

ROUTE ONE SOUTH CONCEPT INFRASTRUCTURE PLAN existing and future conditions technical memoranda

Falmouth, Maine

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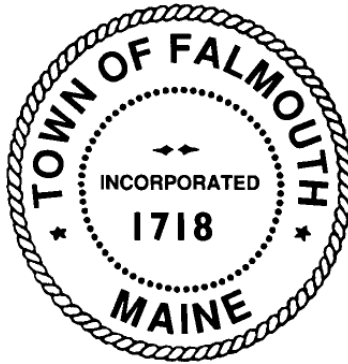
January 17, 2013



Route One South Infrastructure Plan

Falmouth, Maine

Existing Conditions Technical Memorandum



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Town of Falmouth

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INTRODUCTION

The T.Y. Lin International (TYLI) Team, comprised of TYLI, MRLD Landscape Architecture + Urbanism (MRLD), and Woodard & Curran (W&C), was selected by the Town of Falmouth (Town) to develop an Infrastructure Plan (Plan) for Route One between Route 88 to the south and the Maine Turnpike spur to the north (See Figure 1-1). The purpose of the Plan is a coordinated investment in, and improvement of, the public right-of-way (ROW) infrastructure of Route One to make it a more attractive, cohesive, functional, and pedestrian-friendly street that strengthens its economic viability and implements the Town's vision which includes:

- a denser pattern of development of the Route One area with activities day and night;
- a variety of uses including residential;
- an emphasis on pedestrians and sidewalks; and
- attractive landscaping that appeals to both businesses and shoppers

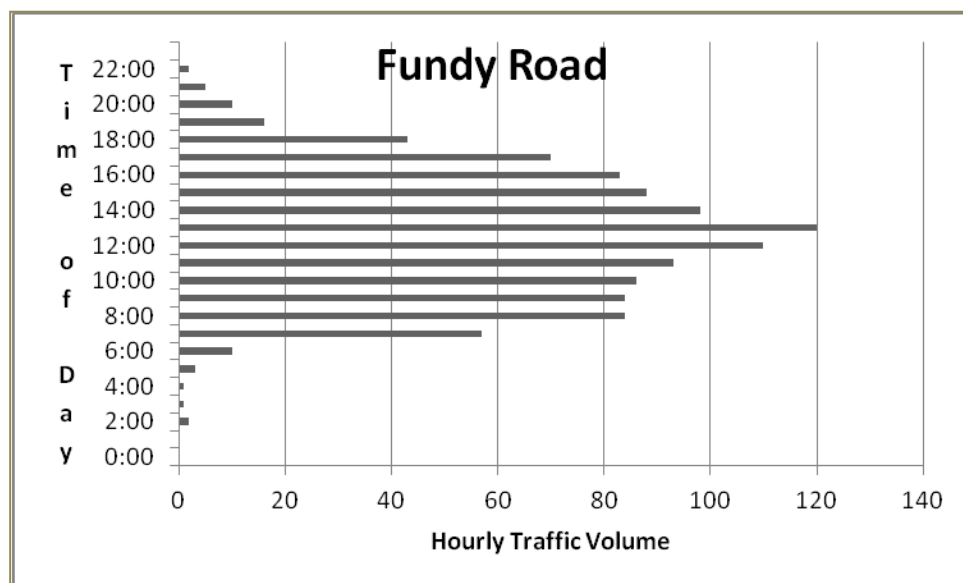
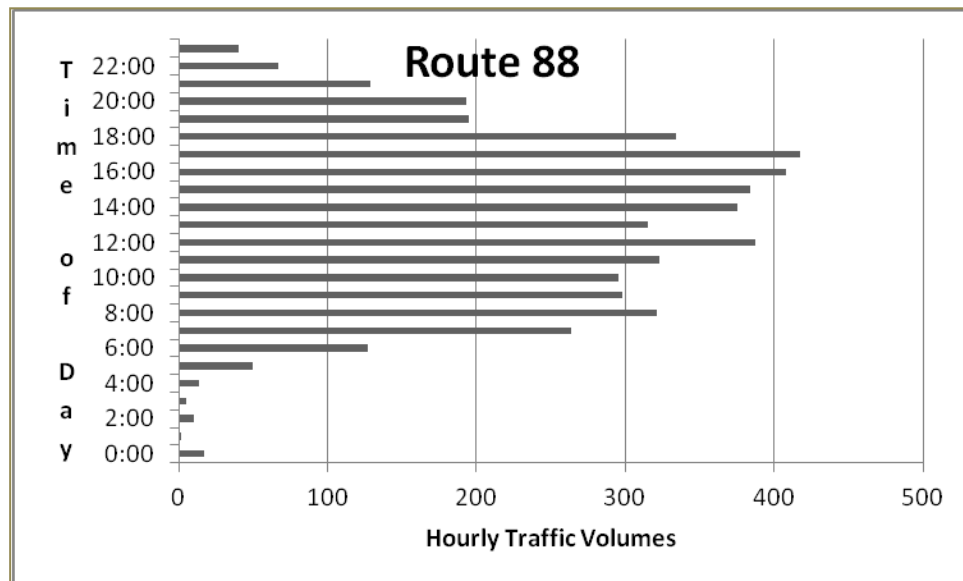
This document serves as the first phase of the plan and contains documentation of existing conditions for transportation, infrastructure, and streetscape design elements.

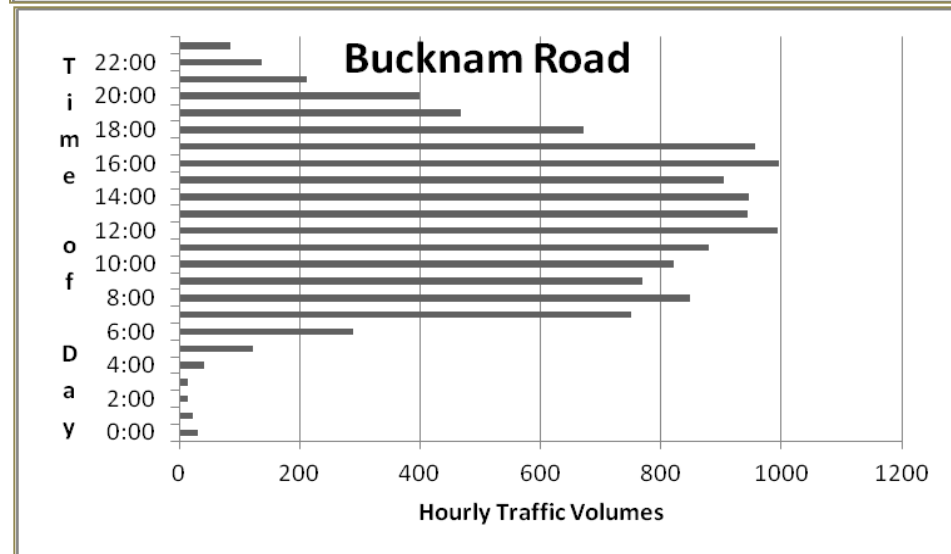
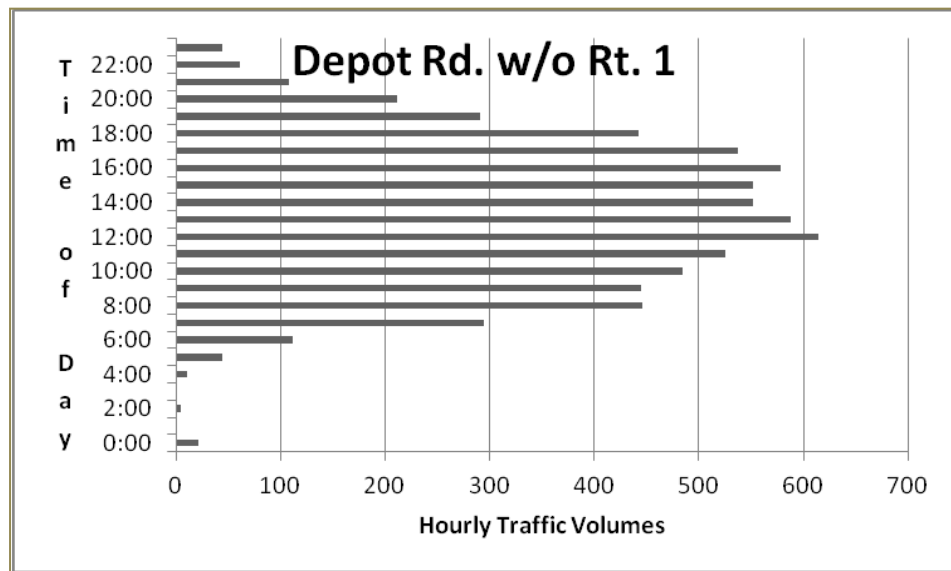
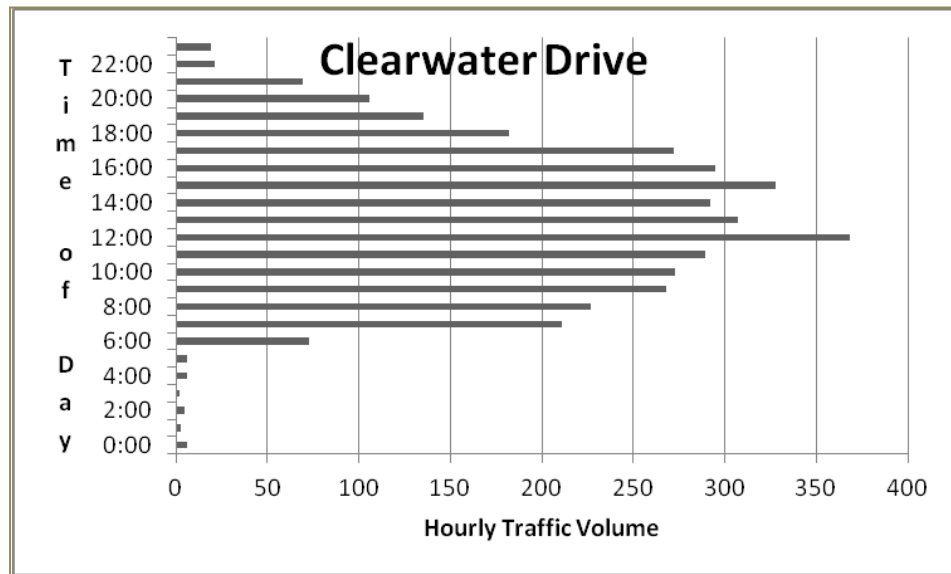


1.0 TRANSPORTATION INFRASTRUCTURE

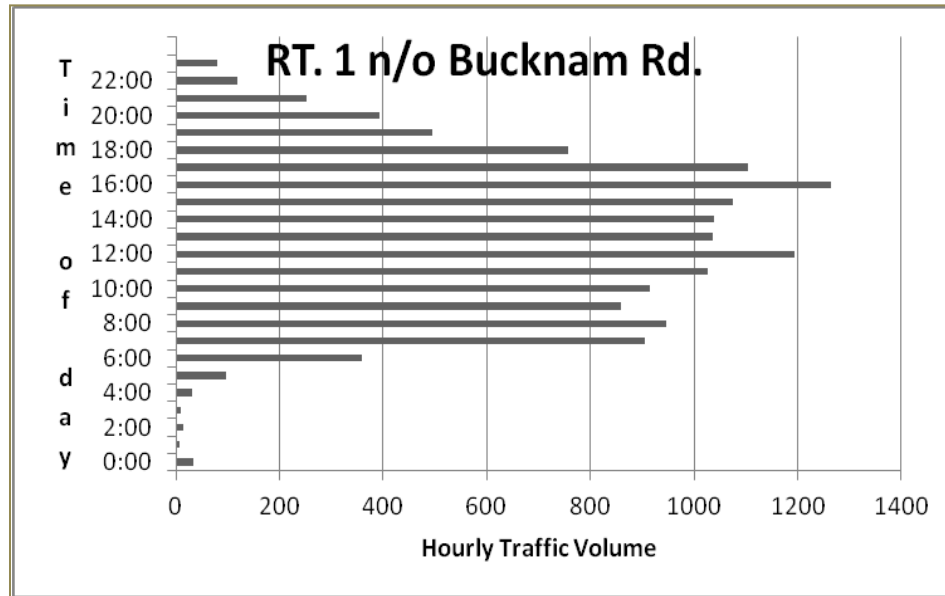
1.1 *Hourly Traffic Volume Variation*

The Maine Department of Transportation (MaineDOT) collected traffic volumes throughout the study area using automatic traffic recorder counters between Tuesday, August 23, 2011 and Friday, August 26, 2011. Refer to Figure 1-1 Key Plan which shows the overall study area. The following presents hourly volume distributions for key corridor locations and generally indicates that the highest traffic volumes occur between 7:00AM and 6:00PM on a typical weekday.





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In addition to getting a general sense of hourly traffic volume variation, we also reviewed peak hour traffic volumes to determine the most appropriate time period to evaluate roadway capacity adequacy. Traditionally, morning and evening time periods are used to assess capacity but following a preliminary review of traffic volumes along Route One, further investigation was warranted (due to lower morning traffic volumes). The following table presents a comparison of AM (8-9AM), Mid-Day (Noon – 1PM), and PM (4-5PM) peak hours to gain a better understanding of volume characteristics. As noted in the table, the Mid-Day and PM peak hour volumes are significantly higher than morning peak hour conditions. Following discussions with MaineDOT and Town staff, it was concluded that this study would include an evaluation of Mid-Day and PM peak hours.

EXISTING PEAK HOUR TRAFFIC VOLUME COMPARISON (BOTH DIRECTIONS)			
<i>Peak Hour Traffic Volume Comparison</i>	<i>AM Peak Hour (8-9AM)</i>	<i>Mid-Day Peak Hour (12-1PM)</i>	<i>PM Peak Hour (4-5PM)</i>
Route One and Route 88			
Route 88	325	387	408
Route One s/o intersection	1220	1423	1495
Route One n/o intersection	956	1165	1179
Total	2501	2975	3082
Route One and Fundy Road			
Shopping Center	41	49	53
Fundy Road	86	110	83
Route One s/o intersection	1012	1343	1301
Route One n/o intersection	1038	1343	1301
Total	2177	2845	2738
Route One and Clearwater Drive			
Clearwater Drive	280	368	295
Bangor Savings Bank	61	62	61

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Route One s/o intersection	1038	1343	1301
Route One n/o intersection	1031	1337	1286
Total	2410	3110	2943
Route One and Depot Road			
Depot Road w/o intersection	406	614	578
Depot Road e/o intersection	311	441	333
Route One s/o intersection	1169	1494	1393
Route One n/o intersection	1079	1482	1375
Total	2965	4031	3679
Route One and Bucknam Road			
Bucknam Road	769	892	1098
Falmouth Shopping Center	186	281	348
Route One s/o intersection	927	1350	1253
Route One n/o intersection	767	1194	1263
Total	2649	3717	3962

1.2 Turning Movement Counts

Intersection turning movement counts were conducted on Thursday August 25, 2011 between 6:00AM and 6:00PM at the following intersections:

- Route One/Route 88
- Route One/Fundy Road
- Route One/Clearwater Drive/Bangor Savings Bank
- Route One/Depot Road
- Route One/Bucknam Road/Falmouth Shopping Center

Figure 1-2 presents the Mid-Day and PM peak hour volumes at the above-noted intersections. No adjustment to the traffic volumes were incorporated because the counts were conducted during the busy summer period.

1.3 Daily Traffic Volumes

Average Annual Daily Traffic (AADT) volumes within the study area collected in August 2011 are presented in the following table and on Figure 1-2. These volumes were based upon the automatic counts collected in August and factored by MaineDOT to estimate AADT conditions.

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2011 AVERAGE ANNUAL DAILY TRAFFIC VOLUME	
Route One south of Route 88	15,620
Route 88 east of Route One	4,250
Route One north of Route 88	12,500
Forside Place	380
Route One south of Fundy Road	13,450
Fundy Road	880
Clearwater Drive	3,400
Route One north of Fundy Road	13,620
Bangor Savings Bank	610
Route One north of Clearwater Drive	13,270
Depot Road west of Route One	6,080
Route One south of Depot Road	14,960
Depot Road east of Route One	3,910
Route One north of Depot Road	14,390
Bucknam Road	10,680
Route One south of Bucknam Road	12,950
Falmouth Shopping Center	2,910
Route One north of Bucknam Road	12,030

1.4 Vehicle Classification

Vehicle classification information was obtained from the traffic counts conducted by MaineDOT for each intersection approach. The following table presents the percent of heavy vehicles (defined as single-unit and tractor trailer) for each study intersections.

% TRUCKS BETWEEN 6:00AM – 6:00PM	
Route One/Route 88	
Route One Southbound	2.1%
Route One Northbound	2.4%
Route 88	3.0%
Route One/Fundy Road/Falmouth Place	
Route One Southbound	2.0%
Route One Northbound	1.7%
Fundy Road	0.8%
Falmouth Place	1.5%
Route One/Clearwater Drive/Bangor Savings Bank	
Route One Southbound	2.1%
Route One Northbound	2.3%
Clearwater Drive	3.7%
Bangor Savings Bank	1.0%
Route One/Depot Road	
Route One Southbound	2.2%

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Route One Northbound	2.4%
Depot Road Eastbound	2.2%
Depot Road Westbound	3.0%
Route One/Bucknam Road/Falmouth Shopping Center	
Route One Southbound	3.0%
Route One Northbound	2.8%
Bucknam Road	3.4%
Falmouth Shopping Center	4.6%

1.5 Pedestrian Volumes

Pedestrian volume information was obtained from the MaineDOT traffic counts for each intersection approach. The following table presents the number of pedestrians for each study intersections collected during the 12-hour turning movement count.

# OF PEDESTRIANS BETWEEN 6:00AM – 6:00PM	
Route One/Route 88	
Route One Southbound	4
Route One Northbound	0
Route 88	0
Route One/Fundy Road/Falmouth Place	
Route One Southbound	1
Route One Northbound	3
Fundy Road	17
Falmouth Place	23
Route One/Clearwater Drive/Bangor Savings Bank	
Route One Southbound	3
Route One Northbound	6
Clearwater Drive	7
Bangor Savings Bank	24
Route One/Depot Road	
Route One Southbound	9
Route One Northbound	0
Depot Road Eastbound	2
Depot Road Westbound	1
Route One/Bucknam Road/Falmouth Shopping Center	
Route One Southbound	1
Route One Northbound	0
Bucknam Road	0
Falmouth Shopping Center	7

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1.6 Historical Traffic Volumes

Historical AADT information was obtained from MaineDOT for the study area between 2005 and 2011. The following presents the historical traffic volumes with growth patterns over the six year period. As noted traffic volumes have both increased and declined over the time periods noted.

HISTORICAL AVERAGE ANNUAL DAILY TRAFFIC VOLUMES					
Location	2011	2010	2007	2005	% Change 2005 to 2011
Route One south of Route 88	15,620	14,580	N/A	N/A	+7.1% (2010 to 2011)
Route 88 east of Route One	4,250	3,490	4,110	3900	+9.0%
Route One north of Route 88	12,500	12,260	12,800	N/A	-2.3% (2007 to 2011)
Route One south of Depot Road	14,960	14,200	16,740	15,360	-2.6%
Depot Road west of Route One	6,080	5,860	5,970	7,790	-22.0%
Depot Road east of Route One	3,910	3,580	3,600	3,360	+14.1%
Route One north of Depot Road	14,390	14,030	14,330	14,170	+1.5%
Route One south of Bucknam Road	12,950	13,070	12,640	12,190	+6.2%
Bucknam Road west of Route One	10,680	13,490	12,160	11,810	-9.6%
Route One north of Bucknam Road	12,030	N/A	12,960	10,930	+9.1%

1.7 Crash History

Crash data was obtained from MaineDOT for the most recent available three-year period (2008-2010) for Route One between the Turnpike Spur and Route 88. No locations (intersections or roadway segments) were identified as a High Crash Location (HCL) per MaineDOT criteria (8 or more crashes and a Critical Rate Factor greater than or equal to 1.0). The following table notes locations that had five or more crashes over the reported three-year period. Figure 1-3 graphically present these locations.

2008-2010 CRASH DATA			
Location	# of Crashes between 2008-2010	Yearly Average	Critical Rate Factor (CRF)
Route One/Clearwater Drive	8	2.67	0.46
Route One between Depot Road and Walmart Entrance	7	2.33	0.82
Route One/Depot Road	18	6.00	0.84
Route One between Depot Road and Bucknam Road	10	3.33	0.83
Route One/Bucknam Road	11	3.67	0.68
Route One/Bucknam Road Right-Turn to Route One Southbound	6	2.00	1.04

In addition to current crash information, a review of historical crash data was compiled for the period 2003 through 2007 and is summarized in the following table.

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2003-2007 HISTORICAL CRASH DATA			
Location	# of Crashes between 2003- 2007	Yearly Average	Critical Rate Factor (CRF)
Route One/Fundy Road	5	1.00	0.13
Route One/Clearwater Drive	15	3.00	0.55
Route One/Depot Road	25	5.00	0.73
Route One/Bucknam Road	23	4.60	0.75
Route One/Bucknam Road Right-Turn to Route One Southbound	9	1.80	0.97
Route One between Depot Road and Walmart Entrance	19	3.80	1.36
Route One between Depot Road and Bucknam Road	11	2.20	0.55

1.8 Intersection Level of Service

The standard used to evaluate traffic operating conditions of the transportation system is referred to as the Level of Service (LOS). This is a qualitative assessment of the quantitative effect of factors such as speed, volume of traffic, geometric features, traffic interruptions, delays, and freedom to maneuver. LOS analysis was based upon procedures detailed in the 2000 Highway Capacity Manual, Transportation Research Board. One of the standard programs used in traffic modeling is Synchro. However, Synchro may not accurately model closely spaced intersections. As such, SimTraffic was used in place of Synchro based on the fact that it better assesses the implication of closely spaced intersections, which currently contribute to spillback issues along Route One in the study area (spillback is when vehicles queuing at one intersection extend to a point where it blocks an adjacent intersection. Gridlock is a common term used to define spillback).

Signalized intersection LOS is based on average stopping delay per vehicle. The following table summarizes LOS categories and their associated delay.

SIGNALIZED INTERSECTIONS		
Level of Service	Average Delay Per Vehicle (sec.)	General Description
A	≤ 10	Very low vehicle delays, free flow, signal progression extremely favorable, most vehicles arrive during given signal phase.
B	>10 and ≥ 20	Good signal progression, more vehicles stop and experience higher delays than for LOS A.
C	>20 and ≥ 35	Stable Flow (Acceptable Delays) Stable flow, fair signal progression, significant number of vehicles stop at signals.
D	>35 and ≥ 55	Approaching Unstable Flow (Tolerable Delay) Congestion noticeable, longer

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		delays and unfavorable signal progression, many vehicles stop at signals.
E	>55 and ≥ 80	Unstable Flow (Intolerable Delay) Limit of acceptable delay, unstable flow, poor signal progression, traffic near roadway capacity, frequent cycle failures.
F	>80	Unacceptable delays, extremely unstable flow and congestion, traffic exceeds roadway capacity, stop-and-go conditions.

The measures of delay for each level of service rating for unsignalized intersections are found below:

UNSIGNALIZED INTERSECTIONS		
Level of Service	Average Delay Per Vehicle (sec.)	General Description
A	≤ 10	No delays at intersections with continuous flow of traffic. Uncongested operations: high frequency of long gaps available for all left and right turning traffic. No observable queues.
B	>10 and ≤ 20	Same as A
C	>20 and ≤ 30	Moderate delays at intersections with satisfactory to good traffic flow. Light congestion; infrequent backups on critical approaches
D	>30 and ≤ 40	Increased probability of delays along every approach. Significant congestion on critical approaches, but intersection functional. No standing long lines formed.
E	>40 and ≤ 50	Heavy traffic flow condition. Heavy delays probable. No available gaps for cross-street traffic or main street turning traffic. Limit of stable flow.
F	>50	Unstable traffic flow. Heavy congestion. Traffic moves in forced flow condition. Average delays greater than one minute highly probable. Total breakdown.

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The following tables summarize each intersection and movement - providing the delay (in seconds) followed by the Level of Service (A-F) for each movement. An overall Level of Service for each intersection is also provided. The analysis was conducted for both the weekday Mid-Day and PM peak hours. Figure 1-3 presents the LOS summaries for each study intersection. Additionally, 95th queues were estimated and provided in the following tables. The 95th queue is a queue length that is exceeded only 5% of the time and is commonly used for design purposes.

Key findings for each of the study intersections are summarized below:

ROUTE ONE @ ROUTE 88 – This intersection operates well with little vehicle queuing during both peak hours evaluated.

Route One @ Route 88 xxx – PM Peak Hour (xxx) – Mid-Day Peak Hour			
Movement	Level of Service	Delay (sec/veh)	95 th % Queue (feet)
Route 88 Left	B (A)	11 (10)	73 (50)
Route 88 Right	A (A)	7 (7)	0 (0)
Route One NB Thru	A (A)	1 (1)	12 (19)
Route One NB Right	A (A)	1 (1)	8 (8)
Route One SB Left	A (A)	10 (6)	41 (68)
Route One SB Thru	A (A)	1 (1)	0 (0)
Overall	N/A	N/A	N/A

ROUTE ONE @ FUNDY ROAD/FALMOUTH PLACE – Movements from the STOP sign controlled approaches do experience some delay, but it is not considered excessive. The analysis does indicate long queues on the northbound Route One approach, which is a sign of spill back from the Clearwater Drive signalized intersection.

ROUTE ONE @ FUNDY ROAD/FALMOUTH PLACE XXX – PM PEAK HOUR (XXX) – MID-DAY PEAK HOUR			
Movement	Level of Service	Delay (sec/veh)	95 th % Queue (feet)
Falmouth Place Left ⁽¹⁾	D (D)	36 (31)	61 (50)
Falmouth Place Thru	N/A	N/A	
Falmouth Place Right	A (A)	7 (7)	
Fundy Rd. Left	C (C)	25 (22)	82 (66)
Fundy Rd. Thru	N/A	N/A (46)	
Fundy Rd. Right	D (B)	31 (19)	
Route One NB Left	A (A)	10 (7)	36 (23)
Route One NB Thru	A (A)	8 (5)	334 (179)
Route One NB Right	A (A)	7 (3)	
Route One SB Left	A (A)	9 (7)	44 (44)
Route One SB Thru	A (A)	1 (1)	12 (18)
Route One SB Right	A (A)	1 (1)	
Overall	A (A)	1 (1)	N/A

(1) – LEFT TURNS ARE PROHIBITED BUT ILLEGAL MOVEMENTS OCCUR

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ROUTE ONE @ CLEARWATER DRIVE – This location operates well and little problems were identified with the exception of minor queuing on the southbound Route One approach.

ROUTE ONE @ CLEARWATER DRIVE XXX – PM PEAK HOUR (XXX) – MID-DAY PEAK HOUR			
Movement	Level of Service	Delay (sec/veh)	95 th % Queue (feet)
Clearwater Dr. Left	C (C)	25 (24)	106 (108)
Clearwater Dr. Thru	B (C)	15 (24)	
Clearwater Dr. Right	A (B)	10 (12)	61 (79)
Bangor Savings Bank Left	C (C)	23 (26)	46 (47)
Bangor Savings Bank Thru	B (B)	15 (19)	
Bangor Savings Bank Right	A (A)	8 (6)	
Route One NB Left	A (A)	7 (10)	78 (81)
Route One NB Thru	A (A)	4 (5)	121 (124)
Route One NB Right	A (A)	3 (3)	
Route One SB Left	B (B)	12 (11)	41 (50)
Route One SB Thru	A (A)	5 (7)	156 (245)
Route One SB Right	A (A)	5 (7)	
Overall	A (A)	7 (8)	N/A

ROUTE ONE @ DEPOT ROAD – This location also operates at a good level of service, although some movements are approaching poor conditions. Another concern noted in the analysis are long vehicles queues (approximately 20 vehicles), on northbound Route One.

ROUTE ONE @ DEPOT ROAD XXX – PM PEAK HOUR (XXX) – MID-DAY PEAK HOUR			
Movement	Level of Service	Delay (sec/veh)	95 th % Queue (feet)
Depot St. EB Left	C (C)	29 (32)	87 (88)
Depot St. EB Thru	B (C)	20 (24)	136 (194)
Depot St. EB Right	A (B)	10 (15)	
Depot St. WB Left	C (D)	24 (51)	119 (257)
Depot St. WB Thru	C (D)	23 (49)	
Depot St. WB Right	B (D)	18 (40)	
Route One NB Left	C (C)	31 (34)	89 (89)
Route One NB Thru	C (C)	23 (23)	557 (462)
Route One NB Right	B (B)	19 (17)	
Route One SB Left	D (D)	44 (37)	62 (68)
Route One SB Thru	B (B)	14 (16)	218 (272)
Route One SB Right	A (B)	10 (13)	
Overall	C (C)	21 (24)	N/A

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ROUTE ONE @ BUCKNAM ROAD/FALMOUTH SHOPPING CENTER – This location operates at excellent levels, overall and for individual movements, and operationally little delay is experienced. Vehicles queues approach over 10 vehicles waiting for the signal.

ROUTE ONE @ BUCKNAM ROAD/FALMOUTH SHOPPING CENTER			
XXX – PM PEAK HOUR			
(XXX) – MID-DAY PEAK HOUR			
Movement	Level of Service	Delay (sec/veh)	95 th % Queue (feet)
Bucknam Rd. Left	C (C)	33 (32)	145 (128)
Bucknam Rd. Thru	B (B)	18 (20)	93 (93)
Bucknam Rd. Right	A (A)	8 (9)	48 (66)
Falmouth Shopping Ctr Left	B (C)	19 (22)	40 (39)
Falmouth Shopping Ctr Thru	B (B)	20 (20)	91 (69)
Falmouth Shopping Ctr Right	B (A)	11 (10)	66 (50)
Route One NB Left	B (B)	19 (16)	144 (129)
Route One NB Thru	B (A)	11 (9)	273 (225)
Route One NB Right	A (A)	9 (8)	
Route One SB Left	B (B)	19 (15)	66 (63)
Route One SB Thru	C (B)	21 (14)	232 (186)
Route One SB Right	A (A)	9 (7)	108 (75)
Overall	B (B)	16 (13)	N/A

1.9 Transportation Infrastructure Inventory

A detailed inventory of existing transportation facilities along the corridor was performed and is summarized below and graphically presented on Figures 1-4 through 1-8.

1.9.1 Sidewalks

Sidewalks in the study area are bituminous concrete with widths ranging from 5 to 6 feet. Esplanades have generally been provided between curb and sidewalk with varying widths.

In the northbound direction, sidewalk begins across from Waldo's and extends to just beyond Depot Road. Esplanade widths range from 3.5 feet at Morong to 13.5 feet in front of Bangor Savings Bank. There is a spur sidewalk from Shaw's that leads to a mid-block crossing in front of Falmouth Village.



In the southbound direction, sidewalk begins at the Irving driveway entrance and extends to the Route 88 intersection. Esplanade widths range from 4.5 feet in front of Simply Home to 13 feet at TD Bank. As the sidewalk enters the Route 88 intersection area, it becomes a 5.5-ft sidewalk with no esplanade. Along this sidewalk, approximately halfway through the intersection area, there is signage and a ramp for a



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bicycle crossing across Route One (no crosswalk markings are provided at this location).

1.9.2 Crosswalks

There are generally three types of crosswalks provided in the study area, Parallel Lines, Duratherm Stamped, and Block Design markings. A summary of locations is presented below:

ACROSS ROUTE ONE

- @ Waldo's – Block Design
- @ Morong Sales – Duratherm
- @ Falmouth Shopping Center – Duratherm

ROUTE ONE APPROACHES

- Southbound Approach to Clearwater Drive – Duratherm
- Northbound Approach to Clearwater Drive – Parallel Lines
- Approaches to Depot Road – Duratherm

SIDE ROADS

- Depot Road Approaches to Route One – Parallel Lines
- Clearwater Drive Approach to Route One – Parallel Lines

DRIVEWAYS

- Morong Sales Drives – Block Design
- Morong Service – Block Design
- Foreside Place – Block Design
- Bangor Savings Approach to Route One – Parallel Lines
- Walmart Drive – Parallel Lines
- Falmouth Village – Block Design
- Key Bank – Parallel Lines
- Key Bank/Irving – Block Design
- Falmouth Shopping Center Drive – Block Design



1.9.3 Bicycle Facilities



Dedicated on or off-road bicycle facilities are not provided within the study corridor. Signage for a bicycle crossing across Route One is provided along the southbound side of Route One at the Route 88 intersection. This sign is provided for guidance only and directs bicyclists to Route 88 when traveling southbound on the sidewalk.

Route One shoulder space varies substantially throughout the corridor and in some locations where shoulder widths range from 4 to 7 feet, desirable on-road bicycle accommodations are achieved. A summary of roadway shoulder widths is presented below:

- Between Route 88 and Clearwater Drive
 - Left Shoulder - 2 to 7 feet
 - Right Shoulder – 2 to 6 feet

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- Between Clearwater Drive and Depot Road
 - Left Shoulder – 1.5 to 3 feet
 - Right Shoulder – 2 to 5 feet
- Between Depot Road and Bucknam Road
 - Left Shoulder – 1.5 to 4 feet
 - Right Shoulder – 2 to 5 feet

1.9.4 Regulatory Signage

The following presents a summary of regulatory signs posted within the study area.

Route One Northbound

- 35 mile per hour (MPH) Speed Limit
- Overhead Lane Assignment
- Advanced Pedestrian Crossing Warning
- Overhead Lane Assignment
- Left Turn Yield on Green Ball on Depot Road Span Wire
- 30 MPH Speed Limit
- Post Mounted Lane Assignment
- Advanced Pedestrian Crossing Warning
- Left Turn Yield on Green Ball on Bucknam Road Span Wire



Route One Southbound

- 35 MPH Speed Limit
- Post Mounted Lane Assignment
- Left Turn Yield on Green Ball on Bucknam Road Span Wire
- Advanced Pedestrian Crossing Warning
- Left Turn Yield on Green Ball on Depot Road Span Wire
- Overhead Lane Assignment
- Advanced Pedestrian Crossing Warning
- Overhead Lane Assignment
- 40 MPH Speed Limit



1.9.5 Intersection Geometry Details

1.9.5.1 Roadway Geometrics

Of the four study area intersections within the corridor, all but Depot Road intersect at 90 degrees to Route One. Depot Road intersects Route One at approximately 60 degrees to

Route One. These intersecting roadways are all two-lane roads. Fundy Road is the only unsignalized study area intersection within the corridor. Travel lanes are 12 feet wide.

The maneuverability of various vehicles was evaluated at these intersections utilizing AutoTURN software. All passenger vehicles can easily perform all turning movements at these intersections. Small trucks and school buses can also make these turns, but occasionally may move slightly into the middle lane (dual turn lane) or opposing traffic lane to traverse an intersection without going over the curb. Trucks with larger wheel bases (WBs) were also evaluated. Design vehicles WB-50, WB-62, and WB-67 have difficulty making these turns without entering the middle or opposing traffic lane to traverse the intersection without going up over the curb.

1.9.5.2 Roadway Characteristics

Route One beginning at Route 88 transitions to a three-lane roadway where one lane is provided in each direction and a center two-way left turn lane (CTWLTL) is provided for turn maneuvers. The CTWLTL transitions to dedicated left turn lanes at Clearwater Drive, Deport Road, and Bucknam Road. A variation in this section exists at the Walmart Shopping Center where a deceleration lane is provided. North of Bucknam Road, Route One becomes a two-lane roadway as it transitions to a suburban higher speed facility. A dedicated turn lane is provided for left-turn movements entering Norway Savings Bank/Forside Tavern Restaurant.

1.9.5.3 Roadway System

Route One in the study area is classified as a Major Urban Collector and is not designated as part of the National Highway System. In simplistic terms, "functional classification" reflects a highway's balance between providing land access versus mobility. Functional classification is the process by which public streets and highways are grouped into classes according to the character of service they are intended to provide. Generally, highways fall into one of four broad categories-- principal arterial, minor arterials, collector roads, and local roads. Arterials provide longer through travel between major trip generators (larger cities, recreational areas, etc.); and collector roads collect traffic from the local roads and also connect smaller cities and towns with each other and to the arterials: local roads provide access to private property or low volume public facilities. The definition of a Collector Street is noted below and definitions of the all roadway classifications are noted in the Appendix.

Collectors:

- Rural: Generally serve travel of primarily intra-county rather than statewide importance and travel distances are shorter than arterial routes.
 1. Major Collector Roads: (a) Serve county seats not on arterial routes, larger towns not directly served by higher systems (b) link nearby larger towns, or cities, or with route of higher classifications (c) serve more important intra-county travel corridors which could connect consolidated schools, shipping points, important agricultural areas, etc.
 2. Minor Collector Roads: Spaced consistent with population density to accommodate local roads within reasonable distance of collector roads. Provide service to smaller communities. Link locally important traffic generators with the arterial system.

- Urban: Provide both land access and traffic circulation within urban residential neighborhoods and commercial and industrial areas in federally designated Urban Areas. Route density is much higher than in rural areas.

1.9.5.4 Stopping Sight Distance

Stopping sight distance is a controlling design criteria for roadways and is the sum of the distance traveled during driver perception / reaction time (2.5 seconds) and the distance traveled while braking to a stop. According to the MaineDOT Highway Design Guide, for the basically level alignment along Route One and a posted speed limit of 35 MPH, required sight distance is 250 feet.

There appears to be more than adequate sight distance available along the study corridor. Intersecting side roads with posted speed limits of 25 and 30 MPH appear to have the required stopping sight distances ranging from 155 to 200 feet, respectively.

1.9.5.5 ADA Compliance

Title II of the Americans With Disabilities Act (ADA) requires state and local governments to make pedestrian crossings accessible to people with disabilities by providing curb ramps. To comply with ADA, the curb ramps provided must meet specific standards for width slope, cross slope, placement, and other features. Ramp design criteria include the following:

- Ramp slope must be 8.33% or less (1:12).
- Cross slope cannot exceed 2%.
- Ramp must be at least 3 feet wide, not including flared sides.
- Ramp must have detectable warnings (dome-shaped bumps) that extend the full width and depth of the ramp.
- Rise is the vertical change measured from the low point (base of curb) at the high point on the other side. Since sidewalks have a cross slope to direct water toward street, the rise of the curb ramp is often greater than the curb reveal height.
 - Ramp run may have a running slope of up to 10% (1:10) if the rise is no more than 6 inches.
 - Ramp run may have a running slope of up to 12.5 % (1:8) several of the existing sidewalk ramps have detectable warning panel surfaces.

There are 88 sidewalk ramp locations within the study area, including several ramps across business driveways. Warning panels have been provided at 21 of these locations (refer to Figures 1-4 through 1-8). However, most of these warning panels are constructed of brick pavers that do not have the detectable warnings (dome-shaped bumps) outlined in ADA guidelines. Some of the ramps at intersections are at the corner of the intersection rather than 90 degrees to the each roadway approach as outlined in ADA guidelines. During the Future Conditions work, a table will be created for each ramp location outlining recommended improvements – type of warning field, reconstruction to improve slopes, etc.

1.9.5.6 Driveway Characteristics and Access Management

An evaluation of property access was performed along the study corridor. This assessment reviewed the number of driveways provided for each property, driveway

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width, and driveway separation and whether properties meet Town standards. The Town currently has the following standards:

- One driveway is permitted for properties with street frontages of 200 feet or less. For properties with street frontages greater than 200 feet, one driveway per 200 feet of street frontage is permitted.
- For commercial land uses, a one-way driveway may have a width of 15 to 30 feet and for two-way driveways 25 to 35 feet is permitted.
- For two-way driveways, 100 feet of separation is required. One-way drives require 75 feet of separation.
- Driveways require a 200 foot separation distance between curb cuts on the same lot or adjoining premises. This is the required separation standard for Route One within the study area with the exception of Residential area zoning near Route 88.

The following table summarizes the results of the evaluation.

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Property	# of Driveways		Driveway Width		Driveway Separation	
	#	Meet Standard?	Width (feet)	Meet Standard?	Separation (feet)	Meet Standard?
Route One Northbound – West; Beginning North of Route 88						
A Perfect Smile	1	Yes	20	Yes	>200	Yes
170 U.S. Route One	1	Yes	24	Yes	<200	No – with abutting Driveway
Simply Home	2	No	20/24	Yes	<200	No – with abutting Driveway
Falmouth Veterinary Hospital	1	Yes	22	Yes	<200	No – with abutting Driveway
Waldo's General Store	2	No	30/32	Yes	<200	No – with abutting Driveway
Falmouth Physical Therapy	1	Yes	22	Yes	<200	No – with abutting Driveway
People's United Bank	1	Yes	40	No	<200	No – with abutting Driveway
190 U.S. Route One	1	Yes	30	Yes	<200	No – with abutting Driveway
Morong Falmouth	1	Yes	50	No	>200	Yes
TD Bank	1	Yes	42	No	>200	Yes
Falmouth Place	1 ¹	Yes	30	Yes	>200	Yes
Walmart Shopping Center ²	3	No	18/50/18	No	<200	No – with abutting Driveway
The Shops at Falmouth	2	Yes	15/50	No	>200	Yes
Key Bank (Starbucks)	2	No	40/45	No	<200	No – with abutting Driveway
Lil' Mart (Irving)	1 ¹	Yes	40	No	<200	No – with abutting Driveway
Norway Savings Bank/ Foreside Tavern	2	Yes (one is shared)	24/32	Yes	>200	Yes
Route One Northbound – East; Beginning North of Route 88						
S.F. Residence	1	Yes	~ 15	Yes	>100	Yes
Falmouth Antiques & Furniture	2	No	40/40	No	<200	No – with abutting Driveway
Morong Falmouth	2	No	20/24	Yes	<200	No – with abutting Driveway
Allen Sterling & Lothrop Garden Center	2	No	24/30	Yes	<200	No – with abutting Driveway
Falmouth Inn	1	Yes	40	No	<200	No – with abutting Driveway
Bangor Savings Plaza	1 ¹	Yes	32	Yes	>200	Yes
Subway/Dunkin Donuts	1	Yes	30	Yes	<200	No – with abutting Driveway
Five County Credit Union	1	Yes	24	Yes	<200	No – with abutting Driveway
McDonald's	1 ¹	Yes	30	Yes	>200	Yes
Dry Cleaners	1 ¹	Yes	30	Yes	>200	Yes
Falmouth Shopping Center ³	4 ¹	Yes	20/65/70/70	No	<200	No – with abutting Driveway
Bath Savings Institution	2 (one-way)	Yes	24/24	Yes	<200	No

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- ¹ Along Route One
² Driveways include Wendy's, Walmart main entrance, and entrance to Walmart / Carriage House Square
³ Driveways include Rite Aid, entrance in front of Shaw's, entrance at Bucknam Road signal, and driveway at Irving

As noted in the table, there are several properties that are non-compliant when considering the Town's access management standards. In general, overall access management is good, as most properties have only one driveway and in many cases separation standards are met. The most prominent issue is the excessive width of driveways.

1.9.5.7 *Traffic Calming*

An important consideration in providing a "Complete Street" from a multi-modal transportation perspective is the speed in which vehicles travel along a roadway. Higher vehicle speeds correlate to a greater probability of severe injury and fatalities for pedestrians when involved in a vehicle crash. In the case of Route One, it is important to have design elements that ensure travel speeds are consistent with geometric features and regulatory speed limits. In some cases "traffic calming" strategies such as speed tables, curb extensions, and narrow travel lanes are implemented to ensure safe vehicle speeds. From our field observations, travel speeds in the primary commercial core (between Fundy Road and Bucknam Road) seem to be reasonable or compliant with the posted speed limit. No actual speed data is available. No specific traffic calming features currently exist within the study corridor, although there are features like sidewalks, streetscape elements, and building placement that help to visually cue motorists that high speeds are not appropriate.

1.9.6 **Traffic Signals**

Three intersections within the study area are controlled by traffic signals (Clearwater Drive, Depot Road, and Bucknam Road) with the following details:

Route One/Clearwater Drive

- Span wire supported signal.
- Fully actuated (an actuated signal has detection for all turn movements and the signal phasing and timing is adjusted according to demand).
- Left-turn protected phases on Route One.
- Pedestrian signal equipment on all approaches.

Route One/Depot Road

- Span wire supported signal.
- Fully actuated.
- Left-turn protected phases on Route One.
- Pedestrian signal equipment on all approaches.

Route One/Bucknam Road/Falmouth Shopping Center

- Span wire supported signal.
- Fully actuated.
- Left-turn protected phases on all approaches.
- No pedestrian signal equipment.



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From a corridor system perspective, the three study traffic signals operate independently of each other. This type of system does not provide optimal system-wide efficiency. Coordination of the traffic signals should be considered as a recommendation.

1.9.7 Bus Stops

METRO's Route 7 traverses the Route One study corridor with 9 formal bus stops – 6 in the northbound direction and 3 in the southbound direction. They are at the following locations:

Northbound

- Across from Simply Home
- In front of the antique business (formerly Portland Saab)
- At Allen Sterling & Lothrop Garden Center
- Across from Walmart
- At McDonald's/Pratt Abbott
- Between Depot Road and the Rite-Aid entrance

Southbound

- Just beyond the TD Bank driveway (directly across from Allen Sterling & Lothrop northbound bus stop)
- In front of Falmouth Village
- Just before Waldo's



METRO provided survey information on the number of bus passengers getting on and off buses along Route One during the Weekday and Saturday operation periods. The data was collected in 2010.

METRO 2010 Bus Ridership Survey				
Bus Stop Location	Weekday		Saturday	
	On	Off	On	Off
Northbound				
ROUTE 88	0	0	0	2
FORMER SAAB (NOW ANTIQUE/REAL ESTATE)	0	0	4	2
ALLEN STERLING & LOTHROP	0	2	7	8
SUBWAY	0	1	1	6
MCDONALD'S	0	5	6	51
HAT TRICK DRIVE	0	3	1	10
WALMART	6	41	0	0
LUNT ROAD	0	0	10	19
SHAW'S	4	24	0	2
MMC	0	0	0	0

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Southbound				
DEPOT ROAD	0	1	0	0
SHAW'S	22	4	16	10
PET QUARTERS	0	0	0	0
HAT TRICK DRIVE	0	0	11	6
WALMART	48	2	57	1
FORESIDE ESTATES	0	0	1	0
190 U.S. ROUTE ONE	0	0	0	0
WALDO CITGO	0	0	0	0
ROUTE 88	0	0	0	0

Section 1 Transportation Infrastructure

Questions / Key Issues / Conclusions

PEDESTRIAN

General Conclusions

- Good visible crosswalks are provided.
- Sidewalks are provided throughout most of the corridor and on side streets, however there are gaps in the system. Gaps should be filled.

Questions

- Should a standardized crosswalk style be provided?
Draft Staff Comments:
 - Yes, but Duratherm should not be the standard. A block design seems more appropriate for a downtown/Main Street feel.
- Are curb extensions acceptable?
Draft Staff Comments:
 - Yes, in certain locations.
- Should median refuge islands be provided?
Draft Staff Comments:
 - Yes, at mid-block crossings, and any non-signal activated crossings.
- Should curb ramps be upgraded to better comply with ADA guidelines?
Draft Staff Comments:
 - Yes. A standardized Detectable Warning Surface material type (plastic, cast iron, etc.) and color should be selected and installed at all curb ramp locations to ensure ADA compliance. This is included in the TIF development program as a stand-alone project.

Section 1 Transportation Infrastructure

Questions / Key Issues / Conclusions

BICYCLE

General Conclusion

- No specific bicycle provisions are provided in the study corridor.
- In some areas shoulder space is provided.

Questions

- Should on-road accommodations (bicycle lanes or shoulder space) be provided?

Draft Staff Comments:

- Yes. The Town could minimize width of vehicular lanes and reallocate this paved area(s) to the shoulder (and keep the same curb-line). Care must be taken while reviewing appropriateness of dedicated facilities to strike a balance between on road specific facilities vs. wide shoulders vs. common shared lanes with no shoulder/edge lines. The intersection with Route 88 must be re-evaluated as the current bicycle facilities are confusing, inappropriate, and a safety consideration. On-street parking may need to be eliminated as a design option.
- Should a parallel multi-use shared use path be considered?

Draft Staff Comments:

- If the goal is to create a village design, adding a shared path would be inconsistent as the travel way would accommodate bicycles and the sidewalk pedestrians. A multi-use shared path should only be considered if on-street parking is constructed and would involve widening the existing sidewalk from a pedestrian only 4-5' width to 8-10' to meet a multi-use standard.

Section 1 Transportation Infrastructure

Questions / Key Issues / Conclusions

TRAFFIC SIGNALS

General Conclusions

- Overall traffic signals are efficient from an isolated intersection perspective.

Questions

- Should traffic signals be coordinated for improved efficiency?

Draft Staff Comments:

- Yes. This is typically done through PACTS region wide program. The cost of this should be weighed as it may not be an efficient use of funds given the current levels of service at the intersections within the study area.

- Should signal supports be upgraded to mast arm support for improved aesthetics?

Draft Staff Comments:

- Yes.

- Should pedestrians signal phasing be concurrent (pedestrians cross with parallel traffic) or exclusive (all traffic is stopped as pedestrians move)?

Draft Staff Comments:

- Staff suggests further study. If deemed appropriate, exclusive phasing should be considered in high use areas as there is plenty of “wiggle room” within the existing delay times and levels of service to add pedestrian only movements at the intersections. It is likely that the pedestrian volumes do not warrant the dedicated signal phases.

INTERSECTION CAPACITY

General Conclusions

- Overall intersection performance (e.g. vehicle delay) is acceptable.
- Vehicle queues can be long between Depot Road and Clearwater Drive in the northbound direction.

Section 1 Transportation Infrastructure

Questions / Key Issues / Conclusions

INTERSECTION CAPACITY (Continued)

Questions

- What level of service standard is considered acceptable? Should lower standards be considered to ensure a balanced transportation system?

Draft Staff Comments:

- Narrowing travel lanes and lowering speeds would likely increase delay times and corresponding lower levels of service. However, with most intersections operating at LOS A-C, there appears to be plenty of delay time capacity to reduce speeds and widths. Reduced speed limits may actually increase traffic capacity. Also, in a village setting lower standards are more often tolerated and sometimes even desired. If this is pursued, private development needs to be commensurate.

ROADWAY CHARACTERISTICS

Questions

- Is it acceptable to eliminate the free-flow channelized right-turn lanes at Bucknam Road? We advocate elimination given their poor safety record, particularly with pedestrians and bicyclists.

Draft Staff Comments:

- Yes. Many users of the right turn lane appear not to yield to the left turning traffic from Route 1 NB onto Bucknam Road. Elimination of the turn lane will only enhance safety, but may require MDOT approval.
- Should the deceleration lane into Walmart be eliminated?

Draft Staff Comments:

- Yes, especially with the new traffic patterns internal to the site that were just approved for the Walmart expansion and if bicycle infrastructure in this area is considered.

ROADWAY GEOMETRY

General Comments

- There is generally acceptable stopping sight distance through the study area.

Section 1 Transportation Infrastructure

Questions / Key Issues / Conclusions

ROADWAY GEOMETRY (CONTINUED)

Questions

- Should lane widths be 12 feet or possibly narrow to 11 feet?
Draft Staff Comments:
 - Yes, narrow to 11 feet.
- Some driveways have large radii that complicate pedestrian movement. How should this condition be avoided?
Draft Staff Comments:
 - This is currently prescribed in the design guidelines, but not promulgated in the ordinance. The Town may want to be proactive and write some governing policy that states that future redevelopment triggers a curb radii retrofit.

DRIVEWAY ACCOMMODATION / ACCESS MANAGEMENT

General Comments

- Generally good access management conditions exist within the corridor.
- Many driveways are very wide.

Questions

- Should recommendations look at narrowing existing driveways?
Draft Staff Comments:
 - Yes, consider narrowing driveways where appropriate. How would this impact previously-issued TMPs and site plans in the corridor?
- Is vehicle encroachment (infrequent truck movements use entire width of driveway to make maneuver) allowable?
Draft Staff Comments:
 - Yes.

CRASH DATA

General Comments

- No locations within the study area are High Crash Locations per MaineDOT criteria.

2.0 UTILITY INFRASTRUCTURE

2.1 *Overview*

A review has been performed of available information for various existing utilities within the study area. Much of the data was obtained from communications with representatives of various utility companies and the Town. There will be an additional meeting with utility company representatives to gather more information about the capacity and condition of existing infrastructure and to discuss future upgrades. This meeting will be held after the Future Conditions Infrastructure Plan is further developed so that proposed future needs can be conveyed to the utilities.

2.2 *Sanitary Sewer*

Woodard & Curran communicated with Pete Clark, superintendant of the Falmouth wastewater treatment facility with regards to the sanitary sewer in the study area. Record drawings of the sewer were provided for reference.

The study area is serviced by three separate segments of gravity sanitary sewer. The sewer is 8-inch asbestos cement pipe that was designed and installed in 1969-1970. The locations of the gravity sewer in Route One are shown on the attached Figures 2-1 to 2-6.

Typical sewer manhole spacing ranges from 300' to 400'. Many of the sewer manholes are located within the sidewalk esplanade, not within vehicle or pedestrian travel-ways.

In addition to the gravity sewer main, a 14" sewer forcemain crosses Route One at Clearwater Drive. The Town's Richard B. Goodenow Wastewater Treatment Facility is located on Clearwater Drive.

Two sections of Route One within the study area do not currently have sewer within the Right-of-Way (ROW). One section is located approximately 2,300' to the south of Clearwater Drive. According to the sewer record drawings, this 275' section of road contains a 36" water main which crosses Route One, restricting the installation of a sewer line. Properties along this short section of Route One currently utilize the adjacent sewer segments within Route One for sewer service.

A 640' length of Route One starting at Depot Road and extending south towards Clearwater Drive also does not have a sewer main in the ROW. Existing properties along this section of Route One currently utilize cross country sewers or sewer mains within roadways adjacent to these properties for sewer service. The need for a sewer main in this area, and the restrictions to its installation will be evaluated as necessary, considering changes proposed as part of the Future Conditions Plan.

At the time of sewer construction, capped pipe stubs were left at the ends of the three segments of gravity sanitary sewer to accommodate future extensions as roadway grades allow. The locations of these stubs are shown on Figures 2-1 to 2-6.

From speaking with Pete Clark, there are no current concerns with regard to sewer capacity in the area, and there are no immediate plans for upgrades. Future development of currently

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undeveloped areas on Clearwater Drive may require the extension of the existing sewer lines on Clearwater Drive. Further consideration for expansion, upgrade, or relocation needs within Route One will occur when more information is prepared as part of the Future Conditions Plan.

2.3 *Stormwater*

Stormwater infrastructure in Town and along Route One is mapped part of the Town's GIS data system. This data was utilized as part of a Maine State Planning office study, "Stormwater Assessment and Retrofit Inventory for State Roadways in Cumberland and Falmouth, ME," completed by Hillier & Associates, Inc. in 2006. Woodard & Curran referenced this study in its evaluation of existing stormwater infrastructure.

Drainage from within the Route One study area is collected and conveyed primarily by a catch basin and closed pipe drainage system. Figures 2-1 to 2-6 show the approximate locations of storm drain pipes and catch basins along and within Route One. Ditches in some areas along the sides of Route One also direct drainage to the stormwater system. Stormwater systems exist on private properties adjacent to Route One. These systems outside of the ROW have not been shown on Figures 2-1 to 2-6, except where necessary for clarity.

Route One is primarily curbed along the length of the study area, directing water from the roadway to catch basins. Catch basin inlets within the study area consist of a mix of curb inlets and standard grates without curb inlets.

Route One both generates its own stormwater runoff and also collects stormwater runoff from adjacent roadways and private property. Stormwater is conveyed along Route One via open and closed drainage systems to several stormwater discharge locations. The project study area contains several stormwater outfalls. These include the following; east of Route One between Bucknam Road and the Maine Turnpike Falmouth Spur, east of Route One and north of the Shaw's Shopping Center Plaza, east of Route One on Depot Road, west of Route One on Depot Road and east of Route One behind Skillin's Greenhouses. These outfalls discharge into tributaries to Mill Creek.

There is currently no stormwater quality treatment for runoff generated by Route One. Stormwater treatment systems are in place on several private properties abutting Route One; however, the extent and condition of this treatment was not identified or researched as part of this evaluation. It appears that the detention basin in front of Starbuck's is within the ROW. As noted in Section 3.5, this may not be the most efficient use of this land.

Mill Creek is identified as the priority watershed in the Town of Falmouth Stormwater Management Plan. The designation of a priority watershed is a requirement under the Town's Municipal Separate Storm Sewer System discharge permit. The Maine Department of Transportation (MaineDOT) and the Maine State Planning Office conducted a study in 2006 to identify stormwater quality treatment options within the Route One corridor. Several possible retrofit opportunities were identified within the project area and one area was further evaluated by MaineDOT for retrofitting under their Surface Water Quality Protection Program. These opportunities for stormwater quality treatment will be evaluated as part of the Future Conditions Plan.

2.4 *Water*

Water service for the project area is provided by the Portland Water District (PWD). Woodard & Curran communicated with Jay Arnold from the PWD to obtain information about the water mains in the project area. Mapping showing the locations of the water main and hydrants in Route One was provided by the PWD. This information has been added to Figures 2-1 to 2-6.

Within the project area, the water main in Route One consists primarily of 20" and 24" pipe, and is part of a looped system. To the north, the water main extends beyond the intersection with the Falmouth Spur. To the south, the water main ends in Route One approximately 1,800' south of Clearwater Drive, where it leaves the roadway and runs cross country to the southeast to Route 88.

An additional water main consisting of 8" and 12" pipe extends along Route One, beginning 600' to the south of Clearwater Drive. This water main is not looped, and dead ends just before the intersection with Route 88.

Both water mains in Route One connect to a 36" cross country pipe that runs to the west towards I-295. The pipe material for all of the water mains in the study area is a mix of ductile iron and cement-lined cast iron pipes installed in the 1960s and 1970s. The PWD has indicated that there is an area within the study area on the west side of Route One, just north of the intersection with Route 88, that occasionally experiences problems with slope erosion, causing some problems for the water line. The PWD will be consulted on improvements to this area to be included as part of the Future Conditions Plan. There have been no other recent problems in the area and no upgrades are currently planned.

2.5 *Power/Communications*

Central Maine Power (CMP) poles are located primarily on the eastern side of Route One throughout the study area. The electric and communications infrastructure is primarily above ground, with a mix of above ground and underground services. Woodard & Curran communicated with Tom Atwood and Marshall Ripley of CMP to obtain information about the electrical utility in the area. Marshall has indicated that there are no existing issues with the electric utility in the study area, and there are no planned improvements.

The CMP poles also carry various communication utilities throughout the study area. Woodard & Curran contacted Scott Crockett of Oxford Networks with regards to their communication lines in the area. There are no existing problems, and there are no plans for improvements. Oxford Networks has fiber optic cables along Route One, ending just north of Route 88, providing telephone and internet service to the area. The main line cables are above ground, mounted on the CMP poles. Most services are also above ground; however, there are underground drops for services at a few businesses, including Morong Falmouth and Gorham Savings Bank. The Oxford Networks system also includes a pole mounted cabinet at the intersection of Route One and Bucknam Road.

Woodard & Curran contacted Stan Thompson and Mark Pelletier of Time Warner Cable (TWC) with regards to their infrastructure in the study area. TWC has primarily aerial cables mounted on the CMP poles within the study area. A few of their services have been installed underground. There are no issues with the current system, and there are no planned improvements.

Woodard & Curran contacted Scott Derrig of Fairpoint Communications. Scott has indicated that Fairpoint's communication lines consist primarily of aerial cables mounted on the CMP poles within the study area. Fairpoint representatives have not provided any feedback on the condition of the existing infrastructure or any plans for improvements.

The Figures 2-1 to 2-6 included with this report include an approximate location of the combined electrical and communication utility lines along the eastern side of Route One.

2.6 *Natural Gas*

Woodard & Curran contacted Sam Murray of Unitil, the natural gas distribution utility for Southern Maine. Route One in Falmouth is not currently serviced by natural gas, and there are no natural gas mains in the immediate study area. Previous discussions have taken place between Unitil and the Town related to the expansion of natural gas service into the project area from either the south or the west; however, several conflicting factors exist, including bridge crossings to the south and crossings with railroad tracks and I-295 to the west. Unitil also identified that they would need to increase the capacity of their distribution mains to the south to provide service to the project area from the south.

The Town is currently exploring other possibilities of providing natural gas service to the study area along Route One.

Section 2 Utility Infrastructure **Questions / Key Issues / Conclusions**

General Conclusions

- Existing utility infrastructure within the study area includes sanitary sewer, stormwater drainage, water, power and communications. Based on correspondence with utility companies and the Town, the existing utility infrastructure along the study area is in good condition and provides an adequate level of capacity and service to the existing properties along Route One, with no planned upgrades, replacements or expansions.
- Existing utility infrastructure within the study area does not include natural gas. We understand that the Town is currently working with Unitil to determine the options for natural gas delivery.
- Electrical and communications infrastructure within the study area, including main distribution lines and most services, consists of overhead lines. The Town would like to consider underground power and communications as part of the proposed plan, including the cost implications of this work.
- Existing stormwater drainage systems within the Route One ROW do not include stormwater quality treatment measures.

Section 2 Utility Infrastructure
Questions / Key Issues / Conclusions

Questions

- Should the proposed utility plan for the Route One ROW include natural gas?

Draft Staff Comments:

- The Town is currently exploring other possibilities of providing natural gas service to the study area along Route One.
- Should the proposed utility plan for the Route One ROW include provisions for stormwater quality treatment?

Draft Staff Comments:

- Rain gardens or appropriate “green” treatments may be considered as both water treatment and aesthetic improvement.

3.0 STREETScape

3.1 *Overview*

Route One has been transformed over the years into a well-landscaped commercial corridor. A variety of mature trees, shrubs, berms and garden beds provide an attractive visual “buffer” between the travel way and the parking lots located in front of the buildings. In terms of a traditional streetscape, the ROW generally lacks pedestrian amenities except for a sidewalk and the items noted below.

This overview of streetscape existing conditions is a starting point for identifying opportunities for improving the pedestrian experience within the Route One corridor as well as creating a leading edge place in terms of green infrastructure, energy efficiency, mobility options and an overall more vibrant public realm responding to the context of the corridor. While Route One must maintain the capacity of a major urban collector, there is the potential to transform the function and aesthetic to that of more of a “complete street.” It is important to note that any improvements to the streetscape of the ROW must be coordinated with mobility and infrastructure improvements and where possible strengthen the relationship with development outside the ROW.

3.2 *Sidewalk Geometry and Materials*

In general, the sidewalk is curvilinear in nature – with an esplanade ranging from three to twelve feet. The location and geometry of the sidewalks does not respond to the placement of buildings outside of the ROW, but appears to respond to the distance between the curb line and the ROW. The sidewalk is asphalt and averages four to five feet wide (see Figures 3-2 thru 3-4). South of Perfect Smile, the sidewalk is directly adjacent to the granite curb without an esplanade.

In general, sidewalks on the east side and the west side of the ROW do not have well-designed and safe connections to the uses along the corridor. Exceptions are the Falmouth Shopping Center and The Shops at Falmouth Village where pedestrian amenities and sidewalks are located within and along the edges of the parking lots.

3.2.1 Sidewalk Location:

East Side:

The sidewalk begins to the south at the Waldo’s crosswalk. This is also the location of a trailhead to conservation lands east of Route One and the beginning of the granite curbing running north along the corridor. A drainage swale runs south of the Waldo’s crosswalk to the Route 88 intersection as noted on Figure 3-2.

A continuous sidewalk runs from the Waldo’s crosswalk ending at the driveway to Rite Aid. There



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is no sidewalk between the Rite Aid Driveway and the southern entrance to the Falmouth Shopping Center, however a sidewalk system serving the Shaw's portion of the parking lot and the rear access to the Rite Aid and Depot Road connects with the Route One crosswalk across from Starbucks. This is a good example of pedestrian circulation outside the ROW.

There is no sidewalk between the southern entrance of the Falmouth Shopping Center and the Turnpike Spur. There is an un-curbed sidewalk along the Bangor Savings Bank frontage on Fundy Road. There is a sidewalk on the northern side of Depot Road running east to the back entrance of Rite Aid and the Falmouth Shopping Center.

West Side:

The sidewalk runs from the Route 88 / Route One Intersection (connecting to the Providence Avenue Neighborhood) north to the gas station just south of Bucknam Road. There is a sidewalk on the southern side of Clearwater Drive and the northern side of Depot Road. There are no sidewalks on Bucknam Road. It should be noted that a sidewalk runs along the northern side of the Walmart Shopping Center serving a Wendy's picnic area and eventually connecting to the current location of Regal Cinemas (the location of the approved expansion of Walmart).

The locations and types of crosswalks on both the eastern and western sides of Route One are detailed in Section 1.9.2 Crosswalks.

3.3 Lighting



In general, the corridor does not include any pedestrian-scaled "traditional" streetscape lighting. The location of high-pressure sodium "cobra head" high streetlights are noted on Figures 2-1 thru 2-6 and Figures 3-1 thru 3-5. The new Gorham Savings Bank has a plaza adjacent to the Clearwater Drive intersection and includes bollard lighting, but these appear to be outside of the ROW. The only traditional – and

deliberately designed - pedestrian-scaled streetscape lights in the study area are along the southern side of Clearwater Drive. There are approximately twelve metal-halide streetlights spaced 50' +/- on center. No Light Emitting Diode (LED) streetlights were identified within or adjacent to the corridor.



3.4 Landscape

As mentioned previously, the edge of the corridor includes extensive landscape buffering. The type of landscaping varies, but in general includes mature deciduous trees with under plantings.

Route One South Infrastructure Plan – Falmouth, Maine

Within the ROW, the landscape consists of a maintained lawn. The width of the lawn area corresponds with the width of the curb to ROW line. One exception to this type of landscaping is



what appears to be a public “park” on the southwestern corner of the of the Depot Road intersection. This space includes a lawn area and woods screened by evergreens at the intersection. As currently designed it is not an inviting or accessible space.

Overhead utilities run along the eastern side of the ROW, thus there are more trees along the western side of the corridor – and planted closer to the ROW – creating a stronger “wall” to what is often described as the “outdoor room” public realm. The trees

not only create a more pedestrian-friendly experience, but are key to the success of the existing landscaping along the corridor.

3.5 *Stormwater*

Open stormwater swales and detention basins are noted on Figures 3-1 thru 3-5. Bucknam Road north on both sides of Route One includes swales that have been naturalized with cattails and other wetland plants. A swale runs from on the eastern side of Route One south from the Waldo’s crosswalk to the Route One / Route 88 intersection.

Within the central commercial core of study area – from Simply Home to Bucknam Road – stormwater is managed by closed systems except for detention basins in front of Olympia Sports and Starbucks. This is a unique use – and not the most efficient use of land for stormwater management within the commercial core because these areas could be designed as aesthetically pleasing rain gardens, visual buffers or active civic space. This detention basin is partially within the ROW and could be an opportunity for public realm improvements.

As noted on Figures 3-1 thru 3-5, in addition to the Starbucks detention basin, there are several areas of ponding. One area of ponding is located at a low point on the corridor sidewalk in front of Olympia Sports. This creates a hazardous situation for pedestrians because they are required to leave the path and walk on the adjacent grassed slope to avoid water or ice in the colder months.



Further analysis of stormwater conditions will be completed in the next phase of this Plan by reviewing a previous study noted in Section 2.3 of green infrastructure / rain garden retrofit opportunities within the ROW.

3.6 *Wayfinding*



There are two typical “Town” wayfinding signs within the corridor. They are identified on Figures 3-3 and 3-4. The wayfinding sign located north of Bucknam Road on the west side of the corridor lacks any directional information. The sign is oriented to serve vehicles arriving from the north.

The second wayfinding sign is located on the western side of the ROW just north of Depot Road. The sign is faded and is oriented to serves vehicles arriving from the south.



3.7 *Public Space and Amenities*

There are no public spaces or pedestrian amenities (e.g., benches, lights, bus shelters, kiosks, trash receptacles, bicycle racks) located within the corridor except for the green space located at the southwestern corner of the Route One / Depot Road intersection and the new pedestrian-scaled street lights on the southern side of Clearwater Drive.

There are several quasi-public spaces adjacent to the corridor. The Falmouth Shopping Center includes a gazebo / trellis structure adjacent the sidewalk leading to the Route One crosswalk and the edge of the Rite Aid parking lot includes a small plaza defined by low stone walls. A small picnic area is located on the Wendy's property with a sidewalk connection to the Route One corridor sidewalk. The new Gorham Savings Bank includes a plaza between the building and the Route One / Clearwater Drive intersection. The Town has a public easement on this plaza.

3.8 *Guardrails*

Guardrails are noted on Figures 3-1 and 3-5. If sidewalks or other public amenities are proposed in the location of existing guardrails, the guardrails may have to be redesigned to respond to the context.

Section 3 Streetscape

Questions / Key Issues / Conclusions

STREETSCAPE

General Conclusions

- The ROW and adjacent development are landscaped and buffered in an attractive manner.
- Sidewalks are found throughout most of the study area, but there are gaps in the system and the alignment of the sidewalk varies (straight versus curving). Currently there are no “streetscapes” that directly engage adjacent development.
- Traditional streetscape amenities such as street trees, street lights, benches, bus stops, bike racks and trash receptacles are not present within the ROW.
- While the study area is an attractive commercial corridor in terms of landscaping, there is a lack of what is considered a village “streetscape”, which typically includes a public realm (including the above mentioned amenities) that directly engage to the adjacent development.
- The primary reason that there is not a traditional streetscape in the study area is that parking is placed between the buildings and the ROW.

Questions

- Does the Town prefer creating a streetscape edge or a landscape buffer between the ROW and the adjacent development?

Draft Staff Comments:

- The Town prefers a streetscape edge as noted in the Council’s adopted policy statement of “All development must contribute to a vibrant, attractive, safe, walkable, human-scaled, mixed-use, around the clock village...”
 - If revised site design standards allow for parking between the building and the ROW, should the parking be buffered from the “streetscape”?
- ##### *Draft Staff Comments:*
- The streetscape will include landscape components between the pedestrian zone and the parking, but the goal is not to create berms or opaque plantings that screen the parking and buildings. The streetscape and integrated landscape elements (street trees, rain gardens, raised planting beds and seat walls, etc.) will mediate between the vehicular travel way and development adjacent to the ROW.

LIGHTING

General Conclusions

- Currently, lighting is not pedestrian-scaled and does not contribute to the visual quality of the study area, except for the recently installed lighting on Clearwater Drive.

Questions

- Should there be a hierarchy / scale of lighting contributing to the visual quality and functionality of the corridor?

Draft Staff Comments:

- Yes. Lighting should be scaled to pedestrians. Cars have built in lighting.

Section 3 Streetscape

Questions / Key Issues / Conclusions

LIGHTING (Continued)

Questions

- Should all lighting in the corridor include LED fixtures?
Draft Staff Comments:
 - Yes
- Should lighting be part of a uniform streetscape aesthetic in terms of style and spacing?
Draft Staff Comments:
 - Yes

STORMWATER

General Conclusions

- Stormwater is currently managed through closed systems within the ROW. Most adjacent development is tied into the closed ROW stormwater system.

Questions

- Should future streetscape systems utilize LID (low impact development) technologies to handle and treat stormwater in a decentralized manner?
Draft Staff Comments:
 - Agree in concept. A review of the success of recently installed stormwater examples would be beneficial as the Town requires development outside of the ROW to treat stormwater on-site. Some of these stormwater systems appear to only work well part of the year. Frozen ground, snow banks and other conditions can impact their efficacy.
- Should street trees be part of a uniform streetscape aesthetic in terms of species and spacing?
Draft Staff Comments:
 - Yes

WAYFINDING

General Conclusions

- Existing wayfinding is in poor condition and auto-oriented.
- There is a “gateway” sign in the northbound direction stating “The Town of Falmouth Incorporated 1718”.
- Distinctive and coordinated gateway signage in the northbound and southbound directions does not identify and brand the corridor as Falmouth’s “village center”.
- There is an opportunity to not only brand the study area as the “village center”, but brand the area as a “green street”, noting LID, LED, East Coast Greenway, watershed stormwater mitigation, increased walkability and multi-modal options (car, bike, pedestrian and public transit).

Section 3 Streetscape

Questions / Key Issues / Conclusions

WAYFINDING (Continued)

General Conclusions

- There is not an accumulation of cluttered, confusing and mismatched signage / branding wayfinding throughout the corridor.
- There are no information booths, maps and pedestrian-scaled wayfinding systems in the corridor.
- While the height of the bus stop signs meets ADA standards for clearance, the information is too small and not legible. In addition, the signs are typically located in lawn areas without shelters or hardscape treatments.

Questions

- What kind of branding does the Town want as part of a wayfinding system?

Draft Staff Comments:

- A better system is needed, but should be based on an evaluation of the results of current branding and results of the proposed “Falmouth 2.0” process. Improvements have an opportunity to be coordinated with the PACTS regional wayfinding study as well as the East Coast Greenway wayfinding efforts.

PUBLIC SPACE AND AMENITIES

General Conclusions

- There are very few amenities along the corridor such as bus shelters, benches, etc. Public space such as the piece of land at Depot Road (Town-owned) are under utilized and may not be the most appropriate use of that land in terms of public realm.
- Existing public spaces and amenities such as the gazebo (outside the ROW) at the Falmouth Shopping Center appear to be more decorative than functional in nature.
- Although there are few amenities directly adjacent the ROW, there are a number of parks and public spaces that are within one block to the east and west of Route 1. These areas include Tidewater, Village Park, Legion Fields, and Pine Grove Park

Questions

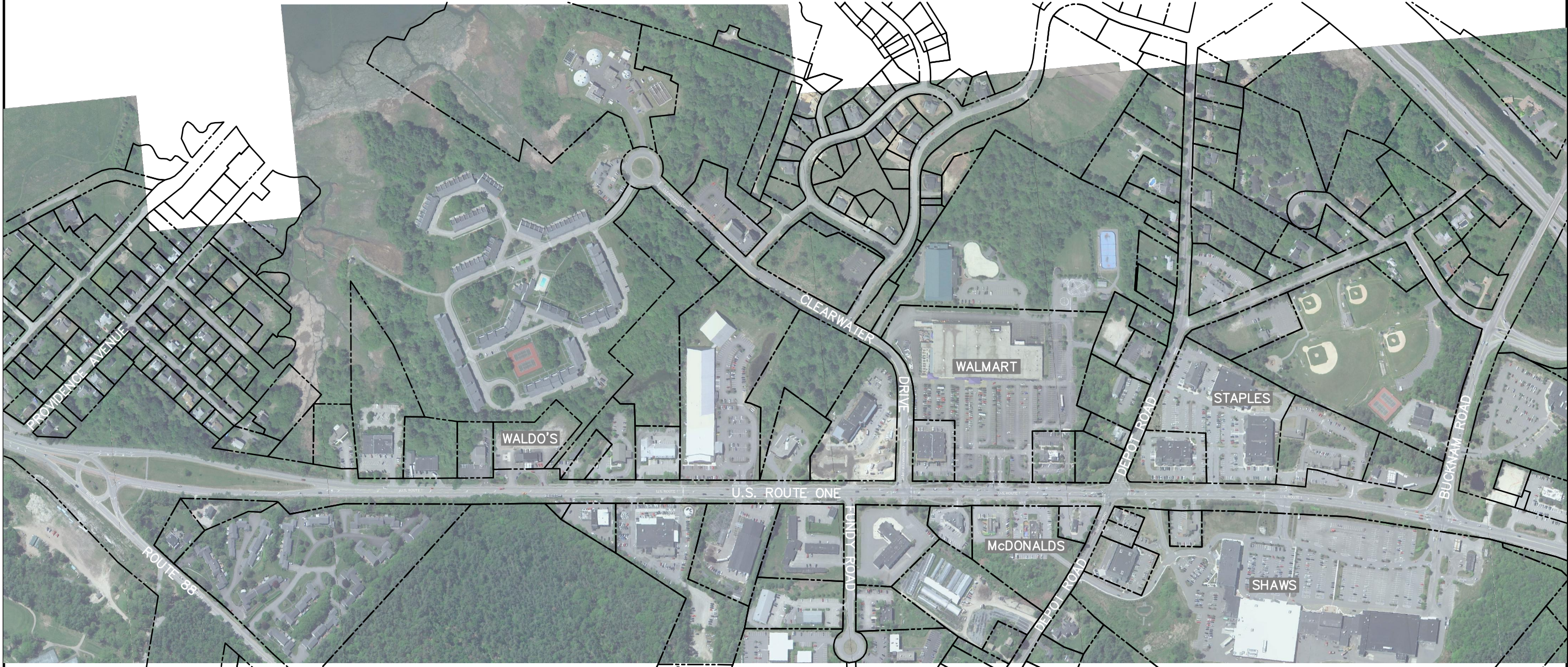
- Are parks and plazas the most efficient / appropriate type of public space within the ROW, or would a traditional linear / functional streetscape be more effective in creating a sense of a village.

Draft Staff Comments:

- A traditional streetscape with a range of coordinated pedestrian amenities would better establish a village setting and inform the scale and proximity of adjacent development.

APPENDIX

FIGURES



TOWN OF FALMOUTH – ROUTE ONE SOUTH
INFRASTRUCTURE PLAN

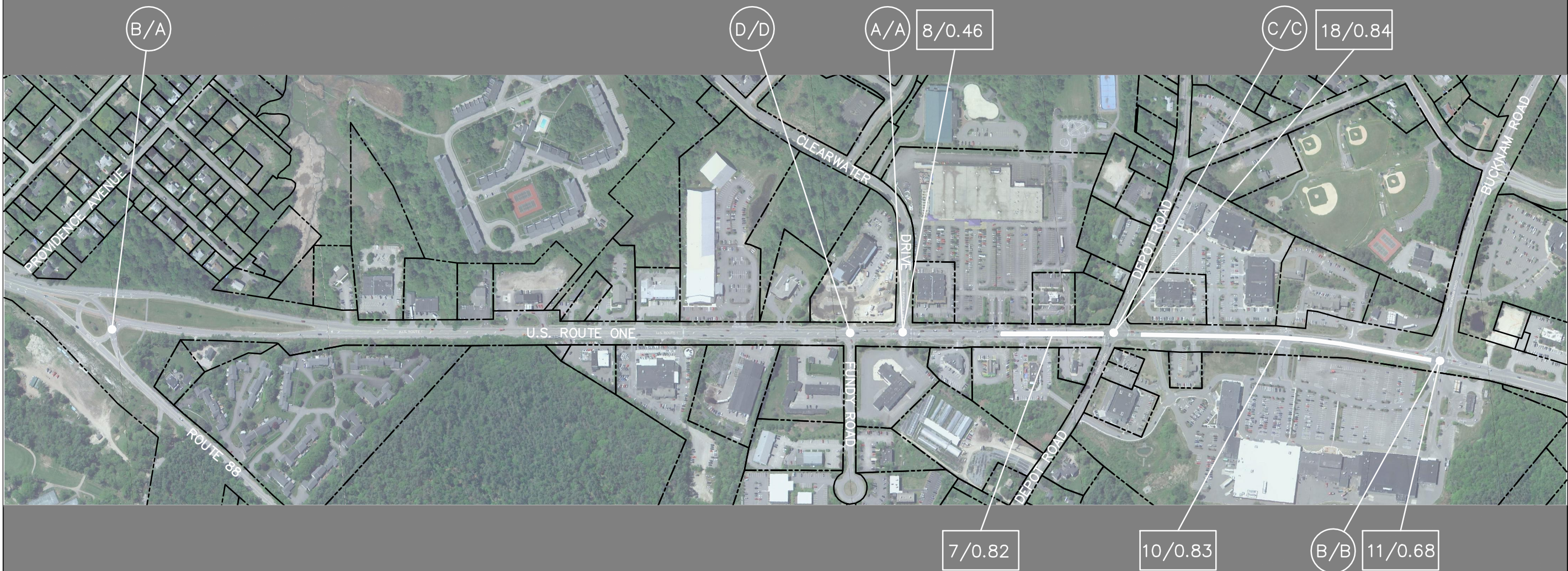
KEY PLAN

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LEGEND

-  LEVEL OF SERVICE – PM/MID-DAY
-  # OF CRASHES (2008–10)/CRITICAL RATE FACTOR

TOWN OF FALMOUTH – ROUTE ONE SOUTH INFRASTRUCTURE PLAN

LEVEL OF SERVICE AND CRASH DATA

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1–3



TOWN OF FALMOUTH – ROUTE ONE SOUTH
INFRASTRUCTURE PLAN

2011 EXISTING CORRIDOR CONDITIONS

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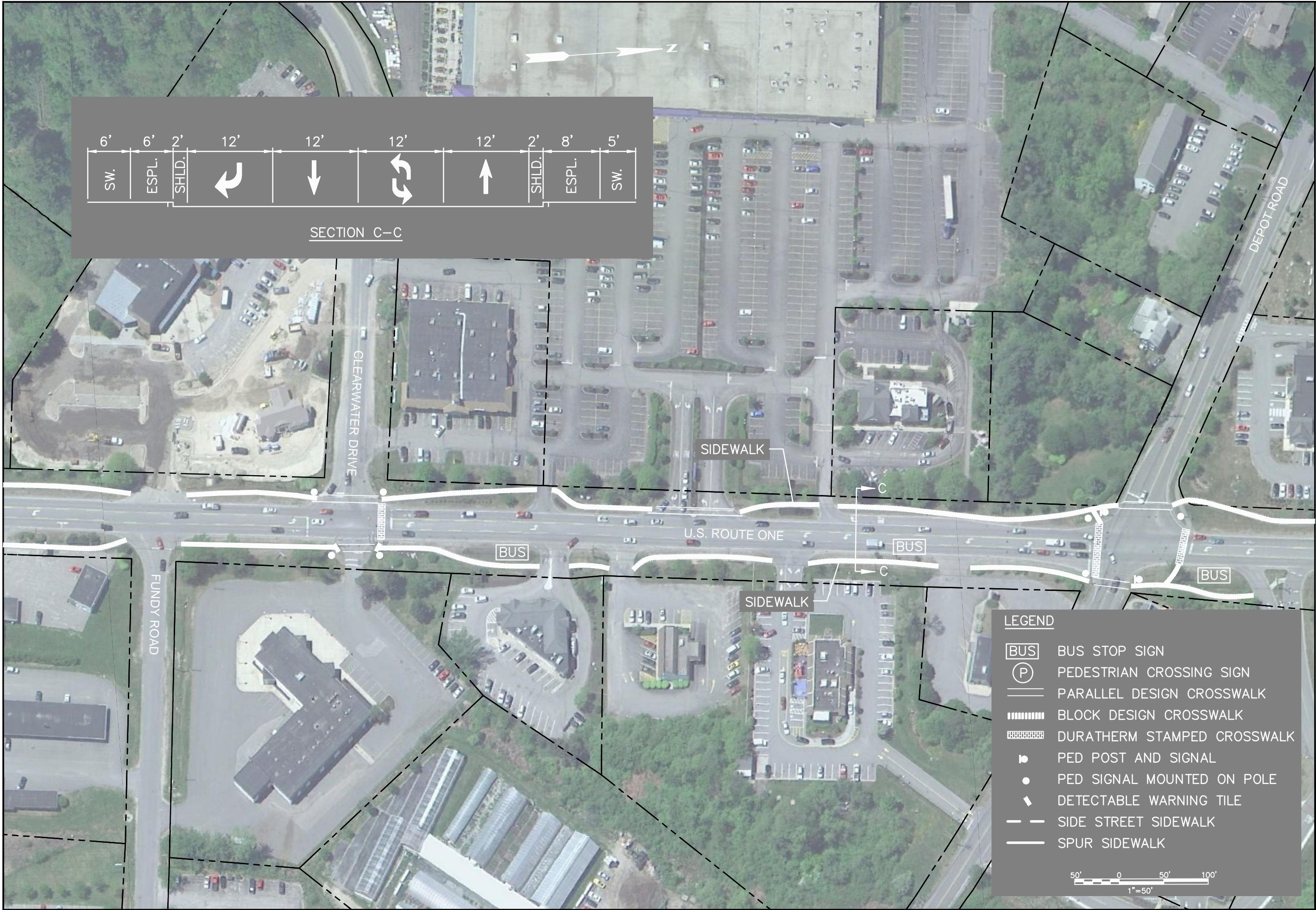
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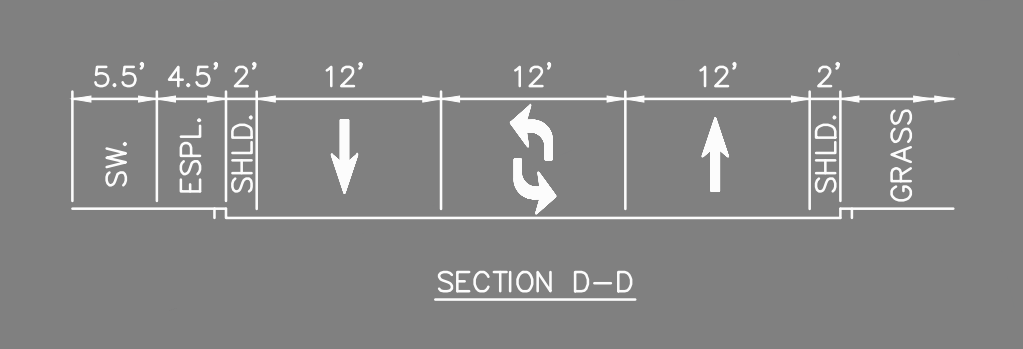
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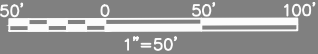
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1-7



- LEGEND
- BUS** BUS STOP SIGN
 - P** PEDESTRIAN CROSSING SIGN
 - PARALLEL DESIGN CROSSWALK
 - ||||| BLOCK DESIGN CROSSWALK
 - ▨ DURATHERM STAMPED CROSSWALK
 - ⬮ PED POST AND SIGNAL
 - PED SIGNAL MOUNTED ON POLE
 - ◆ DETECTABLE WARNING TILE
 - - - SIDE STREET SIDEWALK
 - SPUR SIDEWALK



TOWN OF FALMOUTH – ROUTE ONE SOUTH
INFRASTRUCTURE PLAN

2011 EXISTING CORRIDOR CONDITIONS

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1—8

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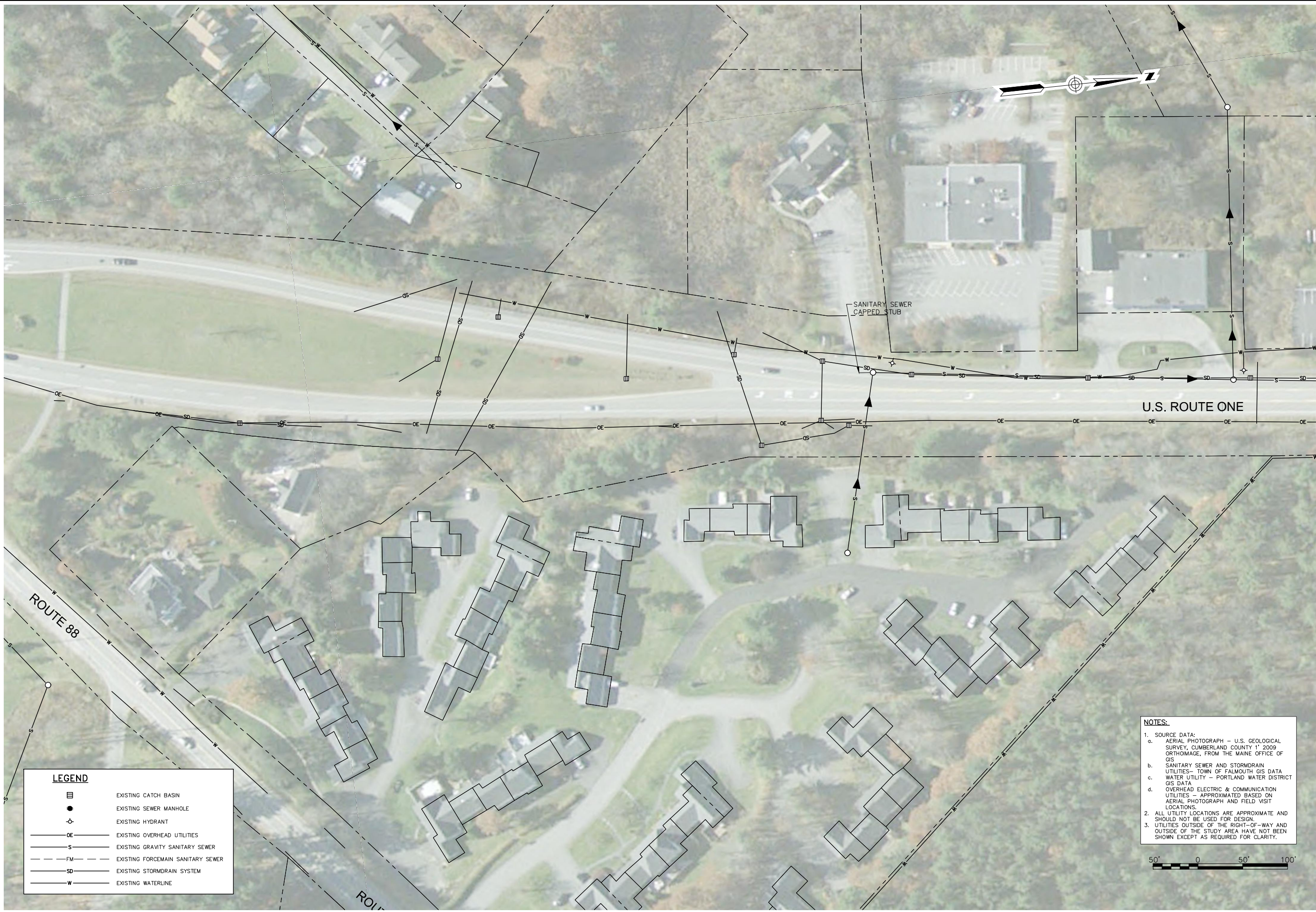
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TOWN OF FALMOUTH – ROUTE ONE

2011 EXISTING INFRASTRUCTURE

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2-1



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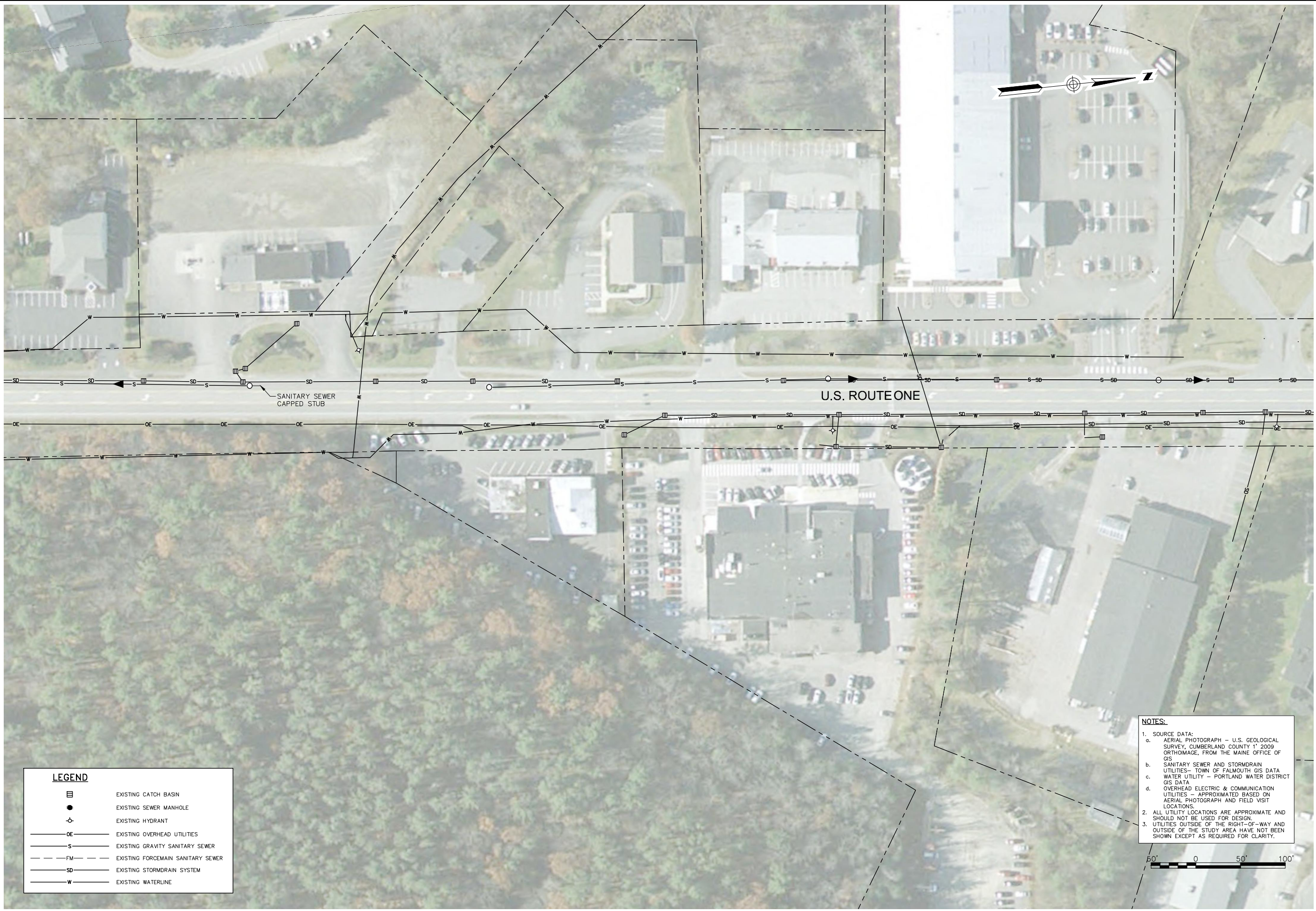
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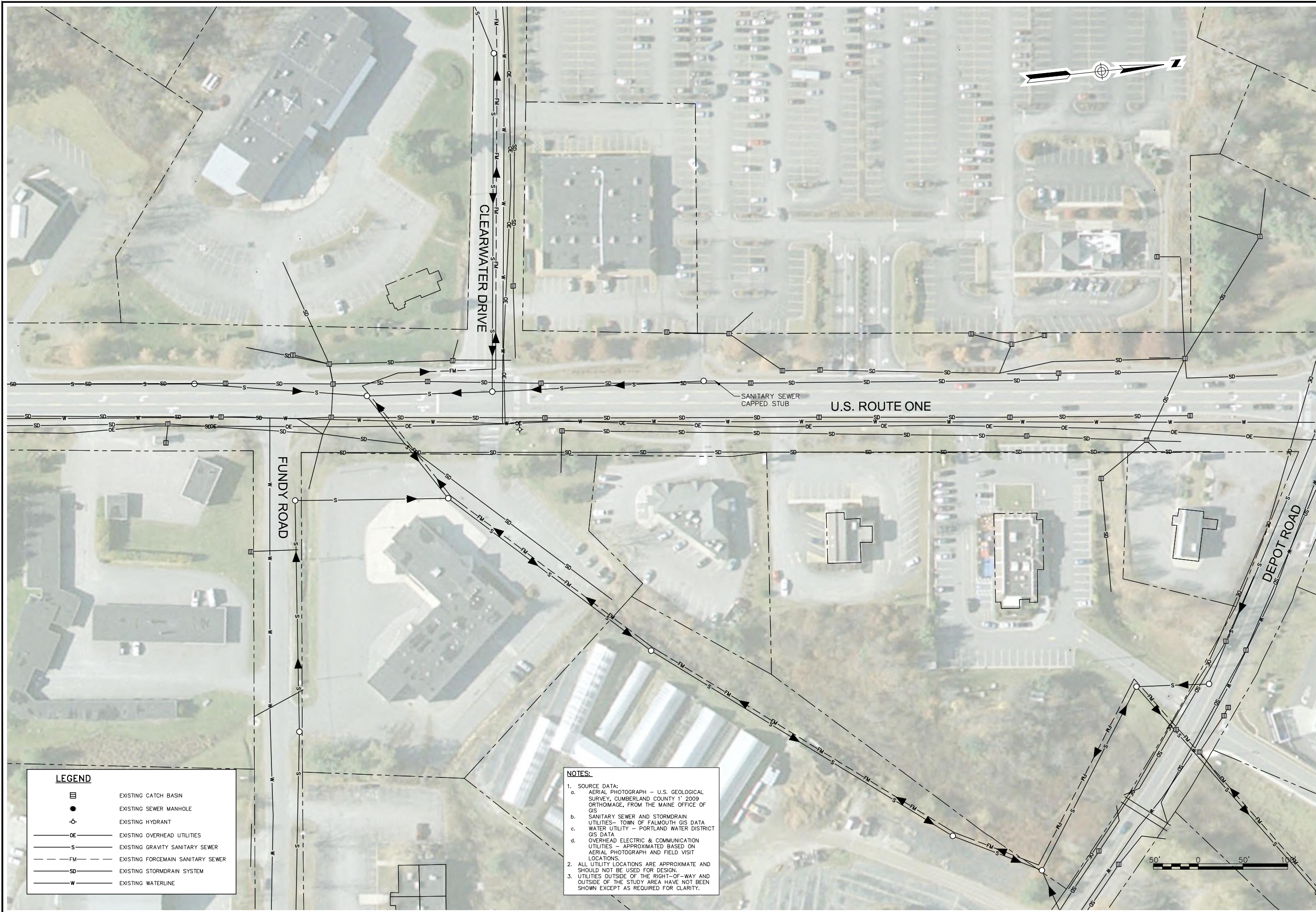


LEGEND

- | | |
|--|-----------------------------------|
| | EXISTING CATCH BASIN |
| | EXISTING SEWER MANHOLE |
| | EXISTING HYDRANT |
| | EXISTING OVERHEAD UTILITIES |
| | EXISTING GRAVITY SANITARY SEWER |
| | EXISTING FORCEMAIN SANITARY SEWER |
| | EXISTING STORMDRAIN SYSTEM |
| | EXISTING WATERLINE |

NOTES:

- SOURCE DATA:
 - AERIAL PHOTOGRAPH – U.S. GEOLOGICAL SURVEY, CUMBERLAND COUNTY 1" 2009 ORTHOMAGE, FROM THE MAINE OFFICE OF GIS
 - SANITARY SEWER AND STORMDRAIN UTILITIES – TOWN OF FALMOUTH GIS DATA
 - WATER UTILITY – PORTLAND WATER DISTRICT GIS DATA
 - OVERHEAD ELECTRIC & COMMUNICATION UTILITIES – APPROXIMATED BASED ON AERIAL PHOTOGRAPH AND FIELD VISIT LOCATIONS.
- ALL UTILITY LOCATIONS ARE APPROXIMATE AND SHOULD NOT BE USED FOR DESIGN.
- UTILITIES OUTSIDE OF THE RIGHT-OF-WAY AND OUTSIDE OF THE STUDY AREA HAVE NOT BEEN SHOWN EXCEPT AS REQUIRED FOR CLARITY.

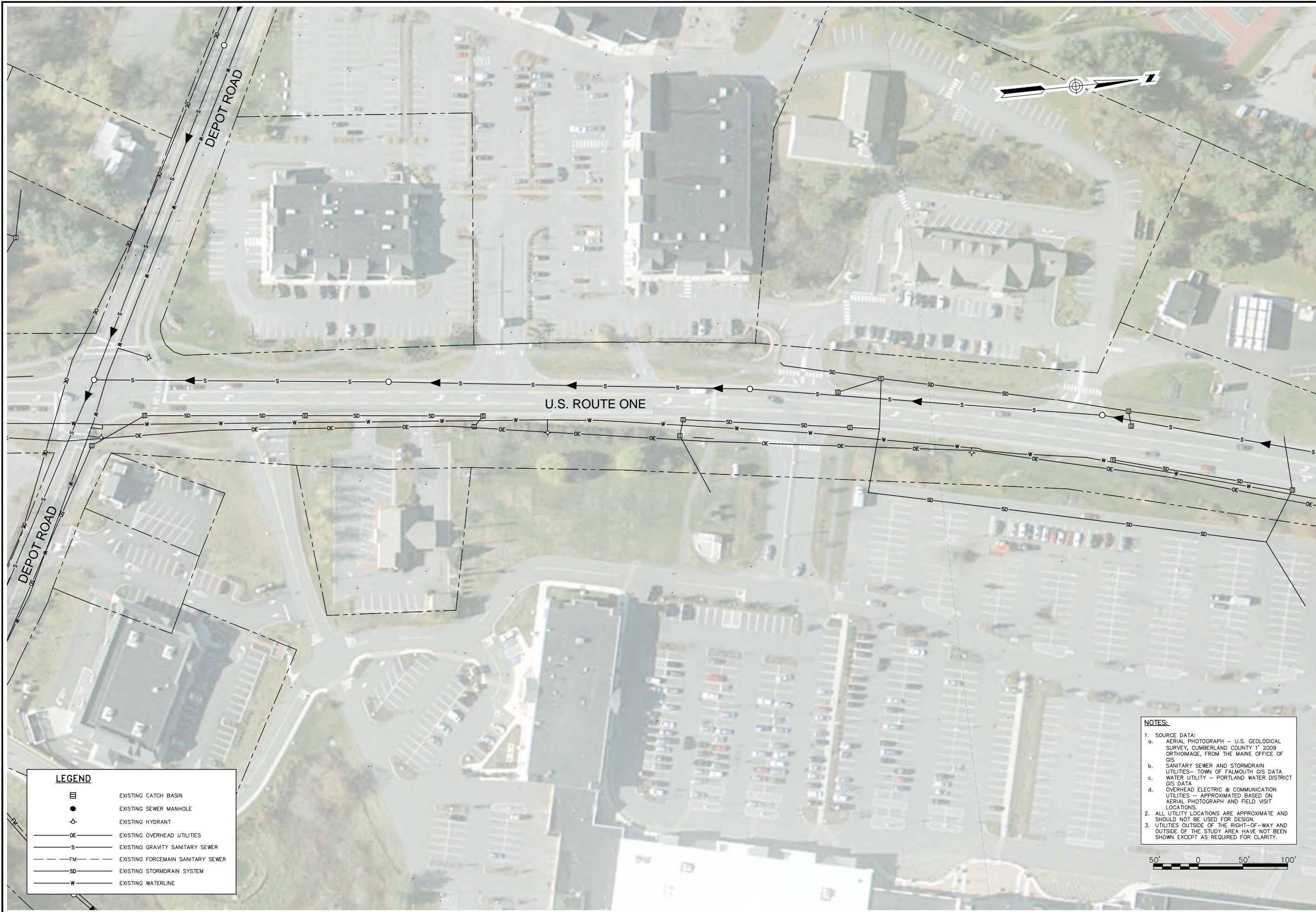


LEGEND

- EXISTING CATCH BASIN
- EXISTING SEWER MANHOLE
- EXISTING HYDRANT
- EXISTING OVERHEAD UTILITIES
- EXISTING GRAVITY SANITARY SEWER
- EXISTING FORCEMAIN SANITARY SEWER
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2-5

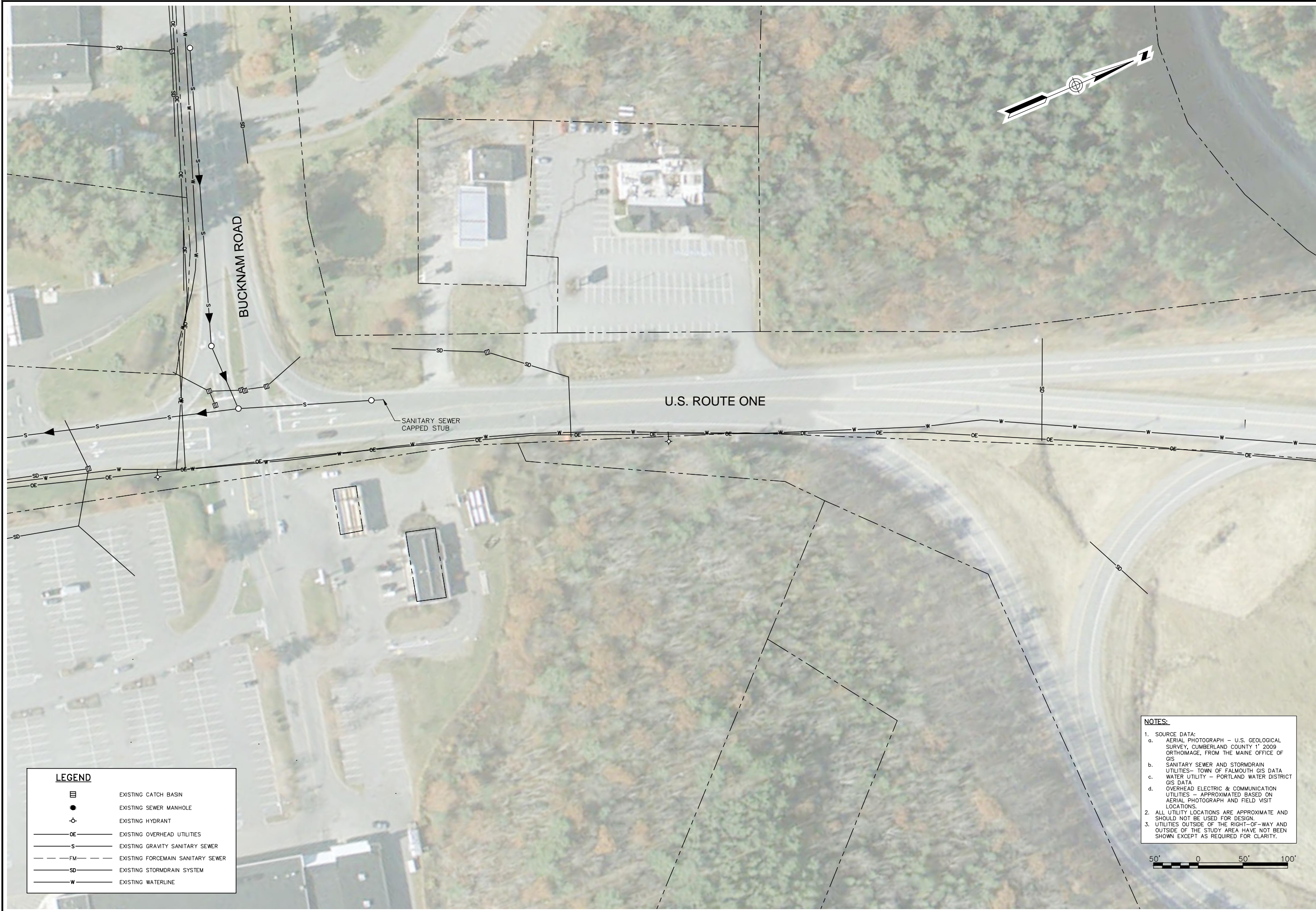
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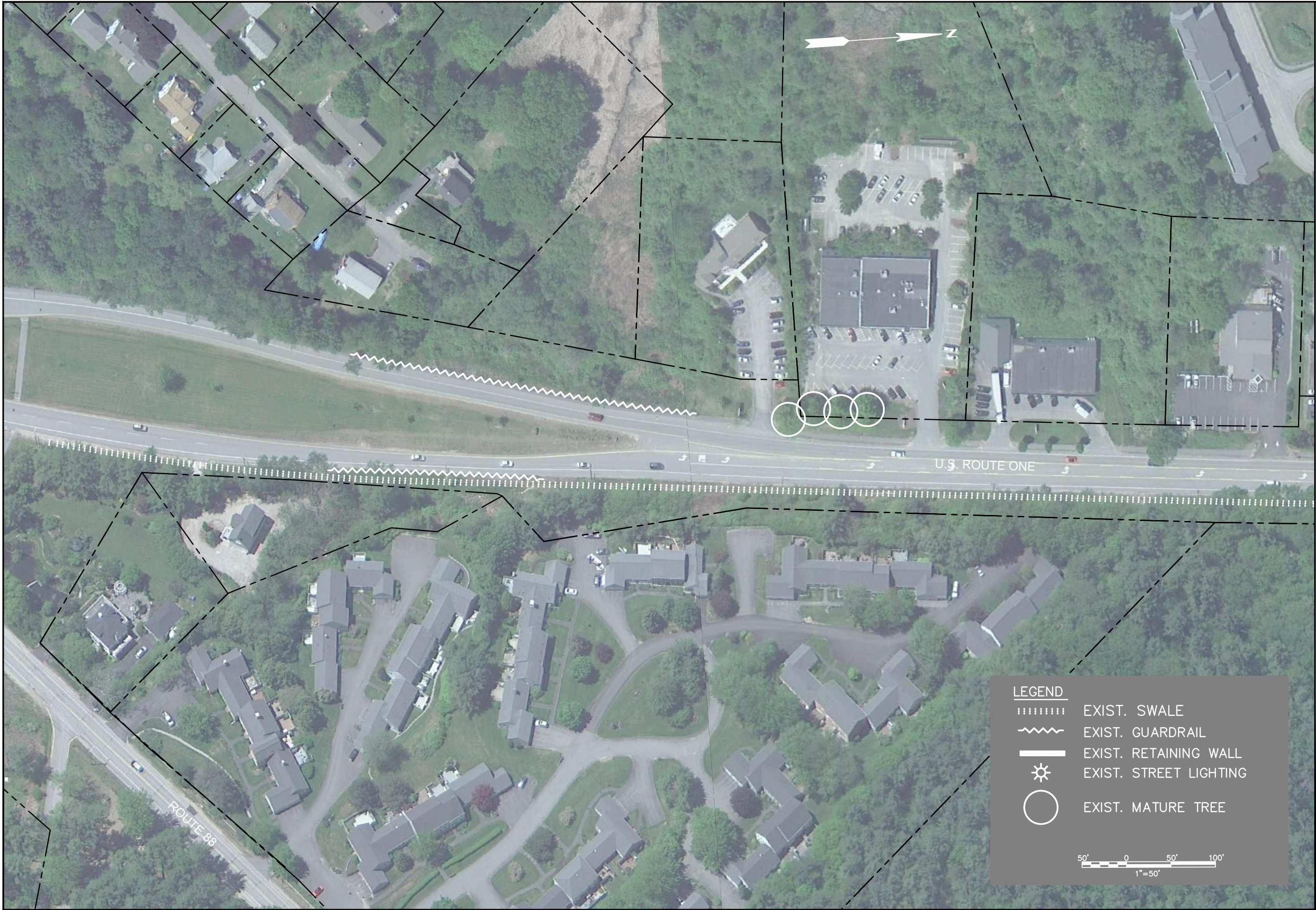
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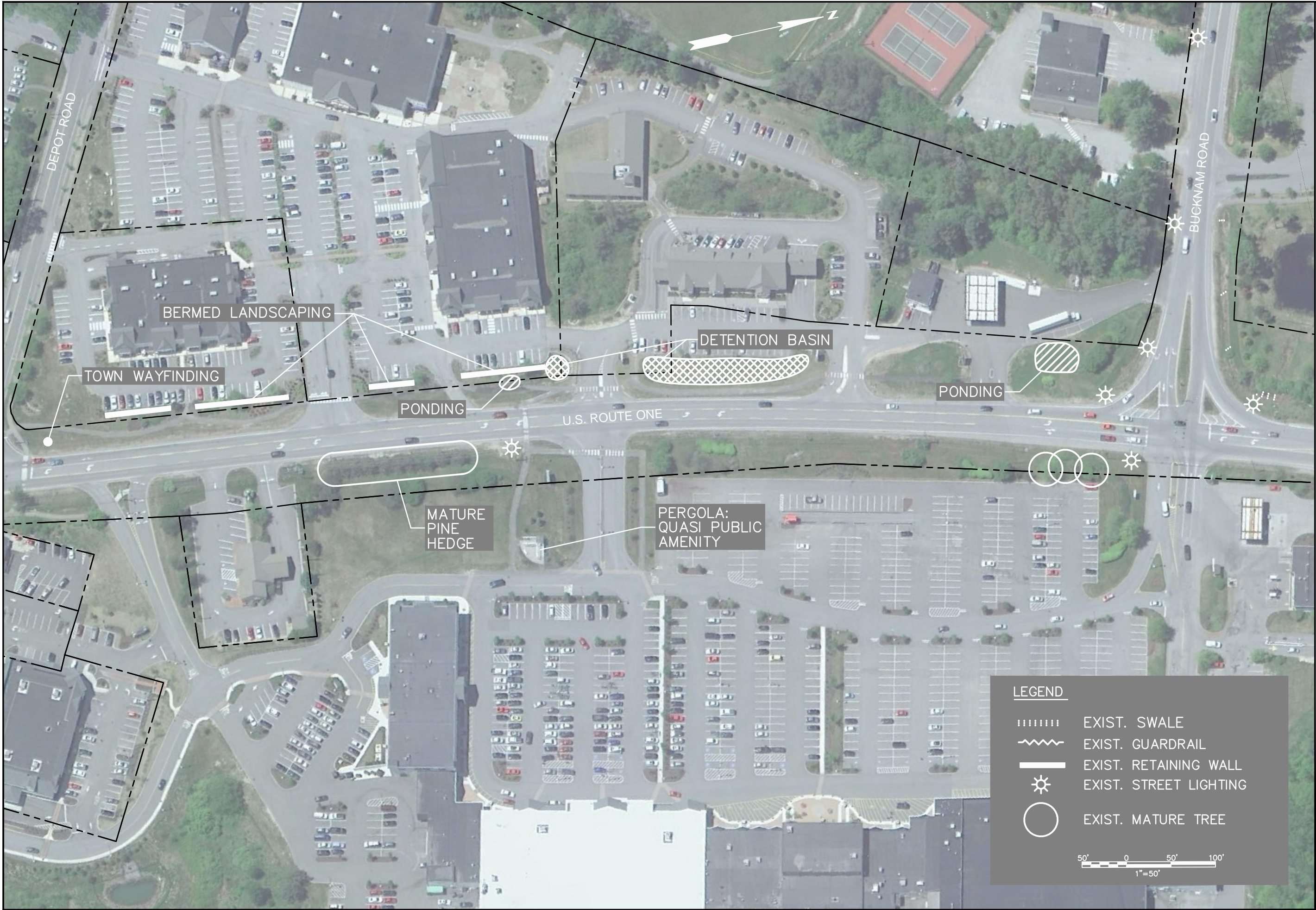




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ROADWAY SYSTEM DEFINITIONS

Route One South Infrastructure Plan – Falmouth, Maine

Principal Arterial - Interstate: A series of continuous routes that have trip lengths and volumes indicative of substantial statewide or interstate travel. This classification is for highways designated as interstate and include I-95, I-195, I-295 and I-395.

Principal Arterial - Other Freeways and Expressways: These roads must be divided highway with partial (freeway) or full (expressway) control-of-access. Primarily serve through traffic and major circulation movements within federally-defined Urban Areas.

Other Principal Arterial: Highways which provide long distance connections, but do not fit the two categories above.

- Rural: Corridor movement suitable for substantial statewide or interstate travel between larger population centers. (e.g., Route 3, Augusta to Belfast).
- Urban: Routes which carry through traffic and most of the trips entering/leaving a Federally-designated Urban Area. They provide continuity for all rural arterials that intercept the urban boundary. (e.g., Western Avenue in Augusta or Brighton Avenue in Portland).

Minor Arterial: A series of continuous routes that should be expected to provide for relatively high overall travel speeds with minimum interference to through movement, and are defined as two distinct types:

- Rural: Form a network of 1,039 miles in Maine, in conjunction with the rural principal arterial system, with service characteristics that:
 1. Link cities, large towns and other traffic generators (i.e., major resort areas) that are capable of attracting travel over long distances.
 2. Integrate interstate and inter-county service.
 3. Have spacing consistent with population density so all developed areas are within a reasonable distance from the arterial system.
 4. Provide service to corridors with trip lengths and travel densities greater than those served by rural collector or local systems. (e.g., Route. 27 from Farmington to Sugarloaf Mountain and to the intersection of Route 16 in Eustis or Route 3 between Ellsworth and Bar Harbor).
- Urban: Within a Federally designated Urban Area, these roads interconnect with and augment the urban principal arterial system. They distribute travel to geographic areas smaller than those of higher systems (e.g., Hogan Road in Bangor, or Stone Street in Augusta from the East side rotary to Eastern Avenue [Route 17]).

Collectors:

- Rural: Generally serve travel of primarily intra-county rather than statewide importance and travel distances are shorter than arterial routes.
 1. Major Collector Roads: (a) Serve county seats not on arterial routes, larger towns not directly served by higher systems (b) link nearby larger towns, or cities, or with route of higher classifications (c) serve more important intra-county travel corridors which could connect consolidated schools, shipping points, important agricultural areas, etc. (e.g., Route 9 in Augusta from intersection of Route 17 to the intersection of Route 126 in Randolph)

2. Minor Collector Roads: Spaced consistent with population density to accommodate local roads within reasonable distance of collector roads. Provide service to smaller communities. Link locally important traffic generators with the arterial system. (e.g., Pond Road / Neck Road between Manchester and Litchfield)
- Urban: Provide both land access and traffic circulation within urban residential neighborhoods and commercial and industrial areas in federally designated Urban Areas. Route density is much higher than in rural areas. (e.g., Buck Street in Bangor next to the racetrack, or Hotel Road in Auburn from Route 122 near the Lewiston / Auburn airport to West Auburn Road).

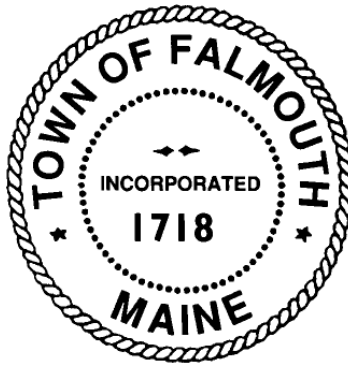
Local Roads: Provide access to adjacent land and provide service to travel over relatively short distances as compared to the higher systems.

- Rural: All rural roads not classified as principal arterial, minor arterial, or collector roads (e.g., Caribou Lake Road between Washburn and Caribou, or Flag Pond Road in Saco from Route One west to Route 112).
- Urban: All urban streets in a federally designated Urban Area that are not in one of the other higher systems. They permit direct access to land, route density is higher than rural areas, and they connect to the higher systems. They also offer lower mobility and service and through-traffic movement is deliberately discouraged. (e.g., Purington Avenue in Augusta between North Belfast Avenue and South Belfast Avenue, or Longfellow Avenue in Brunswick from Route 123 to Maine Street).

Route One South Infrastructure Plan

Falmouth, Maine

Future Conditions Technical Memorandum



Prepared for:
Town of Falmouth

Prepared by:
T.Y. Lin International
MRLD
Woodard & Curran

April 13, 2012

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1.1 Traffic Volume Forecast Methodology	3
1.2 2035 Future Intersection Turning Movement Volumes	5
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1.4 Intersection Level of Service.....	7

List of Figures (located in the Appendix)

Figure 1 2035 Future Traffic Volumes

INTRODUCTION

The T.Y. Lin International (TYLI) Team, comprised of TYLI, MRLD Landscape Architecture + Urbanism (MRLD), and Woodard & Curran (W&C), was selected by the Town of Falmouth (Town) to develop an Infrastructure Plan (Plan) for Route One between Route 88 to the south and the Maine Turnpike spur to the north. The purpose of the Plan is a coordinated investment in, and improvement of, the public right-of-way (ROW) infrastructure of Route One to make it a more attractive, cohesive, functional, and pedestrian-friendly street that strengthens its economic viability and implements the Town's vision which includes:

- a denser pattern of development of the Route One area with activities day and night;
- a variety of uses including residential;
- an emphasis on pedestrians and sidewalks; and
- attractive landscaping that appeals to both businesses and shoppers

This document serves as the second phase of the plan and contains an evaluation of future transportation conditions. Specifically, it provides anticipated future traffic volumes and expected traffic operating conditions along the study corridor in the year 2035.

1.0 TRANSPORTATION INFRASTRUCTURE

1.1 *Traffic Volume Forecast Methodology*

Traffic forecasts for the Falmouth Route One study area were developed for conditions in 2035. Weekday PM peak hour and weekday Mid-day peak hour turning movement forecasts were developed at the following intersections:

- Route One and Bucknam Road
- Route One and Depot Road
- Route One and Clearwater Drive
- Route One and Fundy Road
- Route One and Route 88

Additionally, daily traffic volume forecasts for the roadway links that connect or feed these intersections was estimated.

PACTS Travel Demand Model

The forecasts were developed with the aid of the PACTS travel demand model. The model area encompasses an area bounded by Biddeford on the south, Windham and Standish on the west, and Brunswick on the north.

Model inputs include the existing and future roadway network, the existing and future transit system, and existing and future land use. Land use details include population, households, and employment by type (e.g., retail, services, manufacturing). Land use information is compiled for subareas called traffic analysis zones (TAZs). There are 34 TAZs in Falmouth.

Roadway Network Assumptions

The 25-year forecast includes a widening of the Maine Turnpike to six lanes between Exits 44 and 53. This additional capacity (when considered in combination with no capacity increases along I-295 in Portland) pushes more of the expected traffic growth in the region to the I-95 corridor. Relatively high traffic growth is expected on the Falmouth Spur.

The 25-year forecast also assumes that the intersection of Bucknam Road and the I-295 northbound exit and entry ramps will be improved so that delay for I-295 exiting traffic will be reduced. With the safety and efficiency of the northbound I-295-to-Bucknam Road movement improved, the model forecasts that some “Portland-to-Falmouth” traffic will shift from Route One to I-295 as its primary path. Relatively high growth on Bucknam Road is expected.

Land Use Assumptions in Model

The 25-year forecast for Falmouth is for growth of 28 percent in dwelling units and households. Population is forecast to grow 20 percent (less than household growth because average household sizes are shrinking).

The entire model area is forecast to have 30 percent growth in dwelling units and households and 26 percent growth in population.

Overall wage and salary employment in Falmouth is forecast to grow 22 percent. Along Route One through the study area, along Route One north of the Falmouth Spur, and in the commercial area near Exit 53, overall employment is forecast to grow between 27 and 34 percent in the individual traffic analysis zones.

Region wide wage and salary employment is forecast to grow 17 percent.

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1.2 2035 Future Intersection Turning Movement Volumes

Figure 1 presents the 2035 Future Weekday PM and Mid-day peak hour volumes at the study intersections. The following tables present a comparison of existing and future approach volumes at the study intersections.

EXISTING AND FUTURE PEAK HOUR TRAFFIC VOLUME COMPARISON (PM PEAK HOUR)			
<i>Peak Hour Traffic Volume Comparison</i>	<i>2011</i>	<i>2035</i>	<i>% Change</i>
Route One and Route 88			
Route 88	135	157	16%
Route One Northbound	913	1119	23%
Route One Southbound	481	553	15%
Total	1529	1829	20%
Route One and Fundy Road			
Falmouth Place	42	42	0%
Fundy Road	56	56	0%
Route One Northbound	835	980	17%
Route One Southbound	510	583	14%
Total	1443	1661	15%
Route One and Clearwater Drive			
Clearwater Drive	171	196	15%
Bangor Savings Bank	29	33	14%
Route One Northbound	843	1006	19%
Route One Southbound	456	544	19%
Total	1499	1779	19%
Route One and Depot Road			
Depot Road Eastbound	289	367	27%
Depot Road Westbound	218	261	20%
Route One Northbound	877	1036	18%
Route One Southbound	493	657	33%
Total	1877	2321	24%
Route One and Bucknam Road			
Bucknam Road	421	623	48%
Falmouth Shopping Center	188	241	28%
Route One Northbound	745	934	25%
Route One Southbound	608	699	15%
Total	1962	2497	27%

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EXISTING AND FUTURE PEAK HOUR TRAFFIC VOLUME COMPARISON (MID-DAY PEAK HOUR)			
<i>Peak Hour Traffic Volume Comparison</i>	<i>2011</i>	<i>2035</i>	<i>% Change</i>
Route One and Route 88			
Route 88	176	203	15%
Route One Northbound	745	948	27%
Route One Southbound	475	591	24%
Total	1396	1742	25%
Route One and Fundy Road			
Falmouth Place	29	29	0%
Fundy Road	55	55	0%
Route One Northbound	721	872	21%
Route One Southbound	584	775	33%
Total	1389	1731	25%
Route One and Clearwater Drive			
Clearwater Drive	219	263	20%
Bangor Savings Bank	31	37	19%
Route One Northbound	715	888	24%
Route One Southbound	584	716	23%
Total	1549	1904	23%
Route One and Depot Road			
Depot Road Eastbound	366	492	34%
Depot Road Westbound	201	248	23%
Route One Northbound	795	1001	26%
Route One Southbound	605	703	16%
Total	1967	2444	24%
Route One and Bucknam Road			
Bucknam Road	435	545	25%
Falmouth Shopping Center	149	192	29%
Route One Northbound	712	936	32%
Route One Southbound	533	667	25%
Total	1829	2340	28%

As noted in the table overall intersection peak hour traffic volumes are expected to increase from 15 to 28 percent between now and the year 2035.

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1.3 2035 Future Daily Traffic Volumes

Future Average Annual Daily Traffic (AADT) volumes within the study area were estimated for the year 2035 and are presented in the following table and on Figure 1. These volumes were based upon the automatic counts collected in 2011 and increased according to the PACTS model.

AVERAGE ANNUAL DAILY TRAFFIC VOLUME			
Location	2011	2035	% Change
Route One north of Bucknam Road	12,030	15,170	26%
Route One south of Bucknam Road	12,950	16,440	27%
Route One north of Depot Road	14,390	17,940	25%
Route One south of Depot Road	14,960	18,030	21%
Route One north of Clearwater Drive	13,270	16,160	22%
Route One south of Clearwater Drive	13,450	16,260	21%
Route One north of Route 88	12,500	15,430	23%
Route One south of Route 88	15,620	19,130	22%
Route 88 east of Route One	4,250	5,000	18%
Bucknam Road west of Route One	10,680	13,830	29%
Depot Road west of Route One	6,080	7,920	30%

Similar to the intersection turning movement volumes, daily traffic volumes are projected to increase from between 18 to 30 percent.

1.4 Intersection Level of Service

The standard used to evaluate traffic operating conditions of the transportation system is referred to as the Level of Service (LOS). This is a qualitative assessment of the quantitative effect of factors such as speed, volume of traffic, geometric features, traffic interruptions, delays, and freedom to maneuver. LOS analysis was based upon procedures detailed in the 2000 Highway Capacity Manual, Transportation Research Board. One of the standard programs used in traffic modeling is Synchro. However, Synchro may not accurately model closely spaced intersections. As such, SimTraffic was used in place of Synchro based on the fact that it better assesses the implication of closely spaced intersections, which currently contribute to spillback issues along Route One in the study area (spillback is when vehicles queuing at one intersection extend to a point where it blocks an adjacent intersection. Gridlock is a common term used to define spillback).

Signalized intersection LOS is based on average stopping delay per vehicle. The following table summarizes LOS categories and their associated delay.

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SIGNALIZED INTERSECTIONS		
Level of Service	Average Delay Per Vehicle (sec.)	General Description
A	≤ 10	Very low vehicle delays, free flow
B	>10 and ≥ 20	more vehicles stop and experience higher delays than for LOS A
C	>20 and ≥ 35	Stable Flow (Acceptable Delays) Stable flow
D	>35 and ≥ 55	Approaching Unstable Flow (Tolerable Delay) Congestion noticeable delays
E	>55 and ≥ 80	Unstable Flow (Intolerable Delay) Limit of acceptable delay, unstable flow
F	>80	Unacceptable delays, extremely unstable flow and congestion

The measures of delay for each level of service rating for unsignalized intersections are found below:

UNSIGNALIZED INTERSECTIONS		
Level of Service	Average Delay Per Vehicle (sec.)	General Description
A	≤ 10	No delays at intersections with continuous flow of traffic
B	>10 and ≤ 20	Same as A
C	>20 and ≤ 30	Moderate delays at intersections
D	>30 and ≤ 40	Significant congestion on critical approaches
E	>40 and ≤ 50	Heavy traffic flow condition. Heavy delays probable
F	>50	Unstable traffic flow. Heavy congestion

The following tables summarize each intersection and movement - providing the delay (in seconds) followed by the Level of Service (A-F) for each movement. An overall Level of Service for each intersection is also provided. The analysis was conducted for both the 2035 Weekday PM and Mid-day peak hours. Additionally, 95th queues were estimated and provided in the following tables. The 95th queue is a queue length that is exceeded only 5% of the time and is commonly used for design purposes. Key findings for each of the study intersections are also noted.

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ROUTE ONE @ ROUTE 88 – This intersection operates well with little vehicle delay and queuing during both peak hours evaluated.

Route One @ Route 88 xxx – 2035 PM Peak Hour (xxx) – 2035 Mid-Day Peak Hour			
Movement	Level of Service	Delay (sec/veh)	95 th % Queue (feet)
Route 88 Left	B (A)	18 (10)	106 (122)
Route 88 Right	A (A)	7 (7)	18 (37)
Route One NB Thru	A (A)	1 (1)	39 (108)
Route One NB Right	A (A)	1 (1)	18 (14)
Route One SB Left	B (A)	12 (6)	44 (57)
Route One SB Thru	A (A)	1 (1)	0 (0)
Overall	N/A	N/A	N/A

ROUTE ONE @ FUNDY ROAD/FALMOUTH PLACE – With the expected traffic growth over the next twenty-four years, significant delays can be expected for movements from Fundy Road and Falmouth Place. As Route One traffic increases, limited gaps in traffic will make it very difficult to turn onto Route One. The model also notes congestion on Route One northbound, which is likely related to corridor mobility issues north of the intersection (close spacing of traffic signals and that they are not coordinated).

ROUTE ONE @ FUNDY ROAD/FALMOUTH PLACE XXX – 2035 PM PEAK HOUR (XXX) – 2035 MID-DAY PEAK HOUR			
Movement	Level of Service	Delay (sec/veh)	95 th % Queue (feet)
Falmouth Place Left ⁽¹⁾	F (F)	xx (769)	194 (50)
Falmouth Place Thru	N/A	N/A	
Falmouth Place Right	F (F)	xx (382)	
Fundy Rd. Left	F (F)	xx (692)	461 (66)
Fundy Rd. Thru	N/A (F)	N/A (309)	
Fundy Rd. Right	F (F)	xx (979)	
Route One NB Left	F (F)	92 (114)	50 (23)
Route One NB Thru	F (F)	113 (112)	1296 (179)
Route One NB Right	F (F)	116 (90)	
Route One SB Left	B (A)	10 (9)	34 (44)
Route One SB Thru	A (A)	1 (2)	22 (18)
Route One SB Right	A (A)	1 (1)	

(1) – LEFT TURNS ARE PROHIBITED BUT ILLEGAL MOVEMENTS OCCUR
 XX – DELAY IS SIGNIFICANT AND THE MODEL OUTPUT IS NOT REASONABLE

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ROUTE ONE @ CLEARWATER DRIVE – Overall this intersection is projected to operate at acceptable levels of service, although left-turn movements from Clearwater Drive will begin to experience long delays.

ROUTE ONE @ CLEARWATER DRIVE XXX – 2035 PM PEAK HOUR (XXX) – 2035 MID-DAY PEAK HOUR			
Movement	Level of Service	Delay (sec/veh)	95 th % Queue (feet)
Clearwater Dr. Left	E (E)	77 (57)	250 (244)
Clearwater Dr. Thru	D (D)	46 (55)	
Clearwater Dr. Right	C (C)	30 (25)	124 (129)
Bangor Savings Bank Left	C (C)	29 (28)	59 (63)
Bangor Savings Bank Thru	C (D)	34 (39)	
Bangor Savings Bank Right	C (C)	31 (28)	
Route One NB Left	C (C)	32 (31)	83 (96)
Route One NB Thru	C (D)	34 (39)	125 (128)
Route One NB Right	D (A)	42 (6)	
Route One SB Left	B (B)	15 (17)	42 (71)
Route One SB Thru	A (B)	6 (11)	199 (325)
Route One SB Right	A (B)	6 (12)	
Overall	C (C)	26 (27)	N/A

ROUTE ONE @ DEPOT ROAD – This location will experience significant congestion in the future with long vehicle delays and queues on all intersection approaches.

ROUTE ONE @ DEPOT ROAD XXX – 2035 PM PEAK HOUR (XXX) – 2035 MID-DAY PEAK HOUR			
Movement	Level of Service	Delay (sec/veh)	95 th % Queue (feet)
Depot St. EB Left	F (F)	90 (405)	89 (89)
Depot St. EB Thru	E (F)	75 (371)	427 (462)
Depot St. EB Right	E (F)	60 (364)	
Depot St. WB Left	F (F)	146 (136)	355 (351)
Depot St. WB Thru	F (F)	146 (134)	
Depot St. WB Right	F (F)	146 (123)	
Route One NB Left	E (F)	71 (127)	95 (93)
Route One NB Thru	E (F)	57 (137)	669 (668)
Route One NB Right	D (F)	47 (128)	
Route One SB Left	F (F)	176 (282)	92 (92)
Route One SB Thru	E (F)	63 (97)	1022 (1196)
Route One SB Right	E (F)	62 (100)	
Overall	E (F)	76 (176)	N/A

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ROUTE ONE @ BUCKNAM ROAD/FALMOUTH SHOPPING CENTER – This location will experience unacceptable congestion in the future with long vehicle delays and queues on all intersection approaches, with the exception of movements from the Falmouth Shopping Center.

ROUTE ONE @ BUCKNAM ROAD/FALMOUTH SHOPPING CENTER			
XXX – 2035 PM PEAK HOUR			
(XXX) – 2035 MID-DAY PEAK HOUR			
Movement	Level of Service	Delay (sec/veh)	95 th % Queue (feet)
Bucknam Rd. Left	F (F)	143 (351)	217 (226)
Bucknam Rd. Thru	F (F)	102 (303)	691 (771)
Bucknam Rd. Right	E (F)	79 (278)	79 (112)
Falmouth Shopping Ctr Left	D (D)	41 (63)	70 (84)
Falmouth Shopping Ctr Thru	C (C)	26 (34)	112 (113)
Falmouth Shopping Ctr Right	B (B)	16 (14)	73 (81)
Route One NB Left	D (D)	35 (44)	146 (152)
Route One NB Thru	C (C)	22 (26)	619 (775)
Route One NB Right	C (C)	21 (29)	
Route One SB Left	F (F)	122 (246)	123 (115)
Route One SB Thru	F (F)	111 (243)	1250 (1396)
Route One SB Right	F (F)	95 (232)	121 (115)
Overall	E (F)	68 (148)	N/A

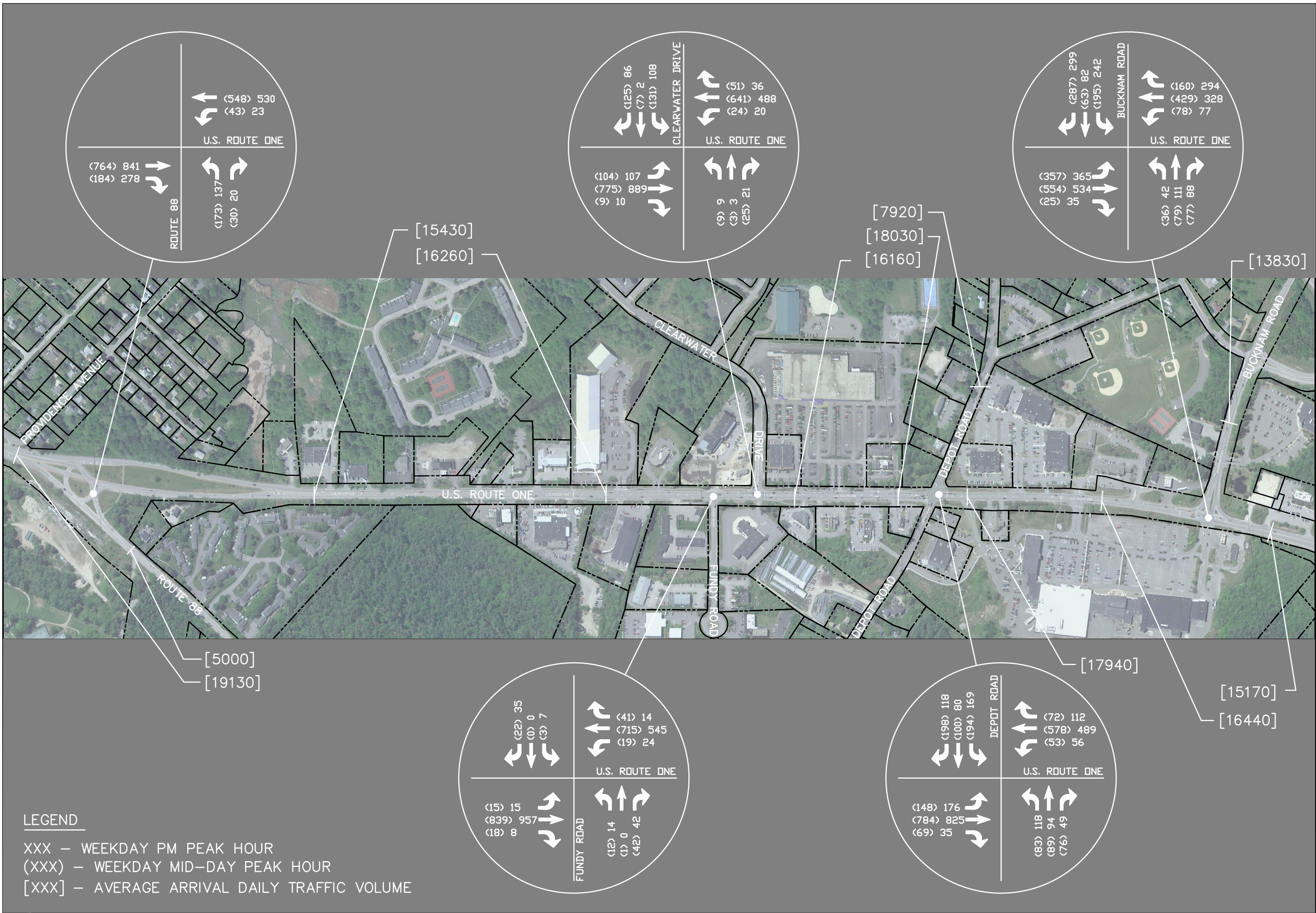
Future Transportation Infrastructure
Questions / Key Issues / Conclusions

General Conclusions

- Intersection turning movement volumes are expected to grow by 15 to 28 percent between now and 2035 with the following overall growth rates per intersection (PM with Mid-day in parenthesis):
 - Route One/Route 88 – 20% (25%)
 - Route One/Fundy Road – 15% (25%)
 - Route One/Clearwater Drive – 19% (23%)
 - Route One/Depot Road – 24% (24%)
 - Route One/Bucknam Road – 27% (28%)
- Daily traffic volumes are expected to experience similar growth rates with the following sample of 2035 traffic volumes:
 - Route One north of Bucknam Road – 15,170 AADT (26%)
 - Route One north of Depot Road – 17,940 AADT (25%)
 - Route One north of Route 88 – 15,430 AADT (23%)
 - Route One south of Route 88 – 19,130 AADT (22%)
 - Depot Road west of Route One – 7,920 AADT (30%)
 - Bucknam Road west of Route One – 13,830 AADT (29%)
- The Route One intersections with Route 88 and Clearwater Drive are expected to operate at acceptable levels of service in the year 2035.
- The Route One intersections with Fundy Road, Depot Road, and Bucknam Road will operate at unacceptable levels of service and will experience long vehicle delays and queues during peak volume time periods.
- Based upon the results of the capacity analysis, mitigation improvements should be considered at the Route One intersections with Bucknam Road, Depot Road, and Fundy Road.

APPENDIX

FIGURES



LEGEND

XXX — WEEKDAY PM PEAK HOUR
(XXX) — WEEKDAY MID-DAY PEAK HOUR
[XXX] — AVERAGE ARRIVAL DAILY TRAFFIC VOLUME

TOWN OF FALMOUTH – ROUTE ONE SOUTH
INFRASTRUCTURE PLAN

2035 FUTURE TRAFFIC VOLUMES

JOB NO.:
DATE: 04/13/12
SCALE: AS NOTED

1

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