pleasant Hill approach
- Construct Paved Shoulders on all approaches

**Black Point Road at Route 77 (Sheet 29)**

- Realign driveway across from Route 77

**Black Point Road at Highland Avenue (Sheet 30)**

- Realign driveway to increase separation from Highland Avenue

**Black Point Road at Fogg Road (Sheet 31)**

- Realign Fogg Road to reduce skew, align with driveway

**Broadturn Road at Ash Swamp Road (Sheet 32)**

- Construct Paved Shoulders on all approaches
- Realign Intersection
- Eliminate existing Ash Swamp Road intersections

**Mussey Road at Gallery Boulevard (Sheet 33)**

- Construct Left Turn Lane for Mussey EB, Gallery SB
- Install New Signal
- Construct Shoulders on all approaches
- Construct Right Turn Lane for Mussey WB, Gallery SB
- Construct Concrete Island for Mussey EB approach

## Oak Hill Improvements

In most cases, the above improvements also shown on the Figures are self-explanatory. However, the Oak Hill improvements are significant enough to warrant additional explanation.

The intersection of Route 1 with Gorham Road and Black Point Road currently operates at or above capacity (depending on the movement) during the PM peak hour. As it is already a wide intersection with many exclusive turning lanes, providing additional

capacity at this location would be costly and result in an extremely large intersection not in keeping with Scarborough's town image.

Therefore, a solution was identified that would move traffic volumes away from this location, and to existing and proposed connector roads. The plan for Oak Hill, shown on Figures 20-21g, would make Gorham Road and Black Point Road one-way roadways away from Route 1, with traffic diverted to the Hannaford access road, a new roadway connecting Commerce Drive to Black Point Road, and a new roadway connecting Route 1 at the Hannaford access road to Eastern Road.

As a result, Oak Hill would be improved from a level of service 'F' to a level of service 'B'. In addition, the right turn lanes for each Route 1 approach would no longer be required, and the roadway could be narrowed to a five-lane section, keeping it consistent with the rest of Route 1 in Scarborough. The total number of turning movements would be halved, resulting in a safer intersection and one more amenable to pedestrians.

# Roadway Corridor Improvemement Recommendations

Widened and paved shoulders are generally recommended on all major collector and arterial roadways throughout the Town. The proposed roadway corridor improvements are depicted on Figures B1 and B2. The widened shoulder width of four feet or more provides ample and safe travel ways for accommodating increased bicycle-pedestrian travel in the Community. The added paved shoulder width, which meets the minimum federal and state roadway design standards, also improves vehicular safety and increases corridor mobility.

Specific recommendations are also identified for addressing current safety problems {high crash sites} at a few select locations, which are highlighted in more detail for each location as follows:

1. *Running Hill Road, Green Street to New Street:*
   Install both horizontal alignment/speed advisory and "deer" warning signs as necessary.
2. *Running Hill Road, New Street to South Portland Line:*
   Install horizontal alignment/speed advisory signs and clear roadside vegetation to improve vehicle sight distance.
3. *Spring Street (North) Payne Road to South Portland Line:*
   Install overhead dynamic "Vehicles Stopped Ahead" sign and replace missing regulatory speed signs.
4. *Payne Road, Two Rod Road to Beech Ridge Road:*
   Establish "high priority" winter salt area for this section of road.
5. *Broadturn Road, Route One to (near) Maine Turnpike Overpass:*
   Adjust roadway alignment reducing roadway crown and improving horizontal curvature.
6. *Route One, Broadturn Road to Saco Line:*
   Widen roadway cross-section providing two (2) twelve-foot travel lanes, two (2) eleven-foot travel lanes, four-foot paved shoulders and five-foot asphalt sidewalks, both sides. Additionally, existing property access drives need to be reduced in width and/or combined with adjacent parcel drives in conformance with adopted access management principles.

Finally, corridor recommendations are provided for two additional locations to accommodate future land development traffic circulation and safety. The recommendations include:

1. *Scarborough Downs, Haigis Parkway and Enterprise Business Park Connectivity:* Connecting sub-division roadways meeting the Town's road standards should be constructed linking each of the three "major" commercial development areas.

2. *Pleasant Hill Road, Route One to Chamberlain Avenue:* The present roadway should be widened to provide twelve-foot travel lanes and six-foot paved shoulders. The widened roadway will provide sufficient travel width to allow through traffic to safely move around vehicles turning left into commercial properties. The added paved shoulder width also adequately and safely meets the need of pedestrian/bicycle travel along this highly traveled portion of Pleasant Hill Road.

# New Highway Corridor Improvement Alternatives

A total of four (4) "new" corridor alternatives that potentially could provide added system capacity and/or reduce peak hour travel on selected overly congested roadways was developed and assessed by the Consultant Team. The future system-wide traffic benefits of each alternative were determined by re-configuring the 2025 PACTS Trips Model appropriately for each proposed improvement. Separate 2025 Trips model runs were completed for each proposed improvement alternative with the 'net' change in trips projected for each of the forty-nine study intersections. Each of the proposed 'new' corridor alternatives and the projected traffic benefits of each are described in the following text and illustratively presented on Figure 38 in Section V.

(It should be noted that the line drawings for each considered alternative were prepared simply for the purpose of testing their long term traffic benefits with the PACTS Trips Model. Environmental limitations, traffic design requirements and/or private property impacts were not assessed in developing the illustrative alignment for each alternative.)

## Alternative #1: Haigis Road Connector

This proposed alternative connects Holmes Road to Haigis Parkway with construction of a new connector roadway. The proposed limited-access roadway would most likely intersect Holmes Road in the general vicinity of the Beech Ridge Race Track and connect with Haigis Parkway at the Maine Turnpike Exit 42 interchange. The proposed alternative would require re-building the present Maine Turnpike interchange to accommodate the extension of Haigis Parkway to Holmes Road. The Holmes Road/Haigis Parkway intersection would be a major intersection, most likely requiring sequenced traffic signals.

Approximately 350 peak hour trips are diverted from other existing roadways onto the proposed connector roadway. The majority of the trips (260) travel from east to west towards Holmes Road. Somewhat significant shifts in current peak hour traffic patterns occur over the entire length of the Route 1 corridor between Green Acres and Payne Road, especially in the southbound direction, where more than 75 peak hour trips are diverted from the Route 1 corridor. Other major trip reductions occur on Haigis Parkway and the portion of Payne Road between Haigis Parkway and Holmes Road. Increased travel is realized on the portion of Payne Road south of Haigis Parkway, as well as Holmes Road west of the proposed connector road intersection.

## Alternative #2: Mussey Road Connector

This alternative is a limited access road that runs parallel with Route 114 north of Cumberland Way, connecting Mussey Road to Green Acre Lane. The connector road would intersect Mussey Road opposite the recently proposed Gallery Boulevard and tie into Green Acre Lane at Elmwood Avenue. (The schematic layout of the proposed connector street does not depict connections to Cumberland Way; however, the proposed alternative does not preclude limited future connections to neighborhood streets.) The results of the TRIPS model run for this alternative shows that the proposed connector road has a very minimal impact on diverting traffic from other existing roadways, most notably the Route 114 corridor. Less than 50 peak hour trips are diverted from the adjacent Route 114 corridor with construction of this proposed alternative.

## Alternative #3: Scarborough Downs Connector Road

This alternative proposes construction of a new connector roadway similar to the current design of Haigis Parkway that connects to Payne Road and Route 1. The proposed restricted access roadway would provide service connections to the undeveloped portion of the Scarborough Downs property and an upgrade of both current full service intersections at both Route 1 and Payne Road. This roadway upgrade alternative clearly is an essential component of the future roadway network within the Town of Scarborough; however, the TIPS model results shows very limited traffic benefits to the system wide roadway network. The significant increases in traffic forecast for the two Scarborough Downs intersections simply represent peak hour trips generated by future increased development of the Scarborough Downs property.

## Alternative #4: Route 114 Overlap

This alternative represents the preferred alignment presented in a prior Route 22/114 Location Study completed by PACTS. The study considered five improvement alternatives for relieving current and future traffic congestion on the portion of Route 22 between both Route 1 14 intersections. The study concluded that the southerly bypass roadway alternative (Alternative #4) which connected the Route Street (Route 114) intersection in the neighboring Town of Gorham to the Route 114/Running Hill Road intersection in Scarborough with construction of a new limited access roadway provided the greatest traffic flow benefit. The latest PACTS Trip model run completed for this alternative shows that with construction the proposed new roadway connection would attract more than 1550 peak hour trips. Major reductions in peak hour traffic are forecast for the portion of County Road and Route 114 north and east of the proposed connector roadway. Peak hour travel on Running Hill Road, especially in a southerly direction will dramatically increase (250 plus trips) as will the volume of traffic turning right from Payne Road onto Route 114 at the Route 114/Payne Road intersection (200 trips). This proposed roadway connection will decrease southbound travel on nearly the entire length of US Route 1 (100-plus peak hour trips), decrease through trip travel on Road and Holmes Road as well as portions of Beech Ridge Road.

## Recommendations

In summary, two of the four "new" roadway corridor alternatives (Alternative #1 and Alternative #4) significantly alter current and future travel patterns on the existing roadway system. The Route 114 Overlap alternative (Alternative #4) is expected to carry more than 1,550 peak hour trips, which provides major reductions in through trip travel in the "overlap" portion of Route 22. This alternative also decreases by an average of 100 peak hour trips the volume of through traffic traveling southbound on

US Route 1. More importantly, it slows the rate of traffic growth on a number of important Town collector streets, such as Broadturn Road, Holmes Road and a portion of Beech Ridge Road. The measured change in traffic recorded for the proposed Haigis Parkway Connector alternative is not as large as those presented for Alternative #4, nonetheless this change still represents a significant reduction in peak hour travel at a number of key locations within the Town including nearly the full length of Route 1 (Green Acres to Payne Road), a critical portion of Payne Road and the full length of Haigis Parkway. Peak hour travel is increased on Holmes Road and the portion of Payne Road south of Haigis Parkway.

Although the system wide traffic benefits of Alternative #3 are negligible, the upgrade of the existing Scarborough Downs service road to collector road standards is paramount to the successful development of the undeveloped property within the Scarborough Downs area.

Both "new" corridor alternatives should be evaluated in considerably greater detail and local decisions made as to the overall transportation benefits to the Town. The cost/ benefits of each "new" corridor alternative should be weighed against the cost/benefits of the proposed localized traffic improvements recommended for each deficient intersection to establish the appropriate direction for completing necessary future transportation improvements.

# Traffic Operational Benefits

## Intersection Capacity Improvements

The Project Team completed operational analysis for the signalized intersections in the Scarborough Townwide study.

The analysis was based on forecast volumes determined in the PACTS TRIPS model, and are those utilized for the existing conditions analysis. All locations were analyzed utilized the Synchro software package. However, in the case where interconnected traffic signals were of significant, particularly on Route 1 and County Road, the modeling was exported to the SimTraffic package, an animated model that provides detailed summaries of traffic behavior.

Oak Hill analysis was completed with improvements that resulted in significantly different volumes than those forecasted based on existing conditions. The Study Team determined the future volumes for the new Oak Hill concept, which are shown in Figures 20-21g as well as Figures 36-37. The improvements to all locations are discussed following the capacity summary.

As with the existing conditions analysis, delays are based on the Highway Capacity Manual and utilize a level of service ranking, with ‘A’ representing minimal delay and ‘F’ representing significant delay. The tables also include the forecast volumes with existing conditions to illustrate the changes (usually improvements) in delay.

**Table 1**
**Year 2025 – Signalized Intersection**
**CAPACITY SUMMARY**

| Intersection/Approach/ Movement | No Build Conditions | | With Improvements | |
|---|---|---|---|---|
| | Delay (sec.) | LOS | Delay (sec.) | LOS |
| Route 1/South Gate Road | | | | |
| Route 1 NB | 4 | A | 4† | A† |
| Route 1 SB | 5 | A | 5† | A† |
| South Gate WB | 19 | B | 19† | B† |
| Route 1/Pleasant Hill Road | | | | |
| Route 1 NB | 28 | C | 17 | B |
| Route 1 SB | 16 | B | 22 | C |
| Pleasant Hill WB | 24 | C | 19 | B |
| Route 1/Haigis Parkway | | | | |
| Route 1 NB | 42 | D | 18* | B* |
| Route 1 SB | >80 | F | 19* | B* |
| Haigis EB | >80 | F | 35* | D* |
| Lincoln WB | 32 | C | 49* | D* |
| Route 1/Willowdale Road | | | | |
| Route 1 NB | 17 | B | 9* | A* |
| Route 1 SB | 27 | C | 19* | B* |
| Enterprise EB | 52 | D | 31* | C* |
| Willowdale WB | 16 | B | 24* | C* |
| Route 1/Scarborough Downs | | | | |
| Route 1 NB | 5 | A | 3* | A* |
| Route 1 SB | 11 | B | 6* | A* |
| Scarborough Downs EB | 29 | C | 37* | D* |
| Route 1/Commerce Drive | | | | |
| Route 1 NB | 19 | B | 10* | B* |
| Route 1 SB | 11 | B | 21* | C* |
| Orion Center EB | 40 | D | 47* | D* |
| Commerce WB | 18 | B | 54* | D* |
| Route 1/Sawyer Road | | | | |
| Route 1 NB | 15 | B | 8* | A* |
| Route 1 SB | 16 | B | 7* | A* |
| Sawyer EB | 25 | C | 26* | C* |
| Sawyer WB | 22 | C | 16* | B* |
| Route 1/Town Hall | | | | |
| Route 1 NB | 10 | A | 8* | A* |
| Route 1 SB | 26 | C | 7* | A* |
| Town Hall EB | 31 | C | 37* | D* |
| Ward WB | 36 | D | 48* | D* |
| Route 1/Oak Hill | | | | |
| Route 1 NB | >80 | F | 17* | B* |
| Route 1 SB | >80 | F | 12* | B* |
| Gorham Road EB | 80 | E | N/A* | N/A* |
| Black Point Road WB | >80 | F | N/A* | N/A* |
| Route 1/Hannaford (Oakhill Terr.) | | | | |
| Route 1 NB | 6 | A | 18* | B* |
| Route 1 SB | 21 | C | 25* | C* |
| Hannaford Drive EB | 37 | D | 45* | D* |
| Proposed Connector WB | N/A | N/A | 34* | C* |

†No change in LOS or delay, as no improvements are proposed.
*Results obtained from SimTraffic output.

**Table 1 Continued**
**Year 2025 – Signalized Intersection**
**CAPACITY SUMMARY**

| Intersection/Approach/ Movement | No Build Conditions | | With Improvements | |
|---|---|---|---|---|
| | Delay (sec.) | LOS | Delay (sec.) | LOS |
| Route 1/Portland Farms Road | | | | |
| Route 1 NB | 15 | B | 11* | B* |
| Route 1 SB | 14 | B | 5* | A* |
| Scarborough Commons EB | 23 | C | 29* | C* |
| Portland Farms WB | 29 | C | 22* | C* |
| Route 1/Hillcrest Avenue | | | | |
| Route 1 NB | 14 | B | 7* | A* |
| Route 1 SB | 17 | B | 16* | B* |
| Green Acres EB | 30 | C | 37* | D* |
| Hillcrest WB | 37 | D | 21* | C* |
| Route 1/Broadturn Road (Dunstan Corner)* | | | | |
| Route 1 NB | >80 | F | 43* | D* |
| Route 1 SB | 21 | C | 34* | C* |
| Broadturn EB | 48 | D | 37* | D* |
| Pine Point WB | 78 | E | 41* | D* |
| Route 1/Payne Road (Dunstan Corner)* | | | | |
| Route 1 NB | 42 | D | 37* | D* |
| Route 1 SB | >80 | F | 15* | B* |
| Payne EB | >80 | F | 38* | D* |
| Harlow/Driveway WB | 45 | D | 45* | D* |
| County Road/Saco Street* | | | | |
| Saco NB | 71 | E | 51* | D* |
| Saco SB | >80 | F | 54* | D* |
| County EB | 27 | C | 23* | C* |
| County WB | >80 | F | 67* | E* |
| County Road/Gorham Road* | | | | |
| Gorham NB | 64 | E | 27* | C* |
| County EB | 26 | C | 54* | D* |
| County WB | 48 | D | 13* | B* |
| Gorham Road/Beech Ridge Road* | | | | |
| Beech Ridge NB | 50 | D | 54* | D* |
| Beech Ridge SB | >80 | F | 21* | C* |
| Gorham EB | 12 | B | 16* | B* |
| Gorham WB | >80 | F | 19* | B* |
| Payne Road/Cummings Road | | | | |
| Payne NB | 29 | C | 22 | C |
| Payne SB | 50 | D | 39 | D |
| Cummings WB | 55 | D | 33 | C |
| Payne Road/Wal-Mart | | | | |
| Payne NB | 2 | A | 13 | B |
| Payne SB | 6 | A | 15 | B |
| Retail EB | 26 | C | 22 | C |
| Wal-Mart WB | 49 | D | 36 | D |

*Results obtained from SimTraffic output.

**Table 1 Continued**
**Year 2025 – Signalized Intersection**
**CAPACITY SUMMARY**

| | No Build Conditions | | With Improvements | |
|---|---|---|---|---|
| **Intersection/Approach/ Movement** | **Delay (sec.)** | **LOS** | **Delay (sec.)** | **LOS** |
| Payne Road/Sam's Club | | | | |
| Payne NB | 7 | A | 5 | A |
| Payne SB | 4 | A | 4 | A |
| Sam's Club EB | 34 | C | 33 | C |
| Sewall Gas WB | 24 | C | 24 | C |
| Payne Road/Gorham Road | | | | |
| Payne NB | 43 | D | 30 | C |
| Payne SB | 40 | D | 19 | B |
| Gorham EB | 36 | D | 46 | D |
| Gorham WB | 46 | D | 43 | D |
| Payne Road/Scarborough Downs | | | | |
| Payne NB | 30 | C | 27 | C |
| Payne SB | 43 | D | 37 | D |
| Holmes EB | >80 | F | 36 | D |
| Scarborough Downs WB | 74 | E | 38 | D |
| Payne Road/Exit 42/Haigis Parkway | | | | |
| Payne NB | 28 | C | 26 | C |
| Payne SB | 38 | D | 26 | C |
| Exit 6 EB | 52 | D | 26 | C |
| Haigis WB | 73 | E | 47 | D |
| Mussey Road/Gorham Road | | | | |
| Gorham NB | 36 | D | 15* | B* |
| Gorham SB | 49 | D | 34* | C* |
| Mussey EB | 71 | E | 23* | C* |
| Mussey WB | 6 | A | 8* | A* |
| Mussey Road/Spring Street | | | | |
| Spring NB | 29 | C | 28* | C* |
| Spring SB | 37 | D | 35* | C* |
| Mussey EB | 4 | A | 5* | A* |
| Mussey WB | 21 | C | 41* | D* |
| Route 114/Spring Street | | | | |
| 114 NB | <1 | A | 20* | C* |
| 114 SB | <1 | A | 6* | A* |
| Spring WB | >80 | F | 18* | B* |

*Results obtained from SimTraffic output.

**Table 2**
**Year 2025 – Unsignalized Intersection**
**CAPACITY SUMMARY**

| | No Build Conditions | | With Improvements | |
|---|---|---|---|---|
| **Intersection/Approach/ Movement** | **Delay (sec.)** | **LOS** | **Delay (sec.)** | **LOS** |
| Pleasant Hill Rd./Highland Ave | | | | |
| Pleasant Hill NB | 15* | B* | 28 | C |
| Pleasant Hill SB | >50* | F* | 13 | B |
| Highland Ave EB | 12* | B* | 20 | B |
| Highland Ave WB | 33* | D* | 13 | B |
| Broadturn Road/Holmes Road | | | | |
| Holmes Road NB | 8* | A* | 8* | A* |
| Holmes Road SB | 31* | D* | 10* | A* |
| Broadturn Road EB | 11* | B* | 9* | A* |
| Broadturn Road WB | 9* | A* | 10* | B* |
| Holmes Road/Beech Ridge Rd | | | | |
| Holmes Road NB | 10* | A* | 8 | A |
| Holmes Road SB | >50* | F* | 17 | B |
| Beech Ridge Rd EB | 15* | B* | 14 | B |
| Beech Ridge Rd WB | 13* | B* | 21 | C |
| Hearn Road/Ash Swamp Road* | | | | |
| Hearn Road NB | 7 | A | 7† | A† |
| Hearn Road SB | 6 | A | 6† | A† |
| Ash Swamp Road EB | 6 | A | 6† | A† |
| Ash Swamp Road WB | 8 | A | 8† | A† |

†No change in LOS or delay, as no improvements are proposed.
*Results obtained from SimTraffic output.

As can be seen from the previous tables, all approaches operate at a level of service 'D' or better with the exception of westbound County Road traffic at Saco Street. This was the case as County Road was kept to a single lane in this area, in order to avoid the potential for a four-lane section.

# Roadway Corridor Improvements

Three locations in particular, currently pose the greatest obstacle to corridor mobility, which are the following:

- Route 1 from Green Acres to Haigas Parkway
- Dunstan Corner (Route 1 at Payne Road and Broadturn Road
- County Road/Route 114/Saco Street/Beech Ridge Road

In addition to deficiencies at the intersections, delays to mainline traffic are so great as to often lead to significant backups with current traffic levels. Forecast traffic levels indicate that these areas could experience delays so significant that they could result in major diversions to minor streets, and could result in significant delay for longer portions of the day.

The improvements are intended to aid overall mobility with particular emphasis on corridor mobility. The Study Team utilized SimTraffic along the three corridors discussed above to determine what benefit is gained in corridor mobility with the proposed improvements. The impacts were determined to be significant.

## Route 1 from Green Acres to Haigis Parkway

Based on the SimTraffic results, it is expected to take a vehicle heading southbound on Route 1 almost thirteen minutes to travel from Green Acres Lane through Haigis Parkway; of this time, approximately one-third, or more than four minutes, is consumed by delay at Oak Hill. Following the proposed improvements, including those at Oak Hill, the travel time is reduced to ten minutes, with only one minute of delay at Oak Hill.

## Dunstan Corner

The SimTraffic results indicate that southbound Route 1 traffic will take almost twelve minutes to pass through the two Dunstan Corner intersections, with northbound traffic taking almost seventeen minutes. Following the proposed improvements, this time is reduced to approximately two minutes for both northbound and southbound traffic on Route 1.

## County Road from Saco Street to Route 114

Westbound traffic on County Road (destined for Gorham and points beyond) is forecast to require almost thirteen minutes to pass through these two intersections based on the SimTraffic modeling. Following the proposed improvements, this time would drop to approximately five minutes. While this does demonstrate remaining congestion, it is a significant reduction.

# Bicycle-Pedestrian Facility Recommendations

Recent surveys conducted by the Town have clearly documented that residents in the Community want an expanded system of bicycle-pedestrian facilities that are safe, convenient to use and barrier free (i.e. Maine Turnpike, etc.). The proposed bicycle-pedestrian facility improvement plan, which is discussed as follows and depicted on attached Figures A1 & A2, provide both intra and inter-Community connectivity; a comprehensive and safe system of improvements that encourages usage by all age groups, minimizes impacts to private property and the environment, are fully coordinated and compatible with future vehicular needs of the community and, importantly, consider the cost of construction.

The recommended bicycle-pedestrian improvement plan focuses on maximizing use of the existing roadway infrastructure and the Eastern Trail Corridor versus construction of new and exclusive pedestrian/bicycle facilities. Short multi-use trail connections are combined with proposed roadway widening recommendations to provide a system of bicycle-pedestrian improvements that encourages other modal travel throughout the Community.

## Eastern Trail

The Eastern Trail is a 55-mile non-vehicular trail, which extends from Kittery to South Portland. The Eastern Trail, when completed, will become southern Maine's segment of the national East Coast Greenway trail system. The portion of the trail corridor in the Town of Scarborough, when completed, will provide a north-south corridor for non-vehicular travel between the Town of Old Orchard Beach on the south and the City of South Portland to the north. Additionally, the more than five mile corridor provides

numerous intra-Community travel opportunities with proposed entry and exit points strategically located throughout the trail corridor.

The Town of Scarborough, through its Public Service Department, has recently completed construction of the center portion of the trail, which connects Blackpoint Road to Pine Point Road, a distance of more than two-miles. Funding requests have been submitted in the Town's 2006 Capital Budget and through the Eastern Trail Management District construction budget for completion of the remaining portions of the trail.

## Community-wide Bicycle-Pedestrian Facilities

All arterial and major collector roadways that traverse the Community will be widened where necessary and economically feasible to provide paved shoulders four to ten feet in width on both sides of the roadway. The Maine Department of Transportation's minimum roadway paved shoulder width for bicycle travel is four feet. "New" sidewalks are generally proposed for both sides of the entire Route 1 corridor; generally along one side of the commercial section of Payne Road (Roundwood Drive to South Portland Town line) and on one side of Spring Street between Payne and Mussey Roads. Pedestrian signal hardware and software recommendations, special roadway striping improvements at all "major" intersection crossings and critically important warning and regulatory signing recommendations are highlights of the Community-wide system of improvements. The proposed improvements are defined on a corridor basis as follows:

***Route 1 Corridor***

1. Pleasant Hill Road to Hillcrest Avenue
   - Provide 5-foot asphalt sidewalk on eastside to MMC north entrance
   - Provide 5-foot paved shoulder minimum on eastside throughout section
   - Provide 5-foot paved shoulder minimum on westside between MMC entrance and Pleasant Hill Road
   - Provide pedestrian-actuated traffic signals on all approaches at the Pleasant Hill Road intersection and across two approaches of the Hillcrest Avenue intersection.
2. Hillcrest Avenue to Sawyer Road
   - Provide 5-foot asphalt sidewalk on eastside throughout section
   - Provide 5-foot paved shoulder on eastside throughout section
   - Provide 4-foot minimum shoulder on westside throughout section
   - Provide pedestrian actuated traffic signals on all approaches at Oak Hill and Sawyer Road intersections, on three approaches at Portland Farms Road, Hannaford Drive and Town Hall intersections
3. Sawyer Road to Millbrook Road
   - Provide 5-foot asphalt sidewalk on eastside throughout section
   - Provide 5-foot paved shoulder minimum on eastside throughout section
   - Maintain 10-foot paved shoulder west side throughout section
   - Provide pedestrian actuated traffic signals on all approaches at Commerce Drive, Willowdale Road, Scarborough Downs and Haigis Parkway
4. Millbrook Road to northern edge of Scarborough Marsh
   - Provide 5-foot asphalt sidewalks on both sides throughout section
   - Provide 5-foot paved shoulders minimum on both sides between Millbrook Road and Haigis Parkway.
   - Maintain existing 4 to 5 foot paved shoulders between Haigis Parkway and northern edge of Scarborough Marsh
   - Provide pedestrian-actuated traffic signals on all approaches at Southside Road intersection.

5. Northern edge of Scarborough Marsh to Milliken Road
   - Maintain existing 5 to 6-foot paved shoulders
6. Milliken Road to relocated Payne Road
   - Provide 5-foot asphalt sidewalks both sides throughout section
   - Provide 5-foot paved shoulders both sides throughout section
   - Provide pedestrian- actuated traffic signals on all approaches at Payne Road relocated intersection
7. Relocated Payne Road to Saco City Line
   - Provide 5-foot asphalt sidewalks both sides throughout section
   - Provide 4-foot paved shoulders both sides throughout section
   - Provide pedestrian-actuated traffic signals on three approaches at Broadturn Road/Pine Point Road intersection and on all approaches at Old Blue Point Road intersection

***Payne Road Corridor***

1. Spring Street (west) to Route 114
   - Provide 5-foot asphalt sidewalk on eastside throughout section
   - Provide pedestrian-actuated traffic signals on two approaches at proposed Gallery Boulevard, Wal-Mart, Sam's and Route 114 intersections
   - Provide pedestrian crosswalk markings across Spring Street (east) approach
2. Route 114 to Roundwood Drive
   - Provide 5-foot asphalt sidewalks both sides throughout section
   - Provide 5-foot paved shoulders both sides throughout section
3. Roundwood Drive to Scottow Hill Road
   - Maintain existing 5 to 6 foot paved shoulders where feasible throughout section
   - Construct 5-foot paved shoulders both sides in remaining areas throughout section
   - Provide pedestrian-actuated signals on all approaches at Mussey Road, Holmes Road and Haigis Parkway intersections. Provide pedestrian crosswalk markings on all approaches at Scottow Hill Road and Beech Ridge Road intersection
4. Scottow Hill Road to Route 1
   - Provide 4- foot paved shoulders both sides throughout section
   - Provide pedestrian-actuated signals on all approaches of relocated Payne Road/Route 1 intersection

***Route 114 Corridor***

1. County Road to Hannaford Drive
   - Provide 5-foot paved shoulders on both sides throughout section
   - Provide pedestrian-actuated traffic signals on all approaches at County Road, Saco Street/Beech Ridge Road, and Mussey Road intersections. Provide pedestrian-actuated signals on two approaches at Running Hill Road, Payne Road and Spring Street.
2. Hannaford Drive to Route 1
   - Provide 4-foot paved shoulders on both sides throughout section
   - Provide 5-foot asphalt sidewalk on north side throughout section
   - Provide pedestrian-actuated traffic signals on all approaches at Hannaford Drive and Oakhill intersections.

***Blackpoint Road Corridor***

1. Route 1 to Eastern Road
   - Provide 4-foot paved shoulders on both sides throughout section
   - Provide 5-foot paved shoulders on both sides throughout sections
   - Provide pedestrian actuated traffic signals on all approaches at Oakhill and Eastern Road intersections.
2. Eastern Road to Route 77
   - Maintain existing 5 to 7-foot paved shoulders both sides throughout section
   - Provide pedestrian crosswalk markings on all approaches at Route 77 and two approaches at Highland Avenue.
3. Route 77 to Prouts Neck Area
   - Provide minimum of 4-foot paved shoulders both sides throughout section

***Pleasant Hill Road Corridor***

1. Route 1 to Chamberlain Road
   - Provide 6-foot paved shoulders both sides throughout section
   - Provide pedestrian-actuated traffic signals on all approaches at Route 1
2. Chamberlain Road to Route 77
   - Provide a minimum of 5-foot paved shoulders throughout section
   - Provide pedestrian-actuated traffic signals on all approaches at Highland Avenue
   - Provide pedestrian crosswalk markings on two approaches at Route 77

***Pine Point Road Corridor***

1. Route 1 to East Grande Avenue
   - Provide a minimum of 5-foot paved shoulders both sides throughout section
   - Provide pedestrian-actuated traffic signals on three approaches at Route 1/Broadturn Road intersection.

***Haigis Parkway and Washington Avenue Corridors***

1. Haigis Parkway between Payne Road and Route 1
   - Maintain existing 5-to 8-foot paved shoulders throughout section
   - Provide pedestrian-actuated traffic signals on all approaches at Payne Road and Route 1 intersections.
2. Lincoln Avenue and Washington Avenue
   - Stripe 5-foot shoulders both sides on each street

***Route 77 Corridor & Highland Avenue Corridors***

1. Route 77 & Blackpoint Road to Cape Elizabeth Town Line
   - Provide minimum of 4-foot paved shoulders both sides throughout section
   - Provide pedestrian crosswalk markings on all approaches at Route 77 and two approaches at Pleasant Hill Road
2. Highland Avenue, Blackpoint Road to Pleasant Hill Road
   - Provide pedestrian crosswalk markings on all approaches at Pleasant Hill Road Highland Avenue and the south approach of Blackpoint Road at Highland Avenue
   - Provide minimum of 4-foot paved shoulders both sides throughout section

***Holmes Road , Beech Ridge Road, Scottow Hill Road, Scarborough Downs Road, Mussey Road and Old Blue Point Road Corridors***

1. Entire Length of Roadways
   - Provide minimum of 5-foot paved shoulders both sides throughout entire length of roadways
   - Provide pedestrian actuated traffic signals on all approaches of Holmes Road/Beech Ridge Road, Holmes Road/Payne Road/Scarborough Downs, Scarborough Downs/Route 1, Mussey Road/Payne Road, Mussey Road/Route 114, Mussey Road/Spring Street, Beech Ridge Road/Saco Street/Route 114, and Old Blue Point Road/Route 1 intersections.
   - Provide pedestrian-actuated traffic signals two approaches of Mussey Road/Proposed Gallery Boulevard intersection.
   - Provide crosswalk markings on all approaches at the Holmes Road/Broadturn Road and Beech Ridge Road/Scottow Hill Road/Payne Road intersections.

***Broadturn Road Corridor***

1. Burnham Road to near Susan Avenue
   - Provide minimum of 5-foot paved shoulders both sides throughout section
   - Provide pedestrian crosswalk markings on all approaches at Holmes Road intersection
2. Near Susan Avenue to Route 1
   - Provide 4-foot minimum paved shoulders both sides throughout section
   - Provide pedestrian-actuated signals on three approaches at the Route 1 intersection.

## Localized Bicycle-Pedestrian Facility Connections

This portion of the proposed bicycle-pedestrian improvement plan identifies a number of possible multi-use trail connections that, if implemented, will encourage increased bicycle-pedestrian travel and discourage short trip vehicular travel within the Town. The plan calls for appropriately designed and constructed multi-use trail connections between adjoining residential neighborhoods; existing residential neighborhoods and commercial properties, existing residential neighborhoods, public facilities, points of interest and adjoining commercial developments. The recommended multi-use trail design standard is an 8-foot wide trail with a stone dust surface. The Town should establish neighborhood watch groups for each proposed multi-use trail whose responsibility would include minor maintenance of the trail, notification to public officials of vandalism problems and identification of major maintenance needs. The recommended multi-use trial connections are identified as follows:

1. Glendale Circle to Springbrook Park
2. Dunn Estates Drive to Fuller Farm
3. Stonebrook Road to Kerryman Circle
4. Thurston Lane to Raymond Wood Drive
5. Glendale Circle to Raymond Wood Road
6. Woodgate Road to Wiley Park
7. Williamsburg Place to Pumpkin Lane
8. Upgrade existing walkway between Musket Road to Pleasant Hill playground
9. Powderhorn Drive to Pleasant Hill playground
10. Improve existing connection between Eastern Trail to Old County Road
11. Partridge Lane to Eastern Trail

12. Improve existing connection between Washington Avenue to Eastern Trail
13. Burnham Wood Road to Peterson Sports Complex Center
14. Ryefield Drive to Hunter Point Subdivision
15. Herbert Drive to Sawyer Road Park
16. Public School Complex to Imperial Lane, Barbara Avenue and Phillip Street
17. Future connection between Hannaford's and Foley Farm parcel

## Future Development Standards

Future development proposals, (i.e. residential, commercial and industrial) should meet adopted Community design guidelines that require bicycle-pedestrian connectivity between adjoining land uses, public facilities, and points of interest. These connections if appropriately designed will reduce localized auto travel and encourage a healthier community.

## Bicycle-Pedestrian Facility Design Details

**Crosswalk Markings:** designated for street locations identified on the proposed improvement plans should be painted semi-annually and conform to the standard detail as presented on Figure 35. The standard crosswalk detail calls for 12-inch wide white longitudinal lines, six feet in length spaced twenty-four inches apart across the full width of the designated roadway. The inner edge (closest to center of intersection) of the crosswalk markings should align with the gutter line extended of the street intersection. Required stop line markings should be painted 4-feet back from the outer edge of the crosswalk and aligned parallel to the crosswalk markings. The paint should be applied with reflective glass beads in conformance with Federal regulations to increase the nighttime visibility of the crossing. The increased area of paint is encouraged for heightening the awareness of approaching vehicular traffic to the crossing area. Any additional crosswalk markings proposed for future improvement projects should conform to the standard detail to insure message consistency throughout the community.

**Signing:** roadway warning, regulatory and directional signing must conform to the applicable section of the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD). A schedule of possible signs is illustratively presented on Figure 34 for a typical signalized and unsignalized intersection and an unspecified section of roadway with paved shoulders in both directions of travel. Sign requirements for all projects should be determined based upon a detailed review of existing roadway geometry, volume of vehicular traffic, expected usage of bicycle-pedestrian facility, nearby points of interest and other less tangible items.

**Pedestrian Signal Hardware and Software:** pedestrian signal hardware, phasing and timing must conform to the applicable sections of the MUTCD. All pedestrian signal heads shall be 18-inch fixtures (with LED light), equipped with appropriate "symbol" messages, pedestrian interval countdown displays and pushbutton actuation. These recommendations will require replacement of existing pedestrian signal equipment at a number of locations. It is suggested that the existing equipment be replaced on an intersectional basis versus presenting two different types and/or styles of pedestrian signals at the same locations. The signal phasing shall be concurrent or "Walk on Green" and the length of the "Walk" and flashing "Don't Walk" signal interval shall be established based upon engineering study and the requirements of the MUTCD. Educational traffic signal signs applicable to pedestrian pushbutton units (MUTCD Reference R10-3b) shall be incorporated into the pushbutton unit.

**Lighting:** it is recommended that overhead lighting be provided at all roadway intersections within the Community which conforms to the minimum lighting standards recommended by the Maine Department of Transportation. The level of lighting should be determined based upon the functional classification of the roadway and the projected volume of both vehicular and other modal traffic. The Illuminating Engineering Society of North America (IESNA) provides criteria for this purpose. (Refer to the table below.) It is further recommended that the Town consider the use of lighting on all existing and proposed non-motorized pathways to encourage safe after dark travel. In cases where lighting is not used the trail heads should be appropriately marked prohibiting use of the path between sunset and sunrise.

**IESNA Recommendations for Walkway Lighting**

| Walkway Location | Maintained Average Horizontal Illuminance (fc) | Horizontal Ave. to Min. Ratio | Maintained Average Vertical Illuminance (fc) | Vertical Ave. to Min. Ratio |
|---|---|---|---|---|
| Isolated from Roadways | 0.5 | 10:1 | 0.5 | 5:1 |

Source: IESNA DG-5-04.

## Bicycle-Pedestrian Facility Maintenance Practices

**Traffic Sign Inspection Program:** annually all required warning and regulatory signs should be inspected and replaced if found missing and /or damaged.

**Pedestrian Signal Hardware and Software:** semi- annually all pedestrian signal system hardware components (i.e. pedestrian push buttons, signal lights, signal housing) should be checked, tested and repaired as necessary to insure that the system is operating consistently with the designed improvements and in conformance with the Manual on Uniform Traffic Control Devices (MUTCD). Additionally, pedestrian signal timing should be checked with a stopwatch to insure that adequate timing is provided for the "Walk" and flashing "Don't Walk" signal intervals as required by the MUTCD.

**Sidewalk Repair:** the public sidewalk system should be fully inspected annually to determine and identify all deficient locations. The Inspector should also identify locations where vegetation from adjacent properties has encroached onto the sidewalk effectively reducing the walking area of the sidewalk. The identified sidewalk deficiencies should be scheduled for repair and/or correction as soon as practical.

# Proposed Access Management Policy

## Previous Discussion

In the previous technical memorandum to the Town (Section I), the access management criteria standards currently in Scarborough's Site Plan Ordinance were compared to those in the Maine Depart of Transportation Entrance and Driveway Rules. The comparison offered initial recommendations for updating the Town's language and requirements on access management. What follows is a more detailed discussion on access management policy.

## Goals of Access Management

One of the most important factors to consider in preserving the safety and maximizing the capacity of a roadway is access management. The goal of access management is to

minimize the number of driveways to the extent practical and locate driveways in a manner to minimize interruption and potential safety concerns for through traffic. In addition to these factors, access management criteria should seek to minimize vehicle miles traveled and reduce response times by emergency vehicles by promoting connectivity between adjacent commercial properties and adjacent residential subdivisions. Two primary sources of information have been reviewed and compared to establish a recommended practice for access management; the MaineDOT Entrance and Driveway rules and the Institute of Transportation Engineers' publication Transportation and Land Development, second edition. The purpose of this document is to provide recommendations for performance standards: however, it is not intended to provide specific language or be all encompassing. We recommend that an ordinance review committee recommend specific language for adoption by the Town following review by the Town's attorney.

The criteria of concern for access management include the following:

- Connectivity to adjacent streets and businesses
- Number of driveways serving a site
- Intersection sight distance for exiting traffic
- Stopping sight distance for traffic approaching the driveway along the street
- Separation from adjacent driveways
- Separation from adjacent street intersections, signalized and unsignalized
- Grade of the driveway
- Width of the driveway
- Angle of intersection of the driveway with the street
- Auxiliary lanes (left or right turn lanes) on the street
- Intersection lighting
- Pedestrian circulation

The MaineDOT criteria generally cover most of these issues to a degree. As discussed in the first Technical Memorandum, it may be appropriate to model the Town criteria by the MaineDOT criteria with minor modifications. The Town's rules could be simplified and kept up to date by referencing the current edition of the MaineDOT rules with exceptions for certain criteria that may be more restrictive. The MaineDOT access management rules for driveways and entrances are available on their web site (http://www.maine.gov/mdot/planning-process-programs/access-mngmnt.php).

Each of the issues is discussed below including recommendations for revisions where appropriate.

***Definition of a Driveway vs. Entrance or Street***

The MaineDOT rules define a driveway as an access generating up to 50 trip ends per day (the equivalent of 5 houses). It is recommended that the Town use up to 30 trips a day to define a driveway and that anything more be considered an entrance or street. The following entrance standards should apply to driveways, entrances and streets except for the grade criteria where a distinction is noted.

***Connectivity***

A review of the aerial photography for many Maine communities, Scarborough included, reveals a disturbing trend from a transportation standpoint; a proliferation of unconnected adjacent subdivisions or other land uses with dead end roadways. Many

developers, particularly of residential subdivisions, maintain that their clients want to be on dead-end streets and therefore lots in these types of developments have a higher value. However, the net effect on the transportation system tends to be that the arterials carry a disproportionate burden of trips. Conversely, interconnecting adjacent subdivisions, as well as other adjacent uses, improves the efficiency of the overall transportation system by providing for travel between neighborhoods as well as to other streets in the area, improves emergency response times, reduces vehicle miles traveled and reduces congestion along the arterial and adjacent roadways. While neighborhoods can be concerned with cut through traffic and speeding, these issues can be somewhat mitigated through design and traffic calming features. While there will be increased traffic levels in some neighborhoods, the end result is a more balanced and safer transportation system, and a more equitable distribution of the traffic.

It is recommended that the Town implement a requirement that all subdivisions and development proposals allow for a connection to adjacent uses or vacant land unless the proposed interconnection is not feasible due to environmental impacts or topographic constraints. A private property owner should be required to allow the cross access without cost to the abutting property owner, but a primary access would be a matter of private negotiation. Proposed interconnections should be designed to minimize speed and provide safe pedestrian facilities. However, increased traffic through a residential neighborhood should not be a reason to waive the interconnection. It is also recommend that consideration be given to implementing provisions within the zoning ordinance to help facilitate cooperation in achieving connectivity by providing a density bonus or other incentives.

It is strongly recommended that provisions for connections to future adjacent land uses be clear in the subdivision or site plan approval and that the proposed connection be built to the abutting property line as part of the approved development.

***Number of Access Points***

The majority of crashes nationwide occur at intersections and driveways; therefore reducing the number of driveways can have a significant affect on the safety of a roadway. MaineDOT rules limit the number of driveways on mobility corridors, which includes Route 1, to one two-way or two one way entrances. We recommend that the Town adopt this standard town wide, with the exception of uses with significant truck traffic, and consider relief in the ordinance to developers that forego a driveway in lieu of a connection with another site. The ordinance will need to consider the phase-in of shared driveways as may be necessary to accommodate large vehicle traffic in and out of driveways. For instance, an isolated site may initially require two driveways to allow bus or large truck circulation. The site plan approval should include provisions to require removal of one driveway when an abutting parcel is developed, at which time the abutting parcel will create a single driveway. The two abutting sites will then share the two driveways to facilitate large vehicle circulation.

***Sight Distance***

It is recommended that the Town's sight distance criteria utilize the MaineDOT and American Association of State Transportation Official's (AASHTO) standards. Intersection sight distance for vehicles exiting driveways and entrances along Route 1 should meet the Mobility Standard, while driveways and entrances in other locations should meet the basic safety standard. A vehicle approaching a driveway or entrance may need to stop for a vehicle waiting to make a turn. Therefore, adequate stopping sight distance must be provided for approaching traffic. These criteria are shown in the following table:

**Standards for Sight Distance**

| Posted Speed (mph) | Sight Distance (Feet) | | | |
|---|---|---|---|---|
| | Town Standard | MaineDOT Standards | | |
| | | Basic Safety Standard | Mobility Standard | Stopping |
| 25 | 160 | 200 | 300 | 150 |
| 30 | - | 250 | 380 | 200 |
| 35 | - | 305 | 480 | 225 |
| 40 | 275 | 360 | 580 | 275 |
| 45 | 325 | 425 | 710 | 325 |
| 50 | 350 | 495 | 840 | 400 |
| 55 | 425 | 570 | 990 | 450 |

***Separation from Adjacent Driveways***

Table 3 of the MaineDOT rules presents minimum spacing criteria for mobility corridors. Although Route 1 in Scarborough is within the urban compact, and therefore not regulated by MaineDOT access requirements, it is recommended that the mobility corridor requirements be adopted for Route 1. However, lesser separations should be considered by the Town if an engineering study shows it is not feasible to obtain the desired distances. These distances are as follows:

**MaineDOT Driveway/Entrance Spacing Standards**

| Posted Speed (mph) | Separation Distance (Feet) |
|---|---|
| 25 | 90 |
| 30 | 105 |
| 35 | 130 |
| 40 | 175 |
| 45 | 265 |
| 50 | 350 |
| 55 | 525 |

***Separation from Adjacent Street Intersections, Signalized and Unsignalized***

MaineDOT standards require that a driveway to a lot adjacent to an intersection be located a minimum of 125 feet edge to edge from the intersection and that access to a corner lot be provided off the side street whenever practicable. However, a greater distance or turning movement restrictions should be provided, if necessary, based on the results of a vehicle queuing analysis at the intersection.

***Grade of the Driveway/Entrance***

MaineDOT criteria indicate that the maximum grade within 75 feet of an intersection not exceed 3 percent. This standard should be utilized for entrances, but 5 percent would be acceptable for driveways.

***Width of the Driveway/Entrance***

The MaineDOT criteria suggest a range of driveway/entrance widths. It is recommended that a driveway width be 12 to 15 feet excluding radii and that a two way entrance width be a minimum of 22 feet with a maximum of 30 feet unless otherwise recommended by an engineering study. The driveway or entrance radii should be designed to accommodate vehicles commonly expected to utilize the driveway.

***Angle of Intersection of the Driveway with the Street***

MaineDOT recommends that the intersection angle be perpendicular to the extent practical. It is recommended that the minimum allowed by the Town be increased to 75 degrees for both two way and one way operations.

***Auxiliary Lanes***

Auxiliary turning lanes should be provided as appropriate as determined by a traffic study. The MaineDOT Highway Design Guide contains graphs that provide criteria to assess when left or right turn lanes should be considered on the roadway to serve traffic turning into the site. As discussed in Technical Memorandum I, it is recommended that references in the Town standards to acceleration and deceleration lanes be removed.

***Lighting***

MaineDOT criteria require that overhead lighting shall be provided, if not existing, to illuminate the intersection. Overhead lighting shall have an average of 0.6 to 1.0 foot candles, with the maximum to minimum lighting ratio of not more than 10:1 and an average to minimum light level of not more than 4:1. It is recommended that these levels be provided in the driveway at the street intersection.

***Pedestrian Facilities***

While the overall Townwide plan provides for significant additional pedestrian facilities at many of the Town's intersections, the Town's Ordinances should be amended to include specific language requiring construction of pedestrian facilities both within and connecting to adjacent site plans and subdivisions. The ordinance re-write should address ***desired connections***, {i.e., adjacent commercial developments, neighborhoods, public facilities, points of interest, etc.}, ***sidewalk construction requirements*** of properties fronting Route 1, ***standards for pedestrian sidewalks, both public and private*** {i.e., public sidewalk width, materials, lighting, esplanade requirement, etc.}, and ***standards for multi-use path connections*** {path width, ownership, maintenance, lighting, etc.}

# Community Policy Recommendations

What follows is a discussion regarding steps and processes the Town can undertaken in the short and long-term to aid the creation of the recommended transportation system.

## Right-of-Way and Infrastructure Improvements

***Capital Funding Considerations:*** It is suggested that a multi-year capital plan be developed for implementation of the proposed Transportation Improvement recommendations. The budgetary plan should be formatted to include two general categories, roadway and other modal and a more detailed series of sub-categories under each major heading. The plan should establish a minimum funding level for each

general and sub-category, based upon the availability of Federal and State transportation funding, other State and private agency grants, fees collected through the driveway permit process, local tax dollar funding. It is suggested that the budget document be adjusted and updated annually as more accurate information on funding and project cost becomes available.

*Completion Horizon: Short-Term*
*Priority: High*

***Dunstan Corner Improvements:*** The Town should actively seek through both PACTS and MaineDOT near-term roadway construction funding for implementing intersection improvement Alternative #3 as amended on Figures 15a and 15b. This project because of its significant regional transportation benefit should be supported by all parties as one of the highest priority roadway improvement projects in Southern Maine.

*Completion Horizon: Short-Term*
*Priority: High*

***Oak Hill Transportation Improvement Recommendation***: The Town should as soon as practical commission a detailed feasibility study of the recommended transportation improvements to Oak Hill as detailed on Figure 20. Present peak hour traffic conditions are generally representative of Level of Service F, or severely deficient traffic operations. The future traffic forecast show a continued increase in vehicle delay, with the potential of near-grid-lock conditions by the build-out year of 2025 at this critically important local regional intersection.

The proposed transportation improvement plan for Oak Hill suggest construction of two 'loop' roadways between Blackpoint Road and Route 1. One of the proposed 'loop' roadways would intersect Route 1 opposite Hannaford Drive and the second proposed roadway would connect to Commerce Drive east of Route 1. It is critically important that a decision is made in a timely manner on the merits of the proposed transportation improvement plan for Oak Hill, specifically the proposed alignment and cross-section of the more southern 'loop' roadway to avoid significant conflicts with a recently proposed residential development project. It would appear that alignment and cross-sectional alternatives exist for the proposed southern 'loop' roadway that would allow complete integration of both projects.

*Completion Horizon: Short-Term to Medium-Term*
*Priority: High*

***New Transportation Corridor Right-of Way Preservation:*** Timely decisions should be rendered by both State and Town officials on the feasibility and desirability of constructing new roadway corridors within the Community. The conclusions of the Transportation Study suggest based upon a preliminary traffic modeling assessment that both the Haigis Parkway Connector and Route 114 Overlap alternatives appear to provide somewhat significant transportation benefit in reducing peak travel demand at a number of key locations. PACTS planning funds should be requested by the Town to study both proposed roadway corridors in greater detail. If the findings of the future study continue to support construction of either or both proposed new roadway corridors, then MaineDOT and the Community should make every effort to preserve the necessary right-of-way through possible land easements and/or approvals of land use applications.

*Completion Horizon: Medium-Term*
*Priority: Medium*

***Scarborough Downs and Haigis Parkway Land Development Transportation Standards:*** It is recommended that the Town, working with MaineDOT and property owners along Haigis Parkway carefully examine the existing control of access restrictions on Haigis Parkway to determine if the previously- determined driveway locations are appropriately located. Proposals for change should carefully consider potential land-development proposals, inter-parcel connectivity, desirable roadway connections to the Enterprise Business Park and the adjacent Scarborough Downs property.

In addition, the Town should require as a part of any future development proposal preparation of a detailed master plan of the Scarborough Downs parcel. The plan should consider along with land-use development proposals, transportation system improvements to the current internal roadway system (i.e. creating a roadway alignment and cross-section that has the capacity to serve and encourage both parcel generated and external vehicular and other modal traffic). Roadway connections, accommodating both vehicular and other modal travel must be provided between the adjoining Enterprise Business Park and properties along Haigis Parkway.

*Completion Horizon: Medium-Term*
*Priority: Medium*

## Access Management Recommendations

***Access Management Initiative:*** Consider the immediate study of driveway access to existing and future land uses along all major commercial development corridors located within the boundaries of the Community. At a minimum the study should examine the Route 1, Pleasant Hill Road between Route 1 and Chamberlain Avenue; Payne Road, between Route 114 and Haigis Parkway. The focus of the study should include:

1. Establishing future driveway locations along major arterial corridors
2. Identifying existing driveways that are poorly located (i.e. sight distance restrictions, close proximity to intersection corners, etc. that should be corrected over time when opportunities for correction arise)
3. Determine locations where driveway connectivity is both practical and feasible
4. Assess the need for roadway corridor improvements for controlling access.

The Town may want to consider a funding request through PACTS (Portland Area Comprehensive Transportation Study) for conducting the study.

*Completion Horizon: Short-Term*
*Priority: High*

***Access Management Principles:*** The Town should appropriately amend or create new zoning ordinances that fully adopt the access management principles discussed in detail in the body of the Transportation Study, as well as the access management initiative discussed above. The proposed ordinance changes should include a well defined process for granting waivers of the proposed access management standards including, who grants the waiver, acceptable reasons for granting the waiver, flexible in allowing engineering judgment, etc.

*Completion Horizon: Short-Term to Medium-Term*
*Priority: High*

***Enactment of Town Ordinance Provisions:*** Further amendments to the Zoning Ordinance might include a similar requirement for Development proposals to provide vehicular connectivity between adjacent and compatible land-uses, penalize projects

that propose construction of dead-end residential streets and/or reward developers whose project includes multiple entrances, and to create a ordinance provision that requires developers contribute the cost of, or alternatively, construct adopted roadway widening improvements across the street frontage of their property. This proposed provision must consider a full or partial waiver of the recommended driveway permit fee assessment. The Town's Street Ordinance should be appropriately amended to include specific language establishing the legal location of all public street appurtenances including mail boxes, private utility pole structures, and underground utility manhole structures.

*Completion Horizon: Short-Term to Medium-Term*
*Priority: Medium*

***Driveway Permit Impact Fee Process:*** Consider the establishment of a driveway permit impact fee process, whereby all new development projects are assessed a per trip fee based upon the volume of peak hour trips generated during either the AM or PM peak hour. The collected fees would be dedicated for implementation of the recommended public transportation improvements. Enactment of a driveway permit program should consider

1. Restructuring or eliminating the existing Payne Road Corridor Impact Fee program
2. Expenditure priorities of program funds
3. Consideration of exempted uses (i.e. single-family homes)
4. Legal issues
5. Trip generation standards, etc.

*Completion Horizon: Short-Term to Medium-Term*
*Priority: Medium*

## Transportation Demand Management (TDM) Strategies

***Rideshare System:*** The Town should request GPGOG's Rideshare Coordinator and the Maine Turnpike Authority to consider expanding the existing commuter rideshare lot at MTA Exit 42. Current usage trends would suggest that peak demand of the rideshare lot is near capacity. Additionally, the Town should request assistance from GPCOG's Coordinator in developing a formal and comprehensive rideshare program for the Community.

*Completion Horizon: Short-Term*
*Priority: Medium to High*

***Promote Bicycle and Pedestrian Travel:*** The Town should complete construction of the Eastern Trail corridor as a high priority Community project. Community usage of the corridor should be encouraged with strategically-placed informational kiosks, trail head parking facilities that are safe, clean and appropriately located, identification and construction of neighborhood linkages where feasible, connections to other intra and inter-Community pedestrian and bicycle facilities, etc.

School children should be encouraged to ride a bicycle or walk to school properties where safe and well-maintained pedestrian-bicycle travel corridors exist. Routine Police presence at key intersection crossings during peak travel periods is essential for insuring that school-aged children can safely cross major intersections safely. Strict enforcement of the State Law requiring motorist to "yield to pedestrians in crosswalks" must be a priority for the Community if pedestrian and bicycle travel is going to safely co-exist on the same roadway corridors. It maybe appropriate to create local ordinances

that prohibit pedestrian "jaywalking" and establish safe and acceptable bicycle operator behavior.

*Completion Horizon: Short-Term to Medium Term*
*Priority: Medium to High*

***Enactment of Town Ordinance Provisions:*** The Town should consider modifying existing Zoning Ordinances to require property developers to construct appropriately designed multi-use trail connection between adjacent neighborhoods, properties, points of interest, existing public facilities, where feasible. If opportunities do not reasonably exist as determined by the Planning Board, then the Developer would be required to contribute a sum of money towards trail construction elsewhere in the Community. The ordinance changes should also address private landscaping encroachment into the public right-of-way, specifically as it relates to impeding vehicle sight distance and the safe and convenient travel of bicycle and pedestrian travel.

*Completion Horizon: Short-Term to Medium Term*
*Priority: Medium*

***Maintenance Practices:*** The Public Works and Community Service Departments should develop standard operating procedures that assign responsibility of the recommended maintenance standards, practices and procedures identified under the Other Modal Improvements section of the report. It is strongly recommended that sufficient funding levels on an annual basis be appropriated in each Department's operating budget to meet the annual maintenance requirements of the proposed plan. The Department of Public Works should develop a formal project evaluation process for determining what future roadways within the Community should be widened to accommodate bicycle-pedestrian travel. The plan should include input from the Community Services Department, Police and School Departments and the Town Council.

*Completion Horizon: Short-Term to Medium Term*
*Priority: Medium*

***Bus Service:*** The Town should seek the assistance of METRO and GPGOG in determining the feasibility of extending limited bus service to select locations within the Town. Possible destination points within the Town might include the Maine Medical Complex/Hillcrest Retirement Community area and the commercial development portion of Payne Road.

*Completion Horizon: Medium Term*
*Priority: Medium*

***Passenger Rail Service:*** The existing AMTRAK Downeaster Route passes through Scarborough, and with it, an opportunity. The Town should work with Guilford Rail Company and AMTRAK to include it as a stop for passenger rail service. Longer term, the Town should work with MaineDOT to utilize this rail corridor as a separate passenger rail line with trains operating independently of AMTRAK.

*Completion Horizon: Medium Term to Long-Term*
*Priority: Low to Medium*

# Transportation System Improvement Program Cost Summary

## Introduction

The Project Team prepared preliminary opinions of probable construction cost for the recommended improvements in Section III of the Scarborough Townwide Study. It should be noted that these opinions are for planning and discussion purposes only, and should not be considered construction estimates. As these items are preliminary, the following points should be noted:

1. The opinions of cost do not include legal or engineering costs.
2. The opinions of cost do not include the remediation or removal of any special or hazardous materials such as asbestos, PCB's, or other materials.
3. The opinions of cost do not include costs associated with right-of-way.
4. The opinions of cost do not include costs associated with wetland impact or remediation.
5. The opinions of cost are based on 2004 dollars.
6. The opinions of cost do not include costs for utility relocations.
7. The opinions of cost do not include overlaying of the existing roadway.
8. The opinion of cost assumes all work at each location is performed concurrently; completion of work in portions is anticipated to add to the overall cost.
9. The opinion of cost for corridor improvements does not include costs for intersection improvements included in the intersection improvements portion of this opinion.
10. The corridor improvements assume open drainage in rural areas.
11. Unless otherwise noted, shoulder and sidewalk construction is considered a pedestrian/bicycle improvement.
12. The cost for pedestrian signal heads is $5,000.

## Intersection Improvement Costs

What follows is a summary of the opinions of cost for each applicable intersection. The concepts for these improvements, along with the preliminary opinions of probable construction cost, are included in Section V.

Payne Road at Cummings Road (Figure 1)

| | |
|---|---|
| Vehicular Improvement Cost: | $435,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 17,000.00 |
| Total Cost: | $452,000.00 |

Payne Road at Spring Street (Figure 2)

| | |
|---|---|
| Vehicular Improvement Cost: | $716,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 24,000.00 |
| Total Cost: | $740,000.00 |

Payne Road at Sam's Club (Figure 3)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 0,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 97,000.00 |
| Total Cost: | $ 97,000.00 |

Payne Road at Wal-Mart (Figure 4)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 90,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 93,000.00 |
| Total Cost: | $183,000.00 |

Payne Road at Route 114 (Figure 5)

| | |
|---|---|
| Vehicular Improvement Cost: | $538,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $127,000.00 |
| Total Cost: | $665,000.00 |

Payne Road at Mussey Road (Figure 6)

| | |
|---|---|
| Vehicular Improvement Cost: | $565,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 83,000.00 |
| Total Cost: | $648,000.00 |

Payne Road at Bridges Drive (Figure 7)

| | |
|---|---|
| Vehicular Improvement Cost: | $103,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 98,000.00 |
| Total Cost: | $201,000.00 |

Payne Road at Holmes Road (Figure 8)

| | |
|---|---|
| Vehicular Improvement Cost: | $465,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $665,000.00 |
| Total Cost: | $1,130,000.00 |

Payne Road at Haigis Parkway (Figure 9)

| | |
|---|---|
| Vehicular Improvement Cost: | $486,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 80,000.00 |
| Total Cost: | $566,000.00 |

Payne Road at Beech Ridge/Scottow Hill Road (Figure 10)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 67,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $188,000.00 |
| Total Cost: | $255,000.00 |

County Road at Saco Street (Figure 11A)

| | |
|---|---|
| Vehicular Improvement Cost: | $466,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $650,000.00 |
| Total Cost: | $1,116,000.00 |

Route 114 at Saco Street (Figure 11B)

| | |
|---|---|
| Vehicular Improvement Cost: | $598,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $695,000.00 |
| Total Cost: | $1,293,000.00 |

County Road at Route 114 (Figure 11C)

| | |
|---|---|
| Vehicular Improvement Cost: | $270,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $440,000.00 |
| Total Cost: | $710,000.00 |

Route 114 at Running Hill Road (Figure 12)

| | |
|---|---|
| Vehicular Improvement Cost: | $565,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 83,000.00 |
| Total Cost: | $594,000.00 |

Eight Corners (Figure 13)

| | |
|---|---|
| Vehicular Improvement Cost: | $403,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $810,000.00 |
| Total Cost: | $1,213,000.00 |

Route 1 at Old Blue Point Road (Figure 14)

| | |
|---|---|
| Vehicular Improvement Cost: | $563,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $505,000.00 |
| Total Cost: | $1,068,000.00 |

Route 1 at Dunstan Corner (Figure 15A)

| | |
|---|---|
| Vehicular Improvement Cost: | $1,231,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $1,760,000.00 |
| Total Cost: | $2,991,000.00 |

Pine Point Road at Harlow Street Extension (Figure 15B)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 75,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 0,000.00 |
| Total Cost: | $ 75,000.00 |

Route 1 at South Gate (Figure 16)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 15,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 5,000.00 |
| Total Cost: | $ 20,000.00 |

Route 1 at Haigis Parkway (Figure 17)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 385,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 925,000.00 |
| Total Cost: | $1,310,000.00 |

Route 1 at Willowdale Road (Figure 18)

| | |
|---|---|
| Vehicular Improvement Cost: | $305,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $483,000.00 |
| Total Cost: | $788,000.00 |

Route 1 at Scarborough Downs (Figure 19)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 15,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $525,000.00 |
| Total Cost: | $540,000.00 |

Route 1 at Commerce Drive (Figure 21A)

| | |
|---|---|
| Vehicular Improvement Cost: | $136,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 5,000.00 |
| Total Cost: | $141,000.00 |

Route 1 at Sawyer Road (Figure 21B)

| | |
|---|---|
| Vehicular Improvement Cost: | $213,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $865,000.00 |
| Total Cost: | $1,078,000.00 |

Route 1 at Ward Street (Figure 21C) $102,000.00

| | |
|---|---|
| Vehicular Improvement Cost: | $ 22,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 80,000.00 |
| Total Cost: | $102,000.00 |

Route 1 at Blackpoint Road/Route 114 (Figure 21D)

| | |
|---|---|
| Vehicular Improvement Cost: | $165,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $420,000.00 |
| Total Cost: | $585,000.00 |

Route 114 at Hannaford Drive (Figure 21E)

| | |
|---|---|
| Vehicular Improvement Cost: | $370,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 30,000.00 |
| Total Cost: | $400,000.00 |

Route 1 at Hannaford Drive (Figure 21F)

| | |
|---|---|
| Vehicular Improvement Cost: | $1,336,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 125,000.00 |
| Total Cost: | $1,386,000.00 |

Blackpoint Road at Eastern Road/New Road (Figure 21G)

| | |
|---|---|
| Vehicular Improvement Cost: | $2,195,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 355,000.00 |
| Total Cost: | $3,792,000.00 |

Route 1 at Portland Farm Road (Figure 22)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 15,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $630,000.00 |
| Total Cost: | $645,000.00 |

Route 1 at Green Acres (Figure 23)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 42,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 5,000.00 |
| Total Cost: | $ 67,000.00 |

Route 1 at Pleasant Hill Road (Figure 24)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 265,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $1,855,000.00 |
| Total Cost: | $2,120,000.00 |

Beech Ridge Road at Holmes Road (Figure 25)

| | |
|---|---|
| Vehicular Improvement Cost: | $300,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 47,000.00 |
| Total Cost: | $347,000.00 |

Broadturn Road at Holmes Road (Figure 26)

| | |
|---|---|
| Vehicular Improvement Cost: | $125,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $390,000.00 |
| Total Cost: | $515,000.00 |

Pleasant Hill Road at Highland Avenue (Figure 27)

| | |
|---|---|
| Vehicular Improvement Cost: | $310,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $305,000.00 |
| Total Cost: | $615,000.00 |

Route 77 at Pleasant Hill Road (Figure 28)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 45,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 90,000.00 |
| Total Cost: | $135,000.00 |

Blackpoint Road at Route 77 (Figure 29)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 50,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 0,000.00 |
| Total Cost: | $ 50,000.00 |

Blackpoint Road at Highland Avenue (Figure 30)

| | |
|---|---|
| Vehicular Improvement Cost: | $250,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 0,000.00 |
| Total Cost: | $250,000.00 |

Blackpoint Road at Fogg Road (Figure 31)

| | |
|---|---|
| Vehicular Improvement Cost: | $200,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 0,000.00 |
| Total Cost: | $200,000.00 |

Broadturn Road at Ash Swamp Road (Figure 32)

| | |
|---|---|
| Vehicular Improvement Cost: | $155,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $ 75,000.00 |
| Total Cost: | $230,000.00 |

Mussey Road at Gallery Boulevard (Figure 33)

| | |
|---|---|
| Vehicular Improvement Cost: | $342,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $165,000.00 |
| Total Cost: | $507,000.00 |

**Total for All Intersections**

| | |
|---|---|
| **Vehicular Improvement Cost:** | **$14,858,000.00** |
| **Pedestrian/Bicycle Improvement Cost:** | **$13,795,000.00** |
| **Total Cost:** | **$28,653,000.00** |

It should be noted that, as of the date of this study, approximately $1,873,000 of vehicular improvements and $204,000 of pedestrian and bicycle improvements have been committed to by other parties (i.e. associated with private development.)

# Corridor Improvement Costs

What follows is a summary of the opinions of cost for each applicable corridor. The location of these improvements, along with the preliminary opinions of probable construction cost, are included in Section V.

Route 114 from Beech Ridge Road to Payne Road, from Eight Corners to Oak Hill (Figures B-1,B-2)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 0,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $3,600,000.00 |
| Total Cost: | $3,600,000.00 |

Beech Ridge Road from Route 114 to Payne Road (Figure B-2)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 0,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $3,600,000.00 |
| Total Cost: | $3,600,000.00 |

Holmes Road (Figure B-2)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 0,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $4,800,000.00 |
| Total Cost: | $4,800,000.00 |

Broadturn Road (Figure B-2)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 0,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $3,250,000.00 |
| Total Cost: | $3,250,000.00 |

Payne Road from Haigis Parkway to Dunstan Corner (Figure B-2)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 0,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $2,250,000.00 |
| Total Cost: | $2,250,000.00 |

Old Blue Point Road from Route 1 to Pine Point Road (Figures B-1, B-2)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 0,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $1,440,000.00 |
| Total Cost: | $1,440,000.00 |

Highland Avenue from Pleasant Hill Road to Blackpoint Road (Figure B-1)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 0,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $1,320,000.00 |
| Total Cost: | $1,320,000.00 |

Pleasant Hill Road from Route 1 to Route 77 (Figure B-1)

| | |
|---|---|
| Vehicular Improvement Cost: | $4,250,000.00* |
| Pedestrian/Bicycle Improvement Cost: | $ 0,000.00 |
| Total Cost: | $4,250,000.00 |

*Improvement for turning traffic.

Route 77 from Cape Elizabeth to Prouts Neck (Figure B-1)

| | |
|---|---|
| Vehicular Improvement Cost: | $ 0,000.00 |
| Pedestrian/Bicycle Improvement Cost: | $3,960,000.00 |
| Total Cost: | $3,960,000.00 |

**Total for All Corridors**

| | |
|---|---|
| **Vehicular Improvement Cost:** | **$ 4,250,000.00** |
| **Pedestrian/Bicycle Improvement Cost:** | **$24,220,000.00** |
| **Total Cost:** | **$28,470,000.00** |