Final Report

Fare Policy & Technology Study

September 2013

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Executive Summary

Advance Transit, Inc. (AT) commissioned a Fare Policy and Technology Study for a business-driven appraisal of the benefits and costs of replacing its existing fare-free policy with a fare-based policy and onboard fare collection on its fixed route and complementary paratransit services. The current policy was enacted in January 2002 but is not universally understood by communities served by AT.

Organized in 1981, AT fare policy began with traditional onboard fare collection and a distance-based zone fare structure. Later it converted to a flat-fare structure before phasing out onboard fare collection entirely over a three-year period concluding in 2002. The transition to a system-wide fare-free policy took place as AT cultivated partnerships with key institutional stakeholders, including Dartmouth-Hitchcock Medical Center (DHMC), Dartmouth College and Medical School, and the Town of Hanover. These funding partners not only contract for the provision of fare-free shuttle services, but also contribute to support the general public fixed route bus system.

AT generated over $4.3 million in total revenue FY 2012, of which just under $4.0 million was used for system operations and the remainder for capital projects. Federal grants paid for 57.5% of total operating costs in FY 2012, and 80% of total capital costs. Institutional support contributed an additional 30.7% of the operating budget through a series of mostly informal agreements negotiated at various times during the past 20 years. This is a bright spot for AT financially that has fueled transit system growth and built a substantial customer base. As a percentage of AT's total operating revenue, institutional support has risen from 11.3% in FY 1997 to nearly 31% last year.

AT is one of very few U.S. public transportation systems that generate significant philanthropic contributions. In recent years it has enlisted a donor base of over 1,200 individuals, local businesses and foundations as supporters of the fare-free transit system. AT's *Keep it Free* fund has raised over $254,000 in contributions since its creation in 2007, including $53,172 in FY 2012. Additionally, AT received $46,051 in service sponsorships in FY 2012. Philanthropic contributions reached nearly $100,000 last year, representing 2.5% of total annual operating revenue.

At the heart of the matter of fare policy is the question of how much net revenue gain would AT receive by restoring a fare-based service policy such as existed prior to 2002. Table ES-1 summarizes the results of detailed analyses of AT's fare revenue potential as well as the annualized costs of implementing, administering and maintaining an onboard fare collection system. Range estimates of the net revenue that AT would likely realize are provided for each of three alternative fare policies that reflect low, medium and high fare scenarios, as well as restrained, moderate and severe customer reactions to the imposition of fares on fixed route and *Access AT* services.

These projections indicate that AT has little to gain financially from enacting a fare-based service policy at this time. The analysis shows that total annual fare revenue proceeds ranging from $49,100 up to $196,250 would be offset by annualized capital and operating expenses totaling $125,970. Net revenue estimates range from a gain of $70,480 per year to a net loss of $76,870 per year, depending on the fare policy alternative selected and the intensity of negative customer reaction to the imposition of fares for fixed route and complementary paratransit service.

Table ES-1: Estimated Net Fare Revenue for Fare Policy Alternatives

	Fare Policy		
	Lower Fares	**Medium Fares**	**Higher Fares**
Fare Revenue			
Fixed Route System			
Customer reaction: Muted	$64,000	$108,300	$177,200
Moderate	$54,100	$88,600	$137,800
Severe	$44,300	$68,900	$98,400
Access AT Complementary Paratransit			
Customer reaction: Muted	$7,000	$11,800	$19,250
Moderate	$5,900	$9,600	$15,000
Severe	$4,800	$7,500	$10,700
Total (Gross) Farebox Revenue			
Customer reaction: Muted	$71,000	$120,100	$196,450
Moderate	$60,000	$98,200	$152,800
Severe	$49,100	$76,400	$109,100
Implementation Costs			
Annual Capital Cost (20 yrs)	$5,275	$5,275	$5,275
Total Capital Cost	$105,507	$105,507	$105,507
Annual Operating Cost	$57,640	$57,640	$57,640
Loss of Keep It Free fund revenue	$47,855	$47,855	$47,855
Loss of Sponsorship revenue	$15,200	$15,200	$15,200
Annual Monetary Costs	$125,970	$125,970	$125,970
Net Revenue from Fare Collection			
Customer reaction: Muted	-$54,970	-$5,870	$70,480
Moderate	-$65,970	-$27,770	$26,830
Severe	-$76,870	-$49,570	-$16,870

At either end of the range, the marginal effect of net fare revenue on AT's budget and overall financial situation is low. The maximum upside potential represents about 1.8% of the FY 2012 operating budget of $3,993,296; the maximum downside loss of $76,870 represents about 1.9%. It is noted additionally that in order to achieve even a small monetary gain, there would need to be an uncharacteristically restrained consumer response to the enactment of a high-fare policy that would make AT transit fares among the most expensive in New Hampshire and Vermont.

Beyond monetary effects, there are several potential costs associated with a possible change in fare policy that should be considered. For example, AT would lose a substantial portion of its fixed route and complementary paratransit ridership base, which would be perceived as a step back for public transit in the community. The combined total losses due to fare-related attrition are estimated between 89,670 and 192,250 customer boardings, which is equivalent to between 35% and 74% of FY 2012 ridership aboard the fixed route system and *Access AT*. Additionally, onboard fare collection could have a significant impact on schedule reliability with serious consequences for AT customers who transfer between bus routes at AT's three transfer hubs in Hanover, Lebanon and West Lebanon.

While not the industry norm, fare-free rural transit is a viable business model in a number of communities characteristically similar to the AT service area. Given its favorable identification as a fare-free transit system, and the substantial revenues it receives from both institutional and philanthropic sources in the name of fare-free transit, AT would be prudent to retain its current fare policy and focus on increasing philanthropic contributions through onboard donations and other means. Similarly, AT should continue to work closely with institutional funding partners to generate additional contributions based on the value of the services it provides to the community.

1.0 Background

1.1 Study Purpose

Advance Transit, Inc. (AT) commissioned a *Fare Policy and Technology Study* for a business-driven assessment of the benefits and costs of replacing its present fare-free service policy with a fare-based policy and onboard fare collection. The existing policy was enacted in January 2002 but is not universally understood in all communities served by AT. Two earlier studies of AT fare policy were completed by the Upper Valley Transportation Management Association (UVTMA) in 2005, and by the Community Transportation Association of America (CTAA) in 2008. Both affirmed the benefits of AT's fare-free service policy, but did not include a specific analysis of the financial gain or loss that AT could reasonably anticipate from a change in fare policy.

This study focuses directly on the business case for returning to a fare-based service policy with onboard fare collection. The potential impacts on the fixed route system and *Access AT* complementary paratransit service are considered individually. The analysis utilizes FY 2012 ridership, revenue and expenses as a base, and also draws on historical data going back to FY 1994 to observe trends that might influence future decisions.

Additionally the study includes a review of fare collection technologies available to U.S. transit systems that could be appropriate for use by AT if required to support the implementation of a new fare policy. The options range from simple mechanical fareboxes and semi-automated coin and currency processing equipment, to highly sophisticated advanced fare collection (AFC) systems that use validating electronic fareboxes, contactless farecard readers, wireless communications, mobile phone and web-based fare purchase applications. The purpose of the technology review was to identify the most appropriate fare collection equipment and methods for AT in the event that a fare-based service policy is adopted and onboard fare collection reinstituted on fixed route and complementary paratransit buses.

1.2 Historical Context

Fare policy has been a significant management interest since AT's formation in 1981. The evolution of fare policy has occurred in three phases.

1.2.1 Fare-based System: 1981 - 1993

AT began as an all-fixed route system using conventional pay-on-entry fare collection and a zone fare structure that charged $0.60 for a one-way trip within and between adjacent towns, and $0.75 for longer trips. In addition to cash fares, pre-paid fare instruments were used; including discount 10- and 12-ride punch tickets, an unlimited monthly ride pass costing $20 with additional family pricing discounts, and a monthly commuter pass costing between $16 and $20.

A more complex zone-based fare structure was implemented in 1983 using seven zones designed to price longer trips more equitably and increase farebox revenue. The single-zone one-way cash fare remained $0.60; however, multi-zone trip fares were re-priced from $0.70 to $1.20 in 10¢ increments. Pre-paid fare media included a 15% discounted ten-ride punch ticket, an unlimited ride monthly pass costing between $18 and $34 with additional family pricing discounts, and a monthly commuter pass costing between $16 and $32.

A general fare increase was implemented in October 1986 with the single-zone one-way cash fare rising from $0.60 to $1.00, and multi-zone trips costing up to $1.75. The ten-ride punch ticket discount was reduced to 10% (*i.e.,* $9.00 for a single-zone ticket) and the unlimited ride monthly pass price range increased to between $27.50 and $47.25. These rates remained in effect until August 1993, at which time the zone fare structure was abandoned in favor of a simplified flat-fare structure as follows:

- One-way cash fare $ 1.25
- Shopper's Pass (after 9:00 am) $ 2.00
- 10-ride Pass $11.50
- Monthly Pass $35.00
- Transfer free
- Accompanied child under five free

Early fare collection methods and procedures were basic. AT buses were not equipped with fareboxes and customers handed their fares directly to the drivers upon boarding. The fares were stored in canvas pouches. Drivers sometimes made change as a convenience to customers, despite the exact fare payment requirement.[1]

Veteran AT drivers and supervisors interviewed during this study recall onboard fare collection prior to 1993 as burdensome because of the complicated zone fare structure that required customers to carry multiple coins and dollar bills when riding. The flat-fare structure implemented in 1993 attempted to streamline fare collection, but was only partially successful. AT drivers disliked the time-consuming fare transactions that slowed down bus travel times and put pressure on schedule reliability and transfer integrity. Onboard fare collection imposed distracting duties on the drivers while driving, and also complicated the conclusion of their work shifts when reconciling fare proceeds with the dispatcher.

1.2.2 Transition to Fare-Free Service: 1991 - 2001

The Town of Hanover implemented a downtown fare-free shuttle in September 1976 to mitigate a growing downtown parking shortage. Initially the service was operated by Town Public Works Department employees and designed to link peripheral parking lots to the Dartmouth College campus and Mary Hitchcock Memorial Hospital in the downtown core. Both institutions contributed to help fund shuttle operations, and the Town used local parking fund revenues to

[1] Exact fare requirement is noted on 1981-83 and January 1990 timetables.

cover remaining operating and capital costs. This partnership was in place for 15 years before AT became involved in 1991.

When the Mary Hitchcock Hospital (later named the Dartmouth-Hitchcock Medical Center (DHMC)) decided to relocate to its present facility in 1991, it recognized the need for frequent shuttle service to provide a convenient connection with downtown Hanover. DHMC contracted with AT to operate the shuttle; this was AT's first experience with fare-free service. Initially three buses were used to provide a 20-minute shuttle service frequency. However, in 1993 DHMC sought to reduce shuttle operating costs by discontinuing two of the three buses, which would have reduced shuttle service frequency to once per hour.

An alternative solution was found when, in March 1994, AT implemented an integrated timetable that consolidated the remaining Hanover Shuttle bus with the general public fixed route bus running on NH 120 (Blue Route) between Hanover and Lebanon (see Figure 1). The blended schedule maintained a 30-minute service frequency between the DHMC campus and downtown Hanover. A fare-free zone was designated in the NH 120 corridor between the Dartmouth College Medical School and DHMC campuses. This enabled the general public to ride this segment of the Blue Route for the first time without paying a fare.[2] The City of Lebanon later joined the transit funding partnership and the fare-free zone was extended to downtown Lebanon.

By 1999, the increasing demand for shuttle service led to a separate agreement between AT, Dartmouth College and the Town of Hanover to operate a new Dartmouth-Hanover Shuttle. This was conceived as a fare-free service open to all downtown area employees, students and visitors. Ridership during its first full year of operation (FY 2000) was about 49,000 boardings. Another agreement reached between AT, Dartmouth and DHMC in 2006 provided for supplemental 15-minute service frequency on the Blue Route between downtown and DHMC.

1.2.3 Fare-Free Service Policy: 2002 - present

The percentage of fare-free boardings on the fixed route system rose steadily through the 1990s and by FY 2000 they accounted for nearly three-quarters of total boardings. At this point AT formulated a strategy to phase out onboard fare collection entirely in three steps between September 2000 and January 2002:

[2] The Blue Route is AT's largest regular route, carrying 40% of total public route ridership and in FY 2012.

- *Phase 1* implemented in September 2000 eliminated all fares in Vermont with funding assistance from a VTrans grant thatrough would extend through June 2002. This action made the Brown Route, Green Route and the White River Junction segment of the Orange Route fare-free.

- *Phase 2* implemented in September 2001 eliminated onboard fare payment for Dartmouth College students and employees on all fixed routes. A *"Show ID – Ride Free"* policy was introduced to substitute for paying a fare. This action made the Red Route and the New Hampshire segment of the Orange Route fare-free for the Dartmouth College community. The Blue Route already was free to the general public at the time; with the exception of selected peak trips extending east of Lebanon on US 4 to Enfield and Canaan.

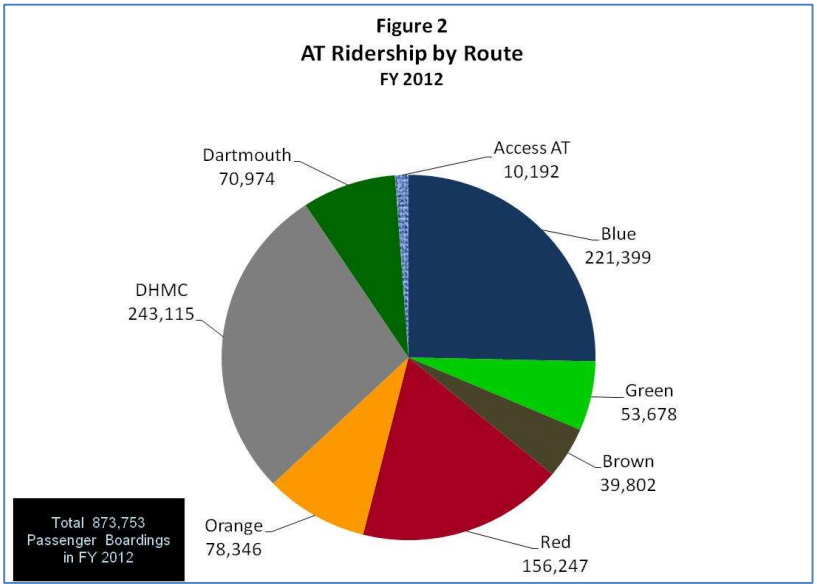
- *Phase 3* implemented in January 2002 eliminated onboard fare collection for all remaining customers on the Red Route and New Hampshire segment of the Orange Route. All AT regular fixed route and contract shuttle services have operated fare-free since that time. Access AT complementary paratransit was initiated in 2007 as a fare-free service consistent with federal requirements.

1.3 Transit System Ridership

AT carried 873,753 passengers on all services in FY 2012, including 549,472 boardings (62.9%) on the fixed route system, 314,089 boardings (35.9%) aboard contract shuttle routes, and 10,192 boardings (1.2%) on *Access AT*. A ridership distribution by service component and route is provided in Figure 2.

AT has enjoyed dramatic ridership gains since the early 1990s. Historical boarding data by year and service category are compiled in Table 1 for a 19-year period that envelopes the transition from the original fare-based service policy to the system-wide fare-free policy in FY 2002 through FY 2012. Total system ridership increased cumulatively by 650% during this period, an average of 32% per year.

Figure 2
AT Ridership by Route
FY 2012



Although still a small fraction of the total, demand for *Access AT* complementary paratransit service has increased very rapidly since its inception in 2007. Annual boardings on *Access AT*

surpassed 10,000 in FY 2012, reflecting a 35% increase over the prior year FY 2011 and a cumulative 370% increase over the first full year of operations in FY 2008.

Table 1: AT Annual Ridership by Route, FY 1994 - 2012

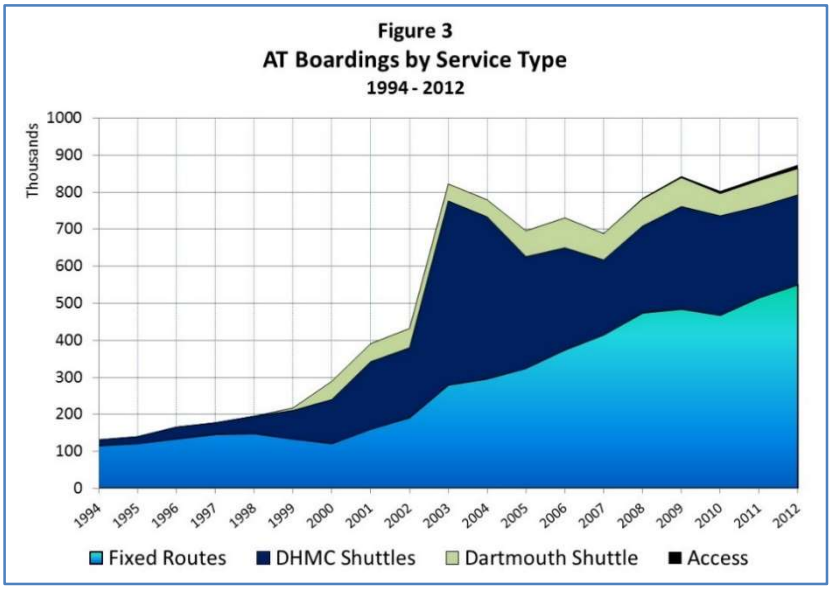
Fiscal Year	Fixed Routes Free	Fixed Routes Paid	Fixed Routes Total	Percent Change	Dartmouth Shuttle	DHMC Shuttles	Subtotal Shuttles	Percent Change	Access AT	System Total	Percent Change
FY 94	17,000	99,500	116,500	--	-	15,000	15,000	--	-	131,500	--
FY 95	64,448	56,164	120,612	3.5%	-	30,000	30,000	100.0%	-	150,612	14.5%
FY 96	74,215	57,667	131,882	9.3%	-	31,300	31,300	4.3%	-	163,182	8.3%
FY 97	80,405	63,393	143,798	9.0%	-	30,200	30,200	-3.5%	-	173,998	6.6%
FY 98	85,149	64,615	149,764	4.1%	-	46,250	46,250	53.1%	-	196,014	12.7%
FY 99	81,272	56,802	138,074	-7.8%	6,636	77,115	83,751	81.1%	-	221,825	13.2%
FY 00	67,132	57,749	124,881	-9.6%	49,236	117,762	166,998	99.4%	-	291,879	31.6%
FY 01	71,246	77,059	148,305	18.8%	48,709	182,346	231,055	38.4%	-	379,360	30.0%
FY 02	156,815	43,824	200,639	35.3%	52,168	187,597	239,765	3.8%	-	440,404	16.1%
FY 03	279,961	-	279,961	39.5%	45,860	496,184	542,044	126.1%	-	822,005	86.6%
FY 04	296,394	-	296,394	5.9%	45,797	437,040	482,837	-10.9%	-	779,231	-5.2%
FY 05	324,055	-	324,055	9.3%	69,875	301,903	371,778	-23.0%	-	695,833	-10.7%
FY 06	374,778	-	374,778	15.7%	80,808	274,981	355,789	-4.3%	-	730,567	5.0%
FY 07	413,986	-	413,986	10.5%	71,097	203,181	274,278	-22.9%	364	688,628	-5.7%
FY 08	475,227	-	475,227	14.8%	72,676	233,413	306,089	11.6%	2,762	784,078	13.9%
FY 09	485,204	-	485,204	2.1%	77,827	276,058	353,885	15.6%	4,156	843,245	7.5%
FY 10	468,606	-	468,606	-3.4%	60,030	267,564	327,594	-7.4%	6,762	802,962	-4.8%
FY 11	515,266	-	515,266	10.0%	70,096	245,954	316,050	-3.5%	7,513	838,829	4.5%
FY 12	549,472	-	549,472	6.6%	70,974	243,115	314,089	-0.6%	10,192	873,753	4.2%

Sources: FY 2002 – 2012 totals per AT ridership reports (Excel); FY 1995-2002 distribution of free vs. paid regular route boardings from UVTMA 2005 Study, p. 34. FY 1994 free vs. paid boarding distribution estimated based on 3.5 months of operation.

Prior to FY 2001, ridership growth occurred primarily on the DHMC Shuttles, which rose 89% annually between FY 1995 and FY 2000. AT began operating the Dartmouth-Hanover Shuttle in FY 1999, and it too experienced rapid growth. The contract shuttle routes were designed as fare-free services by agreement with AT's funding partners.

The regular fixed route system generated more modest gains during the same time period; rising from 116,500 boardings in FY 1994 to nearly 150,000 in FY 1998, but then dropping back below 125,000 boardings in FY 2000. With the exception of Blue Route customers traveling within the fare-free zone between Hanover and Lebanon, most rides on the fixed route system required a fare during these years.

Figure 3 displays transit system ridership trends by service component since FY1994. It shows the sharp rise in total boardings between FY 2000 and FY 2003, including an 87% year-over-year increase in FY 2003 to more than 822,000 boardings. DHMC Shuttle ridership was a major reason for the increase, peaking above 496,000 boardings in FY 2003.[3] System ridership leveled off beginning in FY 2004 and declined to 688,000 boardings in FY 2007 before rising again above 800,000 in FY 2009. AT carried a record 873,753 passengers in FY 2012.



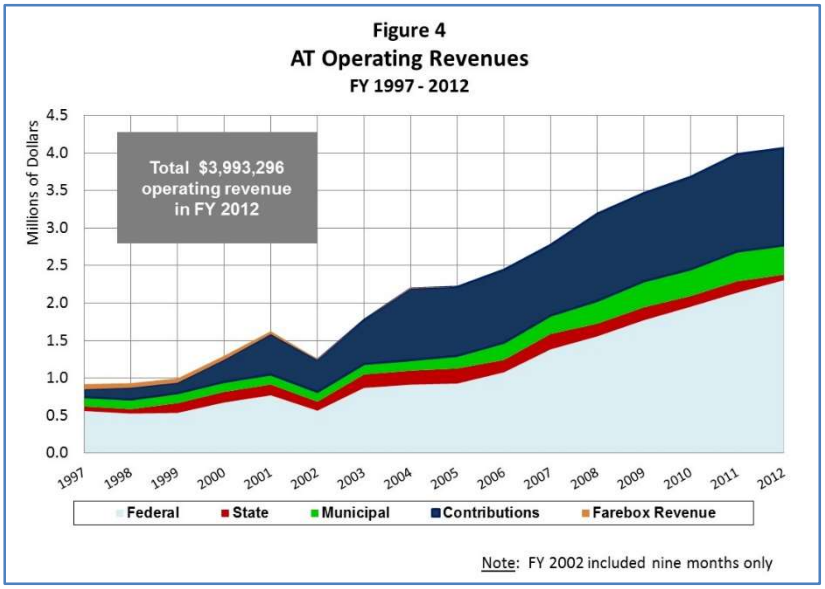
1.4 Transit System Revenue

AT generated over $4.3 million in total revenue in FY 2012, consisting mostly of operating revenues ($3,993,296) as well as $85,000 in capital grants and $158,000 in non-operating revenues.

1.4.1 Operating Revenue

[3] It is noted that FY 2002 contained only nine months due to a change in accounting.

Historical operating revenues covering the 16-year period from FY 1997 through FY 2012 are charted in Figure 4 and compiled in Table 2. Annual income quadrupled during this period from about $921,000 in FY 1997 to nearly $4.0 million last year. AT's principal revenue sources are summarized in following paragraphs, with a particular focus on changes that potentially would be triggered by a change in AT fare policy.



Federal Funds: AT relies heavily on FTA §5311 non-urbanized area formula grants and other federal funds passed through the States of New Hampshire and Vermont to cover operating costs. Total federal assistance in FY 2012 exceeded $2.3 million. FTA has been a dependable revenue source that has kept pace with the growth of AT, supplying 57.7% of total operating revenue in FY 2012 compared to 56.5% in FY 1997. A transition to a fare-based service policy would have a slightly negative result on AT operating revenue received from FTA because §5311 grants are based on the "net cost of service" that reduces funding by the amount of farebox revenues collected by the grantee.

Institutional Support: Revenue generated as institutional contributions increased substantially during the same period; from 11.3% of total operating revenue in FY 1997 to nearly 31% in FY 2012. AT received over $1.1 million in contributions from three major funding partners. The service-related agreements that are the basis for institutional contributions are discussed in detail later in this report (see Section 2.1). It will be seen that these agreements have a significant bearing on the calculation of net fare revenue.

Municipal Contributions: AT received nearly $390,000 or 9.8% of its FY 2012 total operating revenue from six townships in the service area. Total contributions from these member jurisdictions have more than tripled since FY 1997, although the overall percentage of total AT operating revenues coming from this source has declined from 13%.

Philanthropic Contributions / Service Sponsorships: AT generated nearly $100,000 in FY 2012 in the form of donations from over 1,200 contributors, most of whom are individuals, local businesses and foundations giving to the "Keep it Free" fund. The potential loss of philanthropic contributions is a significant concern that must be factored into any calculation of the net benefit of onboard fare collection.

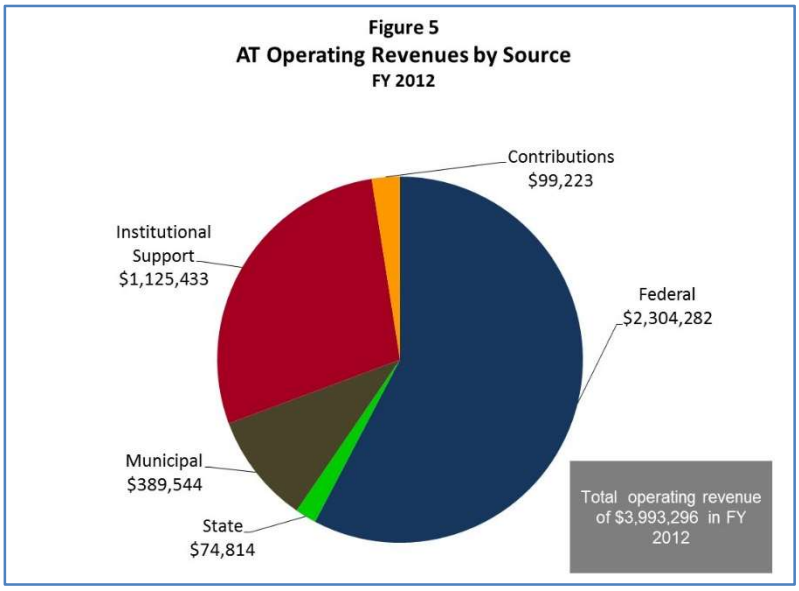
Operating Revenues	FY 1997	1998	1999	2000	2001	9 months 2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Federal Funds																
New Hampshire:																
Section 5311	351,293	334,748	427,568	520,117	607,015	456,739	747,379	760,191	752,662	814,088	1,032,836	1,235,262	1,493,461	1,542,878	1,705,641	1,775,191
Intercity & CMAQ	63,881	37,654	-	-	-	-	-	-	-	-	-	-	-	143,121	144,028	148,978
Rideshare	-	-	-	27,164	33,951	20,262	26,935	36,105	33,095	39,853	51,939	34,581	54,785	45,186	75,358	82,441
All Other federal programs	2,136	613	2,880	8,484	4,239	1,200	7,233	2,568	2,324	1,502	3,617	1,921	3,461	4,291	937	5,564
Vermont:																
Section 5311	74,380	75,035	22,023	75,763	93,520	31,904	58,034	59,160	86,937	119,615	169,743	159,071	183,077	209,764	210,654	289,108
Intercity & CMAQ	40,144	45,000	49,780	-	-	30,423	-	-	-	-	-	-	-	-	-	-
Rideshare	31,704	34,985	34,958	38,422	33,045	26,311	28,559	52,527	51,097	101,237	124,196	125,411	35,000	3,229	-	-
All Other federal programs			310	5,677	188	-	2,886	3,000	3,000	2,261	2,169	1,110	2,733	3,000	2,659	3,000
Subtotal Federal	563,538	528,035	537,519	675,627	771,958	566,839	871,026	913,551	929,115	1,078,556	1,384,500	1,557,356	1,772,517	1,951,469	2,139,277	2,304,282
State Funds																
New Hampshire	-	-	-	-	-	-	20,000	20,000	24,750	29,680	29,260	34,000	33,000	6,013	7,055	-
Vermont	61,758	59,559	130,019	141,838	144,110	120,489	159,025	167,146	176,303	134,783	176,135	135,403	139,340	136,618	144,541	74,814
Subtotal State	61,758	59,559	130,019	141,838	144,110	120,489	179,025	187,146	201,053	164,463	205,395	169,403	172,340	142,631	151,596	74,814
Municipal:																
New Hampshire:																
Canaan	3,710	5,200	6,760	5,200	5,200	5,200	5,200	5,460	3,524	3,523	7,047	7,047	-	7,600	7,600	7,600
Enfield	4,000	7,500	5,000	5,000	5,000	5,000	5,000	3,000	-	3,000	4,000	4,120	4,285	4,000	5,250	4,710
Hanover	30,890	30,999	30,901	30,900	31,723	24,334	32,445	32,445	33,418	34,421	34,421	94,731	94,731	99,468	99,468	99,468
Lebanon	67,500	68,819	73,770	75,660	75,660	83,081	80,630	81,820	114,320	146,820	157,820	149,181	198,939	194,320	234,320	227,640
Vermont:																
Hartford	11,400	11,400	11,400	11,400	11,400	8,550	11,400	11,970	11,970	34,025	34,025	38,655	38,655	40,590	40,590	40,590
Norwich	4,537	4,537	4,537	4,537	4,537	3,403	4,537	4,762	4,891	7,311	7,311	9,082	9,082	9,536	9,536	9,536
Subtotal Municipal	122,037	128,455	132,368	132,697	133,520	129,568	139,212	139,457	168,123	229,100	244,624	302,816	345,692	355,514	396,764	389,544
Institutional																
DHMC Shuttle Services	80,000	92,000	92,000	103,000	225,000	181,262	302,053	564,010	427,336	407,395	308,492	457,033	542,269	564,382	583,617	583,617
DHMC Free Fare							25,000	25,000	25,000	25,000	26,000	27,300	27,300	28,665	29,382	29,382
DHMC FR System Support					10,000	10,000	10,000	10,000	10,000	21,139	21,985	23,084	23,084	24,238	24,844	24,844
DHMC Blue Route #15					-	-	-	-	-	24,401	30,452	31,975	34,533	36,260	37,166	37,166
Dartmouth College Shuttle Services		-		90,000	90,000	67,500	93,000	127,250	199,168	221,693	230,561	242,089	261,456	216,996	222,471	224,309
Dartmouth College Free Fare							25,000	25,000	25,000	25,000	26,000	27,300	27,300	28,665	29,382	29,382
Dartmouth College FR System Support					-					56,020	58,261	61,174	61,174	64,233	65,839	65,839
Dartmouth College Blue Route #15					-	-	-	-	-	8,612	10,748	11,285	12,188	12,797	13,117	13,117
Town of Hanover Shuttle Services							-	67,003	78,456	82,377	85,672	89,956	97,152	78,644	80,611	80,611
Town of Hanover FR System Support			5,000	60,900	161,745	125,802	104,732	104,735	107,874	43,952	43,952					-
Dartmouth Med School Blue Route #15		-		-	-				-	24,401	30,452	31,975	34,533	36,260	37,166	37,166
Windsor SEU transportation		12,454	13,050	13,410	13,410				-		-	-		-	-	
Misc. Contracts	23,646	22,314	28,691	26,896	36,759	40,536	26,894	31,246	45,268	32,961	40,697	36,128	-	-	-	
Subtotal Contributors	103,646	126,768	138,741	294,206	536,914	425,100	586,679	954,244	918,102	972,951	913,272	1,039,299	1,120,989	1,091,140	1,123,595	1,125,433
Contribtuions - Operating																
Donations		30,050	14,000	20	10				-		6,073	-	4,350	14,434	-	
Keep It Free	-				-				-		22,307	67,014	38,752	29,076	43,681	53,172
Sponsorships					-				-			3,780	10,995	24,792	33,100	46,051
Subtotal Contributors	-	30,050	14,000	20	10	-	-	-	-	-	28,380	70,794	54,097	68,302	76,781	99,223
Subtotal Non-Passenger Revenue	850,979	872,867	952,647	1,244,388	1,586,512	1,241,996	1,775,942	2,194,398	2,216,393	2,445,070	2,776,171	3,139,668	3,465,635	3,609,056	3,888,013	3,993,296
Farebox Revenue(all fares)	69,589	61,910	57,584	53,649	40,190	12,195	-	12,915	(20)	-	-	-	-		-	
TOTAL Operating Revenues	**920,568**	**934,777**	**1,010,231**	**1,298,037**	**1,626,702**	**1,254,191**	**1,775,942**	**2,207,313**	**2,216,373**	**2,445,070**	**2,776,171**	**3,139,668**	**3,465,635**	**3,609,056**	**3,888,013**	**3,993,296**

Table 2: AT Operating Revenues by Source, FY 1997 - 2012

State Funds: AT received approximately $75,000 from the State of Vermont in FY 2012, representing less than two percent of total operating revenue. State funding assistance peaked above $205,000 in FY 2007, but has declined significantly in recent years. The State of New Hampshire discontinued operating assistance in FY 2012.

Farebox Proceeds accounted for 7.5% of total operating revenues in FY 1997 and declined to 4.1% in FY 2000, which was the last full year of revenue collection. Fare proceeds were negligible after FY 2002.

A distribution of FY 2012 operating revenues by source is provided in Figure 5. This shows AT's financial dependence on federal funding and institutional support, which collectively comprised nearly 86% of total FY 2012 operating revenue.



1.4.2 Capital Revenue

Historical capital revenue generation during a 16-year period from FY 1997 through FY 2012 are compiled in Table 3. Most of the income is attributable to FTA §5311 grant funding, which typically covers 80% of the cost of revenue vehicles and associated capital equipment. Non-federal matching funds have been supplied primarily by the State of New Hampshire, as well as locally generated funds from donations. Because capital funding typically is project-specific, substantial variation capital revenue is noted from year to year. For example, AT received over $2.9 million in FY 2010, and $156,488 in FY 2012.

Table 3: AT Capital and Other Revenue by Source, FY 1997 - 2012

	FY 1997	1998	1999	2000	2001	9 months 2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Capital Revenue																
Federal Transit Administration	188,786	15,956	126,978	563,417	484,274	89,118	15,200	55,096	1,745,823	154,453	154,218	762,254	1,528,890	2,718,126	1,637,319	84,735
State of New Hampshire			15,419		59,295				133,372		16,015	95,156	108,761	149,282	113,866	
State of Vermont	6,720	1,610	8,123	40,780	1,239	9,393		6,122	3,583	6,162			59,372	3,051		
Capital Campaign Donors												52,374	500	72,717	96,993	71,753
Subtotal	195,506	17,566	150,520	604,197	544,808	98,511	15,200	61,218	1,882,778	160,615	170,233	909,784	1,697,523	2,943,176	1,848,178	156,488
Other Revenue																
Operating Donations						1,245										
Other Grants(planning, misc)	2,040			22,621				26,322	12,000				59,000	16,953	7,047	82,434
Gain/Loss on Sales	3,310	(4,041)		(11,968)	33,159	2,221			11,513			3,875	(5,184)	(13,866)	3,498	
Interest		344	525	2,549	3,760				6,543		6,388	3,222	316	603	1,067	251
Misc.		164	1,156	300	198				65		188	374	781	9,368	1,750	763
Advertising		3,165	7,230	9,540												
Woodstock Demo Project															57,561	74,384
Local Share from UDS		2,517														
Subtotal	5,350	2,149	8,911	23,042	37,117	3,466	-	26,322	30,121	-	6,576	7,471	54,913	13,058	70,923	157,832
Total	**200,856**	**19,715**	**159,431**	**627,239**	**581,925**	**101,977**	**15,200**	**87,540**	**1,912,899**	**160,615**	**176,809**	**917,255**	**1,752,436**	**2,956,234**	**1,919,101**	**314,320**

1.5 Industry Backdrop / Peer Experience

The study work scope included a nationwide peer review of comparable rural transit systems that either currently have a fare-free service policy, or recently converted from fare-free to a fare-based service policy. Detailed findings of the peer review are described in Appendix A to this report; highlights are contained in the following paragraphs.

Further information was obtained from a recent report issued by the Transportation Cooperative Research Program (TCRP) entitled *Synthesis 101: Implementation and Outcomes of Fare-Free Transit Systems*. This document provides the first comprehensive list of 39 U.S. public transit agencies that operate fare-free systems. It was released in 2012 near the conclusion of the research phase of the AT Fare Policy study.

Fare-free transit systems in the U.S. are most likely to occur in four operating environments: Rural and small urban communities; university-oriented communities; destination resort communities; and individual suburban communities within large metropolitan areas. The initial screening for peer systems focused primarily on the first two categories based on service area similarities and role of Dartmouth College in the Upper Valley. Secondary screening criteria included:

- Service area population
- Service area size (square miles)
- Annual ridership
- Annual revenue vehicle miles and vehicle hours
- Annual operating revenue

Twelve peers were selected, including seven fare-based systems and five fare-free systems listed in Table 4. These systems were contacted to obtain current information about agency revenue sources; fare policy issues; community and transit system financing concerns; and ridership impacts related to changes in fare policy.

Table 4: Selected Peer Transit Systems

Fare-free Systems	Fare-based Systems
Go West Transit – Macomb IL	Hele-on Bus – Hawaii County HI
Corvallis Transit – Corvallis OR	Skagit Transit – Mt. Vernon WA
Island Transit – Whidbey Island WA	Link Transit – Chelan WA
Streamline Transit – Bozeman MT	Canby Area Transit – Canby OR
Cache Valley Transit (CVTD) – Logan UT	Asheville Redefines Transit (ART)
	Wildcat Transit – Durham NH
	Mountain Rides – Sun Valley ID

The review revealed several key differences between AT and its peers in terms of system financing. For example, most of the peers benefit from a dedicated local funding source that helps to ensure financial stability from year to year:

- Five systems (CVTD, Island Transit, Link Transit, Mountain Rides, and Skagit Transit) receive local option sales tax revenues. The City of Canby enacted a transit operations fee (TOF) that is assessed on commercial and residential utility bills. The City of Corvallis imposes a 0.6% payroll and net earnings tax on employers located within the city.

- Four peer systems (Asheville Transit, Island Transit, Link Transit and Skagit Transit) receive dedicated motor vehicle registration fees.

- Three systems (GoWest, Streamline and Wildcat Transit) serving university communities receive substantial funding from student fees.

While AT lacks a dedicated funding source, it generates significantly more revenue from institutional and philanthropic sources than its peers. Just two peers have “501c3” non-profit tax status, and none administer formal fund-raising efforts comparable to AT’s Keep It Free fund and capital fund.

Among the seven peer systems that currently charge fares, the decision to implement onboard fare collection was influenced less by revenue expectations than by community values and taxpayer concerns about transit subsidies. Six of the seven systems recovered less than eight percent (8%) of total operating expenses with fare proceeds in FY 2012. Only Asheville NC, a small urban system, achieved 14% recovery of operating expenses through farebox revenue.

The survey of fare collection systems and equipment deployed by the seven systems with onboard fare collection showed that all presently utilize relatively simple mechanical fareboxes and engage in semi-automated processing of coins and currency as a routine daily function. None of the systems currently use advanced technologies such as electronic fareboxes with smart card readers, or Internet and mobile phone applications that support off-vehicle fare purchases. Similarly, none indicated that they were considering a move toward more sophisticated fare collection methods in the foreseeable future.

2.0 Fare Revenue Estimates

Determining the net revenue that AT could expect to generate from a fare-based service policy and onboard fare collection requires reasonable estimates of the gross fare proceeds that would be collected and the total costs secure fare collection and processing. Gross revenue estimates are provided individually for AT fixed route and complementary paratransit services. Key variables that must be quantified to calculate total fare proceeds include:

- *How many customer boardings in FY 2012 would have been required to pay a fare had there been onboard fare collection?*
- *What fare structure and resulting average fare may be assumed for fixed route and complementary paratransit services?*
- *How many customer boardings would not have occurred on AT fixed route and complementary paratransit services in reaction to the imposition of a particular fare structure?*

2.1 Role of Institutional Support

AT generates substantial operating revenue from contributions from DHMC, Dartmouth College and Medical School, and the Town of Hanover. Collectively they contributed more than $1.1 million in FY 2012, equivalent to about 28% of total AT operating revenue. These entities pay the full cost of operating the fare-free contract shuttle services, and also a portion of the operating expenses of the fixed route system. The payments are based on a series of mostly informal, unwritten agreements made since the early 1990s. Gaining a better understanding of the terms of these service-related agreements was necessary to determine how many AT passengers would be excluded from onboard fare collection by virtue of these agreements. Discussions were held with the funding partners during the study to clarify the fare-related provisions of long-standing verbal agreements.[4] Key conclusions are noted in the following pages.

2.1.1 Dartmouth-Hitchcock Medical Center (DHMC)

DHMC contributed over $675,000 in FY 2012 through four service-related agreements listed in Table 5. About 86% of these funds paid the fully-allocated operating cost of the Lots 9 & 20 parking shuttles serving the DHMC campus. These shuttles are fare-free and would remain as such even if fixed route and complementary paratransit fare policy were changed. The other 14% of DHMC contributions are attributed to three purposes:

- Blue Route Supplemental Service – DHMC paid $37,166 to defray the cost of running one additional bus on the Blue Route between 9:15 AM and 4:25 PM

[4] Meetings involving AT Executive Director, Dartmouth College representatives on April 19, 2012; and with DHMC representatives on June 13, 2012.

between the DHMC campus and downtown Hanover. This bus supports an enhanced 15-minute service frequency on this segment of the Blue Route. The unwritten agreement began in March 2006. DHMC believes that all service on between the campus and downtown should remain fare-free.

- System Wide Free Fares – DHMC paid $29,382 in lieu of onboard payment of fixed route system fares by DHMC employees and others who visit the DHMC campus. The negotiated fee is based on a $25,000 lump sum paid annually from FY 2003 through FY 2006, plus an inflation adjustment beginning in FY 2007.

- Fixed Route System Support – DHMC paid $24,844 to help sustain the public fixed route system. This contribution is based on a $10,000 lump sum paid annually since in FY 1994, plus periodic inflation adjustments. There is no written agreement, but DHMC considers the fare-free service policy to be an important characteristic of the fixed route system.

Table 5: DHMC Revenues, FY 2012

Service Agreement	Total Revenue	Percent of Total
Parking Shuttles (Lots 9 & 20)	$583,617	86.5
Blue Route Supplemental Service	37,166	5.5
System Wide Free Fare	29,382	4.3
Fixed Route System Support	24,844	3.7
Total	675,009	100.0

2.1.2 Dartmouth College / Dartmouth Medical School

Dartmouth College and Dartmouth Medical School contributed nearly $370,000 in FY 2012 through four service-related agreements listed in Table 6. Two-thirds of the total paid the fully-allocated operating cost of the Dartmouth-Hanover Shuttle. This agreement commenced in 1999 and has accommodated a 149% increase in operating costs over a 12-year span -- from $90,000 in FY 2000 to $224,309 in FY 2012. Shuttle service is fare-free and would remain as such even if fixed route and complementary paratransit fare policy were changed. The remaining third of Dartmouth College and Medical School payments were contributed for three purposes:

- Fixed Route System Support – Dartmouth College contributed $65,839 to help sustain the fixed route system. The amount is based on a $56,020 lump sum paid initially in FY 1994 with periodic inflation adjustments. The agreement is unwritten, however the College considers the fare-free service policy to be an important characteristic of the fixed route system.

- System Wide Free Fares – Dartmouth College paid $29,382 in lieu of onboard fare payment by Dartmouth employees, faculty, students and visitors who ride the fixed route system. The contribution is based on a $25,000 lump sum paid initially in FY 2003. Annual inflation adjustments were applied beginning in FY 2007.

- Blue Route Supplemental Service – Dartmouth College paid $13,117 and the Medical School paid an additional $37,166 in FY 2012 to offset a portion of the cost of running one additional bus on the Blue Route between the hours of 9:15 AM and 4:25 PM between the DHMC main campus and Dartmouth Medical School on College Street in downtown Hanover. The bus supports an enhanced 15-minute service frequency on this segment of the Blue Route. This agreement began in 2006.

Table 6: Dartmouth College & Medical School Contract Revenues, FY 2012

Service Agreement	Total Revenue	Percent of Total
Dartmouth/Downtown Shuttle	$224,309	60.8
Fixed Route System Support	65,839	17.8
Blue Route Supplemental Service	13,117	3.5
Blue Route Supplemental (Med School)	37,166	10.0
System Wide Free Fare	29,382	7.9
Total	369,813	100.0

2.1.3 Town of Hanover

The Town of Hanover contributed $80,611 to AT in FY 2012 to partly offset the operating cost of the Dartmouth-Hanover Shuttle.[5] The contribution began in 1999 and within two years increased to nearly $162,000. Annual revenue fluctuated within a range between $100,000 and $175,000 through FY 2007; and between $78,000 and $97,200 since FY 2008. It is noted that the Town increased its municipal contribution to AT beginning in FY 2008 to maintain its overall financial support around $175,000 in recent years.

2.2 Fixed Route System Revenue

This section describes the methodology and assumptions used to calculate range estimates of the gross farebox revenue that AT could generate with a fare-based service policy applied to the AT fixed route system. For purposes of revenue estimation, three inputs must be determined:

A. *Ridership base* – total number of fixed route customer boardings that would have been subject to onboard fare collection had a fare-based policy been in effect in FY 2012.

[5] This amount is in addition to a $99,468 appropriation from the Town of Hanover in FY 2012 to support fixed route service.

B. *Average fare* – revenue per customer boarding anticipating assuming a particular fare s and presuming a conventional fare structure.
C. *Ridership attrition rate* – the number of FY 2012 fixed route customer boardings that would have been lost in reaction to the imposition of a fare-based service policy with onboard fare collection.

2.2.1 Ridership Base

As noted early (Section 1.3) AT carried about nearly 550,000 passengers on the five-route fixed route network in FY 2012, and an additional 314,000 passengers on three contract shuttle routes. The preceding discussion of institutional support provides the basis for concluding that all shuttle service customers would be excluded from onboard fare collection; and that a significant number of fixed route customers would be excluded as well.

To estimate the number of fixed route boardings that would be subject to onboard fare collection, Table 7 applies recent AT customer survey findings[6] to FY 2012 fixed route ridership totals to form a distribution of ridership by customer type and route. It is assumed that all boardings attributable to DHMC employees, Dartmouth College undergraduate and graduate students, and Dartmouth College employees are covered by the collective institutional funding agreements, and therefore are excluded from the base ridership subject to onboard fare collection.

The table indicates that 303,403 fixed route riders in FY 2012 would have been excluded from onboard fare collection per funding agreements currently in effect. This number represents 55% of total FY 2012 fixed route system ridership. More than two-thirds of the excluded rides are taken on the Blue Route running between downtown Hanover, the DHMC campus, and downtown Lebanon. The exclusion of these riders reduces the FY 2012 fixed route ridership base subject to onboard fare collection to 246,069 customer boardings.

2.2.2 Alternative Fare Structures

The second input required to estimate fare revenue is the average fare that would be paid by those customers subject to onboard fare collection. Most transit agencies that charge fares utilize a fare structure consisting of a variety of fare types that cumulatively generate an average fare consistent with agency budgetary targets. A prototypical fixed-route fare structure includes a base cash fare paid by adult riders, and discount cash fares paid by customers who are senior citizens or who have a disability. Some systems also extend fare discounts to other customer markets such as teens, college students, or low-income individuals. Most fare-based systems offer (and frequently emphasize) prepaid fare media (*e.g.*, passes, tickets or tokens) that can sell at face value or at a discount. Nearly all systems allow some riders to ride free; for example, young children when accompanied by a

[6] Onboard passenger survey conducted in April 2012 by Tom Crikelair Associates for AT's Transit Development Plan Update.

fare-paying adult, active military personnel in uniform, civilian first-responders, and transit system employees.

Table 7: Fixed Route Ridership Base Subject to Onboard Fare Collection

Fixed Route	Annual Customer Boardings [1]	DHMC Employees		DC Undergrads		DC Grad Students		DC Employees		Total Boardings Excluded	Ridership Base
		Percent [2]	Boardings	Percent	Boardings	Percent	Boardings	Percent	Boardings		
Blue [3]	221,399	19.2%	42,509	11.4%	25,239	15.5%	34,317	39.6%	87,674	210,144	11,255
Red	156,247	3.3%	5,156	1.3%	2,031	1.3%	2,031	1.3%	2,031	11,250	144,997
Green	53,678	1.7%	913	5.0%	2,684	5.0%	2,684	23.3%	12,507	18,787	34,891
Orange	78,346	2.6%	2,037	3.8%	2,977	17.9%	14,024	28.2%	22,094	41,132	37,214
Brown	39,802	0.0%	0	4.4%	1,751	17.8%	7,085	33.3%	13,254	22,090	17,712
Total	549,472		50,614		34,683		60,141		137,560	303,403	246,069

Notes:

[1] - FY 2012 ridership data provided by AT staff.

[2] - Per 2012 AT passenger survey findings provided by T. Crikelair & Associates.

[3] - Includes 20,405 unaffiliated boardings in NH 120 Free Zone (Hanover & Lebanon). Assumes Canaan & Enfield boardings would pay onboard.

Table 8 provides a summary of cash fares in effect in August 2013 among 17 public transit systems operating in New Hampshire and Vermont, excluding AT. These data provide a point of departure for deliberations by AT concerning what level of transit fares can be supported by market conditions and are most appropriate given local circumstances. Base cash fares charged for local, area and regional fixed route services are shown.

Table 8: Base Cash Fares Among 17 New Hampshire and Vermont Transit Systems,

Transit System	Service Area / Operating Base	Local Cash Fare (1 zone)	Area Cash Fare (2 zone)	Regional	Note
CART	Londonderry NH	$3.00	$4.00	$5.00	
COAST	Dover NH	$0.50	$1.50	$5.00	
CAT	Concord NH	$1.25	--	--	
HCS	Keene NH	$1.00	--	--	
MTA	Manchester NH	$1.50	$4.00	--	
NCT	Berlin NH	$3.00	$3.00	--	Day pass
Wildcat	Durham NH	$1.50	--	--	
WTS	Winnepesauke NHe	$1.00	$1.00	$2.00	
ACTR	Middlebury VT	$0.00	$1.00	$2.00	
CCTA	Burlington VT	$1.25	$2.00	$4.00	
CRT	Rockingham VT	$1.00	$2.00	$3.00	donation
DVTA	Brattleboro VT	$0.00	$0.00	--	fare-free system
GMCN	Bennington VT	$0.50	$1.50	$2.00	
GMTA	Berlin / St. Albans VT	$1.00	$2.00	$2.00	
MVRTD	Rutland VT	$0.50	$1.00	$2.00	
RCT	St. Johnsbury VT	$0.00	$0.00	$0.00	fare-free system
Stagecoach	Randolph VT	$1.50	$2.50	$3.50	
Average Fare - All Systems		$1.09	$1.82	$2.77	
Median Fare - All Systems with fare type		$1.00	$1.75	$2.00	
Average Fare - Fare-based Systems		$1.32	$2.13	$3.05	
Modal Fare - All Systems		$1.00	$2.00	$2.00	

2013

Source: Individual transit agency websites

- Local Service - The average base cash fare for local service charged by the 17 systems is $1.09, or $1.32 among the 14 systems that charge a fare. Three systems are fare-free. The median (mid-range) fare for all systems is $1.00, and the modal (most common) fare also is $1.00.

- Area Service – The average adult cash fare charged for a one-way trip between adjacent communities (*i.e.*, two-zones) is $1.82 among the 14 systems that provide area service, or $2.13 among the 12 systems that charge a fare. Two systems that provide area service are fare-free. The median fare for all systems is $1.75, and the modal fare is $2.00.

- Regional Service – The average adult cash fare charged for a one-way trip between non-adjacent communities (*i.e.*, three or more zones) is $2.77 among the 11 systems that provide regional service, or $3.05 among the 10 systems that charge a fare. One system that provides regional service is fare-free. The median fare for all systems is $2.00, and the modal fare also is $2.00.

To demonstrate how transit fares and ridership levels frequently interact, three alternative fare structures for potential use by AT were devised to reflect alternative future fare policies that could be considered. Shown in Table 9, these fare alternatives are characterized relative to the base cash fares that are charged by the 17 other transit systems operating in New Hampshire and Vermont, as follows:

- Lower range – Fares are set initially at or near the bottom of the range of the New Hampshire and Vermont transit agencies in order to minimize the impact on ridership and accept a lower expectation for gross farebox proceeds.

- Medium range - Fares are set initially at or near the center of the range of the New Hampshire and Vermont transit agencies in order to balance revenue gain and ridership loss.

- Higher range - Fares are set initially at or near the top of the range of the New Hampshire and Vermont transit agencies in order to maximize gross farebox proceeds and tolerate greater loss of ridership.

Table 9: Alternative Fixed Route Fare Structures

Fare Type	Lower Range	Medium Range	Higher Range
Base Fare – Adults 18 – 64	$0.50	$1.00	$2.00
Peak Extension Fare - Canaan & Enfield	1.00	2.00	4.00
Half fare – Seniors 65+	0.25	0.50	1.00
Half fare – Persons with Disability	0.25	0.50	1.00
Discount fare – Youth 6 – 17	.35	0.75	1.50
Day Pass	1.25	2.50	5.00
Monthly Pass	18.00	35.00	65.00
Accompanied Children under 6	Free	free	free
Active Military & First Responders	free	free	free
Transfer	free	free	free
Average Fare assumed	0.40	0.80	1.60

2.2.3 Estimated Ridership Attrition

Fare revenue estimation requires assumptions regarding the causal relationship between transit ridership and fares, which is referred to as fare "elasticity". Five decades of U.S. Department of Transportation (USDOT) research and transit industry experience tend to

confirm wide variations in fare elasticity among transit agencies when implementing fare changes. Rider attrition rates that occur in reaction to transit fare increases depend on unique conditions created by system size and mode, service area demographics, customer profile, the magnitude of the fare change, community values and perceptions of the transit agency, regional auto operating costs and gas prices, traffic and parking congestion issues, season and climate. Some of these factors are controllable by the transit system; others are not.

Published in 2004, TCRP *Report 95: Traveler Response to Transportation Changes* is cited frequently in matters pertaining to transit fare policy and fare collection. *Chapter 12: "Transit Pricing and Fares"* addresses transit ridership response to fare changes. Topics covered include changes in fare rates, changes in fare structure including the relationships among fare categories, and free transit. However, the report acknowledges that… *"Available traveler response information on recent and current free transit operations is very sketchy."*[7] Moreover, much of the research into fare-free systems focused on downtown free zones in medium and larger metropolitan areas, while relatively little has been based on systems that are entirely fare-free.

The preponderance of the research into rider attrition rates is based on fare-based transit systems in urban areas that have from time to time imposed fare increases at routine intervals of three to five years. The consensus is that transit systems can expect to experience short-term ridership attrition within a range centering on a three-tenths percent (0.3%) decline in customer boardings for each one percent (1.0%) increase in fare. This relationship indicates an elasticity rate of -0.3, which was referred to as the "Simpson-Curtin Rule" when first adopted in the 1970s. Research conducted within the last 20 years suggests that the center of the range is somewhat higher at -0.35 to -0.4. The TCRP report concludes that:

> *"While the average fare elasticity for bus systems appears to be about −0.4, the elasticity values vary widely among systems. Elasticity values in the APTA [American Public Transit Association, 1991] study varied from −0.12 to −0.85 among the 52 transit systems while the elasticity values in the Ecosometrics [1997] study ranged from −0.16 to −0.65."*[8]

TCRP Report 95 cites a 1994 review of over 20 free-fare programs[9] that:

> *"…concluded that free-fare programs result in significant increases in ridership, typically higher than the increase predicted by the Simpson & Curtin rule [referring to an elasticity of -0.3]. The evidence appears to be essentially*

[7] TCRP Report 95 Traveler Response to System Changes; Chapter 12 Transit Pricing & Fares; p. 12-31
[8] Ibid; p. 12-11
[9] Hodge, D. C., Orrell, J. D. III, and Strauss, T. R., *Fare-Free Policy: Costs, Impacts on Transit Service, and Attainment of Transit System Goals.* Washington State Transportation Center, University of Washington, Seattle, WA (1994); as cited in TCRP Report 95, pp. 12-32-34.

anecdotal, however. On balance, it seems most likely that CBD free-fare programs do attract more ridership than average bus fare elasticity values would predict, but that other applications fall within normal ranges of ridership response to lowered or otherwise altered fare levels, particularly when city size is taken into account."[10]

In the 2005 Operational Impact Study of AT, UVTMA cited an elasticity rate of -0.4 during its general discussion of rider attrition, while also acknowledging that elasticity rates vary significantly based on the individual characteristics of transit systems and demographics of the communities they serve.

Key findings from a 2012 industry survey documented in the TCRP report, *Synthesis 101: Implementation and Outcomes of Fare-Free Transit Systems* indicate highly favorable ridership outcomes that result from changing from a fare-based to a fare-free policy:

"Providing fare-free public transit service is virtually certain to result in significant ridership increases no matter where it is implemented. Evidence from the literature search and returned surveys indicate that ridership will usually increase from 20% to 60% in a matter of just a few months, and even more in some areas."[11]

However, the TCRP survey does not shed further light on the subject of the rider attrition that could be expected by a fare-free transit system changing to a fare-based service policy.

Among the experiences of the peer systems discussed earlier in this report (Section 1.5) that converted from a fare-based to fare-free service policy, it is noteworthy that the two Washington-based transit agencies (Link Transit and Skagit Transit) that converted in 1999 reported initial losses of up to 45% of total annual boardings and residual impacts that lasted for years. However, it must be understood that these agencies also implemented concurrent service cuts due to the sudden loss of dedicated operating revenue. On the other hand, Hele-on Bus serving Hawaii County, which implemented onboard fare collection in July 2011, reported a much lower 7.7% ridership decline in the initial months following the fare change.

The foregoing discussion suggests the limitations of using historical precedents from other areas as the basis for predicting the extent ridership attrition that AT would experience in reaction to the imposition of fares on the fixed route system. For revenue estimation purposes, Table 10 provides a ridership attrition range for each of the three alternative fare structures to illustrate possible customer reactions to the imposition of fares to ride AT fixed routes. At the low end of the range, a -0.35 rate is applied to reflect a restrained customer reaction to a relatively modest fare structure developed around a $0.50 base cash fare. At the upper end of the range, a -0.75 attrition rate is applied to reflect a more robust reaction

[10] Ibid., p. 12-32,33
[11] TCRP Synthesis 101: Implementation and Outcomes of Fare-Free Transit Systems; p. 2.

to a more aggressive fare structure built around a $2.00 cash fare. In between the two, a -0.55 attrition rate is applied to simulate an average customer reaction to a fare structure built around a $1.00 base cash fare.

Table 10: Ridership Attrition Rate Assumptions

Fare Structure Relative to NH & VT Transit Systems	Customer Reaction to Fare Policy		
	Muted	Moderate	Severe
Lower fares	-0.35	-0.45	-0.55
Medium fares	-0.45	-0.55	-0.65
Higher fares	-0.55	-0.65	-0.75

These attrition rates are applied to the FY 2012 ridership base of 246,069 (Table 7) and resulting fixed route ridership losses are estimated in Table 11. Total FY 2012 fixed route boardings lost by attrition are estimated between 86,100 and 184,600 depending on the fare policy alternative selected and the intensity of negative customer reaction to the imposition of fares on the fixed route system. For example, 135,300 annual boardings would be lost in response to a medium fare pricing policy combined with a moderate customer reaction to the imposition of fares and onboard fare collection. This represents a 55% loss of total FY 2012 fixed route system ridership.

Table 11: Estimated Fixed Route Ridership Loss

Fare Structure Relative to NH & VT Transit Systems	Customer Reaction to Fare Policy		
	Muted	Moderate	Severe
Lower fares	86,100	110,700	135,300
Medium fares	110,700	135,300	159,900
Higher fares	135,300	159,900	184,600

Table 12 provides range estimates of total annual fare-paying customer boardings retained on the fixed route system. The number ranges from 61,500 to 159,900 depending on the fare policy alternative selected and the intensity of negative customer reaction to the imposition of fares on the fixed route system. For example, 110,700 annual boardings would be retained in response to a medium fare pricing policy combined with a moderate customer reaction to the imposition of fares and onboard fare collection. This represents retention of 45% of total FY 2012 fixed route system ridership.

Table 12: Retained Fixed Route Ridership (fare-paying)

AT Fare Structure Relative to NH & VT Transit Systems	Customer Reaction to Fare Policy		
	Muted	Moderate	Severe
Lower fares	159,900	135,300	110,700
Medium fares	135,300	110,700	86,100
Higher fares	110,700	86,100	61,500

2.2.4 Estimated Fare Revenue

Farebox revenue estimates are presented in Table 13 suggesting a range of gross annual proceeds that AT could expect from adopting a fare-based service policy for the fixed route system. Total annual revenue based on FY 2012 net ridership varies from $44,300 up to $170,000, depending on the fare policy alternative selected and the intensity of negative customer reaction. For example, $88,600 in gross proceeds would be generated by a medium fare pricing policy combined with a moderate customer reaction to the imposition of fares and onboard fare collection.

Table 13: Fixed Route Farebox Revenue

Fare Structure Relative to NH & VT Transit Systems	Customer Reaction to Fare Policy		
	Muted	Moderate	Severe
Lower fares 40¢ average fare	$64,000	$54,100	$44,300
Medium fares 80¢ average fare	$108,300	$88,600	$68,900
Higher fares $1.60 average fare	$177,200	$137,800	$98,400

2.3 Access AT Fare Revenue

This section describes the methodology and assumptions used to calculate range estimates of the gross farebox revenue that AT could generate with a fare-based service policy applied to *Access AT* complementary paratransit service.

2.3.1 Ridership Base

Access AT provided 10,192 one-way passenger trips during FY2012, or about 40 one-way rides per service day.

2.3.2 Alternative Fare Structures

Three fare structure alternatives for Access AT are provided in Table 14. These reflect a strict interpretation of the ADA maximum fare rule applied to the fixed route fare alternatives in Table 9.

Table 14: Alternative Complementary Paratransit Fare Structures

Fare Type	Lower Range	Medium Range	Higher Range
Base 1-way fare	$1.00	$2.00	$4.00
Peak extension fare - Canaan & Enfield	2.00	4.00	8.00
Personal care attendant / travel aide	Free	Free	free
Average Fare	$1.05	$2.10	$4.20

2.3.3 Estimated Ridership Attrition

Very little research has been undertaken regarding the elasticity relationship that exists between complementary paratransit riders and the fares they pay. There are several practical reasons for this. First, since the enactment of the ADA in 1990, the maximum allowable fare that can be charged for complementary paratransit service was capped at not more than twice the fare for comparable fixed route service. In virtually every community with a transit system, this requirement has resulted in complementary paratransit fares that are below market prices for comparable curb-to-curb services offered by commercial providers. Unlike fixed route services, in many markets there are alternative service providers of specialized services found in the commercial and not-for-profit sector. Most individuals with disabilities that make them eligible for ADA complementary service recognize the value of the service they receive from public transit agencies under the ADA mandate. This helps to explain why these services typically operate near or at capacity in most communities.

Most human service and transit professionals nationwide believe that demand for affordable complementary paratransit service will continue to rise faster than supply for the foreseeable future. Key factors include the aging of the baby boomer generation, improved health care leading to longer lifespans, and demographic trends favoring "aging in place" leading to more people living independently but needing transportation assistance.

Limited paratransit capacity and the high cost per trip of providing complementary service are further reasons why transit managers are less concerned about forecasting the effects of proposed fare increases on complementary paratransit customers. Paratransit trips commonly cost five to ten times as much per passenger as fixed route trips, which adds to the financial burden of maintaining existing service levels, and limits the capacity to add service as customer demand rises. In practical terms, most U.S. transit systems have little available paratransit service capacity to offer, and limited additional resources to expand service. Therefore the focus of fare increases is on the fixed route services on which often there is capacity available.

Absent definitive research, the probable range of ridership loss induced by the imposition of a fare-based policy and onboard fare collection is unclear. For the purpose of calculating net revenue, the attrition rates applied to complementary paratransit service are the same as those applied to the fixed route patronage estimates (see Table 10).

Rider attrition estimates applied to FY 2012 *Access AT ridership* are provided in Table 15. Rider losses are estimated between 3,570 and 7,650 customer boardings, depending on the fare policy alternative selected and the intensity of negative customer reaction to the new fare policy.

Table 15: Estimated Access AT Ridership Loss

Fare Structure Relative to Fixed Route Alternatives	Customer Reaction to Fare Policy		
	Muted	Moderate	Severe
Lower fares	3,570	4,590	5,610
Medium fares	4,590	5,610	6,625
Higher fares	5,610	6.625	7,650

Table 16 provides range estimates of total annual fare-paying customer boardings retained by *Access AT*. For example, 4,590 annual boardings would be retained in response to a medium fare pricing policy combined with a moderate customer reaction to the imposition of fares and onboard fare collection. This mirrors the 45% retention of FY 2012 ridership predicted for the fixed route system.

Table 16: Retained Access AT Ridership (fare-paying)

AT Fare Structure Relative to NH & VT Transit Systems	Customer Reaction to Fare Policy		
	Muted	Moderate	Severe
Lower fares	6,625	5,610	4,590
Medium fares	5,610	4,590	3,570
Higher fares	4,590	3,570	2,550

2.3.4 Estimated Fare Revenue

Farebox revenue estimates are presented in Table 17 suggesting the range of gross annual proceeds that AT could expect from adopting a fare-based service policy for *Access AT.* Annual fare revenue based on FY 2012 net ridership ranges from about $4,800 to $19,250, depending on the fare policy alternative selected and the intensity of negative customer reaction to the imposition of fares on *Access AT*. For example, $9,600 in gross proceeds would be generated by a medium fare pricing policy combined with a moderate customer reaction to the imposition of fares and onboard fare collection.

Table 17: *Access AT* Farebox Revenue

Fare Structure Relative to Fixed Route Alternatives	Customer Reaction		
	Muted	Average	Severe
Lower fares $1.05 average fare	$7,000	$5,900	$4,800
Medium fares $2.10 average fare	$11,800	$9,600	$7,500
Higher fares $4.20 average fare	$19,250	$15,000	$10,700

3.0 Fare Collection Expenses

Calculating net fare revenue requires quantified estimates of the costs of implementing and maintaining an onboard fare collection system, including capital expenses to procure and install fareboxes and revenue handling equipment, and to retrofit the AT operating facility; as well as operating expenses to administer a daily routine of fare collection and processing.

3.1 Capital Costs

An assessment of fare collection technologies (see Appendix B) was prepared during the study that concluded that a simple but secure fare collection system would be best suited to AT's organizational scale and operating environment. The capital costs of a suitable fare collection system include acquisition and installation of fareboxes for AT's active revenue fleet of 29 buses, as well as revenue processing equipment and facility upgrades required to process revenues securely from bus to bank. As summarized in Table 18, the estimated capital cost of implementing onboard fare collection using mechanical fareboxes and industry best practices for revenue handling is approximately $105,500, or $5,275 annually assuming a minimum 20-year life cycle.

Table 18: Fare Collection System Capital Costs

	Unit Cost	Units	Equipment Cost
Fareboxes			
Farebox	$850	29	$24,650
Operational Spare Money Vaults	$325	29	$9,425
Spare Parts (10%)	$118	29	$3,408
Mounting Hardware	$300	29	$8,700
Installation	$200	29	$5,800
Subtotal			$51,983
Contingency (5%)			$2,599
Subtotal, Fareboxes		$1,882	$54,582
Facilities & Equipment			
Money Room construction	$150	250 sq ft	$37,500
Video surveillance	$5,000	1	$5,000
Spare Vault rack	$5,000	1	$5,000
Coin counter / roller	$1,000	1	$1,000
Subtotal			$48,500
Contingency (5%)			$2,425
Subtotal, Facilities & Equipment			$50,925
Total Capital Cost			**$105,507**

3.1.1 Fareboxes

New and used mechanical fareboxes are readily available in the marketplace and range in complexity and price from a simple locking metal donation box costing less than $100, to a two-stage gravity box costing $1,000 or more. The two-stage farebox is preferred for two reasons. First, it allows the driver to view the coins and bills deposited by each customer into a glass-walled upper chamber before dropping the cash into a secure lower chamber beneath the inspection plate. This enables the driver to confirm that the correct fare has been paid. Second, the secure lower chamber contains a separately locking, removable inner vault that protects fare proceeds during the service day and while being transported from the bus to the location where they will be counted. When the fare proceeds are removed from the bus, the inner vault containing the revenue stays locked and is replaced with an empty inner vault. The key used to secure the farebox to a vertical stanchion or the bus floor is different from the key required to remove the inner vault. The estimated cost to purchase and install two-stage mechanical fareboxes for a 29-bus fleet is about $54,600, as indicated in Table 18. It is noted that the mechanical fareboxes envisioned are non-registering devices, meaning that they do generate any information about the transactions that occur or the amounts deposited.

3.1.2 Facility Upgrades

Transit fare collection and secure processing from bus to bank would require physical space within AT's operating facility to accommodate vaulting and money counting activities. Most transit systems conduct vaulting as part of the daily vehicle servicing process that is handled by maintenance personnel at the end of each service day. Among smaller systems that may assign routine vehicle servicing tasks to drivers rather than to maintenance personnel, the vaulting process may be handled by each driver at the Dispatch window as a final duty of the day. While the final decision rests with AT, vaulting through the service lane is assumed for purposes of cost estimation. Minimum facility upgrades recommended to support this new activity include conversion of existing office or storage space into a secure money room containing up to 250 square feet of floor space. The room should be in proximity to the service lane if possible. The use of off-line video surveillance systems is considered an industry best practice for monitoring activitites in the money room and service lane. The capital cost of facilitiy upgrades is estimated at $37,500.

3.1.3 Revenue Processing Equipment

Key equipment required for efficient revenue processing include a coin sorting and rolling machine; rolling cart to move vaults containing cash from the service lane to the money room, and a wall rack in the service lane to hold the empty inner vaults. The estimated cost of this equipment is $11,000.

3.2 Operating Costs

In addition to acquisition and installation expenses, there are ongoing operating costs required to support onboard fare collection and revenue processing. Cost estimates in this section are limited to incremental new or additional expenses that likely would be incurred. First year expenses are estimated to be $57,640 as shown in Table 19.

Expense	Resource	Hours / Units	Hourly / Unit Cost	Total Cost
Personnel				
Revenue Processing	Revenue Clerk	1,040	$21.00	$21,840
Pass Sales	Marketing Assistant	1,040	$17.50	$18,200
Training	Operators & Supervisors	100	$26.25	$2,625
Subtotal				$42,665
Services				
Third-Party Commissions	Cost of sales	$50,000	7.0%	$3,500
Revenue Transport	Contract	255 days	$25.00	$6,375
Bank Fees		12 months	$50.00	$600
Subtotal				$10,475
Materials & Supplies				
Paper transfers	Printing			$1,000
Monthly Passes	Printing			$2,500
Ticket Books	Printing			$1,000
Subtotal				$4,500
Total				**$57,640**

Table 19: Fare Collection System Annual Operating Costs

Added personnel and front-line employee training account for nearly three-quarters of the total. Incremental wages and fringe benefits are assumed for one full-time equivalent (FTE) administrative position (or two half-time positions) to handle new functions:

- *Revenue Processing* – duties include the removal cash and currency from the farebox vaults; revenue processing through a counting and rolling machine; and preparation of reports of daily receipts and bank deposits. It is assumed that AT would contract with an armored transport service to deliver currency and rolled coins to the bank for deposit. The position incumbent also might manage transfer, ticket and token inventories.

- *Pass Sales / Customer Assistance* – duties include the sale and distribution of pre-paid fare media; response to customer service inquiries and resolution of fare-related issues and concerns. This assumes that AT would offer one or more unlimited-ride period passes, tickets or tokens sold directly and through third-party sales outlets at retail or other convenient locations.

Incremental wages and fringe benefits also are included to cover start-up training of front-line employees including drivers, service supervisors, maintenance workers and office personnel. Onboard fare collection would add significant new responsibilities for AT drivers, including verification of cash fares paid; issuing and receiving paper transfers; monitoring the valid use of period passes; collecting or punching tickets; verifying eligibility for discount fares; and answering questions about fare rates and policies. Increased interaction with customers inevitably poses the risk of fare disputes that can be minimized through employee training and customer education. The estimated cost assume a minimum of two hours customer service training per front line employee covering fare policy and procedural requirements, conflict avoidance and resolution techniques, data collection requirements.

It is noted that no incremental expenses are provided for general management and oversight. It is assumed that AT's senior management team would absorb the responsibilities of setting up and overseeing an onboard fare collection program. Key managerial functions include:

- Fare policy and pricing determinations
- Customer and public outreach
- Design and print pre-paid fare media
- Develop vendor participation in third-party distribution network for pre-paid fare media
- Develop written revenue processing procedures
- Monitor and audit daily counting and reconciliation of cash

3.3 Additional Concerns

Beyond the calculation of net revenue based on gross proceeds less annualized capital and operating expenses, several other potential costs must be factored into the fare policy decision.

3.3.1 Loss of Philanthropic Contributions

As noted earlier, the potential loss of revenue generated through contributions to the Keep It Free fund is a significant concern. Given its name and clear purpose, it is reasonable to expect a sharp decline in contributions. The net revenue determination assumes a 90% decline in contributions to the Keep It Free fund, which attracted $53,172 in total contributions in FY 2012. The estimated annual revenue loss is $47,855.

AT also generated $46,051 through the sale of service sponsorships to local businesses and foundations in FY 2012. AT staff would need to poll its sponsors directly for a more precise appraisal of the response to the imposition of onboard fare collection. For the

purpose of estimating net revenue, the loss of one-third of FY 2012 sponsorship revenue is assumed. The estimated annual revenue loss is $15,200.

3.3.2 Impact on Schedule Reliability

The AT fixed route network is designed around three hubs or pulse transfer points located in Hanover, Lebanon and West Lebanon where multiple routes meet every 30 or 60 minutes throughout the service day. Operating schedules are calibrated at these locations to facilitate convenient transfers between routes with minimal customer waiting. Currently all AT public fixed routes (except for the Brown Route) share a common 60-minute schedule cycle[12] and deploy either two buses to maintain a 30-minute headway or one bus to maintain an hourly headway. The routes are able to meet consistently because they all share the same hourly schedule cycle. The multiple hub network design depends heavily on schedule accuracy and on-time performance to protect transfer integrity.

AT operations staff reported that operating schedules on most routes already are tight with schedule recovery times below accepted industry best practice suggesting recovery time equivalent to 15% of round trip running time.[13] Adequate recovery time is a key input with considerable influence on schedule adherence by enabling a late-arriving bus to get back on schedule to depart on time for its next trip. When adequate recovery time is unavailable, it can be anticipated that schedule integrity will crumble over the course of the service day as the accumulated lateness of successive trips leads to trips being dropped from the schedule.

Current transfer commitments and running time issues among AT public fixed routes are noted as follows:

- *Green Route* – This route connects in West Lebanon with the Orange Route and the Red Routes every 30 minutes; and connects in Hanover with the Blue Route every 30 minutes. AT staff feels that the Green Route schedule is the tightest of all routes with recovery time available only on the three trips in the daily timetable that bypass Hartford Village. Currently the 60-minute schedule cycle includes 30 minutes to run between West Lebanon and Hanover via Hartford Village, or 25 minutes when Hartford Village is bypassed. Planned recovery time in the Green Route schedule is 9.1% of round trip running time on trips that serve Hartford Village in one direction only; the trips that serve Hartford Village in both directions have no scheduled recovery time.

- *Orange Route* – This route connects in West Lebanon with the Red Route buses every 30 minutes heading toward both Lebanon and the Route 12A Plaza area; and with the Green route every hour for passengers going to Hartford Village, Wilder and Hanover. It also connects in Hanover with the Blue route every 30 minutes; and with the Brown Route once every two hours. Currently the schedule cycle includes 25 minutes to run the

[12] The schedule cycle includes round trip running time plus recovery time at one or both ends of the line.
[13] Applied to AT, an optimal schedule cycle consists of up to 52 minutes of round trip running time plus eight minutes of recovery time.

White River Junction loop; 30 minutes to run the West Lebanon to Hanover; and five minutes of scheduled recovery time to accommodate the two pulse transfers in Hanover and West Lebanon. Current recovery time in the Orange Route schedule is 9.1% of round trip running time.

- *Blue Route* – This route connects in Hanover with the Green Route and Orange Route every 60 minutes; and connects in Lebanon with the Red Route every 30 minutes. Currently the 60-minute cycle includes 25 minutes for northbound trips from Lebanon to Hanover; 27 minutes for southbound trips; and up to eight minutes of scheduled recovery time in Lebanon. Recovery time for these trips is optimally 15% of round trip running time. For those trips that run just between Hanover and DHMC, there are six minutes of recovery time scheduled at the hospital per 30 minute loop, which is 25% of round trip running time but nevertheless realistic due to the shorter cycle. The Blue Route extension trips that serve Canaan and Enfield during commute hours have no recovery time.

- *Red Route* – This route connects in Lebanon with the northbound Blue Route to Hanover every 30 minutes; and connects in West Lebanon with the Green Route every hour and the Orange Route every 30 minutes. Currently the schedule cycle allows for 12 minutes per direction to run between Lebanon and West Lebanon; 25 minutes to run the loop through the Route 12A shopping plazas; and 11 minutes of scheduled recovery time to accommodate the two pulse transfers in Lebanon and West Lebanon. Planned recovery time in the Red Route schedule is 22% of round trip running time, although in practice less recovery time is available during afternoon and evening hours due to the traffic on Route 12A near the I-89 interchange.

- *Brown Route* – This is the only route that does not operate on a 60-minute cycle, which is less convenient for transfers but also demanding less emphasis on on-time performance. The Brown Route runs on a 40-minute schedule cycle with recovery time provided at CRREL on the Hanover end and at Dan & Whits or the Park-Ride lot on the Norwich end.

A key concern is that onboard fare collection would increase dwell times at bus stops where customers board, thus adding to round trip running times at the further expense of already limited recovery times.[14] The Blue Route extension trips that serve Canaan and Enfield during commute hours would require immediate rescheduling to accommodate onboard fare collection, and changes to the Green Route and Orange Route almost certainly would be required to preserve an hourly schedule cycle and maintain transfer integrity. Potential changes could include a further reduction or discontinuation of Green Route service to Hartford Village, spreading headways system-wide from the current 30/60 minutes to 40/80 minutes; or add buses to existing lines to maintain current headways – the cost of which would negate revenue gains from implementation of fares.

[14] Assuming 12 stops per one-way trip to pick up passengers and average additional dwell time of 15 seconds per stop, it may be estimated that onboard fare collection would be expected to add three to four minutes per one way trip.

3.3.3 Ridership Loss

As discussed earlier, total FY 2012 fixed route boardings that could be lost through fare-related attrition are estimated between 86,100 and 184,600 depending on the fare policy alternative selected and the intensity of negative customer reaction to the imposition of a new fare policy. Similarly, between 3,570 and 7,650 *Access AT* customer boardings would be lost. The combined total losses due to fare-related attrition are estimated between 89,670 and 192,250 customer boardings, which is equivalent to between 35% and 74% of FY 2012 ridership aboard the fixed route system and *Access AT*.

The significance of the loss of ridership means more than just the farebox revenue that would not be collected because some customers are riding less or not at all. Ridership is the most basic of transit performance measures, and a sense of whether it is rising or falling is what most residents, employers and businesses in the AT service area rely on to formulate their opinion of the transit agency. A sudden and dramatic decline in ridership would be a major local news event that surely would diminish the goodwill that AT has built up over the years in the community, and influence public willingness to continue to support local public transportation as a viable alternative to owning and driving a personal vehicle. Any future service reductions that might be triggered by a shrinking customer base could jeopardize current levels of institutional support for the existing system.

4.0 Conclusion

The primary purpose for this study is to provide a business-driven assessment of the benefits and costs of replacing its present fare-free service policy with a fare-based policy and onboard fare collection. Both monetary and non-monetary factors are pertinent to this analysis.

At the heart of the matter is the question of how much net revenue gain would AT achieve by initiating a fare-based service policy for fixed route and complementary paratransit service. Chapters 2 and 3 of this report focused on facts and assumptions required to generate reasonable estimates of potential fare revenue as well as the offsetting expenses of fare collection and processing. Table 20 summarizes the preceding discussions and presents range estimates of net fare revenue associated with the three fare policy alternatives compiled in Table 9. These projections indicate that AT has little to gain financially from enacting a fare-based service policy at this time. The analysis shows that total annual fare revenue proceeds ranging from $49,100 up to $196,250 would be offset by annualized capital and operating expenses totaling $125,970. Net revenue estimates range from a gain of $70,480 per year to a net loss of $76,870 per year, depending on the fare policy alternative selected and the intensity of negative customer reaction to the imposition of fares for fixed route and complementary paratransit service.

These results generally are consistent with the conclusion of the 2012 TCRP Synthesis 101 report on 39 fare-free transit systems currently operating in the U.S., which found that fare-free transit is a more effective revenue policy for systems with limited capacity to generate fare revenue. “In general, the smaller the system, the more likely the net revenue of collecting fares is closer to zero.”[15]

At either end of the range, the marginal effect of net fare revenue on AT’s budget and overall financial situation is low. The maximum upside potential represents about 1.8% of the FY 2012 operating budget of $3,993,296; the maximum downside loss of $76,870 represents 1.9% of the budget. It is noted additionally that in order to achieve even a small monetary gain, there would need to be an uncharacteristically restrained consumer response to the enactment of a high-fare policy that would make AT transit fares among the most expensive in New Hampshire and Vermont.

Beyond monetary effects, the study identified several potential costs associated with a possible change in fare policy that should be considered. These include deterioration of schedule reliability that would have a serious impact on AT customers, and potentially could lead to increased operating costs or a system-wide reduction in service frequency to preserve transfer integrity at the transit hubs. Additionally, AT would lose a substantial portion of its fixed route and complementary paratransit ridership base, which would be perceived as a step back for public transit in the community.

[15] TCRP Synthesis 101: Implementation and Outcomes of Fare-Free Transit Systems; p. 10.

Table 20: Estimated Net Revenue for Fare Policy Alternatives

	Fare Policy		
	Lower Fares	**Medium Fares**	**Higher Fares**
Fare Revenue			
Fixed Route System			
Customer reaction: Muted	$64,000	$108,300	$177,200
Moderate	$54,100	$88,600	$137,800
Severe	$44,300	$68,900	$98,400
Access AT Complementary Paratransit			
Customer reaction: Muted	$7,000	$11,800	$19,250
Moderate	$5,900	$9,600	$15,000
Severe	$4,800	$7,500	$10,700
Total (Gross) Farebox Revenue			
Customer reaction: Muted	$71,000	$120,100	$196,450
Moderate	$60,000	$98,200	$152,800
Severe	$49,100	$76,400	$109,100
Implementation Costs			
Annual Capital Cost (20 yrs)	$5,275	$5,275	$5,275
Total Capital Cost	$105,507	$105,507	$105,507
Annual Operating Cost	$57,640	$57,640	$57,640
Loss of Keep It Free fund revenue	$47,855	$47,855	$47,855
Loss of Sponsorship revenue	$15,200	$15,200	$15,200
Annual Monetary Costs	$125,970	$125,970	$125,970
Net Revenue from Fare Collection			
Customer reaction: Muted	-$54,970	-$5,870	$70,480
Moderate	-$65,970	-$27,770	$26,830
Severe	-$76,870	-$49,570	-$16,870

In conclusion, while not the industry norm, fare-free rural transit is a viable business model in a number of communities characteristically similar to the AT service area. Given its long-term identification as a fare-free transit system, and the substantial revenue it receives from institutional and philanthropic sources in the name of fare-free transit, AT would be prudent to retain its present fare policy and focus on increasing philanthropic contributions through onboard donations and other means. Similarly, AT should continue to work closely with institutional funding partners to generate additional contributions based on the value of the services it provides to the community.