CBL: 152-B-1

FOLDER NAME: Traffic Impact Study 6-2004

PROJECT: Morrills Crossing Contract Rezoning

ADDRESS: 33 Allen Avenue

Traffic Impact and Access Study

Morrill's Crossing

Portland, Maine

Prepared for **Packard Development**

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Executive Summary

Vanasse Hangen Brustlin, Inc. (VHB) has been retained by Packard Development (the proponent) to conduct a traffic impact and access study for the proposed construction of 128,100 square feet (sf) of new retail and supermarket shopping space; 2,500 sf of office space; and 48 units of residential properties in Portland, Maine. The 20.2-acre site, located on Allen Avenue near Morrill's Corner in Portland currently is home to a restaurant, bingo hall, and boxing club along with several abandoned buildings.

VHB has evaluated the existing traffic operations in the vicinity of the project site, assessed the short-term and long-term impacts of the proposed development program, and has identified specific roadway improvements in the area necessary to address current traffic deficiencies and accommodate future traffic growth. In addition to these specific roadway improvements, traffic demand management (TDM) actions and pedestrian enhancements are also identified in an effort to maximize the use of alternative forms of travel modes and minimize the impact of automobile traffic in the vicinity of the project. This traffic impact study was prepared in accordance with the Maine Department of Transportation's (Maine DOT) Traffic Movement Permit regulations and in conjunction with the City of Portland's Traffic Engineering staff and Maine DOT.

Project Description

The proposed project involves the construction of 128,100 sf of new retail space (along with 5,624 sf of non-sales office space supporting the supermarket); 2,500 sf of office space; and 48 units of residential properties on the site, which is graphically illustrated on Figure ES-1.

The new retail space is broken into the following uses:

- 65,821 sf new supermarket retail space (with an additional 5,624 sf of non-sales area mezzanine space), and
- 62,300 sf of additional new retail uses in five different buildings.

The new residential space is broken into the following uses:

- 8 apartment units, and
- 40 condominium and multi-family units.

In addition to this new development as detailed above, the existing athletic boxing club currently located on the site will be relocated to a new facility in the rear of the site. The existing 3,500-sf Bruno's restaurant and its 3,500 sf of second story office

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Vanasse Hangen Brustlin, Inc.

ES-1 12 April 2004

Conceptual Site Development Plan

space will also remain on the site as well in its current location. The bingo hall, which currently seats up to 500 participants on a nightly basis, will no longer remain on the site.

The renovated boxing club space will serve to enhance these current uses and will provide improved facilities for users. Specifically, the new building will provide state-of-the-art athletic facilities for the boxing club and office space for day-to-day operations.

Site Access

As Figure ES-1 shows, primary vehicular access to the site is proposed through a signalized intersection located along Allen Avenue approximately 625 feet north of Forest Avenue. Various points of pedestrian-only access are provided along the site's frontage with the Woodlawn area neighborhoods. Emergency access will be provided via an access point along Allen Avenue.

Site-Generated Traffic

Site-generated trips were based on data contained in the Institute of Transportation Engineer's publication *Trip Generation, 6th Edition*.

While a portion of the traffic arriving and departing from the site will be new traffic to the area roadways, it should be noted that not all the traffic generated by the site would be new traffic to the area. A large percentage of the retail-based site traffic will be considered "pass-by" traffic and will be drawn from the existing traffic streams traveling past the site along Allen Avenue, Stevens Avenue, and Forest Avenue. ITE data suggests that as much as 57 percent of the traffic generated by a supermarket and retail center might be classified as pass-by traffic. However, based on observations conducted by VHB at similar Super Stop & Shop supermarket centers in the New England area and in conjunction with the available ITE data, it was assumed for the purposes of this study that only 44 percent of the evening peak hour site traffic and 29 percent of the Saturday midday peak hour traffic can be classified as "pass-by" traffic. Furthermore, by combining residential and retail/commercial land uses within the same project site, there will likely be some interaction between these uses that is not necessarily included in these numbers.

Based on the proposed development program for the site using these assumptions, the development is expected to generate approximately:

- 460 new vehicle-trips (220 entering and 240 exiting) during the weekday evening peak hour period; and

- 770 new vehicle-trips (410 entering and 360 exiting) during the Saturday midday peak period.

These trips will be spread out along both Allen Avenue to the north of the site and along Forest Avenue and Stevens Avenue to the south as they arrive and depart from the site. Figure ES-2 provides a summary of the expected evening and Saturday midday traffic volume increases on roadways leading to and from the project site.

Traffic Mitigation

As a result of the study area intersection assessments, a series of recommended measures were developed intended to address project-related traffic impacts at the site access, at impacted off-site intersections, and also recommends potential improvements at deficient locations which are currently operating at constrained levels independent of the proposed project. These proposed improvements not only will mitigate the project's impacts on area roadways, but will also address several long-standing operational issues in the vicinity of the area – particularly the Morrill's Corner intersections (Forest Avenue, Stevens Avenue, and Allen Avenue).

In sum, these roadway improvements will total approximately $1.5 million in transportation infrastructure improvements to the City of Portland, to be funded entirely by the proponent.

Roadway Capacity Improvements

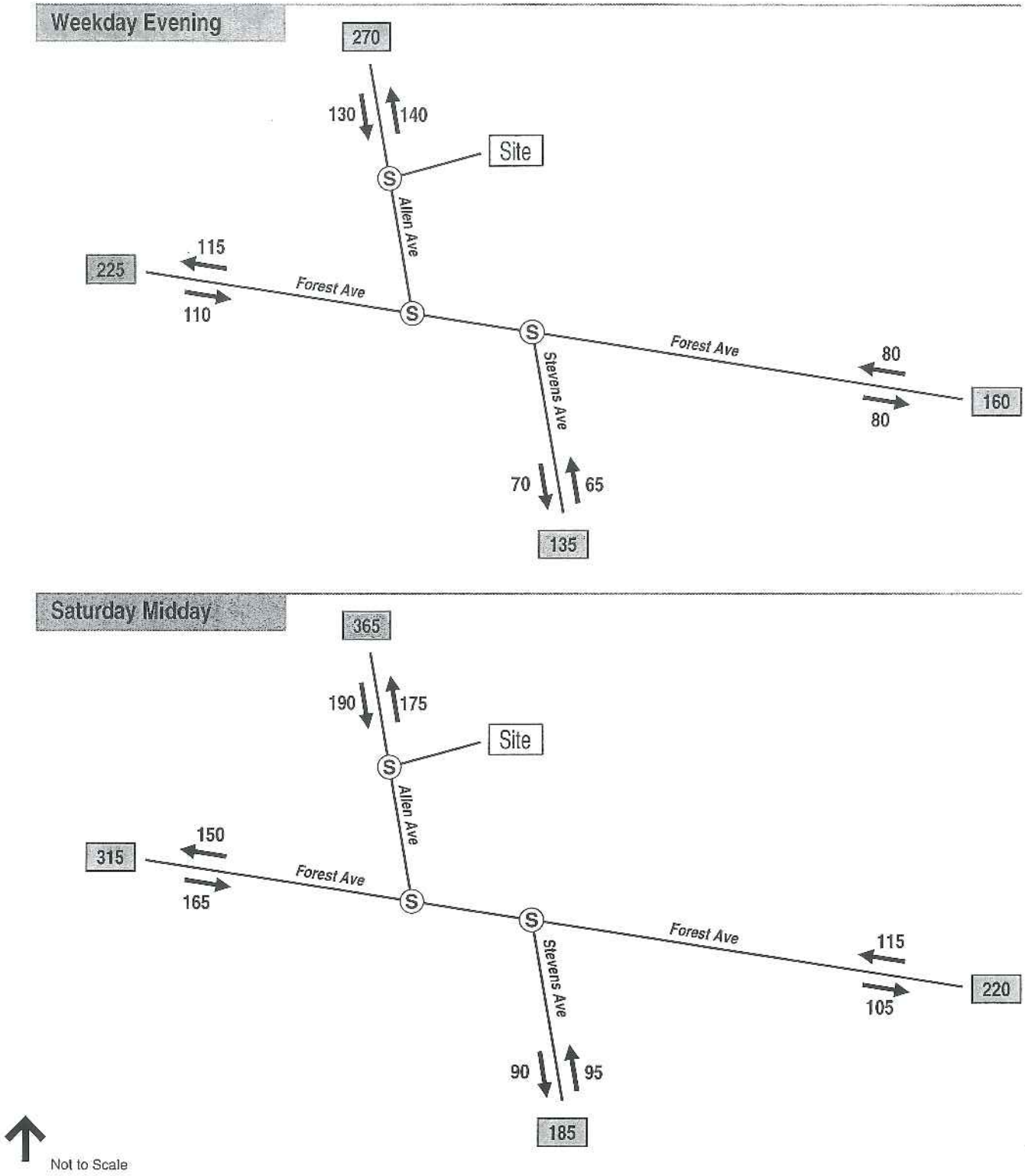
The project proponent plans to implement the following off-site infrastructure mitigation measures to the roadways and signals surrounding the site. These intersection improvements are as follows:

Morrill's Corner Intersections

Maine DOT recently completed the process of widening Forest Avenue from Allen Avenue to Warren Avenue in the vicinity of the project. These improvements have improved driving conditions to the motorists traveling through the Morrill's Corner area and along many of the roadways in the vicinity of the project site.

The following section highlights the major additional improvements to the Morrill's Corner intersections that will be undertaken by the proponent (shown graphically in Figure ES-2):

- Widen Forest Avenue from Morrill Street to Allen Avenue in the westbound direction by one additional lane of traffic. This improvement will require some land takings and modifications to the current driveways along the northern edge



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Project-Related
Peak Hour
Vehicle Trip Increases

Figure ES-2

of the roadway. This will result in improved capacity for the drivers traveling through the intersection and provide a dedicated lane for use by motorists traveling to the proposed development and along Allen Avenue.

- Upgrade existing traffic signal equipment and coordinate the three signalized intersections within the Morrill's Corner area (Stevens Avenue at Forest Avenue; Allen Avenue at Forest Avenue, and Warren Avenue at Forest Avenue). This will result in improved traffic coordination between the signals and less driver frustration while traveling through the intersections.

- Upgrade and/or replace the current railroad crossing equipment along Forest Avenue and improve the signal pre-emption when the trains travel through the area. This will result in less gridlock occurring during the peak hours when trains travel through the area as well as during off-peak hours.

- Upgrade and/or install new sidewalks in the Morrill's Corner area including pedestrian crosswalks and introducing pedestrian phases to the signal system. This will result in improved pedestrian safety as they attempt to cross the streets of Morrill's Corner as well as improve the current pedestrian infrastructure in the area.

In sum, the implementation of these improvements along with the recently constructed Maine DOT improvements will improve traffic operations at all intersections within the Morrill's Corner study area and will upgrade the pedestrian environment as well throughout the area.

Allen Avenue at the Site Driveway

In addition to the Morrill's Corner intersections, the site driveway improvements will also be upgraded to provide adequate access and egress from the site. Specifically the applicant will be providing the following roadway improvements:

- Widen Allen Avenue from Forest Avenue past the site driveway to a four-lane cross-section to Woodlawn Avenue. This will provide adequate vehicle storage and traffic operations for all traffic along Allen Avenue.

- Install a new traffic signal at the proposed site driveway location (just south of Woodlawn Avenue) to improve access into and out of the site during all periods of the day and to moderate traffic speeds along Allen Avenue.

- Upgrade and/or replace the current railroad crossing equipment along Allen Avenue and improve the signal pre-emption when the trains travel through the area. This will result in less gridlock occurring during the peak hours when the occasional train travel through the area as well as during off-peak hours.

- Provide new and upgraded pedestrian amenities including additional crosswalks, sidewalks (both on the proposed development's site and along Allen Avenue), and by including a pedestrian actuated signal crossing phase at the site driveway intersection to assist pedestrians that desire to cross Allen Avenue.

Traffic Demand Management (TDM) Plans

The project proponent will also implement a TDM program at the facility aimed at reducing the reliance of customers to travel to and from the site by automobile. Components of this plan will include (but are not limited to):

- The creation of over 1.5 miles of pedestrian walking trails and sidewalks on the site. These trails and sidewalks will be integrated into the surrounding Woodlawn Avenue neighborhood and will serve as both a recreational system as well as a means of walking between stores without needing to use a vehicle to travel within the site.

- The creation of an on-site bus stop for use by The Metro and other transit service options. This will serve to reduce the number of vehicle trips arriving and departing from the site as well as provide an opportunity to shop at the center for those customers who may not own a vehicle and/or cannot drive to a supermarket.

- Employing effective employee trip reduction techniques such as: promoting employee carpooling, providing bicycle amenities on the site, and distributing transit service amenity options to employees and visitors.

Conclusion

Implementation of the recommended on-site TDM measures and construction of the proposed site access and off-site roadway improvements will not only mitigate the expected project impacts, but will provide a net benefit to the traffic flow through the congested Morrill's Corner area and improve pedestrian and driver safety in the area.

The proponent is committed to these previously outlined project commitments that are expected to:

- Total approximately $1.5 million worth of off-site transportation and pedestrian improvements to the area roadways including a number of land takings and roadway capacity improvements.

- Provide upgraded pedestrian amenities throughout the Morrill's Corner area including both off-site improvements to sidewalks and pedestrian crossings as well as on-site amenities such as 1.5 miles of walking paths through the site.

- Improve or maintain the intersection and all approach levels of service (LOS) within the Morrill's Corner intersections to acceptable levels during the peak commuter hours.

- Upgrade outdated railroad crossings and improve traffic operations during those time periods when trains do cross through the area.

- Provide transit options for shoppers whereas these options are not readily available at other supermarkets in the region.

With these improvements in place, the traffic environment in the Morrill's Corner area will improve significantly during all periods of the day. These improvements will not only be designed to accommodate the development-related traffic, but will also be effective in reducing the vehicle delays such that the traffic operations at Morrill's Corner will improve beyond the current conditions – even with the project-related traffic on the area roadways.

1

Introduction

Vanasse Hangen Brustlin, Inc. (VHB) has been retained by Packard Development to evaluate the traffic impacts associated with the proposed development of a shopping, office and residential community located on a largely vacant site, which is currently home of Bruno's restaurant, Portland Bingo and Portland Boxing off of Allen Avenue in Portland, Maine. VHB has evaluated the existing traffic operations in the area, assessed both the short-term and long-term impacts of the proposed development program, and has identified specific roadway improvements necessary to accommodate both existing and future traffic growth in the area. In addition to the physical roadway improvements, specific traffic demand management actions are also identified to minimize the impact of motorized vehicles on the area roadway network and to enhance the pedestrian environment throughout the Morrill's Corner area. This traffic impact and access study was prepared in accordance with the City of Portland's traffic guidelines and in cooperation with the City of Portland Traffic Engineering Department and the Maine Department of Transportation (Maine DOT).

Project Description

The proposed development will be located on a 20.2-acre site bounded by residential properties to the east (including the 'paper street' known as Princeton Street), Allen Avenue to the south, and the Guilford railroad line to the west, and industrial properties to the north. The location of the redevelopment is in the heart of the Morrill's Corner area in the western portion of the City of Portland, Maine and is shown in Figure 1. In general, the proposed project involves the construction of approximately 128,100 sf of new retail space, 2,500 sf of office space and 48 units of residential properties on the 20.2-acre site along with other supporting uses that are intended to compliment the primary retail uses proposed for the site. A more descriptive summary of the proposed land uses is provided in Table 1 below.

It should be noted that the site is located within the City of Portland's Urban Compact Zone and, therefore, the City of Portland has delegated review authority of this traffic study. At the request of the City and Maine DOT, a copy of this report will also be forwarded to the Maine DOT for their review as well.

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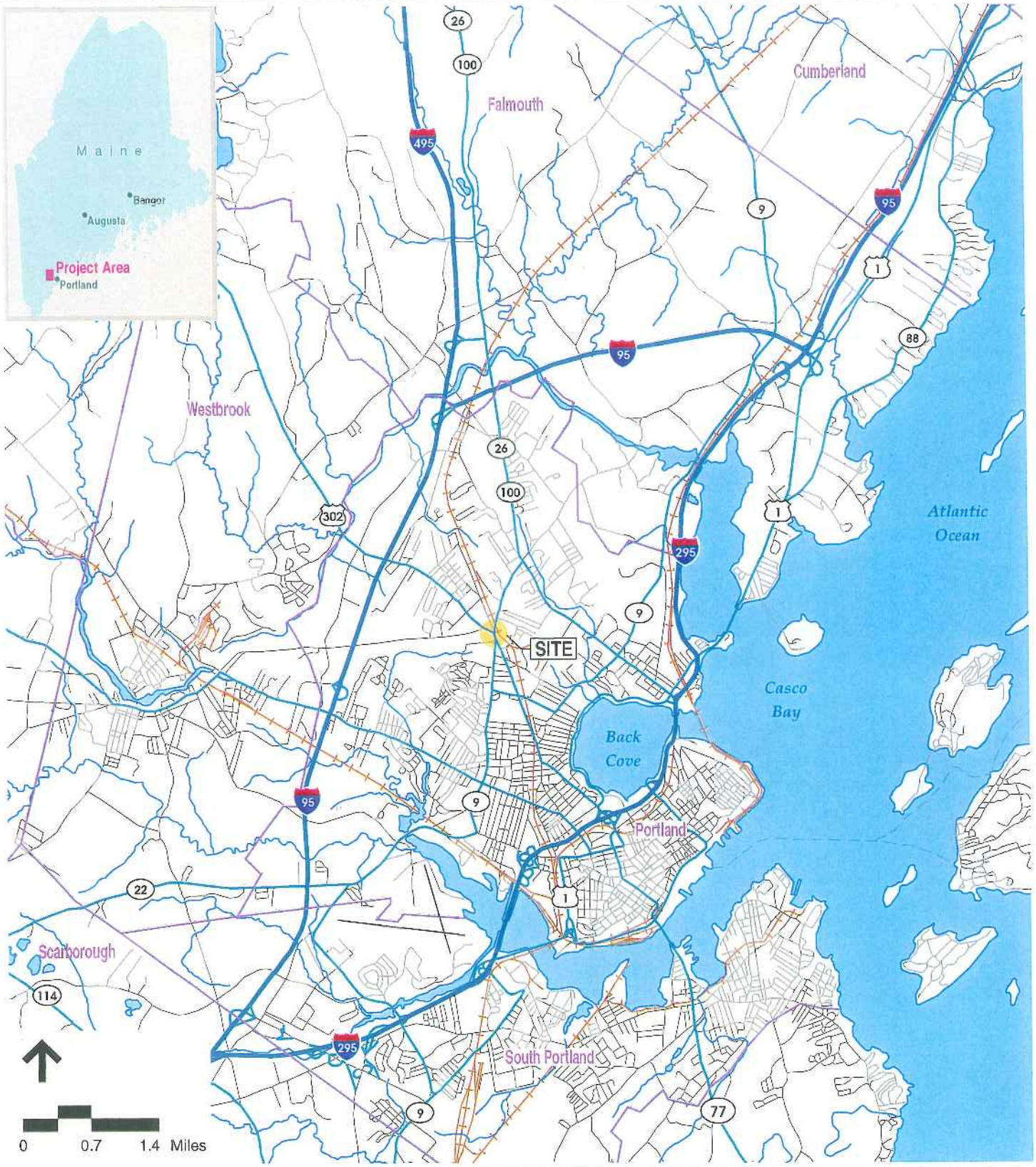

Site Location Map

Figure 1

Table 1
Proposed Land Uses

Proposed Land Use	Size
Supermarket	65,800 sf [a]
Ancillary Support Retail Space	62,300 sf [b]
Total New Retail Floor Area	**128,100 sf**
General Office Space	**2,500 sf**
Residential Units	**48 units**

a does not include 5,624 sf of non-sale mezzanine space
b spread over five buildings

In addition to this new development detailed above, the existing athletic boxing club currently located on the site will be relocated to a new facility in the rear of the site. The existing 3,500-sf Bruno's restaurant and its 3,500 sf of second story office space will also remain on the site in its current location. The bingo hall, which currently seats up to 500 participants on a nightly basis, will no longer remain on the site.

The renovated boxing club space will serve to enhance these current uses and will provide improved facilities for users. Specifically, the new building will provide state-of-the-art athletic facilities for the boxing club and office space for day-to-day operations. It is envisioned that the club will host boxing matches, from time to time, as it currently does.

The Site and Its Environs

The site encompasses approximately 20.2 acres of disturbed, but generally undeveloped land located off of Allen Avenue. Currently, the site contains an existing and operational restaurant, bingo hall, and athletic boxing club. While the site is currently zoned as Commercial Business, Residential, and Industrial-Low Impact, the developer will be seeking to rezone the site as part of this proposal.

Access to the site is provided via Allen Avenue. Stevens Avenue and Warren Street both provide additional local access to the site, through the Morrill's Corner intersections. No direct public vehicle access between the project site and the abutting neighborhoods is provided as part of this development proposal.

Site Access and Parking

Primary access to the site is proposed through a three-way signalized intersection located along Allen Avenue approximately 625 feet north of Forest Avenue. To facilitate signalized access at this intersection, the proposed traffic signal will be

coordinated with the existing traffic signal system at the Morrill's Corner intersections.

Currently, the site provides several, un-striped parking spaces dispersed around the site to support the existing uses. With the proposed redevelopment of the site, approximately 623 parking spaces are planned to support the proposed development program. A conceptual site development plan is shown in Figure 2.

Study Methodology

This traffic assessment was conducted in three phases. The first phase consisted of an assessment of existing traffic conditions in and around the proposed redevelopment area and included a review of existing roadway geometry, observations of traffic flow, daily and peak period traffic counts, and a review of traffic safety in this area.

The second phase of the study built upon the database assembled in the first phase and established the framework for evaluating the transportation impacts of the proposed project. In this phase, specific travel demand forecasts for the project were assessed along with future traffic demands on the study area roadways due to projected traffic growth that will occur independent of the proposed redevelopment. The year 2009, the expected completion date of the project, was selected as the design year for analysis for the preparation of this traffic impact and access study. The traffic analysis conducted in the second phase identifies both existing and projected future roadway capacities in addition to pertinent traffic safety issues.

The third and final phase of the study identifies, describes, and analyzes potential measures to improve existing and future traffic operations and to mitigate the traffic-related impacts associated with the proposed redevelopment project.

In accordance with standard guidelines for the preparation of traffic studies, the analysis of the future impacts includes those roadway improvements and development projects that are planned for the area, but not yet constructed.

Study Area

The study area includes those locations that could be affected by the proposed project and was determined based on discussions with the City of Portland, a review of the Maine DOT criteria for selection of study area intersections[1] and in review of the likely impacted traffic locations. Based on this assessment, the study area generally includes the following roadways serving the area:

[1] Traffic Movement Permit; State of Maine, Department of Transportation, Traffic Engineering Division; April 2000.

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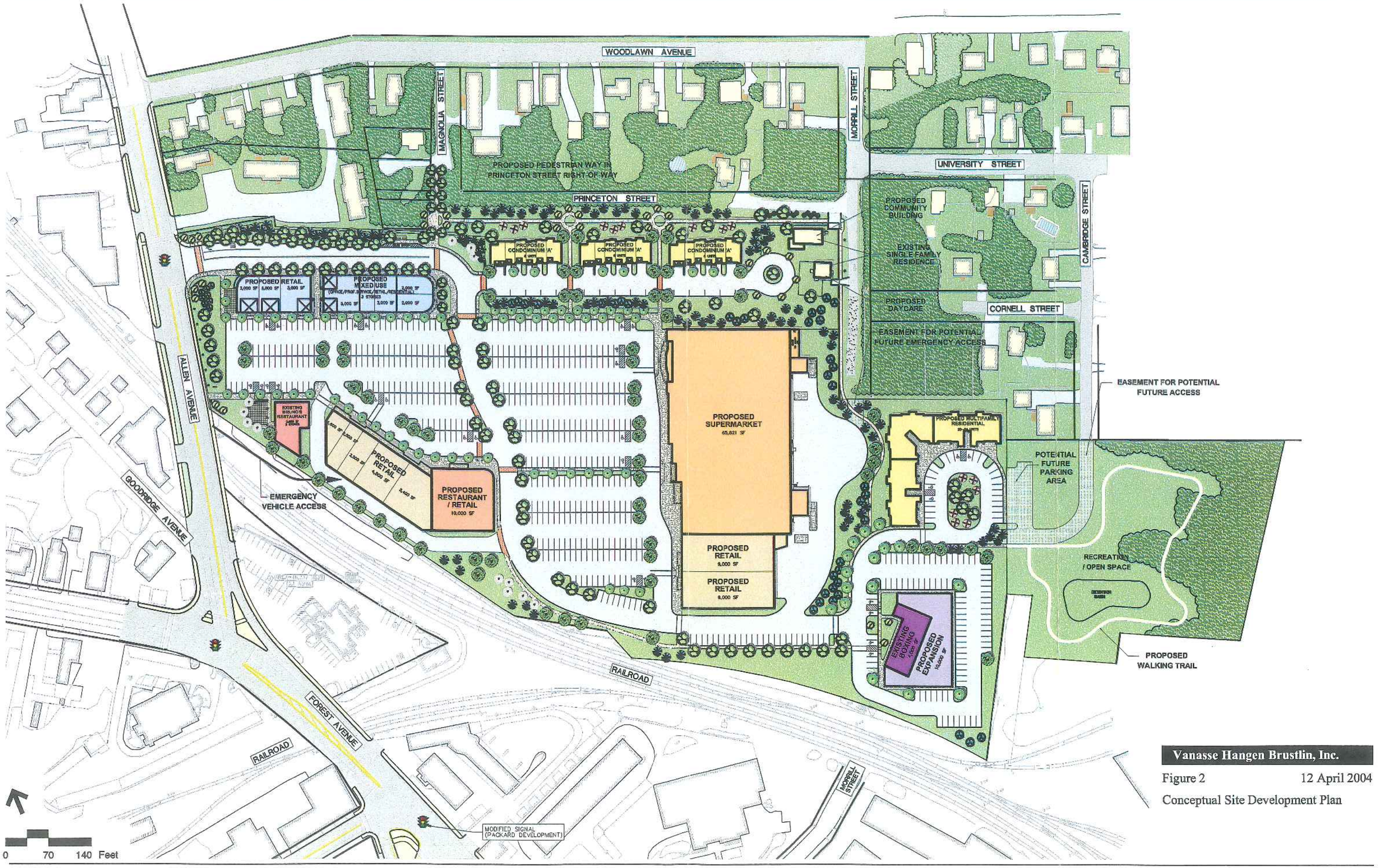

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Figure 2 12 April 2004

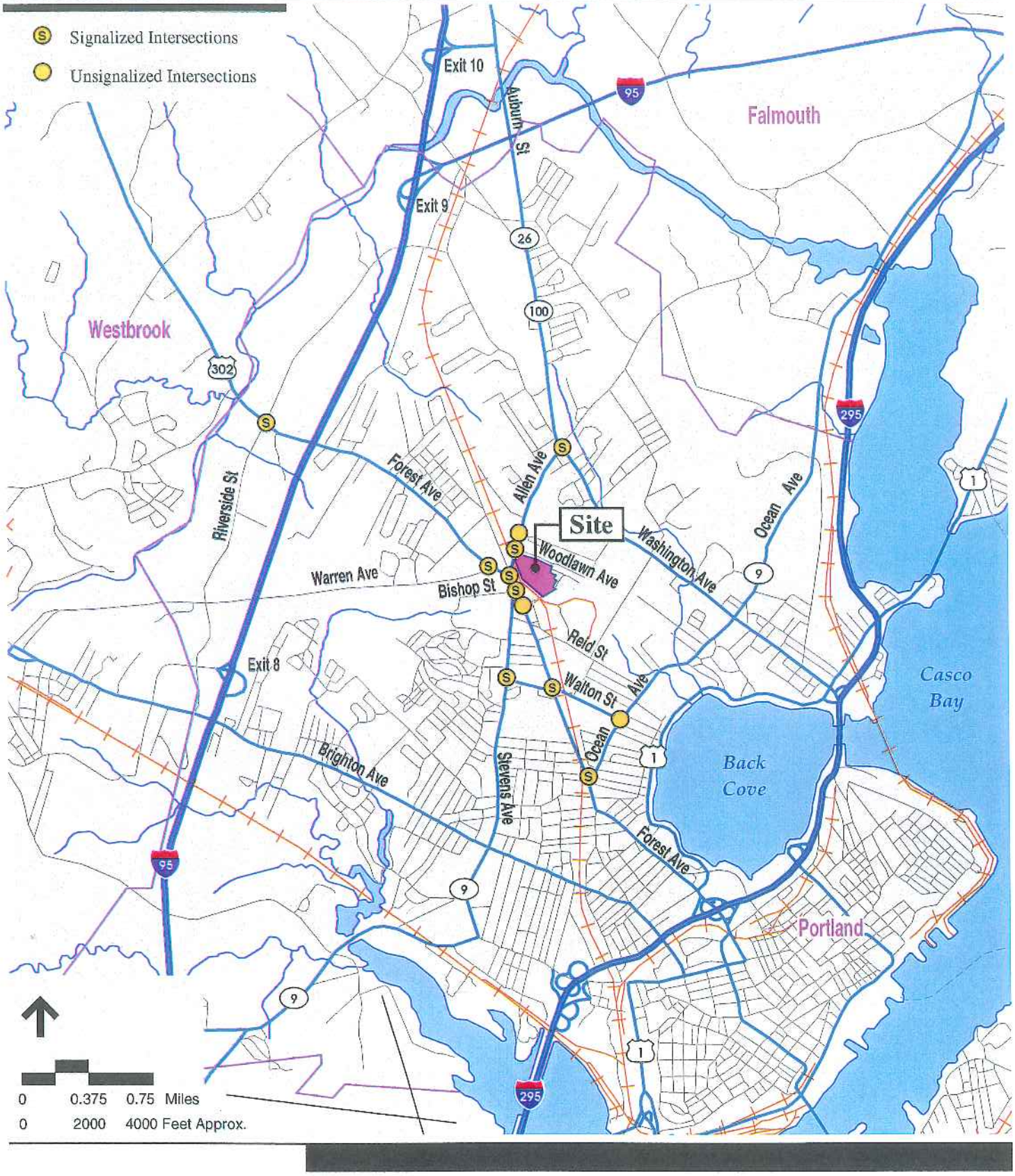
Conceptual Site Development Plan

- Forest Avenue
- Stevens Avenue
- Riverside Avenue
- Ocean Avenue
- Allen Avenue
- Washington Avenue
- Walton Street

Within these boundaries, the specific study area encompasses twelve specific intersections (9 signalized and 3 unsignalized), and are identified below:

- Forest Avenue at Riverside Street (signalized)
- Forest Avenue at Warren Avenue (signalized)
- Allen Avenue at Washington Avenue (signalized)
- Walton Street at Ocean Avenue (unsignalized)
- Forest Avenue at Ocean Avenue (signalized)
- Stevens Avenue at Walton Street (signalized)
- Forest Avenue at Walton Street (signalized)
- Forest Avenue at Morrill Street (unsignalized)
- Forest Avenue at Stevens Avenue/Bishop Street (signalized)
- Forest Avenue at Allen Avenue (signalized)
- Allen Avenue at Woodlawn Avenue (unsignalized)
- the future intersection of Allen Avenue at proposed site driveway (signalized)

Figure 3 graphically illustrates these intersection locations in respect to the site.



Study Area Locations Figure 3

2

Existing Conditions

Effective evaluation of the transportation impacts associated with the proposed redevelopment project requires a thorough understanding of the existing transportation system in the project study area. In order to determine a basis for evaluating the transportation impacts of the proposed redevelopment, the existing roadway system and traffic flow characteristics in the vicinity of the site were reviewed in detail. The existing transportation conditions in the study area include an inventory of roadway geometry and traffic control devices, the collection of daily and peak hour traffic volumes and observations of traffic flow, and a review of recent traffic safety data within the study area. A summary of the pertinent information is presented in this section.

Roadway Network

There are a number of major and minor roadways and intersections serving the site. The principal roadways and intersections within the study area are described briefly in the following section. Detailed descriptions of the roadways and intersections are located in the Appendix to this report.

Roadway Jurisdiction

According to Maine DOT roadway classification data, the roadways in the immediate vicinity of the project site are comprised of primary state-owned roadways and local urban/secondary roadways. Figure 4 illustrates the local roadway network and corresponding jurisdiction in the area.

As shown, Route 302/100 (Forest Avenue) is a primary, state-owned roadway that runs to and from the north/northwest and south within the vicinity of the site. The posted speed limit in this area is 35 miles per hour (mph). Similarly, Allen Avenue (Route 100), from Forest Avenue to Washington Avenue, Auburn Street, and Brighton Avenue are also a primary state-owned and maintained roadways. Stevens Avenue and Ocean Avenue are state-aided local roadways. The remaining roadways that fall within the study area are classified as local urban and/or secondary roadways. These

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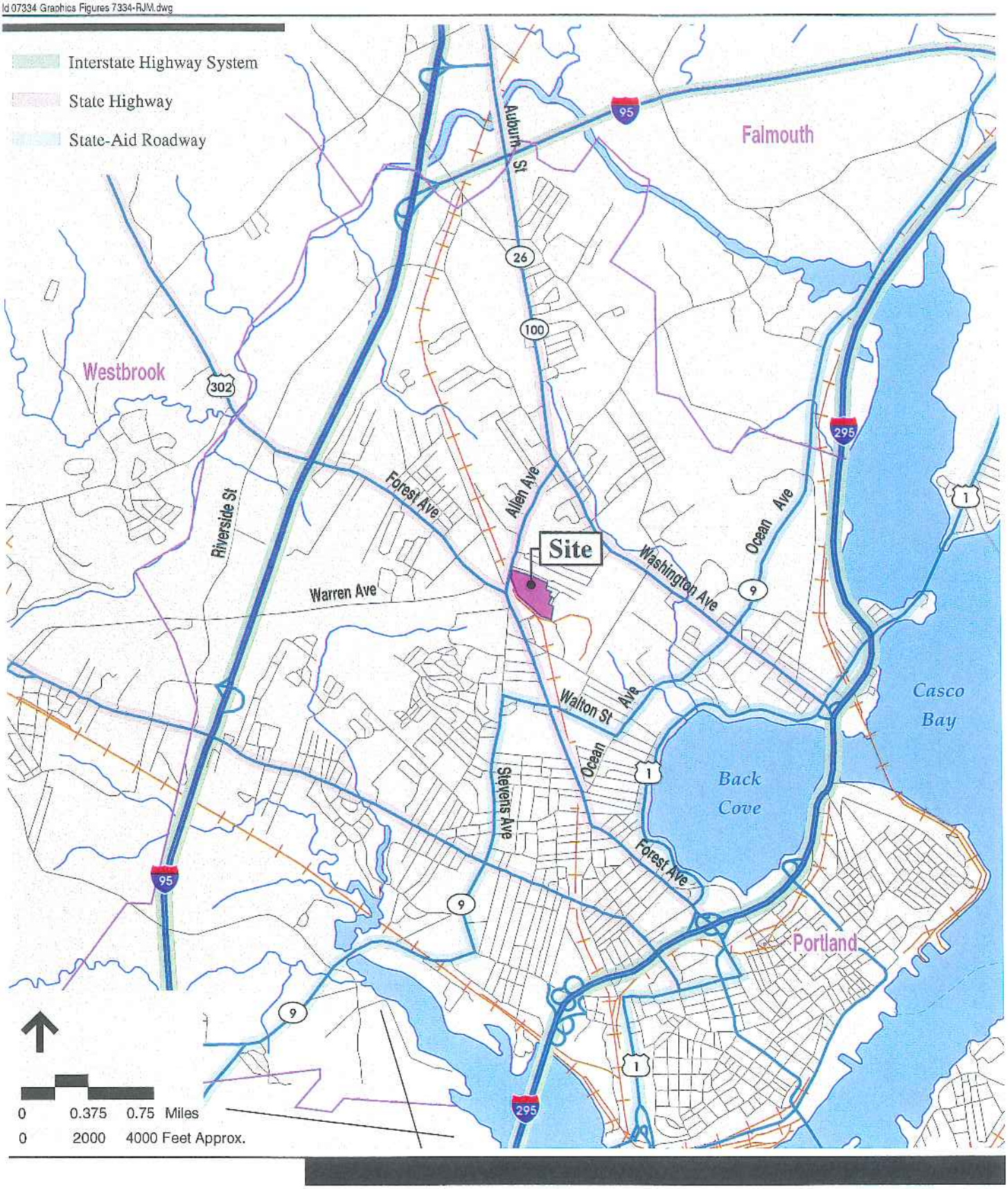


Roadway Jurisdiction Map Figure 4

roadways include Woodlawn Avenue, Warren Avenue, Bishop Street, Morrill Street, and Walton Street. Figure 5 illustrates the observed lane use at key locations within the study area. As noted previously, the intersections and roadways are described in detail in the Appendix.

Traffic Volumes

Traffic movement data for the study area were initially collected by VHB in May 2004. Manual turning movement and classification (TMC) counts were conducted at the twelve study area intersections during peak retail shopping activity periods, which include the weekday evening peak period (4:00 PM - 6:00 PM) and during the Saturday midday peak period (11:00 AM - 2:00 PM). In addition to the TMCs, automatic traffic recorder (ATR) counts were conducted at six locations. The TMC and ATR count data is included in the Appendix and is summarized in Table 2.

Table 2
Existing Traffic Volumes

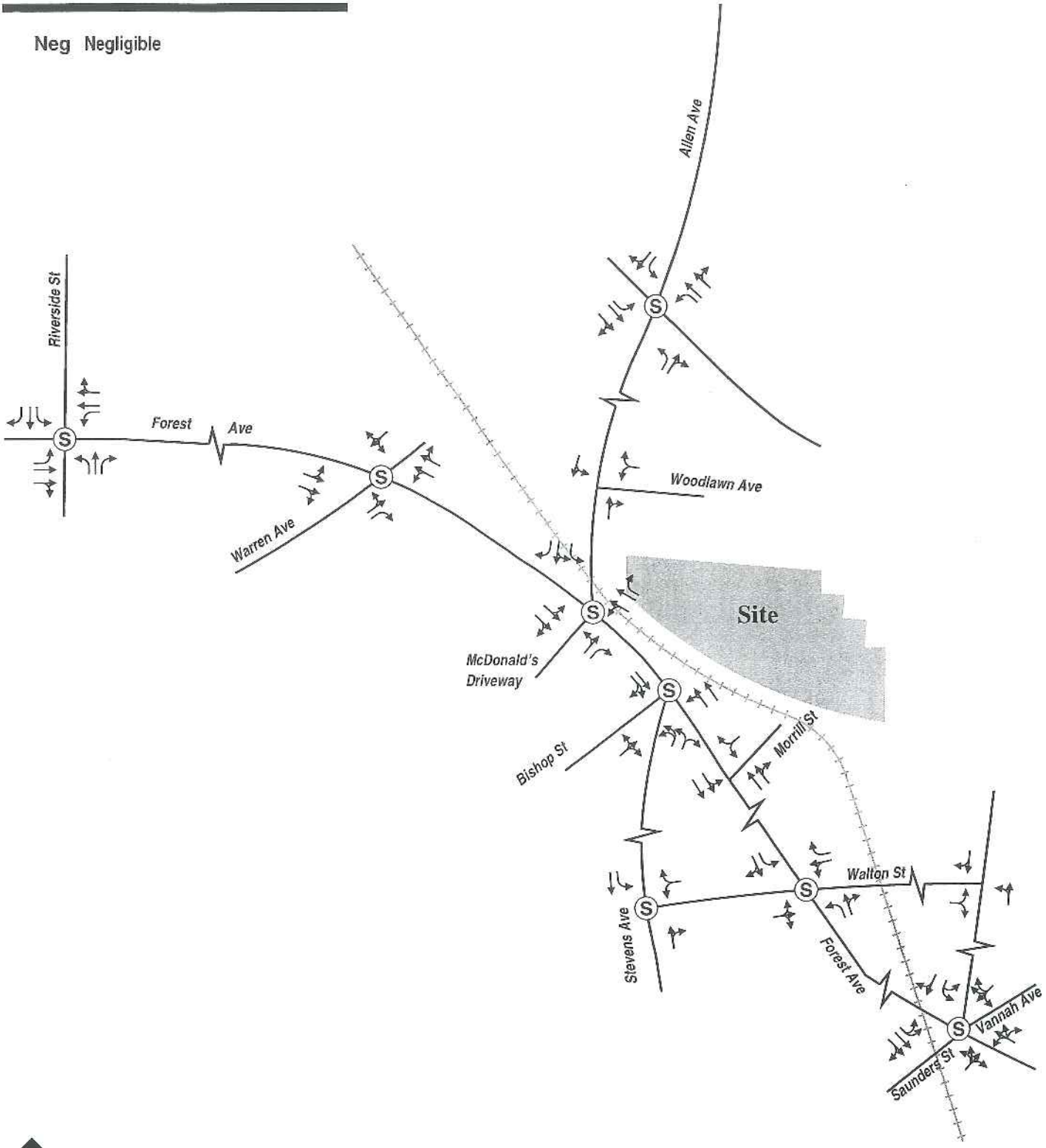
	Daily		Peak Hour					
			Weekday Evening			Saturday Midday		
Location	Weekday (vpd) [a]	Saturday (vpd) [a]	Volume (vph) [b]	'K' Factor [c]	Predominant Flow	Volume (vph) [b]	'K' Factor	Predominant Flow
Forest Avenue, northwest of Allen Avenue [d]	32,500	26,100	2,330	7.2%	57% WB	1,990	7.6%	51% WB
Stevens Avenue, south of Forest Avenue	11,500	9,300	910	7.9%	52% SB	760	8.2%	53% NB
Warren Avenue, south of Forest Avenue	15,400	12,200	1,070	6.9%	54% NB	1,100	9.0%	53% NB
Allen Avenue, south of Plymouth Street	20,700	19,200	1,460	7.1%	51% SB	1,480	7.7%	54% SB
Forest Avenue, east of Avalon Road	22,900	17,700	1,850	8.1%	59% WB	1,200	6.8%	53% WB
Forest Avenue, southeast of Allen Avenue	35,900	27,600	2,700	7.5%	61% WB	1,990	7.2%	53% NB

Source: automatic traffic recorder (ATR) counts conducted by VHB, Inc. in May 2004
a daily traffic expressed in vehicles per day
b peak hour volumes expressed in vehicles per hour
c percent of daily traffic that occurs during the peak hour
d Due to a technical issue with the traffic counters, the traffic volumes for Forest Avenue are presented based on August 2001 data.
NB, SB northbound, southbound
EB, WB eastbound, westbound
Note: peak hours do not necessarily coincide with the peak hours of the turning movement counts shown on the figures.

As shown in Table 2, the average weekday daily traffic volume along Allen Avenue in front of the proposed site is approximately 20,700 vehicles per weekday. During a Saturday, this volume drops to approximately 19,200 vehicles per day along the roadway. Forest Avenue entering the Morrill's Corner area carries approximately 35,900 daily vehicles during a weekday with approximately 27,600 Saturday daily vehicles.

As would be expected of a commuter route between the City of Portland and the surrounding western suburban area, approximately 61 percent of the traffic along Forest Avenue during the morning peak hour is heading into Portland while approximately 53 percent of the traffic is traveling outbound from the City during the evening commuter peak hours.

Neg Negligible



Not to Scale

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Observed Lane Use
(2001 Conditions)

Figure 5

Design Hour Determination

In conformance with the Maine DOT traffic impact guidelines, the existing traffic volumes collected at the study area intersections and roadways are required to be adjusted to represent the design hour for traffic analysis. The design hour, as specified by Maine DOT, is the 30th highest hour traffic volume adjacent to the site. The determination of the design hour is a two-step process. First, the most critical time period for the specific development is selected. This is determined by comparing weekday and Saturday peak hour traffic impacts of the development on the adjacent streets. Once the critical hours have been selected, the traffic volumes are adjusted to the 30th highest hourly volume using the adjustment factors provided by Maine DOT.

At the request of the City of Portland, both weekday evening peak hour and Saturday midday traffic volumes were collected and projected to a design condition. While traffic volumes along the roadways are generally higher in the weekday evening peak commuter periods, the traffic generation of the site is slightly greater during the Saturday peak periods. Therefore, two design hour conditions (weekday evening and Saturday midday) have been selected and evaluated as part of this study.

The next step adjusts the observed traffic volumes to thirtieth highest (design) hour volume levels using the Maine DOT's 2002 Weekly Group Mean Factors[2]. According to Maine DOT, the study area roadways fall under the Urban Group classification. The 30th highest hour for this classification is the peak hour occurring during the third week of July. The traffic counts for this project were conducted during the third week of May, when the traffic volumes are approximately five percent lower than the design hour condition. Therefore, because the traffic volumes were collected during a period when traffic volumes were lower than the 30th highest hour, these traffic volumes were adjusted upward to represent a conservative assessment of the 30th highest design hour for the project. The exact methodologies used in the determination of the design hour are provided in the Appendix to this report.

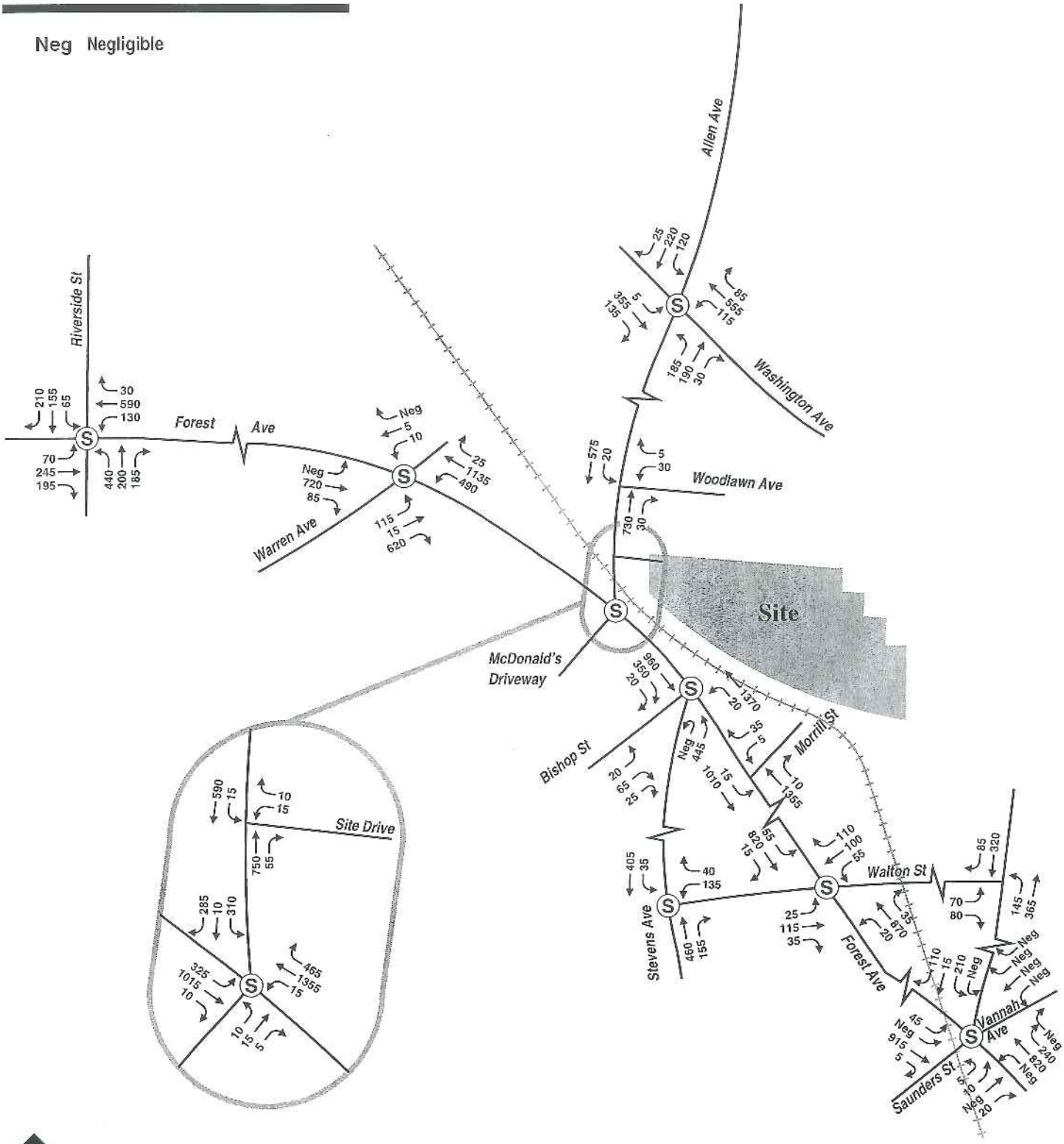
In addition, there is generally some fluctuation between "summertime" traffic volumes and "non-summertime" traffic volumes on the roadways in this study area. Since the traffic counts were performed during the school year in May 2004, these volumes represent a condition where the traffic volumes are projected to be July conditions and also include traffic associated with non-summertime uses (such as school traffic). The resulting existing weekday evening and Saturday midday design hour traffic volume networks are summarized in Figures 6 and 7, respectively.

Pedestrian Amenities

There are scattered pedestrian amenities throughout the study area in various

[2] Traffic Volume Counts: 2002 Annual Report; Maine Department of Transportation; Department of Transportation and Traffic Engineering; pp. 8-10.

Neg Negligible



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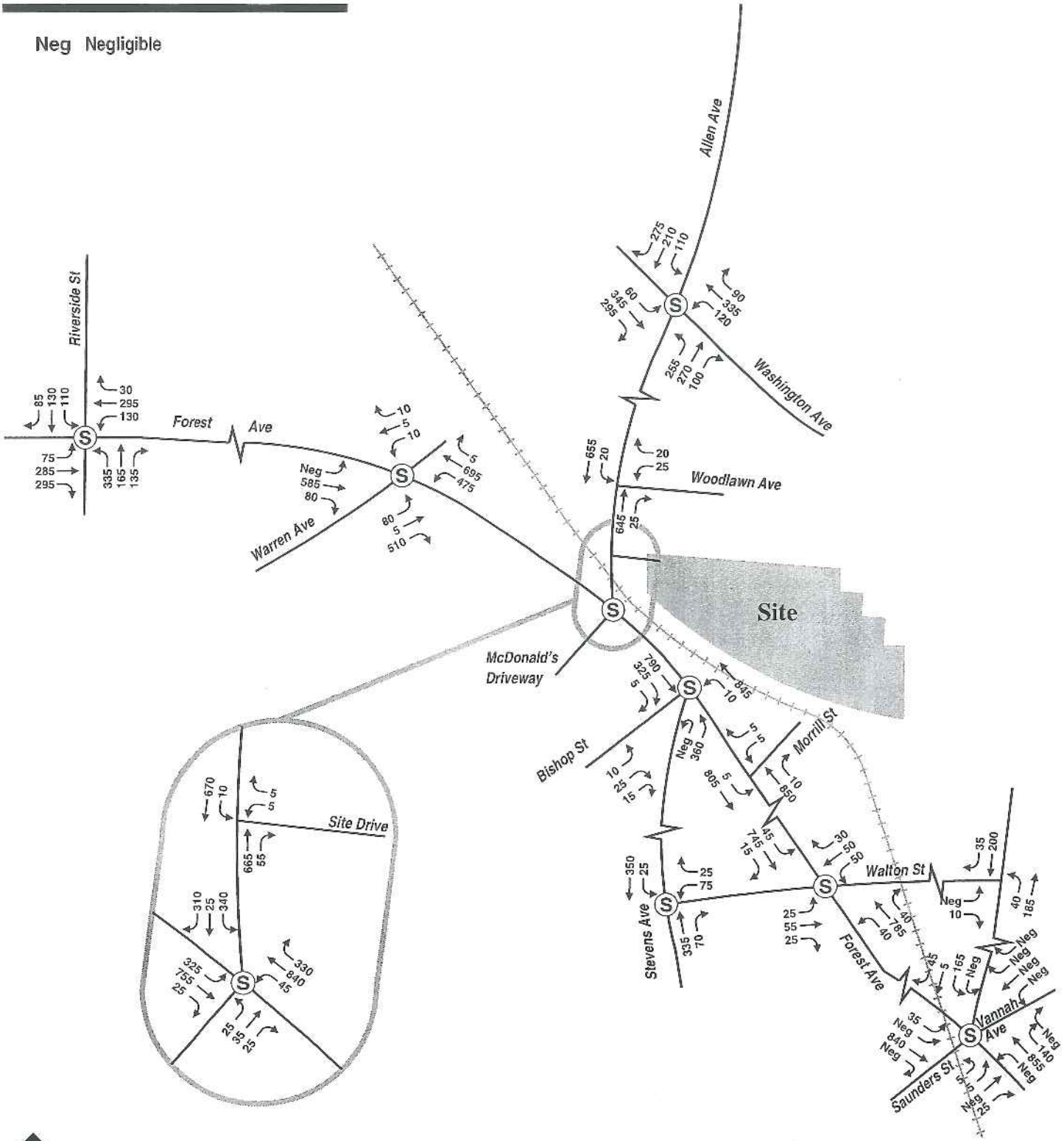
2004 Existing
Weekday Evening Peak Hour
Traffic Volumes

Figure 6

Neg Negligible



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2004 Existing
Saturday Midday Peak Hour
Traffic Volumes

Figure 7

conditions serving the needs of the businesses and residential properties. Immediately adjacent to the site, it was noted at a few intersections that wheel-chair ramps and pedestrian push buttons did not meet the Americans with Disabilities Act (ADA) standards. In some locations, the pedestrian push buttons did not function, thereby not providing a signal-protected crossing for pedestrians attempting to use that crosswalk.

Additionally, there are several areas where school bus and METRO transit bus service pick up locations are located on the opposite side of the roadway from the residential neighborhoods.

Pedestrian activity was noted to be minimal during the majority of the day, however the morning and evening peak commuter hours did exhibit some volume of pedestrian activity throughout the Morrill's Corner area as people were waiting for commuter/school buses or were walking to or from the schools along Stevens Avenue. In general, the current pedestrian accommodations would be benefited by an upgrade of some pedestrian amenities within the area. Chapter 5 (Transportation Improvements) suggests a number of area-wide improvements aimed at upgrading the current pedestrian and transit services to the region.

Railroad

The current site driveway access on Allen Avenue is located adjacent to the existing grade crossing of Allen Avenue and a mainline track owned by Guilford Rail Systems (GRS). Activity along this track consists of two to four trains per day on average. From time to time, additional 'unscheduled' trains use this corridor as well. The current driveway for the proposed development is located directly north of the existing at-grade crossing. The current configuration of the two-gated grade crossing does not protect the driveway exits from making a left turn onto the crossing during a train movement, even when the gates are down.

Additionally, there is an at-grade crossing over Forest Avenue between Allen Avenue and Stevens Avenue that reduces the efficiency of the intersection operations due to the tracks being in the street. While this line is essentially not in use, it is used on a very sporadic basis according to the area merchants. The crossing equipment at this location is out of date and in need of upgrade should trains continue to use this line in the future.

It was also noted that when trains travel through this area, the current pre-emption between the crossing equipment and the traffic signals shuts down all the approaches to the Morrill's Corner intersections. This is specifically detrimental to traffic flow through the area as it does not permit traffic to flow along the unaffected portions of Forest Avenue during this time. Discussions with area merchants and regulatory authorities suggested that it takes up to eight to ten signal phases to clear up the traffic gridlock created when a train travels through the area.

Suggestions are provided in Chapter 5 (Transportation Improvements) aimed at improving both the safety of the railroad crossings as well as their inter-coordination with the current and proposed traffic signals in the area.

Public Transportation

The Greater Portland Transit District currently provides local bus service within Portland, Westbrook, and Gorham. Four of the eight bus routes provided are within the study area. All of the bus routes offer service to and from Downtown Portland at the Metro Pulse Area. Weekday hours of operation are usually from 6:00 AM to 10:00 PM, except for certain routes when service runs until midnight.

- **Bus Route #2 (Riverton)** runs along Forest Avenue from Riverton Park and Pride's Corner in Westbrook to the Metro Pulse Area in downtown Portland. This bus route runs on 15-minute headways.

- **Bus Route #3 (North Deering)** runs in front of the project site along Auburn Street, Allen Avenue, Stevens Avenue, and Congress Street. This bus route runs approximately every 30 minutes.

- **Bus Route #4 (Westbrook – Exit 80)** travels from Main Street in Westbrook, Maine to Downtown Portland via Brighton Avenue and/or Woodford Street. The bus run varies from 20 to 30 minutes, depending on its intended route.

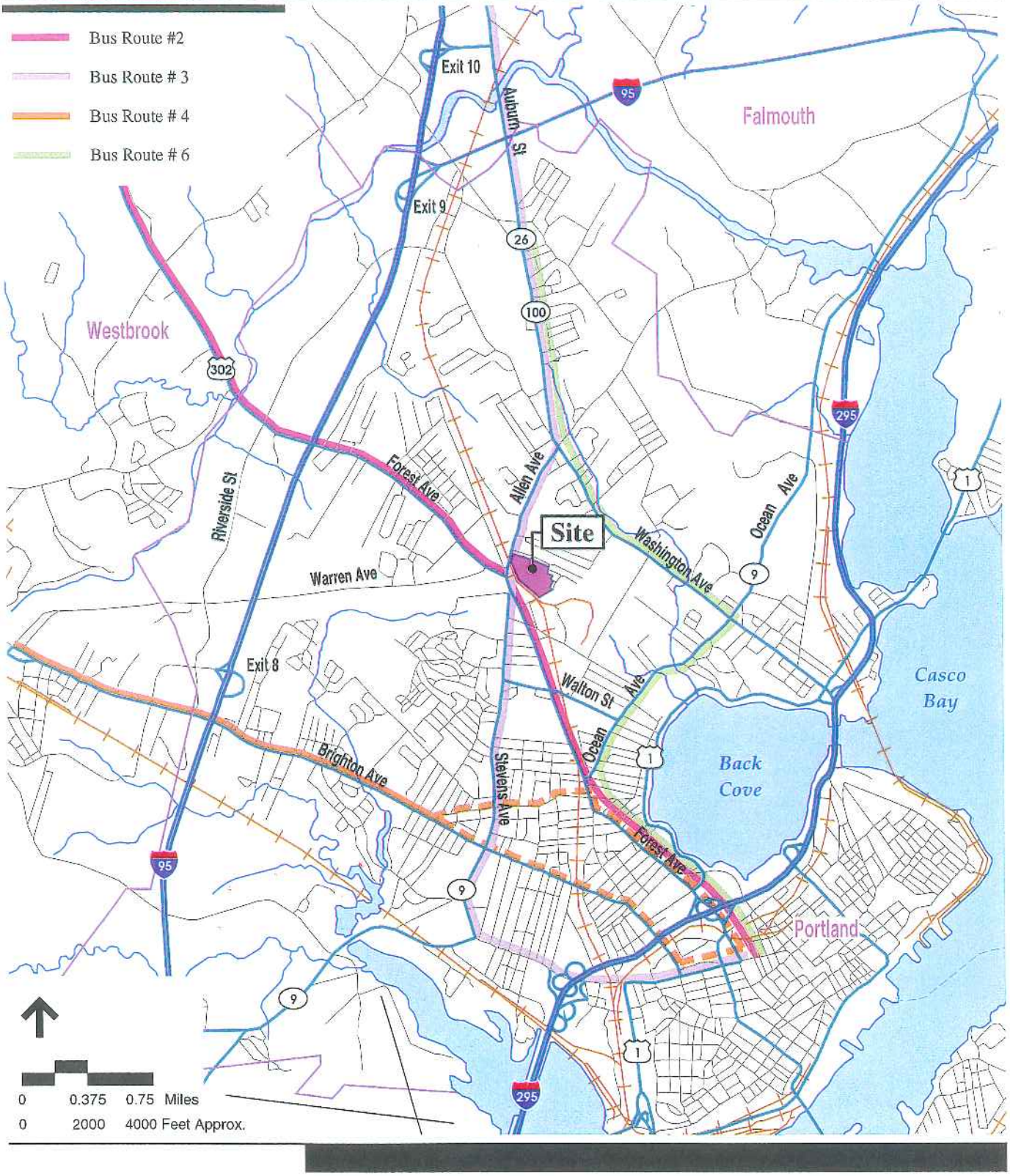
- **Bus Route #6 (North Deering)** travels along Washington Avenue from Lambert Street to downtown Portland. The bus runs are approximately every 30 minutes.

Figure 8 illustrates the above-mentioned bus routes. Suggestions for coordination with the METRO service are made in Chapter 5 (Transportation Improvements) aimed at providing a bus stop within the proposed development site.

Vehicle Crash History

The next step in the evaluation of the existing traffic conditions in the vicinity of the project site is to perform a detailed safety evaluation of the study area locations. This evaluation consisted of compiling and analyzing crash data and reviewing the existing roadway geometry for design deficiencies.

The Maine DOT provided the records of crashes occurring in the study area for the most recent 3-year period available (from 2000 to 2002). The Maine DOT's traffic crash database analyzes statewide crash data on a three-year basis. The database calculates actual crash rates for every highway link and intersection on state highways. Also calculated is an 'expected crash rate' for each location based upon the type of highway or intersection, the traffic volume, and the vehicle miles of travel on



Area Bus Routes Figure 8

the highway. The ratio of the actual crash rate to the expected crash rate is then calculated and referred to as the critical rate factor (CRF). If this ratio is higher than 1.0, then the rate of crash occurrence at that location is said to be 'higher than expected.' As a first level screening, if a location has a CRF greater than 1.0 ('higher than expected') and eight or more crashes have occurred at the location over the three-year period, the location meets the criteria to be placed on Maine DOT's List of High Crash Locations (HCL). Locations with a CRF greater than 2.0 on the HCL List and appear to have a correctable crash pattern are prioritized for further investigation and funding of future safety improvement projects.

Intersections

A summary of the accident frequency and the calculated CRFs for the study area intersections and roadway links is presented below in Table 3 and is shown graphically in Figure 9.

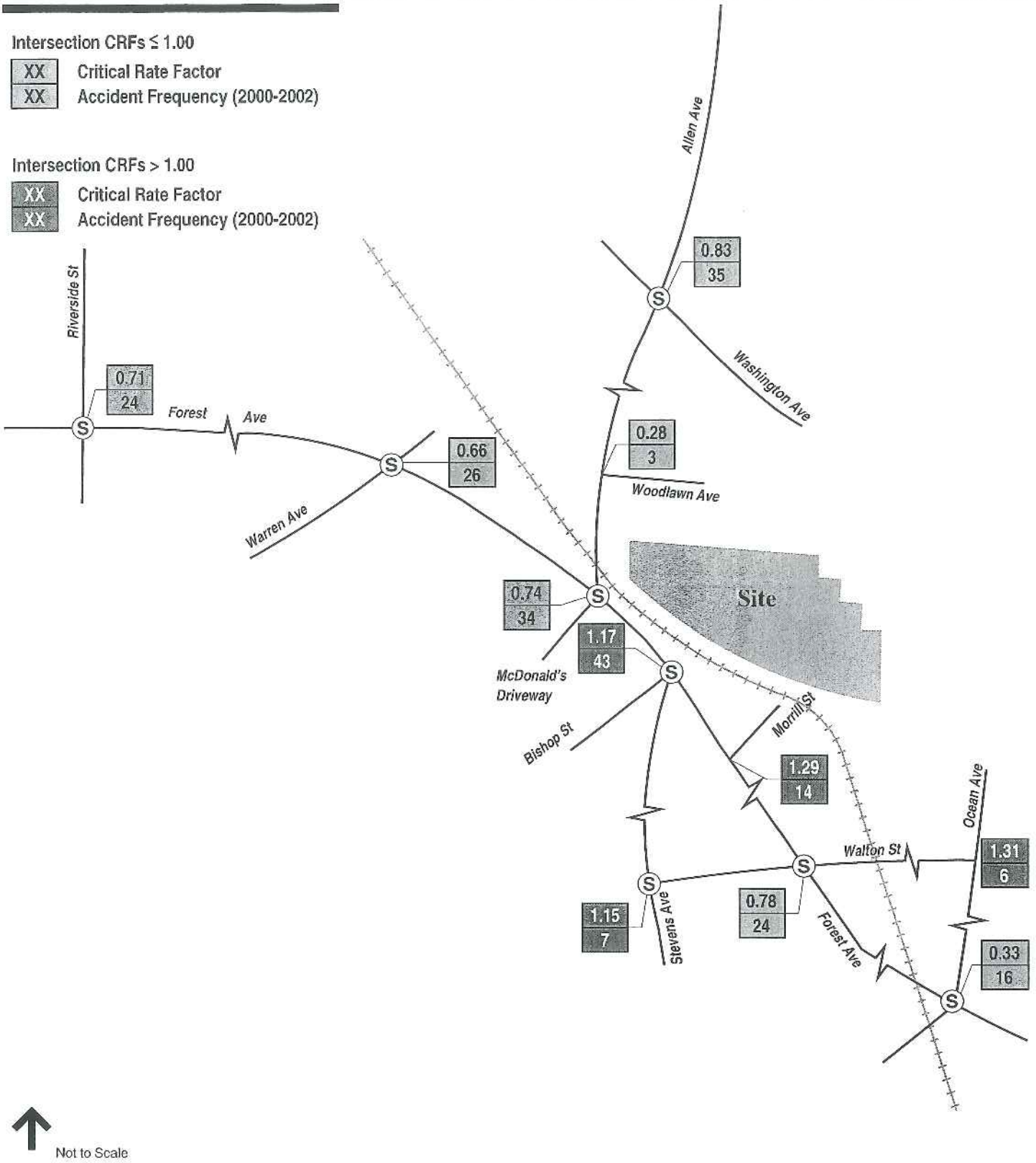
Table 3
Vehicle Crash Summary – Intersections

Intersection	2000 – 2002 Total Crashes	Crash Rate (Actual)	Critical Rate (Expected)	Critical Rate Factor [a]
Forest Avenue at Riverside Street	24	0.74	1.04	0.71
Forest Avenue at Warren Avenue	26	0.67	1.01	0.66
Allen Avenue at Washington Avenue	35	0.82	0.99	0.83
Walton Street at Ocean Avenue	**6**	**0.59**	**0.45**	**1.31**
Forest Avenue at Ocean Avenue	16	0.46	1.40	0.33
Stevens Avenue at Walton Street	**7**	**0.47**	**0.41**	**1.15**
Forest Avenue at Walton Street	24	0.82	1.05	0.78
Forest Avenue at Morrill Street	**14**	**0.49**	**0.38**	**1.29**
Forest Avenue at Stevens/Bishop	**43**	**1.19**	**1.02**	**1.17**
Forest Avenue at Allen Avenue	34	0.73	0.98	0.74
Allen Avenue at Woodlawn Avenue	3	0.11	0.39	0.28

Source: Maine DOT
a (Actual Crash Rate) / (Intersection Critical Rate) = Critical Rate Factor

As Table 3 shows, there are four intersections that could be classified as safety-deficient locations within the study area. The intersections of Walton Street at Ocean Avenue, Stevens Avenue at Walton Street, Forest Avenue at Morrill Street, and Forest Avenue at Stevens Avenue/Bishop Street each exhibited a CRF greater than 1.00. The high CRF at Forest Avenue at Stevens Avenue/Bishop Street is possibly attributable to its atypical geometry.

There are 6 intersections that experienced 24 or more crashes over the three-year period. While the data suggests that this is 'lower than expected' for roadway facilities of these types, VHB will work with the City to identify causes and potential improvements to these intersections as the process moves forward. Any impacts to these locations by the proposed project would be addressed as part of this project's advancement.



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Intersection Vehicle Crash Summary

Figure 9

Roadway Links

In addition to the isolated intersection evaluation, VHB reviewed data from Maine DOT that identified crash characteristics on the roadway links (roadway links between intersections, rather than at the major intersection).

Table 4 indicates sections of roadway links in the study area that exhibit critical rate factors that exceed 1.0 and experience eight or more crashes over the past three years. Each of the major roadways contains links that have a CRF that exceeds 1.00. The remaining roadway links in the study area (i.e., those not listed in Table 4) have CRFs below 1.00.

Table 4
Vehicle Crash Summary – Roadway Links

Segment	2000 – 2002 Total Crashes	Crash Rate (Actual)	Critical Rate (Expected)	Critical Rate Factor [a]
Forest Avenue, from Route 1 to Riverside Street	*292*	*326.65*	*220.84*	*1.48*
Between Baxter Boulevard and Bank Road	19	1716.35	471.70	3.64
Between Bank Road and Fenwick Road	6	547.95	473.02	1.16
Between Node 3081 and Falmouth Street	7	517.37	448.18	1.15
Between Noyes Street and Belmont Street	18	698.49	382.90	1.82
Between Clifton Street and Lincoln Street	4	818.00	582.38	1.40
Between Lincoln Street and Arlington Street	5	691.56	526.64	1.31
Between Arlington Street and Revere Street #2	8	563.78	442.82	1.27
Between Arbor Street and Morrill Street	14	685.27	404.66	1.69
Between Morrill Street and Bishop Street	10	656.17	434.95	1.51
Between Node 7289 and Allen Avenue	7	1866.67	622.30	3.00
Between Warren Avenue and Avalon Road	20	538.50	352.45	1.53
Between Riverton Drive and Riverside Street	16	1104.21	440.49	2.51
Walton Street, from Stevens Avenue to Ocean Avenue	*5*	*188.53*	*376.15*	*0.50*
Warren Avenue, from Forest Avenue to Cumberland Street	*83*	*200.93*	*250.34*	*0.80*
Between Newcomb Street and Node 6311	5	998.00	604.56	1.65
Allen Avenue/Auburn Street, from Forest Avenue to Lambert Street	*87*	*235.21*	*240.55*	*0.98*
Between Forest Avenue and Goodridge Avenue	4	966.18	607.29	1.59
Between Goodridge Avenue and Node 7447	6	581.40	480.29	1.21
Between Abbott Street and Washington Avenue	16	1137.17	443.77	2.56
Between Washington Avenue and Cypress Street	7	462.96	435.81	1.06
Stevens Avenue, from Brighton Avenue to Forest Avenue	*34*	*185.06*	*276.82*	*0.67*
Between Rackcliff Street and Mondtrose Avenue	1	925.93	828.53	1.12
Between Pleasant Avenue and Brentwood Street	3	740.74	638.01	1.16

Source: Maine Department of Transportation
a (Actual Crash Rate) / (Intersection Critical Rate) = Critical Rate Factor

3

Future Conditions

To determine the impacts of the site-generated traffic volumes on the surrounding roadway network, traffic volumes in the study area were projected to the year 2009, which reflects a five-year planning horizon. Independent of the proposed project, volumes on the roadway network under 2009 No-Build (without the project in place) conditions are assumed to include existing traffic, new traffic resulting from background traffic growth, and any traffic resulting from roadway improvements that might adjust traffic patterns through the area. Anticipated site-generated traffic volumes were superimposed upon the 2009 No-Build traffic volume networks to reflect the 2009 Build (with the project in place) conditions within the project study area.

Area Roadway Improvements

In addressing future traffic conditions, proposed roadway improvements within the study area were considered. Based on discussions with representatives of the Maine DOT and the City of Portland, there is currently one major roadway improvement project scheduled in the vicinity of the proposed project site. There are also some minor roadway projects in the area that may affect travel patterns through the Canco Road neighborhood.

The potential impacts associated with the redevelopment project have been considered within the context of these roadway improvements. Should changes to the schedules or, more importantly, the construction of these improvements occur, this traffic study would need to be updated as it has been assumed that these improvements will be in place prior to this project moving forward. A description of the roadway improvements in the study area is provided below and also shown in Figure 10.

Morrill's Corner

Maine DOT, in conjunction with the City of Portland, has recently completed the majority of a widening project along Forest Avenue. This project widened Forest

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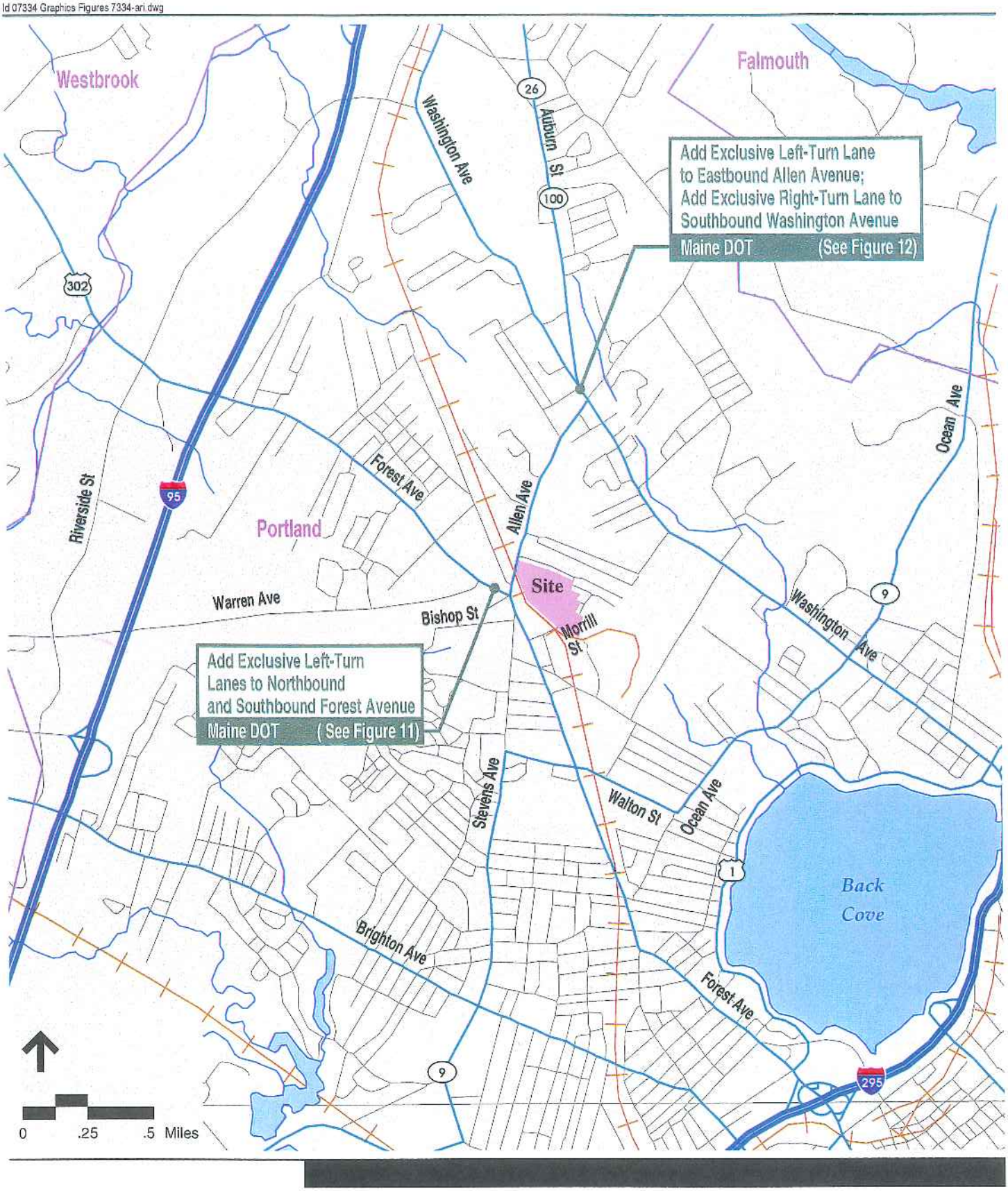

Area Roadway Improvements Figure 10

Avenue from its former 4-lane configuration to a 5-lane configuration between the intersections of Forest Avenue at Allen Avenue and Forest Avenue at Warren Avenue. The improvements consisted of widening Forest Avenue to accommodate northbound and southbound exclusive left-turn lanes at Allen Avenue and a northbound exclusive left-turn lane at Warren Avenue. Signal timing and phasing modifications and intersection improvements were also necessary as part of this project. The transportation improvement plan for the Morrill's Corner area is shown in Figure 11.

Based on discussions with the City of Portland Traffic Engineering Department and Maine DOT, the construction of this improvement is essentially finalized with only minor landscaping remaining. The project was completed in its entirety in the Fall of 2003.

Allen's Corner

In addition to the recently completed roadway improvements in the Morrill's Corner area, roadway improvements are being planned in the Washington Avenue at Allen Avenue area, more commonly referred to as "Allen's Corner". Improvements at this location will include roadway widening, signal upgrades, and pedestrian improvements associated with a project being completed through the City and the Maine DOT. The transportation improvement plan for the Allen's Corner area is shown in Figure 12.

The construction for this project is expected to be substantially completed in 2004 and have been included in future traffic analysis scenarios.

Background Traffic Growth

Traffic growth on area roadways is a function of the expected land development, economic activity, and changes in population demographics. Several methods can be used to estimate this growth. A procedure frequently employed by transportation engineers is to identify estimated traffic generated by planned site-specific developments that would be expected to impact the project study area roadways. An alternative procedure is to estimate an annual percentage increase and apply that increase to study area traffic volumes. For the purpose of this preliminary assessment, both methods were utilized.

Site-Specific Background Development

Traffic volumes in the area will be affected by nearby developments. To assess potential growth within the study area, representatives of the City of Portland and Maine DOT were contacted. Based on these discussions, two specific developments were identified that may influence traffic patterns near the project site. A discussion of each development follows.

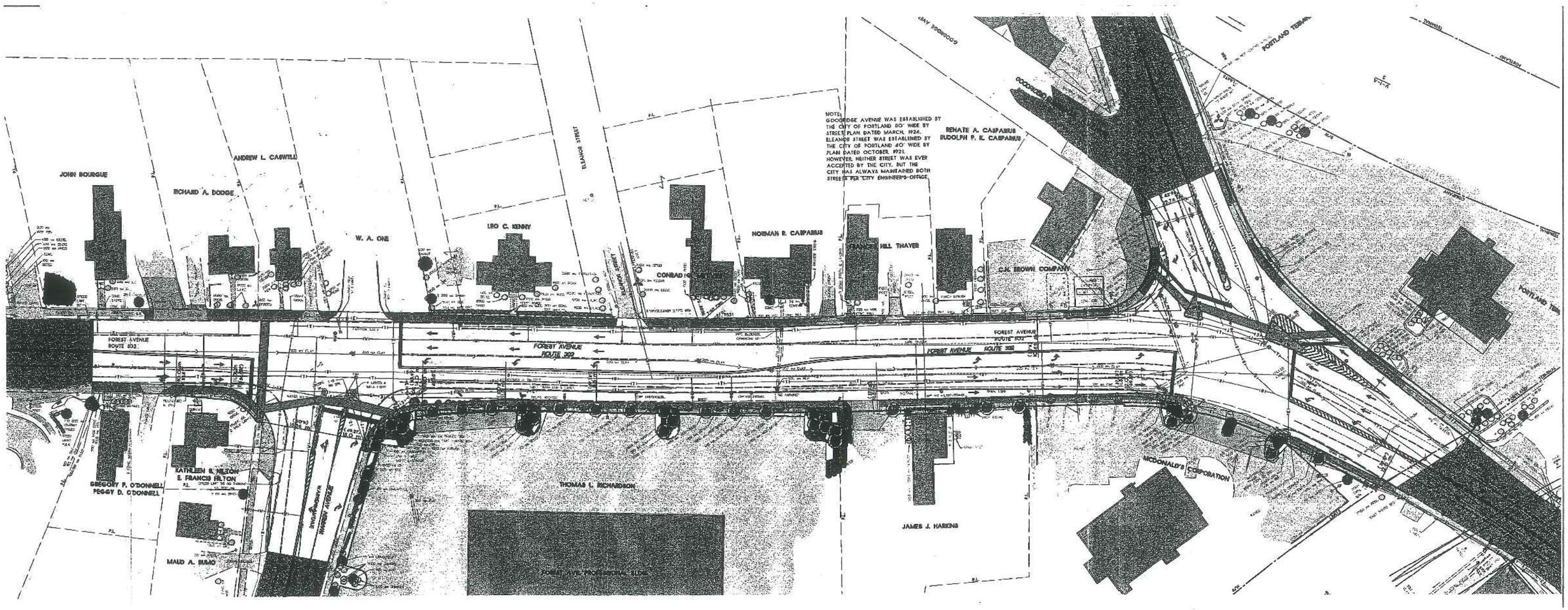

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Figure 11
Morrill's Corner
Transportation Improvement Plan

Source: City of Portland, ME

Apartment Complex

A planned 46-unit apartment complex is currently being considered on Forest Avenue between Interstate 95 and Riverside Street. Judging by its proximity to I-95, the City anticipates that trips generated by this development are likely to be distributed heavily to and from I-95. No traffic study for this project was available for review at this time. Therefore, traffic volumes for this development were estimated and added to the 2009 traffic networks to account for this development's impacts on the local roadways.

Hannaford Supermarket

A Hannaford Supermarket project is currently proposed to be located on the northwest corner of Forest Avenue and Riverside Street. The City has identified this development as an approximately 30,000-sf facility with access/egress driveways on Forest Avenue and Riverside Street. No traffic study for this project was available for review at this time. While the project impacts are not likely to significantly impact traffic volumes within the study area for this project, traffic estimates were made and the traffic resulting from this project were added to the 2009 traffic networks.

■

Historic Traffic Growth

To determine the average annual traffic growth on study area roadways resulting from regional background growth, historical traffic volumes through the area and a review of the Portland Area Comprehensive Transportation Committee's (PACTS) regional plan update was conducted.

According to the PACTS model, daily traffic volumes along study area roadways are expected to increase in the area by approximately 0.10 to 0.50 percent per year from 2000 to 2025. Historical traffic volume information supports this low growth rate with only limited increases in traffic volumes experienced over the past several years.

■

No-Build Traffic Volumes

The previous information notes that, through discussions with area planners and engineers, that there will be little additional motorized vehicles added to the area roadway network over the next five years. In order to account for some traffic growth in the area, a conservative one percent per year growth rate was applied to the 2004 Existing traffic volumes. This represents an overall total growth rate in traffic of five percent over the existing volumes. The resulting 2009 No-Build weekday evening and Saturday midday design hour traffic volume networks are displayed in Figures 13 and 14, respectively.

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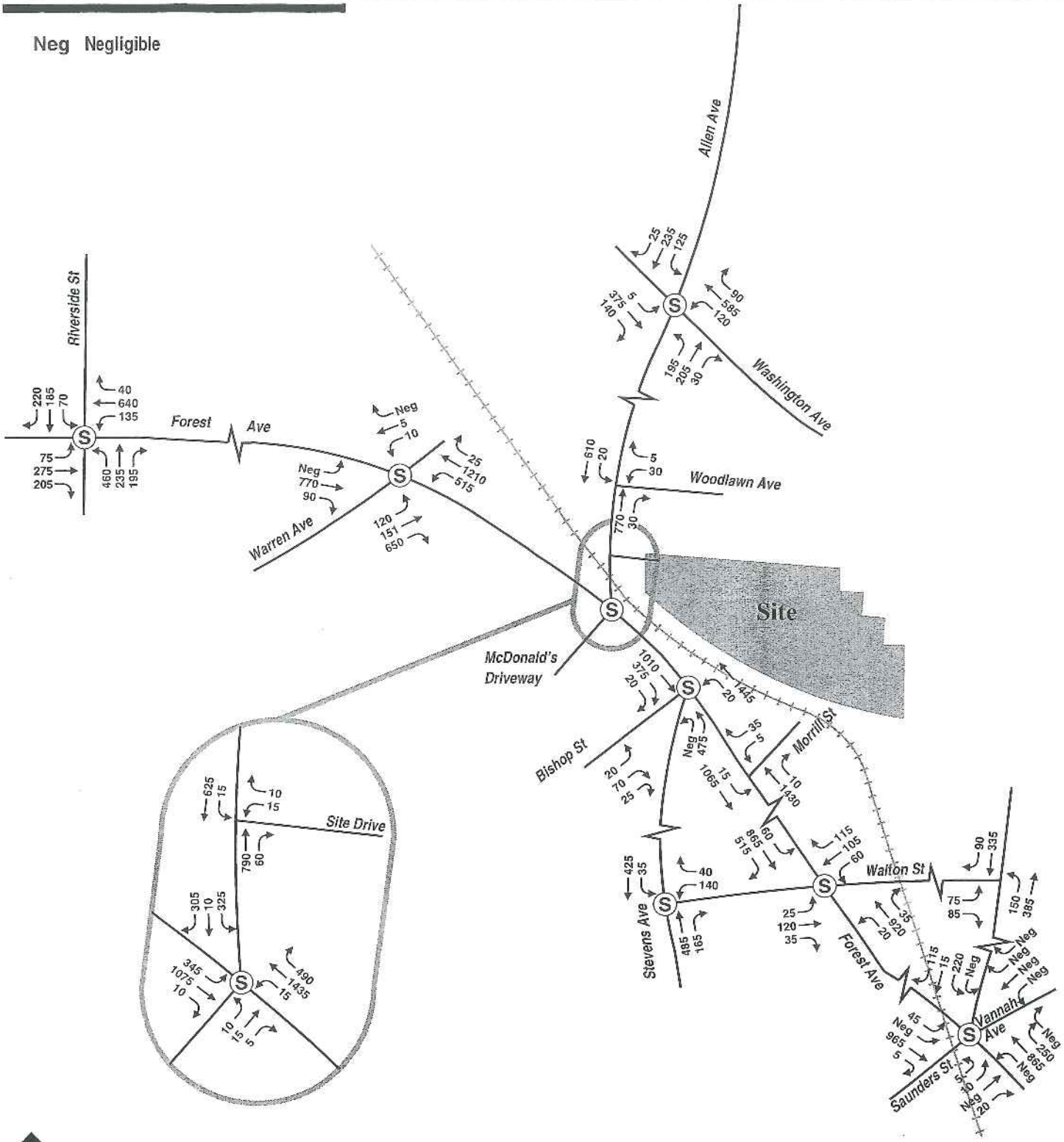

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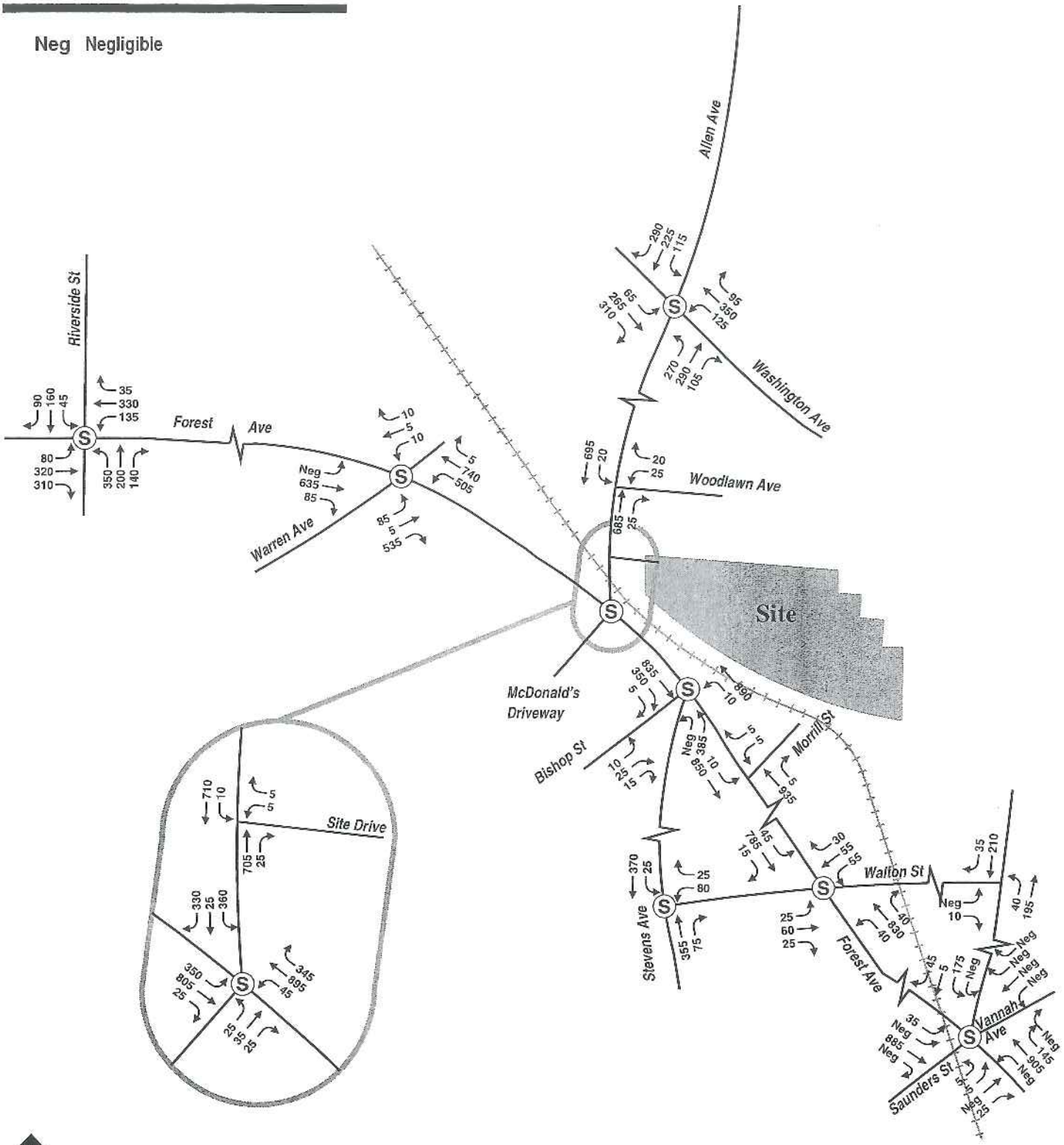
2009 No-Build
Weekday Evening Peak Hour
Traffic Volumes

Figure 13

Neg Negligible



Not to Scale

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2009 No-Build
Saturday Midday Peak Hour
Traffic Volumes

Figure 14

Site-Generated Traffic Volumes

In order to estimate the trip-generating characteristics of the proposed redevelopment project, traffic generation estimates for the various land uses were derived from the Institute of Transportation Engineers (ITE) Trip Generation[3] using the programmed square footage of the buildings under consideration.

The design year 2009 Build traffic volume networks for study area roadways were determined by estimating site-generated traffic volumes and distributing these volumes over the study area roadways. These site-generated volumes were added to the No-Build traffic volume networks to create the year 2009 Build traffic volume networks. The following sections describe the procedures used to develop the Build condition traffic volume networks.

Trip Generation

In sum, the proposed new development will consist of the following land uses and sizes:

- 65,821-sf supermarket (and an additional 5,624 sf of non-sales mezzanine space)
- 62,300 sf of ancillary retail in five buildings
- 2,500 sf of general office space
- 8 apartment units (above retail)
- 40 condominium units

As noted previously, the existing other uses on the site (the Bruno's Restaurant and associated office space along with the boxing club) will remain within the site plan. The Portland Bingo hall, which seats up to 500 patrons per night, will no longer remain on the site.

To estimate traffic impacts of the proposed redevelopment, it is first necessary to determine the individual traffic volumes that can be expected from the various components of the redevelopment project. The following text discusses the procedures used for determination of the expected individual and total project trip generation.

Retail Trip Generation

As stated, for the purposes of estimating the traffic generation, the retail components comprise a total of 133,724 sf in size divided as follows:

- 65,821-sf supermarket (in addition to 5,624 sf of non-sales mezzanine space)
- 62,300 sf of additional retail in five buildings

[3] Trip Generation; 6th Edition; Published by the Institute of Transportation Engineers (ITE); Washington D.C.; 1997

The description of the retail components in the proposed redevelopment program is very similar to those described and projected by Trip Generation for shopping centers (land use code 820). While the supermarket may generate traffic slightly differently than the other retail uses, ITE suggests that these uses can be combined into the Shopping Center land use and, ultimately, should be looked at as a whole.

Shared Trips and Pass-By Trips

While the ITE rates estimate all the traffic projected to be associated with each land use, not all of the project traffic will be new to the area roadways. A major portion of the traffic generated by these retail uses will be considered "pass-by" traffic. Pass-by traffic consists of vehicles already on the roadways adjacent to the site that are 'attracted' to the services being offered at the site as they are passing through the area as a convenience. The primary destination for these trips is elsewhere and the primary trip will be resumed following the visit to the store. An appropriate example of this is a driver stopping at the supermarket to pick up miscellaneous groceries on their way home from work. While the primary trip for the motorist is between work and home, the convenience of the supermarket on their way home has attracted the driver as they passed by the site. To the naked eye, this motorist does not "add" to traffic in the area, but is simply turning into and out of the project's driveway.

ITE indicates that based on studies at five supermarkets ranging in size from less than 25,000 sf to 50,000 sf, between 9 and 57 percent of the traffic generated by the supermarket may be classified as pass by traffic. ITE recognizes that their database is limited and recommends that, "...pass-by and diverted link trip percentages be determined on the basis of site specific data collected...".

Empirical studies conducted by VHB and others for Stop & Shop supermarket centers in the northeast has shown that the percentage of supermarket pass by traffic ranges from 38 to 50 percent during the weekday evening commuter peak hour and between 21 and 38 percent during the Saturday midday peak hours. Average pass-by rates at the seven Super Stop & Shop stores reviewed by VHB are approximately 44 percent and 29 percent for the weekday evening and Saturday midday peak hours, respectively.

For the purposes of this study, a 44-percent pass-by rate was applied to the retail-based traffic generation in this analysis for weekday evening peak commuter hours and a 29-percent pass-by rate was used for the Saturday midday, consistent with the average observations at other similar facilities in the northeast. On a daily basis, the overall pass-by rate was assumed to be only 25 percent as drivers during the middle of the day are more likely to be destined specifically to the supermarket or retail uses on the site.

The trip-generation volumes, pass-by trip-generation volumes, and new retail trip-generation volumes for the project are presented in Table 5 below.

Table 5
Trip Generation Summary – Retail-Based Trips

Time Period	Movement	Total Retail Trips[a] (133,724 sf)	Pass By Trips[b] Percentage	Pass By Trips[b] Trips	New Retail Trips
Weekday Daily [c]	Enter	4,110		1,030	3,080
	Exit	4,110		1,030	3,080
	Total	8,220	25%	2,060	6,160
Weekday Evening Design Hour [d]	Enter	365		165	200
	Exit	395		165	230
	Total	760	44%	330	430
Saturday Daily [c]	Enter	5,490		1,375	4,115
	Exit	5,490		1,375	4,115
	Total	10,980	25%	2,750	8,230
Saturday Midday Design Hour [d]	Enter	550		155	395
	Exit	505		155	350
	Total	1,055	29%	310	745

a based on ITE LUC 820 (Shopping Center – regression) for 133,724 sf of retail space (including non-sales mezzanine space in supermarket)
b represents 25 percent pass-by rate for the development over the course of the entire day; represents 44 percent pass-by rate during the weekday evening condition and 29 percent pass-by rate during the Saturday midday peak hour
c vehicles per day
d vehicles per hour

As Table 5 indicates, subtracting the pass-by trip-generation volumes from the total retail (gross) trip-generation volumes yields the new retail (net) trip-generation volumes for the proposed development. These are the traffic volumes that can be expected to be 'new' to the study area roadways and intersections as a result of the retail-based portion of the proposed development.

Table 5 further indicates that the proposed development is expected to generate approximately 430 'new' vehicle-trips (200 entering and 230 exiting) during the weekday evening peak hour period and 745 'new' vehicle-trips (395 entering and 350 exiting) during the Saturday midday peak period. Over the course of an average weekday, the shopping center components of the site are expected to generate 6,160 'new' trips (3,080 entering and 3,080 exiting) over the course of the average weekday and 8,230 'new' trips (4,115 entering and 4,115 exiting) over the course of the average Saturday.

Office and Residential Trip Generation

As stated, the office and residential components are divided as follows:

- 2,500 sf of general office space
- 8 apartment units (to be located above some of the retail components)

➤ 40 condominium units

The trip-generation volumes, pass-by trip-generation volumes, and new retail trip-generation volumes for the project are presented in Table 6 below.

Table 6
Trip Generation Summary – Total Trips

Time Period	Movement	New Retail Trips[a] (133,724 sf)	Office Trips[b] (2,500 sf)	Apartment Trips[c] (8 units)	Condo Trips[d] (40 units)	Total New Trips
Weekday Daily[e]	Enter	3,080	15	25	115	3,235
	Exit	3,080	15	25	115	3,235
	Total	6,160	30	50	230	6,470
Weekday Evening Design Hour[f]	Enter	200	0	5	15	220
	Exit	230	5	0	5	240
	Total	430	5	5	20	460
Saturday Daily[e]	Enter	4,115	5	25	115	4,260
	Exit	4,115	5	25	115	4,260
	Total	8,230	10	50	230	8,520
Saturday Midday Design Hour[f]	Enter	395	0	5	10	410
	Exit	350	0	0	10	360
	Total	745	0	5	20	770

a taken from Table 6
b based on ITE LUC 710 (General Office Building - average) for 2,500 sf of office space
c based on ITE LUC 220 (Apartment – average) for 8 apartment units
d based on ITE LUC 230 (Residential Condominium/Townhouse – average) for 40 condominium units
e vehicles per day
f vehicles per hour

Table 6 indicates that the proposed development is expected to generate approximately 460 'new' vehicle-trips (220 entering and 240 exiting) during the weekday evening peak hour period and 770 'new' vehicle-trips (410 entering and 360 exiting) during the Saturday midday peak period. Over the course of an average weekday, the shopping center components of the site are expected to generate 6,470 'new' trips (3,235 entering and 3,235 exiting) over the course of the average weekday and 8,520 'new' trips (4,260 entering and 4,260 exiting) over the course of the average Saturday.

The traffic generation numbers presented above do not include the likely influence of the mixed use nature of this development. Specifically, the mix of residential and retail/commercial uses contained within the same site will keep some of the vehicle trips internal to the site. While not expected to influence these numbers significantly, any internal trips between these uses will only serve to lessen the off-site impact of the project on surrounding roadways.

Boxing Club, Restaurant, and Bingo Hall Trip Generation

In addition to the retail-, office- and residential-based trips to and from the site, the proposed redevelopment will upgrade the existing athletic boxing facility, maintain the existing Bruno's restaurant and eliminate the bingo hall.

While boxing event nights are expected to attract spectators to the club as they currently do, they only occur only five to six times per year. Normal day-to-day activity is expected to occur regularly as it currently does. The only changes to the club will include the addition of state-of-the-art boxing facilities including weights, saunas, and other exercise equipment for the athletes to use. A portion of this upgraded facility will be dedicated to the office uses, intended mainly to support the athletic boxing facility.

The existing Bruno's restaurant on the site will continue to operate as it currently does within its existing facility.

There is a bingo hall currently located on the site that seats approximately 500 people on any given night. According to the operator of the bingo hall, the typical evening attendance for this bingo hall is approximately 250 people. Bingo games are played 364 days per year, from approximately 6:30 PM to 9:30 PM. With the elimination of the existing facility on the site, the current traffic associated with this use will also be eliminated from the future traffic conditions.

For the purposes of this assessment, the existing traffic arriving and departing from the boxing club and Bruno's restaurant were assumed to be captured in the existing traffic counts conducted as part of this study. While Bruno's and the improved boxing facility have the potential to attract additional patrons to the site, the elimination of the bingo hall will result in a loss of traffic greater than the likely potential traffic gain associated with Bruno's and the boxing facility. Therefore, to provide a conservative analysis, the existing traffic counts were used instead of the net traffic loss that would result from calculating the potential trip generation of these uses.

■

Trip Distribution and Assignment

The directional distribution of site traffic approaching and departing the development is a function of several variables. These variables include the population densities, shopping opportunities, competing uses, existing travel patterns, and the efficiency of the roadways leading to the site. The travel distribution of retail center traffic has been documented by ITE in Transportation and Land Development[4], as well as the Urban Land Institute (ULI)[5] and shows that for community retail centers, the primary

[4] Transportation and Land Development, 2d Edition, Institute of Transportation Engineers, Washington, DC (2002)
[5] ULI – The Urban Land Institute, *Parking Requirements for Shopping Centers: Summary Recommendations and Research Study Report*, a study conducted under the direction of ULI by Wilbur Smith and Associates, Inc., and sponsored by the International Council of Shopping Centers

market area for new trips to and from the development is typically located within a 15- to 20-minute travel distance to the facility. Subsequently, the projected trade area is expected to include portions of Portland, South Portland, Falmouth, Westbrook, Gorham, and Scarborough.

The trip distribution for the project was developed based on a gravity model that uses census tract population data[6] for surrounding communities. The gravity model for the site consisted of two market trade areas, or 'attraction zones,' that were weighted relative to influence. The primary trade area for the proposed development was determined to extend to approximately a two-mile radius from the site, and the secondary trade area extends from the two-mile mark out to the outer periphery of the expected trade area, anywhere between two and eight miles, depending upon the direction. Based on the distribution of population surrounding the project site within the project study area, as well as competing land uses, the arrival and departure directions for project-related traffic were then estimated and adjusted, if appropriate, based on known local factors. The assignment of traffic to specific travel routes was based on the assumption that most motorists will seek the fastest and most direct routes to/from the site. Please refer to the Appendix for detailed evaluation.

In consideration of the above factors, a vehicle trip distribution for the project was developed as summarized in Table 7 and shown in Figure 15.

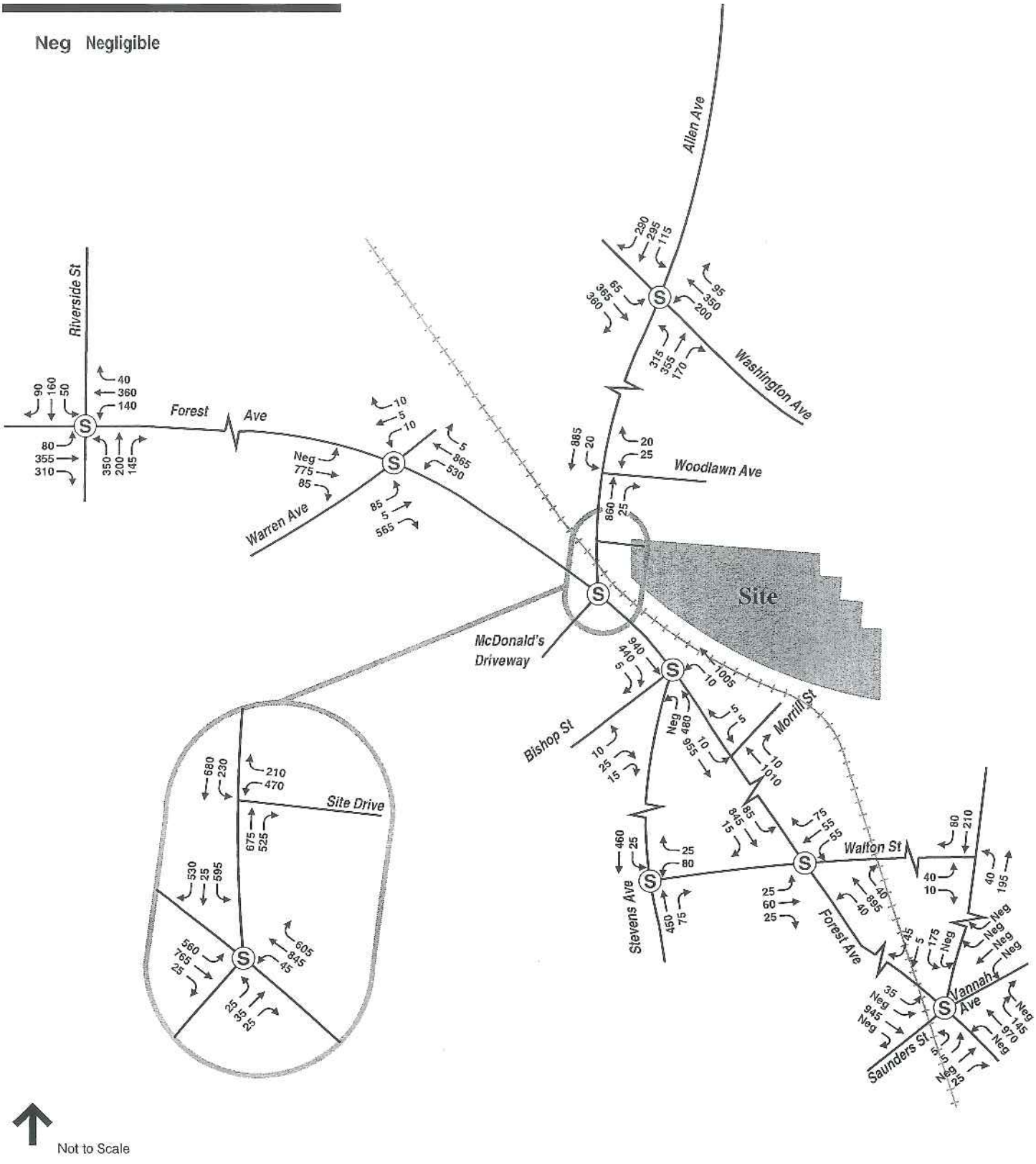
Table 7
Vehicle Trip Distribution Summary

Direction (From/To)	Major Roadway	Percent of Total
North	Auburn St.	7%
North	Allen Ave.	12%
West	Washington Ave.	2%
East	Washington Ave.	13%
North	Ocean Ave.	8%
South	Forest Ave.	12%
North	Forest Ave.	23%
West	Warren Ave.	5%
South	Stevens Ave.	18%
Total	--	*100%*

As shown, immediately adjacent to the site, traffic can approach from four general directions: from the east and west along Washington Avenue and Warren Avenue and from the north and south along Forest Avenue and Allen Avenue.

The site-generated traffic volumes were assigned to the roadway network and combined with the 2009 No-Build traffic volume networks to develop the 2009 Build design hour traffic volume networks. The 2009 Build weekday evening and Saturday midday design hour traffic volume networks are illustrated in Figures 16 and 17, respectively.

[6] US Census Bureau, 2000 US Census Data



Vanasse Hangen Brustlin, Inc.

2009 Build
Saturday Midday Peak Hour
Traffic Volumes

Figure 17

4

Traffic Operations Analysis

Measuring existing traffic volumes and projecting future traffic volumes quantifies traffic flow within the study area. To assess quality of flow, roadway capacity analyses were conducted with respect to Existing and projected No-Build and Build traffic volume conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them. Calculated levels of service classify roadway-operating conditions.

Level-Of-Service Criteria

Level of service (LOS) is the term used to denote the different operating conditions which occur on a given roadway segment under various traffic volume loads. It is a qualitative measure of the effect of a number of factors including roadway geometry, speed, travel delay, freedom to maneuver, and safety. Level of service provides an index to the operational qualities of a roadway segment or an intersection. Level of service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions.

For this study, capacity analyses were completed for signalized and unsignalized intersections outlined in the previous text project study area. Level-of-service designations are reported differently for signalized and unsignalized intersections. For signalized intersections, the analysis considers the operation of each lane or lane group entering the intersection and the LOS designation is for overall conditions at the intersection. For unsignalized intersections, however, the analysis assumes that traffic on the mainline is not affected by traffic on the side streets. The LOS is only determined for left turns from the main street and all movements from the minor street. The LOS designation is for the most critical movement, which is most often the left turn out of the side street. The evaluation criteria used to analyze area intersections are based on the 2000 Highway Capacity Manual (HCM)[7] and are included in the Appendix.

With regard to the 2009 Build condition with mitigation measures in place, the

[7] Highway Capacity Manual, Transportation Research Board, National Research Council, Washington D.C. (2000).

results of the capacity analyses were evaluated based on Maine DOT's definition of unreasonable congestion[8].

Signalized Intersections Capacity Analysis

Capacity analyses were conducted for the 12 signalized intersections identified in the study area. Capacity analyses were conducted for 2004 Existing conditions and the 2009 No-Build and Build conditions. A summary of the signalized capacity analyses is presented in Table 9.

Table 9
Signalized Intersection Capacity Analysis Summary

Location	Time Period (Peak Hour)	2004 Existing Conditions v/c [a]	Delay [b]	LOS [c]	2009 No-Build Conditions v/c	Delay	LOS	2009 Build Conditions v/c	Delay	LOS	2009 Build Conditions with Mitigation [d] v/c	Delay	LOS
Forest Avenue at	Weekday Evening	0.82	41	D	0.85	44	D	0.86	46	D	0.86	46	D
Riverside Street	Saturday Midday	0.73	33	C	0.77	36	D	0.78	37	D	0.78	37	D
Forest Avenue at	Weekday Evening	0.72	23	C	0.76	22	C	0.72	19	B	0.74	19	B
Warren Avenue	Saturday Midday	0.65	21	C	0.70	22	C	0.70	19	B	0.72	15	B
Allen Avenue at	Weekday Evening	0.69	35	D	0.57	28	C	0.71	35	C	0.69	27	C
Washington Avenue	Saturday Midday	0.88	49	D	0.76	34	C	0.82	44	D	0.83	44	D
Forest Avenue at	Weekday Evening	0.84	26	C	0.87	29	C	0.90	31	C	0.90	31	C
Ocean Avenue	Saturday Midday	0.79	20	C	0.83	22	C	0.86	24	C	0.86	24	C
Stevens Avenue at	Weekday Evening	0.52	41	D	0.55	42	D	0.59	39	D	0.59	39	D
Walton Street	Saturday Midday	0.35	44	D	0.37	42	D	0.43	43	D	0.43	43	D
Forest Avenue at	Weekday Evening	0.71	26	C	0.76	28	C	0.84	31	C	0.84	31	C
Walton Street	Saturday Midday	0.58	20	B	0.64	22	C	0.70	23	C	0.70	23	C
Forest Avenue at	Weekday Evening	0.87	24	C	0.93	31	C	0.89	25	C	0.90	25	C
Stevens Ave/Bishop St	Saturday Midday	0.66	14	B	0.70	13	B	0.78	13	B	0.80	14	B
Forest Avenue at	Weekday Evening	0.80	28	C	0.84	30	C	1.01	53	D	0.97	45	D
Allen Avenue	Saturday Midday	0.67	31	C	0.72	26	C	1.08	69	E	0.95	34	C
Allen Avenue at	Weekday Evening	n/a			n/a			0.97	29	C	0.59	15	B
proposed site drive	Saturday Midday							1.04	46	D	0.72	16	B

a volume to capacity ratio
b average delay per vehicle in seconds
c level of service
d Specific mitigation is summarized in Chapter 6 – Findings and Recommendations
n/a not applicable; movement does not exist under these conditions

As shown in Table 9, all of the study intersections are expected to operate at acceptable levels of service with project-related traffic and the corresponding mitigation measures in place. As a result of the proposed project, the intersection of Forest Avenue at Allen Avenue is expected to operate over capacity during both

[8] Traffic Movement Permit; State of Maine, Department of Transportation, Traffic Engineering Division; Chapter 305 Rules, 4.C.(4)(5); April 2000.

peak hours and the intersection of Allen Avenue at the proposed site drive is projected to operate over capacity during the Saturday peak hour in the absence of any mitigation being implemented at these locations. These two intersections are discussed in greater detail below.

Forest Avenue at Allen Avenue

This intersection is expected to operate over capacity during the Saturday midday peak hour condition. As noted previously, this intersection has been upgraded by Maine DOT to provide an exclusive left-turn lane from Forest Avenue into Allen Avenue and associated signal timing improvements. Based on recent observations of this improvement, traffic conditions through this area have improved markedly over previous conditions. Traffic impacts from the proposed development will include traffic entering and exiting Allen Avenue to access the site. Based on the assessments conducted for this study, this intersection will operate at LOS E during the Saturday midday design hour under build conditions (without any project mitigation in place). However, it is believed that roadway geometric improvements, and signal timing and phasing adjustments will improve operations at this location (discussed in the recommendations section of this report).

Allen Avenue at Proposed Site Drive

Finally, the intersection of Allen Avenue at the proposed site driveway is projected to operate in excess of its capacity, even with a signal system in place. However, it is believed that roadway geometric improvements will improve operations at this location (discussed in the recommendations section of this report).

Unsignalized Intersection Capacity Analysis

Capacity analyses were conducted for the three unsignalized intersections identified in the study area. Capacity analyses were conducted for 2004 Existing conditions and the 2009 No-Build and Build conditions. The results of the analyses are shown in Table 10.

Table 10
Unsignalized Intersection Capacity Analysis Summary

Location	Time Period (Peak Hour)	2004 Existing Conditions Demand [a]	Delay [b]	LOS [c]	2009 No-Build Conditions Demand	Delay	LOS	2009 Build Conditions Demand	Delay	LOS
Walton Street at Ocean Avenue	Weekday Evening	70	33	D	75	41	E	105	80	F
	Saturday Midday	2	10	B	2	10	B	40	13	B
Forest Avenue at Morrill Street	Weekday Evening	5	87	F	5	117	F	5	170	F
	Saturday Midday	5	31	D	5	35	D	5	46	E
Allen Avenue at Woodlawn Avenue	Weekday Evening	30	39	E	30	45	E	30	83	F
	Saturday Midday	25	27	D	25	30	D	25	57	F
Allen Avenue at proposed site drive	Weekday Evening	15	24	C	15	27	D	n/a		
	Saturday Midday	5	19	C	5	20	C			

a expressed in vehicles per hour for the critical movement at the intersection (typically the left turn movement from the side street)
b average delay per vehicle in seconds
c level of service
n/a not applicable; this intersection is signalized under these conditions

As shown in Table 10, two out of the four unsignalized intersections operate at an unacceptable level of service during one peak hour under current conditions. Under future conditions, the operations at these intersections is expected to worsen, with the intersections of Forest Avenue at Morrill Street and the Allen Avenue at Woodlawn Avenue expected to operate at unacceptable levels of service during both peak hours under the 2009 Build condition. The Walton Street at Ocean Avenue intersection is expected to operate at LOS F during the weekday evening peak hour under the 2009 Build condition. The other intersection, Allen Avenue at the proposed site drive, currently operates at acceptable levels of service and is proposed to become signalized under the 2009 Build condition. The three intersections with operational issues are discussed in greater detail below.

■

Walton Street at Ocean Avenue

This intersection is expected to operate over capacity during the evening peak commuter hour in the future with or without the proposed project in place. Operational deficiencies at this intersection were observed to include traffic delays along the Walton Street approach to this intersection. The proposed project is not anticipated to create any noticeable additional delays at this intersection.

■

Forest Avenue at Morrill Street

This intersection currently operates over capacity during the evening peak commuter hour and is expected to operate over capacity during both peak hours in the future with or without the proposed project in place. Operational deficiencies at this intersection were observed to include traffic delays along the Morrill Street approach to this intersection. The proposed project is not anticipated to create any additional demand along Morrill Street and, therefore, no additional delay for the vehicles on this approach. In fact, the extension of a northbound travel lane on Forest Avenue

from Allen Avenue to Morrill Street will provide enhanced access for drivers turning onto Allen Avenue. As a result of the expected improvement in traffic flow on Forest Avenue at Morrill Street, additional opportunities for drivers turning out of Morrill Street may be created.

■

Allen Avenue at Woodlawn Avenue

This intersection currently operates over capacity during the evening peak commuter hour and is expected to operate over capacity during both peak hours with the proposed project in place. The project is not expected to create any additional demand along Woodlawn Avenue and, therefore, no additional delay for residents who live in the neighborhood. In fact, the presence of a new signal at the site driveway (just south of Woodlawn Avenue) may create additional opportunities for drivers to find gaps in the traffic stream as mainline traffic along Allen Avenue will be stopped.

Vehicle Queue Analysis

In addition to the intersection capacity analysis, a vehicle queue analysis was conducted at the signalized study area intersections during the weekday evening peak hour. This analysis was conducted using the Synchro software package, which provides reasonable queue estimates for coordinated traffic signal systems. The results of the vehicle queue analysis are summarized below in Table 11.

Table 11
Average Queue Results (in feet)

Location	Movement	2004 Existing Conditions PM	2004 Existing Conditions Saturday	2009 No-Build Conditions PM	2009 No-Build Conditions Saturday	2009 Build Conditions PM	2009 Build Conditions Saturday	2009 Build Conditions with Mitigation PM	2009 Build Conditions with Mitigation Saturday
Forest Avenue at	EB L/T	131	74	135	78	110	70	82	50
Warren Avenue	EB R	517	262	496	249	342	261	289	181
	WB L/T/R	15	11	0	8	11	11	8	8
	NB L	243	306	241	189	118	155	348	145
	NB T/R	0	35	0	12	16	23	0	9
	SB L/T/R	278	256	324	262	358	303	202	227
Forest Avenue at	EB L/R	104	34	111	35	87	29	66	17
Stevens Avenue /	NB L/T	355	81	708	280	371	162	174	91
Bishop Street	SB T	796	410	899	342	698	397	572	93
	SB R	237	63	130	120	185	147	59	3
	NE L/R	194	166	216	55	238	118	178	143
Forest Avenue at	EB L	11	24	11	24	8	20	6	15
Allen Avenue	EB T	16	34	16	34	12	28	9	21
	EB R	0	0	0	0	0	0	0	0
	WB L	143	154	151	162	229	241	171	171
	WB L/T	151	164	161	171	256	257	180	184
	WB R	103	106	119	112	122	92	130	0
	NB L	12	34	12	39	13	38	10	22
	NB T	511	266	552	196	566	343	532	231
	NB R	99	50	141	35	192	112	142	88
	SB L	312	193	335	289	456	467	330	353
	SB T/R	252	166	271	219	0	208	107	84
Allen Avenue at	WB L	n/a		n/a		344	379	243	263
proposed site drive	WB R					38	51	51	46
	NB T/R					204	806	n/a	
	NB T					n/a		92	105
	NB R							0	0
	SB L/T					166	255	n/a	
	SB L					n/a		37	56
	SB T							183	235

L, T, R left, through, right
n/a not applicable; movement does not exist under current condition
Note: Vehicle queues can be metered by upstream signal operations where intersections are closely spaced. See worksheets for additional information.

As shown in Table 11, the vehicle queue lengths in the Morrill's Corner area generally are similar during all conditions. Under the Build condition, the queue lengths on most of the approaches at the intersection of Forest Avenue at Allen Avenue would increase, but not significantly or to the point of extending beyond the existing or proposed storage lengths. With the mitigation measures in place, the vehicle queue lengths in the Morrill's Corner area are expected to be reduced to levels that are generally better than those that exist under the No-Build condition.

5

Transportation Improvements

The preceding analysis of existing conditions and projected future traffic demands in the No-Build condition indicate that traffic operation deficiencies are present or are expected to occur at certain key study area intersections, independent of the proposed project.

This section presents several recommended measures to address both project-related traffic impacts at site access points and at impacted off-site intersections, and also recommends potential improvements at deficient locations that have been identified independent of the proposed project. The proposed measures not only mitigate project impacts but also contribute to improving overall traffic operations in this area.

Transportation Demand Management (TDM)

Most mitigation of project-related traffic impacts involves physical roadway ('capacity-increasing') improvements, and traffic control measures. However, many mixed-use developments have had success in attempting to reduce its customers' and employees' reliance on private automobiles through implementation of on-site Traffic Demand Management (TDM) and Traffic System Management (TSM) strategies. Overall, TDM and TSM measures are most effective with commuter-type traffic (office-type development). However, there are a number of measures that the proponent would suggest in an attempt to reduce retail traffic to the site. The following text discusses proposed project mitigation and commitments.

The goal of the Transportation Demand Management (TDM) plan is to reduce the project's overall traffic impact through the implementation of TDM measures that are geared toward affecting the demand side of the transportation equation, rather than the supply side. By their very nature, TDM programs attempt to change people's behavior. To be successful, they must rely on incentives or disincentives to make these shifts in behavior attractive to the commuter or retail customer.[9] Suggested

[9] Implementing Effective Traffic Demand Management Measures: Inventory of Measures and Synthesis of Experience, prepared by Comsis Corporation and the Institute of Transportation Engineers, for the U.S. Department of Transportation, DOT-T-94-02, September, 1993, p. I-1.

TDM programs are designed to maximize the people-moving capability of the existing transportation infrastructure by increasing the number of persons in a vehicle, providing alternate modes of travel, or influencing the time of, or need to, travel.

TDM measures are most often directed at commuter travel. The day-to-day regularity of this type of trip and conditions at the workplace, in terms of employer practices such as on-site services, bicycle storage and showers, and shuttle services, impact employees commuter choices, and makes this market the most suitable for identifying alternatives.

The term TDM encompasses both alternatives to driving alone and the techniques or supporting strategies that encourage the use of these alternatives[10]. TDM alternatives to driving alone include carpools and vanpools, public and private transit, and non-motorized travel, including bicycling and walking. TDM alternatives can also influence when trips are made. For example, alternative work hours (compressed work weeks, flextime, and telecommuting) can affect what time of day trips are made, or if trips occur at all on certain days. On an area-wide basis, the provision of park and ride facilities and transit services can also provide a competitive alternative to drive alone commuting.

TDM strategies are the supporting measures that encourage the use of alternatives to driving alone. TDM strategies include financial incentives, time incentives, provision of new or enhanced commuter services, dissemination of information, and marketing alternative services. TDM strategies include all the incentives and disincentives that increase the likelihood for people to change their existing travel behavior.

A distinction can be drawn between area-wide TDM programs and employer-based TDM programs. Employer-based TDM programs are those run by individual employers or groups of employers, generally located near one another. 'Area-wide' usually refers to a region, municipality, or corridor. Area-wide programs address a more diverse group of travelers traveling to a wide variety of locations at many different times.

■

Traffic Demand Management Plan

To implement a traffic demand management program at the proposed facility, the proponent is proposing a number of measures, which will contribute toward the reduction of vehicular traffic to and from the site. The following text describes in detail the proponent's Traffic Demand Management program.

[10] Implementing Effective Travel Demand Management Measures: Inventory of Measures and Synthesis of Experience, prepared by Comsis Corporation and The Institute of Transportation Engineers, for the U.S. Department of Transportation, DOT-T-94-02, September, 1993, P. 1-2.

Ridesharing

The proponent will promote ridesharing via car pools to its employees. Information regarding carpooling and its benefits will be distributed to new employees, interested carpooler names will be posted in the employee area, and a notice of interested carpoolers will be listed in the facility newsletter. Additionally, a guaranteed ride home program, in the case of an emergency for registered ride-sharers, will be provided via a local taxi service. Preferential parking spaces for employees that carpool will be designated. An incentive program will be established to encourage employees to rideshare through the provision of a financial incentive. An on-site Transportation Coordinator will be identified to ensure that the complete rideshare program, including ride-matching, accommodating work shifts, promotion, incentives, preferential parking, and a guaranteed ride home, is consistently promoted and provided.

Bicycle and Pedestrian Measures

Bicycling and walking to the retail center will likely be attractive to some employees and local residents due to the proximity of the residential communities to the site. To facilitate both employee and potential customer bicycle access to the site, secure bicycle storage racks will be provided near the front doors to the facility.

Due to the proximity of the site to residential communities, it is also likely that some employees and/or customers may walk to the proposed facility particularly during fair weather conditions. To encourage walking between the site and the neighborhood, the proponent will be constructing pedestrian pathways along the site's boarders with Princeton Street and other residential locations. The specific locations of these connections will be worked out with the residents of the neighborhood and the City.

In addition, residents to the south of the proposed site may have concerns about crossing Forest Avenue at the Morrill's Corner intersections to access the supermarket. As such, the proponent is proposing a crosswalk and necessary signage just south of Morrill Street. Additionally, the proponent will provide pedestrian accommodations at the intersection of the site driveway and Allen Avenue to permit pedestrians to cross Allen Avenue under controlled (signalized) conditions.

Transit Services

During the public outreach meetings held as part of this project, it was identified that transit options to and from this site would be a welcome addition to many of the residents in and around the project site. Therefore, in addition to bicycle and pedestrian amenities committed to, the applicant has been contacted by and will be

working with The Metro (the local transit provider) to identify suitable location(s) within the site for the use of the transit service to drop off and pick up passengers.

On-site Services

Employees make midday trips during their breaks and lunchtime to conduct personal business. On-site services reduce the need for employees to leave the facility to conduct personal business during the day. Many of the employees will work shorter than eight-hour shifts with typical shifts running from 7:00 AM to 12:00 noon or 1:00 PM; 12:00 noon to 5:00 PM; 5:00 PM to 12:00 midnight; and 11:00 PM to 7:00 AM. These schedules are made to accommodate working parents, older workers, after-school workers, and the like. Subsequently, the level of midday trip-making is less than other types of retail or office because of these shorter work shifts. Combining this fact with the on-site services proposed will result in minimal midday trip making for employee personal business and errands.

Intersection/Roadway Mitigation

The second part of the transportation improvement plan investigated a series of potential intersection and roadway improvement measures. The preceding analysis of existing and projected future traffic demands in the No-Build condition indicates that traffic operational deficiencies exist or will exist at certain key intersections. This section of the report presents several recommended measures to address project-related traffic impacts at intersections and along roadway locations in the study area.

Site Access

The first stage in the recommended improvements to the roadways surrounding the site is to identify the improvements necessary to gain access to and from the site driveway along Allen Avenue. This section discusses these roadway improvements.

The Allen Avenue intersection with the site driveway is intended to serve as the primary access to the site. In order to determine if signalization is warranted at this intersection, an analysis was conducted using the estimated future traffic conditions and procedures defined in the 2000 Manual of Uniform Traffic Control Devices (MUTCD2000). For this study, several warrants were examined. The warrant analysis is presented in the Appendix to this report and the results indicate that signalization is expected to be warranted under the Build design hour conditions. For this reason, a fully-actuated signal is proposed to be installed at this location to control all movements along Allen Avenue and into and out of the site driveway.

The signal would be coordinated with the existing (and upgraded, see below) signals located at the Morrill's Corner intersections to provide improved traffic flow

between the systems. Additionally, the signal would be tied into the railroad crossing pre-emption system to shut down access to the at-grade crossing. Pedestrian actuation and crosswalks would also be provided at the intersection to facilitate crossings of Allen Avenue.

In addition to this action, the site access will also require the following roadway geometry actions:

- Widen Allen Avenue to provide a consistent four lane cross-section between Forest Avenue and Woodlawn Avenue;
- Two exit and two entrance lanes along the site driveway.

In addition to those improvements cited above, there will also need to be right-of-way dedication by the applicant in order to implement these improvements along Allen Avenue. Based on existing information, it appears that this widening can be provided along the site frontage in order to meet the necessary requirements for the installation of the four-lane cross section. Additionally, the proponent has negotiated with Guilford (the owners of the rail line) to provide the necessary dedication along their frontage as well.

Finally, as the project advances, the proponent will be working with the City of Portland Fire and Police Departments to determine if an emergency access driveway into the site is necessary and, if so, identify a suitable location.

■

Off-Site Improvements

While the previous section identifies the front-door access requirements for the project, this section identifies the off-site improvements necessary to accommodate the proposed mixed-use development-generated traffic on the surrounding roadway network.

Allen's Corner

Concurrent with the improvements at Morrill's Corner, the proponent will make signal timing and phasing adjustments to the Allen's Corner intersections in order to address capacity-related issues identified in the analysis. The proponent will work with the City of Portland to identify these changes, which will result in improved traffic operations for both the project-related traffic and general traffic traveling through the area. One set of potential timing and phasing options have been provided in the Appendix to this report for consideration.

Warren Avenue at Forest Avenue

Similarly, the intersection of Warren Avenue at Forest Avenue will see some benefit through the implementation of revised signal timing and phasing plans. Specifically, it was noted that the westbound left-turn from Forest Avenue to Warren Avenue currently operates on a protected phase condition which restricts the ability for left-turning vehicles to make a turn when no on-coming traffic is approaching. This is particularly apparent during the weekday evening commuter peak hour when opposing traffic is minimal. As part of the larger traffic improvement program proposed below, the applicant will coordinate this traffic signal with the other two signalized locations to improve traffic flow between these locations.

Morrill's Corner

As noted, the intersections included in the Morrill's Corner intersections will serve as the major gateway to the project site for the majority of the visitors. Capacity analyses indicate that the intersections of Allen Avenue at Forest Avenue and Forest Avenue at Stevens Avenue/Bishop Street currently experience congestion, even with the current Maine DOT improvements being in place.

In order to mitigate the traffic impacts at these locations, the proponent is committed to the design and construction of adding an additional travel lane along westbound Forest Avenue that would extend from Morrill Street to Allen Avenue. A conceptual plan of the transportation improvements in the Morrill's Corner area is shown in Figure 18. The addition of this lane will serve to essentially increase the capacity of outbound Allen Avenue by approximately 50 percent during the evening peak commuter hours (by expanding from two to three outbound lanes) and will provide additional capacity to serve the other approaches during off-peak hours.

The addition of this lane will also require the modification of traffic signal operations (and equipment) at both Morrill's Corner intersections. This will include new signal equipment at both locations as well as upgraded at-grade railroad crossing equipment and pre-emption detection. A full discussion of the coordinated traffic signal system is provided in the following sections.

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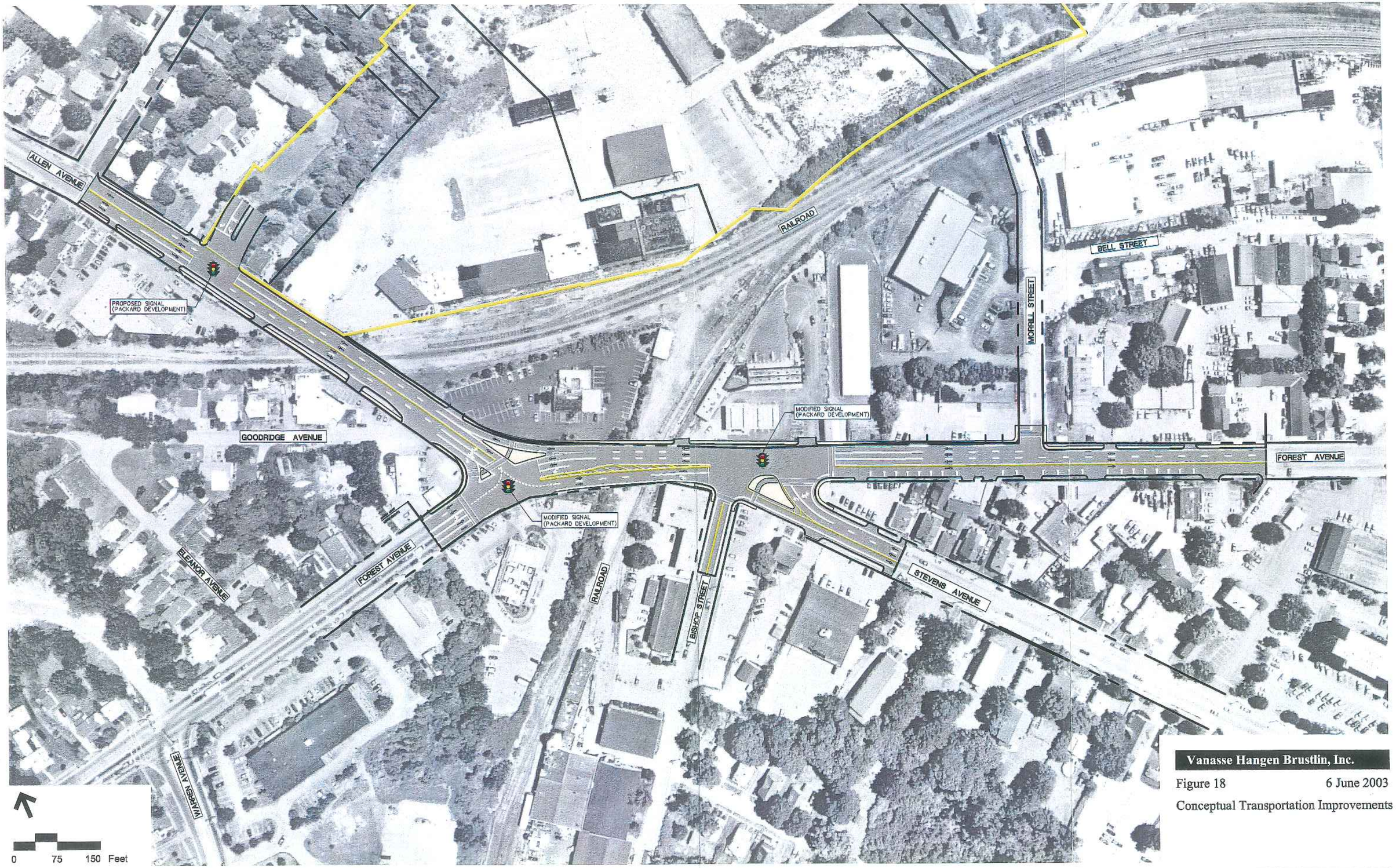

Vanasse Hangen Brustlin, Inc.

Figure 18 6 June 2003

Conceptual Transportation Improvements

serve to offset existing operational deficiencies, improve existing safety deficiencies, and provide an overall net benefit to existing traffic signal operations in this area.

Table 12
Mitigation Impact Capacity Analysis Summary

Location	Time Period (Peak Hour)	2009 No-Build Conditions v/c	Delay	LOS	2009 Build Conditions v/c	Delay	LOS	2009 Build Conditions with Mitigation v/c	Delay	LOS
Forest Avenue at Warren Avenue	Weekday Evening	0.76	22	C	0.72	19	B	0.74	19	B
	Saturday Midday	0.70	22	C	0.70	19	B	0.72	15	B
Allen Avenue at Washington Avenue	Weekday Evening	0.57	28	C	0.71	35	C	0.69	27	C
	Saturday Midday	0.76	34	C	0.82	44	D	0.83	44	D
Morrill's Corner Intersections										
Forest Avenue at Stevens Ave/Bishop St	Weekday Evening	0.93	31	C	0.89	25	C	0.90	25	C
	Saturday Midday	0.70	13	B	0.78	13	B	0.80	14	B
Forest Avenue at Allen Avenue	Weekday Evening	0.84	30	C	1.01	53	D	0.97	45	D
	Saturday Midday	0.72	26	C	1.08	69	E	0.95	34	C
Allen Avenue at proposed site drive	Weekday Evening	n/a			0.97	29	C	0.59	15	B
	Saturday Midday				1.04	46	D	0.72	16	B

a volume to capacity ratio
b average delay per vehicle in seconds
c level of service
n/a not applicable; movement does not exist under these conditions

As shown in Table 12, timing improvements at the intersection of Forest Avenue at Warren Avenue would improve traffic conditions at that location. Similarly, the Allen's Corner intersection would also see a slight improvement over the Build conditions.

Most importantly, all three Morrill's Corner intersections are expected to operate at LOS C or better under future 2009 Build conditions with the proposed mitigation measures in place. This condition would be similar to or slightly better than the conditions experienced along the corridor today.

As shown previously in Table 11, with the mitigation measures in place, the vehicle queue lengths in the Morrill's Corner area are expected to be reduced to levels that are generally better than those that exist under the No-Build condition.

It should be noted that the roadway widening and signal coordination at the Morrill's Corner intersections will also need to be coordinated with the Maine DOT improvements between Allen Avenue and Warren Avenue. Additionally, some land takings will be required to accommodate these improvements. In total, the improvements to the Morrill's Corner intersections will total in excess of $1,000,000 worth of mitigation.

With this improvement in place, the traffic environment in the Morrill's Corner area will improve significantly during all periods of the day. These improvements will not only be designed to accommodate the development-related traffic, but will also be effective in reducing the vehicle delays and queues such that the traffic operations at Morrill's Corner will improve beyond the current conditions.

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Commitment to Mitigation and Improvements

The above sections have identified a number of potential improvements designed to mitigate not only the project's impacts on the roadway system, but to accommodate existing and future traffic conditions unrelated to the proposed project. In order to provide a fair-share contribution towards the improvements in the area, the proponent is committed to the following mitigation measures:

Design and construct the Morrill's Corner intersection improvements along with the Allen Avenue 'front-door' improvements. All costs associated with the design and construction of those above-identified improvements will be the responsibility of the project proponent, pending issuance of all necessary state and local permits for construction of the proposed project. The final traffic signal system design will be subject to approval by the City of Portland and the Maine DOT for conformance with local and State design standards.

Institute a Travel Demand Management program for the development occupants. In order to reduce the vehicle trips associated with the development, the proponent will develop and implement a TDM program for the site.