



# RapidBART

The fast, free airport connection that will save \$400 million and help the community

## TRANSFORM



WORLD-CLASS PUBLIC TRANSPORTATION. WALKABLE COMMUNITIES.

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**TransForm** (formerly TALC, the Transportation and Land Use Coalition) works to create world-class public transportation and walkable communities in the Bay Area and beyond. We build diverse coalitions, influence policy, and develop innovative programs to improve the lives of all people and protect the environment.

### **Acknowledgements**

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John Knox White and Stuart Cohen are the primary authors of RapidBART. Sherman Lewis, Jerry Cauthen, Rebecca Kaplan, Denise Mewbourne and many others all provided critical feedback. While their assistance is sincerely appreciated, the authors are responsible for any errors in the report. Cover Image and Hegenberger Image by Lawrence Leong.

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## Executive Summary

Since the 1970's, planners and policymakers have discussed the creation of a connection from BART to the Oakland Airport. Alameda County voters approved an "automated guideway" elevated people mover (not necessarily rail) in November 2000 as a \$130 million project.

Huge cost escalations have required them to scale back goals of the project: intermediate stations considered in 2001 are not part of the proposal, vehicles will be slower and less frequent, and there will be additional walk time as a direct connection from the Airport station to the terminals was eliminated. Passengers will now descend into the parking lot and cross multiple lanes of traffic. Even with all of these cost savings the project is now estimated at \$522 million or more for the 3.2 miles! BART, facing a long-term deficit of over \$7 billion will vote on May 14 to borrow up to \$150 million for this project. To cover the costs they are proposing a \$12 round trip fare on the connector *on top of the BART fare!*

New ridership numbers are dramatically lower than those being touted – depending on which BART report you choose the ridership is either 13,540 by 2020, or 4,670. The private sector backed out of participating based on the low ridership numbers.

TransForm believes there is a better and much more affordable alternative to the Oakland Airport Connector as currently proposed. We call it RapidBART. BART has never studied a true Bus Rapid Transit option, one that can bypass traffic. And on-road vehicle times have improved dramatically since their "Quality Bus" option was studied in 2001.

The RapidBART service outlined in this report would:

- **Cost dramatically less**, as much 90% less to build.
- **Better serve the community** by including as stop on Hegenberger.
- Use some of the existing funds dedicated to building the Oakland Airport Connector to make service **free to riders in perpetuity**.
- Have about the **same door-to-door travel times**.
- **Have higher ridership than the Connector**. TransForm estimates a ridership benefit of over 2000 passengers per day, largely due to the free fare and the additional station.
- Stop in front of any future terminals at almost no cost.
- **Keep BART from incurring any debt or risk**.
- **Allow BART and agencies across the region to use Recovery Act funds to save jobs and service this year**. BART would be able to use other savings to improve seismic safety or fill other critical needs.

TransForm believes that all BART riders, indeed all Bay Area commuters, deserve for this option to be studied before BART gets further buried in debt. TransForm is requesting that BART staff and consultants immediately commit to working with public interest groups to analyze this proposal, to use their models to project ridership, and to bring the results to the May 14 BART Board meeting. We are also calling on the Metropolitan Transportation Commission to grant an extension to BART, which they can do under the Recovery Act, for awarding this contract.



## Introduction

Since the 1970's, planners and policymakers have discussed the creation of a connection from BART to the Oakland Airport. Throughout most of these discussions, the goal has been moving people efficiently and cost-effectively to the airport without regards to a specific transportation mode or technology. Throughout the 1970's, 1980's, and 1990's, planning discussions looked at Bus Rapid Transit service. It wasn't until the end of the 1990's that the project became a guideway-only project, an elevated, operatorless people-mover system.

### OAC Costs Quadrupled while Benefits Decreased

The Oakland Airport Connector was approved by Alameda County voters in November 2000 as a \$130 million project. Just six months later (April 2001), the base price escalated to \$220 million, and 2 intermediate stops were added along Hegenberger bringing the cost to \$232 million.

Since 2001, many features have been scaled back to keep the project affordable. Intermediate stations have been removed, vehicles will be slower and less frequent, and there will be additional walk time as a direct connection from the Airport station to the terminals was eliminated. Passengers will now descend into the parking lot and cross multiple lanes of traffic. Even with all of these cost savings the project is now estimated at \$522 million or more for the 3.2 miles!

Because the exorbitant costs created funding shortfalls, BART hoped the private sector would invest. But all three prospective consortia have since backed out.

### What Is the Rush

Just as the project seemed to have little chance of moving forward, the Metropolitan Transportation Commission committed \$70 million of federal stimulus (American Recovery and Reinvestment Act) funding to the project. But there was a catch. That money would only be allocated if BART raised the remaining amount, up to \$200 million by June 30, 2009. If they didn't come up with the funds, the stimulus funds would be split between the region's transit agencies for critical current needs (BART would receive over \$15 million).

With no other source available to find these funds quickly, BART is proposing taking on up to \$150 million in debt for the project. In addition they are considering a \$6 one way fare, on top of the usual BART fare, just to recoup the debt repayments and cover operations. And, if ridership is lower than expected, the fare could go up (as it likely will for BART to SFO) or could lead to **fare hikes and service cuts for all riders**.

The 2002 ridership projections of 13,540 riders per day by 2020 are now likely to be lower -- much, much, lower -- for many of the reasons stated above (higher fares, slower service, less frequency, the removal of Hegenberger stops). But what is more Oakland Airport is now projected to have many fewer passengers.

On May 5, 2009, BART released a "BART-Oakland Airport Connector Ridership Update". This ridership model was different than the one used in 2002, it is somewhat more conservative. It was primarily meant "to provide BART with forecasts which were

based purposely on conservative assumptions to avoid overstating potential ridership. The reason for this was that the forecasts were intended to be used to assist BART and potential private sector partners in reaching decisions related to the financial viability of the project.”

The new ridership numbers are pretty abysmal, with 2020 numbers ranging from 3,890 to 4,670 riders per day, depending on the fare and the overall airport use. And they state the dramatic drop off in ridership at Oakland Airport, while it may recover at some point, is vulnerable to continued travel loss if fuel costs rise, from the emphasis on greenhouse gases, and from the planned California High Speed Rail system.

What voters approved in 2000 and BART approved in a 2002 Environmental Impact Report no longer meets the criteria outlined in the 2002 EIR. The EIR looked at a Quality Bus Service (essentially like “rapid bus” but without a way around traffic) but selected the \$232 million, 4-stop, Automated People Mover based on the following criteria:

- Cost Effectiveness
- Maximizes Transit Ridership
- Travel Time Savings
- Providing Opportunities for Economic Development on the Hegenberger Corridor
- Reliable Scheduled Service
- Service Flexibility
- Convenient, Safe and Comfortable Connection

It turns out that the recently revised Connector project no longer performs strongly in the key goals of "Travel Time Savings", "Maximizing Transit Ridership", "Cost Effectiveness" or "Providing Economic Development along Hegenberger."

### **TransForm's Proposed Alternative: Bus Rapid Transit**

TransForm believes there is a better and much more affordable alternative to the Oakland Airport Connector as currently proposed. We call it RapidBART. BART has never studied a true Bus Rapid Transit option, one that can bypass traffic.

The RapidBART service outlined in this report would:

- **Cost dramatically less** (possibly as much 90% less to build!).
- Use some of the existing funds dedicated to building the Oakland Airport Connector to make service **free to riders in perpetuity**.
- Have similar travel times to the proposed Connector.
- Allow intermediate stops to **better serve the East Oakland community**.
- Stop in front of any future terminals at almost no cost.
- Keep BART from incurring any debt or risk.
- Result in more, sustainable long-term jobs.

TransForm believes that all BART riders, indeed all Bay Area commuters, deserve for this option to be studied before BART gets further buried in debt. We believe this proposal would actually get higher ridership, because of the free fares and similar ride times. We would like BART to take our challenge to fully study a real alternative to the proposed people-mover.

## RapidBART Alternative

The RapidBART is designed to be much faster, frequent, more comfortable, reliable and convenient than the current AirBART shuttles. It will have many similarities to rail, but using rubber tires. Much of the operational and technical information for the RapidBART proposal is based on the 2002 EIR proposal for “Quality Bus”.



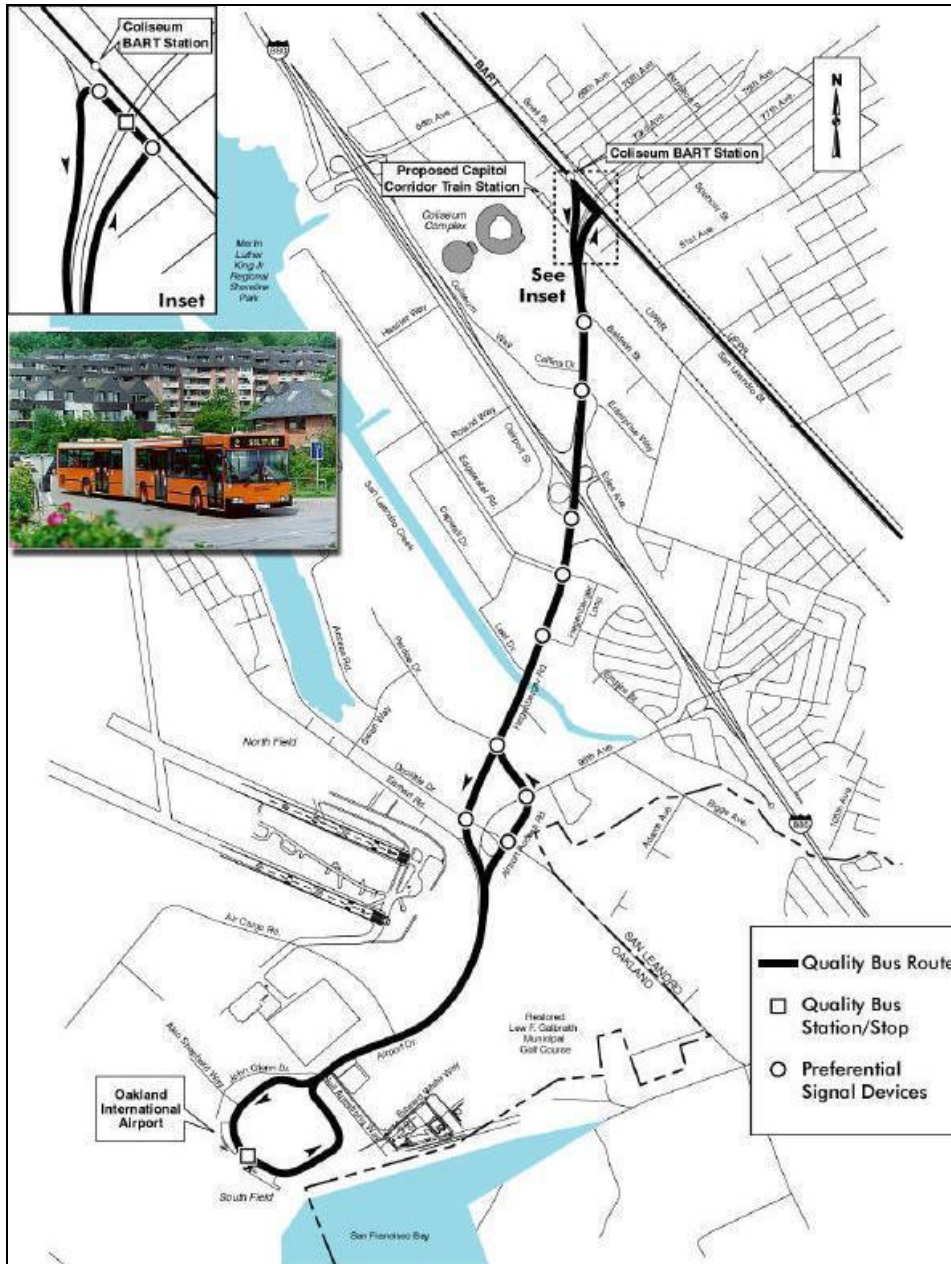
**Figure 1. RapidBART proposed interior emulates the comfort and ease of rail with 3 or 4 doors that open wide and no fare collection.**

Since 2002, a number of different ways to provide better schedule reliability with bus technologies have been developed. These improvements primarily focus on two different components of the bus system, including making the loading/unloading of passengers more efficient to minimize dwell time, and providing preferential traffic signal treatment for buses to improve running time. RapidBART systems typically achieve more efficient loading/unloading with specific features of the vehicle, including low floors, four-door buses with all-door loading, wide doors, and no fare collection on the vehicle.

## RapidBART Route

The RapidBART route between OAK and the Coliseum BART Station would be identical to the proposed Quality Bus route in the EIR: the buses would use Airport Drive, continue on Airport Access Road past Doolittle Drive and turn right onto Hegenberger Road. They would then travel on Hegenberger Road, exit Hegenberger Road, cross San Leandro Street and turn left onto Snell Street, turning left into a new BRT station under the existing Coliseum BART Station.

Leaving the BART station, buses would proceed directly onto Hegenberger Road from the new station rather than follow the AirBART route that travels along 66th Avenue, Oakport Street, and Edgewater Road to reach Hegenberger Road. Buses would travel south on Hegenberger Road, through the intersection with Doolittle Drive and onto Airport Drive to OIA. The RapidBART route is shown in Figure 1.



**Figure 2 – RapidBART would follow the same route proposed for the Quality Bus alternative in the 2002 EIR.**

## Speeding RapidBART Past Traffic

The two primary technologies that will be utilized to keep the speed and reliability of RapidBART are signal prioritization and queue jump lanes.

### Signal Prioritization

This inexpensive technology allows a vehicle approaching an intersection to communicate with traffic signals and keep a light green until the transit vehicle passes through. This can be done for any pre-designated amount of time, say ten extra seconds of green. This was part of the Quality Bus alternative in the EIR.

## Right Hand Queue Jump Lanes

In the event that the light could no longer be held green, RapidBART would be able to get around the vehicles in front of it by using a right-hand Queue jump lane. Queue jump lanes are increasingly being used to get transit vehicles around traffic in places that don't have room for a full designated transit lane.

All signaled intersections which RapidBART passes through would be able to have the buses turn into the right turn lanes. Then, as pictured in Figure 2, the bus would not make a right turn with regular traffic but would wait for a special green light, and then proceed before other vehicles moving in the same direction received their green. It would then pull back into the mixed flow lane, ahead of the other vehicles.

These special lights would generally turn green as the bus approached. In some cases the bus may have a short wait. As the bus crosses the intersection the signal resumes normal phasing, including completion of the phase it is in.

Queue jumpers are particularly applicable along major roadways like Hegenberger, where lack of available right-of-way may preclude a continuous exclusive-busway.



**Figure 3 – Right-hand queue jump lanes would allow RapidBART to bypass traffic congestion, greatly improving speed and reliability. New stop is visible across intersection**

All major signaled intersections would have signal prioritization, with the exception of the right-hand turn onto Hegenberger during RapidBART's return from the airport.

Approaching the airport terminal, RapidBART vehicles would travel on Airport Drive before entering an exclusive bus lane as it approaches the terminal. The exclusive bus lane would provide access to the RapidBART station's passenger drop-off area.

## Stations / Stops

### Coliseum RapidBART Station

The Coliseum RapidBART Station would ideally be located at street level of the east end of the existing BART station, perpendicularly under the Coliseum BART Station and across San Leandro Street from the Hegenberger on-ramp. This space under the BART tracks and platform is currently vacant. There is a No Stopping zone in the curb space in this area, and the RapidBART station would be about 300 feet east of the curbside berthing area currently used by AirBART and AC Transit buses. Escalators, elevators, and stairs would link the RapidBART station directly to the east end of the BART station platform, located directly above (see Figure 3).



**Figure 4 - The proposed Coliseum RapidBART station would be clearly marked, covered and inviting.**

Buses would stop in the RapidBART station located beneath the Coliseum BART platform which would provide an enclosed pedestrian area and keep riders protected from the elements while exiting the BART station and boarding the BRT vehicle. As the RapidBART would be free, no transfer would be needed. The total passenger walk time is estimated to be no different than the Oakland Airport Connector.

At the BART station, the RapidBART loading area would be located in line with the traffic signal at the intersection of the Hegenberger Road on-ramp and San Leandro Street, east of the current AirBART stop. This signal would be reconfigured to incorporate the movement of the RapidBART vehicles. Since only RapidBART vehicles would be exiting the RapidBART station, the buses could actuate the signal rather than preempt it.

The actuated signal would be activated as the buses drive over an inductive wire loop imbedded in the pavement in the bus loading area, and would then provide the green phase to the buses exiting the Coliseum RapidBART Station. After waiting approximately five to fifteen seconds for the green phase to be actuated, the buses would exit the Coliseum RapidBART Station directly onto the southbound Hegenberger

Road on-ramp. For pedestrian safety, pedestrian indicators would be provided at the sidewalks approaching the RapidBART station curb-cuts.

By designing the BRT station platform at the same height as the vehicle floors, no unnecessary bus ramps would be needed to assist passengers in boarding with their bags.

### **OAK Terminals 1 and 2 RapidBART Station**

With RapidBART, an at-grade Airport RapidBART Station would be located in the location of the current AirBART.

Passengers would exit the buses at the RapidBART station and then be able to proceed directly to the terminals. The total passenger walk time is estimated to be 2 minutes, or less than the Oakland Airport Connector people mover which will require passengers to exit a raised, secure station, descend to street level in the current parking lot area and then walk to the terminals. The Airport RapidBART Station would be able to accommodate two buses at once and would have a raised platform for easy boarding and alighting.

The RapidBART vehicles would enter and exit the airport exactly as the AirBART does today. Pedestrians walking between the parking lots and the terminal on the ground level would have to cross the RapidBART lane in the same way that they currently do. The two traffic signals would be bus-actuated, installed at the locations where pedestrians cross the RapidBART lane. The signals would be actuated by the RapidBART vehicles, stopping pedestrian traffic for the time required for the RapidBART to pass. They will otherwise work as they do now.

Airport RapidBART Station would be located in the location of the current AirBART, though if door-to-door travel time is paramount, stops could be located in front of each terminal.

### **Future OAK Terminal 3 RapidBART Station**

If and when the Oakland Airport constructs its third terminal, there will be no problem adding an additional stop for RapidBART right in front of the station. At that time, the RapidBART would likely provide a quicker travel time to the terminal than the proposed OAC. This is because the OAC will have a single station by terminals 1 and 2 and the cost of building an additional station would be prohibitive. At that time, travelers could expect a walk of 7-8 minutes to the new terminal, compared to 2 minutes for the RapidBART alternative.

The Future Terminal 3 RapidBART Station would be located at street level across from the terminal with crosswalks connecting riders directly to the gates and counters. The station would provide an enclosed pedestrian area and keep riders dry while exiting the RapidBART station and boarding the BRT vehicle. As the RapidBART would be free, no fares would be collected at the station. The BRT station platform would be at the same height as the vehicle floors, no unnecessary bus ramps would be needed to assist passengers in boarding with their bags.

## **Hegenberger RapidBART Stations**

To serve the growing number of jobs along Hegenberger, an at-grade transit stop would be provided at Pardee and Hegenberger (suggested location, this would be planned with community involvement and could be placed where it was most needed). This stop, at a cost of about \$1 million, would allow RapidBART to provide economic development benefits to the Hegenberger corridor as envisioned in the original EIR (the OAC proposal no longer has a stop here).

The Hegenberger RapidBART Stations would be located on the far-side of the intersections (see figure 2, the queue jump illustration). The station would provide an enclosed pedestrian area and keep riders dry while exiting the RapidBART station and boarding the BRT vehicle. As the RapidBART would be free, no fares would be collected. The BRT station platform would be at the same height as the vehicle floors, so no bus ramps would be needed to assist passengers in boarding with their luggage.

## **Fares**

RapidBART is proposed to be a free service. The total annual operating and maintenance cost of RapidBART is estimated to be the same as the Quality Bus alternative in the EIR, equaling \$3.1 million annually by 2020. The on-going operating cost for the RapidBART system would be covered by some of the existing funding sources that would otherwise go towards the \$500+ million OAC.

In particular, TransForm is recommending that BART request the Metropolitan Transportation Commission to shift the \$65 million of Regional Measure 2 funds designated for the Oakland Airport Connector into an annual operating revenue source.

If additional funds are needed, BART is already proposing to use farebox collected from the core system to fund operations of the OAC, this would be a less desirable, but equally viable way to fund RapidBART operations. BART's ridership study suggests that even with a low \$1-2 fare, ridership on RapidBART would be higher than the proposed OAC.

The free fares would be a huge boon for the community – particularly for airport workers and workers taking transit along the corridor – especially compared with fares that could be \$6 or higher for a people-mover alternative. It would also increase the speed of boardings/alightings and reduce the travel time associated with the AirBART. It will reduce boarding times by allowing people to quickly board through all doors, and reduce costs over “proof of payment” systems by not requiring marshals to check tickets on the buses. It would also mean no ticket machines would be necessary at the Airport station(s). The ease of use will also be a factor in increasing ridership.

## Operational Characteristics

Operational characteristics are listed below. The speed assigned to RapidBART is significantly faster than the 12 minutes given to Quality Bus in 2002. The designation is based on a variety of factors, including empirical evidence of test vehicle runs on May 6, 2008 during morning rush hour.

Much has changed since 2002 that is allowing for this greater speed including:

- Significant improvements and expansions to Airport Drive, with higher speed limits posted.
- Expansion and better circulation on Hegenberger Rd. that has reduced congestion and wait times.
- Significant roadway expansion at the terminal itself, with multiple lanes dedicated just for buses.
- Massive improvements to 98th Ave., which now attracts much more of the airport vehicular traffic.

Importantly, the queue jump lanes will allow the buses to bypass congestion, thus remaining much more reliable even as traffic increases over time.

Operating and Cost Features of the RapidBART	
Description: RapidBART. Preempted green time at signalized intersections. Exclusive through lanes at intersections (auto-right turn only)	
Alignment: Hegenberger Road and Airport Drive, access lane to and from RapidBART station on terminal roadway.	
Stations: (+3) Coliseum BART, Hegenberger/Pardee, Oakland Airport Terminals 1 & 2	
Auxiliary Features: Offsite maintenance facility	
	2020 and beyond
<b>Vehicles</b>	
Type: 60-foot articulated (possible 80-foot)	
Capacity:	60-80
Average Speed (mph, not including dwell time)	28
Peak Operating Fleet	9
Total Fleet	11
<b>System Capacity (pphpd)*</b>	
<b>900-1200</b>	
Average Travel Times	
In Vehicle Travel Time	8 minutes
One-Way Travel Time (In vehicle travel time (min.) plus average wait (2.5 min.))	10.5 minutes
Headway* (minutes)	5
Total Trip Time Between BART and OAK (wait and walk time at Coliseum (5.5 min.), in-vehicle travel time (8 min.) and walk time at terminal (2 min.))	15.5 minutes
<b>Cost</b>	
Capital (in 2009 \$) (Range depends on Coliseum Station Design)	\$45 - \$60 million
Annual O&M (in 2009 \$)	\$3.1 million

## Ridership

Developing reliable ridership numbers are made difficult because BART has produced a huge range of numbers for their Oakland Airport Connector project. As mentioned in the introduction, the 2002 ridership projections of 13,540 riders per day by 2020 are now likely to be lower -- much, much, lower -- because of the higher fare, slower service, and reduced frequency. Even more importantly, Oakland Airport is now projected to have many fewer passengers.

On May 5, 2009, BART released a “BART-Oakland Airport Connector Ridership Update”. This ridership model was different from the one used in 2002, and is somewhat more conservative. It was primarily meant “to provide BART with forecasts which were based purposely on conservative assumptions to avoid overstating potential ridership. The reason for this was that the forecasts were intended to be used to assist BART and potential private sector partners in reaching decisions related to the financial viability of the project.”

The new ridership numbers seem very low, with 2020 numbers ranging from 3,890 to 4,670 riders per day, depending on the overall airport use.

For the sake of an estimate, TransForm is basing ridership projections on the estimates of 13,540, since that is the patronage still posted on BART’s project website as of May 6, 2009. No matter which “base” projection is used, we believe the RapidBART will look compare well because conditions have changed dramatically (all in RapidBART’s favor) as seen in the charts below.

### **FROM THE ORIGINAL 2002 EIR for 2020**

Characteristic	“Quality Bus” from EIR	Original OAC People Mover (from 2002 proposal)
Average In-Vehicle Travel time to/from terminals	12 minutes	5.6 minutes
Walk Between Transit and Terminal	3 minutes	2 minutes
Fare	\$2	\$2

### **TransForm’s Current Estimates**

Characteristic	TransForm RapidBART (Estimate)	Current 2009 OAC People Mover
Average In-Vehicle Travel time to/from terminals	<b>8 minutes</b>	<b>8 minutes*</b>
Walk Between Transit and Terminal	<b>2 minutes</b>	<b>3 minutes**</b>
Hegenberger Station	<b>One</b>	<b>None</b>
Fare	<b>Free</b>	<b>\$6</b>

\*In order to attract a wider range of technologies and more competitive bids, the minimum travel speed for the OAC has been reduced from 45 MPH to 30 MPH.

\*\*The walk time has not been released, however the current proposal removes the pedestrian overcrossing so now passengers must exit the station using an elevator or escalator, descend to the parking lot, walk past the existing AirBART bus lanes, and proceed to the terminals.

Based on TransForm's current estimates the following factors were applied to OAC's original ridership projections:

- **An adjustment upwards for RapidBART of 20% for the fare differential.** BART consultants Wilbur Smith Associates assigned a reduction of 17.5% for the fare increase from \$2 to \$6 for the OAC. TransForm is assuming that ridership would increase when a service goes from \$6 to free.
- **An adjustment downward of 8% for "rail" desirability.** Even though the people mover is not likely to actually be rail, it will be a raised "fixed guideway" people are likely to perceive it as rail. The April 2007 Wilbur Smith ridership forecast assumed that there would be a difference of 5.1% for a perception of being "bus" versus "rail." Based on this, and because that number could be conservative, TransForm assigned an 8% "perception" reduction for RapidBART.
- **An increase of 900 riders per day for the Hegenberger stop.** This increase is based on a ridership increase assigned to OAC people mover of nearly 4,500 extra riders when two Hegenberger stops were added. But since Wal-Mart has come in instead of a job center at one of the proposed stops, ridership would clearly be lower than expected in 2002.

**Based on these numbers, and working off of BART's estimate of 13,540 riders, TransForm is projecting an increase of over 2,000 riders or 16,065 for RapidBART.**

Using the May 5, 2009 ridership update methodology, which resulted in just 4,670 riders for OAC in 2020, TransForm would estimate a RapidBART ridership of 6,130.

One extremely important factor to note: The May 5, 2009 updated ridership projections note that the estimates they have for OAC are not very different from AirBART in part because, "the forecasts are based on comparative travel times and costs for the entire trip to the airport, of which the trip on OAC AGT (people mover) would only be a small part. This approach is realistic in that it represents the full trip that potential OAC riders would experience, but it does tend to reduce the apparent significance of the time savings and other benefits offered by the AGT service compared to the current AirBART bus service."

In other words, one or two minutes on a 10 minute trip may feel important to people, but on a door-to-door trip of 30 minutes to one hour will not have a significant impact on ridership.

## **Reliability**

AirBART can be very unreliable at times, and that is certainly something that people are concerned about. But concerns about unreliability would be largely eliminated with RapidBART.

RapidBART would be less subject to congestion and more likely to maintain schedule adherence as a result of the improvements in right-of-way semi-exclusivity at intersections along Hegenberger. The RapidBART includes signal priority devices at the traffic signals along the RapidBART route, an exclusive Oakland Airport BRT lane through the OAK terminal area, bus-actuated signal at the RapidBART station on San

Leandro Street, and exclusive bus lanes at the entrances and exits to the Coliseum BART station.

BART’s 2002 EIR found that slight improvements to the right-of-way at the stations also would also reduce the average in-vehicle travel time between the Coliseum BART Station and OAK under future conditions when compared to AirBART travel time resulting in an average in-vehicle travel time between the Coliseum station and the Airport that would be less than the AirBART. With the addition of semi-exclusive lanes at the signalized intersections, congestion on this corridor would not reduce the travel time for RapidBART as initially found in the EIR for “Quality Bus” service.

With the announcement that the Oakland A’s are moving to a new stadium, the number of events at the Coliseum will be reduced by over 80 events annually. As identified by BART in the 2002 EIR, congestion on those event days can be dealt with as identified below.

The 2002 EIR found that in 2020, without semi-exclusive queue jump lanes, the average one-way running time between the two end stations during the p.m. peak commute hour is expected to be about 12 minutes, including delays by traffic signals. The addition of queue jumps would remove the variability in travel time identified in the EIR. Station design, no fare and four door vehicles would each minimize the dwell time identified in the EIR.

### Schedule and Headway

The RapidBART would operate during the same hours that BART would: between 5:00 a.m. and 12:05 a.m. Monday through Saturday and between 8:00 a.m. and 12:05 a.m. on Sunday. To achieve the design-hour (the peak hour of the average Friday in August) ridership levels projected for 2020, the RapidBART would need to maintain a headway of about five minutes, assuming buses with a capacity of 60-80 passengers.

At this service level, the RapidBART system would be capable of carrying a peak-direction peak-hour passenger load of 900-1200 passengers. The average passenger wait time (the elapsed time between a passenger’s arrival at the bus stop and the bus arrival at the stop) under these operating conditions would be two-and-a-half minutes. In the first year of revenue service, 8 buses would need to operate on the RapidBART route during the peak ridership periods. The average passenger wait time would range from two minutes to three minutes depending on the scheduled frequency of service. Schedule and headways (the elapsed time between the arrival of a bus at a stop and the arrival of the next bus at the stop) are listed in Table 2.3-2.

Time	Number of Buses Operating	Average Headway (minutes)
5am – 6 am	3	10
6am – 8pm	8	4-5
8pm – midnight	4	8
Midnight – 1am	3	10

Source: Wilbur Smith Associates, September 2000.

In 2020, there would be nine buses operating on the RapidBART route during the peak ridership periods as shown in Table 2.3-3, with each bus having a capacity of

approximately 60 persons with luggage. The average round trip time would be approximately 34 minutes including dwell time at each of the two stations (Wilbur Smith Associates, July 2000). The average passenger wait time would range from 5.5 minutes during early morning hours (5:00 a.m. to 6:00 a.m. and midnight to 1:00 a.m.) to about 3.0 minutes between 6:00 a.m. and 8:00 a.m. and between 8:00 p.m. and midnight, to about 2.5 minutes between 8:00 a.m. and 8:00 p.m.

Time	Number of Buses Operating	Average Headway (minutes)
5am – 6 am	3	11
6am – 8pm	9	4
8pm – midnight	6	6
Midnight – 1am	3	11

Source: Wilbur Smith Associates, September 2000.

## Coliseum Events

As noted above, the Oakland A's may be leaving the Oakland Coliseum within 4 years which could reduce the number of major events at the Coliseum by at least 80 per year, or about half of all events. During these events, special operational practices would be instituted, similar to those implemented at Pacific Bell Park in San Francisco. Such practices would include a system for allowing the traffic control officers to give priority to the buses by allowing approaching traffic, including transit vehicles to proceed through the intersection for a longer duration. Such practices have proven to be effective at Pacific Bell Park in San Francisco and Compaq Center in San Jose.

If the delay on Hegenberger during events was shown to be greater than three minutes and insurmountable, it would be viable to reroute buses to 98th Avenue during these short periods to bypass most of the congestion. A test-vehicle run driving San Leandro Ave. to 98th Ave on May 6, 2009 at 8:40 a.m. took 11 minutes, about 3 minutes longer than the Hegenberger route. This routing would allow RapidBART to maintain reliability. If this route was used with any regularity, signal prioritization features can be installed at low cost.

Detailed RapidBART operating procedures for special events can be developed as part of the planning process prior to implementation of the RapidBART system. Such operating procedures could include:

- Special temporary bus only lanes during special events;
- Rerouting buses away from congested areas;
- Training traffic control officers to recognize and give priority to buses; and/or
- Establishing an information system to advise bus dispatchers and operators of traffic conditions in the corridor.

## Operating Configuration

The headway and round-trip travel time determine the number of vehicles in the active vehicle fleet. By 2020, the round-trip RapidBART travel time during peak periods could be as much as 34 minutes, including a one-way travel time of 12 minutes and a maximum layover time of less than five minutes at each of the two terminus stations.

The original EIR found that dwell times as long as five minutes would occur if 60 passengers alighted the bus, and another 60 passengers boarded the same bus. However, with no fare, level-floor station design, and four-door buses, this would no longer be an issue.

An operating headway of four minutes during peak periods would require an active fleet of nine vehicles. Approximately two spare vehicles would also be needed to allow for maintenance of the vehicles. Therefore, the RapidBART system would require a total fleet of 11 vehicles in 2020. In 2005, the one-way running time of the RapidBART vehicles would be less than in 2020, and the expected ridership would be lower, which would allow shorter dwell times, even during periods of peak demand. During off-peak periods, buses could operate at longer headways and still meet passenger demand.

### **Maintenance/Storage Facility**

As discussed in the 2002 EIR, the RapidBART service would require a facility or facilities to maintain, service, and store the vehicles. Ideally this facility would be close to the RapidBART route to facilitate operations, although storage, refueling and maintenance would not necessarily have to take place in the same location. Two to three acres of space would be needed to accommodate a parking area for the buses, a refueling facility, washing equipment and a two-bay bus maintenance building with offices and an employee rest area. There are a number of sites in the study area that would be suitable. Several potential sites were identified for a maintenance facility in the BART-Oakland Airport Intermodal Connector Project Update Report, 1993.

### **Design Options**

- The RapidBART would include a single intermediate stop along the RapidBART route. However, additional stops could be installed easily and quickly if development along the corridor required it.
- The Coliseum RapidBART station could replicate the proposed Quality Bus station and access in the EIR and achieve significant cost savings.
- If traffic on Hegenberger is projected to become an ongoing problem, an elevated busway could be provided between the Coliseum station and Oakport, similar to the elevated People Mover, while remaining well under the proposed OAC people-mover costs.

### **Costs**

The RapidBART is projected to cost \$45-\$60 million. This amount is calculated based on the 2002 EIR amount adjusted to 2009 dollars plus additional costs for the Coliseum BART station, depending on design aspects. Annual operating and maintenance costs for the system would be \$3.1 million in 2020 per the 2002 EIR, adjusted for 2009 dollars.

Based on all of this information, TransForm is asking the BART Board of Directors to analyze RapidBART immediately before assuming a huge new debt.