

**FAIRFAX COUNTY DEPARTMENT OF TRANSPORTATION:  
FAIRFAX CONNECTOR**

**Comprehensive Transit Plan**

**Technical Memorandum 8: Prioritization and Programming of  
Proposed Improvements**

**October 29, 2015**

*Prepared for:*

**Fairfax County Department of Transportation**

*By:*



**EXPERIENCE | Transportation**

and



**FOURSQUARE INTEGRATED  
TRANSPORTATION PLANNING**

*In association with:*

**WBA Research**

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## 8. Prioritization and Programming of Proposed Improvements

### 8.1. Prioritization Process

The development of this Comprehensive Transit Plan (CTP) included a review of existing services and the creation of numerous individual recommendations to improve existing routes and add new routes. These recommendations were developed and refined in consultation with County staff, the Technical Advisory Group (TAG), other regional partners, and the public. The outreach process and the service recommendations themselves are documented in separate technical memoranda.

After the list of recommendations was finalized, the study team estimated the operating costs and ridership impacts for each of the changes. The results were then used to rate and rank the recommendations. The 10-year CTP is not cost-constrained; the six-year Transit Development Plan (TDP), created in a parallel process, is cost-constrained per Virginia Department of Rail and Public Transportation (DRPT) guidelines. The first six years of the CTP match the recommendations of the TDP and are therefore limited by funding that is anticipated to be available. The remaining projects – those not proposed to be funded within the TDP period – were rated in terms of priority, but not programmed by year.

At the time of the prioritization, the Fairfax County Department of Transportation (FCDOT) had already programmed several route improvements for FY2016 and FY2017; these changes were not part of the rating process. Route changes that are related to the Silver Line Phase 2 opening in FY2020 were programmed for that year and were also not rated.

The remaining recommendations were coded by type of improvement using the categories in Table 8-1. Generally Type I recommendations (fix problems) generally rated highly because they consist primarily of lower-cost improvements that respond to specific problems associated with existing bus service.

**Table 8-1: Types of Recommendations**

#	Type	Description
1	Fix problems	Reduce crowding, adjust the schedule, reduce unproductive service, or make small alignment changes to existing routes.
2	Improve existing	Improve span or frequency of existing route (including new evening, Saturday, or Sunday service), generally to make route closer to service guidelines or to accommodate future expected ridership.
3	New connection	New route that permits a one-seat connection between major nodes in the County that cannot now be easily made by transit.
4	New area	Service to parts of the county that do not currently have bus service.

The ratings were developed using the following methodology:

1. Calculate *average subsidy per boarding* as forecast net operating cost (operating cost less fare revenue) per forecast riders for each route.
2. Calculate *incremental subsidy per boarding* as change in net operating cost per change in boardings. This measure is not defined for new routes.
3. Determine a “Priority A” cost-effectiveness rating based on average cost per boarding where High is  $\leq \$10$ ; Medium is  $< \$20$  and  $> \$10$ ; Low is  $\geq \$20$ .

4. Determine a “Priority B” cost-effectiveness rating based on incremental cost per boarding using the same thresholds as for Priority A (High is  $\leq \$10$ ; Medium is  $< \$20$  and  $> \$10$ ; Low is  $\geq \$20$ ).
5. Determine a final priority rating based on the Priority A rating modified as follows: Routes that had overall low cost-effectiveness (Priority A), but whose incremental improvement in cost effectiveness (Priority B) was high (meaning the route would see a significant boost as a result of the proposed improvement) had their final rating upgraded from low to medium or from medium to high. Similarly, if the incremental cost effectiveness (Priority B) of a change was low, then a recommendation with a high Priority A rating was downgraded to the medium group, and a medium-ranking recommendation to the low group.
6. Program projects for FY2018 and FY2019. For FY2018, 10 low-cost and cost-saving projects were selected, six of which were the “Fix Problems” type and three of which were the “Improve Existing” type (as defined previously). All of these 10 projects had a “high” rating, except for one that was rated “medium.”

The following sections describe the development of ridership and cost estimates that were used as inputs to the rating process and the use of the ratings to program projects not previously programmed for a specific year.

## 8.2. Ridership Estimation

Route-level ridership estimates for proposed changes (or new routes) were developed using a variety of techniques depending on the type of recommendation. The following is a summary of the techniques used relative to the type of improvement proposed:

- **Changes in headway** – The impact of headway changes was estimated using industry-standard elasticities drawn from the TCRP Report 95, *Traveler Response to Transportation System Changes, Chapter 9*. Midpoint arc elasticities were applied to the existing ridership during the relevant time period for the proposed headway change to estimate the future ridership.
- **Changes in span of service** – The impact of the extension of service into a new time period—be it midday, evening, or weekend—was estimated using ratios of ridership in the new time period to ridership in the existing time period. These ratios were drawn from routes operating in the same area with similar service levels. If there were no analogous routes, then the ratios were based on typical industry experience.
- **New routes** – The ridership on an entirely new service is necessarily more speculative. Whenever possible, the productivity of a similar route serving a similar area was used as the basis for the estimate. That productivity was then multiplied by the projected number of revenue hours to produce a ridership estimate.
- **Multiple changes** – In some cases, a route was being changed in more than one way, such as revised headways and a new alignment, and perhaps a new span as well. In addition, routes in the northwestern part of the county were strongly affected by the Silver Line Phase 2 implementation. The impacts of each of these changes were accounted for separately. For instance, Route 950 is expected to lose many riders to the Silver Line when Phase 2 opens (specifically, those who currently ride between Herndon-Monroe and Wiehle-Reston East Metrorail station), but it will gain riders from Route 505, which it is recommended to absorb. The headway will also be improved. Thus it was necessary to take account of all of these factors in order to estimate the total ridership impact of the recommendations.

The ridership estimates were based on current-year base ridership; that is, without adjusting for any potential background increase in transit demand over time (e.g., due to population growth). This was necessary because it was not known initially in which year the changes would be implemented. Equally importantly, it was important to separate the ridership effects of the recommendations from those of background growth in transit demand. Existing route-level ridership was taken from September 2014 farebox data for Fairfax Connector and from automatic passenger counter averages for the fall quarter of 2014 for Metrobus.

### 8.3. Cost Estimation

The cost for each of the recommendations was calculated by subtracting the current cost of service on a route from the estimated future cost based on the proposed operating parameters. If the recommendation was a wholly new route, then the full cost of the future service was used. The cost of existing service was based on FCDOT figures on daily revenue hours by route for May 2015. These daily hours for Saturdays, Sundays, and weekdays were annualized by multiplying by the number of days of each type per year. For Metrobus routes, revenue hours of service was available only at the line level. Where changes were proposed for only one route within a line, the incremental change in revenue hours was calculated using the change in service rather than by subtracting existing service from future service. For example, if the proposal was to increase weekday service by four round-trips, the revenue hours for those four round-trips was calculated directly from the schedule, and that figure was the basis of the incremental service cost.

The annual operating cost estimate for each recommendation was calculated by multiplying the net change in annual revenue hours by the current operating cost of \$103.04 per revenue hour (for Fairfax Connector routes) or \$144.22 per revenue hour (for Metrobus routes), as shown in Table 8-2 below. The difference in the cost per revenue hour rates between the two systems can be attributed to the difference in business models. WMATA directly operates the Metrobus service; the Fairfax Connector is operated by a contractor.

To derive the net cost of each recommendation, the estimated change in fare revenue was subtracted from the incremental change in operating cost. The fare revenue was calculated by multiplying the change in ridership (forecast less existing) by an average fare revenue of \$1.21 per boarding (for Fairfax Connector) or \$1.12 per boarding (for Metrobus).

**Table 8-2: Assumptions Used in Cost Estimates**

	Operating Cost per Revenue Hour (2015)	Passenger Revenue per Boarding (2015)
<b>Fairfax Connector</b>	\$103.04	\$1.21
<b>Metrobus</b>	\$144.22	\$1.12

### 8.4. Recommendations Previously Programmed

As mentioned above, a number of recommendations that were developed during the CTP/TDP process were already programmed by FCDOT for the coming two years. For FY2016, which was already underway as the study was being completed, the program included improvements to Routes 109, 151/152, and the 620-650 series. These projects are:

- Route 109 – Add Sunday service.
- Route 151 – Improve headways from 60 to 30 minutes for weekday midday and weekends.
- Route 152 – Add selected off-peak trips.
- Routes 621, 630, 640, and 650 - Add weekend service and adjust the schedule to improve reliability.
- Route 624/634 – Create two new routes to supplement existing routes 631 and 632 to serve the newly expanded Stringfellow Road Park and Ride.

As shown in Table 8-3, these improvements together are expected to increase ridership by 444,000 boardings per year and are expected to cost an additional \$3.35 million in annual operating subsidies.

**Table 8-3: Recommendations Programmed for FY2016**

Route Number	Existing Cost	Proposed Cost	Existing Ridership	Forecast Ridership	Change in Riders	Change in Operating Cost	Change in Net Cost
109	\$1,202,742	\$1,336,159	153,004	159,274	6,270	\$133,417	\$125,830
151	\$1,955,231	\$2,902,998	401,195	497,353	96,158	\$947,766	\$831,415
152	\$1,742,103	\$1,831,289	192,528	197,628	5,100	\$89,186	\$83,015
621	\$453,302	\$895,429	64,171	105,129	40,958	\$442,127	\$392,568
630	\$427,653	\$625,007	55,947	90,371	34,424	\$197,354	\$155,700
640	\$324,011	\$804,704	26,928	43,998	17,070	\$480,693	\$460,039
650	\$364,316	\$1,001,454	56,738	91,325	34,587	\$637,138	\$595,287
624/634	\$0	\$960,753	-	209,610	209,610	\$960,753	\$707,125
<b>TOTAL</b>	<b>\$6,469,359</b>	<b>\$10,357,793</b>	<b>950,510</b>	<b>1,394,688</b>	<b>444,177</b>	<b>\$3,888,433</b>	<b>\$3,350,979</b>

For FY2017, FCDOT has proposed improvements to Route 321/322 plus the addition of new routes 308, 313, and 451. These improvements are:

- Route 313 - Create a new cross-county route between the Franconia-Springfield Metrorail/VRE Station and Fair Oaks/Fairfax County Government Center via Fairfax County Judicial Center.
- Route 308 - Create a new cross-county route between the Franconia-Springfield Metrorail/VRE Station and Mount Vernon Hospital via Beulah Road and Telegraph Road.
- Route 321/322 – Streamline the route alignment; improve weekday peak headways; add late evening service.
- Route 451 – Create a new route, the Merrifield Circulator, to serve new development south of the Dunn Loring Metrorail Station.

As shown in Table 8-4, these changes together are expected to increase annual ridership by 428,000 boardings and are expected to require \$4.7 million in additional operating subsidy.

**Table 8-4: Projects Programmed for FY2017**

Route Number	Existing Cost	Proposed Cost	Existing Ridership	Forecast Ridership	Change in Riders	Change in Operating Cost	Change in Net Cost
308	\$0	\$1,539,150	-	145,750	145,750	\$1,539,150	\$1,362,793
313	\$0	\$1,643,548	-	82,000	82,000	\$1,643,548	\$1,544,328
451	\$0	\$541,269	-	61,200	61,200	\$541,269	\$467,217
321/322	\$2,877,471	\$4,375,842	510,165	649,295	139,130	\$1,498,371	\$1,330,024
<b>TOTAL</b>	<b>\$2,877,471</b>	<b>\$8,099,809</b>	<b>510,165</b>	<b>938,245</b>	<b>428,080</b>	<b>\$5,222,338</b>	<b>\$4,704,361</b>

The Service Recommendations Technical Memorandum also identified 20 separate route changes intended to complement the opening of Silver Line Phase 2 service, currently expected for FY2020. These recommendations are:

- Eliminate selected routes that will be covered by the extended Silver Line or new/expanded bus routes (Routes 505, 926, 980, 981, 985);
- Streamline existing routes (Routes 574, 983);
- Expand coverage in Herndon (Routes 921, 922, 954);
- Modify existing routes to connect to the new stations and/or improve levels of service (Routes 585, 605, 924, 927, 929, 950, 951, 952).

As shown in Table 8-5, the recommended changes related to the Silver Line Phase 2 opening will result in an increase of about 175,000 riders on the improved and new bus routes in the corridor. Of course, bus riders on the eliminated routes (especially 980, 981, and the truncated 983) will become Silver Line riders, resulting in an overall corridor decline in bus boardings, more than made up for by the anticipated increase in Silver Line boardings. The total cost of these changes, combining both service increases and decreases, is expected to require a \$2.35 million increase in annual operating subsidy.

**Table 8-5: Projects Programmed for FY2020, with Silver Line Phase 2**

Route Number	Existing Cost	Proposed Cost	Existing Boardings	Forecast Boardings	Change in Boardings	Change in Operating Cost	Change in Net Cost
505	\$1,278,850	\$0	140,724	-	(140,724)	(\$1,278,850)	(\$1,108,574)
574	\$1,583,450	\$1,637,994	115,281	107,541	(7,740)	\$54,544	\$63,909
585	\$466,769	\$1,125,840	68,085	116,025	47,940	\$659,071	\$601,063
605	\$1,556,703	\$2,172,851	133,868	179,543	45,675	\$616,148	\$560,881
921	\$0	\$573,188	-	55,530	55,530	\$573,188	\$505,997
922	\$0	\$573,188	-	55,530	55,530	\$573,188	\$505,997
924	\$406,454	\$1,000,048	57,108	104,280	47,172	\$593,594	\$536,516
926	\$344,949	\$0	26,100	-	(26,100)	(\$344,949)	(\$313,368)
927	\$212,256	\$669,865	33,915	73,855	39,940	\$457,609	\$409,281
929 Ph. 2	\$514,994	\$963,459	50,235	84,660	34,425	\$448,465	\$406,811
950	\$3,012,381	\$3,590,595	867,074	868,907	1,833	\$578,215	\$575,997
951	\$249,682	\$608,928	28,050	30,600	2,550	\$359,245	\$356,160
952	\$339,191	\$608,928	30,090	32,640	2,550	\$269,737	\$266,651
954	\$0	\$378,888	-	38,250	38,250	\$378,888	\$332,606
980	\$566,366	\$0	346,290	-	(346,290)	(\$566,366)	(\$147,355)
981	\$583,325	\$0	57,459	-	(57,459)	(\$583,325)	(\$513,800)
983	\$1,888,002	\$1,260,839	165,836	55,388	(110,449)	(\$627,163)	(\$493,521)
985	\$376,419	\$0	21,517	-	(21,517)	(\$376,419)	(\$350,383)
RIBS 1	\$1,547,331	\$1,624,948	155,196	155,196	0	\$77,617	\$77,617
RIBS 3	\$1,546,186	\$1,624,761	178,752	178,752	0	\$78,575	\$78,575
<b>TOTAL</b>	<b>\$16,473,306</b>	<b>\$18,414,319</b>	<b>2,475,580</b>	<b>2,136,697</b>	<b>(338,883)</b>	<b>\$1,941,013</b>	<b>\$2,351,062</b>

## 8.5. Ratings of the Recommendations

The remaining recommended Fairfax Connector route improvements and new routes identified in the Service Recommendations Technical Memorandum were rated based on cost effectiveness: the net cost per rider and change in net cost per rider. The net cost per rider is calculated as the total annual operating cost less the total annual fare revenue divided by the total annual ridership. The change in net

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cost per rider represents the same ratio, but for the increment between the proposed future service and the present-day service. These measures are equivalent for any wholly new routes.

There were several route-level changes in the Service Recommendations that must be implemented in conjunction with another route change, either because they involve moving one part of a route alignment to another route or because the routes are operationally conjoined (for example, all buses operating on Route 161 also operate 162 in an alternating pattern). For the purposes of rating the recommendations, the routes listed in Table 8-6 were packaged together.

**Table 8-6: Routes Combined for Rating**

Route Numbers
161/162
171/172
231/232
305/372/373
321/322
333/340/341
401/402/401L/402L
624/634

Table 8-7 lists, by route number, the recommendations not included in the previous section (that is, not programmed for FY2016, FY2017, or FY2020), showing both existing and forecast operating costs and ridership, and the calculation of net operating costs (operating subsidy).

**Table 8-7: Service Recommendations Not Programmed for FY2016, FY2017, or FY2020**

Route Number	Type	Existing Cost	Proposed Cost	Existing Boardings	Forecast Boardings	Change in Cost	Change in Boardings	Net Operating Costs
101	1	\$1,225,500	\$1,265,133	181,715	181,715	\$39,632	-	\$1,045,257
161/162	1	\$1,808,764	\$1,846,683	293,610	267,215	\$37,919	(26,395)	\$1,523,353
171/172	2	\$4,306,678	\$5,241,254	1,101,081	1,111,536	\$934,576	10,455	\$3,896,296
231/232	1	\$1,174,868	\$1,210,639	134,117	134,117	\$35,770	-	\$1,048,357
305/372/373	1	\$1,793,055	\$1,899,854	179,890	196,465	\$106,800	16,575	\$1,662,132
315	3	\$0	\$1,643,548	-	88,690	\$1,643,548	88,690	\$1,536,233
333/340/341	1	\$553,541	\$1,010,369	89,735	102,000	\$456,828	12,266	\$886,949
334	1	\$797,727	\$826,274	42,725	52,585	\$28,546	9,860	\$762,646
335	2	\$405,178	\$520,972	54,022	56,572	\$115,794	2,550	\$452,520
395	1	\$589,951	\$757,777	127,730	127,730	\$167,825	-	\$603,224
401/402(+L)	2	\$6,658,562	\$8,824,655	1,536,276	1,626,036	\$2,166,092	89,760	\$6,857,151
463	1	\$1,732,730	\$1,672,787	101,081	138,056	(\$59,943)	36,975	\$1,505,739
464	4	\$0	\$202,976	-	28,000	\$202,976	28,000	\$169,096
466	1	\$257,011	\$595,396	49,215	91,290	\$338,385	42,075	\$484,935
496	3	\$0	\$2,561,583	-	344,000	\$2,561,583	344,000	\$2,145,343
552	2	\$359,082	\$347,314	40,800	41,820	(\$11,768)	1,020	\$296,712
607	3	\$0	\$1,810,651	-	82,000	\$1,810,651	82,000	\$1,711,431
610 Ph. 1	3	\$0	\$1,732,061	-	122,400	\$1,732,061	122,400	\$1,583,957
610 Ph. 2	3	\$1,732,061	\$2,293,071	122,400	145,750	\$561,010	23,350	\$2,116,713
622	2	\$323,750	\$449,178	54,570	66,045	\$125,429	11,475	\$369,264
623	2	\$393,891	\$494,134	117,938	143,438	\$100,243	25,500	\$320,574
625	4	\$0	\$243,571	-	42,840	\$243,571	42,840	\$191,735
631	1	\$426,344	\$776,045	120,437	151,037	\$349,700	30,600	\$593,290
632	2	\$494,130	\$756,649	123,254	148,754	\$262,519	25,500	\$576,656
641	2	\$538,623	\$727,781	71,171	86,471	\$189,158	15,300	\$623,152
642	2	\$601,698	\$1,076,975	114,521	137,471	\$475,277	22,950	\$910,636
644	2	\$510,095	\$717,001	109,829	122,579	\$206,906	12,750	\$568,681
651	2	\$472,146	\$962,106	76,067	99,017	\$489,960	22,950	\$842,296
652	2	\$477,118	\$905,724	75,531	98,481	\$428,605	22,950	\$786,562
724	1	\$322,717	\$304,464	14,535	11,985	(\$18,253)	(2,550)	\$289,962
724 Flex	4	\$0	\$175,912	-	6,120	\$175,912	6,120	\$168,507
734	1	\$229,821	\$676,586	6,120	12,750	\$446,765	6,630	\$661,159
901	3	\$0	\$1,810,651	-	99,950	\$1,810,651	99,950	\$1,689,712
924 Ph. 2	2	\$970,920	\$1,208,489	104,280	113,835	\$237,569	9,555	\$1,070,749
929	2	\$545,690	\$498,870	46,410	50,235	(\$46,820)	3,825	\$438,085
929 Ph. 3	4	\$935,397	\$1,039,237	84,660	87,210	\$103,840	2,550	\$933,713
929 Ph. 4	2	\$1,008,968	\$1,129,172	87,210	97,810	\$120,205	10,600	\$1,010,822
Flex 1	4	\$0	\$757,777	-	42,840	\$757,777	42,840	\$705,940
Flex 2	4	\$0	\$757,777	-	42,840	\$757,777	42,840	\$705,940
Flex 3	4	\$0	\$757,777	-	57,120	\$757,777	57,120	\$688,662
RIBS 2	3	\$588,167	\$558,638	40,390	58,540	(\$29,529)	18,150	\$487,805
<b>TOTAL</b>		<b>\$32,234,186</b>	<b>\$53,047,509</b>	<b>5,301,316</b>	<b>6,715,341</b>	<b>\$20,813,324</b>	<b>1,414,026</b>	<b>\$44,921,947</b>

The application of ratings (high, medium, low) for each project is shown in Table 8-8.

**Table 8-8: Rating of Recommendations**

Route Number	Type	Avg Subsidy per Boarding	Incr. Subsidy per Boarding	Priority A: Average Subsidy	Priority B: Incremental Subsidy	Rating	Year Programmed
623	2	\$2.23	\$2.72	H	H	H	2018
552	2	\$7.09	-\$12.75	H	H	H	2018
RIBS 2	3	\$8.33	-\$2.84	H	H	H	2018
929	2	\$8.72	-\$13.45	H	H	H	2018
161/162	1	\$5.70	-\$2.65	H	H	H	2018
101	1	\$5.75		H		H	2018
231/232	1	\$7.82		H		H	2018
463	1	\$10.91	-\$2.83	M	H	H	2018
334	1	\$14.50	\$1.69	M	H	H	2018
724	1	\$24.19	\$5.95	L	H	M	2018
625	4	\$4.48	\$4.48	H	H	H	2019
466	1	\$5.31	\$6.83	H	H	H	2019
622	2	\$5.59	\$9.72	H	H	H	2019
464	4	\$6.04	\$6.04	H	H	H	2019
305/372/373	1	\$8.46	\$5.23	H	H	H	2019
632	2	\$3.88	\$9.08	H	H	H	2019
496	3	\$6.24	\$6.24	H	H	H	
171/172	2	\$3.51	\$88.18	H	L	M	2019
631	1	\$3.93	\$10.22	H	M	M	
401/402L	2	\$4.22	\$22.92	H	L	M	
644	2	\$4.64	\$15.02	H	M	M	
642	2	\$6.62	\$19.50	H	M	M	
641	2	\$7.21	\$11.15	H	M	M	
652	2	\$7.99	\$17.47	H	M	M	
335	2	\$8.00	\$44.20	H	L	M	
651	2	\$8.51	\$20.14	H	L	M	
333/340/341	1	\$8.70	\$36.03	H	L	M	
924 Phase 2	2	\$9.41	\$23.65	H	L	M	
929 Phase 4	2	\$10.33	\$10.13	M	M	M	
Flex 3	4	\$12.06	\$12.06	M	M	M	
610 phase 2	3	\$14.52	\$22.82	M	L	M	
Flex 1	4	\$16.48	\$16.48	M	M	M	
Flex 2	4	\$16.48	\$16.48	M	M	M	
901	3	\$16.91	\$16.91	M	M	M	
315	3	\$17.32	\$17.32	M	M	M	
610 Phase 1	3	\$12.94	\$12.94	M	M	M	
395	1	\$4.72		H		L	
929 Phase 3	4	\$10.71	\$39.51	M	L	L	
607	3	\$20.87	\$20.87	L	L	L	
724 Flex	4	\$27.53	\$27.53	L	L	L	
734	1	\$51.86	\$66.18	L	L	L	

Note: H=High, M=Medium, L=Low

Table 8-9 summarizes the projects recommended to be implemented in FY2018 and shows that the net cost of the changes will be very small, with a modest increase in ridership of about 66,000 boardings per year.

**Table 8-9: Proposed Projects for FY2018**

Route Number	Project Type	Existing Cost	Proposed Cost	Existing Boardings	Forecast Boardings	Change in Boardings	Change in Operating Cost	Change in Net Cost
101	1	\$1,225,500	\$1,265,133	181,715	181,715	-	\$39,632	\$39,632
161/162	1	\$1,808,764	\$1,846,683	293,610	267,215	(26,395)	\$37,919	\$69,857
231/232	1	\$1,174,868	\$1,210,639	134,117	134,117	-	\$35,770	\$35,770
334	1	\$797,727	\$826,274	42,725	52,585	9,860	\$28,546	\$16,616
463	1	\$1,732,730	\$1,672,787	101,081	138,056	36,975	(\$59,943)	(\$104,683)
552	2	\$359,082	\$347,314	40,800	41,820	1,020	(\$11,768)	(\$13,002)
623	2	\$393,891	\$494,134	117,938	143,438	25,500	\$100,243	\$69,388
724	1	\$322,717	\$304,464	14,535	11,985	(2,550)	-\$18,253	-\$15,168
929	2	\$545,690	\$498,870	46,410	50,235	3,825	-\$46,820	-\$51,448
RIBS 2	3	\$588,167	\$558,638	40,390	58,540	18,150	-\$29,529	-\$51,490
<b>TOTAL</b>		<b>\$8,949,136</b>	<b>\$9,024,934</b>	<b>1,013,321</b>	<b>1,079,706</b>	<b>66,385</b>	<b>\$75,798</b>	<b>-\$4,528</b>

As shown in Table 8-10, for FY2019 seven projects are proposed, consisting of all but one of the remaining high-rated projects, plus one medium-rated project. These projects include two “Fix Problems” projects: expanded service on three routes (171/172, 622, and 632), and two new routes (464 and 625). The projects combined will require a \$2.0 million annual increase in operating subsidy.

**Table 8-10: Proposed Projects for FY2019**

Route Number	Project Type	Existing Cost	Proposed Cost	Existing Boardings	Forecast Boardings	Change in Boardings	Change in Operating Cost	Change in Net Cost
171/172	2	\$4,306,678	\$5,241,254	1,101,081	1,111,536	10,455	\$934,576	\$921,925
305/372/373	1	\$1,793,055	\$1,899,854	179,890	196,465	16,575	\$106,800	\$86,744
464	4	\$0	\$202,976		28,000	28,000	\$202,976	\$169,096
466	1	\$257,011	\$595,396	49,215	91,290	42,075	\$338,385	\$287,475
622	2	\$323,750	\$449,178	54,570	66,045	11,475	\$125,429	\$111,544
625	4	\$0	\$243,571		42,840	42,840	\$243,571	\$191,735
632	2	\$494,130	\$756,649	123,254	148,754	25,500	\$262,519	\$231,664
<b>TOTAL</b>		<b>\$7,174,624</b>	<b>\$9,388,879</b>	<b>1,508,010</b>	<b>1,684,930</b>	<b>176,920</b>	<b>\$2,214,255</b>	<b>\$2,000,182</b>

For FY2021 and beyond, no specific projects have yet been programmed. Instead, the County should consider the ratings calculated here as one element of its decision on which route improvements to implement as funding becomes available. Other considerations should include geographic balance of improvements as well as any changes that will have occurred, such as new land development projects completed, new major employers, etc.

## 8.6. Metrobus Projects

The CTP/TDP included a comprehensive review of all WMATA Metrobus routes that operate within Fairfax County. A number of modifications of routes were suggested and two new inter-state routes were recommended in consultation with WMATA staff. However, WMATA, in conjunction with Fairfax County and other affected jurisdictions, will ultimately decide on when—and whether—to implement these recommendations. WMATA periodically conducts a “State of Good Operations” (SOGO) process that recommends changes to bus service designed to produce more efficient use of available resources. In September 2015, WMATA put forward the following proposals that affect service in Fairfax, for implementation in January 2016:

- **1A,B,E,Z Wilson Boulevard-Vienna Line:** Change IZ trips to 1A and eliminate IZ designation; change route 1B to bypass Seven Corners Shopping Center, Eliminate route 1E (by Dominion Hills). This change was also recommended by the CTP.
- **1C Fair Oaks-Dunn Loring Line:** Add additional time to weekday, Saturday, and Sunday schedules.
- **2B Fair Oaks-Jermantown Road Line:** Add service on Sunday at 60 minute headways. This change was also recommended by the CTP.
- **2T Tysons Corner-Dunn Loring Line:** Eliminate Sunday service.
- **3T Pimmit Hills Line:** Eliminate the section between East Falls Church and West Falls Church. The CTP recommended this as well as other modifications to the route.
- **5A DC-Dulles Line:** Eliminate service (alternative service available via Silver Line). This change was recommended by the CTP to occur coincident with the opening of Silver Line Phase 2.
- **15M George Mason University-Tysons Corner Line:** Eliminate service. This change was also recommended by the CTP.
- **18E,F Springfield Line:** Eliminate service.
- **23A,B,T McLean-Crystal City Line:** Run the 23B and 23T in place of the 23A weekdays non-rush hour, and all day Saturdays and Sundays.
- **26A Annandale-East Falls Church Line:** Increase peak frequency from 1 to 2 buses per hour.
- **28X Leesburg Pike Limited Line:** Option 1: Have the bus come every 30 minutes instead of every 15 minutes or, Option 2: Restructure the route to go between Mark Center and East Falls Church Metro Station with a combined headway of 20 - 25 minutes.
- **29N Alexandria-Fairfax Line:** Improve weekend frequency from 60 to 30 minute headways. The CTP recommends increasing peak-period frequency on this route and route 29K by reducing frequency on the 29CG express routes.

The remaining Metrobus recommendations from the CTP not already included in the list above are itemized in Table 8-11. Implementing all of these changes would require an increase in Metrobus annual operating subsidy of \$6.3 million and would generate an estimated 650,000 additional annual boardings. Most of the increase in cost is due to the two proposed new routes: Route 14A between Tysons and Bethesda, and Route NH7 between Huntington Metrorail Station and National Harbor, which together account for \$3.8 million of the \$6.3 million additional annual subsidy and also 364,000 of the expected 650,000 annual additional boardings.

**Table 8-11: Metrobus Recommendations**

Route Number	Regional Route	Improvement Type	Change in Boardings	Change in Operating Subsidy
11Y	Y	1	25,500	\$65,036
29G	Y	1	(12,750)	-\$235,991
29KN	Y	1	71,400	\$724,475
28X	Y	2	7,650	\$36,123
2B	Y	2	27,075	\$300,006
3T	Y	2	34,050	\$589,120
14A	Y	3	114,240	\$1,874,294
NH7	Y	3	162,000	\$1,842,462
NH7 Phase 2	Y	3	87,480	\$101,644
26A	Y	2	30,600	\$278,567
17ABFM	N	2	59,930	\$234,000
17A Phase2	N	2	2,260	\$24,000
17GHKL	N	2	19,890	\$201,000
17GKL Phase2	N	2	8,540	\$156,000
18GHJK	N	2	37,300	\$214,000
18G Phase 2	N	2	5,780	\$37,000
18PRS	N	2	(40,590)	(\$445,000)
18PS Phase 2	N	2	7,020	\$353,000
<b>TOTAL</b>			647,375	\$6,349,736

These recommendations were rated using the same procedure as used for the Fairfax Connector recommendations, using the same thresholds for designation of High, Medium, and Low ratings. All of the recommendations received either a High or Medium rating. These improvements have not been programmed for a specific year, as decisions on Metrobus improvements must be made in conjunction with WMATA for non-regional service (the 17/18 lines) and with WMATA and other jurisdictions for any changes to regional service (the remaining Metrobus lines with recommendations).

**Table 8-12: Rating of Metrobus Recommendations**

Route Number	Average Subsidy per Boarding	Incr. Subsidy per Boarding	Priority A: Average Subsidy	Priority B: Incremental Subsidy	Final Rating
11Y	\$1.32	\$2.55	H	H	H
29G	\$7.78	\$18.51	H	M	H
29KN	\$1.94	\$10.15	H	M	H
28X	\$4.37	\$4.72	H	H	H
2B	\$6.49	\$11.08	H	M	H
3T	\$13.33	\$17.30	M	M	M
14A	\$16.41	\$16.41	M	M	M
NH7	\$11.37	\$11.37	M	M	M
NH7 Phase 2	\$7.79	\$1.16	H	H	H
26A	\$5.07	\$9.10	H	H	H
17ABFM	\$6.77	\$3.93	H	H	H
17A Phase2	\$5.12	\$10.62	H	M	H
17GHKL	\$5.23	\$10.11	H	M	H
17GKL Phase2	\$4.65	\$18.27	H	M	H
18GHJK	\$2.50	\$5.74	H	H	H
18G Phase 2	\$0.64	\$6.40	H	H	H
18PRS	\$1.51	\$10.96	H	M	H
18PS Phase 2	\$5.35	\$50.28	H	L	M

Note: H=High, M=Medium, L=Low

### 8.7. Vehicle Requirements and Garage Capacity

For each recommended improvement, the number of vehicles by type of service day was estimated, as shown in Table 8-15. The total fleet increase was estimated for all recommended improvements grouped together by programmed year, assuming a 20% spare ratio. The table also shows the planned fleet expansion. The 20 buses expected to become available in 2016-2017 fall slightly short of the estimated 21 additional peak buses needed. However, the additional peak vehicle requirement calculation overstates needs because it does not take into account interlining of routes. However, if the vehicle needs end up being as great as suggested by Table 8-15, the 7 buses expected for 2018 delivery would bring the fleet almost to the required 20% spare ratio. Currently there are not enough buses planned for the service improvements suggested for 2019. If Fairfax County does not increase bus orders, these proposed projects will need to be delayed to 2020, when 14 of the 15 required buses will become available (considering both new vehicles on order and a reduction in peak requirements due to the Silver Line Phase 2 opening). Delaying the FY2019 service proposal to FY2020 could still leave a shortfall of up to four buses, including the required spares, unless there is significant interlining that will reduce the peak requirement.

**Table 8-13: Additional Vehicles Required**

<b>Fiscal Year</b>	<b>Additional Peak Vehicle Requirement</b>	<b>With 20% Spares</b>	<b>Planned Fleet Expansion</b>
<b>2016</b>	7	8	12
<b>2017</b>	14	17	8*
<b>2018</b>	1	1	7
<b>2019</b>	15	18	0
<b>2020</b>	-2	-2	12
<b>Total</b>	<b>34</b>	<b>41</b>	<b>39</b>

\*Five of the 13 vehicles on order for 2017 will be used for I-495 express service, replacing buses temporarily taken out of spare availability, and returning the system to its preferred spare ratio.

In FY2016, Fairfax County began construction on a \$20 million expansion of administrative and maintenance space and service buildings at the West Ox Bus Garage. Parking to support the expansion was built concurrently with the initial construction of the facility. When the project is completed in mid FY2017, the West Ox Bus Operations Center will be able to both maintain and park 170 buses, 80 more than before the project. Thus there will be ample maintenance and storage capacity for additional buses when the facility is complete.