



Advance Transit, Inc.

# Transit Development Plan

## Final Report



with

RSG, Inc.

Tom Crikelair Associates

December 31, 2018



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## 1. Introduction

Advance Transit plays a critical role in the transportation system of the Upper Valley. The well-used buses operated by Advance Transit reduce congestion on the area's roadways; function as an integral component of the parking strategies of Dartmouth College, Dartmouth Medical School, Dartmouth-Hitchcock Medical Center (DHMC), and the town of Hanover; and provide transportation alternatives and mobility for the region's residents and workers.

The economically vibrant region includes the largest employer in New Hampshire (DHMC), but this economic vitality results in a significant amount of traffic congestion. New development in the pipeline, most notably River Park in West Lebanon, but also multi-family housing on Sykes Mountain Avenue in White River Junction and new housing along NH 120 in Lebanon, will increase travel demand.

To effectively address a changing travel market and make most efficient use of its limited resources, Advance Transit takes a proactive stance toward planning. It has updated its short-term plan roughly every five years for the past two decades. Its recently completed Strategic Plan reinforces this approach in its number one strategic planning goal: "Support and implement service planning, development and prioritization in the core service area." The first item under this goal is to complete a new Transit Development Plan (TDP) in 2018 to "evaluate core service area transit services."

Steadman Hill Consulting, Inc., assisted by Tom Crikelair Associates and RSG, Inc. have completed updating the TDP for Advance Transit. This report presents the findings of the study and a recommended implementation and financial plan for the next five years. It includes eight chapters:

### **Chapter 1 Introduction**

### **Chapter 2 Review of Existing Services**

Chapter two presents a critical review of existing Advance Transit routes and services. The review process included four steps: (1) analysis of ridership data, (2) calculation of route-by-route performance measures, (3) on-site inspections of Advance Transit bus routes, and (4) interviews with bus drivers and support staff.

### **Chapter 3 Passenger Survey**

Chapter three presents the results of a survey distributed to Advance Transit bus riders on Tuesday, October 31, 2017. The survey examines trip purposes, transfer activity, frequency of use, residence and commute patterns, technology usage, and the employment status of Advance Transit users. It asked passengers to evaluate Advance Transit bus operations and to make suggestions for improving the service. The chapter includes comparisons with similar passenger surveys carried out in prior years.

### **Chapter 4 Community Involvement**

Chapter four describes efforts to involve members of the public in the study, including stakeholder meetings at Dartmouth College and Dartmouth-Hitchcock Medical Center, as well as meetings for the general public.

### **Chapter 5 Current Travel Patterns and Projected Development**

Chapter five includes analysis of travel patterns associated with major trip generators in the AT service area. It also lists anticipated planned construction and development projects in the Upper Valley that may be relevant for public transportation planning.

## **Chapter 6 Short-Term Schedule Adjustments**

Chapter six includes a list of adjustments to the timetables of existing routes to improve reliability and transfer connections.

## **Chapter 7 Longer-Term Service Proposals**

Chapter seven includes a detailed description of service concepts to expand the Advance Transit system over the longer term. Each existing line route is discussed, and then proposals for new routes are described.

## **Chapter 8 Recommendations and Financial Plan**

Chapter eight lists the recommended service improvements for the coming five year period and provides a financial analysis of the costs, revenues, and ridership associated with those improvements.

## 2. Review of Existing Services

This chapter presents an analysis of existing Advance Transit routes and services. The review process included four steps: (1) analysis of ridership data, (2) calculation of route-by-route performance measures, (3) on-site inspections of Advance Transit bus routes, and (4) interviews with bus drivers. This chapter analyzes Advance Transit performance, describes how buses are currently being used, and identifies strengths and weaknesses of the current service design.

This review effort is important in part because it helps to identify needed service improvements. It also helps ensure that any proposed changes do not undermine the strengths of existing services.

The chapter begins with an overview of Advance Transit ridership patterns. The second section examines performance and productivity for individual bus routes. Sections 2.3 through 2.9 discuss more details about individual Advance Transit bus routes. The chapter is structured as follows:

Section 2.1	System Ridership
Section 2.2	Route-by-Route Performance Measures
Section 2.3	Blue Route
Section 2.4	Red Route
Section 2.5	Green Route
Section 2.6	Orange Route
Section 2.7	Brown Route
Section 2.8	Hanover / Dartmouth Shuttle
Section 2.9	DHMC Parking Lot Shuttles

### 2.1. System Ridership

Combined Advance Transit ridership increased from 863,561 in FY 2012 when the last Transit Development Plan was done, to 877,721 in FY 2018 (down from 923,167 in FY 2016, AT's all-time high). Regular fixed-route ridership accounted for 66% of the FY 2018 total. The Dartmouth Downtown Shuttle accounted for 7% of combined system ridership, while DHMC parking lot shuttles accounted for 26%.

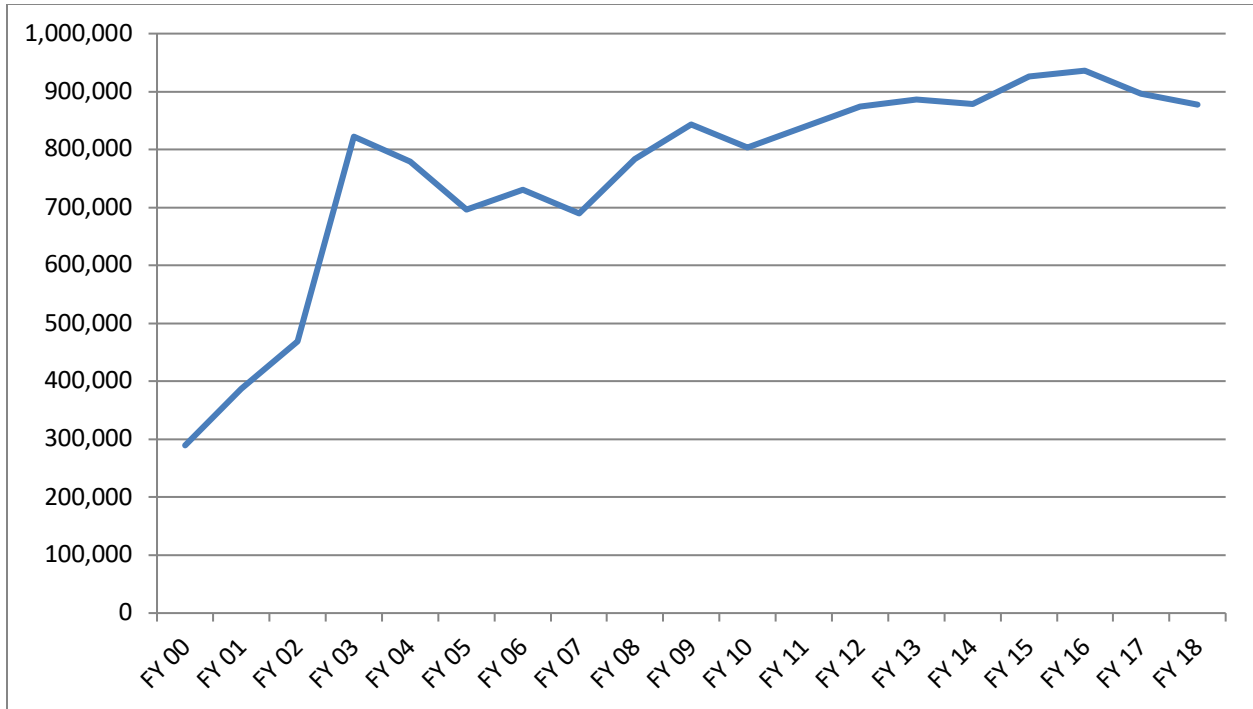
Between 2000 and 2015, Advance Transit experienced steady and remarkable growth in regular route ridership. As can be seen in Figure 2.1, the growth trend has flattened out over the past three years, but past periods of stability (FY08-FY10 and FY12-FY14) have been followed by growth. As will be discussed later, ridership is both due to the level of service provided, as well as exogenous factors such as the price of gasoline and the state of the economy.

Figure 2.2 provides additional detail by route for the past 10 years and includes ridership for the Dartmouth and DHMC shuttles. Over the 10-year period, Blue route ridership has been relatively steady and Brown route ridership has dropped, while Red, Green and Orange route ridership has increased. The Green route experienced the largest increase in FY 15 with the addition of a second bus on that route, doubling service from one trip per hour to two. In the last three years, Brown route ridership has climbed, while the other line routes have been steady or declining.

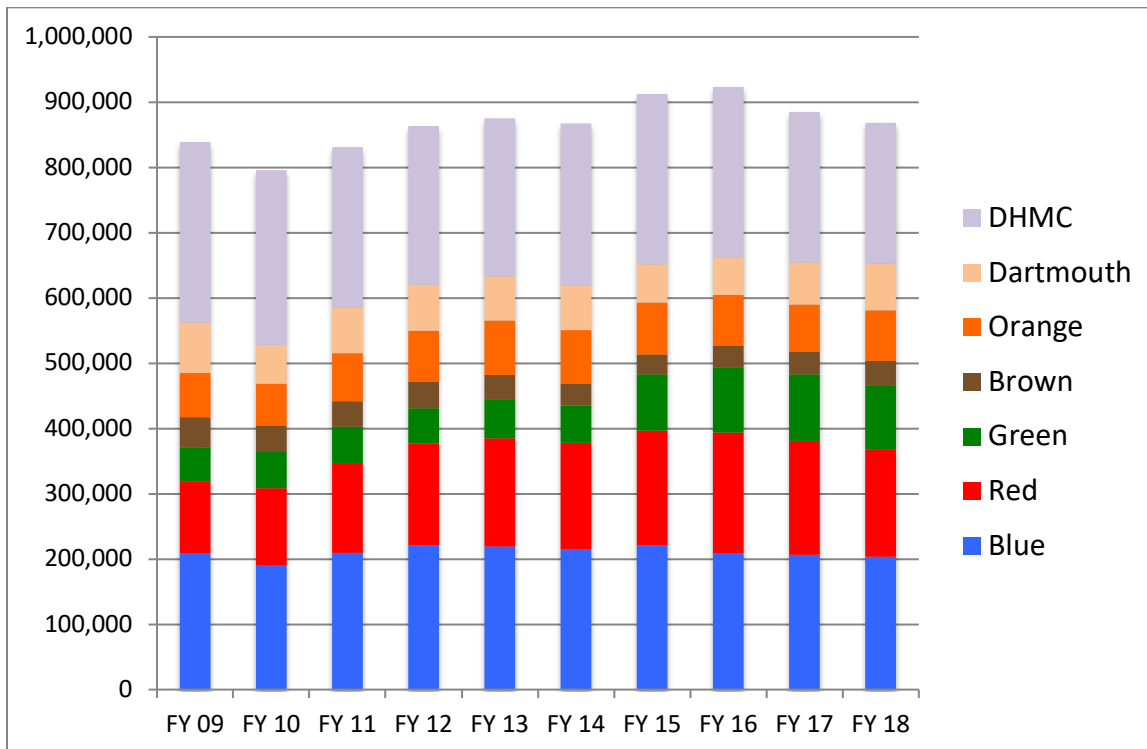
Most of the decline in ridership between FY 2016 and FY 2018 is due to the DHMC parking lot shuttles. These shuttles lost over 46,500 riders since 2016, which is more than 85% of the total

ridership loss of 54,700. However, in the first five months of FY 2019, in response to a promotional campaign by DHMC, use of the parking lot shuttles is up 16% over the prior year.

**Figure 2.1 Total Regular Route Ridership since FY 2000**



**Figure 2.2 Ten-Year Ridership Trend by Route**



## 2.2. Route-by-Route Performance Measures

Performance measures were calculated for individual routes and service components for February, March and April of 2018. Measures include rides per month, rides per day, rides per revenue service hour, and rides per scheduled round trip. The results are presented in Table 2.1.

**Table 2.1 Advance Transit Performance, Feb-Mar-Apr 2018**

	Total Rides	Daily Rides	Rides per Hour	Rides per Round Trip
<b>BLUE</b>	53,467	849	20.6	23
<b>GREEN</b>	24,861	395	16.1	15
<b>RED</b>	40,908	649	29.2	28
<b>BROWN</b>	8,854	141	12.1	9
<b>ORANGE</b>	20,045	318	26.7	27
<b>DARTMOUTH</b>	22,094	351	12.5	6
<b>DHMC</b>	58,564	930	27.6	4
<b>TOTAL</b>	228,793	3632	21.0	9
<b>REGULAR ROUTES</b>	148,135	2351	21.1	20

Table 2.2 compares route-by-route performance measures for February, March, and April 2018 with the same measures for February, March, and April 2012. Some observations:

- By far the greatest ridership growth was on the Green route, with a net increase of 177 riders per day. This reflects the addition of a second bus to the Green route, with service frequency increasing from once an hour to twice an hour.
- Green route ridership increased by 81%, while riders per service hour on this route decreased from 19.0 to 16.1. In order for the productivity to have remained the same (or increased) ridership would have had to increase by 100% or more, given the doubling of service supplied.
- Orange route ridership dropped by 1% in spite of increased boardings from residents at Sachem Village. It is likely that the increase in Green route service diverted some ridership from the Orange route among passengers traveling between West Lebanon and Hanover.
- Red route ridership and productivity rose slightly between 2012 and 2018. It was the most productive route in 2012, but now the margin between it and the other routes has increased, as productivity for all other routes fell in the five-year interval.
- Brown route ridership fell from 2012 to 2018, though it has been rising slightly since 2015. Its productivity is the lowest among AT's regular routes and is the only one that carries fewer than ten riders per round-trip. However, its productivity of 12 passengers per hour ranks it among the top Small Town routes in Vermont, surpassing the "successful" threshold of 10 passengers per hour.
- The Blue route has been relatively stable in terms of ridership and productivity. It carries the most riders of any regular route, but it also has a much higher service level, with 15-minute headways between Hanover and DHMC through most of the day. Ridership in 2015 was nearly equal to that of 2012, but it has since dropped slightly.



- Overall, ridership is up slightly since 2012 but productivity is down slightly because of the doubling of service on the Green route.

**Table 2.2 Advance Transit Performance, 2012 and 2018**

**FEBRUARY, MARCH, APRIL 2012 AND 2018**

RIDERS PER DAY

	2012	2018	Change
<b>BLUE</b>	940	849	-10%
<b>GREEN</b>	218	395	81%
<b>RED</b>	624	649	4%
<b>BROWN</b>	164	141	-14%
<b>ORANGE</b>	323	318	-1%
<b>DARTMOUTH</b>	337	351	4%
<b>DHMC</b>	946	930	-2%
<b>TOTAL</b>	3,551	3,632	2%
<b>REGULAR ROUTE</b>	2,269	2,351	3%

RIDERS PER VEHICLE REVENUE HOUR

	2012	2018	Change
<b>BLUE</b>	22.4	20.6	-8%
<b>GREEN</b>	19.0	16.1	-15%
<b>RED</b>	28.4	29.2	3%
<b>BROWN</b>	14.1	12.1	-14%
<b>ORANGE</b>	27.1	26.7	-1%
<b>DARTMOUTH</b>	13.0	12.5	-4%
<b>DHMC</b>	27.8	27.6	-1%
<b>TOTAL</b>	22.4	21.0	-6%
<b>REGULAR ROUTE</b>	22.9	21.1	-8%

RIDERS PER ROUND TRIP

	2012	2018	Change
<b>BLUE</b>	26.1	23.4	-10%
<b>GREEN</b>	19.9	14.7	-26%
<b>RED</b>	28.4	27.8	-2%
<b>BROWN</b>	10.2	9.2	-9%
<b>ORANGE</b>	26.9	26.9	0%
<b>DARTMOUTH</b>	6.5	6.3	-2%
<b>DHMC</b>	4.7	4.1	-12%
<b>TOTAL</b>	10.1	9.1	-10%
<b>REGULAR ROUTE</b>	23.4	20.0	-14%

Advance Transit's routes and services are very efficient and productive. The productivities achieved by these routes are more typical of urban areas than the collection of small towns that make up the Upper Valley.

The components with the lowest productivity are midday buses on the Dartmouth and DHMC shuttle routes. The medical center, the college, and the town of Hanover subsidize these services. These sponsoring institutions understand that demand for parking lot shuttles varies by time of day, and that while midday buses may be less productive, employees and visitors need to be able to get back to their cars during the middle of the day.

### 2.3. Blue Route

Advance Transit's Blue route includes three components:

- All-day 30-minute service between downtown Lebanon and downtown Hanover, including service to the Dartmouth-Hitchcock Medical Center and Dartmouth College
- Limited commuter service to Enfield and Canaan
- 15-minute scheduled service between the Dartmouth Medical School and DHMC during midday hours

Blue route market segments include:

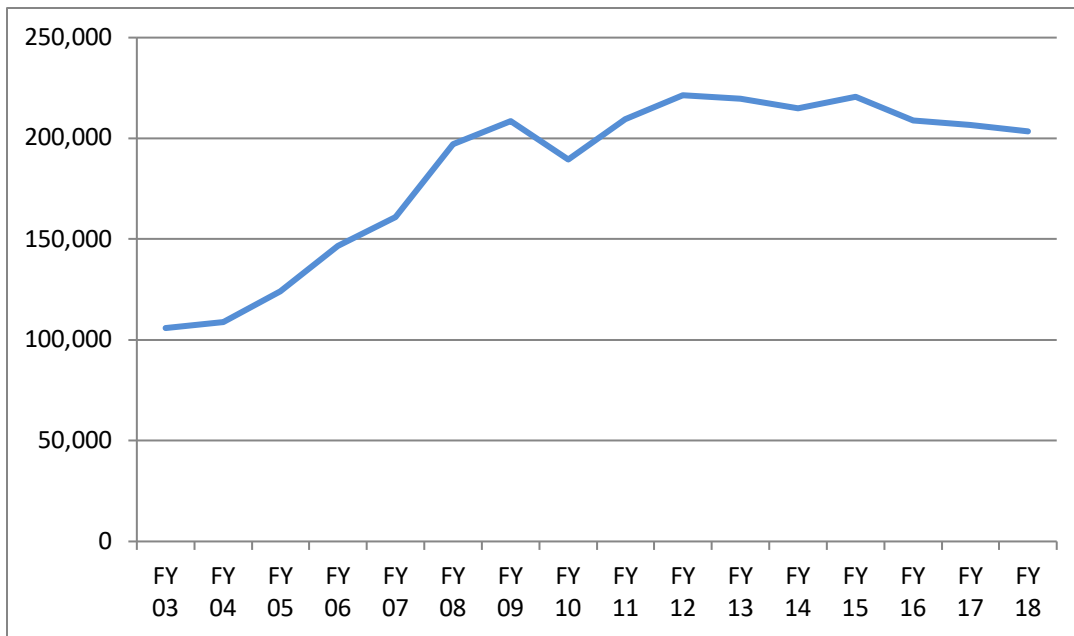
- Commuters traveling to jobs at Dartmouth College, DHMC, downtown Hanover, downtown Lebanon, and elsewhere
- Dartmouth Medical School students and staff traveling between the medical school and the hospital
- DHMC patients and visitors
- Dartmouth College students traveling to classes
- Area residents who use the bus for shopping and errands
- Residents of Hanover, Canaan, and Enfield who transfer to the Red Route in Lebanon to reach West Lebanon and the Route 12A shopping plazas

The Blue route is Advance Transit's busiest route, with nearly 850 riders per day. Blue route ridership has decreased by 10% since the 2012 Transit Development Plan. As shown in Figure 2.3 below, Blue route ridership has been relatively flat for the past seven years. FY 2012 was, indeed, the all-time high for Blue route ridership.

During October of 2017, four Blue route bus stops accounted for 63% of passenger boardings on the route. The busiest stop was DHMC, with 25% of Blue route boardings. Since most people travel round trip, this figure suggests that travel to and from the medical center accounts for approximately 50% of Blue route usage. The bus stop at Lebanon City Hall generated 18% of Blue route boardings, while the Dartmouth Bookstore accounted for 12% of boardings and Vail/DMS generated 7%. Stops in Canaan and Enfield accounted for 1,112 boardings in October of 2017, or 6% of the Blue route total. All of these percentages are slightly lower than those in 2012, suggesting that other stops became somewhat more important during the last five years.

Stops in downtown Hanover and on the Dartmouth College campus generated a combined total of 5,682 boardings, or 31% of the Blue route total. This suggests that about 62% of Blue route rides involve trips to or from Hanover or the college. Clearly many of the riders are traveling between Hanover/Dartmouth and DHMC.

**Figure 2.3 Advance Transit 15-Year Annual Blue Route Ridership**



The Blue route offers convenient front-door service at the DHMC East Entrance and at the Dartmouth Medical School, plus centrally located bus stops in downtown Hanover and downtown Lebanon. It provides timed connections with Red route buses in downtown Lebanon, and with Green, Orange, and Brown route buses in Hanover.

There are a number of issues and concerns that could be addressed in future service planning for the Blue Route. This section addresses conditions as they existed in the winter of 2018.

1. Turning left from Route 120 onto Heater Road can be very difficult, as it seems that the timing of the traffic signal is poor. The green arrow sometimes lasts only a few seconds, causing significant backups. Transit signal priority at this intersection would have a significant benefit for Blue route reliability. Alternatively, if buses could travel directly between downtown Lebanon and the high school without detouring via Route 120, they would save significant travel time. This would require a new overpass across I-89 restricted for the use of buses and emergency vehicles. Such an overpass would clearly be a longer-term consideration, past the horizon of this TDP.

2. The convenience of Blue route service could be improved by offering 15-minute service during peak periods, and in the midday between downtown Lebanon and DHMC. This would require the addition of one more bus to the route middays, and possibly two buses during the peaks. The DHMC-Hanover segment already has 15-minute midday service, thanks to the interest and financial support of Dartmouth Medical School (DMS).

3. With the exception of delays caused by late-afternoon Route 120 traffic congestion, as well as delays affecting the 7:32 a.m. departure from City Hall, there do not appear to be scheduling issues for Blue route buses. Regular buses have eight minutes of layover time every hour in downtown Lebanon. DMS buses have six minutes of layover time every half hour at DHMC. While these timetables currently work well, it should be noted that Blue route buses are threatened by the potential for congestion that may result in future years due to continuing business expansion in the Route 120 corridor (see chapter 5).

4. Drivers suggested consolidating the Bookstore and Hanover Park stops in downtown Hanover.

## 2.4. Red Route

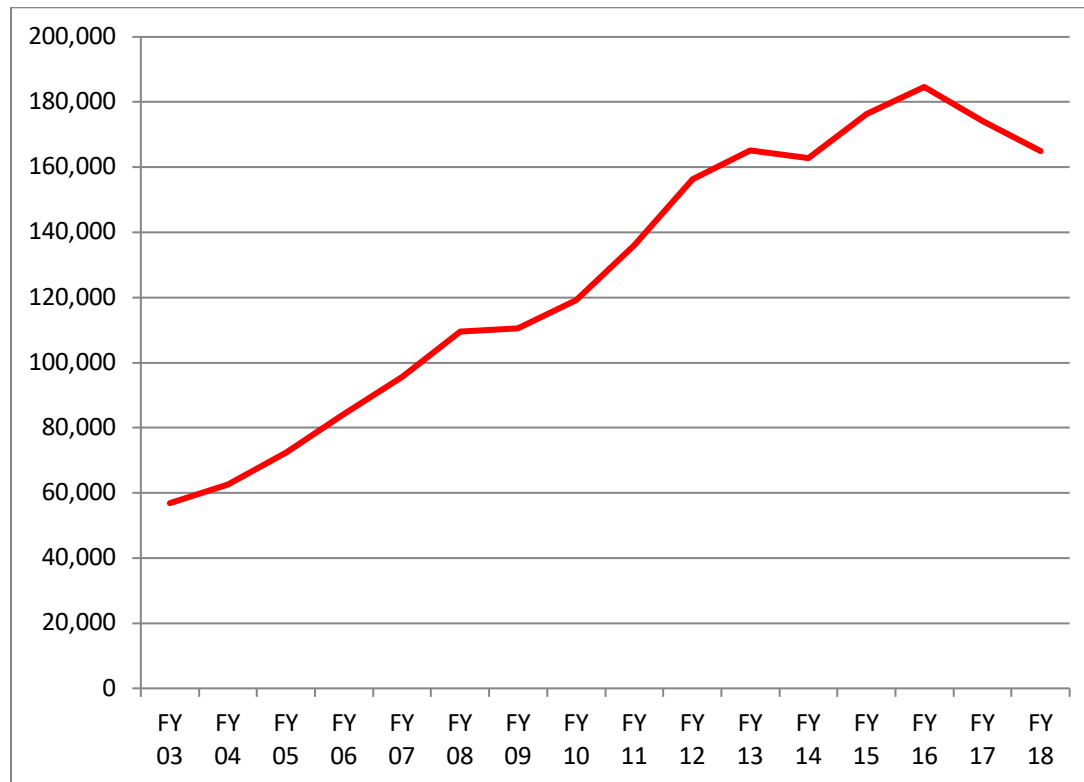
The Red route connects downtown Lebanon with West Lebanon and the Route 12A Plazas. The Red route is used by people traveling to job sites located along Route 4, in West Lebanon, and in the plaza area. Area residents use the Red route bus to reach a variety of shopping destinations, including Walmart, Shaws, and others. The Red route connects with the Blue route in downtown Lebanon and with the Orange and Green routes in West Lebanon. Some commuters from Lebanon ride the Red route and transfer to the Orange route in West Lebanon to reach the VA Hospital in White River Junction.

The Red route is Advance Transit's second busiest route, with 650 riders per day, and the most productive local bus route in New Hampshire (excluding the UNH Campus Connector). Between 2012 and 2018, Red route usage increased by 5.5%, from 156,247 to 164,908. The all-time high ridership occurred in FY 2016 as shown below in Figure 2.4. The Red route has by far the most transfer activity of any of Advance Transit's routes (see chapter 3).

During October of 2017, three Red route bus stops accounted for 68% of passenger boardings on the route. The busiest stop was in front of Kilton Library in West Lebanon, which generated 28% of Red route boardings. Lebanon City Hall, with 25% of Red route boardings was the next busiest. Walmart accounted for 15% of boardings on this route.

Other Route 12A plaza stops (from Glen Rd Plaza south) accounted for 14% of Red route boardings. Since most people travel round trip, these figures suggest that travel to and from the Route 12A plazas accounts for 50% or more of Red route usage (since some riders likely make multiple stops among the plazas).

**Figure 2.4 Advance Transit 15-Year Annual Red Route Ridership**



Service planning issues for the Red route in the winter of 2018 included the following:

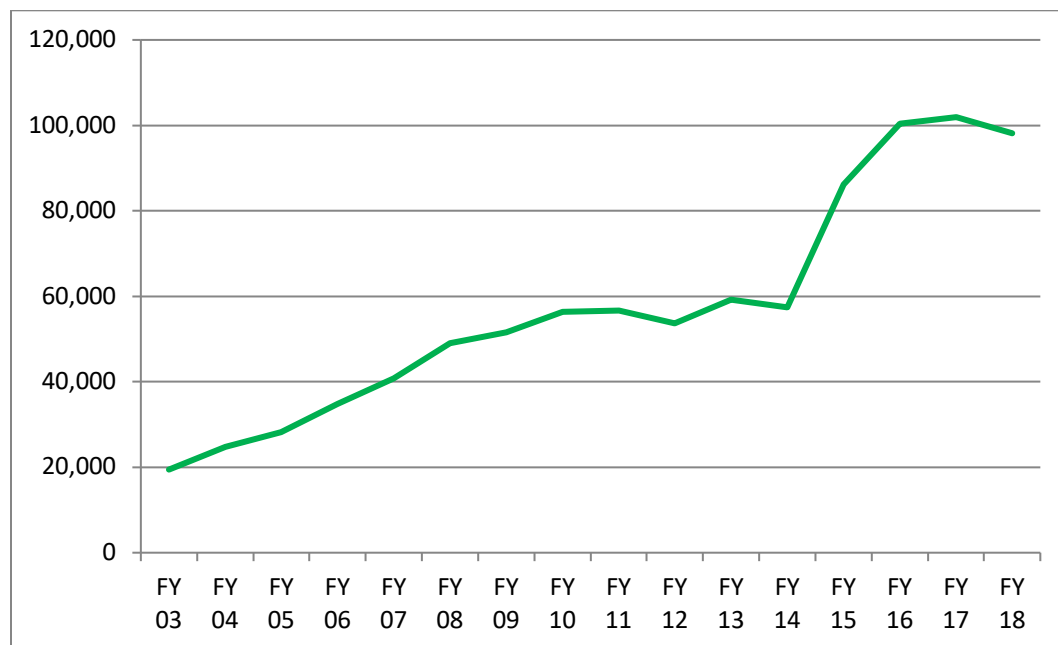
1. The possibility of moving the West Lebanon transfer point from Kilton Library to the River Park development would affect the Red route more than the others. It is unclear whether that extra mileage could be accommodated in the current schedule.
2. According to the drivers, the current schedule works well for the Red route most of the time. There can be some delays in the plazas at the busiest times in the afternoon, especially during peak shopping periods.
3. There are particular issues with a few Red route stops that can be addressed in the immediate term: pulling back into traffic at the Miracle Mile stop can be a challenge due to sight distances; the early morning stop at Upper Valley Plaza should not be a mandatory timepoint since nothing is open there at that time; departures at Kilton Library could be moved 5 minutes later to facilitate transfers, except when traffic is heaviest (holiday shopping season). These drivers felt that it was possible to accomplish the trip through the plazas in five minutes less than the current scheduled time.

## 2.5. Green Route

The Green route links West Lebanon and Hanover via Hartford Village and Wilder. It carries riders to Hanover, where it connects with the Blue and Brown routes, and to West Lebanon, where it connects with the Red and Orange routes. It transports many riders between bus stops within Vermont. This includes low-income individuals who travel between Hartford Village and the Haven.

Annual Green route ridership grew from 53,678 in FY 2012 to 98,189, an increase of 83%. This tremendous growth is due to the doubling of service in FY15 when headways dropped from 60 minutes to 30 minutes. As shown in Figure 2.5, ridership has leveled off after the rapid growth in FY15 and FY16.

**Figure 2.5 Advance Transit 15-Year Annual Green Route Ridership**



The Green route serves a variety of commuters, including people who work at Dartmouth College. Other employment destinations for Green route riders include the Route 12A plazas, downtown Lebanon, West Lebanon, White River Junction, and DHMC. Many of these work destinations require passengers to transfer to other routes.

The Green route provides Wilder and Hartford Village residents with access to social service programs at The Haven. It provides access to social services programs at the Gilman Center via a connection with the Orange route in West Lebanon. The Green route also gives Wilder and Hartford Village residents access to the Route 12A plazas via a connection with the Red route in West Lebanon.

In October of 2017, West Lebanon accounted for 22% of Green route boardings, while stops on the Dartmouth College campus and in downtown Hanover accounted for 20% of Green route boardings. Assuming that most people ride round trip, this suggests that 84% of Green route usage involves trips to New Hampshire, with West Lebanon accounting for 44% and Hanover/Dartmouth College accounting for 40%, although there are likely some people who ride all the way from West Lebanon to Hanover via the Green route, and they would be double counted by this method.

The busiest stop in Vermont is the Haven, with nearly 1,000 Green route boardings in October 2017 (about 45 per day northbound and southbound combined). Hartford Village and other stops west of Route 5 accounted for 12% of Green route boardings (split evenly northbound and southbound).

Service planning issues for the Green route in the winter of 2018 included the following:

1. With the addition of the second bus to this route in FY 2015 and the revamping of the schedule, drivers report few operational problems with the Green route. The one item that was mentioned was a possible stop consolidation in Wilder where three stops are located very close together (Haven, Funeral Home, and Cumberland Farms).

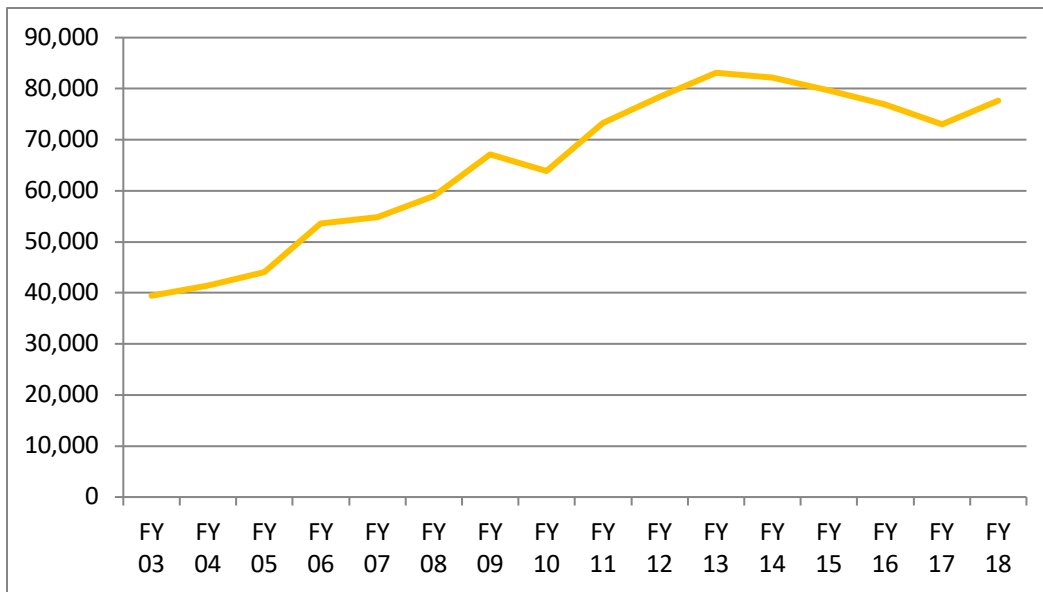
## **2.6. Orange Route**

The Orange route links White River Junction with West Lebanon and downtown Hanover. On the Vermont side of the Connecticut River, the Orange route serves downtown White River Junction, nearby residential neighborhoods, social service agencies at the Gilman Center, the Greyhound terminal, and the VA Hospital. In New Hampshire, the route serves West Lebanon, residences adjacent to Route 10, graduate student housing at Sagem Village, downtown Hanover, and the Dartmouth College campus.

The Orange route offers connections with the Red and Green routes in West Lebanon, and with the Brown and Blue routes in Hanover. It provides car-free access to the local Amtrak station and the Greyhound bus terminal, although Orange route buses do not operate late enough in the day to meet Amtrak's northbound arrival.

Annual Orange route ridership dropped from 78,346 in FY 2012 to 77,671 a decrease of 1%. As shown in Figure 2.6, the all-time peak ridership on the Orange route occurred in FY 2013, and it has been dropping slowly ever since, though FY 2018 showed an increase over the prior year.

**Figure 2.6 Advance Transit 15-Year Annual Orange Route Ridership**



In October of 2017, 27% of Orange route passengers boarded in White River Junction, 45% boarded within the town of Lebanon, and 28% boarded in Hanover. The busiest stop on the route was West Lebanon, which accounted for 24% of Orange route boardings, down from 27% in 2012. Sachem Village, which had been the fourth busiest stop at the time of the last TDP in 2012 is now the second busiest, with more than 1,100 boardings there in October 2017 (over 50 per day), in spite of the long walk from where the housing is out to the bus stop on Route 10. That figure represents 16% of total Orange line riders. The next busiest stops were the Dartmouth Bookstore with 9%, and the Coolidge Hotel/American Legion with 8%. The VA Hospital accounted for 4% of Orange route boardings.

Downtown Hanover and the Dartmouth College campus combined to account for 24% of Orange route boardings. Assuming that everyone rides round trip, this would suggest that trips to and from Hanover/Dartmouth College account for 48% of Orange route usage.

Service planning issues for the Orange route include the following:

1. Orange route timetables are tight, allowing very limited time to accommodate either wheelchair assists or delays caused by traffic congestion. There was close to unanimous agreement among the drivers that the Orange route presents the greatest reliability challenge among AT's routes.
2. There appears to be little or no opportunity to speed up the Vermont portion of the Orange route, other than skipping diversions to the Gilman Center. While the number of boardings at the Gilman Center is limited (5 per day), this diversion provides Vermont residents with access to important social service programs. It may be possible to limit the number of trips that operate to this location.
3. Representatives of the Upper Valley Aquatic Center have expressed an interest in being served by Advance Transit. It will not be possible to extend the Orange route to the Aquatic Center without a broader restructuring including more resources.
4. Sachem Village is likely to generate a much higher level of usage if residents are not required to walk out to Route 10, and if shuttle service to the Dartmouth campus is extended into the evening.

## 2.7. Brown Route

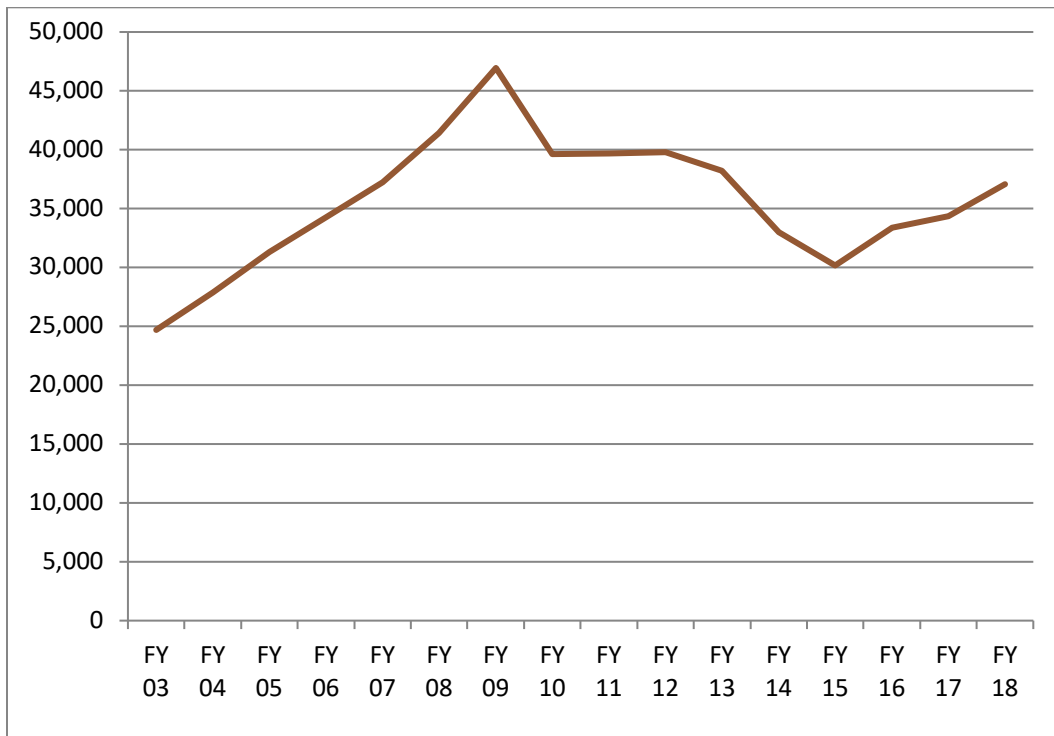
The Brown route consists of two segments. It operates between Norwich and Hanover, including peak-hour service to a Norwich park and ride lot. The Brown route also links downtown Hanover and the Dartmouth College campus with CRREL, the Frances Richmond Middle School, and the Kendal retirement community.

Norwich residents use the Brown route to commute to jobs in Hanover and Lebanon. Destination work sites include Dartmouth College, CRREL, and DHMC. School children in Norwich use the Brown route bus to travel to the Frances Richmond Middle School. Norwich residents use the bus for a variety of midday errands in Hanover and elsewhere. Residents of Kendal rely on the Brown route for access to Hanover.

Brown route passengers from Norwich connect with the Blue route by walking from the Hanover Inn to the Dartmouth Book Store, or by switching buses at Vail/DMS. They transfer to the Green and Orange routes at the Hanover Inn. Passengers from the CRREL end of the route can transfer to Blue, Green, and Orange routes at Maynard Street.

Annual Brown route ridership decreased from 39,802 in FY 2012 to 37,057 in FY 2018, for a net change of -7%. The all-time peak ridership for the Brown route was in FY 2009, just prior to a service cutback from 30-minute headways to 40-minute headways. Since FY 2015, the Brown route has seen steady ridership growth.

**Figure 2.7 Advance Transit 15-Year Annual Brown Route Ridership**



In October of 2017, 36% of boardings on the Brown route occurred in Norwich. Since most of these passengers probably traveled round trip to Hanover, this suggests that Norwich riders account for about 72% of Brown route usage and that less than 30% of the usage was fully within Hanover.



The busiest Brown route stop was Dan & Whit's, with 17% of Brown route boardings, followed by the Hanover Inn with 15%, Vail/DMS with 12%, and CRREL with 10%. Combined stops on the Dartmouth College campus (including the Hanover Inn) accounted for 37% of Brown route boardings. The combined percentage for the fire station, CRREL, Rivercrest, and Kendal was 24%. The peak-hour route extension to the Norwich park and ride lot accounted for 4% of Brown route boardings though the rest of that loop generated another 12% of the ridership (with Heritage Lane by far the most important of those stops).

Service planning issues for the Brown route include the following:

1. In 2009, Brown route headways were changed from every 30 minutes to every 40 minutes. Prior to this change, Brown route drivers had difficulty completing round trips in the available 30-minute window. Peak-hour times were adjusted further to accommodate important connections with other Advance Transit bus routes in Hanover. These peak-hour adjustments, in turn, allowed the route to be extended west to a newly designated Norwich park & ride lot. The revised timetable has resulted in reliable on-time service on this route.
2. Dartmouth College continues to experience strong demand for on-campus parking from employees who drive across the Ledyard Bridge from Norwich. If a park & ride lot could be located closer to the river, it might be possible to use the Brown route to help the college avoid the costs associated with expanding on-campus parking.
3. While only two or three people a day board at the new park & ride lot west of downtown Norwich, the diversion to this site generates an average of about ten riders per day. Most are people who live along the route extension, many of whom are middle school students.
4. The Brown route was designed in part to accommodate CRREL commuters. At the present time, there appear to be more middle school children using this stop than CRREL employees.
5. Overall, the Brown route has the lowest productivity of any of the regular routes. Its 40-minute headway is also out of sync with the rest of the system. A restructuring could benefit this route.
6. Some of the scheduled departure times from Dan & Whit's could be adjusted to facilitate transfers. Furthermore, there are very few boardings on the park & ride loop after the 7:20 a.m. trip.
7. Rivercrest, which used to be the location of Dartmouth housing, is currently vacant. It may be used in the near term for temporary parking during construction projects, and the college will likely redevelop it at some point.

## **2.8. Dartmouth/Hanover Shuttle**

Advance Transit operates an in-town shuttle for Dartmouth College and the town of Hanover. The shuttle connects parking lots at Dewey and the Thompson Arena with downtown Hanover and various locations on the Dartmouth College campus.

The number of buses and shuttle headways vary according to season and time of day, as shown in Table 2.3. Evening service is offered during the regular academic season only. The evening route links the Hanover Inn with Tuck and the Dewey parking lot. There is no evening service through downtown Hanover to the Thompson parking lot but the evening alignment connects to Schem Village and DHMC after the regular fixed routes go out of service.

The Dartmouth/Hanover shuttle accommodates workers and students who park in the Thompson and Dewey lots. The shuttle also facilitates various movements across the Dartmouth campus, as well as trips between college facilities and downtown Hanover.

**Table 2.3 Dartmouth/Hanover Shuttle Service Levels**

**Full Academic Session**

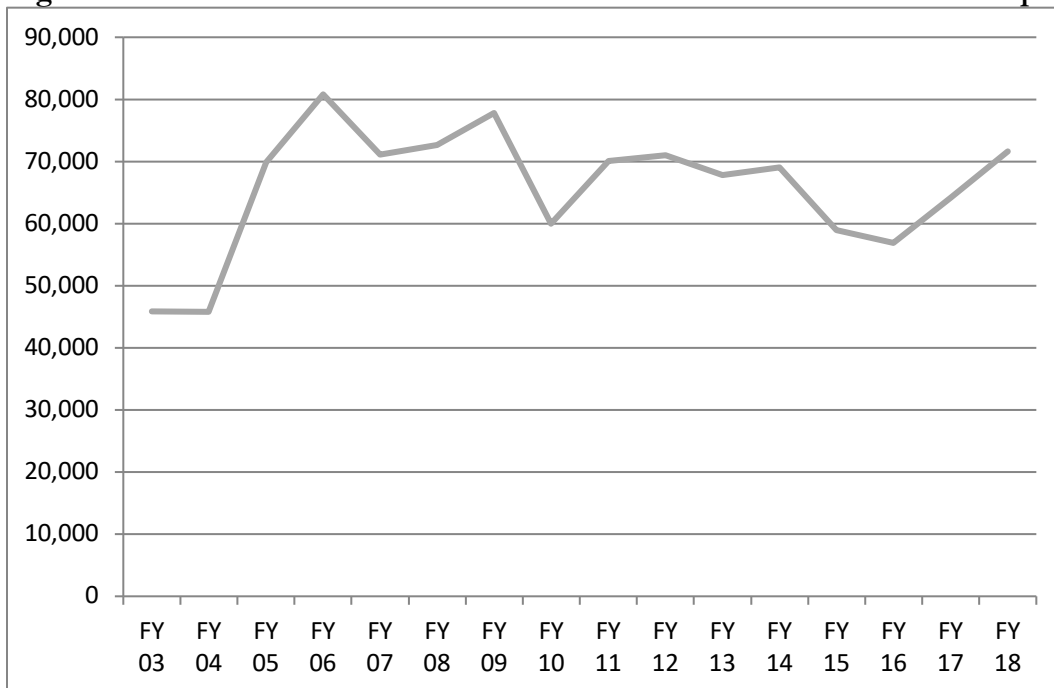
	Number of Buses	Headway
7:00 a.m. – 10:00 a.m.	3	10 minutes
10:00 a.m. – 3:00 p.m.	1	30 minutes
3:00 p.m. – 7:00 p.m.	3	10 minutes
7:00 p.m. – 9:00 p.m.	1 (Sachem-Hanover-DHMC)	60 minutes

**Summer, Vacations, and Holidays**

	Number of Buses	Headway
7:00 a.m. – 10:00 a.m.	2	15 minutes
10:00 a.m. – 3:00 p.m.	1	30 minutes
3:00 p.m. – 7:00 p.m.	2	15 minutes
7:00 p.m. – 9:00 p.m.	none	

Annual Dartmouth Shuttle ridership increased from 70,974 in FY 2012 to 71,623 in FY 2018, for a net increase of 1%. As shown in Figure 2.8, ridership has been increasing steadily over the past three years. Use of parking lot shuttles increased significantly when individual routes were combined into a unified system in 2005. In 2009, midday service was cut back from two buses providing 15-minute headways to one bus and 30-minute headways.

**Figure 2.8 Advance Transit 15-Year Annual Dartmouth Shuttle Ridership**



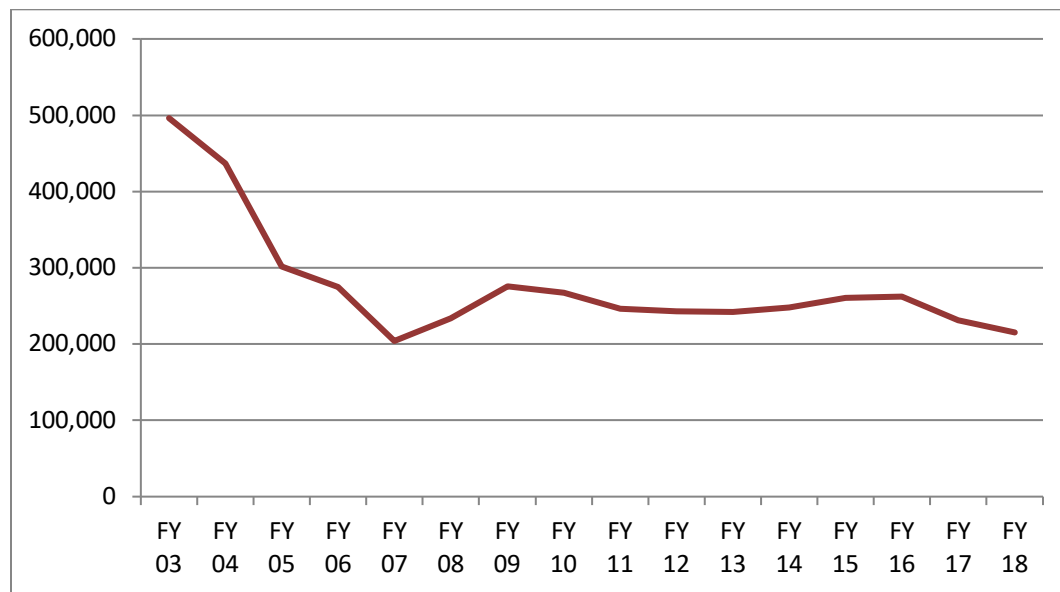
The Dartmouth/Downtown shuttle has a measure of complexity, which results from changing the service pattern at different times of the day and from reducing the level of service during the summer. Variations are designed to control costs, to avoid early-morning congestion in downtown Hanover, and to facilitate access from Dewey to Tuck in the morning, and from Tuck to Dewey in the afternoon

## 2.9. DHMC Parking Lot Shuttles

Advance Transit operates parking lot shuttles at DHMC that benefit patients, visitors, and employees. Two buses serve Lot 9, while one bus serves Lot 20. Continuous service is available on both routes, with departures approximately every ten minutes for Lot 9 and every six minutes for Lot 20. The Lot 9 shuttle operates from 6:30 a.m. to 6:00 p.m. The Lot 20 shuttle operates from 6:00 a.m. to 6:00 p.m.

Use of DHMC shuttles decreased from 243,115 in FY 2012 to 215,512 in FY 2018, for a loss of 11%. As shown in Figure 2.9, ridership overall has been relatively flat for more than a decade, with a steady decrease in ridership over the past three years. However, ridership thus far in FY 2019 is up 16% over the same period in FY 2018, in response to encouragement by DHMC leadership to use the remote lots and shuttles.

**Figure 2.9 15-Year Annual DHMC Shuttle Ridership**



AT assigns large buses to these shuttle routes because of high demand during peak periods. There is some perceived inefficiency during the middle of the day, as large buses circle the parking areas with only a handful of riders.

DHMC shuttles provide a high level of convenience for individuals traveling to and from the medical center. While it might be possible to lower costs by reducing the frequency of midday service, this is likely to reduce people’s willingness to park in outlying parking lots.

### 3. Passenger Survey

This chapter presents the results of an onboard passenger survey distributed to Advance Transit bus riders on Tuesday, October 31, 2017. It includes comparisons with similar passenger surveys carried out in 1999, 2004, 2008, 2012, and 2015.

The survey examines trip purposes, transfer activity, frequency of use, residence and commute patterns, technology usage, and the employment status of Advance Transit users. It asked passengers to evaluate Advance Transit bus operations and to make suggestions for improving the service.

A copy of the survey form is included in Appendix A. A full transcription of passenger comments is presented in Appendix B.

The chapter is structured as follows:

- Section 3.1 Methodology and Response
- Section 3.2 Transfers between Routes
- Section 3.3 Trip Purpose
- Section 3.4 Residence by Town
- Section 3.5 Frequency and History of Transit Use
- Section 3.6 Dartmouth Students
- Section 3.7 Employment Status and Work Sites
- Section 3.8 Automobile Availability
- Section 3.9 Demographics
- Section 3.10 Use of Other Routes and Services
- Section 3.11 Service Evaluation
- Section 3.12 Transit Information and Use of Technology
- Section 3.13 Weekend and Saturday Service
- Section 3.14 Passenger Comments and Suggestions

#### 3.1. Methodology and Response

Advance Transit bus riders were surveyed on Tuesday, October 31, 2017. Surveys were distributed on Advance Transit's five regular bus routes between 5:35 a.m. and 2:00 p.m. though on some routes, the survey ended prior to 2:00 because the desired sample had been achieved. This included the Blue, Red, Orange, Green, and Brown routes. Surveys were not distributed on the Dartmouth/Downtown Shuttle or on DHMC parking lot shuttles.

Passengers were handed a survey form and a pencil when they boarded the bus. Passengers turned in completed forms as they exited the bus. Most individuals who were offered a survey form agreed to take one. In 2017, 628 surveys were distributed and 583 were returned, for a response rate of 92.8%. The response rate was similar in past years. The total of 583 completed surveys in 2017 compares with 526 in 2015, 578 in 2012, 572 in 2008, 346 in 2004, and 117 completed surveys in 1999.

Table 3.1 shows the distribution of completed 2017 surveys by bus route. The total is greater than 583 because some respondents used more than one bus route for their trip and these riders were counted on all of the routes that they rode. Table 3.1 also shows the distribution of ridership by route for October 2017 excluding campus and parking lot shuttles. The Blue route was a bit oversampled and the Red route a bit undersampled. Many riders transfer from other routes to the Red route (see below), and thus would have already received a survey before boarding the Red route.

**Table 3.1 Survey and Ridership Distribution**

	Survey Respondents	Survey Distribution	Oct 2017 Ridership Distribution
Blue	283	39%	36%
Red	159	22%	27%
Green	132	18%	17%
Orange	110	15%	14%
Brown	48	7%	7%
Total	732	100%	100%

### 3.2. Transfers between Routes

In 2017, 26% of survey participants said their trip involved a transfer between bus routes. This compares with 28% in 2015, 27% in 2012, 26% in 2008, 14% in 2004, and 14% in 1999. This means that in 2017, 74% of the passengers surveyed used only one bus to complete their trip. A vast majority of Advance Transit riders enjoyed the convenience of a one-seat ride.

Nearly 50% of the survey respondents who said they used only one bus filled out a survey form on a Blue route bus, well above the 36% of total system boardings that occur on the Blue route. The full distribution of single-seat riders by route is shown in Table 3.2. In spite of carrying 27% of total system riders, only 13% of single-seat riders received a survey form on a Red route bus.

**Table 3.2 Single-Seat Rides by Route**

	Survey Respondents	Percent of Total
Blue	201	47%
Red	56	13%
Green	76	18%
Orange	65	15%
Brown	33	8%
Total	431	100%

Some 72% percent of the people on the Blue route who used only one bus said they work at either DHMC (24%) or Dartmouth College (48%). On the Green, Orange, and Brown routes, between 30% and 43% of single-seat riders work for Dartmouth.

When analyzing survey responses and transfer activity, it is important to remember that the survey addresses individuals, while transit ridership statistics address unlinked trips. An individual who boards

only one bus to complete a trip counts as one ride, while an individual who boards two buses to complete a trip counts as two rides. Passengers were asked to fill out the survey only once, so an individual who filled out a survey on the Blue route and then transferred to the Red route will not show up as a Red route rider – unless second and third routes are included in the counts for each route.

For example, 40 of the 96 people who filled out a survey on the Red route said they used more than one bus to complete their trip. At first glance, this might appear to suggest that 41% of Red route riders transferred between routes. However, another 63 individuals who filled out surveys on other routes indicated that they would use the Red route to complete their trip. If these additional rides are included in the Red route count, the percentage of Red route trips that involve transfers comes to 64% (102 of 159 Red route rides). Table 3.3 shows the percentage of riders by route who transfer, no matter which route the rider was surveyed on.

**Table 3.3 Transfer Activity by Route (including second and third routes)**

	Transferring Riders	Survey Respondents	Percent Transfers
Blue	79	283	28%
Red	102	159	64%
Green	53	132	40%
Orange	45	110	41%
Brown	14	48	29%
Total	293	732	40%

These results suggest that while 26% percent of Advance Transit riders transfer between buses, 40% of Advance Transit’s recorded unlinked trips involve people who use more than one bus to complete their trip.

The three busiest transfer pairs all involved the Red route bus: Red/Blue (49), Red/Green (30), and Red/Orange (23). Together, these pairs accounted for 61% of all transfers. The next busiest transfer pair was Blue/Green with 13 transfers (8%), followed by Green/Orange with 12 (7%), Blue/Brown with 11 (7%), Blue/Orange with 10 (6%).

**Table 3.4 Transfer Activity between Routes**

CROSSTAB: BUS 1 AND BUS 2

Route2\Route 1	Blue	Red	Green	Orange	Brown	Row Total
Blue	0	18	8	4	4	34
Red	31	0	19	12	0	62
Green	0	11	0	6	0	17
Orange	3	10	5	0	1	19
Brown	6	0	2	0	0	8
Downtown	1	0	1	1	1	4
DHMC parking	0	0	0	0	0	0
Centerra	1	0	0	0	0	1
Stagecoach	0	0	0	1	0	1
The Current	3	1	1	1	0	6
	45	40	36	25	6	152

CROSSTAB: BUS 1 AND BUS 3

Route3\Route 1	Blue	Red	Green	Orange	Brown	Row Total
Blue	0	0	2	2	0	4
Red	0	0	0	1	0	1
Green	2	0	0	0	0	2
Orange	1	0	0	0	0	1
Brown	0	1	0	0	0	1
Downtown	0	1	0	0	0	1
DHMC parking	0	0	0	0	0	0
Centerra	0	0	0	0	0	0
Stagecoach	0	0	0	0	0	0
The Current	0	0	0	0	0	0

There were also five cases where the respondent apparently received the survey form on the middle bus of a three-seat ride. Two of these were transfers from Stagecoach, and the other three were midday riders who boarded after the survey supply had been exhausted on the first bus they boarded.

CROSSTAB: BUS 0 WITH BUS 1

Routes 0\Route 1	Blue	Red	Green	Orange	Brown	Row Total
Blue	0	0	1	0	0	1
Orange	0	0	1	0	0	1
Brown	1	0	0	0	0	1
Stagecoach	0	0	2	0	0	2

The following table summarizes all of the transfer linkages between routes.

**Table 3.5 Transfer Summary**

CROSSTAB: BUS 1 WITH BUS 0, BUS 2 AND BUS 3

Route0+2+3\Route 1	Blue	Red	Green	Orange	Brown	Row Total
Blue	0	18	11	6	4	39
Red	31	0	19	13	0	63
Green	2	11	0	7	0	20
Orange	4	10	5	0	1	20
Brown	7	1	2	0	0	10
Downtown	1	1	1	1	1	5
DHMC parking	0	0	0	0	0	0
Centerra	1	0	0	0	0	1
Stagecoach	0	0	2	1	0	3
The Current	3	1	1	1	0	6
	49	42	41	29	6	167

The combined total of transfers at various locations in Hanover was 49, or 30% of the transfer activity reported by survey participants. West Lebanon accounted for 65 transfers, or 40% of

reported transfers. Lebanon City Hall had 49 transfer movements, or 30% of recorded transfers. One transfer (1%) took place at DHMC. Compared to the 2015 survey, the number of transfers rose significantly at Lebanon City Hall and dropped slightly at Hanover.

It is important to note that the absolute figures of transfers represent just the first half of the day, and should be doubled to provide an estimate of total transfer activity over the course of an entire day. Of course, the true daily total will not be exactly double these figures because not all riders make the reverse trip in the afternoon, and some riders make a variety of trips during the day.

### 3.3. Trip Purpose

Passengers were asked to identify the primary purpose of their bus trip. The results are presented in Table 3.6.

**Table 3.6 Trip Purpose**

	<b>1999</b>	<b>2004</b>	<b>2008</b>	<b>2012</b>	<b>2015</b>	<b>2017</b>
Work	72%	62%	69%	58%	64%	54%
Shopping	13%	14%	9%	11%	8%	8%
School or college	10%	11%	11%	17%	11%	22%
Medical	2%	6%	4%	7%	7%	7%
Recreation/Social	3%	4%	4%	4%	5%	4%
Other		4%	3%	3%	5%	4%
	100%	100%	100%	100%	100%	100%

Among all of the surveys taken on Advance Transit over the past 18 years, the 2017 survey had the lowest percentage of commuters and the highest percentage of students. Other trip purposes were relatively stable, though shopping is less common than it was five years ago and before.

Nonetheless, Advance Transit continues to carry a high percentage of commuters when compared with other rural public transit systems.

Table 3.7 below shows the trip purpose by route. Riders who transferred between routes are included in all of the routes they rode. Thus, the total percentage shown in the rightmost column does not match the 2017 figures in Table 6, because transferring riders are effectively weighted more heavily in Table 3.7. Table 3.6 figures can be thought of as a representation of the purposes of the people using AT on the survey day, while Table 3.7 represents the purposes associated with boardings on the survey day.

**Table 3.7 2017 Trip Purposes by Route (including transfer routes)**

	<b>Blue</b>	<b>Red</b>	<b>Green</b>	<b>Orange</b>	<b>Brown</b>	<b>Total</b>
Work	70%	48%	46%	34%	33%	53%
Shopping	4%	26%	10%	12%	4%	11%
School or college	13%	3%	15%	38%	61%	18%
Medical	7%	14%	14%	6%	0%	9%
Recreation/Social	2%	4%	8%	5%	0%	4%
Other	4%	4%	8%	4%	2%	5%



Compared to the results in 2015 (shown in Table 3.8 below), the Blue and Red routes show a similar pattern of trip purposes, with most of the figures within a few percentage points of prior results. The Green route shows a moderate shift from work trips to all of the other trip purposes. The Orange and Brown routes, however, show a dramatic shift from work trips to school/college trips. Increased boardings from Sachem Village on the Orange route headed to Tuck and Dartmouth College, and the many middle school students on the Brown route account for these shifts. The changes on the Orange and Brown routes are the cause of the overall shift from work to school/college seen on Table 3.6.

**Table 3.8 2015 Trip Purposes by Route (including transfer routes)**

	<b>Blue</b>	<b>Red</b>	<b>Green</b>	<b>Orange</b>	<b>Brown</b>	<b>Total</b>
Work	72%	52%	67%	52%	60%	63%
Shopping	2%	24%	7%	8%	6%	9%
School or college	11%	1%	4%	17%	13%	9%
Medical	6%	10%	10%	10%	6%	8%
Recreation/Social	3%	3%	0%	1%	6%	2%
Other	1%	5%	3%	6%	0%	3%

### 3.4. Residence by Town

The distribution of bus riders by town is presented in Table 3.9. This includes a comparison with previous survey results. The ridership by town has been very stable over the past decade. The large jump in Hartford riders between 2012 and 2015, attributed to the increase in service the Green route, is maintained in 2017, though to a slightly lower degree.

**Table 3.9 Residence of Advance Transit Bus Riders**

	<i>1999</i>	<i>2004</i>	<i>2008</i>	<i>2012</i>	<i>2015</i>	<i>2017</i>
Lebanon	51%	41%	44%	43%	43%	44%
Hartford	16%	16%	18%	18%	23%	21%
Hanover	9%	13%	11%	18%	14%	14%
Norwich	1%	11%	6%	6%	5%	6%
Canaan	12%	5%	6%	4%	4%	4%
Enfield	3%	5%	6%	4%	4%	3%
Other	7%	8%	9%	6%	7%	7%

The 2017 distribution of bus riders by town and by route is presented in Table 3.10. The results are consistent with those from 2015 and largely reflect the geographic territory served by the routes. Residents of Canaan, Enfield, and “other” combined to account for 25% of Blue route usage, and also 14% of Red route usage. The Orange route has the greatest concentration of origin towns, with 89% of riders coming from just Lebanon and Hartford (White River Junction). No other route has more than 81% of riders from any two towns combined.

**Table 3.10 2017 Town of Residence by Route (including transfer routes)**

	Blue	Red	Green	Orange	Brown	Total
Lebanon	46%	61%	10%	62%	8%	42%
Hartford	6%	20%	70%	27%	2%	23%
Hanover	21%	3%	10%	5%	24%	13%
Norwich	2%	1%	2%	1%	57%	5%
Canaan	8%	6%	1%	2%	0%	5%
Enfield	7%	4%	1%	0%	2%	4%
Other	10%	4%	6%	4%	6%	7%

Brown route users are somewhat more concentrated in Norwich in 2017 than in previous surveys. It may be that more of the middle school students who ride the Brown route chose to fill out surveys this year compared to prior years, resulting in both a higher representation of Norwich residents and a higher proportion of school trips on that line.

Over half of the people who live in “other” towns outside Advance Transit’s service area completed surveys on the Blue route. The most common of these “other” towns among Blue route riders include Grafton, Claremont, and Thetford.

### 3.5. Frequency and History of Transit Use

The majority of Advance Transit’s riders use the bus every weekday. Over 80% of riders surveyed use the bus at least three days per week. Of course, it must be recognized that infrequent riders are less likely to be included in the sample in a one-day survey. That is, someone who rides every day had close to a 100% chance of being surveyed, but someone who rides only once a week (assuming that the particular day they ride changes from week to week) had at most a 20% chance of being surveyed. Thus among the total population of people who use AT routes at least occasionally, there are more infrequent riders than are indicated by these survey results. However, these figures do provide an accurate snapshot of the people on the bus on any given day. The distribution of frequency has changed relatively little since 2004.

**Table 3.11 Frequency of Use of AT Buses**

	<b>1999</b>	<b>2004</b>	<b>2008</b>	<b>2012</b>	<b>2015</b>	<b>2017</b>
5 days per week	62%	52%	49%	51%	53%	56%
3-4 days per week	18%	31%	33%	29%	30%	27%
1-2 days per week	12%	12%	10%	14%	11%	11%
Less than once per week	9%	6%	8%	7%	7%	6%
Total	101%	101%	100%	100%	100%	100%

As shown in Table 3.12, 28% of survey respondents said they started using Advance Transit within the last year, while a third of riders have been using the system for more than five years. The 2017 results for rider longevity are largely consistent with prior years.

**Table 3.12 Number of Years Riding Advance Transit**

	<b>1999</b>	<b>2004</b>	<b>2008</b>	<b>2012</b>	<b>2015</b>	<b>2017</b>
Within 1 year	34%	31%	33%	27%	24%	28%
1-5 years	23%	46%	45%	45%	41%	39%
More than 5 years	42%	23%	22%	27%	36%	33%

Just over half of the respondents who started riding in the past year said that they were students, but only 29% of those riding for 1 to 2 years are students. Only 10% of riders who have been on the system for more than 5 years said they were students.

### 3.6. Dartmouth Students

Overall, 26% of survey respondents indicated that they are students. Of the student respondents, 76% were Dartmouth College students, 8% were local high school students, and 6% attend Richmond Middle School. Nineteen percent of Advance Transit riders indicated that they are enrolled at Dartmouth College. This compares with 14% in 2015, 19% in 2012, 13% in 2008, and 12% in 2004.

The distribution of Dartmouth students by type is presented in Table 3.13.

**Table 3.13 Distribution of Dartmouth College Students**

	<b>2004</b>	<b>2008</b>	<b>2012</b>	<b>2015</b>	<b>2017</b>
Undergraduate	46%	19%	37%	28%	17%
Tuck	10%	8%	4%	3%	5%
Thayer	5%	11%	14%	11%	17%
Medical School	5%	19%	9%	15%	11%
Arts & Science Graduate	24%	41%	29%	35%	32%
Other Graduate	10%	3%	8%	8%	18%

The largest shift from prior years is fewer undergrads riding, while more “other graduate” students ride. Thayer also had its highest representation among any of the surveys.

Of the Dartmouth students who participated in the survey, 33% live in Hanover, 14% live in downtown Lebanon, 7% live in White River Junction, and 38% live in West Lebanon.

Thirty-five percent of Dartmouth students filled out survey forms on the Blue route, 41% percent were on the Orange route, and 15% were on the Green route (a notable increase from the 5% figure in the 2015 survey). The Brown and Red routes had few Dartmouth College students.

### 3.7. Employment Status and Work Sites

Over half of Advance Transit bus riders said they are employed full-time as shown below in Table 3.14. Among the 7% who chose “other” as their employment status, most of the respondents said they were “disabled.”

**Table 3.14 Employment Status**

	<b>2008</b>	<b>2012</b>	<b>2015</b>	<b>2017</b>
Full-time	66%	53%	62%	55%
Part-time	16%	22%	16%	18%
Retired	6%	6%	8%	7%
Unemployed	6%	13%	9%	14%
Other	6%	6%	6%	7%

Advance Transit passengers were asked: “Who is your employer?” Forty percent of employed respondents said they are employed by Dartmouth College. This figure translates into 30% of all riders after taking into account people who are not employed. Another 14% of employed respondents work for DHMC. Some 53 of these 63 respondents were riders on the Blue route. Only 1% said they worked at the VA hospital.

About a third of the employed riders cited other employers, with about 100 individual employers mentioned. Employers that accounted for three or more Advance Transit riders include Price Chopper (14), Au Bon Pain (4), Walmart (4), BJ’s (3), and CRREL (3). Nine individuals said they were self employed.

The most common employment location cited in the survey was Downtown Hanover, with nearly a third of employed respondents working there. The other primary work location was the DHMC main campus, accounting for another 25% of employed respondents. These figures are similar to the results from the 2015 survey. The rest of the distribution of work locations is shown below in Table 3.15.

**Table 3.15 Employment Locations**

<b>Location</b>	<b>Responses</b>	<b>Percent</b>
Downtown Hanover	138	31%
DHMC main campus	109	25%
West Lebanon	30	7%
White River Junction	27	6%
Route 12A Plazas	26	6%
Hanover Lyme Rd	17	4%
Downtown Lebanon	16	4%
Wilder	8	2%
Centerra	6	1%
DHMC Heater Rd	5	1%
Norwich	4	1%
Other	56	13%
	<b>442</b>	<b>100%</b>

Among the “other” work locations, the most common were the Miracle Mile on US 4, the Town of Canaan, and parts of the Dartmouth campus north of downtown Hanover (most often the Medical School).

Survey results suggest that Dartmouth employees and students together account for 40% of Advance Transit ridership. This is less than the sum of Dartmouth students (19%) and Dartmouth employees (30%), because some indicated that they are both Dartmouth students and Dartmouth employees. (There were a total of 177 Dartmouth employees and 111 Dartmouth students. Because 55 individuals said they were both, the net total number of individuals associated with the College was 233.)

The distribution of Dartmouth College employees was 56% on the Blue route, 19% on the Orange route, 17% on the Green route, 6% on the Brown route, and 2% on the Red route. This distribution is similar to that observed in 2015.

### 3.8. Automobile Availability

In 2017, 58% of Advance Transit survey respondents said they had no car available. This compares with 48% who said they had no car available in 2015, 61% who said they had no car available in 2012, 47% who said they had no car available in 2008, 57% who said they had no car available in 2004, and 75% who had no car available in 1999. In the present survey, another 7% of riders said that someone else was using their car, and 1% said the car was in for repairs.

Stated differently, the percentage of Advance Transit riders who choose to ride instead of drive is 42%. There may well be others who chose not to buy a car in the first place because of the availability of AT service, so the 42% represents a lower bound of “choice” riders. The percentage of Advance Transit riders that left cars at home was 24%, which is consistent with prior years. More detail on automobile usage is shown below in Table 3.16.

The percentage that parked near an Advance Transit bus stop went from 8% in 2004 and 10% in 2008 to 3% in 2012, 4% in 2015 and down to 2% in 2017. Of the 14 respondents who said that they had parked at a bus stop, 4 were in Canaan at the Methodist Church, 2 were at Sachem Village, one was in Enfield, and one was on the Norwich side of the Ledyard Bridge. No survey participants indicated that they parked their car at the Norwich park and ride lot or in downtown Lebanon.

In 2017, 54% percent of Advance Transit riders indicated that they have a valid drivers license. This compares with 61% in both 2015 and 2012 and 60% in 2008.

**Table 3.16 Automobile Usage**

	<b>2004</b>	<b>2008</b>	<b>2012</b>	<b>2015</b>	<b>2017</b>
No car available	57%	47%	61%	48%	58%
Home	23%	29%	23%	28%	24%
DHMC Lot	0%	1%	3%	2%	4%
Dartmouth or Hanover lot	2%	3%	2%	2%	2%
Someone else is using it	8%	7%	5%	13%	7%
Garage for repairs	1%	1%	3%	2%	1%
Near AT bus stop	8%	10%	3%	4%	2%
Other	2%	2%	1%	1%	1%

### 3.9. Age

Distribution by age group is shown in Table 3.17. In the 2017 survey, 24% of survey participants were under the age of 26, while 39% were over the age of 40. The age distribution is similar to 2015, with somewhat greater representation of teenagers.

**Table 3.17 Distribution of Advance Transit Riders by Age Group**

	<b>1999</b>	<b>2004</b>	<b>2008</b>	<b>2012</b>	<b>2015</b>	<b>2017</b>
Under 18	1%	8%	3%	4%	2%	5%
18-25	17%	21%	22%	26%	19%	19%
26-40	39%	24%	29%	32%	36%	37%
41-65	37%	40%	41%	30%	34%	32%
Over 65	5%	8%	5%	7%	8%	7%

### 3.10. Use of Other Routes and Services

A new question added to the survey in 2017 sought to capture how broadly riders use the Advance Transit system as well as other transit services in the area. In addition to the five mainline AT routes, respondents were asked whether they use, at least twice per year, the Dartmouth/Downtown shuttle, the DHMC parking lot shuttle, the DHMC/Centerra shuttle, the Tuck shuttle (from Sagem Village), Stagecoach, The Current, Dartmouth Coach, and Amtrak. The results are shown below in Table 3.18.

**Table 3.18 Use of Other Services by AT Riders**

<b>Route/Service</b>	<b>Percent Using</b>	<b>Route/Service</b>	<b>Percent Using</b>	<b>Route/Service</b>	<b>Percent Using</b>
Blue	67%	DT Shuttle	10%	The Current	1%
Red	47%	DHMC Shuttle	4%	Dartmouth Coach	23%
Green	38%	Centerra Shuttle	4%	Amtrak	4%
Orange	34%	Stagecoach	4%	Tuck shuttle	1%
Brown	18%				

Table 3.19 breaks out the results by the route on which the passenger was surveyed. The percentages represent the number of citations of the service used (first column) divided by the number of surveys received for each of the mainline routes.

The results by route show some interesting patterns. Dartmouth Coach use is much more common among Blue and Orange route riders than among Red route riders. One would expect more Orange route users to use the Tuck shuttle, but respondents perhaps did not see the Tuck shuttle option on the survey or know that it was referring to the livery service they use. It is also possible that many of the Tuck shuttle users only use the Orange route for the trip home in the afternoon, in which case they would not have been captured in the survey.

**Table 3.19 Use of Other Services by AT Mainline Route**

<b>Service Used\Survey Route</b>	<b>Blue</b>	<b>Red</b>	<b>Green</b>	<b>Orange</b>	<b>Brown</b>
Blue	100%	52%	43%	38%	36%
Red	35%	100%	44%	46%	10%
Green	16%	38%	100%	32%	10%
Orange	15%	32%	32%	100%	15%
Brown	11%	8%	20%	8%	100%
DT Shuttle	10%	1%	10%	16%	15%
DHMC Shuttle	9%	0%	4%	0%	0%
Centerra Shuttle	7%	1%	4%	2%	0%
Stagecoach	2%	2%	5%	8%	0%
The Current	1%	1%	3%	1%	0%
Dartmouth Coach	33%	4%	19%	27%	15%
Amtrak	4%	0%	6%	1%	8%
Tuck shuttle	0%	0%	3%	2%	0%

### 3.11. Service Evaluation

Passengers were asked to evaluate the quality of service provided by Advance Transit. They were asked to rate the cleanliness of buses and the politeness of bus drivers. They were asked if buses are comfortable, whether seats are readily available, whether buses ran on time, if bus schedules are easy to find, and if schedules are easy to understand. Riders were also asked about transfers between routes.

As shown in detail on Table 3.21 on the next page, 98% of Advance Transit passengers said buses were usually or nearly always clean. Ninety-seven percent said that buses were usually or nearly always comfortable. Ninety-eight percent said that bus drivers are usually or nearly always polite and helpful. Ninety-eight percent said that drivers were usually or nearly always safe. These findings are consistent with rider responses to the same questions in prior surveys and show a very high degree of satisfaction among riders and a recognition of high-quality service.

Table 3.20 below shows a composite rating for each measure on a 4-point scale. Higher ratings are better. Ratings from 2015 and the change from 2015 to 2017 are also shown.

The lowest ratings among the evaluation measures were for on-time performance, especially in the afternoon, being able to understand the schedule, and being able to find a seat. The ratings for these measures were not bad, but they were not as high as for the other measures. Compared to 2015, the ratings for on-time performance improved slightly but the ratings for being able to find and understand schedules declined very slightly. Since the schedule booklet has not changed since 2014, this change in rating reflects a change in the population more than a change in what AT is doing.

**Table 3.20 Composite Ratings of Service Quality Measures**

	<b>2017</b>	<b>2015</b>	<b>Change</b>
Buses are clean	3.79	3.72	0.07
Buses are comfortable	3.75	3.67	0.08
It is easy to find a seat	3.62	3.63	-0.01
Drivers are polite and helpful	3.78	3.76	0.02
Drivers are safe	3.81	3.78	0.03
Buses are on-time in the morning	3.60	3.60	0.00
Buses are on time in the afternoon	3.53	3.45	0.08
Bus schedules are easy to find	3.73	3.77	-0.04
Bus schedules are easy to understand	3.52	3.58	-0.06
Transfers between routes are easy	3.67	3.62	0.05

For morning on-time performance, most of the low ratings occurred on the Blue route, with 18 passengers saying buses were only sometimes or almost never on time. Only 3 Green, 2 Orange, 1 Brown, and 2 Red riders used those ratings for morning service. In the afternoon, 20 Blue route, 5 Green route, 4 Orange route, 2 Brown route, and 5 Red route riders expressed dissatisfaction with on-time performance, indicating that reliability issues are a bit more widespread in the afternoon. Overall, though, these ratings are still very good.



Table 3.21 Evaluation of Service Quality

2017

	<i>Nearly Always</i>	<i>Usually</i>	<i>Sometimes</i>	<i>Almost Never</i>
Buses are clean	81%	17%	1%	0%
Buses are comfortable	78%	19%	2%	1%
It is easy to find a seat	68%	27%	4%	1%
Drivers are polite and helpful	81%	17%	2%	0%
Drivers are safe	84%	14%	2%	1%
Buses are on-time in the morning	65%	30%	4%	1%
Buses are on time in the afternoon	60%	34%	6%	1%
Bus schedules are easy to find	79%	16%	5%	1%
Schedules are easy to understand	65%	24%	9%	2%
Transfers between routes are easy	71%	25%	4%	0%

2015

	<i>Nearly Always</i>	<i>Usually</i>	<i>Sometimes</i>	<i>Almost Never</i>
Buses are clean	76%	22%	1%	0%
Buses are comfortable	72%	24%	3%	1%
It is easy to find a seat	67%	29%	4%	0%
Drivers are polite and helpful	78%	20%	2%	0%
Drivers are safe	80%	18%	2%	0%
Buses are on-time in the morning	65%	29%	6%	1%
Buses are on time in the afternoon	54%	36%	10%	1%
Bus schedules are easy to find	80%	17%	3%	0%
Schedules are easy to understand	67%	25%	7%	1%
Transfers between routes are easy	66%	30%	4%	0%

Change from 2015 to 2017

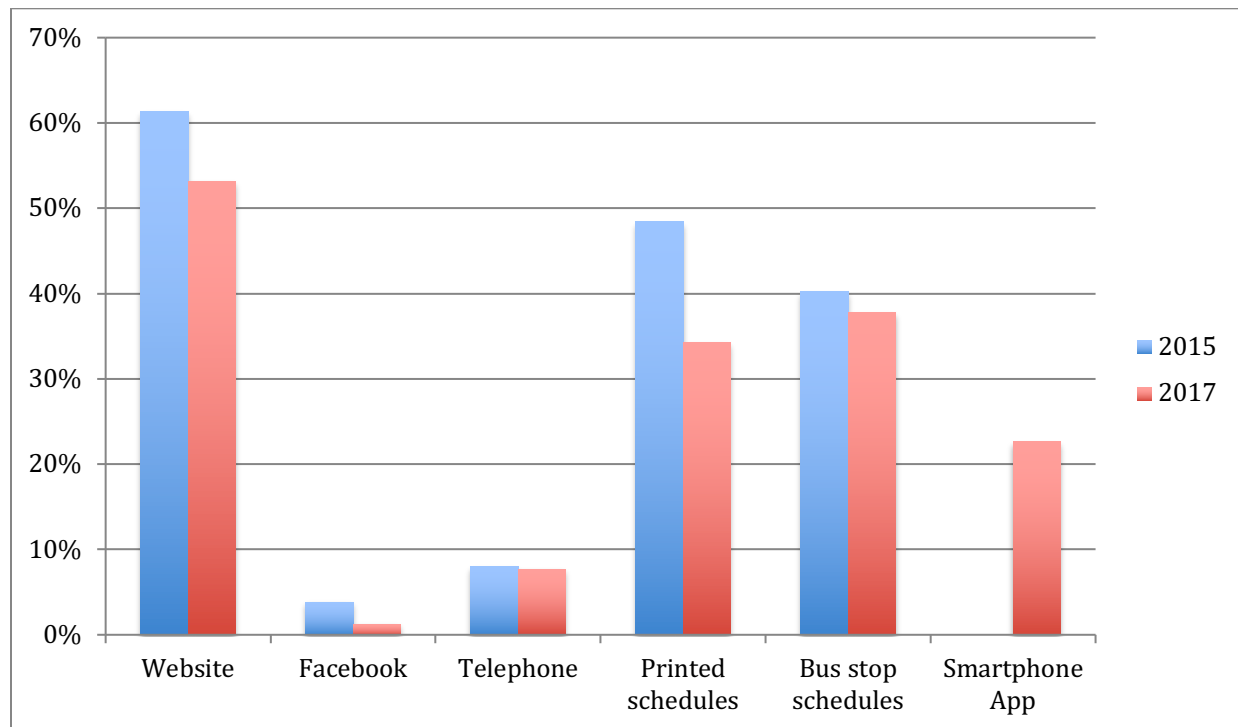
	<i>Nearly Always</i>	<i>Usually</i>	<i>Sometimes</i>	<i>Almost Never</i>
Buses are clean	5%	-5%	0%	0%
Buses are comfortable	6%	-5%	-1%	0%
It is easy to find a seat	1%	-2%	0%	1%
Drivers are polite and helpful	3%	-3%	0%	0%
Drivers are safe	4%	-4%	0%	1%
Buses are on-time in the morning	0%	1%	-2%	0%
Buses are on time in the afternoon	6%	-2%	-4%	0%
Bus schedules are easy to find	-1%	-1%	2%	1%
Schedules are easy to understand	-2%	-1%	2%	1%
Transfers between routes are easy	5%	-5%	0%	0%

### 3.12. Transit Information and Use of Technology

Riders were asked how they obtain information about Advance Transit. They were also asked about their use of the Internet and cell phones.

The three most popular sources of transit information were the Advance Transit website (53%), bus stop schedules (38%), and printed schedules (34%). AT's smartphone app has quickly become an important means of spreading information, as 23% of riders cited this source. Other sources of information, cited by 4% of riders total, included Google maps, AT drivers, and word of mouth from friends and family. Figure 3.1 shows the sources of information cited in 2017 compared to those cited in the 2015 survey. The smartphone app seems to be a substitute for the website and Facebook, as well as printed schedules. The app was not yet available in 2015.

**Figure 3.1 Sources of Transit Information**



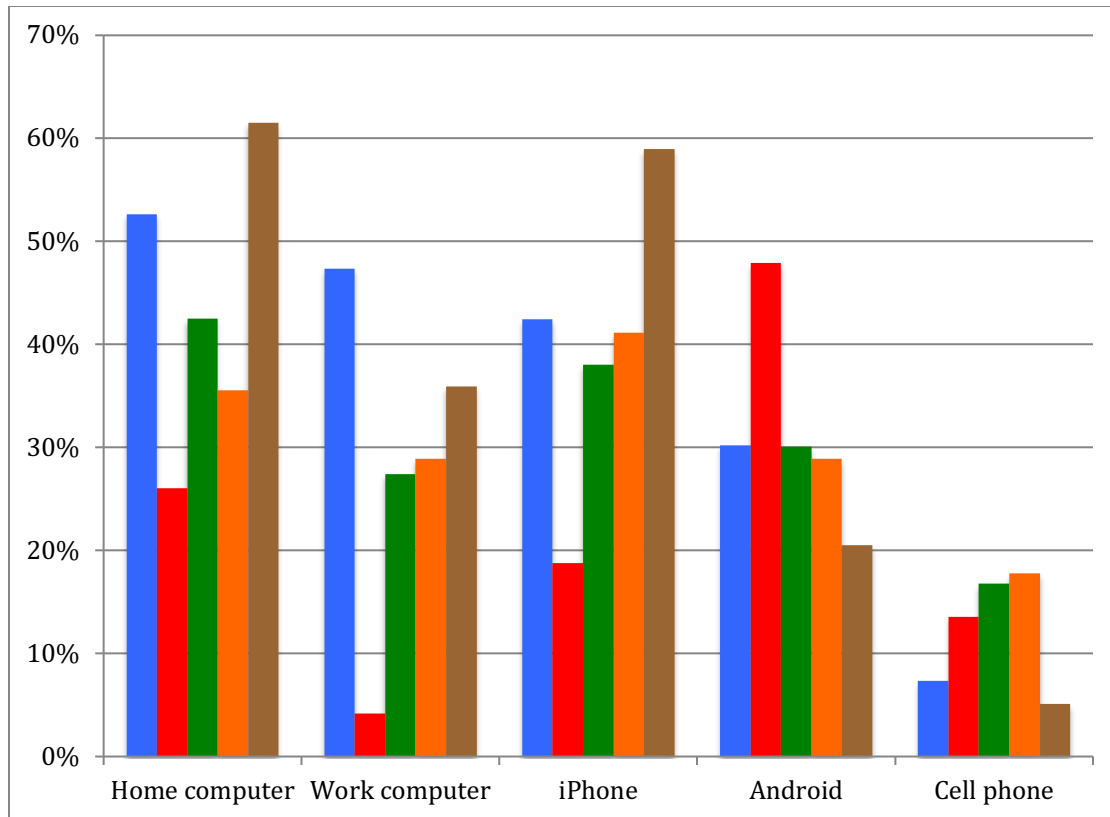
Passengers were asked whether they used the following technologies:

- Computer at home
- Computer at work
- iPhone
- Android smartphone
- Regular cell phone

Other than regular cell phones, at least 32% of riders said they used each of the technologies listed above. Home computers were the most common at 45%, followed by iPhones at 39%.

At the route level, there are notable differences in the technologies used by riders. Figure 3.2 shows the technologies cited by riders on each route, color coded in the bar chart.

**Figure 3.2 Technology Use in 2017**



Red route riders are less likely to have a computer at home and much less likely to have one at work compared to the other routes. They are also more likely to have Android phones than iPhones. Brown route riders are more likely than those on other routes to have a computer at home and to have an iPhone. Riders on the Green and Orange routes are very similar to each other, and more similar to those on the Blue route, except less likely to have a computer at home or at work.

The technology question was reworded in significant ways in the 2017 survey, so comparisons with prior surveys are not possible.

### 3.13. Weekend and Evening Service

The survey did not ask any questions about weekend or evening service. Without prompting, 79 Advance Transit riders (13%) used the comment section to ask for weekend service. Requests for weekend service were most common on the Orange route (17% of riders) and least common on the Blue (11%) and Brown (8%) routes. However, because there were more Blue route surveys than other routes, the highest absolute number of requests for weekend service came from Blue route riders (28). Among the Orange route riders requesting weekend service, 63% of them were Dartmouth graduate students, many of whom live at Sachem Village or other locations in West Lebanon.

Residents of Lebanon, West Lebanon and Hanover accounted for the majority of requests for weekend service, at 33%, 22%, and 18%, respectively. White River Junction was next most common at 12% of the total.

Nearly 50 riders requested “later” or evening service, representing 9% of the total surveys received. Nearly half of these requests came from Blue route riders, with another quarter coming from Green route riders. Orange, Brown and Red route riders had relatively fewer requests for evening service.

About one third of the requests for weekend service came from Dartmouth students, even though they represent only 19% of the total ridership. Another 20% of requests for weekend service came from Dartmouth or DHMC employees (who were not also Dartmouth students). Of the requests for later evening service, about half came from Dartmouth employees.

### **3.14. Passenger Comments and Suggestions**

In total, 373 of the 583 respondents offered comments. Some were very brief, such as “Convenient!” or “Free!”, while others contained specific suggestions. This section attempts to summarize the comments received. Appendix B contains all of the comments recorded verbatim.

#### ***General Positive Comments***

- 68 comments noted the benefit of the service being free
- 55 comments contained thanks or gratitude for the service in general
- 48 comments praised the “convenience” of the service
- 42 comments said the service or the drivers were “great”
- 110 comments offered other general praise for drivers or the service overall

Several of the riders emphasized how important it is that Advance Transit exists, and that they would be unable to work or take care of their basic necessities without it.

#### ***Specific Requests for More Service***

In addition to the numerous comments for weekend and evening service described above, there were nearly 30 comments with more specific requests for increased service. Nine of these requested more service to/from Canaan, either in general, or at specific times such as lunch time, or between 6:45 a.m. and 8:30 a.m. Five passengers requested an increase in service on the Orange route. The other service requests were somewhat more general, looking for better connections between the Brown and Blue routes in the morning, or between the Blue and Red routes at City Hall between 4:00 and 4:30 p.m.

#### ***Service to New Places***

Specific places or connections requested by riders include the following:

- Etna, NH
- Maple Street
- Centerra
- Quail Hollow
- Dartmouth Coach
- Brook Rd in Hanover
- Etna Road
- Lyme
- Deeper into Hartford
- Better connections to grocery stores in each town

### ***Smartphone App***

Among the few complaints received, most involved the smartphone app. A half dozen riders complained that the app did not work properly, that it crashed or that it was not easy to use. The iPhone app was mentioned specifically several times.

### ***Other Specific Comments***

Fifteen riders offered comments on specific aspects of service. These are listed below:

- I read on the bus so please keep lights on for readers
- A shelter on Beaver Meadow by Huntley would be very welcome
- 3-bike rack sometimes needed on Blue Line
- Bikes should be allowed in the bus if both of the racks are full
- Hard to cross the road by Buck Rd; doesn't feel safe to stand there either
- Drunks and drug problems, and sometimes it smells bad; need air circulation
- We need a bus stop schedule at the Maynard stop in Hanover
- Drivers don't announce approaching stops. This is inconvenient when I don't have cell coverage
- Please don't let drivers whistle; I'm considering changing my evening bus because of the driver (Blue route rider)
- No food or drinks should be allowed, and keep the windows closed when heat is on!
- Have better seating availability for people with wheelchairs and strollers!
- Please put signs with bus stop name in each stop
- Getting home to West Lebanon from DHMC in the evening is difficult, often requiring a 20 minute wait for transfer
- The driver in the morning @ City Hall runs slightly late, which is fine, but then he always take a bathroom break (I assume) 7-10 minutes, which means we usually arrive after 8am to DHMC - late to work. I understand drivers need to take these breaks, but not at this pertinent time. Please work w/your drivers to provide them better times for breaks.
- Blue route is scheduled to leave Lebanon city hall at 7:32 am, but usually leaves after 7:40. Please prioritize leaving on time, as people taking this bus need to work at DHMC at 8:00

## 4. Community Involvement

This chapter describes efforts to involve members of the public in the transportation study and to obtain ideas and suggestions for the future of Advance Transit's public transportation program. In the early stage of the study, there were two meetings with stakeholder groups and two public meetings. In addition, the study team held a meeting with the director of the Upper Valley Aquatic Center. Notes from these meetings are presented in the sections below.

### 4.1. Meeting with Dartmouth-Hitchcock Medical Center – November 1, 2017

This meeting was convened by Dan Dahmen of DHMC and was attended by seven stakeholders from DHMC. Two consultants and two AT leaders were also in attendance.

DHMC stated at the top of the meeting that the relationship between AT and DHMC was going well. AT's current 15-minute midday service between Hanover and the hospital provides a good connection for the patient surgery center.

DHMC noted that a new hospice center was opening up in December. It is on the loop road near north entrance.

The stakeholders felt that it was important to implement full 15-minute service on the Blue route, during commuting times and between DHMC and Lebanon in the midday. The Canaan service is important to DHMC. Connection from WRJ via the Orange route is also important. Stakeholders asked about the possibility of service from Grafton.

Use of the East entrance for all bus access was working OK, but it does get congested. DHMC has looked at reconfiguring that in the past. People going to the pharmacy who drive themselves makes it crowded. Bus drivers make way for each other.

One stakeholder noted that he hears from Medical School students who think that they don't have time to use the bus. How can they be educated about the actual time savings compared to driving and parking? Suggestions included incentives to get them to try it, and to get senior leadership to ride the bus as an example.

There was some discussion of intercept lots farther from the DHMC campus. The study team noted that other locations have been studied but none have been deemed feasible yet. It was noted that Lot 9 is only at 60% capacity. (As noted in chapter 2, DHMC has more recently been encouraging the use of Lot 9 and both utilization and ridership on the shuttle have increased significantly. Lot 9 Shuttle ridership is up 24% in the first five months of FY 2019.)

DHMC expects to continue to operate the Centerra shuttle. The new hospice has been added to the route.

DHMC sort of acts like a transit hub. The stakeholders have a concern that people are using parking at DHMC to go other places. STSI and Current deliver some passengers who are not hospital employees or visitors.

DHMC has looked at incentives and disincentives, such as parking charges, but that has not gone anywhere yet. There was some consensus to focus transit service and marketing on the 8 to 5 workers and create incentives to park in Lot 9 to allow off-shift workers (whose shifts begin and end when there is no bus service) to park closer.

## **4.2. Meeting with Dartmouth College – November 1, 2017**

This meeting was convened by Patrick O’Neill, the Director of Transportation Services, and was attended by 10 stakeholders from Dartmouth College, representing various graduate schools, and college staff.

The stakeholders felt that the fixed routes served the College well. Especially noted were the Brown route providing access from Norwich and the 15-minute headways to DHMC. The Dartmouth/Downtown Shuttle provides good service for people working 8:00 to 4:30, but it doesn’t go late enough in the evening for graduate students.

The lack of any service on the weekends was the subject of a substantial discussion. Stakeholders noted the impacts on international students, very few of whom have access to cars. There was not a strong consensus whether service on both Saturday and Sunday was worthwhile and necessary. Certainly for some students Sunday service would be useful, but it was unclear whether there were enough to make it viable.

There was a similar discussion about evening service and how late it would need to run. The Dartmouth staff said they could poll the graduate student community.

The group discussed ridership growth from Sachem Village. The representative from the Tuck school noted that 50% of Sachem residents go to Tuck. There will be expansion there; up to 500 more people. Within the next several years, there will be 300-400 more beds. AT and consultant staff encouraged Dartmouth representatives to help fund the proposed Sachem Village shuttle.

In upcoming West End construction, Tuck circle will be inaccessible, affecting the Dartmouth Shuttle in the evening. The CS project at the Thayer School sits on 144 parking spaces. They are talking about replacing it with a 376-space structure underneath.

The Dartmouth real estate office has unbundled parking from housing, so that residents pay for each separately. This potentially creates opportunities to establish monetary incentives to use transit rather than parking.

## **4.3. Public Meeting in Lebanon – November 14, 2017**

A public meeting was held at the Upper Valley Senior Center in Lebanon. This meeting had been moved from its planned location at the Upper Valley/Lake Sunapee Regional Planning Commission due to an elevator outage. Only one member of the public appeared at the meeting.

The chair of the Lebanon Pedestrian & Bicycle Advisory Committee requested a 7:45 a.m. Red Route leaving Lebanon. There was discussion around moving the 8:15 a.m., or modifying a trip from Canaan to go to the plazas instead of back to Canaan (if counts support it).

He also indicated the bike racks are often full – are there options for increasing the bike capacity on buses?

Only some buses can take a 3-bike rack, their durability is untested, and there is concern that if a 3-rack bike is full, it will pose challenges if the riders transfer to a bus with a 2-bike rack.

He raised a question about winter maintenance/snow removal. When the City plows the sidewalks, it can create large barriers of snow to climb over to board/alight the bus. This condition is particularly challenging for elderly and disabled riders.

There was discussion about the adaptive signals on NH 120 producing sometimes odd results. NH 120-Heater Road was mentioned as a place that works well mostly, but once in a while only gives bus drivers turning left onto Heater Road minimal time. The same was observed for those crossing NH 120 on Heater Road.

#### 4.4. Public Meeting in Hartford – November 15, 2017

This meeting was held in the Hartford Municipal Building at noon time. Three members of the public attended, plus the town planners from Enfield and Hartford.

The attendees were generally very happy with Advance Transit, noting that it provided a great benefit to the region. One commenter said AT was one of the reasons he moved to West Lebanon. Another said that AT service was “close to perfection.” Other comments are noted below:

- The Orange route to Hanover and the Green Route to Hanover are often at nearly the same time and that if the Green route offshoot to Hartford Village were switched to the other (either on the hour or half hour) pass, these two routes would be offset, which would effectively provide more frequent service options to Hanover.
- It would be nice to have weekend service to the plazas and wondered if the merchants may be willing to support a weekend run from Hanover to the Plazas, particularly with the interest of capturing shopping traffic from students.
- The 12A overpass over the railroad is dangerous to walk in the winter and that he appreciates the AT service especially in winter months, as it serves as an alternative way to get to 12A shops.
- There is a relatively high density at Sterling Springs (off of Bugbee) but that she has to walk a good distance and across two interchange ramps to get to the bus stop.
- Could one of the Green Route trips to Hartford Village divert up Bugbee?
- A Norwich resident said that his wife works at DHMC and regularly takes the Brown route to the Blue route to get to work. If she leaves at 7:00 AM her transfer from Brown to Blue is nearly seamless and works very well. However, if she leaves at 8:00 AM the timing is offset and she then has a 30 minute wait for the Blue line in Hanover. If she travels later, at 9:00 AM the transfer is well synched again. Is there a way to match up these transfers at 8:00, which is likely the highest demand period for commuters to DHMC. He noted that return trips from DHMC to Norwich work well with transfers.
- A commenter said he appreciates the AT app.
- Someone asked if the Brown route park and ride was ideally situated and Van answered that it is less than ideal from a commuter standpoint but then explained the details of the municipal park and ride program.
- Discussion went to churches in Norwich and other park and ride opportunities, as well as the Car Store site. All were noted to be unlikely candidates for park and rides due to existing and future demands on the spaces.
- The Enfield Town Planner noted that Enfield struggles with food access and that transportation is a key limiting factor to food access for some Enfield residents.



#### **4.5. Meeting with Rich Synnott of UVAC – November 15, 2017**

The director of the Upper Valley Aquatic Center met with the consultant and Advance Transit's Executive Director at the UVAC facility. He provided very useful information about the patterns of usage at UVAC and later on provided a listing of members' addresses. These were mapped for analysis (see chapter 5).

On any given day, about 100 children/teens practice at the UVAC, and they typically stay there for one or one-and-a-half hours. These practices mainly occur between 3 and 6 p.m. Many students at Hartford High School use the UVAC facility.

The "secondary peak" time is from 6:30 a.m. to 10:00 a.m. when most of the programs oriented toward senior citizens are held. Again the typical visit is 1.5 hours. The bulk of these members live in West Lebanon and Hartford.

In addition to regular usage, there are five or six large swim meets per year, which occur primarily on weekends.

#### **4.6. Public Comment at the End of the Study**

After completing the planning portion of the study, service concepts were presented to Dartmouth and DHMC stakeholders and to the general public in two meetings. Notes from the two public meetings are presented in Appendix D to this report.

## 5. Current Travel Patterns and Projected Development

This chapter presents some analysis of travel patterns in the Upper Valley region and then provides a listing of development projects in the pipeline, expected to take place within the planning horizon of this study. This information helps assess how well Advance Transit is serving the current market, and how it may need to change to serve the market in the near future.

The travel pattern analysis looks at three specific large traffic generators and takes advantage of detailed address data provided by those institutions. Dartmouth College and Dartmouth-Hitchcock Medical Center are the two largest employers in the region. The Upper Valley Aquatic Center draws scores of members in for swimming practice and exercise every day. In its current configuration, Dartmouth and DHMC are very well served by AT, but funding and schedule constraints have prevented AT from providing direct service to UVAC.

Each of the three institutions was willing to share either the home addresses of their employees or members, or a ready-made map of their employees' home locations. Dartmouth College provided addresses of employees and graduate students, and UVAC provided addresses of members. The consultant team was able to generate maps from these listings. DHMC had done its own internal analysis and provided a map of its employees' home locations. These maps are shown below.

### 5.1. Dartmouth College

The portions of the Dartmouth College community which are most likely to live off campus, and thus need some form of transportation to reach their jobs or classes, are the faculty and staff, and the students of the various graduate schools. Undergraduates are more likely to live on campus and have less need for a bus service. Figures 5.1 and 5.2 show the home locations of Dartmouth employees and graduate students. Figure 5.1 presents a larger regional view, while Figure 5.2 focuses in on Advance Transit's core service area.

In Figure 5.1, it can be seen that the densest clusters of residences for both employees and graduate students are already served by Advance Transit. These include downtown Lebanon, West Lebanon, Wilder, downtown Norwich, and Hanover surrounding the campus. Graduate students, especially, are clustered in these areas, with relatively few yellow dots spread further away in the more rural parts of Norwich, Enfield, and Hanover.

The northern part of Hanover, along NH 10 has a significant number of home locations, as does the Etna Road/Hanover Center Road corridor. The intersection of Bugbee Street and Christian Street in Hartford has a moderate cluster, as does the Blueberry Hill Drive and Westview Road neighborhood on the Hanover/Lebanon border. Of these, only Bugbee/Christian is close enough to an existing route to consider bus service in the short term.

Dartmouth employees are distributed through much of Norwich, well beyond the reach of the current Brown route. There is a municipal park & ride lot served by the Brown route with plenty of available capacity, but it is not in a convenient enough location, nor is the level of service high enough on the Brown route, to make this an enticing choice for these people.

Figure 5.2 provides some additional clarity on the locations of employees around the Bugbee/Christian intersection, as well as a cluster in Hanover east of the northern end of the Brown route, where Reservoir Road turns into Grasse Road. Many employees live along East Wheelock Street, east of where the Blue route turns south on South Park Street. The large cluster of graduate students at Sachem Village is also very obvious on this map.

Figure 5.1 Regional Overview of Dartmouth Employees and Graduate Student Home Locations

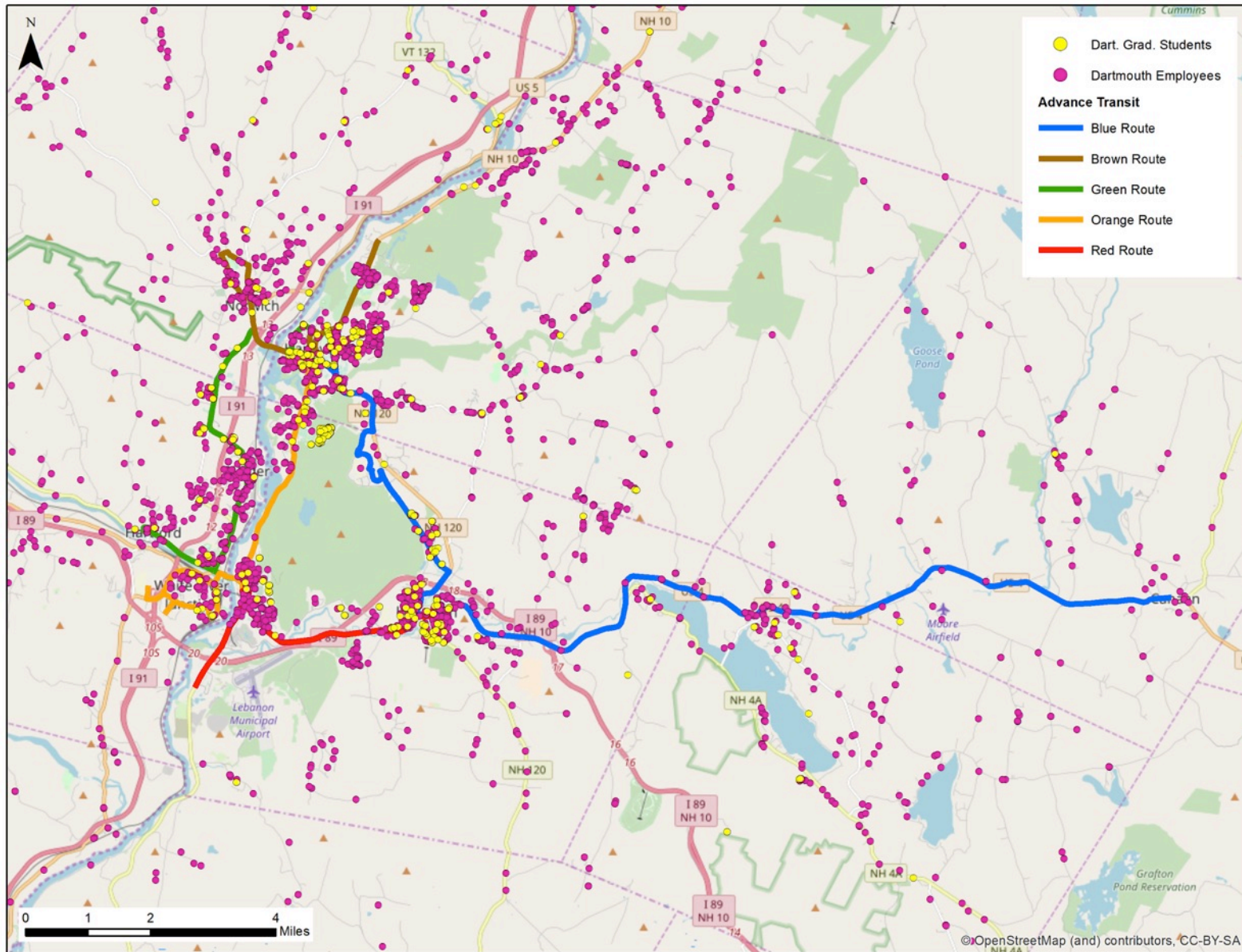
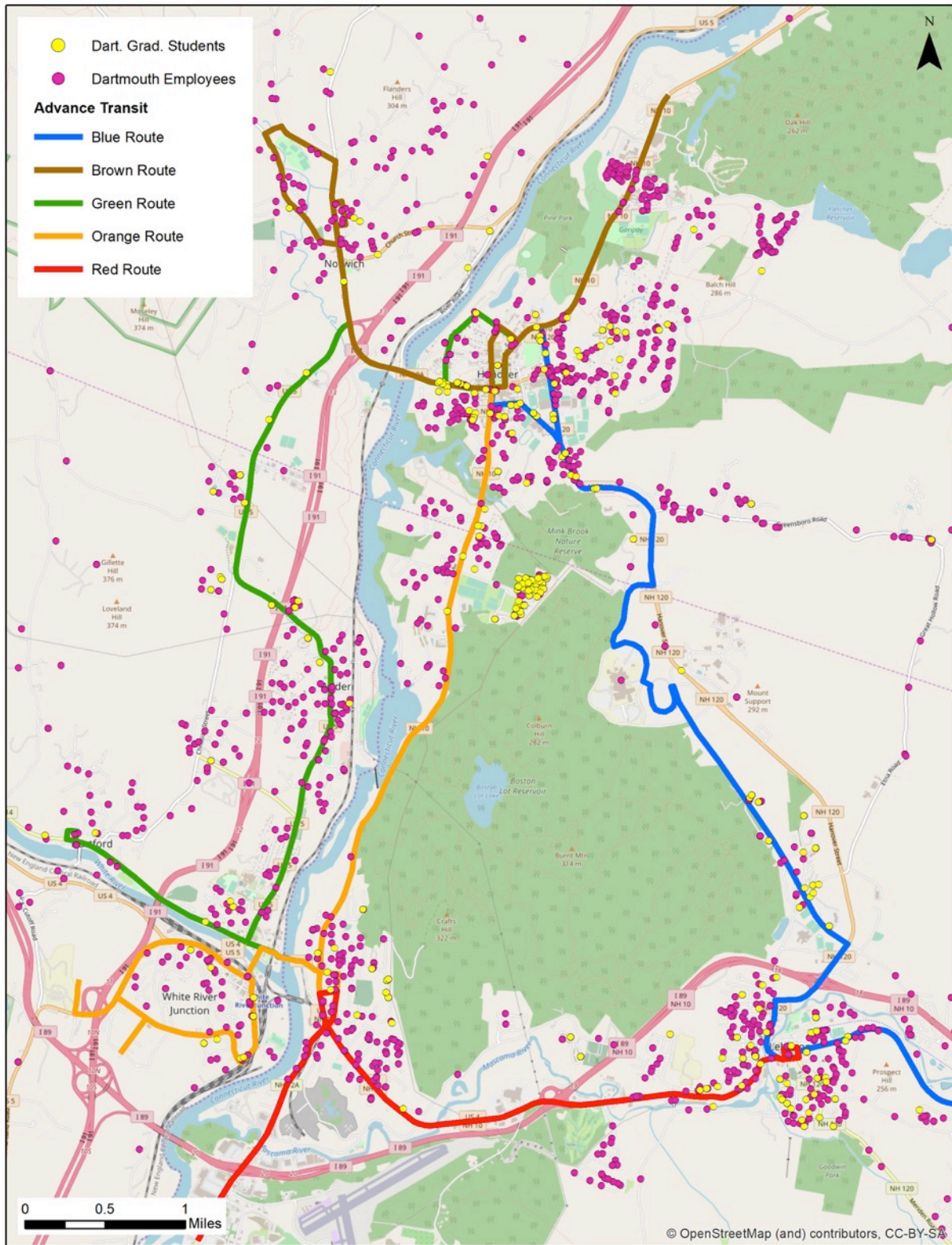


Figure 5.2 Dartmouth Employees and Graduate Students in AT Core Service Area



## 5.2. Dartmouth-Hitchcock Medical Center

Figure 5.3, provided to the study by DHMC, shows a broad regional view of the home locations for first-shift employees at DHMC—those that would have work start and end times within the span of service of Advance Transit. While there are many employees who live long distances from the DHMC, and even significant clusters in some of these remote towns, such as Claremont, Newport and New London, the greatest density of dots occurs in areas served by Advance Transit.

Within the towns served by Advance Transit, there are some corridors without service, including the following:

- NH 10 in northern Hanover
- Etna Road/Hanover Center Road in Hanover
- Roads surrounding Mascoma Lake in Enfield (which also showed up on Figure 5.1)
- New Boston Road in Norwich

While Advance Transit could potentially offer commuter service along these corridors, as it does on the US 4 corridor to Enfield and Canaan, and it may be attractive to these commuters, this type of service is expensive to operate and would detract from AT's emphasis on enhancing the service level on its core routes. If additional park & ride lots could be established along existing bus routes as collection points for these commuters, that would be the most effective way to offer transit access to DHMC. In that case, the farther away the lot is from DHMC, the more attractive it would be, in terms of saving wear and tear on the employees' cars and avoiding traffic congestion in Lebanon.

Rather, the clustering of home locations around existing AT bus routes lends further support for the concept of service enhancements on existing routes, especially better service frequency during peak commuting periods. If Blue route service operated every 15 minutes during the peaks, and Brown route service operated more frequently, or offered a one-seat ride to DHMC, more of these people who live within an easy walk of a bus route would be willing to ride instead of driving their own cars.

## 5.3. Upper Valley Aquatic Center

The Upper Valley Aquatic Center is not currently served by Advance Transit, though the Orange route comes within 0.6 miles of the front door. As a condition for its construction, UVAC was supposed to construct a bus stop for AT, and each year it needs to certify, with the support of AT, that a bus stop is not justified because AT is not able to extend its service to UVAC under current budgetary constraints.

Figure 5.4 shows the home location of UVAC members and offers support for the concept of a service extension there. Many UVAC members reside along AT routes, especially in Wilder, White River Junction, and West Lebanon. Additional members, though not at as great a density, reside in Norwich, Hanover and Lebanon. Beyond the existing routes, the most notable cluster is at the intersection of Bugbee and Christian streets.

It must be noted, though, that the availability of free parking at the facility means that the potential market for AT service would be mostly restricted to those who cannot easily drive themselves, such as younger teenagers and, perhaps, some older adults. The transit service would offer new access to people who cannot drive or easily get a ride.

Figure 5.3 Home Locations of First-Shift DHMC Employees

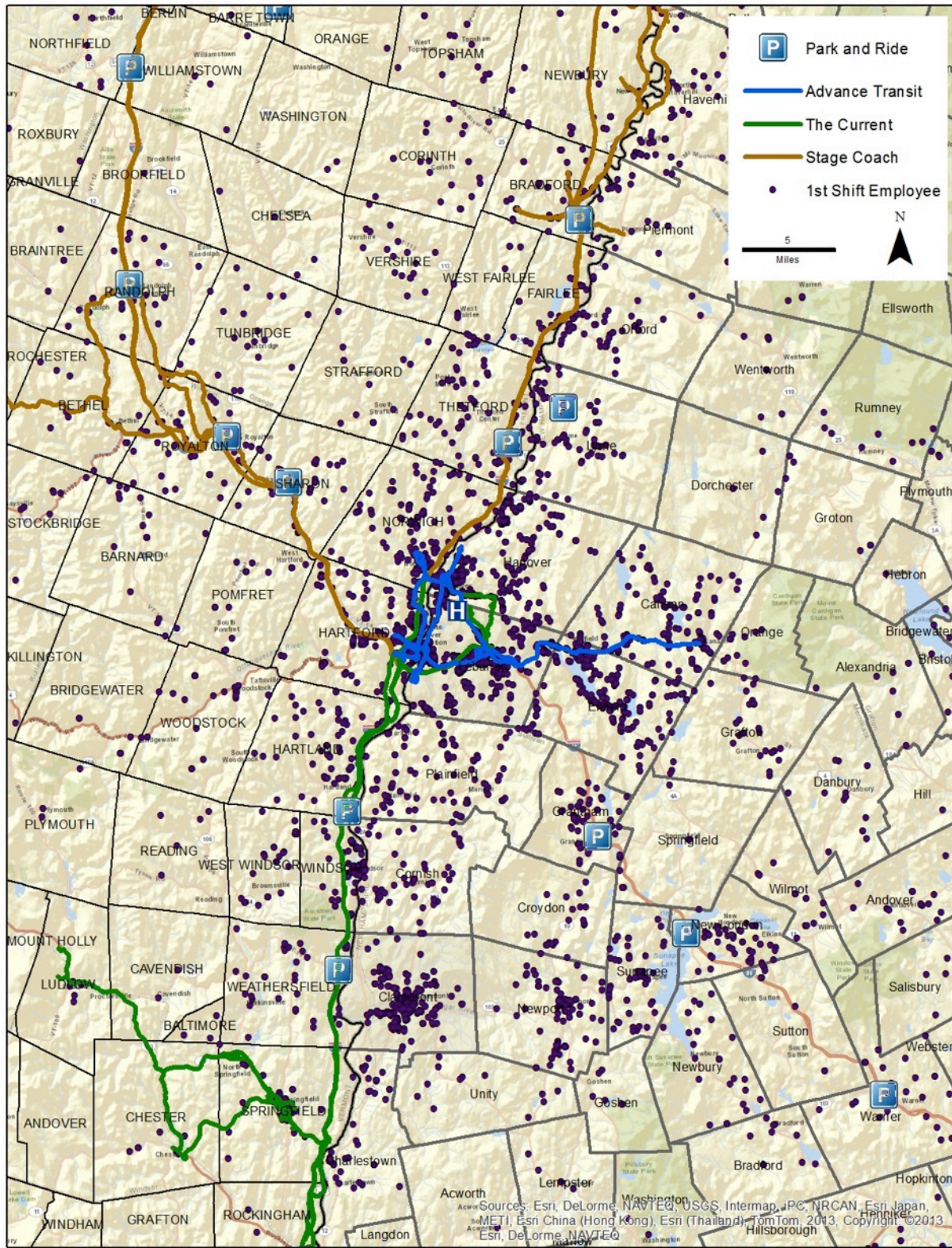
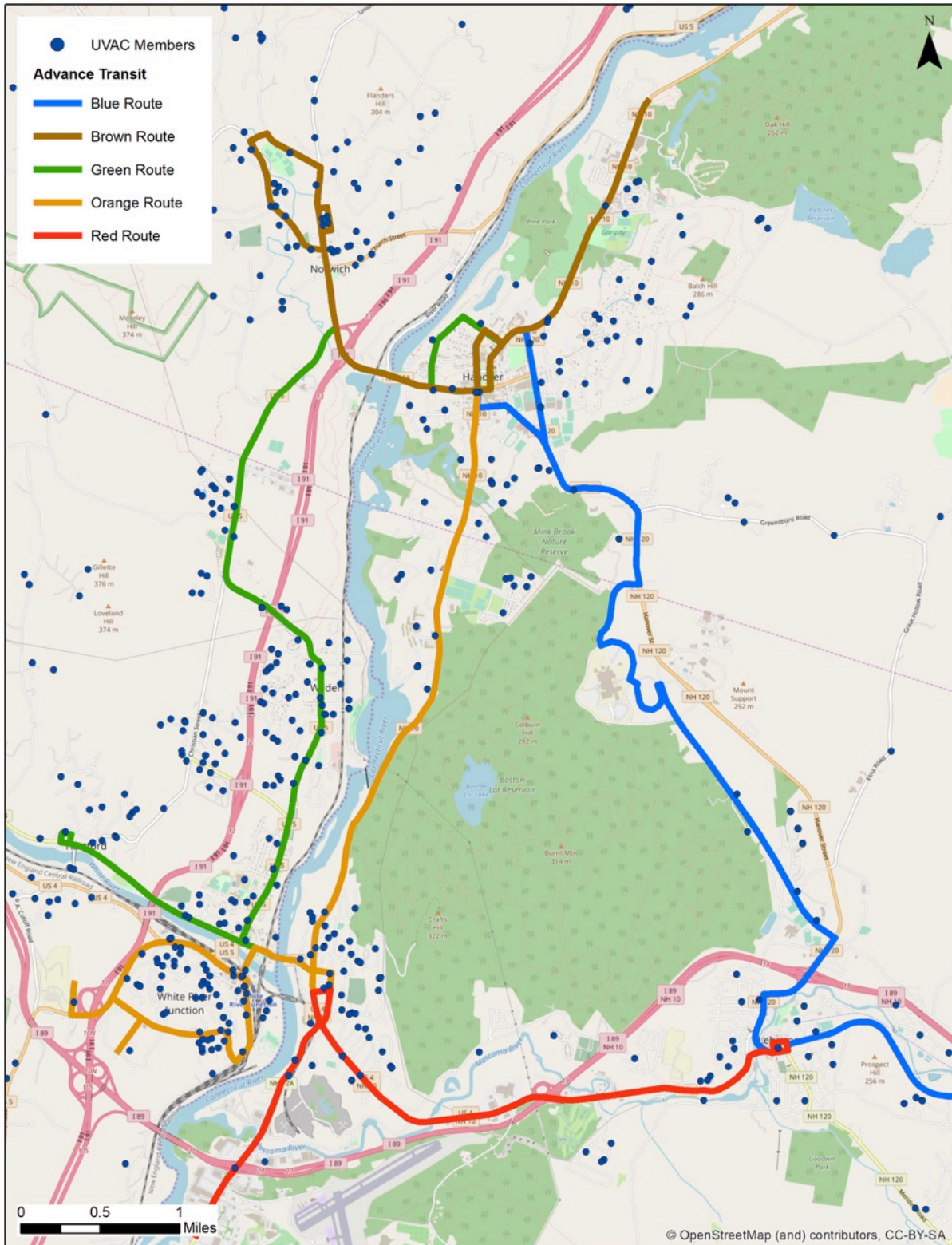


Figure 5.4 Home Locations of UVAC Members



## 5.4. Projected Future Development

In prior TDPs, the consultant met with Town Planners from all of the towns served by Advance Transit and compiled a comprehensive list of planned developments in these communities. This TDP did not have sufficient budget for that type of effort, but through communication with AT staff, information gathered from the stakeholder meetings, and local knowledge of members of the team, the following list of potential developments was assembled. These developments are mapped in Figure 5.5.

- **Sachem Village** – Up to 500 more residents are envisaged at Sachem Village, including 300-400 within the next several years. There is already enough demand there to justify direct shuttle service to Tuck and the Dartmouth campus, but with further development, the case will be overwhelming for expanded transit.
- **Dartmouth Campus** – On-going development of the campus: Thayer School, Energy Institute, possible dorms, rowing/boating facilities, parking garage, possible riverfront park.
- **DHMC Campus** – Dartmouth-Hitchcock Medical Center recently announced a \$130 million expansion plan including 60 new in-patient beds in a four-story tower and a 400-space parking garage. Construction may not be complete until 2023.
- **Bridgman Building expansion** – Sizeable infill development in downtown Hanover.
- **Quail Hollow expansion** – Approximately 40 new units at existing senior living development, adding to roughly 280 units already there.
- **Centerra Park** – There are already about 5,000 employees in this commercial development near the DHMC facility. A 26-unit residential project was finished in early 2018, and an expansion of an existing daycare facility is in the works. There is little or no other developable land within Centerra.
- **Altaria** – This multi-use development along the east side of NH 120, south of Centerra, includes the Element Hotel, already in place, and 153 additional housing units, expected to be built within the next few years.
- **Etna Road** – A 75-unit residential development near the intersection of Etna Road and NH 120 is currently under construction.
- **River Park** – The large project along NH 10 north of West Lebanon village, which has been in the planning phase for years, is projected to include commercial development, laboratory space, residential and retail space, up to 800,000 square feet. It is the potential location for a relocated bus hub in West Lebanon.
- **Sykes Mountain Avenue** – Multi-family and apartment complexes are projected to be built along this road in White River Junction. This road is already served by the Orange route.
- **Route 12A Plazas** – Redevelopment of retail space continues on an ongoing basis in this commercial zone.
- **Jake's Market, Enfield** - The roughly 7,800-square-foot facility planned for Enfield Village will include a full convenience store offering groceries, home goods and a hardware department.



Figure 5.5 Expected Developments in AT Service Area



## 6. Short-term Schedule Adjustments

The bus timetables for Advance Transit were last changed in July, 2014. In the four years since then, Advance Transit staff has been collecting suggestions from operators and considering other potential adjustments to the timetables to reflect changes in operating conditions, ridership demand (or lack thereof), and opportunities for transfer connections. The outreach to drivers at the beginning of the TDP process generated further suggestions.

After weighing the potential benefits and costs of these adjustments, Advance Transit leadership has developed the following list of timetable changes, organized by route and driver run.

### 6.1. Blue Route

On Run 2B, the bus has unofficially remained in service after its final stop at Vail at 7:10 p.m. to carry any passengers along the Green route alignment as far as Dothan Brook School in Wilder, which is across the street from the AT garage. This unofficial service will now be incorporated into the public timetable. One other change for this run is to move the arrival time at Lebanon City Hall from 5:45 p.m. to 5:50 p.m. to reflect actual running times. The next departure, at 5:50 p.m., would not change.

On Run 3B, the final departure from Vail will change from 6:40 p.m. to 6:38 p.m. to avoid two minutes of dwell time. This run already continues in service to Norwich and Wilder, as run 2B is proposed to do.

On Run 16, the arrival time at Enfield will be moved from 5:30 p.m. to 5:25 p.m. (to reflect actual running times) and the Canaan and returning Enfield times would also move earlier by 5 minutes. The run will still end at Lebanon at 6:10 p.m.

### 6.2. Red Route

In the afternoon, the BJ's stop would be switched from run 52 to run 51. This change will help to equalize the running times of the two runs. With this change, run 51 would stop at BJ's, Walmart, and Shaws, while run 52 would stop at Upper Valley Plaza and Walmart.

The only other change for the Red route is to change the 5:45 p.m. Lebanon departure to 5:50 p.m., moving all departures later by 5 minutes until the 6:25 p.m. departure from West Lebanon, which would remain the same. This change better reflects actual departure times, as the trip is often delayed until 5:50 because of transfers from other routes.

### 6.3. Green Route

In the morning, on Run 41A, the 7:00 and 8:00 trips would move 5 minutes earlier through the arrival at Vail. These changes would improve the connection to the Blue route and make the driver swap at 8:10 easier to accomplish.

In the afternoon, on Run 41B, the 5:55 p.m. departure would move 5 minutes later, which shifts the “Opposite Datamann” time to 6:08. This change would allow transfers from the Red route to be made more easily.

On the second bus, the times at Opposite Datamann would be moved two minutes earlier to better reflect running times. This small shift would affect subsequent stops as well. Southbound departures from Vail would remain the same.

The timetable would also be changed to include the Haven and Opposite Haven as timepoints, since these are heavily used stops. These stops could substitute for the Datamann stops on the timetable if there is not enough room for two more timepoints.

#### **6.4. Orange Route**

One of the most significant changes to the timetable addresses one of the most salient problems voiced by the drivers: the inability to complete the Orange route run in the allotted amount of time. To reduce the pressure on Orange route drivers, the deviation into the Gilman Center should be eliminated. This stop generates only about 5 boardings per day, but takes more than 3 minutes of running time on every trip.

In addition, the Greyhound stop will be moved in conjunction with the reconstruction of the Sykes Mountain Ave/US 5 intersection. On the timetable, Gilman Ctr will be replaced by Sykes Mtn. Ave, representing the new Greyhound stop. In addition, Veterans Park will be replaced by Bugbee Sr. Ctr. on the timetable. Times will be adjusted accordingly.

The final change is to adjust the times at Maynard, starting at 9:37 a.m. from 37 minutes after the hour to 35 minutes after the hour, making the 2 minute travel time from Hanover Inn consistent over the day. The bookstore time would move two minutes earlier as well, starting at 9:38 a.m.

#### **6.5. Brown Route**

Two changes are proposed for Run 6A to reduce unneeded dwell time and improve connections. The first three departure times for the 7:15 a.m. trip would all be moved 5 minutes earlier to allow for riders to transfer to the 7:29 Blue route trip to DHMC. The fourth trip would be changed substantially so that it no longer served the Park & Ride loop. It would depart from Dan & Whit’s at 9:02 a.m. and arrive at Vail at 9:20. It would depart from Vail at 9:25, providing a good two-way connection with the Blue route, arriving at Dan & Whit’s at 9:34 and return to Vail by 9:41. The bus would dwell there for a driver switch and resume the old schedule at 9:55 a.m.

On Run 6B, the 10:35 and 12:35 departure times from Vail will move 5 minutes later, which will also affect the following three stops. This change allows for better connections from the Blue route. Three departures from Dan & Whit’s will move 5 minutes earlier: 11:08, 1:08 p.m. and 3:08 p.m. These changes will also result in better Blue route connections. Finally, the the 5:38 p.m. departure from Dan & Whit’s would move 5 minutes earlier, as well as the Hanover Inn departure. The Vail stop would remain at 5:45 p.m. to match up with the Blue route.

## 7. Longer-term Service Proposals

This chapter presents service design ideas that could be implemented by Advance Transit in the next two to five years. It focuses on service improvements for the four municipalities within Advance Transit's core service area (Lebanon, Hanover, Hartford, and Norwich). The chapter presents a full range of possible strategies. Some require increased funding that may or may not be available in future years.

The chapter includes eight sections:

- Section 7.1 Blue Route
- Section 7.2 Red Route
- Section 7.3 Green Route
- Section 7.4 Orange Route
- Section 7.5 Brown Route
- Section 7.6 Sachem Shuttle
- Section 7.7 Evening Service
- Section 7.8 Saturday Service
- Section 7.9 New Lebanon Route
- Section 7.10 Estimated Costs

The sections below present the basic descriptions of the proposed service improvements. The costs and ridership associated with these improvements are presented in chapter 8.

### 7.1. Blue Route

#### 15-Minute Headway

Additional buses could be added to the Blue route to allow for 15-minute service throughout the day between downtown Lebanon and downtown Hanover. Fifteen-minute service is now available on the Hanover-DHMC segment between 9:00 a.m. and 4:15 p.m. Currently, bus service between Hanover and downtown Lebanon operates every 30 minutes.

Fifteen-minute service would require two extra buses at the start and end of the day, and just one extra bus between 9:00 a.m. and 4:15 p.m. A timetable showing 15-minute Blue route service is included in Appendix C.

#### Canaan and Enfield

While it has traditionally been presented as part of the Blue route, bus service to Canaan and Enfield is quite different from Advance Transit's other routes and services. Advance Transit provides these two outlying communities with what is essentially a regional commuter service consisting of three morning trips and three evening trips, plus a late afternoon trip during the school year.

The October 2017 passenger survey obtained responses from 16 Canaan residents and 17 Enfield residents. Two thirds of these respondents ride the bus 5 days per week, while another seven respondents (21%) ride 3 or 4 days per week. Seven of these frequent riders are Dartmouth employees, while only four are DHMC employees. The other 15 frequent riders work for other employers spread around the AT service area, including locations such as West Lebanon, Wilder, Route 12A plazas, and Lyme Rd. Half of the Canaan/Enfield riders had no car available for the trip.

While Canaan-Enfield service is productive and serves transit-dependent riders as well as choice riders, it is also expensive – because it involves a long travel distance with extensive deadhead hours and deadhead miles. At the same time, Canaan and Enfield provide relatively small amounts of municipal funding to offset operating costs associated with the route. This route segment thus relies heavily on Advance Transit’s Section 5311 funding from NHDOT. The estimated annual gross cost for the present service is \$290,000 (which includes about 1.5 round-trips between Lebanon and Hanover connected to the trips between Lebanon and Canaan).

If Advance Transit’s funding from the Federal Transit Administration is reduced, it may be necessary to discontinue bus service to Enfield and Canaan. Eliminating the service would inconvenience many commuters and strand those without access to an automobile, and it would marginally increase parking demand at DHMC and Dartmouth College.

If FTA funding is not reduced, Advance Transit may decide to continue the current service arrangement, recognizing that this will limit its ability to expand elsewhere in the transit system’s core service area.

If bus service to Enfield and Canaan is not continued, it could be replaced by privately-owned commuter vanpools. It may be possible for Dartmouth College and Dartmouth-Hitchcock Medical Center to work together to acquire vans or Sprinter-type vehicles for college and medical center employees who travel this route. Vanpools to these two destinations would not address the needs of all of the current Canaan/Enfield riders, however, since many have other destinations.

## **7.2. Red Route**

No significant changes are proposed for the Red route. If the River Park development proceeds faster than currently anticipated and a new West Lebanon bus hub there becomes possible, an extension to River Park would substitute for the current turn-around loop in West Lebanon.

## **7.3. Green Route**

No significant changes are proposed for the Green route. If the River Park development proceeds faster than currently anticipated and a new West Lebanon bus hub there becomes possible, an extension to River Park would substitute for the current turn-around loop in West Lebanon. The Green route has sufficient time in its schedule to accommodate the shift to River Park.

## **7.4. Orange Route**

This section discusses two possible approaches to improving the Orange route:

- Addition of a second bus to the current alignment
- New service to the Aquatic Center and Bugbee/Chandler

### **Addition of a second Orange route bus**

The Orange route currently has the highest productivity of any “Small Town” route in Vermont by a wide margin. The current Orange route operates with one bus, resulting in an hourly headway. The addition of a second bus would mean more convenient 30-minute service on the route. For the

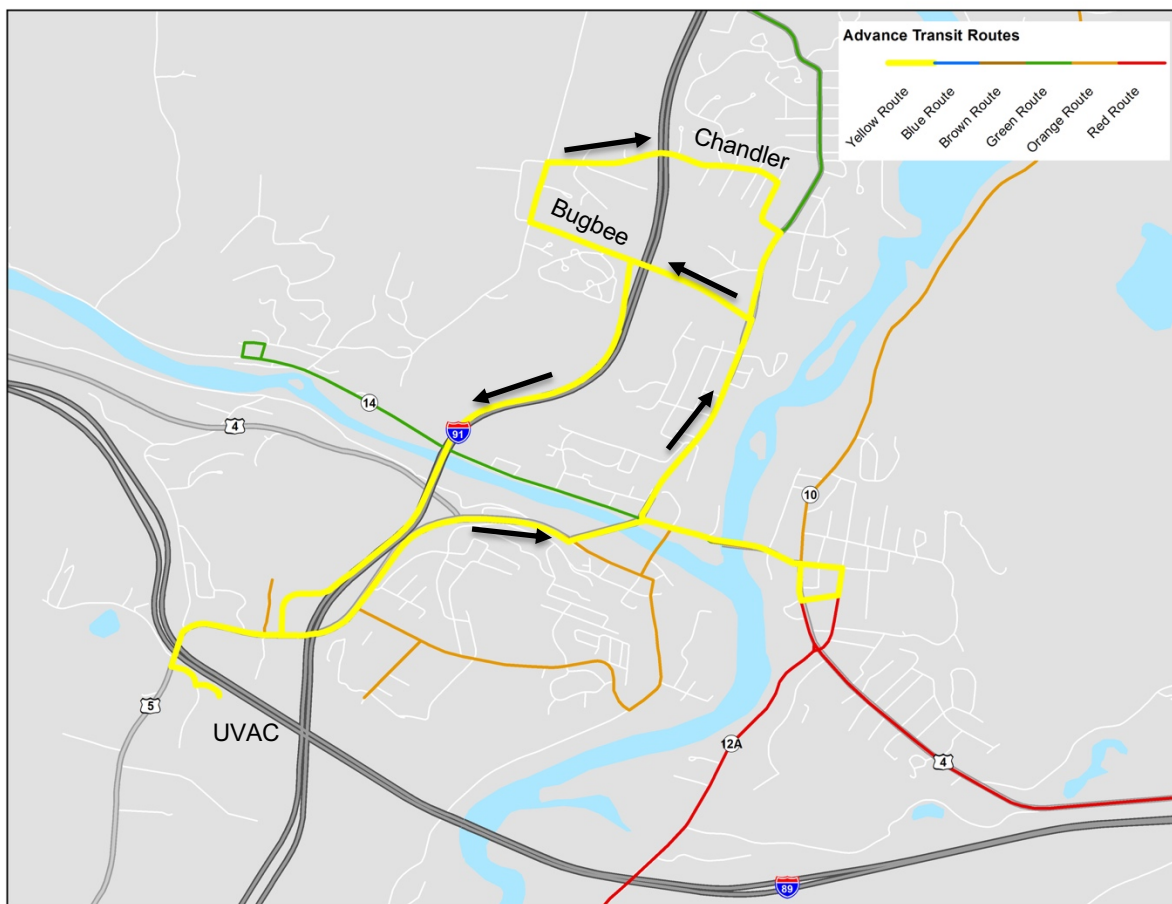
purpose of this analysis, it is assumed that the second bus would operate only during 6 peak-period hours per day (such as 6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 6:00 p.m.).

In this proposal, the two buses would follow the same alignment. Though the elimination of the Gilman Center spur should improve reliability and reduce pressure on the drivers to some extent, there will still be no slack time in the schedule to allow for increased ridership and other delays. Thus, although this proposal is simple and beneficial to riders, it is perhaps not the best long-term option for the Orange route.

### New service to Aquatic Center and Bugbee/Chandler

The second option also includes a second bus in service during peak periods (6:00 a.m. to 10:00 a.m. and 2:30 p.m. to 6:00 p.m.), but it would split its time between the Vermont portion of the Orange route, and a new alignment, tentatively called the Yellow route, which would connect West Lebanon to the Haven, Brookview Apartments on Bugbee, the neighborhood around Chandler Road, and the Aquatic Center (see Figure 7.1). Representatives of The Haven have requested that Advance Transit serve these low-income apartments on Bugbee Street, and a resident of a nearby apartment complex has also asked for a Bugbee Street bus stop.

**Figure 7.1 Potential Yellow Route**



The Yellow route bus would leave Kilton Library, loop around via Maple Street, cross into Vermont and then turn north on US 5. After stopping at the Haven, it would turn left on Bugbee Street to

serve a stop across from Sterling Springs and a stop at Brookview Apartments at Christian Street. Turning right on Christian, the bus would head north and then east onto Chandler. One or two stops could be designated on Chandler, and then the bus would turn south on US 5. It would again turn onto Bugbee to reach the I-91 entrance, and would use the highway to get to the Aquatic Center. From the Aquatic Center, the route would use North Main Street to return to Kilton Library as the Orange route currently does.

A tentative schedule calls for the bus to spend 25 minutes on the Vermont portion of the Orange route (including 5 minutes recovery time) and then 35 minutes on the Yellow route (including 5 minutes recovery time). The Orange route trips would leave the library at the bottom of the hour, offset from the current Orange route trips that serve Vermont at the top of the hour. Vermont Orange route passengers on these new trips who want to travel to Hanover would need to transfer to the Green route at Kilton Library. According to the current schedule, those Green route trips leaving on the hour include the spur to Hartford Village, and thus the connection to Hanover would take 10 extra minutes compared to the Orange route trips that go directly to Hanover. Nonetheless, this plan would offer a 30-minute headway between White River Junction/VA Hospital and West Lebanon, which is a significant improvement over the current 60-minute headway. Orange route service in the midday period would be unchanged.

## **7.5. Brown Route**

The short-term chapter included several adjustments to the Brown route schedule. It may be appropriate at some time in the future to split the Brown route into two routes. This would allow Advance Transit to provide the Vermont and New Hampshire segments with consistent 30-minute service, instead of semi-regular 40-minute service. The future need for separate routes will depend largely on whether Dartmouth College develops residential properties north of the college campus.

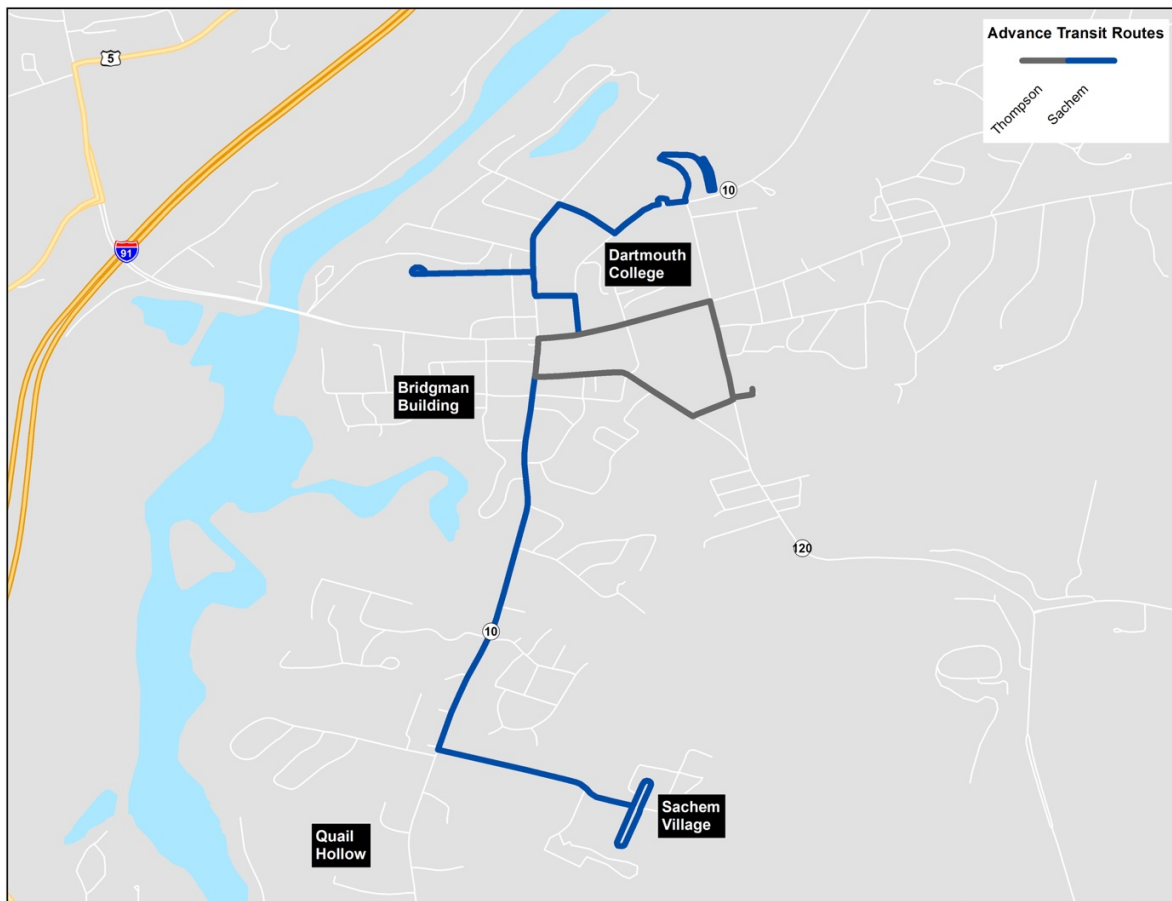
## **7.6. Sachem Village Shuttle**

Outside of the four existing line routes, a new shuttle route could be added to link Sachem Village and Sachem Field with downtown Hanover and Tuck Circle (see Figure 7.2). Three buses would provide 15-minute headways during peak commute times, extending beyond Tuck Circle to Dewey (see Appendix C for draft timetables). During the midday period, one bus could provide a 30-minute headway between Sachem Village and Tuck Circle. At night, between 7:00 p.m. and 11:00 p.m., one bus would provide scheduled service between Tuck and Sachem Village, with on-demand drop-offs at Dewey. The draft timetable for evening service includes 15 minutes of extra time to accommodate rides to Dewey and other off-route diversions mandated by the Americans with Disabilities Act. Summer service could be limited to one bus every 30-minutes throughout the day and 45-minute service in the evening.

At the same time, a separate shuttle route would link the Thompson Arena lot with downtown Hanover every 10-15 minutes. This bus would follow a consistent service pattern throughout the day: It would begin at the Thompson Arena parking lot and offer stops on Summer Street, Lebanon Street, and the Hanover Inn. Buses would return to Thompson via East Wheelock Street and South Park Street. The Thompson shuttle would operate 7:00 a.m. to 10:00 a.m. and 3:00 p.m. to 7:00 p.m. Midday access between the Thompson lot and downtown would be provided by Blue route buses that operate every 15 minutes, with northbound stops on South Park Street and southbound stops on Lebanon Street in front of Hanover High School.

Combined, these two shuttles would require four peak buses and one bus during off-peak periods, compared to the three peak and one off-peak buses that are currently used for the Dartmouth Downtown Shuttle. In this plan, the Dartmouth Downtown Shuttle would no longer operate, as the Sachem Village Shuttle and the Thompson Arena Shuttle would cover all of its territory. It should be noted that the Dartmouth Downtown Shuttle currently operates at a 10-minute peak headway, but the future Sachem Village Shuttle would operate at a 15-minute peak headway. Also, this plan proposes not to operate the Thompson Arena shuttle during the midday when demand is low, which would require people wanted to get there during the midday to walk or to take the Blue route (which runs every 15 minutes).

**Figure 7.2 Sachem Village Shuttle**



### 7.7. Evening Service

Service on Advance Transit’s line routes ends in the 6:00 p.m. hour, except for the final Blue route trips which go out of service just after 7:00 p.m. Under this proposal, service on all routes would be extended for roughly one hour so that the system operated until approximately 7:30 p.m. The extensions would operate as follows:

- Blue Route – The final trip on Run 2B would not terminate at Vail at 7:10, but would instead continue on the southbound trip, serving the Bookstore at 7:15, DHMC East at 7:25, Heater Road at 7:30 and arriving at Lebanon City Hall at 7:38. That bus would then continue in service along the Red route alignment to West Lebanon, terminating there at 7:50.



- Red Route – Run 51 would not terminate at 6:35, but would instead depart from Lebanon City Hall at 6:45 (allowing for transfers from the Blue route) and complete a full run to West Lebanon and through the Plazas, returning to West Lebanon at 7:20 and terminating there.
- Orange Route – The final trip on Run 7B would not terminate at the VA Hospital at 6:13, but would complete another full loop, terminating at the VA Hospital at 7:13.
- Green Route – The final trip on Run 42B would serve Hartford Village at 6:30 and then operate a regular run to Hanover, departing from Vail at 6:55 and arriving in West Lebanon at 7:20. It would then continue in service with one more trip to Hartford Village at 7:25, and stopping at The Haven and Bugbee Street on its way back to garage. This trip would be designed to accommodate people participating in an evening dinner program planned for the Listen Center.
- Brown Route – The final trip on Run 6B would not terminate at Vail at 5:55, but would continue for one more loop, reaching Hazen Street at 6:10 and departing from Dan & Whit's at 6:20. That trip would terminate at Vail at 6:30 and then return to the garage via a partial trip on the Green route alignment with an on-demand stop in Norwich. If new development occurs at Rivercrest or other locations north of the Dartmouth Campus, that final trip could continue north to its regular turnaround at Kendal, adding another 10 minutes of revenue service.

The above proposal represents an incremental increase in evening service. It has the potential of addressing the longstanding need for transit service for nurses at DHMC who have 12-hour shifts ending at 7:00 p.m. The schedule above would allow them to board a southbound Blue route bus at 7:25 and have a one-seat ride through downtown Lebanon to West Lebanon.

ADA complementary paratransit service is currently operated until 7:20 p.m. based on the present schedule. This incremental service expansion would require that ADA service be provided until 7:50 p.m.

If this service extension proves productive, it would set the stage for further extensions of service in the future, allowing riders to use the system ultimately into the 8:00 and 9:00 hours. Each additional hour would cost approximately the same, except that the ADA cost increment would be double what it is for this first extension.

## 7.8. Saturday Service

One of the most common and recurring requests from Advance Transit riders has been for Saturday service. Routes and schedules for limited Saturday service were developed as part of Advance Transit's 2012 TDP, with hourly service on both sides of the Connecticut River.

A New Hampshire Saturday route would link Hanover, DHMC, Lebanon City Hall, West Lebanon, and the Route 12A plazas. A Vermont Saturday route would link Hanover, Norwich, Wilder, West Lebanon, and White River Junction. Each route would require two buses in service. All four buses would operate eight hours a day, with service beginning at 9:00 a.m. and continuing until 5:30 p.m.

Because it does not begin until 9:00 a.m., this limited Saturday service will not meet the needs of passengers trying to commute to early morning jobs. Saturday hours could be extended in the future if midday service is successful, and if adequate funding becomes available.

A tentative timetable is shown below. Note that the Blue and Red routes are interlined, as are the Orange, Green and Brown routes. It is not recommended to implement a Saturday service with

**SATURDAY BLUE ROUTE (Bus 1 and 2)**

Lebanon	DHMC	Hanover Inn	Hanover Inn	DHMC	Lebanon	
9:30 a	9:45 a	9:55 a	10:00 a	10:10 a	10:25 a	to West Leb
10:30 a	10:45 a	10:55 a	11:00 a	11:10 a	11:25 a	to West Leb
11:30 a	11:45 a	11:55 a	12:00 p	12:10 p	12:25 p	to West Leb
12:30 p	12:45 p	12:55 p	1:00 p	1:10 p	1:25 p	to West Leb
1:30 p	1:45 p	1:55 p	2:00 p	2:10 p	2:25 p	to West Leb
2:30 p	2:45 p	2:55 p	3:00 p	3:10 p	3:25 p	to West Leb
3:30 p	3:45 p	3:55 p	4:00 p	4:10 p	4:25 p	to West Leb
4:30 p	4:45 p	4:55 p				

**SATURDAY RED ROUTE (Bus 1 and 2)**

Lebanon	West Leb	Wal-Mart	West Leb	P&C	Lebanon	
9:30 a	9:40 a	10:00 a	10:15 a	10:20 a	10:25 a	to DHMC/Hanover
10:30 a	10:40 a	11:00 a	11:15 a	11:20 a	11:25 a	to DHMC/Hanover
11:30 a	11:40 a	12:00 p	12:15 p	12:20 p	12:25 p	to DHMC/Hanover
12:30 p	12:40 p	1:00 p	1:15 p	1:20 p	1:25 p	to DHMC/Hanover
1:30 p	1:40 p	2:00 p	2:15 p	2:20 p	2:25 p	to DHMC/Hanover
2:30 p	2:40 p	3:00 p	3:15 p	3:20 p	3:25 p	to DHMC/Hanover
3:30 p	3:40 p	4:00 p	4:15 p	4:20 p	4:25 p	to DHMC/Hanover
4:30 p	4:40 p	5:00 p	5:15 p	5:20 p	5:25 p	to DHMC/Hanover

**SATURDAY ORANGE ROUTE (Bus 3 and 4)**

West Leb	WRJ Coolidge	Aquatic Center	WRJ VA Park	West Leb	
9:45 a	9:48 a	10:00 a	10:05 a	10:10 a	to D&W and Hanover
10:45 a	10:48 a	11:00 a	11:05 a	11:10 a	to D&W and Hanover
11:45 a	11:48 a	12:00 p	12:05 p	12:10 p	to D&W and Hanover
12:45 p	12:48 p	1:00 p	1:05 p	1:10 p	to D&W and Hanover
1:45 p	1:48 p	2:00 p	2:05 p	2:10 p	to D&W and Hanover
2:45 p	2:48 p	3:00 p	3:05 p	3:10 p	to D&W and Hanover
3:45 p	3:48 p	4:00 p	4:05 p	4:10 p	to D&W and Hanover
4:45 p	4:48 p	5:00 p	5:05 p	5:10 p	to D&W and Hanover

**SATURDAY GREEN AND BROWN ROUTES (Bus 3 and 4)**

West Leb	Hartford Village	Data-mann	Dan & Whit's	Hanover Inn	Hanover Inn	Dan & Whit's	Data-mann	Hartford Village	West Leb	
9:15 a	9:22 a	9:30 a	9:40 a	9:45 a	10:00 a	10:12 a	10:20 a	10:30 a	10:35 a	to WRJ
10:15 a	10:22 a	10:30 a	10:40 a	10:45 a	11:00 a	11:12 a	11:20 a	11:30 a	11:35 a	to WRJ
11:15 a	11:22 a	11:30 a	11:40 a	11:45 a	12:00 p	12:12 p	12:20 p	12:30 p	12:35 p	to WRJ
12:15 p	12:22 p	12:30 p	12:40 p	12:45 p	1:00 p	1:12 p	1:20 p	1:30 p	1:35 p	to WRJ
1:15 p	1:22 p	1:30 p	1:40 p	1:45 p	2:00 p	2:12 p	2:20 p	2:30 p	2:35 p	to WRJ
2:15 p	2:22 p	2:30 p	2:40 p	2:45 p	3:00 p	3:12 p	3:20 p	3:30 p	3:35 p	to WRJ
3:15 p	3:22 p	3:30 p	3:40 p	3:45 p	4:00 p	4:12 p	4:20 p	4:30 p	4:35 p	to WRJ
4:15 p	4:22 p	4:30 p	4:40 p	4:45 p						

fewer than four buses in service, as headways of longer than one hour will not be attractive and ridership will likely be unsustainably poor.

The service below will require the operation of ADA complementary paratransit service on Saturday, as well as requiring maintenance personnel and at least one supervisor working in the office.

## 7.9. New Lebanon Route

In prior TDPs and in the data gathering and public input portion of this TDP, a number of trip generators in Lebanon were identified as areas that could potentially be worth serving by a bus route. These include the following:

- Renihan Meadows Condominiums
- Alice Peck Day Hospital and its associated assisted living facilities
- School Street south of downtown, possibly as far as Keene Medical Products on NH 120
- Dartmouth Coach and other development on Labombard Road
- Development on Etna Road
- Altaria and Centerra Park on NH 120

It is not possible to serve any of these locations with the current routes without significant disruptions to existing passengers. However, a new route in Lebanon could serve several, if not all, of these locations.

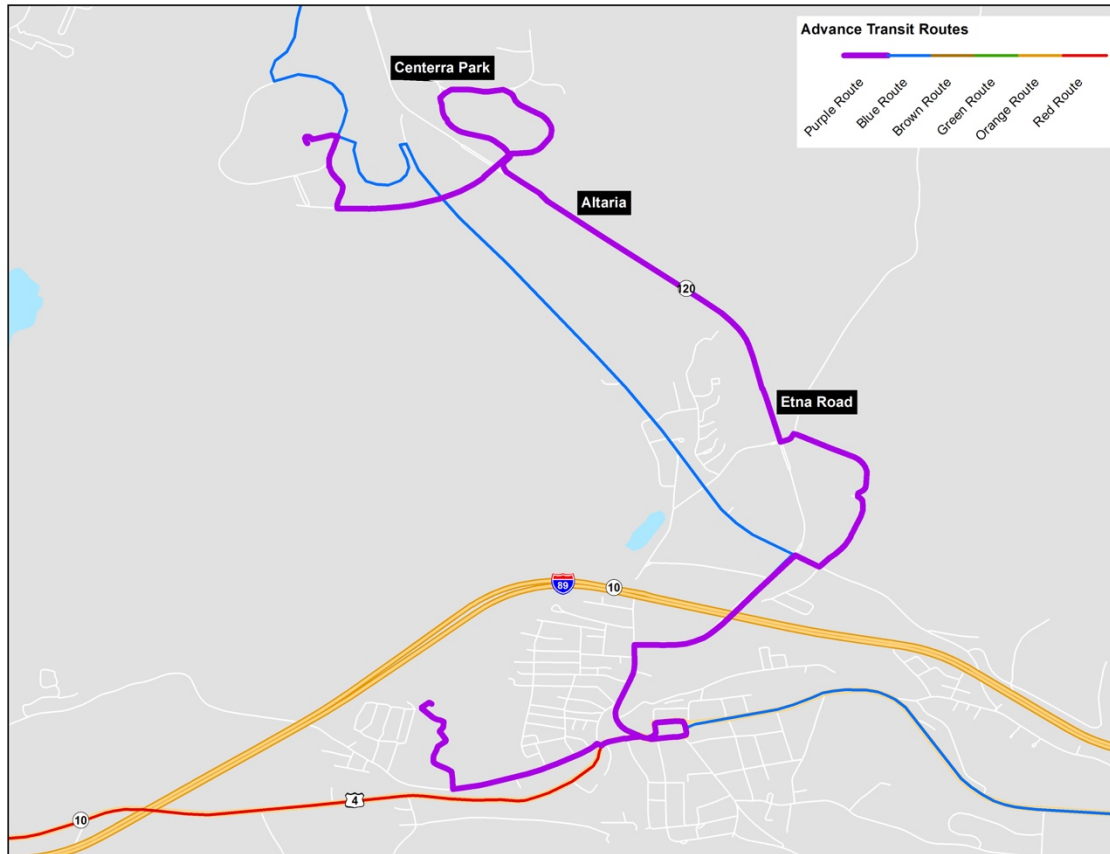
A potential new route, tentatively labeled the Purple route, could start at Alice Peck Day Hospital, looping through the complex to serve the two assisted living facilities there, and then travel on Mascoma Street to City Hall (see Figure 7.3). The intersection of Mascoma, High, and Mechanic Street is currently a dangerous intersection, but is planned to be converted to a roundabout within the next three years.

From City Hall, it would follow the Blue route alignment to Heater Road, but turn right instead of left to serve Labombard, stopping at Dartmouth Coach and near the new hotel and convention center. It would then turn north on NH 120 (via a short segment of Etna Road) and run express to Centerra Park, where it would operate in a loop around Morgan Drive, Lafayette and Centerra Parkway. Finally, it would cross NH 120 to terminate at the east entrance of Dartmouth/Hitchcock Medical Center. This alignment is approximately 6.5 miles, and a round-trip could be completed in an hour, including 8-10 minutes of recovery time.

It would not be feasible to serve the Altaria development directly (as it would take several minutes to circulate through the development), nor to install a bus stop at the intersection of Alta Boulevard and NH 120 due to the high speed of traffic there. However, there will be a foot/bicycle path between Altaria and Centerra, so that people could comfortably walk the 0.2 mile distance between a stop on Morgan Drive at Centerra and the Altaria parcel.

With this alignment, downtown Lebanon would be connected directly to both major medical facilities in town, as well as the intercity bus terminal and the Co-op and employment at Centerra. If this route were operated with two buses, it would be possible for DHMC to discontinue its separate Centerra shuttle, as the Purple route would offer an equivalent 30-minute headway between Centerra and the main DHMC facility.

**Figure 7.3 Potential Purple Route**



### 7.10. Estimated Costs

The following table presents a summary of the longer-term recommendations described above. The estimated costs in the rightmost column represent the net cost of implementing the improvement in 2019 dollars. The implementation plan in the next chapter inflates these costs to the recommended year of implementation, assuming a steady 2.5% annual rate of inflation.

As will be seen in the next chapter, not all of these improvements are recommended for implementation in the coming five-year period. Given the limited amount of new funding that came available since the last TDP, it is unlikely that more than a few of these improvements can be realized before 2024.

A few additional notes:

- The second Orange route peak bus and the Orange/Yellow service would not both be implemented. They are both shown in the table for reference, but the Orange/Yellow service is the option included in the recommended plan, due to the fact that additional funding is more likely to come from Vermont than from New Hampshire.
- The cost for the Sached Village Shuttle represents the net cost, assuming that the Dartmouth/Downtown shuttle is replaced by the new service.

- The first evening extension of line route service would only require 30 minutes of additional ADA service, because ADA service is already available until 7:20 p.m. It is assumed that a second additional round trip on each route would entail a full additional hour of ADA service.

## SUMMARY OF PROPOSED IMPROVEMENTS AND COSTS

Route	Improvement	New Areas Served	New Time Periods Served	Net Increase in Peak Buses	Estimated Net Cost in 2019 dollars
<b>Blue</b>	15-minute headways during peak periods	None	None	2	\$316,586
<b>Orange</b>	30-minute headway during peak periods	None	None	1	\$186,417
<b>Orange/Yellow</b>	Increase in peak period service to WRJ and new connections	Aquatic Center, Bugbee Street, Chandler Road	None	1	\$197,326
<b>Brown</b>	Split into two routes, each with 30-minute headway	TBD depending on new residential development	None	1	\$238,600
<b>Sachem Village Shuttle</b>	New route from Sachem Village to Hanover; replaces Dartmouth/Downtown Shuttle	Sachem Village	None	1	\$226,731
<b>All line routes</b>	Extend weekday evening service by one additional trip (including 30 minute extension of ADA service)	None	Roughly 6:30 p.m. to 7:30 p.m.	0	\$94,753
<b>All line routes</b>	Extend weekday evening service by a second additional trip (including one hour extension of ADA service)	None	Roughly 7:30 p.m. to 8:30 p.m.	0	\$104,753
<b>All line routes</b>	Operation of core system on Saturday including ADA service	None	Saturday 9:00 a.m. to 5:30 p.m.	0	\$211,057
<b>Purple</b>	New route to serve other parts of Lebanon	APD Hospital, Mascoma Street, Labombard Rd. Altaria/Centerra	Full day service	2 (to provide 30-minute headway)	\$576,838

## 8. Recommendations and Financial Plan

This chapter presents a five-year financial plan for Advance Transit. It includes operating cost projections for the period FY 2020 through 2024 as well as ridership estimates by route for each of the five years. Unlike the 2012 TDP, this document does not include a detailed capital plan. The recommendations below for the coming five-year period entail a maximum of two additional peak buses in service, and Advance Transit's current fleet, including the 2018 bus procurement, is sufficient to operate this expanded service with no additional vehicles needed. It is the case that to support future vehicle replacements, subject to available state and federal funding, Advance Transit will need about \$200,000 to \$250,000 per year in local match above and beyond the operating budget.

The five-year financial projections presented in this chapter are based on strategies and assumptions identified in the written discussion and in a supporting spreadsheet cost model. Different choices and assumptions could have been made. The cost model includes an interactive control panel and is designed to allow Advance Transit to test the financial impact of alternative future scenarios.

The chapter includes seven sections:

- Section 8.1 Strategic Choices for Advance Transit
- Section 8.2 Recommended Implementation Plan
- Section 8.3 Parking Capacity, Pricing and Local Funding
- Section 8.4 Operating Cost Projections
- Section 8.5 Ridership Projections

### 8.1. Strategic Choices for Advance Transit

Because of limited funding and changing financial conditions, Advance Transit must carefully consider where to focus its available resources. During the course of this study, a number of strategic choices have emerged that can help determine Advance Transit's future. Answers to these strategic questions have helped guide the service design recommendations included in this five-year financial plan. Recommended strategic choices include the following:

1. Advance Transit should continue to focus on its core service area (Hanover, Lebanon, Norwich, and Hartford).
2. Advance Transit should focus on improving its existing trunk line routes (increasing frequency, extending hours, improving stops and shelters and pedestrian access), and save new off-route destinations (Centerra, Alice Peck Day, Airport, etc.) for another time.
3. Advance Transit should work to increase market penetration along its existing core routes, targeting Dartmouth College and DHMC commuters and others who live within walking distance of current bus stops.
4. The least costly and likely most cost-effective improvement would be to extend service on weekday evenings by roughly one hour.
5. If additional funding is available, Advance Transit should consider adding Saturday service to support a growing car-free constituency that includes graduate students without cars.
6. If funding is cut or financial pressures mount for other reasons, Advance Transit should consider discontinuing regularly scheduled bus service from Canaan and Enfield, leaving this route segment to be served instead by private or employer-organized vanpools.

The relevance of these strategic choices can be illustrated by considering one target market – Dartmouth College graduate students. Graduate students have expressed their needs and expectations in onboard surveys. They want more convenient bus stop locations, especially at Sachem Village. They want more frequent service, and they want evening service. They want buses to operate on Saturdays.

Riders praise the existing service for its high quality, but the service is still not good enough for many potential riders. This is particularly true for Hanover commuters from Sachem Village, White River Junction, and Hartford. These people need buses that operate more frequently than once an hour. Residents of Sachem Village need buses that run later than 6:00 p.m.

## 8.2. Recommended Implementation Plan

The recommended implementation plan focuses on improvements to Advance Transit's core services. At the time of this writing, the proposed budget for FY 2020 was essentially set, and so the first improvements are programmed for FY 2021. Highlights include:

- Extension of weekday evening service by one hour starting in FY 2021
- Introduction of Sachem Village Shuttle and Thompson Shuttle to replace Dartmouth/Downtown Shuttle in FY 2021
- Introduction of Yellow route and expanded Orange route service in White River Junction in FY 2022
- Further extension of weekday evening service by another hour in FY 2023
- New hourly Saturday bus service beginning in FY 2024 (or earlier if funding becomes available)
- Fifteen-minute peak service on the Blue route or introduction of Purple route service in Lebanon in FY 2025
- Increased service on Brown route beginning in FY 2026 (to be considered in more detail in the next TDP)

The cost model assumes that federal appropriations will allow FTA 5311 funding to keep pace with inflation, and that funding allocations from NHDOT will increase at least to maintain pace with cost increases on existing service. Unfortunately, this has not been the case over the past several years, as 5311 allocations from NHDOT have been flat. The cost model also assumes that the state of Vermont will provide enough federal and state dollars to cover 80% of the cost of the Yellow route and doubling service in White River Junction.

To some extent, the recommended plan reflects what *should* happen with public transportation in the Upper Valley. This is not necessarily what is likely to happen. Advance Transit and its partners need to remember that future service expansion depends on federal and state funding decisions that have not yet been made. The great majority of recommendations from the 2012 TDP were not implemented due to a lack of new funding. Service additions included in the cost model for the coming years may need to be postponed until the required funding becomes available from federal, state, and local sources.

### 8.3. Parking Capacity, Pricing and Local Funding

Before proceeding with the financial analysis of operations associated with the recommended plan, this section considers how parking capacity and parking pricing interact with the feasibility of future service expansion. Parking policy for four of the primary destination areas served by Advance Transit can have either a major positive impact on AT operations and finances, or it can have a neutral or negative impact on AT.

There is ample evidence in the US and around the world that parking availability and pricing are integrally related to the success of mass transit services. The less parking available and the more it costs, the better positioned transit is to capture a large share of the travel market. In large cities with constrained and expensive parking, bus and rail systems can capture 30%, 40% or an even greater share of the travel market. However, in suburban and exurban areas with ample amounts of free parking, transit routes are almost never successful in capturing a significant market share and end up carrying only passengers who have no other mobility options.

In the Advance Transit service area, there are five primary trip destination zones, or, in other words, places where many people go to work or shopping or school:

- Downtown Hanover and the Dartmouth College Campus
- Dartmouth-Hitchcock Medical Center
- Downtown Lebanon
- White River Junction
- Route 12A Plazas

These zones are not all of the same scale, and West Lebanon/Kilton Library could arguably be included as a sixth zone. White River Junction has a lower level of demand than the others, but it has seen rapid growth and redevelopment over the past five years and further development is planned.

In four of these zones, there has been recent discussion of the need for additional parking capacity, either in the form of additional surface lots or in parking garages. Dartmouth College is in the process of building a 300-car garage as part of its project at the Thayer School, and DHMC recently announced a major expansion which includes a 400-car garage. The City of Lebanon has mentioned the idea of structured parking at a recent meeting, and White River Junction conducted a parking study in 2017 identifying a shortage of parking in several sections of the village. The Route 12A Plazas area consists of large retail outlets with expansive parking lots, and so will be set aside for the purposes of this discussion.

Advance Transit has a high level of service to three of the destination zones (Dartmouth, DHMC and Lebanon) and this TDP proposes a service increase to White River Junction. As shown in the travel pattern analysis in Chapter 5, there are many people living along AT bus routes who work or go to school in these destination zones but who are not currently using the bus system. Improving the level of service on the buses (through longer hours and better frequency) is the “carrot” to entice people to start riding, but a significant shift from driving to transit only happens when there is also a “stick” involved. That stick could take the form of a spike in gasoline prices, but no one in the Upper Valley has control over that. The other effective stick is the price of parking, and here, local and institutional officials have a great deal of control.



As stated in section 8.1 above, Advance Transit has made a strategic decision to focus service on the corridors with the highest ridership potential, rather than spreading service over a wider area, hoping to capture longer-distance trips. Only the Canann/Enfield trips goes beyond the core area, and it is an expensive service to operate, costing some \$290,000 annually to transport about 50 people per day back and forth. This focus on the core area allows AT to operate relatively frequent service.

With the construction cost of a structured parking space running in the vicinity of \$30,000 (not including ongoing maintenance), the parking garages being built in the region have a price tag of \$10 million or more. Those spaces, especially if they become available to drivers at no cost, become a permanent disincentive to using public transit. If those funds were instead invested in Advance Transit, to purchase new buses and shelters and to increase the level of service, then comfortable and very convenient service could be offered to get to those destinations from all parts of the service area, allowing drivers to forgo the cost of operating their car, but still having flexibility and freedom in their travel to work and school. Instead of people who live in downtown Lebanon hopping in their cars and driving the short distance to work at DHMC, they could ride the bus and free up parking spaces for people coming from longer distances who don't have convenient transit options. If enough spaces were freed up as a result, it would be possible to save the millions of dollars associated with building parking garages.

Most officials consider parking to be a necessary amenity to provide to employees and shoppers, and that the parking has to be “free” to those drivers. As discussed in the seminal work *The High Cost of Free Parking* by Donald Shoup, and more recently in *Parking Pricing Implementation Guidelines* by Todd Litman of the Victoria Transport Policy Institute (<http://www.vtpi.org/parkpricing.pdf>), there is no such thing as free parking. A parking space for which a driver pays nothing is a significant subsidy to that driver paid by someone else, whether it is a municipality (the local taxpayers) or an employer (with the cost passed on to customers).

If instead of receiving that hidden subsidy, drivers had to pay for the actual cost of parking, in terms of the amortized construction cost, the ongoing maintenance cost, and the opportunity cost of using that land for parking rather than something more productive, the calculus on whether to drive or to use another mode of transportation would shift radically. Furthermore, the calculation as to whether it is worthwhile to spend \$30,000 per space to build a garage would be influenced by how much it is worth to the drivers who use that space, if those drivers had to pay the cost of having it available.

From an economist's perspective, it only makes sense to invest substantial amounts of money into a project if the users place an equivalent or greater value on the result of the project. The way to determine how much value a user places on a parking spot is to start charging for parking and to see how that affects usage. If parking that is now free is changed to paid parking, and the usage remains the same, then it demonstrates that the users are obtaining value from the parking at least as great as the price. If there is a full parking lot, and even with increasing prices it remains full to the point that the price equals the marginal cost of building a space in a garage, then that indicates that structured parking would be an economically efficient solution to the problem.

The Upper Valley is nowhere near that point. Outside of downtown Hanover<sup>1</sup>, most parking in the region is free. All of the parking at DHMC is free. Parking in downtown Lebanon is free (with the

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<sup>1</sup> The Town of Hanover is in the process of completing a study of parking. Opportunities for expanded parking supply in the downtown area (exclusive of the Dartmouth campus) are very limited and any new structured parking would be extremely expensive. The study recommends consideration of remote parking lots and increased shuttle service from those lots to the downtown area.

City having considered installing parking meters in the summer of 2018). All parking in White River Junction is free.

If a parking charge were imposed on these areas of highest demand, it would both create a significant incentive to use Advance Transit service instead of driving, as well as creating a large new revenue source to support a higher level of service on the bus routes. That revenue, combined with the money not spent on building and maintaining new parking lots and garages would spur a virtuous cycle in which transit service becomes much more attractive, people use it more, space is freed up for additional development, spurring more demand and ridership and economic activity overall.

The counterargument for charging for parking is typically that the people who drive now (mainly employees) will be upset and that shoppers will go someplace else where they can find free parking. As Shoup points out in his book, in cases where parking charges were increased, the local economy thrived rather than withering.

Another counterargument is the Advance Transit is highly subsidized and is available at no cost to the rider. A driving advocate could say that free parking is therefore fair and results in a level playing field. However, the traffic congestion, air pollution, greenhouse gas emissions, and unproductive land use associated with driving and providing parking capacity are significant negative consequences. While transit operations produce some pollution and GHG emissions, a bus full of people is far less polluting and causes far less congestion than 40 individual cars carrying one person apiece.

In an era when people are becoming more concerned about climate change and the impacts of burning fossil fuels, it may not be the case that imposing a charge for parking, as long as it is put into proper context, clearly explained, and implemented in conjunction with a boost in transit service, would be soundly rejected by the driving constituency. Many people (but not all) would gladly use a bus service if they thought it was convenient and safe and ran when they needed it to.

Advance Transit is already much of the way there, especially when it comes to service to DHMC, downtown Hanover and downtown Lebanon. A change in the policy toward parking pricing on a regional basis could shift AT from being a respected local entity serving a niche market to an integral player in the Upper Valley's transportation system, leading to a large reduction in congestion, pollution and unproductive land use dedicated to parking.

#### **8.4. Operating Cost Projections**

Projected operating costs for Advance Transit, assuming that the recommended new services are funded and implemented as listed in section 8.2 above, are shown on the tables on the following pages. The first table breaks down the costs by route and route component: existing services are shown in non-shaded rows, and recommended services are shown in shaded rows. The cost forecasts encompass all of AT's operations, including regular routes, shuttle services, ADA paratransit service, and administrative costs associated with philanthropy. Saturday service is listed as its own type. Capital and depreciation costs for vehicles and facilities are not included.

Operating cost projections are based on Advance Transit's budgeted average unit costs for fixed route bus service in FY 2019. Unit cost measures include average cost per hour (for labor and administrative expenses), average cost per mile (for fuel and repairs), and average cost per scheduled bus (for vehicle insurance and registrations).

**PROJECTED COSTS BY SERVICE COMPONENT (proposed services shaded in green)**

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
<b>Regular</b>	<b>2,705,376</b>	<b>2,773,010</b>	<b>2,931,379</b>	<b>3,217,162</b>	<b>3,391,143</b>	<b>3,475,921</b>
Blue - regular	583,453	598,039	612,990	628,315	644,023	660,123
Blue - Canaan	290,539	297,802	305,247	312,878	320,700	328,718
Blue - DMS	169,902	174,150	178,504	182,966	187,540	192,229
Blue - school	20,864	21,386	21,920	22,468	23,030	23,606
Blue - extra trip	-	-	15,106	15,484	15,871	16,268
Blue – 15 min. all day	-	-	-	-	-	-
Brown - regular	266,467	273,129	279,957	286,956	294,130	301,483
Brown - extra trip	-	-	13,038	13,364	13,698	14,041
Brown - second bus	-	-	-	-	-	-
Green - regular	573,494	587,831	602,527	617,590	633,030	648,855
Green - extra trip	-	-	24,291	24,899	25,521	26,159
Orange - regular	282,992	290,067	297,319	304,752	312,370	320,180
Orange - extra trip	-	-	21,466	22,002	22,552	23,116
Orange/Yellow - peak	-	-	-	212,498	217,810	223,256
Orange - second bus	-	-	-	-	-	-
Purple - 2 buses	-	-	-	-	-	-
Red - regular	517,665	530,607	543,872	557,469	571,405	585,690
Red - extra trip	-	-	15,142	15,521	15,909	16,307
Second evening hour	-	-	-	-	93,552	95,890
<b>Shuttle</b>	<b>1,383,422</b>	<b>1,418,008</b>	<b>1,691,667</b>	<b>1,733,959</b>	<b>1,777,308</b>	<b>1,821,741</b>
Downtown summer	109,342	112,075	-	-	-	-
Downtown winter	499,692	512,184	-	-	-	-
Lot 20	273,356	280,189	287,194	294,374	301,733	309,277
Lot 9	501,033	513,559	526,398	539,557	553,046	566,873
Sachem - peak 15	-	-	483,946	496,044	508,445	521,157
Sachem - midday 30	-	-	112,121	114,924	117,797	92,332
Sachem - evenings 45	-	-	74,203	76,058	77,959	79,908
Thompson peaks	-	-	207,806	213,001	218,326	223,784
<b>Saturday</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>163,836</b>
Saturday hourly	-	-	-	-	-	163,836
<b>ADA</b>	<b>380,241</b>	<b>389,747</b>	<b>409,997</b>	<b>420,247</b>	<b>452,829</b>	<b>539,106</b>
ADA Paratransit	380,241	389,747	399,491	409,478	419,715	430,208
ADA extra eve 30 min	-	-	10,506	10,769	11,038	11,314
ADA Saturdays	-	-	-	-	-	74,956
<b>Philanthropy</b>	<b>60,639</b>	<b>62,155</b>	<b>63,709</b>	<b>65,302</b>	<b>66,934</b>	<b>68,607</b>
Philanthropy Admin	60,639	62,155	63,709	65,302	66,934	68,607
<b>Grand Total</b>	<b>4,529,678</b>	<b>4,642,920</b>	<b>5,096,752</b>	<b>5,436,669</b>	<b>5,688,214</b>	<b>6,069,211</b>

These cost factors are adjusted for anticipated inflation in future years. Inflation rates utilized by the cost model can be adjusted separately for each year. The model is currently set to reflect inflation rates of 2.5% per year throughout the five-year planning period.

The cost model uses fully allocated costs. This means that the average cost per hour includes all administrative costs associated with Advance Transit’s regular bus operations. It does not include administrative costs assigned to ADA paratransit, or Advance Transit’s philanthropic fund raising efforts., since those items are listed separately in the table. Mileage and service hour calculations for individual service components include miles and hours associated with moving buses to and from Advance Transit’s bus garage in Wilder. Again, capital costs and depreciation are not included.

Using fully allocated costs results in conservative budget estimates. Support expenses are unlikely to increase proportionally with the growth of service hours and service miles (with the exception of Saturday service for which new administrative, maintenance and supervisory costs are involved).

The table below summarizes the costs by category from the table above.

### SUMMARY OF COSTS

Service Category	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024
Regular	2,705,376	2,773,010	2,931,379	3,217,162	3,391,143	3,475,921
Shuttle	1,383,422	1,418,008	1,691,667	1,733,959	1,777,308	1,821,741
ADA	380,241	389,747	409,997	420,247	452,829	539,106
Saturday bus	-	-	-	-	-	163,836
Philanthropy	60,639	62,155	63,709	65,302	66,934	68,607
<b>Grand Total</b>	<b>4,529,678</b>	<b>4,642,920</b>	<b>5,096,752</b>	<b>5,436,669</b>	<b>5,688,214</b>	<b>6,069,211</b>

## 8.5. Ridership Projections

Total ridership in FY 2018 was 877,721. During the five-year planning horizon, if all of the recommended improvements are implemented, combined Advance Transit ridership is projected to increase by 23%, from 932,000 in FY 2019 to 1.08 million in FY 2024. The most significant changes include:

- A boost of about 15,000 annual riders due to later weekday evening service in FY 2021.
- 250 new boardings a day on a Sachem Shuttle beginning in FY 2021, with 5% annual increases in the subsequent two years.
- A boost of another 12,000 annual riders when weekday evening service is further extended in FY 2022.
- 100 new boardings a day on the Orange and Yellow routes with the addition of a second peak bus in Vermont beginning in FY 2023, followed by 3% annual increases for each of the next three years.
- Approximately 350 riders each Saturday with the introduction of hourly service in FY 2024.

Given the up and down nature of system ridership over the past few years, it is not assumed that there will be any background growth in the base ridership from FY 2019 through FY 2024. Through five months of FY 2019, ridership is about 3% higher than FY 2018 ridership for the regular routes overall and about 16% higher for the DHMC shuttle routes, so this may be a conservative

assumption. Note that the FY 2019 projections in the table assume that the rates of change for the first five months of FY 2019 at the route level hold true for the rest of the fiscal year.

**ADVANCE TRANSIT RIDERSHIP PROJECTIONS**

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Blue	203,470	204,080	204,080	207,110	207,110	209,382	215,050
Green	98,189	103,197	103,197	106,767	106,767	109,444	112,407
Red	164,906	179,088	179,088	182,530	182,530	185,112	190,123
Brown	37,057	33,907	33,907	35,097	35,097	35,990	36,964
Orange	77,671	80,467	80,467	85,057	109,057	113,220	117,004
<b>Total Regular</b>	<b>581,293</b>	<b>600,739</b>	<b>600,739</b>	<b>616,561</b>	<b>640,561</b>	<b>653,148</b>	<b>671,548</b>
Dartmouth	71,623	70,549	70,549				
Sachem/ Thompson	0	0	0	134,299	138,277	142,256	146,234
DHMC	215,512	250,856	250,856	250,856	250,856	250,856	250,856
<b>Shuttles</b>	<b>287,135</b>	<b>321,405</b>	<b>321,405</b>	<b>385,155</b>	<b>389,133</b>	<b>393,112</b>	<b>397,090</b>
ADA Riders	9,293	9,572	9,572	9,824	10,206	10,407	10,700
<b>Grand Total</b>	<b>877,721</b>	<b>931,716</b>	<b>931,716</b>	<b>1,012,114</b>	<b>1,040,383</b>	<b>1,057,120</b>	<b>1,079,338</b>

## Appendix A – Survey Form

### Advance Transit Passenger Survey 2017

Please take a few minutes to fill out this survey. Complete the survey only once. Thank you!

1. DATE \_\_\_\_\_ 2. TIME \_\_\_\_\_  A.M.  P.M.
3. Which bus route are you on now?  
 Blue  Red  Green  Orange  Brown
4. Will this trip involve a transfer between routes?  Yes  No
5. If yes, which bus routes will you use for this trip?  
 Blue  Red  Green  Orange  Brown  
 Dartmouth / Downtown Shuttle  DHMC parking lot shuttle  DHMC Centerra shuttle  
 Stagecoach  The Current
6. What is the main purpose of this bus trip? (Please check only one) To or from ...  
 Work  Shopping  School or College  
 Medical  Recreation  Social Visit  Other \_\_\_\_\_
7. Which town or village do you live in?  
 Lebanon  West Lebanon  Hanover  Canaan  Enfield  Norwich  
 WRJ  Hartford Village  Wilder  Other \_\_\_\_\_
8. How often do you usually ride Advance Transit?  
 5 days per week  3-4 days per week  1-2 days per week  Less than once per week
9. When did you first begin using Advance Transit?  
 Within the last year  1-2 years ago  3-5 years ago  More than 5 years ago
10. Are you a student?  Yes  No School or college \_\_\_\_\_
11. If you are a Dartmouth College student, which type?  
 Undergraduate  Tuck  Thayer  Medical School  
 Arts & Science Graduate Student  Other Graduate Student
12. What is your employment status?  
 Full-time  Part-time  Childcare provider  Retired  Unemployed  
 Other \_\_\_\_\_
13. If you are employed, who is your employer?  DHMC  Dartmouth  VA Hospital  
 Other \_\_\_\_\_
14. If you are employed, what is your primary work location?  
 Downtown Hanover  Hanover Lyme Rd  DHMC main campus  Centerra  
 DHMC Heater Road  Downtown Lebanon  Route 12A Plazas  West Lebanon  
 WRJ  Norwich  Wilder  Other \_\_\_\_\_

Please complete both sides.

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Advance Transit Passenger Survey 2017

15. If you have a car available for your use, where is that car now?

- No car available     Home     DHMC Lot     Dartmouth or Hanover lot  
 Someone else is using it     Garage for repairs  
 Near Advance Transit bus stop (Where?) \_\_\_\_\_  
 Other \_\_\_\_\_

16. Which transit routes/services do you use at least twice per year? Check all that apply.

- Blue     Red     Green     Orange     Brown  
 Dartmouth / Downtown Shuttle     DHMC parking lot shuttle     DHMC Centerra shuttle  
 Stagecoach     The Current     Dartmouth Coach     Amtrak     Tuck shuttle

How often are these statements about Advance Transit true?

	Nearly Always	Usually	Some- times	Almost Never
17. Buses are clean.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Buses are comfortable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. It is easy to find a seat.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Drivers are polite and helpful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Drivers are safe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Buses are on time in the morning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Buses are on time in the afternoon.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Bus schedules are easy to find.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Schedules are easy to understand.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Transfers between routes are easy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

27. How do you currently obtain information about Advance Transit? Check all that apply.

- AT website     Facebook     Telephone     Printed schedules     Bus stop schedules  
 AT smartphone app     Other \_\_\_\_\_

28. Which devices do you use?

- Computer at home     Computer at work     iPhone     Android phone     Other cell phone

29. What is your age?

- 17 or younger     18-25     26-40     41-65     Over 65

30. Do you have a valid drivers license?     Yes     No

31. What do you like about Advance Transit bus service? What can we do to improve the service?  
*Comments and suggestions will be posted at [www.advancetransit.com](http://www.advancetransit.com).*

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Please complete both sides.

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## Appendix B – Verbatim Comments from Survey

Town	Route	Comments
Canaan	Blue	I like everything; more buses to Canaan please
Canaan	Blue	People are nice, music should be louder
Canaan	Blue	More buses to Canaan please
Canaan	Blue	The service is free and easy to use
Canaan	Blue	It's a reliable way for me to get to work. The drivers are always very helpful
Canaan	Blue	More routes to and from Canaan, the 6:45 bus from Canaan should go to the green in Lebanon before it goes to Hanover
Lebanon	Blue	It's free and reliable
Canaan	Blue	More buses to Canaan!
Lebanon	Blue	The fact that it is available, and for free, with no car I'd be stuck at home. It makes my retirement much more fulfilling
Lebanon	Blue	Great use of transportation to work and other places since I can't drive. Also good people
Lebanon	Blue	Super convenient
Hanover	Blue	Always on time, drivers are good and safe, keep it up!
Lebanon	Blue	No food or drinks should be allowed, and keep the windows closed when heat is on! Thank you all!!!
Lebanon	Blue	I think it's an important area service, short of adding another bus, theres not a need for improvement
Lebanon	Blue	Can't think of anything to change
Lebanon	Blue	Convenient, no driving/parking hassle, economical - negates the need for a 2nd car, free, friendly
Lebanon	Blue	It helps me get to work. The fact it is free makes it so much better; without both buses I would have to walk
Lebanon	Blue	I like it, offers a large option of drop off areas, makes those who don't drive able to do stuff. No improvement suggestions on my end!
Lebanon	Blue	Environmental awareness, ability to share transit, save CO2 etc
Lebanon	Blue	Great service, connect to new darmouth coach, bus center would be great
Lebanon	Blue	Convenience, no cost, generally clean, I can avoid the hassle of driving to work and finding a parking spot, drivers are safe and friendly
Hanover	Blue	Survey is too long!
Lebanon	Blue	Free transportation is amazing! More weekend and evening service would be nice
Lebanon	Blue	Please do not leave earlier than scheduled (8:15), bus often leaves at 8:13 or earlier :)
Lebanon	Blue	Fabulous service. The call-ahead for transfers is a wonderful service, and helps to ensure one doesn't miss a connection for work. Love the "where's my bus" tool. Later pm service would be great; weekend service too. I'm grateful for the current service as is. Nice to have options. The red bus tends to be less clean sometimes, harder to find seat at the start of a route, more riders on bad weather days
Lebanon	Blue	I like a lot this service because it facilitates your daily life, if you do not have any car or you simply do not want to use it. It is free and there is a great variety of times so it fits you very well. Besides the drivers are very kind. Thank you!



<b>Town</b>	<b>Route</b>	<b>Comments</b>
		I love that it's free! It's very friendly, I know my drivers and meet people on the bus. It would be so helpful if buses ran even a little bit later on weeknights, I could use the bus more often/ weekend service would be amazing, too. I would happily pay for after-hours buses
Lebanon	Blue	
Other	Blue	More park and ride options
Lebanon	Blue	It's really helpful. I decided to postpone purchasing a car to save money, because this service was available
Lebanon	Blue	It's free, convenient and reliable. Evening and weekend service would be good
Lebanon	Blue	One more schedule from college to Lebanon is needed after 6:30pm, I usually leave the building around 6:40pm, when there is no bus for me back to home
Lebanon	Blue	I appreciate the AT. Thank you!
Lebanon	Blue	I love the convenience of being picked up @ tomlerwood commons and dropped off at entrance of DHMC. I sold my car because I no longer need it.
Lebanon	Blue	Run on saturday
Lebanon	Blue	Always on time; polite service
Lebanon	Blue	Please don't let drivers whistle; i'm considering changing my evening bus because of the driver
Lebanon	Blue	Provide service after 7pm to Lebanon
Lebanon	Blue	None
Lebanon	Blue	It would be great to have service a bit later in the evening. I have to drive to work on days when I need to work late. Otherwise, everything is great
Hanover	Blue	I like that it is free so I don't have to pay just to get to the doctor (which I do at least once a week)
Other	Blue	Make sure everyone is seated before taking off
Lebanon	Blue	Useful and usually quick public transport. I have used it for several jobs and for shipping in west leb
Lebanon	Blue	Ride
Lebanon	Blue	I like everything about AT. Maybe adding 1-2 extended hours trips to Lebanon from college campus around 8-9 pm
Lebanon	Blue	Free! Easy and convenient. Would be nice if there were more park and rides and if buses worked later. More frequent trips to wrj
Hanover	Blue	I like the familiarity of driver. An improvement would be more diligence in eliminating passengers that are intoxicated and/or smell like a brewery or marijuana
Norwich	Blue	Fabulous - love direct bus to Norwich in evening, would like better brown-blue connection in Hanover in AM
Lebanon	Blue	Easy access to most of upper valley; sometimes weekends would be nice
Lebanon	Blue	Gets me to work, shopping and to friends in Enfield
Lebanon	Blue	The drivers are always pleasant + very helpful, I recommend the blue bus to everyone. Thank you for all you do :)
Hanover	Blue	Free
Lebanon	Blue	All drivers are polite and friendly
Lebanon	Blue	Drivers are nice
Lebanon	Blue	The fact that it is free and always has been is great! One thing that would be helpful would be longer hours and limited service on weekends
Canaan	Blue	It is there when I need it

Town	Route	Comments
Lebanon	Blue	The service is extremely convenient for a commuting trip I make once per week
Other	Blue	Wonderful drivers - almost like ambassadors for the upper valley! Thanks, at!
Lebanon	Blue	On time, read on bus so please keep lights on for readers
Lebanon	Blue	Reliable, safe, extensive
Lebanon	Blue	Very reliable and easy to use
Lebanon	Blue	It's safe, maybe run a little bit later in the pm
Hanover	Blue	As a free service, you provide stellar schedules, routes and drivers. Without at, i'd be spending thousands of dollars I don't have on car payments and gas - thanks!
Hanover	Blue	I suggest to have a line from DHMC directly to west Lebanon. Thank you
Lebanon	Blue	Great to have when you have no car. Wish they ran weekends!
Lebanon	Blue	I appreciate its consistency, that there is bike storage on the front of the bus and that it is free. Thank you!
Lebanon	Blue	Love that it is free and close to home and work, would take bus more often if it ran later. Every now and then I work late, I love the service as is , I rarely work late so no need for extended hours, but it may help others
Lebanon	Blue	Blue route is scheduled to leave Lebanon city hall at 7:32 am, but usually leaves after 7:40 (driver takes a few minutes for cigarette even if already late) please prioritize leaving on time, as people taking this bus need to work at DHMC at 8:00
Lebanon	Blue	The driver in the morning @city hall runs slightly late, which is fine, but then he always take a bathroom break (I assume) 7-10 minutes, which means we usually arrive after 8am to DHMC - late to work. I understand drivers need to take these breaks, but not @this pertinent time. Please work w/your drivers to provide them better times for breaks
Lebanon	Blue	AT is wonderful. I would add saturday service, at commuter times at least,ex. 7-9am and 3-5pm or 4-6pm, with a small charge if necessary, so workers can avoid taxI fares
Lebanon	Blue	Bus on weekend please, at least saturday. Clearer announcement at stops, it's easier for newcomers to use it. More frequent schedule in the morning and evening please.
Lebanon	Blue	I like the fact that the bus stop is close to my house and also the fact that it is free, it would be great if the service was available even on weekends. I wouldn't even mind paying for weekend rides
Lebanon	Blue	Bikes should be allowed in the bus if both of the racks are full
Lebanon	Blue	I like the bus running 7:30 to 7:40 in the morning time, thanks a lot for this service and for the bus driver :)
Lebanon	Blue	It will be good if some AT bus service is available during the weekend
Lebanon	Blue	I love the AT!
Hanover	Blue	I particularly enjoy that its free. I'm so happy that I have this option because I can't afford a car
Hanover	Blue	It's free
Hanover	Blue	The app, many stops, clean
Hanover	Blue	Service to Etna
Hanover	Blue	DHMC blue route on the weekend (even for two stops, or two routes a day) Dartmouth evening shuttle (later than 8pm) and during the summer
Hanover	Blue	Weekend availability would be amazing - even if only a truncated schedule. Awesome service!

<b>Town</b>	<b>Route</b>	<b>Comments</b>
Hanover	Blue	Orange bus on the half hour would be great, we love having one car, we love the bike rack, so I can bike to bus stop and back, need an orange bus on weekend, blue bus is great - would love a few later orange and blue buses
Hanover	Blue	The bus drivers put up with a lot of stuff from riders and I feel they do a great job. Some drivers need to have a refresher in safe braking
Lebanon	Blue	It's easier than walking all the way
Enfield	Blue	A lunch route to Enfield/Canaan please!
Lebanon	Blue	Love that it's free, 3-bike rack sometimes needed on blue line
Lebanon	Blue	Clean, on time and friendly
Lebanon	Blue	A few trips on saturday and sunday would be greatly appreciated. Maybe just 4 trips, two in the morning and two in afternoon
Enfield	Blue	The blue line is noticeably newer and cleaner than the orange line. The orange line buses are creaky, loud, dirty, and the windows don't stay closed
Lebanon	Blue	Love it! So convenient. Would love weekend service, but I know that is unlikely :) also like my friendly bus driver. Thanks!
Hanover	Blue	Hard to cross the road by buck rd, doesn't feel safe to stand there either
Hanover	Blue	The particularly nice thing is that bus riders become a community. Also I like the fact that using public transportation saves fuel (especially as more people use it)
Wilder	Blue	Everything is excellent - it's unbelievable, they're so good - my family couldn't believe it's for everybody and not just for seniors
Canaan	Blue	Convenient, keep up the good work
Canaan	Blue	The bus schedule is my biggest complaint - not enough buses to Canaan, but I understand that cost-wise, more are not feasible. I am very grateful to have free bus service at at. Thanks, at!
Other	Blue	Convenient, reliable mass transit, affordable, makes commuting more viable, safe
Other	Blue	I can't think of any improvements. Service on the blue express (Canaan/Enfield) is outstanding. Thank you for providing this service
Other	Blue	I like the convenience of the service and how polite the drivers and passengers are
Enfield	Blue	That they bring me to work is great, I wish they ran on the weekends
Enfield	Blue	The small bus needs TLC! 2:50bus to Enfield during school year is awesome. Very helpful!
Hanover	Blue	Improvement: more bus in the evening after 6pm, and bus on weekend
Hanover	Blue	Bus should run later in the day and on the weekends!
Norwich	Blue	Convenient, have the 7:29 bus wait for me when I arrive at Hanover, have the flexibility to wait for coming passengers who are transferring from the brown bus, for the blue line going to dhmc
Hanover	Blue	The bus offers me an easy transit to and from work, especially when the weather is bad. The only thing I am not entirely happy with is the bus always gets delayed in the morning. The 8:05 bus will come at 8:15 ie
Other	Blue	Great service! Improvement? Saturday service
Norwich	Blue	I wish sometimes I could meet the blue bus at 7:29 when the brown bus is running late from Norwich, but love this service
Hanover	Blue	Polite driver, free, hope to have bus come on time in morning, bus in evening always leaves earlier than scheduled
Hanover	Blue	App does not work often, doesn't account for transfers
Lebanon	Blue	35 years ridership, real need for service, thanks!

<b>Town</b>	<b>Route</b>	<b>Comments</b>
Enfield	Blue	It gets me where I want to go
Canaan	Blue	Easy and convenient; it would be nice to see a saturday route
Canaan	Blue	I like that I can be a part of the community because I have seizures and cant drive, this bus helps me to have a job without having to ask for rides to work, and helps me have independence. The drivers are all really nice about my condition and make me feel safe. Keep sending buses to Canaan so I can keep working
Canaan	Blue	More trips to Canaan later in the day and at night would be great
Canaan	Blue	Free, great routes, route to Canaan, drivers should be paid more for extended hours (nights and weekends)
Canaan	Blue	Consistency
Enfield	Blue	It's free and goes through more than one town
Canaan	Blue	Provides alternative to driving or biking. Saves \$ helps the environment (fewer cars) drivers are friendly, feels safe. To improve: continue the 2:50 Lebanon -> listen ctr route year-round. Maybe use a smaller bus (or a van) when you don't expect many riders
Enfield	Blue	We are immigrants and have only 1 car in household. At is really helpful, sometimes it is the only way to arrive at work. It would be helpful to get more morning buses on the road Lebanon - Enfield - Canaan
Enfield	Blue	More trips to Canaan and Enfield. Later bus routes, maybe. Thank you!
Enfield	Blue	Really would recommend an afternoon blue route service. Maybe around 11-12:30pm thanks you!
Enfield	Blue	Everything is fine
Hanover	Blue	I like that the service is free, I would appreciate weekend service, even if I had to pay
Hanover	Blue	It's extremely convenient for getting across town
Hanover	Blue	Please extend hours and run on weekends
Hanover	Blue	I really appreciate how friendly drivers are! They're very willing to help + explain things, which has been invaluable to me (a new resident of Hanover)
Wilder	Blue	Convenience!
Hanover	Blue	I like how easy it is to access
Hanover	Blue	AT has become very reliable
Other	Blue	Extend range deeper into harford/sharon, connect hartford to hospital directly commuter times only, already high school, ie town hall hartford, west leb exchange, downtown Lebanon
Canaan	Blue	I would love a bus that leaves Canaan between 6:45 and 8:30 am servicing the new health clinic in Canaan on route 4. You have excellent drivers
Other	Blue	Frequent departures, friendly drivers, keep doing what you're doing
Hanover	Blue	It is inconvenient...if I tried to take the bus to/from work it would take literally an hour to get 4 miles from my home to place of employment due to having to do orange-blue transfer. Not worth it. Also need to not let on people that reek of cigarette smoke and ban smoking at all stops
Lebanon	Blue	More buses till later in the evenings and on weekends
W Lebanon	Blue	Convenient and on time
Lebanon	Blue	Limited saturday service or later blue route service in evenings
Other	Blue	Free, readily available, convenient

<b>Town</b>	<b>Route</b>	<b>Comments</b>
Other	Blue	This is my first time riding
Hanover	Blue	Amazing service, thank you so much
Enfield	Blue	Convenience to Hanover and back, no worries about parking
Hanover	Blue	Great service always, i'd be lost without it. Do wish we had it on weekends, especially sunday for church (Dartmouth downtown shuttle)
Hanover	Blue	Easy, don't need to find parking in downtown Hanover
Other	Blue	The drivers are very friendly and helpful! The staff answering the telephones have also been very helpful when we need help navigating routes for visitors
Hanover	Blue	Some services on saturday (even just one or two) would be super helpful. Otherwise, everything is great! Thank you :)
Hanover	Blue	None
Norwich	Blue	I've found the map and transfer schedule confusing sometimes
Other	Blue	Safe and courteous drivers, prompt schedules, clean buses
Other	Green	Convenience, service, no cost
Wilder	Green	Convenient
WRJ	Green	Advance transit is perfect the way it is.
WRJ	Green	I love AT. In my case, it picks up at the end of my road and drops off right across the street from my work. So convenient!
Wilder	Green	It is convenient for me, happy it runs in bad weather. A few drivers not as helpful and drive too fast or take off before you sit down. Sometimes they take off too early from a stop
Wilder	Green	The drivers are helpful and friendly, I save gas by not driving - hopefully helps environment. If you ever replace the buses, please dont get the upholstered cushion seats. The absorb the smell of the riders' dirty clothes and it give the whole bus a rank, nasty smell. For 10-20 minte rides, we can sit on a moulded plastic seat, easy to clean
Wilder	Green	We need a bus stop schedule at the maynard stop in Hanover.
Norwich	Green	I don't know - i'm just glad that there's a transit system up here. I would just suggest not leaving early from a station/stop, but i'm just picky
Hartford Vill	Green	Only way I get to work in the morning, great service
Hartford Vill	Green	They go where I need when I need to
WRJ	Green	I like that its free. Later routes would be helpful for grad students and professors
WRJ	Green	So grateful for AT's service, thank you thank you thank you:)
WRJ	Green	The iphone app crashes frequently. It would be helpful if it were more robust. Later service (until 7pm) on the green line. A modified schedul on saturday
Wilder	Green	AT is convenient, easy to use, and free. Buses are often crowded at the end of the work day, so it might be useful to have them run more frequently then or have more of the bigger buses
Wilder	Green	Convenient, excellent service + free!
WRJ	Green	Free, clean, convenient, friendly drivers and riders, wish it went farther north. I have a primary home in st. Johnsbury)
Norwich	Green	Please try to be on time in the morning - don't want to have to take an earlier bus to be on time for work
WRJ	Green	More buses please! It should not end at 6, that's too early, and I need buses on weekends! At least a couple buses should work on weekends. Thank you!

<b>Town</b>	<b>Route</b>	<b>Comments</b>
Hanover	Green	Weekend service would be great
WRJ	Green	Get where I need to go, run on weekends
W Lebanon	Green	You guys are doing a tremendous job. Thank you
WRJ	Green	I like the fact that its free yet still very dignified service
WRJ	Green	A night bus might be nice
Hartford Vill	Green	I would be isolated and unable to get to work without AT
WRJ	Green	Service is great, wish the buses ran later. Windows come unlatched a lot
WRJ	Green	Love that it's free, but wish it ran on weekends. I'd buy a weekend pass
W Lebanon	Green	Good reliable service, well connected routes. Miss it greatly on the weekends!!
Wilder	Green	Everything
Wilder	Green	Everything!!!
Hartford Vill	Green	Nothing I think it is running just fine. Thank you
Wilder	Green	So helpful to commute to work especially in inclement weather. Extending hours into evening would help lots - often have to stay at work later than last green bus and thats the only one back to wilder
Hanover	Green	Medical transportation - minI bus available? Need safety crossing route 120 near buck rd and town garage...dangerous traffic
Hanover	Green	Stop at brook rd Hanover? Weekend trips to west leb from Dartmouth for student shopping!
Hanover	Green	It is a blessing to get a free ride, though weekend work is out of the question. To be picked up at 89er not just dropped off would be fare, thank you
Wilder	Green	Love that it is free, would pay on the weekend
WRJ	Green	I like how many places are accessible and that it is free!
WRJ	Green	The rides to go shopping and the haven
Hartford Vill	Green	Weekends maybe charge \$1 a trip so worth it for drivers
W Lebanon	Green	I'm grateful that the AT is cost free. I wish that the buses were available at a later time and/or available on the weekends
W Lebanon	Green	Just perfect! Thank you very much
Wilder	Green	Advise fill in bus drivers not to leave their stops more than 2 mins early...I love and appreciate your services. Thank you!
Wilder	Green	Reliable, etna road on a route would help a lot of people I know, unifirst would help with donations
Other	Green	I like that I have multiple options to get where i'm going
Other	Green	Very grateful for the service! It's free for me when I get into town so that helps a lot
Other	Green	Great resource for community - I bike into town and use AT to access places that are less safe to bike in. Great forlks working for AT drivers are friendly. Love to see those with lessmeans being able to access transportation
WRJ	Green	I'm just glad it exists - I don't have a car! Extended schedules in the evening would be helpful so I could work later
WRJ	Green	Reliable transportation. Meeting neighbors. Fix the water leaks!
Wilder	Green	I like that its free and on time!
Wilder	Green	Great and free
Wilder	Green	Give fred a raise!

<b>Town</b>	<b>Route</b>	<b>Comments</b>
WRJ	Green	Convenient
Hartford Vill	Green	Doing fine
Hanover	Green	Free and on time
Hartford Vill	Green	Running through later hours would be nice
Wilder	Green	Add service later in the evening, add service directly from Wilder into downtown Norwich w/o transferring between Brown and Green, which currentl has a long walk
Wilder	Green	It its reliable to use, summer or winter, clean and usually on time the buses leak when its wet!
Wilder	Green	The drivers are the best, they help you make connections and find your way. That it's free...dont like the rattly windows
Wilder	Green	Very convenient. Great workers, very friendly - maybe go later at night and weekends
Wilder	Green	Exgtend to lyme, even if fare based! Evening hours on thur-sat would be great, love the 2x/hr schedules and small, clean buses, thanks!
Other	Green	It's so handy, free, and the drivers are always super lovely and helpful. It's hard to get about outside work hours for food, shopping,, it would be great if it ran weekends or evenings, even if it was a paid version
Wilder	Green	App did not work
Wilder	Green	Drivers are courteous and professional
Hartford Vill	Green	Convenience and its free
WRJ	Green	It's free, and easy to get from place to place
Hartford Vill	Green	The drivers are always nice and have good personalities. They are always helpful when you need information
WRJ	Green	That it's free, it's very easy to get anywhere I need to go because I know most of the bus schedules from memory
WRJ	Green	I moved to area 2 years ago, I was homeless, 70 years old, alcoholic, with no means of getting around. I had lived 40 years in fl. I was told buses were free. I was able to attend aa, get to hospital, find shelter. I credit at for enabling me to participate and have a life. Thank you
Hanover	Green	Reliability and kindness of drivers
WRJ	Green	Extremely appreciative of AT, no other way to work - great job community is very lucky to have you. Maybe weekends possible? A few hours a day?
WRJ	Green	I appreciate the fact that there is such a service for non-drivers
Wilder	Green	Very convenient; always available. Get to all my appointments on time...we need this
WRJ	Green	Very convenient and has good service, thank you for serving us!
Wilder	Green	I think its perfect now
Hanover	Green	It's safe and friendly; thanks!
Wilder	Green	Free, regular. One earlier bus, app improvements
Hanover	Green	The drivers are great, thank you!
Norwich	Green	Connect each town to at least one of the grocery stores
Hartford Vill	Green	Sell sandwiches on the bus - LOL
Hartford Vill	Green	Run nights and weekends
W Lebanon	Orange	I like it the way it is

<b>Town</b>	<b>Route</b>	<b>Comments</b>
W Lebanon	Orange	On time, regular, free! Could be more frequent at certain times, 2 hour gap between 5:30 orange and 7:30 pm shuttle
W Lebanon	Orange	Extended hours would be helpful during the week, it's a wonderful service and i'm very glad its a part of the upper valley -- thank you!
Hanover	Orange	Please have bus go to Centerra it would be awesome if blue did
W Lebanon	Orange	Very convenient; has schedule for just about everywhere I need to go. Drivers are very professional
WRJ	Orange	Great service!
W Lebanon	Orange	I would like more frequent service. Every 1/2 hour rather than hour. Thanks. Fix the windows...they pop open on the orange line
W Lebanon	Orange	AT is a great, reliable way for me to get to work without driving. I would use it more if buses had later hours (it's difficult to catch the last bus home) weekend service would be great also!
Hanover	Orange	No app on the iphone. Mobile website tough to track buses. Also, would love buses on weekends
W Lebanon	Orange	It'll be great if there is one trip to school and one afternoon trip on the weekends becuase sometimes students need to work extra hours on weekends
W Lebanon	Orange	More orange buses
W Lebanon	Orange	It would be nice to see the orange and red buses run 1/2 a day on saturdays...other than that I am very happy
WRJ	Orange	Driver talks to herself, a man treated others with disrespect and rivers should read their body language and deal with these people
WRJ	Orange	Keep up the good work
WRJ	Orange	That it is free!
WRJ	Orange	I love the bus
WRJ	Orange	Drivers are nice
WRJ	Orange	Have buses run later into the evening and have them run on weekends
W Lebanon	Orange	Getting home to west Lebanon from DHMC in the evening is difficult, often requiring a 20 minute wait for transfer
W Lebanon	Orange	Would you add evening shuttle at 6:30pm?
Other	Orange	There should be one bus at least on weekend to stores from college
W Lebanon	Orange	Should a weekend bus be supplied?
W Lebanon	Orange	Please put signs with bus stop name in each stop, more often buses would be nice (especially orange line)
W Lebanon	Orange	It's dependable and easy to use
WRJ	Orange	I live in WRJ and access to RR and VAH and other facilities would be great
WRJ	Orange	Convenient and reliable
Other	Orange	It gets me from A-Z on time, thank you!
WRJ	Orange	Free
W Lebanon	Orange	They are so nice, anyway, thanks a lot!
W Lebanon	Orange	Can we keep it on weekends? Can we have more orange lines? 1 hour is too long. Can the shuttle from sachem be larger in the morning? Too crowded.
W Lebanon	Orange	Easy and comfortable
W Lebanon	Orange	I think the bus stop at google map should be more accurate since the website at AT doesn't show all the stops clearly



<b>Town</b>	<b>Route</b>	<b>Comments</b>
W Lebanon	Orange	I wish the buses would run on weekends
W Lebanon	Orange	The bus service is very good, and useful
W Lebanon	Orange	It is better if there are more frequent orange bus schedules and a little longer schedule at night
W Lebanon	Orange	Start service on weekends please!
W Lebanon	Orange	More buses later @ night, weekend buses are critical
W Lebanon	Orange	Hope there can be weekend buses as well, especially in winter and for students who don't have cars. Willing to pay for the trip!
WRJ	Orange	The buses are free and it's easy to get to where I need to go, it would be nice if the buses would run on weekends if only once or twice a month. Would be willing to pay on weekends
W Lebanon	Orange	If all seven days, at least 6 days, the buses were running it would be very useful
W Lebanon	Orange	More evening shuttles to Sachem (later at night) and weekend service
W Lebanon	Orange	Limited weekend service would be excellent. I have no car and find it hard to do my grocery shopping during the work week. Also wish there was a direct line from Hanover to grocery stores in West Lebanon, Plaza/Miracle Mile. Thank you!
W Lebanon	Orange	It is great! Drivers are wonderful and, of course, I love the fact that it's free!
W Lebanon	Orange	Please cover Quail Hollow area at stop sign for seniors, thanks!
W Lebanon	Orange	Bus stop covered by Quail Hollow stop, thanks for your service!
Lebanon	Orange	Weekends
WRJ	Orange	It's great; wouldn't change a thing
W Lebanon	Orange	The service is wonderful and convenient. Thank you!
Norwich	Brown	I have a new job in Hanover that allows me to take the AT. I enjoy not driving to work!
Hanover	Brown	Overall brilliant experience, allowing me nearly the freedom of a car
Norwich	Brown	Convenient
Norwich	Brown	The driver is very nice, buses are on time, let the 7:29 driver know to wait for me!
Norwich	Brown	None
Norwich	Brown	Nothing
Norwich	Brown	It is a comfortable and easy way for me to get to school
Norwich	Brown	The AT is very good, maybe bigger buses
Norwich	Brown	My driver is amazing!!!
Norwich	Brown	It's easy and fast and always available when I need it
Norwich	Brown	Convenience of times/stops along my way to work or for errands, don't have to drive to work if I don't want to!
Norwich	Brown	I would want to improve anything
Norwich	Brown	A shelter on Beaver Meadow by Huntley would be very welcome
Norwich	Brown	Driver is fantastic
Norwich	Brown	Nothing to improve!
Norwich	Brown	Driver is very friendly, always polite!
Other	Brown	This helps me get to school on time; thank you!
Norwich	Brown	The drivers are great - so friendly. Great sense of community from riding the bus - I'm so appreciative of the bus service - thank you!

<b>Town</b>	<b>Route</b>	<b>Comments</b>
Norwich	Brown	The driver is really nice, and the people on the bus are nice too
Norwich	Brown	I have no complaints, the bus driver is always very nice, he is almost always on time, and I very much enjoy riding the AT
Hanover	Brown	It is always on time, drivers are really nice
Norwich	Brown	It's great - but more buses, please!
Norwich	Brown	Very useful for getting around and reduces carbon footprint
Hanover	Brown	More frequency, more bus routes, weekend bus would be highly appreciated!
Hanover	Brown	Very friendly service - it's great to always see a friendly face in the morning before the work day begins
Hanover	Brown	Have the brown line connect easier w/Blue line (time-wise)
Lebanon	Brown	Punctuality and good service
Norwich	Brown	These b uses are nice to ride to my job sites each day, and I would like to give them some things they will like to eat
Norwich	Brown	Expand service to later in evenings and Saturdays, more buses in mornings and end of work day
Norwich	Brown	Weekend service, night service on weekdays
Hanover	Brown	It is free, convenient, and easy to use
WRJ	Red	It's free
Lebanon	Red	Saturday bus to Lebanon, west leb, Hanover, starting at 6AM ending at 5 with a 4:30 stop at BJ's, a lot of people would use this
Lebanon	Red	I like that it's free, i'd like the lights on so I can read w/o a flashlight. Lower the music volume or turn it off. I like the sideways seats for the leg room
W Lebanon	Red	Connection with the blue and red that meets at city hall around 4:00pm and 4:30pm
Lebanon	Red	Thank you
W Lebanon	Red	I think AT is such a great idea for Lebanon citizens
W Lebanon	Red	Fast, easy, less stress than driving, can read while I ride, friendly courteous drivers, get exercise walking to bus stop
Lebanon	Red	It is very convenient especially when you are on your own juggling school and a job
Lebanon	Red	I love everything!!! My only wish was that it works on the weekends, too!!!
Lebanon	Red	Always dependable, no matter the weather, should also be available on weekends
Lebanon	Red	To wake up in the mornings knowing exactly where we are getting a ride to work, or shopping, or to the hospital is wonderful. If only we could have it on weekends also
Lebanon	Red	Service on Saturday - even just in the morning would be great
Lebanon	Red	That it's free and the bus drivers are nice
Lebanon	Red	It's all great!
Lebanon	Red	It's free, but I would be willing to pay for a bus pass
W Lebanon	Red	It gets me where I want to go. Dan should try to soften his attitude, be more helpful and not so gruff. He can be rather mean at times.
W Lebanon	Red	Everything. Convenient, safe ride for myself and my children
W Lebanon	Red	Saves gas, better for environment, get exercise. Would like stop at intersection of Dana + Maple streets in W Leb, especially on rainy/snowy days. Would like blue from DHMC to meet orange to W Leb

<b>Town</b>	<b>Route</b>	<b>Comments</b>
W Lebanon	Red	I love how friendly the bus drivers are, especially Ben!
Lebanon	Red	The drivers are always on time, they're mostly nice and make stops that really help me, being handicapped. I'm a bilateral amputee, I have no feet and they go beyond helping me on the blue bus to Canaan and the red bus
Lebanon	Red	None, good job!
Lebanon	Red	Convenient
W Lebanon	Red	Anywhere on Maple st - for SS people
W Lebanon	Red	Running on weekends would be very helpful
Other	Red	It's free
Lebanon	Red	Weekends are really what we need, a lot of people will use it on weekends, you should do a survey on weekend use; the number would surprise you, thank you!
Lebanon	Red	It's free, which saves money for my family, even if you started charging again it would still be less than a car, insurance and maintenance. So, thank you at!
Lebanon	Red	No comments/suggestions
Lebanon	Red	Easy way to get where I want to go
Lebanon	Red	Make the app easier to use
W Lebanon	Red	A. That it exists! Frequent route times, it's free b. Weekends! (at least lighter schedule on most used routes and/or with fare
WRJ	Red	I wouldn't be able to get to work, shopping or doctors without it. A weekend bus would make a huge difference. Without a car it's impossible to do activities with kids since they are only free on nights and weekends...many families would pay for a bus to be able to have family outings on the weekends. Most jobs also want weekend workers
WRJ	Red	Free transit to work. Need more buses in the early morning, 6-8am
Wilder	Red	I think you should run later than 6pm and bring back the morning red bus so there are 2 buses in morning
Lebanon	Red	Drivers don't announce approaching stops. This is inconvenient when I don't have cell coverage
W Lebanon	Red	I live in Lebanon and all my appointments are in Lebanon
Lebanon	Red	Convenience and free
W Lebanon	Red	I take the bus every day to and from work. I don't drive. The bus drivers are always nice. They always say hi when you get on the bus and say have a good day when you get off the bus. I know most of the drivers by name
W Lebanon	Red	I like that it is very convenient since I don't have a car and not working at the moment. The bus drivers are very pleasant and helpful. I love the service, keep up the good work. God bless!
W Lebanon	Red	Convenient
Lebanon	Red	I like the bus because it's free, I wish the buses ran on weekends
Wilder	Red	It allows me to have a job, would be nice if better starting on time and if some drivers weren't so snappy and rude. Would also be nice if available on weekends
Lebanon	Red	I like the dependability of the buses, I would love to see a Saturday schedule even if it's pay as you ride
W Lebanon	Red	It's easy and very helpful. It's kid friendly and gets me to everywhere in town I need to go
WRJ	Red	Convenient, help w/ transportation, would be very helpful if they ran a little later and on Saturdays at least, too

<b>Town</b>	<b>Route</b>	<b>Comments</b>
W Lebanon	Red	Polite, clean and not ghetto like in big cities I have been to
W Lebanon	Red	Like free service, upper valley coverage, would like occasional weekend service Hanover>W Leb>Plazas
Lebanon	Red	The nice drivers
Lebanon	Red	Great bus service
Lebanon	Red	The drivers and passengers
Lebanon	Red	Run on weekends
W Lebanon	Red	Another AM red bus, 7pm route from west Leb
Lebanon	Red	Have better seating availability for people with wheelchairs and strollers! Later routes on red and blue
W Lebanon	Red	Convenience
W Lebanon	Red	Convenient, free, on time, clean, friendly, wish they ran on weekends
Norwich	Red	I like everything but I wish the brown bus was extended in timing and pickup locations
Lebanon	Red	Everything!
Lebanon	Red	It's very helpful when you have no car. There should be more bus routes out to Canaan
W Lebanon	Red	I feel lucky we have this service in my area
W Lebanon	Red	For transit dependent people, very grateful for service. Thank you!
Hanover	Red	Excellent service, fantastic drivers, always a pleasure to ride the bus, always on time and excellent at calling for our transfers. No improvement needed from our point of view
W Lebanon	Red	Driver who wears black gloves is a jerk, love most of drivers, you have some recent new ones who are mean to people. Buses must start waiting for transfers, that's a mess
Lebanon	Red	Drunks and drug problems, ans sometimes it smells bad; need air circulation
Lebanon	Red	Love that it's free!
Hartford Vill	Red	It's nice to have a ride to my Drs. office and physical therapy. I can go shopping and get a ride home
Hanover	Red	You all do an absolutely SUPERIOR job!! Drivers are fantastic!!
Enfield	Red	It is convenient
Lebanon	Red	More buses early in the morning, 6AM not early enough, need bus by 4AM

## Appendix C – Draft Schedules

### BLUE ROUTE: 15-MINUTE HEADWAYS

Lebanon	DHMC	Vail DMS	Park- hurst	Book Store	DHMC	Lebanon
5:45 a	6:00 a	6:10 a	6:12 a	6:14 a	6:24 a	6:37 a
6:15 a	6:30 a	6:40 a	6:42 a	6:44 a	6:54 a	7:07 a
6:45 a	7:00 a	7:10 a	7:12 a	7:14 a	7:24 a	7:37 a
7:15 a	7:30 a	7:40 a	7:42 a	7:44 a	7:54 a	8:07 a
7:45 a	8:00 a	8:10 a	8:12 a	8:14 a	8:24 a	8:37 a
8:00 a	8:15 a	8:25 a	8:27 a	8:29 a	8:39 a	8:52 a
8:15 a	8:30 a	8:40 a	8:42 a	8:44 a	8:54 a	9:07 a
8:30 a	8:45 a	8:55 a	8:57 a	8:59 a	9:09 a	9:22 a
8:45 a	9:00 a	9:10 a	9:12 a	9:14 a	9:24 a	9:37 a
9:00 a	9:15 a	9:25 a	9:27 a	9:29 a	9:39 a	9:52 a
9:15 a	9:30 a	9:40 a	9:42 a	9:44 a	9:54 a	10:07 a
9:30 a	9:45 a	9:55 a	9:57 a	9:59 a	10:09 a	10:22 a
9:45 a	10:00 a	10:10 a	10:12 a	10:14 a	10:24 a	10:37 a
10:00 a	10:15 a	10:25 a	10:27 a	10:29 a	10:39 a	10:52 a
10:15 a	10:30 a	10:40 a	10:42 a	10:44 a	10:54 a	11:07 a
10:30 a	10:45 a	10:55 a	10:57 a	10:59 a	11:09 a	11:22 a
10:45 a	11:00 a	11:10 a	11:12 a	11:14 a	11:24 a	11:37 a
11:00 a	11:15 a	11:25 a	11:27 a	11:29 a	11:39 a	11:52 a
11:15 a	11:30 a	11:40 a	11:42 a	11:44 a	11:54 a	12:07 p
11:30 a	11:45 a	11:55 a	11:57 a	11:59 a	12:09 p	12:22 p
11:45 a	12:00 p	12:10 p	12:12 p	12:14 p	12:24 p	12:37 p
12:00 p	12:15 p	12:25 p	12:27 p	12:29 p	12:39 p	12:52 p
12:15 p	12:30 p	12:40 p	12:42 p	12:44 p	12:54 p	1:07 p
12:30 p	12:45 p	12:55 p	12:57 p	12:59 p	1:09 p	1:22 p
12:45 p	1:00 p	1:10 p	1:12 p	1:14 p	1:24 p	1:37 p
1:00 p	1:15 p	1:25 p	1:27 p	1:29 p	1:39 p	1:52 p
1:15 p	1:30 p	1:40 p	1:42 p	1:44 p	1:54 p	2:07 p
1:30 p	1:45 p	1:55 p	1:57 p	1:59 p	2:09 p	2:22 p
1:45 p	2:00 p	2:10 p	2:12 p	2:14 p	2:24 p	2:37 p
2:00 p	2:15 p	2:25 p	2:27 p	2:29 p	2:39 p	2:52 p
2:15 p	2:30 p	2:40 p	2:42 p	2:44 p	2:54 p	3:07 p
2:30 p	2:45 p	2:55 p	2:57 p	2:59 p	3:09 p	3:22 p
2:45 p	3:00 p	3:10 p	3:12 p	3:14 p	3:24 p	3:37 p
3:00 p	3:15 p	3:25 p	3:27 p	3:29 p	3:39 p	3:52 p
3:15 p	3:30 p	3:40 p	3:42 p	3:44 p	3:54 p	4:07 p
3:30 p	3:45 p	3:55 p	3:57 p	3:59 p	4:09 p	4:22 p
3:45 p	4:00 p	4:10 p	4:12 p	4:14 p	4:24 p	4:37 p
4:00 p	4:15 p	4:25 p	4:27 p	4:29 p	4:39 p	4:52 p
4:15 p	4:30 p	4:40 p	4:42 p	4:44 p	4:54 p	5:07 p
4:30 p	4:45 p	4:55 p	4:57 p	4:59 p	5:09 p	5:22 p
4:45 p	5:00 p	5:10 p	5:12 p	5:14 p	5:24 p	5:37 p
5:00 p	5:15 p	5:25 p	5:27 p	5:29 p	5:39 p	5:52 p
5:15 p	5:30 p	5:40 p	5:42 p	5:44 p	5:54 p	6:07 p
5:30 p	5:45 p	5:55 p	5:57 p	5:59 p	6:09 p	6:22 p
5:45 p	6:00 p	6:10 p	6:12 p	6:14 p	6:24 p	6:37 p
6:15 p	6:30 p	6:40 p	6:42 p			
6:45 p	7:00 p	7:10 p	7:12 p			

## SACHEM / DEWEY SHUTTLE

Sachem Village	Sachem Lot	Hanover Inn	Tuck	Dewey	Tuck	Book-store	Sachem Lot	Sachem Village
7:00 a	7:02 a	7:08 a	7:12 a	7:20 a	7:25 a	7:29 a	7:35 a	7:38 a
7:15 a	7:17 a	7:23 a	7:27 a	7:35 a	7:40 a	7:44 a	7:50 a	7:53 a
7:30 a	7:32 a	7:38 a	7:42 a	7:50 a	7:55 a	7:59 a	8:05 a	8:08 a
7:45 a	7:47 a	7:53 a	7:57 a	8:05 a	8:10 a	8:14 a	8:20 a	8:23 a
8:00 a	8:02 a	8:08 a	8:12 a	8:20 a	8:25 a	8:29 a	8:35 a	8:38 a
8:15 a	8:17 a	8:23 a	8:27 a	8:35 a	8:40 a	8:44 a	8:50 a	8:53 a
8:30 a	8:32 a	8:38 a	8:42 a	8:50 a	8:55 a	8:59 a	9:05 a	9:08 a
8:45 a	8:47 a	8:53 a	8:57 a	9:05 a	9:10 a	9:14 a	9:20 a	9:23 a
9:00 a	9:02 a	9:08 a	9:12 a	9:20 a	9:25 a	9:29 a	9:35 a	9:38 a
9:15 a	9:17 a	9:23 a	9:27 a	9:35 a	9:40 a	9:44 a	9:50 a	9:53 a
9:30 a	9:32 a	9:38 a	9:42 a	9:50 a	9:55 a	9:59 a	10:05 a	10:08 a
9:45 a	9:47 a	9:53 a	9:57 a	10:05 a	10:10 a	10:14 a	10:20 a	10:23 a
10:00 a	10:02 a	10:08 a	10:12 a	-	10:12 a	10:16 a	10:22 a	10:25 a
10:30 a	10:32 a	10:38 a	10:42 a	-	10:42 a	10:46 a	10:52 a	10:55 a
11:00 a	11:02 a	11:08 a	11:12 a	-	11:12 a	11:16 a	11:22 a	11:25 a
11:30 a	11:32 a	11:38 a	11:42 a	-	11:42 a	11:46 a	11:52 a	11:55 a
12:00 p	12:02 p	12:08 p	12:12 p	-	12:12 p	12:16 p	12:22 p	12:25 p
12:30 p	12:32 p	12:38 p	12:42 p	-	12:42 p	12:46 p	12:52 p	12:55 p
1:00 p	1:02 p	1:08 p	1:12 p	-	1:12 p	1:16 p	1:22 p	1:25 p
1:30 p	1:32 p	1:38 p	1:42 p	-	1:42 p	1:46 p	1:52 p	1:55 p
2:00 p	2:02 p	2:08 p	2:12 p	-	2:12 p	2:16 p	2:22 p	2:25 p
2:30 p	2:32 p	2:38 p	2:42 p	-	2:42 p	2:46 p	2:52 p	2:55 p
3:00 p	3:02 p	3:08 p	3:12 p	3:20 p	3:25 p	3:29 p	3:35 p	3:38 p
3:15 p	3:17 p	3:23 p	3:27 p	3:35 p	3:40 p	3:44 p	3:50 p	3:53 p
3:30 p	3:32 p	3:38 p	3:42 p	3:50 p	3:55 p	3:59 p	4:05 p	4:08 p
3:45 p	3:47 p	3:53 p	3:57 p	4:05 p	4:10 p	4:14 p	4:20 p	4:23 p
4:00 p	4:02 p	4:08 p	4:12 p	4:20 p	4:25 p	4:29 p	4:35 p	4:38 p
4:15 p	4:17 p	4:23 p	4:27 p	4:35 p	4:40 p	4:44 p	4:50 p	4:53 p
4:30 p	4:32 p	4:38 p	4:42 p	4:50 p	4:55 p	4:59 p	5:05 p	5:08 p
4:45 p	4:47 p	4:53 p	4:57 p	5:05 p	5:10 p	5:14 p	5:20 p	5:23 p
5:00 p	5:02 p	5:08 p	5:12 p	5:20 p	5:25 p	5:29 p	5:35 p	5:38 p
5:15 p	5:17 p	5:23 p	5:27 p	5:35 p	5:40 p	5:44 p	5:50 p	5:53 p
5:30 p	5:32 p	5:38 p	5:42 p	5:50 p	5:55 p	5:59 p	6:05 p	6:08 p
5:45 p	5:47 p	5:53 p	5:57 p	6:05 p	6:10 p	6:14 p	6:20 p	6:23 p
6:00 p	6:02 p	6:08 p	6:12 p	6:20 p	6:25 p	6:29 p	6:35 p	6:38 p
6:15 p	6:17 p	6:23 p	6:27 p	6:35 p	6:40 p	6:44 p	6:50 p	6:53 p
6:30 p	6:32 p	6:38 p	6:42 p	6:50 p	6:55 p	6:59 p	7:05 p	7:08 p
6:45 p	6:47 p	6:53 p	6:57 p	7:05 p	7:10 p	7:14 p	7:20 p	7:23 p
7:00 p	7:02 p	7:08 p	7:12 p	7:20 p	7:25 p	7:29 p	7:35 p	7:38 p
7:15 p	7:17 p	7:23 p	7:27 p	R	-	7:31 p	R	7:38 p
7:45 p	7:47 p	7:53 p	7:57 p	R	-	8:01 p	R	8:08 p
8:15 p	R	8:23 p	8:30 p	R	-	8:34 p	R	8:41 p
9:00 p	R	9:08 p	9:15 p	R	-	9:19 p	R	9:26 p
9:45 p	R	9:53 p	10:00 p	R	-	10:04 p	R	10:11 p
10:30 p	R	10:38 p	10:45 p	R	-	10:49 p	R	10:56 p

## Appendix D – Public Comments

The following pages contain summaries of the two public meetings held in November 2018 at which the recommended service concepts of the TDP were presented. In addition to those comments, Advance Transit received the comment below via email.

I would love to see the blue route have a stop in or near Centerra in Lebanon instead of only at DHMC. There is no sidewalk or safe shoulder to walk on between DHMC and Centerra, and this has deterred me from taking the bus, especially since it requires walking with my child to drop her off at daycare before I head to work.

I would also love to see some weekend service that could be used by people going out to enjoy the nightlife in Hanover or WRJ on weekends or evenings, especially since taxis are essentially nonexistent here.

Thanks!

Brittany Crocco

# MEMO

**TO:** Van Chestnut, Steve Falbel  
**FROM:** Ben Swanson  
**DATE:** November 14, 2018  
**SUBJECT:** Advance Transit 5-Year Development Plan Meeting Notes (11-14-18)

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## 1.0 SIGN IN SHEET (11-14-18)

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The following members of the public signed in:

- Max Lu, (Dartmouth Class of 17)
- Karen Afre, (Lebanon, NH)
- Renalta Baptista (Lebanon, NH)
- Meghan Butts,(UVLSRPC)
- Steve Schneider, (UVLSRPC)
- Maureen McNutty, (Lebanon)
- Also in attendance: Ben Swanson, Steve Falbel, Van Chestnut, Chris (AT), Bethany Fleishman

## 2.0 MEETING NOTES

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Steve F. started the meeting with an overview of the process to date and the range of improvements under consideration. He indicated there were both large-scale improvements under consideration for the mid to long-term as well as minor improvements for the near-term.

### IMPROVEMENT STRATEGY OVERVIEW

Steve then proceeded to provide an overview of the various improvement plans under consideration.

1. Blue Route – 15-minute headways for the whole route.
  - a. This garnered an **“oh wow”** from a member of the audience.
2. Blue Route – extended service in evening to catch nursing shifts.
3. Brown Route – add a bus to achieve 30-minute headways and perhaps split route.
4. Weekend Service.
5. Yellow Route
  - a. Joined with orange route improvements. Would serve Chandler Neighborhood and Haven.



- b. **Max asked if this would solve Orange Route issues** and Steve indicated it could by allowing an augmented orange route to run more efficiently.
6. Sachem Village
    - a. Adding direct service to Sachem could capture a lot of demand.
    - b. Breaking up the downtown loops would allow for 15-minute headways and would require only 1 new bus.
    - c. Could also serve as a park-and-ride location with a lot at Sachem/Campion.
    - d. Would also benefit the overall system if/when Dartmouth adds additional units at Sachem Village.
  7. Purple Route
    - a. Split between Red and Blue
    - b. Serve APD, Dart Coach, Hilton, Centerra, and DHMC
    - c. **Max asked if this would be hourly.** Steve answered that this could be hourly or every half hour and that it would potentially allow DHMC to discontinue DH shuttle to Centerra.

## GROUP DISCUSSION

**Max** asked Steve to go over the short-term improvements. Steve mentioned the following:

- Blue Route to remain in service on trip back to garage at the end of the day.
- Shifting of schedule times in several locations by a few minutes to match up with reality of timing.
- Red Route to alternate stops at different plazas on each trip.
- Orange alteration at Gilman Center.
- Brown Route dropping the latest park-and-ride loop.

**Meghan** asked if the Purple route would add any stops on Heater Road? Steve indicated that none were considered at this point.

**Renalta** asked for a more detailed explanation of the proposed Dartmouth Downtown Shuttle and Sachem plan. Steve described how the Thompson Shuttle would perform a short continuous loop and how the sachem route.

**Renalta** indicated the current downtown shuttle can be confusing and also makes it tough to get back to Dewey in the middle of the day, due to the direction in which the shuttle loops. Steve indicated this would be improved by the proposed Sachem switch by creating a more linear route to/from Dewey.

**Maureen** indicated she was very happy to see the proposed purple route as this would greatly improve access to the coop. She also mentioned she would very much appreciate weekend service and that this would provide a critical service to the community of folks who many need transportation to weekend jobs.



**Renalta** mentioned that having maps which show the directionality of bus routes would be very helpful.

**Karen** asked if small it would be possible for the minor stops to also be labeled in the route timetables. She said that it can be tough, especially for new riders to know where exactly the minor stops are located and when a bus may be there. **Van** suggested zooming in on the map on the website for more information. **Renalta** indicated the app often crashes when trying to zoom. **Van** said he thinks the real-time service is now on the website. **Max** asked why the real-time service doesn't tell you when the first bus of the day will arrive when you look at it overnight. **Van** explained this was due to the system operating on real-time locations and a predictive algorithm that doesn't apply to parked busses. **Chris** suggested using the website, which works well to zoom in on minor stops and then provides information for each.

**Meghan** said it would be great to have the Blue Route run later in the evening. This was seconded by the audience. Someone said it would be "amazing".

**Maureen** mentioned that in the past you couldn't reliably take the Blue Route to work at DHMC if you had a 7:00 AM shift. However, then acknowledged this was many years ago prior to changes that added DHMC service at 6:30. **Van** said that going to 15-minute headways would greatly help DHMC staff by making transit much more convenient for them.

**Bethany** said that if you extend to evening service for the Blue Route, it would be very helpful to also extend other routes so that folks could transfer and make it fully home. **Van** agreed but reminded everyone of the need for incremental improvements when funding is short.

**Renalta** indicated the yellow route wasn't entirely clear to her and that a detailed timetable and directional map would help her.

**Max** asked if they could have the Green Route service the Chandler neighborhood. Steve said potentially but that the Green Route works well now, and they don't want to break it.

**Van** provided some information on funding and the breakdown of VT (\$10 per capita) and NH (\$0.95 per capita)

**Maureen** asked why they use large busses that often aren't full. **Steve** indicated these are more comfortable and reliable and that the major cost is the driver not the bus. **Chris** also reminded her that the busses are often full during peak times and it wouldn't make sense to switch to smaller busses midday. **Van** added that smaller busses also often aren't ADA compliant or accessible.

## **PRIORITIES**

Longer weekday service got several mentions.

Purple route got several mentions.

**Bethany** asked what would get the most ridership. **Steve** indicated he guessed evening ridership but qualified this as a guess.



**Maureen** said she would like weekend service. **Chris** discussed how adding weekend service would be orders of magnitude more expensive than adding to weekday service as the overhead on weekends would all be new.

**Van** provided context that the institutions provide much of their funding and that will likely drive which services will come on-line first.

**Max** mentioned that the Red Route can be confusing with the West Lebanon spur and asked if it could be split into two separate routes. **Van** responded that this would help in that regard but could make folks then think they need to transfer between lines, when in reality they would just be staying on the same bus.

**Renalta** asked if it would be possible to get a large-scale map of routes posted inside the bus. This could be similar to the linear route stop indications used on subways. **Chris and Steve** mentioned that an issue would be that the busses often switch between routes on different days. **Chris** did say there might be enough room to add this for all routes though. **AT will consider this further.**



# MEMO

**TO:** Van Chestnut, Steve Falbel  
**FROM:** Ben Swanson  
**DATE:** November 15, 2018  
**SUBJECT:** Advance Transit 5-Year Development Plan Meeting Notes (11-15-18)

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## 1.0 SIGN IN SHEET (11-15-18)

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The following members of the public signed in:

- Sally Bellew,
- Anastasia B. Uli,
- Richard Gray,
- Erik Krauss,
- GRAH?MR (illegible).
- Michael Riva,
- Craig Sterling,
- Michelle Kersey,
- Alan Reetz,
- Chris Anderson,
- Anne Goodrich,
- Faye Grearson,
- Alan Johnson,
- Jonathan Edwards,
- Also in attendance: Ben Swanson, Steve Falbel, Van Chestnut, Paige Heverly

## 2.0 MEETING NOTES

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Steve F. started the meeting with an overview of the process to date and the range of improvements under consideration. He indicated there were both large-scale improvements under consideration for the mid to long-term as well as minor improvements for the near-term. He also provided a caveat regarding funding sources and funding limitations and indicated this meeting process is a key part of prioritizing improvements.

Steve started off with a brief overview of the minor adjustments. For this meeting, many in the audience had concerns about a proposed change to remove the Orange Route spur into the Gilman Center. Much discussion was spent on this.

## ORANGE ROUTE DISCUSSION

**Steve** provided some context for the proposed removal of the Gilman Center stop.

- Orange is currently the most difficult AT route to operate
- Drivers are always under stress to stay on time.
- Orange has the highest # of accidents.
- Removing the Gilman stop would cut 3 minutes from the route.
- Gilman currently has about 5 riders per day.

**Michelle** asked if Steve knew how ridership fluctuates over the course of the day or over the month. Are there any times that are notably heavier? **Chris** indicated there are approximately 80 to 120 boardings at Gilman per month.

**Steve** mentioned the Orange could also likely stop on Sykes Ave to serve Gilman.

**TPHT** representatives indicated this may not work for many of their visitors/tenants who are elderly or otherwise would have trouble navigating this walk, which does not currently have sidewalks. While paratransit is an option for some, they have had residents whose applications have been denied but who would have trouble making the walk. They also mentioned vulnerable users at the site including Easter Seals, and that the state office moving likely dropped ridership here.

**Gilman** owner listed the following site tenants:

- Twin Pines Housing Trust
- Bradford Psychiatric
- Primary care provider
- Adaptive Driving

He said they were about 40% occupied two years ago when he took control and that they are trending up now. Tenants are always interested in AT at the site.

**Michelle** said TPHT has 59 units over the next year at Kilton, Sykes and housing for elderly in Hanover.

**Chris** reiterated that they can't keep the Orange Route as it is as they can't serve it in the time allowed. It is important to keep the route on schedule, and the only other option would be to schedule the service as longer than hourly, but this can really be detrimental to overall route ridership and viability.

**TPHT** asked why there is current pressure on the Orange Route.

**Van** mentioned that ridership is the biggest thing. More people are getting on and off at more of the stops. Then there is general congestion in West Lebanon and elsewhere and new developments. He said that service to Centerra used to exist, but it was similarly killing the schedule with delays and AT couldn't keep up, so they had to stop servicing it. The Orange is the highest performing small route in VT and it has a lot of pressure on it. Their plan considers splitting Orange with the Yellow Route, but this would likely be 2-3 years out and needs funding.

**Michelle** said she saw an article in the Valley News about high crash locations in Hartford and potential roadway improvements and asked how AT plans for roadway improvement projects in



their planning of route changes? **Van** suggested any significant roadway improvements that might decrease route travel times would likely not occur within the 5-year planning window for the current AT study. The Sykes Ave roundabout will be built next summer.

**Michelle** asked if dropping Gilman had to be an all-or-nothing proposition. Or perhaps could AT consider serving it at certain times of day on a limited basis?

**TPHT** asked if there are any overlaps with the orange and other routes that could be leveraged. The answer was no.

**Jonathan Edwards** suggested folks talk to the Town about increasing funding as they could have solutions if there were money available for the Yellow Route change, or otherwise. He also reminded folks that much of AT's services are funded by institutions.

**Alan Johnson** is a member of the Hartford Selectboard and told the group that any such funding would need voter approval. He asked if there are other things the Town could do to help improve conditions and reduce times for the Orange Route. For instance, could they investigate building a sidewalk on to the Gilman Center?

**Van** provided historical precedent for town funding in that the Hartford voters were key in doubling service on the Green Route. If AT can get state funding for the Yellow, they would aggressively pursue a local match to make this happen, similar to the Green route doubling a few years ago. **Chris** added that the Green Route expansion was spurred by similar tight timing and pressures on that route a few years ago and that VT stepped up to help.

## IMPROVEMENT STRATEGY OVERVIEW

At this point in the meeting Steve provided an overview of the various improvement plans under consideration.

1. Blue Route – 15-minute headways for the whole route.
2. Blue Route – extended service in evening to catch nursing shifts.
3. Orange Route
  - a. Double service or
  - b. Yellow Route
    - i. Would serve Chandler by way of Bugbee. This got a “Whoa” for the audience.
    - ii. All on VT side so chance for VT funding.
  - c. A member of the audience asked about potential service to Maxfield Athletic fields. This is not likely to occur due to the balance of cost, demand, and funds.
4. Brown Route – add a bus to achieve 30-minute headways and perhaps split route.
5. Sachem Village
  - a. Adding direct service to Sachem could capture a lot of demand.



- b. Breaking up the downtown loops would allow for 15-minute headways and would require only 1 new bus.
  - c. Could also serve as a park-and-ride location with a lot at Sachem/Campion.
  - d. Would also benefit the overall system if/when Dartmouth adds additional units at Sachem Village.
6. Purple Route
    - a. Split between Red and Blue
    - b. Serve APD, Dart Coach, Hilton, Centerra, and DHMC
  7. Weekend Service.

**Alan Johnson** said he would like to have better service but that he doesn't "need" it. He mentioned the needs of more vulnerable users should perhaps be prioritized.

**An audience member from Canaan** mentioned the desire for service to Canaan more frequently during the day. He also asked if weekend service would serve Qual hollow? The answer was not as currently under consideration.

There was then a discussion of impacts from Uber, Lyft and other transport network companies (TNCs). **Van** thinks these could have a positive impact on transit by allowing folks to drop a car from their family stable when transit is complimented by TNCs.

**A resident of Wilder** asked if AT could subsidize TNC rides for vulnerable users. **Paige** discussed the TMA's guaranteed ride home program and what it offers but that it is not a source of new rides.

**The owner of Gilman Center** asked what daily ridership was at Gilman when the State offices were there. **Chris** guessed about 10-12 boardings per day.

**Van** discussed why they bother doing a 5-year plan update when so many items from the last plan are still undone and are still good ideas. He mentioned the need to prioritize to be ready when funding does come available and the need to continually adjust services to maximize the benefit they can provide with limited funds. He said the Gilman change would continue to be discussed and evaluated.

**Michelle** asked if AT gets funding for Yellow, will the Gilman stop stay? **Van** answered that is to be determined but it would certainly make it a lot easier to achieve.

**Alan Reetz** said he rode AT yesterday and was very happy with the new stop and sidewalk near Buck Road. He said he understands the desire not to walk to Gilman without a sidewalk. He also said he was happy to see the coop service in the Purple Route under consideration. He knows this would greatly help coop employees who currently walk over from DHMC blue route stops without a sidewalk. He thanked AT for their efforts.

## PRIORITIES

Aside from Gilman...

- Canaan midday (1 mention).
- Evening Service (3 votes).



- Creative problem solving.
  - o Some service midday?
  - o Occasional service to Gilman and Coop?
- Holistic solutions.

