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To: **Tom Dunscombe, BART**

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Date: **July 13, 2010**

Subject: **Service and Fare Change Impacts of the Proposed Oakland Airport Connector Project**

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1. INTRODUCTION

Title VI of the Civil Rights Act of 1964 prohibits discrimination on the grounds of race, color, and national origin in programs and activities of the Federal government or of recipients of Federal funds. Over time, the protections of Title VI have been expanded to include low-income populations. Accordingly, Federal agencies have adopted regulations and reporting compliance requirements to ensure that the programs and activities of their respective agency and the recipients of federal financial assistance comply with the requirements of Title VI.

In May 2007, the Federal Transit Administration (FTA) issued a Circular entitled "Title VI and Title VI-Dependent Guidelines for Federal Transit Administration Recipients." This Circular outlined the requirements of Title VI reporting and reaffirmed new requirements pursuant to Executive Orders 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" and Executive Order 13166 "Improving Access to Services for Persons with Limited English Proficiency."

As approved by the Federal Transit Administration (FTA) on April 21, 2010, BART's Title VI Corrective Action Plan (version r15a) includes Action Item 6, the requirement to perform a fare and service change analysis of the Oakland Airport Connector Project to determine if either the service change or the possible fares will have a disproportionately high and adverse effect on minority and low-income populations. BART engaged HDR Engineering, Inc. to undertake this analysis.

This report analyzes the service change and possible fare increase impacts associated with the replacement of the current AirBART bus service with an Automated Guideway Transit (AGT) system, similar to a People Mover. The analysis was conducted for four populations: minority, non-minority, low-income and non-low-income.

The report begins with a summary of findings from the analysis and then provides a full description and review of the proposed service changes, fare structure options, and ridership profile. Section 5 contains the analysis of the proposed change in service and potential impacts to minority and low-income populations. The data and methodology relevant to the metrics subject to quantification are described, and an assessment is performed of the proposed change in service and potential impacts to minority and low-income populations vis-a-vis non-minority and non-low-income populations. A narrative comparison of other service impacts is also provided. The report provides a finding of whether the change in service would have a disproportionately high and adverse impact on minority and low-income populations.

In Section 6, the data and methodology used to assess the impact of the proposed fares are described. First, the cumulative impact of fare increases is discussed. For each of three possible fares within a range of options, the report analyzes the impact of the proposed fares on minority and low-income populations vis-à-vis the impact on non-minority and non-low-income populations. The report discusses the alternatives available for people affected by the fare increase and provides a finding on whether the possible fare increases considered would have a disproportionately high or adverse impact to minority and low-income populations.

2. SUMMARY OF FINDINGS

2.1 Service Change

The review of the change in service from the existing AirBART bus service to the proposed AGT system finds that the project would not result in a discriminatory impact on minority or low-income communities. The benefits accrued from implementation of the service change would be shared equally by all users of the AGT regardless of socioeconomic characteristics. A discussion of the benefits resulting from the change in service is provided in Section 5. Benefits include (but are not be limited to) reductions in wait times, improved fare media, enhanced system capacity, greater service reliability, and reductions in overall travel times for passengers. A travel time savings analysis was conducted in an effort to identify and quantify how the benefits from the change in service are distributed among protected and non-protected populations. The travel time analysis found that minority and low-income populations will experience a slightly greater benefit than non-minority and non-low income riders (1.45% and 0.52% respectively) as a percentage of total trip time savings. These results demonstrate that the change in service with the implementation of the AGT service will be shared almost equally by all population groups, with minority and low-income riders experiencing a slightly greater benefit.

2.2 Fare Change

The findings of this report also indicate that the possible fare increases to $4.50 and $6.00 would result in minorities and low-income populations paying a slightly higher percentage increase as compared to non-minority and non-low-income populations (between 0.52% and 1.41%). The slight differences in percentages do not suggest that either of the proposed fare increases analyzed would result in a disproportionately high or adverse impact on minority or low-income populations when compared respectively to non-minority or non-low-income populations.

2.3 Conclusion Regarding Proposed Service and Fare Change

Pursuant to FTA Circular 4702.1A dated May 13, 2007, a disproportionately high and adverse effect is defined as an adverse effect that either “is predominantly borne” by minority or low-income populations or “is appreciably more severe or greater in magnitude” than the adverse effect suffered by non-minority and/or non-low-income populations. This definition was used to determine whether either the proposed service change or fare increase will have such an effect and this report concludes that neither will. There is no adverse effect associated with the change in service. None of the fare increases in the range studied are predominantly borne by the minority or low-income groups, nor is the adverse effect of the fare increase experienced by these groups more severe or greater in magnitude than that experienced by the non-protected populations.

3. DESCRIPTION OF THE PROPOSED SERVICE CHANGE, FARE CHANGE, AND RIDERSHIP PROFILE

3.1 Service Change

The Oakland Airport Connector (OAC) project is an Automated Guideway Transit (AGT) project proposed by the San Francisco Bay Area Rapid Transit (BART) District, and is intended to provide a rapid transit link between the Coliseum/Oakland Airport BART station and the Oakland International Airport (OAK). Currently, the Oakland Airport contracts with a private company to operate a fixed-route bus shuttle service, AirBART, between OAK and the Coliseum/Oakland Airport BART station. The AirBART bus service has no stops between the Coliseum/Oakland Airport BART station and the airport. The OAC Project would replace this bus route entirely using an elevated guideway, offering a more direct, reliable, and faster transit service. **Figures 1** and **2** show the general alignment of the current AirBART bus service and the proposed OAC Project AGT system along with the underlying land use and census tract boundaries. The implementation of the OAC Project would constitute a programmed capital improvement and a major change in service structure as defined by BART.

3.2 Fare Change

The current fare for the AirBART bus service is $3.00.[1] Transit fares for the AGT service may need to be increased to help pay for the capital cost of the project. BART has considered several transit fare options, including maintaining the current one-way fare of $3.00, or raising fares to either $4.50 or $6.00.

3.3 AirBART Ridership Profile

According to available ridership data, the AirBART bus service currently serves approximately 2,200 daily passengers. The demographic profile of current AirBART passengers is diverse. An on-board survey conducted in 2006[2] indicated that AirBART patrons came from a range of locations throughout the Bay Area, including some from San Mateo, Santa Clara, and Marin counties. However, most riders came from San Francisco, Alameda and Contra Costa counties. According to BART's 2008 Station ProfileStudy, approximately 28 percent of travelers between the Coliseum/Oakland Airport BART Station and the Oakland Airport had annual household incomes under $50,000, with 29 percent having household incomes between $50,000 and $100,000, and 43 percent having household incomes in excess of $100,000. Selected demographic information pertaining to AirBART riders is provided in **Table 1**, collected from the BART 2008 Station ProfileStudy. The survey results indicated that 63 percent of respondents self-identified themselves as non-minority riders, with 36 percent of respondents self-identifying themselves as minorities.

According to the 2006 on-board passenger survey referenced above, approximately 90 percent of AirBART passengers were airline travelers flying into or out of OAK. Less than 5 percent of the passengers surveyed worked at the airport. The remaining patrons (approximately 5 percent) were traveling to the airport to accompany a traveler, had business at the airport, or used the AirBART bus service for another reason. The primary trip purposes of AirBART riders surveyed are summarized in **Table 2**.

[1] The fare for AirBART may escalate by 2013.

[2] AirBART Bus System On-Board Survey Results, Wilbur Smith Associates, September 29 through October 3, 2006. Reported in Appendix B of the BART-Oakland Airport Connector Patronage Refinement, April 24, 2007, Wilbur Smith Associates.

Table 1: Demographic Profile of AirBART Riders

BART 2008 Station Profile Survey - AirBART Riders (weekdays only)

Weight: Origin weight (for entries at Coliseum) + Destination weight (for exits at Coliseum)
Margin of error: +/- 5.5 for estimated percentages of 50% at the 95% confidence level.

AirBART Rider Demographics

	%	n
Gender		
Male	55%	
Female	45%	
Total	**100%**	**332**
Age		
13-17	1%	
18-24	9%	
25-34	32%	
35-44	16%	
45-54	20%	
55-64	15%	
65-74	6%	
75 or older	1%	
Total	**100%**	**333**
Ethnicity		
White alone Non Hispanic	64%	
Black alone Non Hispanic	7%	
Asian alone Non Hispanic	21%	
Am Ind alone Non Hispanic	0%	
Other or Multiple Race, Non Hispanic	1%	
Hispanic, any race	7%	
Total	**100%**	**329**
Annual Household Income		
Under $50K	28%	
50 - 100 K	29%	
100K+	43%	
Total	**100%**	**313**

Source: BART 2008 Station Profile Study
Note: n = 313 to 333, depending on question

Table 2: Trip Purpose of AirBART Riders

Purpose	Percent
Business	35.3
Convention/Trade Show	2.6
Visit Friends/Relatives	38.0
Vacation	18.4
School	1.4
Other	4.3
Total	**100.0**

Source: Wilbur Smith Associates, October 2006

4. DEFINITIONS AND DATA USED IN DETERMINING TRANSIT IMPACTS

4.1 OAC Study Area

The OAC Study Area was identified using the data from the AirBART On-Board Passenger survey conducted in September, 2006. The results of the survey indicated that most AirBART riders came from Alameda, Contra Costa, and San Francisco counties. A study by the MTC[3] also indicated that more than three-quarters of the local Oakland Airport passengers originating from the nine–county San Francisco Bay Area came from Alameda (40.1 percent), Contra Costa (22.7 percent), and San Francisco (15.2 percent) counties. Therefore, for the purpose of this analysis, the OAC Study Area was defined as the land area contained in Alameda, Contra Costa, and San Francisco counties.

4.2 Minority Populations

In an effort to identify minority populations geographically, a percentage threshold for minority residents living in the three-county OAC Study Area was calculated. Using year 2000 census data, the total population within the three-county OAC Study Area was first determined. The total minority population was then calculated for all of the census tracts in the three-county region, and a percentage of minorities was determined. According to the year 2000 Census data, 53.3 percent of the total population living within the OAC Study Area was minority residents. This includes persons who self identified themselves as Black or African American, Asian or Pacific Islander, Native American or Alaska Native, Hispanic or Latino, and those persons who identified themselves as some other race or two or more races . Using year 2000 Census data, if the minority population percentage of a census tract within the three-county OAC Study Area was greater than 53.3 percent, then the census tract was identified as a minority tract. This was done to identify the locations of minority populations geographically and also for analysis of travel patterns used to consider whether populations experienced disproportionate or adverse effects resulting from the proposed change in service or proposed fare increases. **Figure 3** shows the three-county OAC Study Area and the geographical distribution of minority populations. There are 665 census tracts in the three-county area of which 338 census tracts (51 percent) are above the 53.3 percent threshold for minority populations, and 327 census tracts (49 percent) are below the threshold. The percentages shown for the census tracts are rounded to the nearest whole number. Based on the year 2000

[3] Metropolitan Transportation Commission, Oakland International Airport-San Francisco International Airport, 2006 Airline Passenger Survey, December 2007.

Census data, the minority population residing in the OAC Study Area was 1,689,877 persons.[4] The Census data for race and ethnicity was retrieved from the Census Summary File 1.

4.3 Low-Income Populations

As part of the MTC's Equity Analysis Report published in February, 2009, concentrations of poverty were defined by the MTC as places where at least 30 percent of residents had incomes below 200 percent of the federal poverty level. This 200 percent threshold takes into consideration the high cost of living in the Bay Area and therefore allows BART to be more inclusive in its definition of low-income populations. It should be noted that the 30 percent threshold is reflective of the nine-county MTC Bay Area region. Using the 2000 Census, the percentage of low-income population within the three-county OAC Study Area that is under 200 percent of the Federal poverty level was determined. That number was found to be 22.9 percent. Similar to the method for identifying minority populations described above, if the percentage of the low-income population for a census tract was found to be higher than 22.9 percent, the tract was flagged as a low-income tract. **Figure 4** shows the OAC Study Area and the geographical distribution of low-income populations. There are 665 census tracts in the three-county area of which 271 tracts (46 percent) are above the 22.9 percent low-income threshold and 394 tracts (54 percent) are below the threshold. Based on the year 2000 Census data, the low-income population residing in the three-county OAC Study Area was 716,327 persons.[5] It is necessary to note that Census data for poverty statistics is extrapolated for the population of a census unit based on the responses obtained from the long-form.

The methodology described in Sections 5 and 6 below, which is briefly described in Attachment B of the Action Plan, was used to analyze whether disproportionately high or adverse impacts would be experienced by minority or low-income populations as a result of the proposed changes in service and possible fare increases associated with implementation of the OAC Project. The data used to conduct these analyses was retrieved from the U.S. Census Bureau Census 2000 data tables, BART's full cash fare tables, and data inputs to the BART Ridership Model. It should be noted that only inputs to the model were used, and not the ridership model itself.

5. ANALYZING THE IMPACT OF SERVICE CHANGE

Travel times related to the proposed service change were quantified and analyzed to determine whether they decreased transit service to any census tracts. The methodology for this analysis, which was endorsed by the FTA when it approved BART's Corrective Action Plan on April 21, 2010, consists of three major steps as described in Section 5.1. Other important service characteristics associated with both the AirBART and proposed OAC service are described and summarized in Section 5.2.

5.1 Travel Time Savings Analysis - Methodology

The methodology to analyze the travel time impacts of the OAC Project consists of three steps.

Step 1: Define the OAC Study Area

The OAC Study Area was defined based on the AirBART On-Board Passenger survey conducted in September, 2006, in conjunction with the MTC's Oakland International Airport-San

[4] U.S. Census Bureau, Census 2000 Summary File 1 (SF 1), 2001.
[5] U.S. Census Bureau, Census 2000 Summary File 3 (SF 3), 2001.

Francisco International Airport, 2006 Airline Passenger Survey. Refer to Section 4.1 for additional information on the definition of the OAC Study Area.

Step 2: Estimate the average travel time and service levels to Oakland Airport for the existing service (AirBART) and the proposed service (OAC Project)
The input data for the BART Ridership Model (BRM) was used to determine the service change impacts of the proposed OAC Project[6]. The BRM model was developed by HDR for the purpose of simulating and forecasting the ridership on the BART network. The decision to use the BART ridership model inputs for this equity analysis (as opposed to MTC's regional travel model) was made for the following reasons:

- The model was built using the origin-destination data extracted from the BART 2008 Spring Ridership data. This data is collected electronically at station turnstiles by the Automatic Passenger Count System.
- Unlike the large-scale regional travel models, BRM model uses more accurate travel times and the actual fares customers pay at the point of entry to the system.

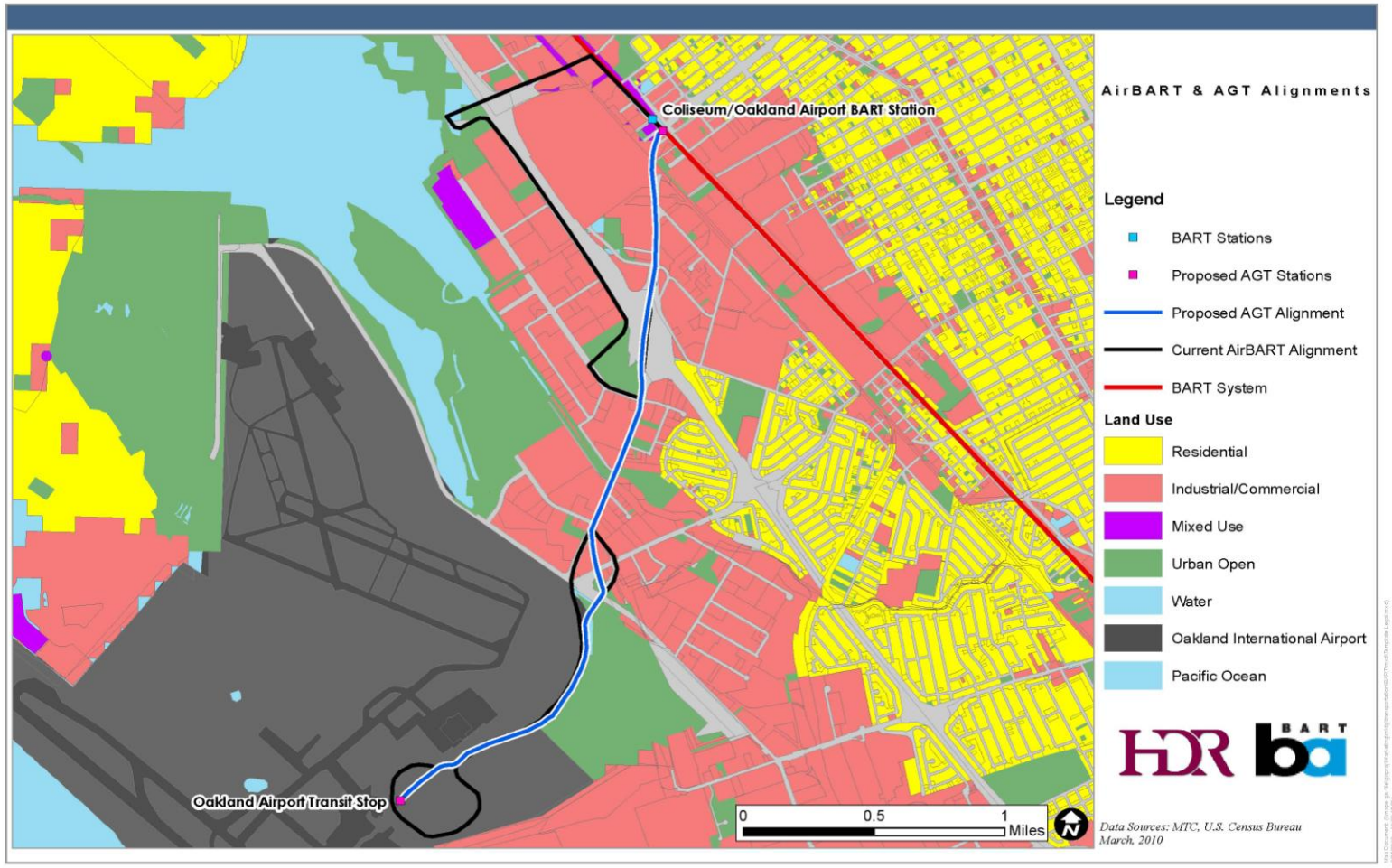
Estimation of average travel times to Oakland Airport

One of the inputs to the BART Ridership Model (BRM) contains station to station travel times as well as the average out-of-vehicle travel times (access time to a station, egress time from a station, waiting time and transfer time)[7]. Using this travel time data, the average travel time from the origin census tracts to each boarding station on the BART network was determined, and from each station to Coliseum/Oakland Airport BART Station was estimated. The average travel time from each origin census tract to Oakland Airport was then estimated by adding the time to Coliseum/Oakland Airport BART Station and the travel time from Coliseum/Oakland Airport BART Station to the Airport. The average travel time from Coliseum/Oakland Airport BART Station to Oakland Airport is approximately 23 minutes using the current AirBART service. The average travel time on the proposed AGT service is expected to be about 14.5 minutes.

[6] The station catchment area data of the BRM was verified against the 2008 Station Profile Study for general consistency.

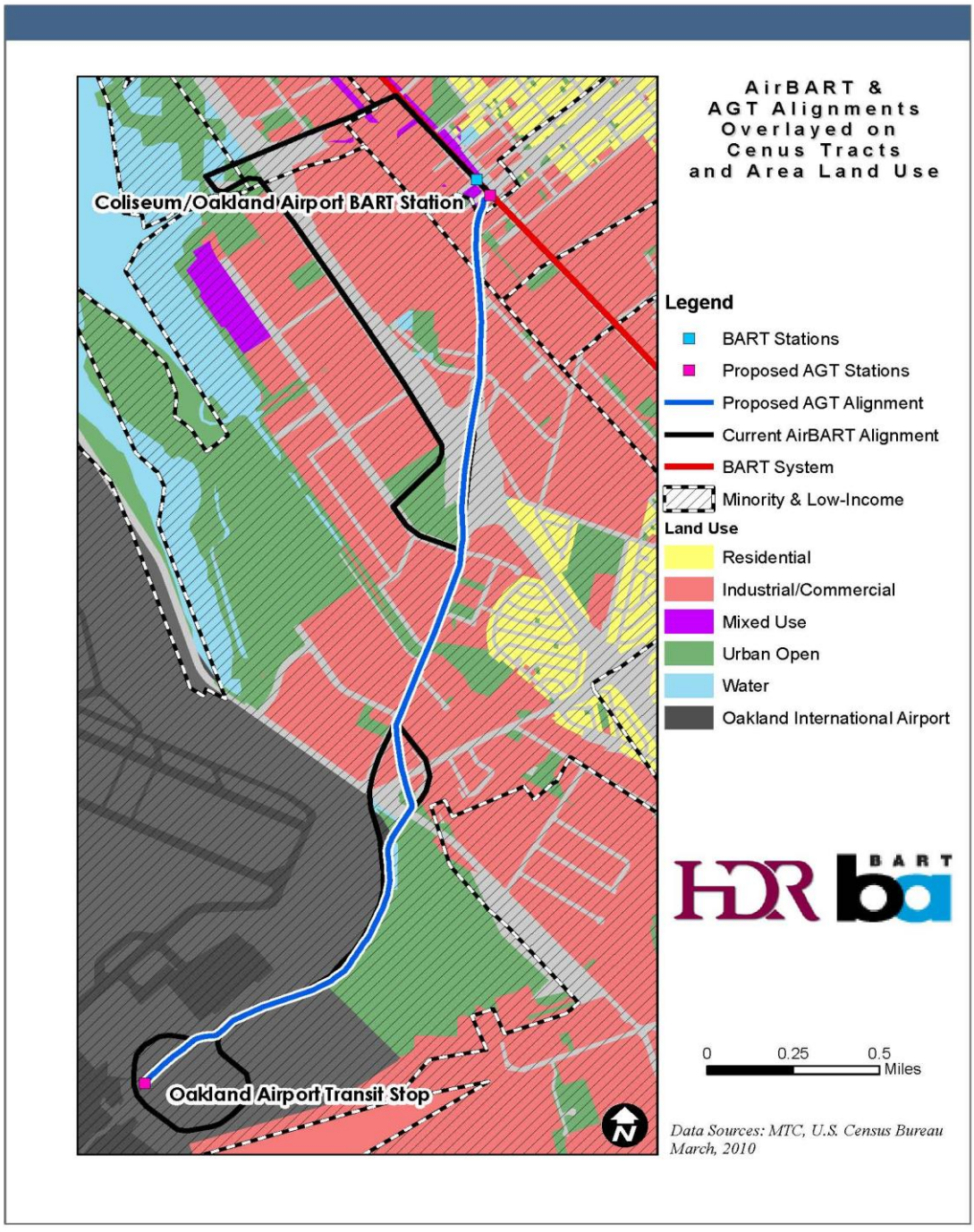
[7] Travel time reflects such parameters of service as headway, vehicle capacity, waiting time, ease of ticketing, and trip time variability/reliability of service. While these parameters are described in Section 5.2, they can be considered quantifiable to the extent they are reflected in the average travel time metric.

Figure 1: Alignments of AirBART and the Proposed AGT System



Source: HDR Inc

Figure 2: AirBART & AGT Alignments, Land Use, and Census Tracts



Source: HDR Inc

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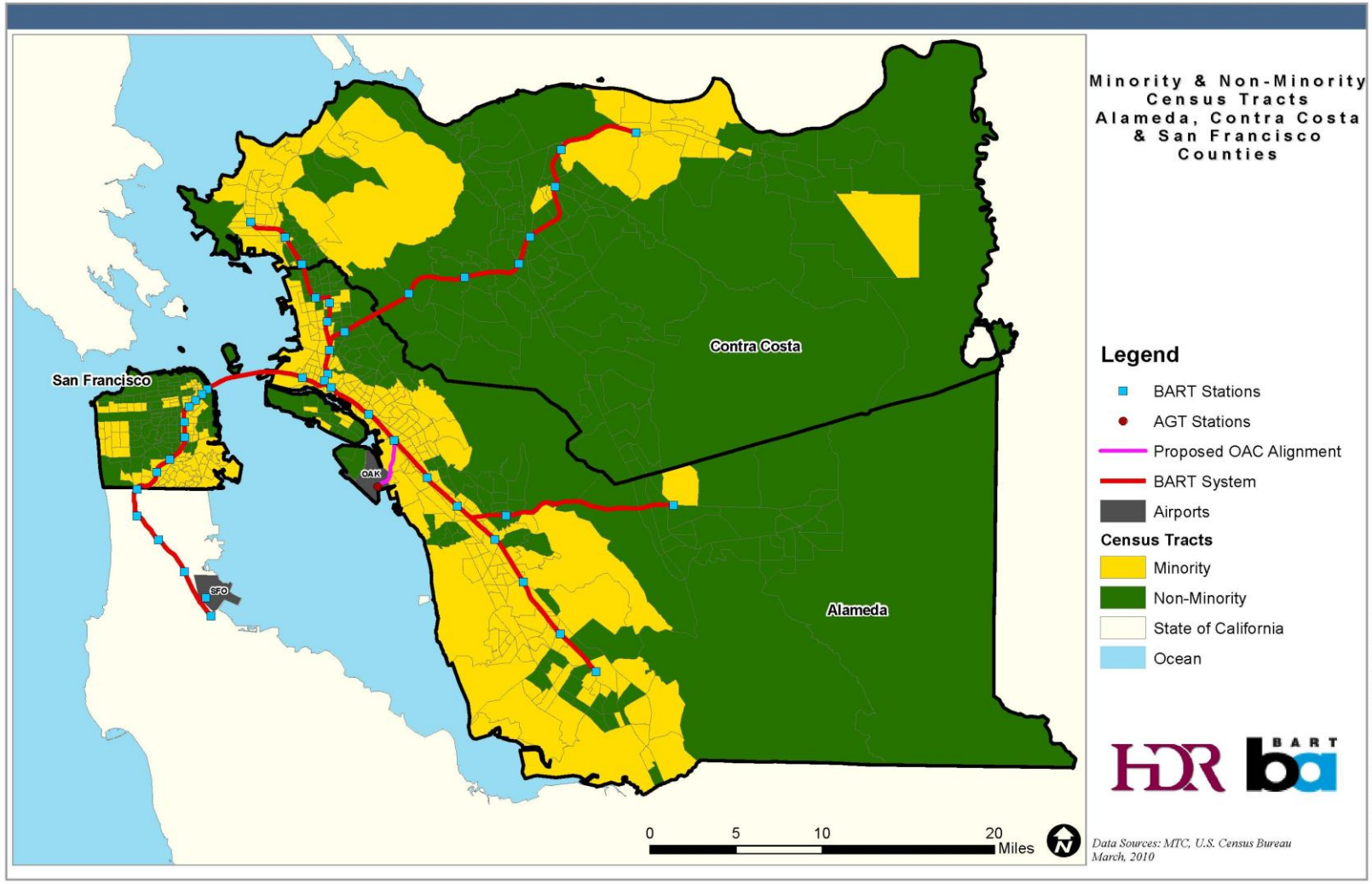
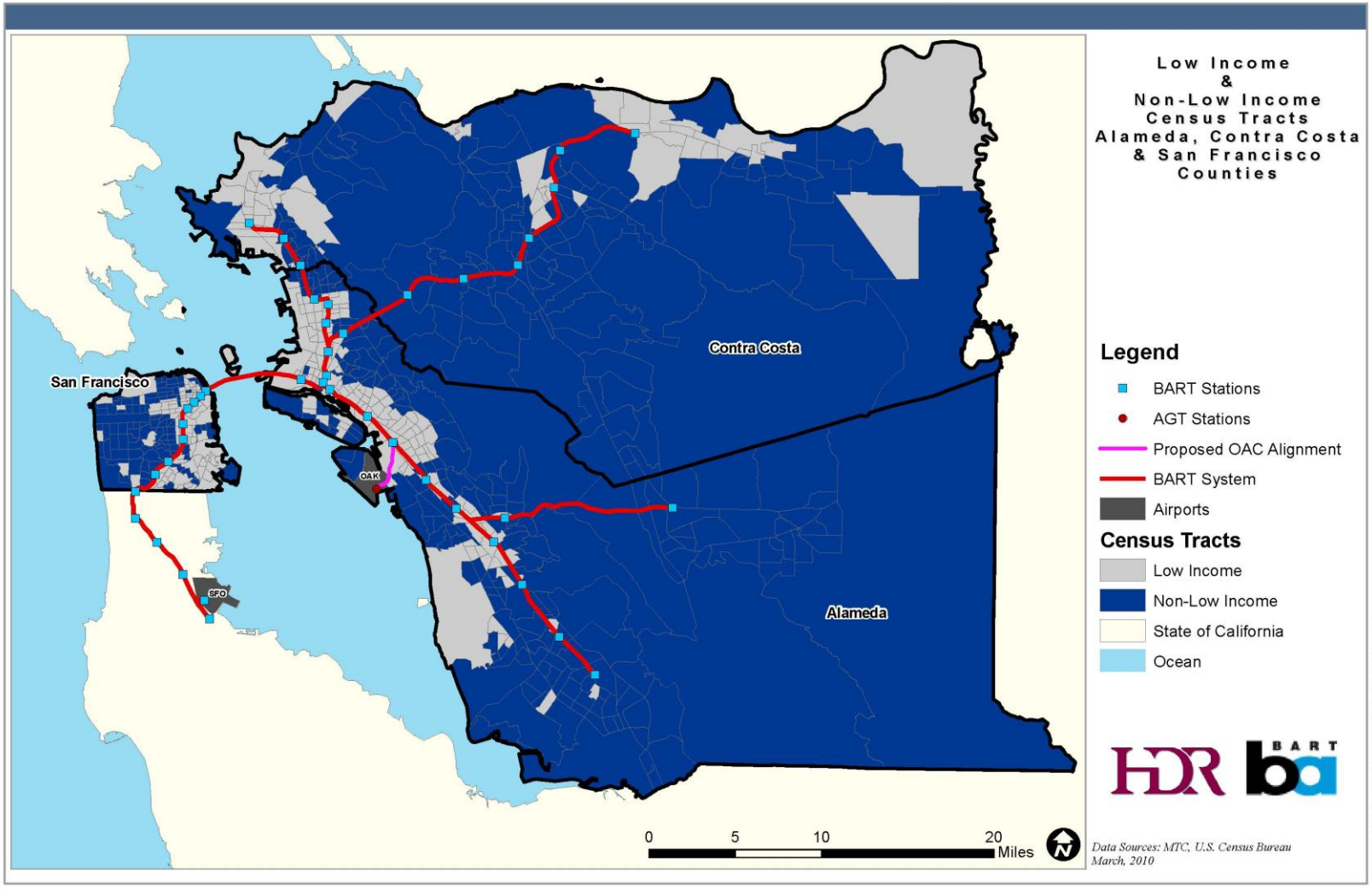
Figure 3: Locations of Predominantly Minority Population in the OAC Study Area



Source: HDR, Inc.

Figure 4: Locations of Predominantly Low-income Population in the OAC Study Area



Source: HDR, Inc.

Step 3: Compare the estimated average travel times in the OAC Study Area to Oakland Airport for Minority, Non-Minority, Low-Income and Non Low-Income population

- For each BART station, all the census tracts that generate ridership to that station (generally known as the station catchment area) were obtained from the BRM. Using the definitions described in Sections 4.2 and 4.3, each census tract in the catchment area is flagged as either predominantly minority, predominantly non-minority, predominantly low-income, or predominantly non-low-income.
- Next, the system-wide average travel time to Oakland Airport for each of the above-mentioned four population groups was estimated by taking the average of all travel times from the origin census tracts that are predominantly minority, non-minority, low-income and non-low-income to Oakland Airport. This calculation was performed for both the AirBART and AGT alternatives.
- Knowing the system-wide average travel times to Oakland Airport by AirBART bus and AGT alternatives, the percent reduction in travel time for each of the four population groups was calculated.
- By comparing the percent reduction in travel time for the minority group with the non-minority group and for the low-income group with the non-low-income group, a finding was made as to whether the travel time reductions resulted in any disproportionate or adverse impacts.

5.1.1 Analysis Findings

The proposed AGT service would operate more frequently (every 4.5 minutes as opposed to every 10 minutes by AirBART bus service) and will complete end-to-end trips faster than the current AirBART bus service (14.5 minutes end-to-end as opposed to 23 minutes end-to-end by AirBART bus service). For purposes of this report, the relevant question is how the improved travel time affects non-minority and non-low-income populations when compared to minority and low-income populations. The above methodology was applied to answer that question.

The analysis indicates the average travel time to Oakland Airport on the BART network is about 60.08 minutes for the whole population in the AirBART Study Area as shown in **Table 3**. When the AirBART service is replaced by the AGT service, there is a reduction of about 8.5 minutes in the average travel time.

Table 3: Service Impact of the OAC Project (AGT System)

(For the OAC Project Study Area of Alameda, Contra Costa, and San Francisco Counties)

	System wide average travel time to Oakland Airport by BART and AirBART (minutes)	System wide average travel time to Oakland Airport by BART and AGT (minutes)	Reduction in travel time (minutes)	Percent reduction In travel time
For all population in the Study Area	60.08	51.58	8.5	**14.14%**
For Minority population	57.06	48.56	8.5	**14.89%**
For Non-minority population	63.23	54.73	8.5	**13.44%**
Difference between Minority and Non-Minority				**1.45%**
For Low-income population	58.86	50.36	8.5	**14.44%**
For non-Low-income population	61.04	52.54	8.5	**13.92%**
Difference between Low-income and Non-Low-income				**0.52%**

Source: HDR, Inc.

The percent savings in travel time for all populations in the Study Area is estimated to be 14.1 percent. For minority populations, the savings in travel time is estimated to be about 14.8 percent, and for non-minority, it is about 13.4 percent. Therefore, the 8.5-minute travel time reduction offered by the AGT translates to a higher percent savings for the minority populations than for the non-minority populations. The same conditions apply to low-income populations that tend to live closer to the urban core and the BART system than non-low-income populations. The results of the analysis are very similar. As shown in **Table 3**, the travel time reduction for low-income populations is estimated to be 14.4 percent, while for the non-low-income, it is 13.9 percent.

All population groups studied will benefit from reduced travel times of the proposed service change. The results show, on average, that protected populations are expected to enjoy slightly

more time savings than non-low-income and non-minority populations. The difference in travel time savings is under 2 percent.

5.2 Other Service Effects

In addition to the reduction in travel time and the increase in service frequency, the proposed AGT service will offer other advantages when compared to the current AirBART service. **Table 4** shows a comparative summary of major service parameters associated with the AirBART bus service and the proposed AGT service.

Peak Headways: The proposed OAC Project would offer about 14 vehicles per hour (one every 4.5 minutes), whereas the current AirBART bus service offers 6 vehicles per hour (one every 10 minutes). This represents about a 130 percent increase in the number of vehicles stopping at each station. The average wait time is half of the headway[8]; therefore, the average wait time for the AirBART bus is 5 minutes, while the wait time for the AGT will average about 2 minutes. This service change translates to a reduction in wait time the average patron experiences before a vehicle departs by approximately 3 minutes. This contributes to an overall shorter trip time for all population groups, regardless of ethnicity or economic status.

Hourly Capacity: The hourly capacity is calculated by the average number of vehicles provided each hour multiplied by the capacity of the vehicle. The hourly capacity of the AirBART bus service is about 420 seats/standees. The AGT service would offer about 1,500 seats/standees per hour, an improvement of about 260 percent to all groups of population, regardless of ethnicity or income status.

System Capacity: Prior to the economic downturn, the AirBART bus ridership reached as high as 1.3 million annual riders, while the current annual ridership is about 750,000 passengers. In 2007 the AirBART bus reached and exceeded the capacity of the service provided. Many buses were full and had to leave patrons behind to wait for the next bus. The ridership currently is down at the Oakland Airport due to economic conditions and competition from other Bay Area airports. It is expected that the Airport will grow as the economic conditions improve.

With the AGT in service, this ridership is expected to increase as travel times, trip time variability and reliability are improved significantly. It is estimated that at least a 15 to 25 percent increase in ridership[9] can be expected in the short term, assuming the airline operations at Oakland Airport remain stable. Most of the ridership increase is expected to be in the category of airline passengers composed of business travelers and people making personal trips compared to work trips made by employees of the airport.

System capacity directly correlates with the number and capacity of vehicles provided per hour. The AirBART bus will reach full capacity at approximately 1.2 million annual passengers, while the AGT system will begin with a capacity of 3.2 million annual passengers, it could be extended to serve up to 4.9 million annual passengers once service warrants.

Figure 6 shows a comparison of different level of service parameters between the AGT service and AirBART service that are quantifiable.

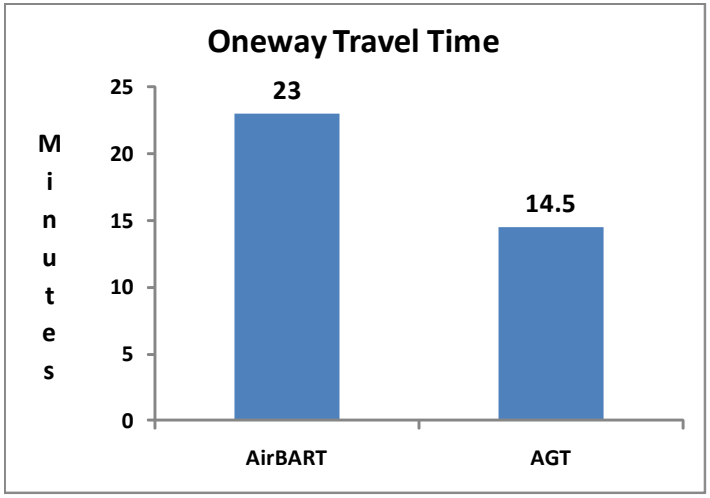
[8] This assumption is used in most travel models. It is based on the assumption that if passengers arrive at the station randomly, on the average, they will wait half the time between consecutive bus or train arrivals.

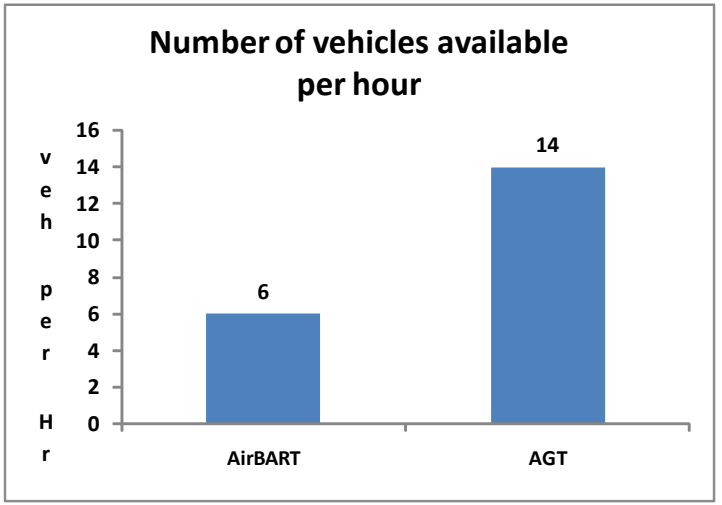
[9] Calculations shown in Section 6.1.

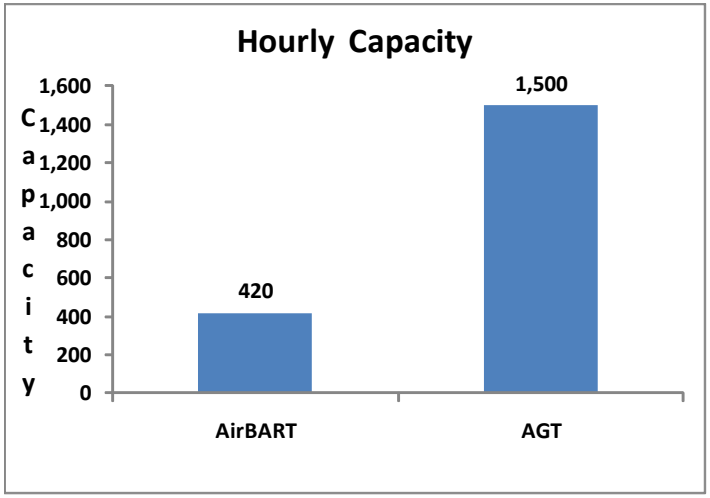
Service Consistency: The AirBART bus service runs on city streets sharing the road with all other vehicles on Hegenberger Road and other city streets, and is therefore subject to varying traffic conditions along the way. While the average travel time on the AirBART bus is approximately 23 minutes, the AirBART bus trip time varies between 10 and over 30 minutes depending on the traffic conditions.

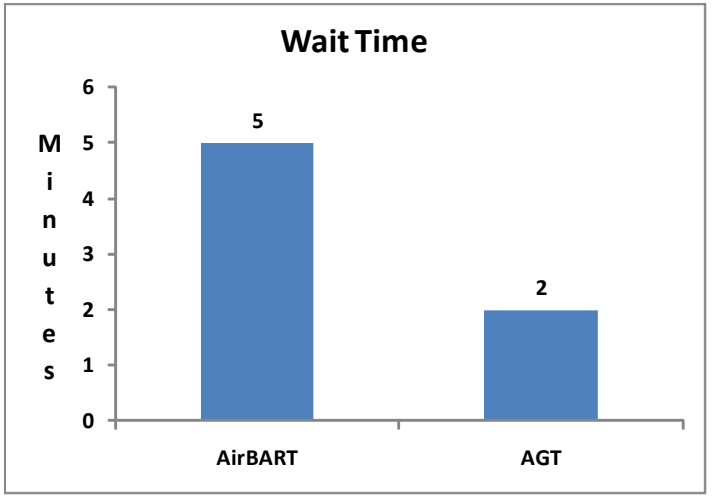
Fare and Fare Media: AirBART users currently depart the BART trains at the Coliseum/Oakland Airport BART Station at the elevated platform level and walk down to the concourse to exit the station where the AirBART bus station sits at street level on San Leandro Boulevard. AirBART users at the Airport exit the terminal and access the AirBART bus stop located centrally between Terminals 1 and 2. Patrons must have the exact $3 fare or a BART ticket containing $3 in value. AirBART bus drivers observe as patrons insert $3 fare into collection devices but do not provide a change service. Both BART and the Airport provide change and ticketing machines to assist in these transactions. Patrons familiar with the service may be prepared with the exact fare but because the trip is an occasional one for most users, many must stop to obtain change or a $3 ticket. Patrons without the correct fare can decide to overpay or exit the bus to use change and ticketing devices. While these transactions commonly occur for AirBART patrons, they are not factored into the overall trip time as most patrons can complete the ticketing or change process after they exit the BART fare gates but prior to the bus departing. However, the additional transaction time can result in a patron occasionally missing a departing AirBART bus.

Figure 6: Comparison of AGT and AirBART Level of Service









Source: HDR, Inc.

Prior to entering the AGT platform area, BART patrons will exit fare gates using their BART ticket. Payment for the entire BART ride to the Coliseum/Oakland Airport BART Station, including the AGT service to the Airport, will be subtracted from the remaining value on the BART ticket. No other fare medium is required. Patrons arriving from the airport will enter BART at fare gates at the Coliseum AGT station concourse and will pay the entire fare (from the Airport to their destination) upon exiting the BART system. Ticketing and bill-to-bill change machines will be available at the AGT concourse level for those that need to purchase or increase the value of their BART ticket. The service will improve the transaction time for many as it eliminates the separate fare transaction required to board an AirBART bus, thereby reducing the number of buses that might be missed due to the transaction time required during the ticketing process.

Riders on the AGT service will be able to purchase tickets wherever and with whatever payment method they currently use, and rides will be subject to all applicable fare discounts available to BART patrons system wide.

Intermodal Connection: The AirBART bus service requires patrons to go down to the street level to access the bus. Unless utilizing the handicap access, they must climb up several steps to access the bus single file. AirBART patrons carrying bags and luggage must pick up and deposit their luggage in a luggage rack.

The AGT station concourse and platform will be one level above the BART platform level so patrons will travel upstairs to the AGT platform. Stair, escalator, and elevator service will be provided. Like BART (but unlike AirBART), the floor of the AGT vehicle will be even with the platform level, thereby allowing patrons to enter/exit the vehicle without picking up luggage if it has wheels. Four doors on the AGT vehicle will allow patrons to enter and exit vehicles much faster than the AirBART bus.

Stops: The current AirBART bus system provides a direct connection to and from the airport without intermediate station stops. The design of the AGT system will accommodate the future construction of an intermediate stop near the mid-point of the alignment at the corner of Hegenberger Road and Pardee Avenue, where a number of hotels are located.

Table 4: Comparison of Service Levels

Service Parameters	AirBART service	AGT service
Hours of operation	5:00 AM to 12:05 AM	5:00 AM to 1:00 AM
Peak headways	Scheduled 10 minutes but is variable	4.5 minutes
Off-peak headways	Scheduled 10 minutes but is variable	9.5 minutes
One-way travel time	23 minutes	14.5 minutes
Vehicle capacity	32 seats, 10 standees plus luggage	113 passengers (standees included) plus luggage
System Capacity	1.2 million annual passengers	3.2 million up to 4.9 million annual passengers
Intermodal Connection	Exit station to street level (one level down) Single File Access One Entry/Exit Door Step up required Central Luggage	In station (one level up) Four Door entry/exit Vehicle at platform level Luggage stays with Patron
Fare and Fare Media	Separate ticketing from BART	Integrated into BART fare system
Service Consistency	Headways Vary Dependent on roadway conditions	Headways Consistent Elevated Guideway not dependent upon traffic conditions
Stops	None	None Initially Design accommodates future intermediate station

Source: HDR, Inc.

5.3 Analysis Findings

Because the percentage change in travel times will benefit all users of the service, and because additional benefits of the project will be available to all users, there are no identifiable adverse effects on minority or low-income populations. All population groups will benefit from reduced travel times associated with the proposed project. The proposed OAC Project will offer significant improvements in service quality and quantity vis-à-vis the current AirBART bus service, including enhanced fare media, improved intermodal connections, longer hours of operation, reduced vehicle headways (wait time), increased system capacity, and service consistency. All beneficial changes in service associated with implementation of the OAC Project are distributed among protected and non-protected populations equally. Based on these results, this service change analysis finds that the project does not result in a discriminatory impact on minority or low-income populations.

6. ANALYZING THE IMPACT OF PROPOSED AGT FARES

Many factors are involved in setting a fare, including the loan amount taken by BART to construct the project, the state of the economy, the ridership on the AirBART bus and the market conditions at the Oakland Airport at the time just prior to opening the AGT system. A fare for the proposed AGT system has not been determined, and the BART Board of Directors will set the fare prior to the OAC Project beginning service. The fare decision will also take into account riders potentially affected by any increase, including minority and low-income riders.

Suggested fares for the AGT system range from the current one-way $3.00 AirBART fare to a high of $6.00.[10] The question framed by Circular 4702.1A is whether minority or low-income riders are more likely to be adversely impacted by a potential fare increase. This analysis separately tests the impact of $3.00, $4.50 and $6.00 fares.

6.1 Ridership Impact (Cumulative Impact of Fare Increases and Service Improvement)

The impacts of a fare increase and service improvements on AirBART ridership were evaluated using the principles of travel demand elasticity. The travel demand price elasticity is a factor that quantifies the percent change in demand (ridership) as a result of one percent change in the price or fare of the service supplied. For example, a fare elasticity of -0.35 would mean that a one percent increase in fare would most likely result in a reduction of 0.35 percent in ridership. The negative sign indicates the inverse relationship between the two variables being compared (i.e. ridership and fare).

According to studies released recently by Todd Littman of the Victoria Policy Institute[11], fare elasticities can vary widely based on a variety of factors.

[10] The $6 fare was developed as part of a conservative financial modeling exercise designed to characterize the order of magnitude of BART's financial risk in implementing the OAC Project in the event that the economy has not recovered prior to opening AGT service.

[11] Transit Price Elasticities and Cross Elasticities, by Todd Littman, Victoria Transportation Policy Institute, August 2007

Factors which tend to make transit trip takers more fare inelastic (less price sensitive) include the following:

- Urban Setting
- Bus Mode
- Peak Period Travel
- Work Trips
- Younger Travelers
- Lower Income Travelers
- Disabled Travelers
- Limited Availability of other trip options, e.g. driving

Factors which tend to make transit trip takers more fare elastic (more price sensitive) are essentially the opposite, and include the following:

- Rural Setting
- Rail Mode
- Off-Peak Period Travel
- Non-Work Trips
- Older Travelers
- Higher Income Travelers
- Able-Bodied Travelers
- Availability of other trip options

In general, Littman's research demonstrates that riders who have other transportation options (known as Choice riders) such as car, carpool and other modes, are more price sensitive than transit dependent riders (known as Captive Riders). Certain demographic groups, including people with disabilities, high school and college students, elderly and non-drivers tend to be more transit dependent. The fare elasticities of Choice Riders are usually higher than Captive Riders. In general, minority and low-income populations fall into the category of Captive Riders. To this date, the number of fare elasticity studies done primarily on minority and low-income populations appears to be limited.

Users of the AirBART shuttle service and the proposed OAC project face a mix of both inelastic and elastic factors in their trip-making decision. On the inelastic side, these trips are in an urban setting and driving options are limited for low-income users. On the elastic side, these trips tend to be during the off-peak, non-work in nature, and involve adult travelers. Given that transit riders in the project corridor do not fit conclusively in either the Captive Rider or Choice Rider category, a decision was made to evaluate the ridership impacts by applying an overall elasticity factor that is tied specifically to a rail system such as BART.

In this analysis, a fare elasticity factor of -0.35 was used to evaluate the ridership impact. This factor was obtained from one of the most comprehensive and well known research studies conducted on elasticities by the Transit Cooperative Research Program (TCRP). The research was sponsored by the Federal Transit Administration and the findings of that work are reported in (TCRP), Report 95, published in 2004. This elasticity factor is based on the ridership data of the Dallas Rapid Transit System (DART). To evaluate the impact of service improvement, we used an elasticity factor of -0.50 for headway and -0.50 for travel time improvement. These factors were taken from the TCRP report mentioned above. By applying the elasticities

incrementally (fare increase, travel time improvement and headway improvement), we computed the ridership impact under the planned service improvement and the proposed fare structure. The results shown in **Table 5** indicate that daily ridership is likely to increase by 15 to 25 percent when the AGT service goes into effect even with possible fares of $4.50 and $6.00. It should be noted that other level of service factors of the AGT such as reliability, ride quality, vehicle capacity, ease of fare payment etc., will have a significant positive impact on ridership. Since some of those factors are not quantifiable, their effect on ridership has **not** been included in the following table.

Table 5: Ridership Impact

	Market segment	Current daily ridership on AirBART	AGT Ridership with service improvement and $4.50 fare	Percent change	AGT Ridership with service improvement and $6.00 fare	Percent change
Cumulative impact of fare increase and Service improvements	All AirBART riders	2,200	2,760	About 25% increase	2,520	About 15% increase

Source: HDR, Inc

6.2 Methodology for Evaluating the Impact of Fare Increases

In BART's Action Plan submitted to the FTA in February 2010, BART proposed that an elasticity based methodology would be followed to determine the average percent change in ridership for the protected environmental justice (EJ) versus non-protected (Non-EJ) populations. BART's original approach was to conduct a detailed literature search to determine the most appropriate fare and service elasticity factors for minority and low-income populations. However, as discussed in Section 6.1, the number of fare elasticity studies pertaining to minority and low-income populations was found to be limited. Therefore, a different approach was taken to analyze any possible disproportionate or adverse impacts of the proposed AGT fares on the protected populations. The methodology used is similar to the method used for analyzing the service impacts. It involves estimating the system wide weighted average fares for minority and low-income populations and comparing them with their non-EJ counterparts and making a determination on the presence or absence of any disparate impacts. The fare from each BART station to the Coliseum/Oakland Airport BART Station was calculated by adding the BART fare from each station to Coliseum/Oakland Airport BART Station and the AirBART fare from the Coliseum/Oakland Airport BART Station to the Airport. This fare represents the "current" condition. The same exercise was repeated by assuming the proposed AGT fare that represents the "after" condition. These fares are then weighted by the number of minority, non-minority, low-income and non-low-income populations residing in the catchment area around each BART station to obtain the system wide weighted average fare for each of the four population groups. The percent increase in fare is then estimated for each group.[12] The calculations of weighted average fares are included in the appendix.

[12] The methodology tracks that employed in the equity analysis for BART's 2008 and 2009 fare increases that were submitted to the Federal Transit Administration on May 31, 2010.

6.3 Results

Impact of $3.00 AGT Fare: The one-way fare on the current AirBART bus is $3.00. If the proposed fare on the AGT is set at $3.00, there would no impact on any population group.

Impact of $4.50 AGT Fare: If the proposed fare for using the AGT is set at $4.50, the $1.50 increase may produce different impacts on minorities, non-minorities, low-income and non-low - income populations depending on where those populations are located and the total one-way fare paid to travel to Oakland Airport.

The results of the analysis show the $4.50 fare on AGT would result in an overall fare increase of approximately 24.1 percent for all populations living in the Study Area (see **Table 6**). For minority populations, the average fare increase would be approximately 24.4 percent and for non-minority, the average fare increase would be 23.9 percent. Similarly, the average fare increase for low-income populations is estimated to be 24.7 percent, whereas for non-low-income populations, it would be 24.0 percent.

These percentages should be understood with one qualification. Since the existing average fare for minorities and low-income populations is lower than the Study Area average as shown in Table 6, the *absolute* price increase of $1.50 will affect the protected groups more on a *percentage* basis. In terms of actual average fare, it can be seen that minorities would pay about 6 cents less ($7.69 - $7.63) than the Study Area average and the low-income population would pay 13 cents less ($7.69 - $7.56) than the Study Area average while non-minorities would pay 8 cents ($7.77 - $7.69) more than the Study Area average and non-low-income populations will pay 4 cents ($7.73 - $7.69) more than the Study Area average. Though the percent fare increase for minority and low-income populations is projected to be slightly higher than that of their counterparts, the magnitude of that increase is less than 1 percent (0.52 and 0.71 as shown in Table 6).

Table 6: Impact of charging $4.50 for the AGT service
(For Study Area in Alameda, Contra Costa, and San Francisco Counties)

	Average fare paid before fare increase (BART + AirBART)	Average fare paid after fare increase (BART + AGT)	Absolute increase in fare	Percent fare increase
For all population in the Study Area	$6.19	$7.69	$1.50	24.19%
For Minority population	$6.13	$7.63	$1.50	24.43%
For Non-minority population	$6.27	$7.77	$1.50	23.91%
Difference between Minority and Non-Minority				0.52%
For Low-income population	$6.06	$7.56	$1.50	24.74%
For non-Low-income population	$6.23	$7.73	$1.50	24.03%
Difference between Low-income and Non-Low-income				0.71%

Source: HDR, Inc.

Impact of $6.00 AGT fare: If the proposed fare for using the AGT is set at $6.00, the $3.00 increase may produce different impacts on minorities, non-minorities, low-income and non-low-income populations depending on where those populations are located and their total one-way fare to Oakland Airport. The results of the analysis show the $6.00 fare on AGT would result in an overall fare increase of approximately 48.3 percent for all populations living in the Study Area (see **Table 7**). For minority populations, the fare increase would be approximately 48.8 percent and for non-minority, the fare increase would be 47.8 percent. Similarly, the average fare increase for low-income populations is estimated to be 49.4 percent whereas for non-low-income populations, it would be 48.0 percent.

These percentages should be understood with one qualification. Since the existing average fare for minorities and low income populations is lower than the Study Area average as shown in Table 7, the *absolute* price increase of $3.00 will affect the protected groups more on a *percentage* basis. In terms of actual average fare, it can be seen that minorities would pay about 6 cents less ($9.19 - $9.13) than the Study Area average and the low-income population would pay 13 cents less ($9.19 - $9.06) than the Study Area average while non-minorities would pay 8 cents ($9.27 - $9.19) more than the Study Area average and non-low-income populations will pay 4 cents ($9.23 - $9.19) more than the Study Area average. Though the percent fare

increase for minority and low-income populations is projected to be slightly higher than that of their counterparts, the magnitude of that increase is less than 1.5 percent (1.04 and 1.41 as shown in **Table 7**).

Table 7: Impact of charging $6.00 for the AGT
(For Study Area in San Francisco, Alameda and Contra Costa Counties)

	Average fare paid before fare increase (BART + AirBART)	Average fare paid after fare increase (BART + AGT)	Absolute increase in fare	Percent fare increase
For all population in the Study Area	$6.19	$9.19	$3.00	48.39%
For Minority population	$6.13	$9.13	$3.00	48.87%
For Non-minority population	$6.27	$9.27	$3.00	47.83%
Difference between Minority and Non-Minority				1.04%
For Low-income population	$6.06	$9.06	$3.00	49.48%
For non-Low-income population	$6.23	$9.23	$3.00	48.07%
Difference between Low-income and Non-Low-income				1.41%

Source: HDR, Inc.

6.4 Summary of Results

In the case of a $4.50 fare, for minority populations, the average fare increase would be approximately 24.4 percent and for non-minority, the average fare increase would be 23.9 percent. Similarly, the average fare increase for low-income populations is estimated to be 24.7 percent, whereas for non-low-income populations, it would be 24.0 percent.

In the case of a $6.00 fare, for minority populations, the average fare increase would be approximately 48.8 percent and for non-minority, the fare increase would be 47.8 percent. Similarly, the average fare increase for low-income populations is estimated to be 49.4 percent whereas for non-low-income populations, it would be 48.0 percent.

At most, the difference in percent fare increase for the minority versus non-minority populations and low-income versus non-low-income populations is less than 1.5 percent.

6.5 Availability of Alternative Modes

For those who would be impacted by the OAC Project, there would be two alternative routes available. AC Transit provides local bus service between the Coliseum/Oakland Airport BART Station and Oakland International Airport. The AC Transit 50 Line runs between Fruitvale BART Station and the Bay Fair BART Station via Alameda, Harbor Bay Ferry Terminal, Oakland Airport, the Coliseum/Oakland Airport BART Station and the Eastmont Transit Center. The portion of the route between the Coliseum/Oakland Airport BART Station and the airport is on Hegenberger Road and Airport Drive. Scheduled travel times between the Coliseum/Oakland Airport BART Station and the airport range from 11 to 14 minutes. The 50 Line generally runs at 15-minute intervals throughout the day with 30-minute headways in the evening hours after 8:30 p.m. The 50 Line runs from approximately 5:30 a.m. until 12:45 a.m. Refer to **Table 8** below.

Table 8: Comparison of fares, service levels and travel times3

			Alternative modes	
	AirBART	**AGT**	**AC Transit Route 50**	**AC Transit Route 805**
Fares	$3.00	Not set yet	$2.00	$2.00
In-vehicle travel time	About 12 min	8.2 min	About 12 - 15 min	About 12- 15 min
Hours of operation	5:00 AM to 12:05 AM	5:00 AM to 1:00 AM	5:30 AM to 12:45 AM	5:30 AM to 12:30 AM
Peak headways	10 min	4.5 min	15 min	15 min
Off-peak headways	20 min	9.5 min	30 min	30 min

Source: HDR, Inc.

The AC Transit 805 line provides late night bus service. The 805 Line runs from downtown Oakland to the Oakland Airport via MacArthur Boulevard, the Eastmont Transit Center, and the Coliseum/Oakland Airport BART Station. The portion of the route between the Coliseum/Oakland Airport BART Station and OAK is along Hegenberger Road. The 805 line runs once an hour between approximately 12:30 a.m. and 5:30 a.m. The AC Transit fare for adults is $2.00 ($1.75 with a transfer issued by BART).

BART does not control AC Transit's independent service, and there is nothing to suggest that AC Transit will discontinue providing bus service between the Coliseum/Oakland Airport BART Station and Oakland International Airport when the AGT begins running in 2013. There is no reason to believe that operation of the AGT is any more likely to impact AC Transit than does the existing AirBART.

6.6 Analysis Findings

A fare of $3.00 does not represent an increase over current AirBART fares and thus has no adverse effects. Possible fare changes of $4.50 and $6.00 will have a slightly greater impact on

minority and low-income populations as compared with non-minority and non-low-income populations. However, even in the case of the highest fare studied, the absolute difference in the fare increase between groups was less than 1.5 percent. Thus these results demonstrate that protected persons would not be adversely impacted by the fare increase.

7 CONCLUSIONS

7.1 Service

The results of this analysis indicate that all populations in the OAC Study Area are anticipated to share the benefits of the OAC Connector Project. The replacement of the existing AirBART bus service will improve transit service through increased capacity, greater service reliability, and reduced travel times for all populations within the Study Area. Minority and low-income communities traveling to the Oakland Airport that are predominantly clustered closer to the urban cores (and their associated BART stations) of the greater Bay Area region would likely experience slightly greater benefits from the project's implementation than non-minority and non-low-income populations.

7.2 Fares

The proposed fare increase of either $1.50 or $3.00 translates to a slightly higher percent increase for the minority and low-income populations than for the non-minority and non-low-income populations. However, in each case considered, the absolute difference in the percentage fare increase paid by minority versus non-minority and low-income versus non-low-income populations was very small. Despite the percentages being slightly higher, the analysis results also indicate that minority and low-income users would continue to pay lower average fares compared to non-minority and non-low-income populations in the case of both the $4.50 and $6.00 fare.

In accordance with Circular 4702.1A, a disproportionately high and adverse effect is either a) one that is predominantly borne by a minority population and/or low-income population, or b) will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority and/ or non-low-income population. While potential fares in the range of $4.50 and $6.00 clearly represent an increase in fares for all riders (vis-à-vis the current AirBART fare), they are not predominantly borne by a minority population and/or low-income population, nor will be they be suffered by the minority population and/or low-income population to an appreciably more severe or greater magnitude than the adverse effect that will be suffered by the non-minority and/ or non-low-income population. Hence the proposed fares for the AGT service would not have a disproportionately high and adverse effect on minority and low-income riders.

APPENDIX

Elasticity Based Calculation of Ridership Impact

RIDERSHIP IMPACTS

Assumptions on Elasticity factors

	Fare	travel time	Headway
All population	**-0.35**	**-0.5**	**-0.5**

Current daily ridership on AirBART

total ridership	**2200**

Impact of $4.50 AGT fare and Service Improvement

	% fare increase	Adjusted ridership	% travel time reduction	Adjusted ridership	% headway reduction	Adjusted ridesrhip	Overall Ridership increase (%)
All population	22.58	2025	14.6	2170	55	2760	25.45

Impact of $6.00 AGT fare and Service Improvement

	% fare increase	Adjusted ridership	% travel time reduction	Adjusted ridership	% headway reduction	Adjusted ridesrhip	
All population	45.16	1850	14.6	1980	55	2520	14.55

Source: HDR Inc

OAC Fare Impact

$4.50 impact

Calculation of weighted average fares for low-income and non-low-income populations

station code	before inc	after inc	Sum of lowincpop	Sum of nonlowincpop	lowinc weighted before inc	lowinc weighted after inc	Nonlowinc weighted before inc	Nonlowinc weighted after inc
12th Street	4.75	6.25	13318	19279	63262	83240	91575	120493
16th Street	6.9	8.4	12671	29734	87427	106433	205167	249769
19th Street	4.75	6.25	5286	8717	25111	33040	41406	54481
24th Street	6.95	8.45	19561	51464	135948	165289	357675	434871
Ashby	5.2	6.7	12989	19358	67542	87026	100662	129699
Balboa Park	7.15	8.65	18212	62929	130218	157536	449943	544336
Bay Fair	4.75	6.25	13748	14284	65304	85927	67847	89272
Berkeley	5.35	6.85	23285	74944	124575	159502	400949	513365
Castro Valley	5.3	6.8	23926	46168	126807	162696	244692	313945
Civic Center	6.8	8.3	32954	42384	224085	273515	288212	351788
Coliseum	7.25	8.75	17531	64990	127099	153395	471181	568666
Concord	7	8.5	6325	41767	44273	53760	292370	355021
Dublin/Pleasanton	6.6	8.1	11572	135120	76376	93734	891793	1094474
El Cerrito del Norte	5.9	7.4	2051	6468	12099	15175	38164	47867
El Cerrito Plaza	5.75	7.25	24789	86874	142535	179718	499525	629836
Embarcadero	6.8	8.3	6759	30457	45962	56101	207109	252795
Fremont	6.6	8.1	22073	154968	145684	178793	1022789	1255242
Fruitvale	4.75	6.25	40557	69343	192647	253483	329380	433395
Glen Park	7.05	8.55	11077	44139	78095	94711	311180	377388
Hayward	5.3	6.8	19540	58790	103563	132873	311587	399772
Lafayette	6.15	7.65	3632	49023	22339	27788	301490	375024
Lake Merritt	4.75	6.25	11399	17607	54146	71245	83634	110044
Macarthur	5	6.5	16028	37208	80141	104184	186040	241852
Montgomery	6.8	8.3	2822	4958	19189	23422	33717	41155
North Berkeley	5.45	6.95	6889	27886	37543	47876	151980	193810
North Concord/Martinez	7.15	8.65	5958	30276	42600	51537	216471	261884
Orinda	5.8	7.3	2682	33056	15555	19578	191725	241309

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Pittsburg/Bay Point	7.65	9.15	14985	30771	114638	137116	235400	281557
Pleasant Hill	6.6	8.1	11952	76527	78885	96814	505077	619867
Powell	6.8	8.3	22137	24838	150533	183739	168897	206153
Richmond	6.1	7.6	33307	37853	203172	253132	230904	287684
Rockridge	5.05	6.55	7147	32768	36094	46815	165479	214631
San Leandro	4.75	6.25	19517	70757	92708	121984	336096	442232
South Hayward	11.8	13.3	13922	53188	164276	185158	627620	707402
Union City	6.3	7.8	16710	89734	105274	130339	565327	699928
Walnut Creek	6.5	8	6742	72637	43820	53932	472140	581095
West Oakland	4.95	6.45	37925	129699	187728	244615	642009	836557
Grand Total			**571,979**	**1,880,965**	3,467,252	4,325,221	11,737,212	14,558,660
			put the above numbers here ---->		**571,979**	**571,979**	**1,880,965**	**1,880,965**

	Low-income (before increase)	Low-income (after increase)	Non-Low-income (before increase)	Non-Low-income (after increase)
Weighted average fare	**6.061848**	**7.561848**	**6.239993**	**7.739993**
Absolute increase in fare		**-1.500000**		**-1.500000**
Percent fare increase		**24.74**		**24.04**

Source: HDR Inc

Note: The above calculations are based on demographics contained in the catchment area for each station within the 3 county, not the entire 3 county area

OAC Fare Impact

$4.50 impact

Calculation of weighted average fares for minority and non-minority populations

station code	before inc	after inc	Sum of minpop	Sum of nonminpop	minority weighted before increase	minority weighted after increase	Non minority weighted before increase	Non minority weighted after increase
12th Street	4.75	6.25	23902	8695	113536	149389	41301	54343
16th Street	6.9	8.4	20901	21504	144218	175569	148377	180632
19th Street	4.75	6.25	9187	4816	43640	57421	22876	30100
24th Street	6.95	8.45	39330	31695	273345	332340	220278	267820
Ashby	5.2	6.7	20342	12005	105780	136294	62424	80431
Balboa Park	7.15	8.65	48120	33021	344061	416242	236099	285630
Bay Fair	4.75	6.25	13184	14848	62622	82398	70529	92801
Berkeley	5.35	6.85	78904	19325	422137	540494	103387	132374
Castro Valley	5.3	6.8	31403	38691	166438	213543	205062	263098
Civic Center	6.8	8.3	66703	8635	453579	553634	58717	71669
Coliseum	7.25	8.75	30754	51768	222964	269095	375315	452967
Concord	7	8.5	17376	30716	121634	147699	215009	261083
Dublin/Pleasanton	6.6	8.1	40922	105770	270086	331469	698083	856739
El Cerrito del Norte	5.9	7.4	2927	5592	17272	21663	32991	41378
El Cerrito Plaza	5.75	7.25	71332	40331	410159	517157	231901	292397
Embarcadero	6.8	8.3	16933	20283	115147	140547	137925	168350
Fremont	6.6	8.1	103870	73171	685542	841347	482931	592688
Fruitvale	4.75	6.25	82383	27518	391318	514892	130710	171987
Glen Park	7.05	8.55	35324	19892	249034	302019	140241	170080
Hayward	5.3	6.8	50677	27653	268588	344603	146562	188042
Lafayette	6.15	7.65	8365	44290	51443	63990	272386	338821
Lake Merritt	4.75	6.25	22398	6608	106390	139987	31390	41303
Macarthur	5	6.5	30477	22759	152385	198101	113796	147935
Montgomery	6.8	8.3	4097	3683	27861	34007	25045	30570
North Berkeley	5.45	6.95	12868	21907	70131	89434	119392	152252
North Concord/Martine	7.15	8.65	12432	23802	88888	107536	170183	205885
Orinda	5.8	7.3	8099	27639	46976	59126	160303	201761

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Pittsburg/Bay Point	7.65	9.15	29713	16044	227302	271871	122736	146802
Pleasant Hill	6.6	8.1	24616	63864	162463	199386	421499	517294
Powell	6.8	8.3	29303	17672	199263	243218	120167	146674
Richmond	6.1	7.6	60799	10361	370875	462074	63201	78742
Rockridge	5.05	6.55	12042	27874	60811	78873	140762	182572
San Leandro	4.75	6.25	66561	23714	316165	416006	112639	148210
South Hayward	11.8	13.3	41416	25694	488704	550827	303192	341733
Union City	6.3	7.8	69476	36969	437698	541911	232903	288355
Walnut Creek	6.5	8	13649	65730	88717	109190	427243	525838
West Oakland	4.95	6.45	84395	83229	417753	544345	411983	536827
Grand Total			**1,335,181**	**1,117,764**	8,194,924	10,197,695	7,009,539	8,686,186
			put the above numbers here ---->		**1,335,181**	**1,335,181**	**1,117,764**	**1,117,764**

	Minority (before increase)	Minority (after increase)	Non-Minority (before increase)	Non-Minority (after increase)
Weighted average fare	**6.137689**	**7.637689**	**6.271036**	**7.771036**
Absolute increase in fare		**-1.500000**		**-1.500000**
Percent fare increase		**24.44**		**23.92**

Source: HDR Inc.

Note: The above calculations are based on demographics contained in the catchment area for each station within the 3 county, not the entire 3 county area

OAC Fare Impact

$6.00 impact

Calculation of weighted average fares for low-income and non-low-income populations

station code	before inc	after inc	Sum of lowincpop	Sum of nonlowincpop	lowinc weighted before inc	lowinc weighted after inc	Nonlowinc weighted before inc	Nonlowinc weighted after inc
12th Street	4.75	7.75	13318	19279	63262	103217	91575	149412
16th Street	6.9	9.9	12671	29734	87427	125439	205167	294370
19th Street	4.75	7.75	5286	8717	25111	40970	41406	67557
24th Street	6.95	9.95	19561	51464	135948	194631	357675	512067
Ashby	5.2	8.2	12989	19358	67542	106509	100662	158736
Balboa Park	7.15	10.15	18212	62929	130218	184854	449943	638730
Bay Fair	4.75	7.75	13748	14284	65304	106549	67847	110698
Berkeley	5.35	8.35	23285	74944	124575	194430	400949	625781
Castro Valley	5.3	8.3	23926	46168	126807	198585	244692	383198
Civic Center	6.8	9.8	32954	42384	224085	322946	288212	415364
Coliseum	7.25	10.25	17531	64990	127099	179692	471181	666152
Concord	7	10	6325	41767	44273	63248	292370	417672
Dublin/Pleasanton	6.6	9.6	11572	135120	76376	111092	891793	1297154
El Cerrito del Norte	5.9	8.9	2051	6468	12099	18251	38164	57570
El Cerrito Plaza	5.75	8.75	24789	86874	142535	216901	499525	760147
Embarcadero	6.8	9.8	6759	30457	45962	66240	207109	298481
Fremont	6.6	9.6	22073	154968	145684	211903	1022789	1487694
Fruitvale	4.75	7.75	40557	69343	192647	314320	329380	537410
Glen Park	7.05	10.05	11077	44139	78095	111327	311180	443597
Hayward	5.3	8.3	19540	58790	103563	162184	311587	487957
Lafayette	6.15	9.15	3632	49023	22339	33236	301490	448558
Lake Merritt	4.75	7.75	11399	17607	54146	88344	83634	136455
Macarthur	5	8	16028	37208	80141	128226	186040	297664
Montgomery	6.8	9.8	2822	4958	19189	27655	33717	48592
North Berkeley	5.45	8.45	6889	27886	37543	58209	151980	235639
North Concord/Martine	7.15	10.15	5958	30276	42600	60474	216471	307298
Orinda	5.8	8.8	2682	33056	15555	23601	191725	290893

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Pittsburg/Bay Point	7.65	10.65	14985	30771	114638	159594	235400	327714
Pleasant Hill	6.6	9.6	11952	76527	78885	114742	505077	734657
Powell	6.8	9.8	22137	24838	150533	216945	168897	243410
Richmond	6.1	9.1	33307	37853	203172	303092	230904	344464
Rockridge	5.05	8.05	7147	32768	36094	57536	165479	263783
San Leandro	4.75	7.75	19517	70757	92708	151261	336096	548367
South Hayward	11.8	14.8	13922	53188	164276	206041	627620	787184
Union City	6.3	9.3	16710	89734	105274	155404	565327	834530
Walnut Creek	6.5	9.5	6742	72637	43820	64045	472140	690051
West Oakland	4.95	7.95	37925	129699	187728	301502	642009	1031105
Grand Total			**571,979**	**1,880,965**	3,467,252	5,183,190	11,737,212	17,380,108
			put the above numbers here ---->		**571,979**	**571,979**	**1,880,965**	**1,880,965**

	Low-income (before increase)	Low-income (after increase)	Non-Low-income (before increase)	Non-Low-income (after increase)
Weighted average fare	**6.061848**	**9.061848**	**6.239993**	**9.239993**
Absolute increase in fare		**-3.000000**		**-3.000000**
Percent fare increase		**49.49**		**48.08**

Source: HDR Inc

Note: The above calculations are based on demographics contained in the catchment area for each station within the 3 county, not the entire 3 county area

OAC Fare Impact

$6.00 impact

Calculation of weighted average fares for minority and non-minority populations

station code	before inc	after inc	Sum of minpop	Sum of nonminpop	minority weighted before increase	minority weighted after increase	Non minority weighted before increase	Non minority weighted after increase
12th Street	4.75	7.75	23902	8695	113536	185243	41301	67386
16th Street	6.9	9.9	20901	21504	144218	206921	148377	212888
19th Street	4.75	7.75	9187	4816	43640	71202	22876	37324
24th Street	6.95	9.95	39330	31695	273345	391335	220278	315362
Ashby	5.2	8.2	20342	12005	105780	166807	62424	98437
Balboa Park	7.15	10.15	48120	33021	344061	488423	236099	335161
Bay Fair	4.75	7.75	13184	14848	62622	102173	70529	115073
Berkeley	5.35	8.35	78904	19325	422137	658850	103387	161360
Castro Valley	5.3	8.3	31403	38691	166438	260648	205062	321134
Civic Center	6.8	9.8	66703	8635	453579	653688	58717	84621
Coliseum	7.25	10.25	30754	51768	222964	315225	375315	530618
Concord	7	10	17376	30716	121634	173763	215009	307156
Dublin/Pleasanton	6.6	9.6	40922	105770	270086	392852	698083	1015394
El Cerrito del Norte	5.9	8.9	2927	5592	17272	26055	32991	49766
El Cerrito Plaza	5.75	8.75	71332	40331	410159	624155	231901	352893
Embarcadero	6.8	9.8	16933	20283	115147	165947	137925	198775
Fremont	6.6	9.6	103870	73171	685542	997152	482931	702446
Fruitvale	4.75	7.75	82383	27518	391318	638466	130710	213263
Glen Park	7.05	10.05	35324	19892	249034	355005	140241	199919
Hayward	5.3	8.3	50677	27653	268588	420619	146562	229522
Lafayette	6.15	9.15	8365	44290	51443	76537	272386	405257
Lake Merritt	4.75	7.75	22398	6608	106390	173583	31390	51215
Macarthur	5	8	30477	22759	152385	243816	113796	182074
Montgomery	6.8	9.8	4097	3683	27861	40153	25045	36095
North Berkeley	5.45	8.45	12868	21907	70131	108736	119392	185112
North Concord/Martine	7.15	10.15	12432	23802	88888	126184	170183	241588
Orinda	5.8	8.8	8099	27639	46976	71275	160303	243219
Pittsburg/Bay Point	7.65	10.65	29713	16044	227302	316440	122736	170868

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Pleasant Hill	6.6	9.6	24616	63864	162463	236310	421499	613090
Powell	6.8	9.8	29303	17672	199263	287173	120167	173182
Richmond	6.1	9.1	60799	10361	370875	553272	63201	94284
Rockridge	5.05	8.05	12042	27874	60811	96936	140762	224383
San Leandro	4.75	7.75	66561	23714	316165	515847	112639	183780
South Hayward	11.8	14.8	41416	25694	488704	612950	303192	380275
Union City	6.3	9.3	69476	36969	437698	646125	232903	343808
Walnut Creek	6.5	9.5	13649	65730	88717	129663	427243	624432
West Oakland	4.95	7.95	84395	83229	417753	670937	411983	661670
Grand Total			**1,335,181**	**1,117,764**	8,194,924	12,200,466	7,009,539	10,362,832
			put the above numbers here ---->		**1,335,181**	**1,335,181**	**1,117,764**	**1,117,764**

	Minority before increase	Minority after increase	Non-Minority before increase	Non-Minority after increase
Weighted average fare	**6.137689**	**9.137689**	**6.271036**	**9.271036**
Absolute increase in fare		**-3.000000**		**-3.000000**
Percent fare increase		**48.88**		**47.84**

Source: HDR Inc

Note: The above calculations are based on demographics contained in the catchment area for each station within the 3 county, not the entire 3 county area