BART-Oakland International Airport Connector
Final Environmental Impact Report/
Final Environmental Impact Statement

SCH #99112009

Volume I – Final Environmental Impact Statement

March, 2002

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Prepared for:

San Francisco Bay Area Rapid Transit District
and the
Federal Transit Administration

FINAL
ENVIRONMENTAL IMPACT REPORT/ ENVIRONMENTAL IMPACT STATEMENT

For the

BART – OAKLAND INTERNATIONAL AIRPORT CONNECTOR

Oakland, Alameda County
California

State Clearinghouse Number -- 99112009

Prepared by the:

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL TRANSIT ADMINISTRATION (FTA)

And the

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT (BART)

Prepared Pursuant to the:

National Environmental Policy Act of 1969, §102, 42 U.S.C. §4332(2)(c); National Historic Preservation Act of 1966, §106, 16 U.S.C. §470f; Federal Transit Act, as amended, §§(d), 3(i) & 14, 49 U.S.C. §§1602(d) and (i) and 1610; Executive Order 12898; National Transportation Act of 1966, 49 U.S.C. §303 (formerly Department of Transportation Act of 1966, §4(f)); and California Environmental Quality Act, California Public Resources Code, §21000 *et seq.*

Date MAR 18 2002 For FTA: Leslie T. Rogers

Leslie T. Rogers
Regional Administrator
Federal Transit Administration

Date: 3/12/02 For BART: Dorothy W. Dugger

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Deputy General Manager
Acting for the General Manager
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Contents

Section 3 Environmental Analysis

Appendices (in Separate Volume)

Tables

Page

Figures

Page

Executive Summary
BART-Oakland International Airport Connector
Final Environmental Impact Report/ Final Environmental Impact Statement

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The San Francisco Bay Area Rapid Transit District (BART) is proposing a BART-Oakland International Airport Connector (Connector) project to improve access to the airport using direct and convenient connections to the existing regional BART rail transit system. The Connector study area lies in the City of Oakland, Alameda County, California within the nine-county San Francisco Bay Area (see Figure S-1). The Connector would link the Oakland International Airport (OIA) and the Coliseum BART Station. OIA is one of three primary commercial aviation airports in the San Francisco Bay Area. It is located in the southern portion of the City of Oakland adjacent to the San Francisco Bay. OIA is south of downtown Oakland and the City of Alameda, and north of the City of San Leandro. Figure S-2 presents the project study area and project corridor.

On August 3, 2001, BART and the Federal Transit Administration (FTA) distributed to public agencies and the general public the Draft Environmental Impact Report/Draft Environmental Impact Statement (DEIR/DEIS) for the Connector project. The DEIR/DEIS evaluated several alternatives: (1) a No Action Alternative under which current AirBART bus service would continue; (2) a Quality Bus Alternative providing improved bus service through a seamless transfer between BART and the bus, traffic signal preemption along the bus route, and an exclusive bus lane at OIA; and (3) Automated Guideway Transit (AGT) providing an exclusive aerial guideway for transit vehicles. The AGT evaluation included five separate design options: an AGT alignment from the Coliseum BART Station along the median of Hegenberger Road, adjacent to Airport Drive, and across the airport parking lot to OIA; Option A, an alternate alignment to the west of the Hegenberger Road north of Interstate I-880; Option B, an alternate alignment west of Hegenberger Road south of Interstate I-880; Option D, an alternative alignment to the east of Airport Drive south of Air Cargo Road, entering OIA from the east; and Intermediate Stations, which added two AGT stops along the alignment between Interstate I-880 and Doolittle Drive.

This Volume I of the Final Environmental Impact Report/Final Environmental Impact Statement (FEIR/FEIS) for the BART Oakland Airport Connector project identifies and provides a focused environmental analysis of the AGT as the preferred alternative, following the AGT alignment with Option A and with Intermediate Stations. The focus on the preferred alternative in this document is consistent with FTA procedures for final environmental documents. This Volume I of the FEIR/FEIS also incorporates clarifications

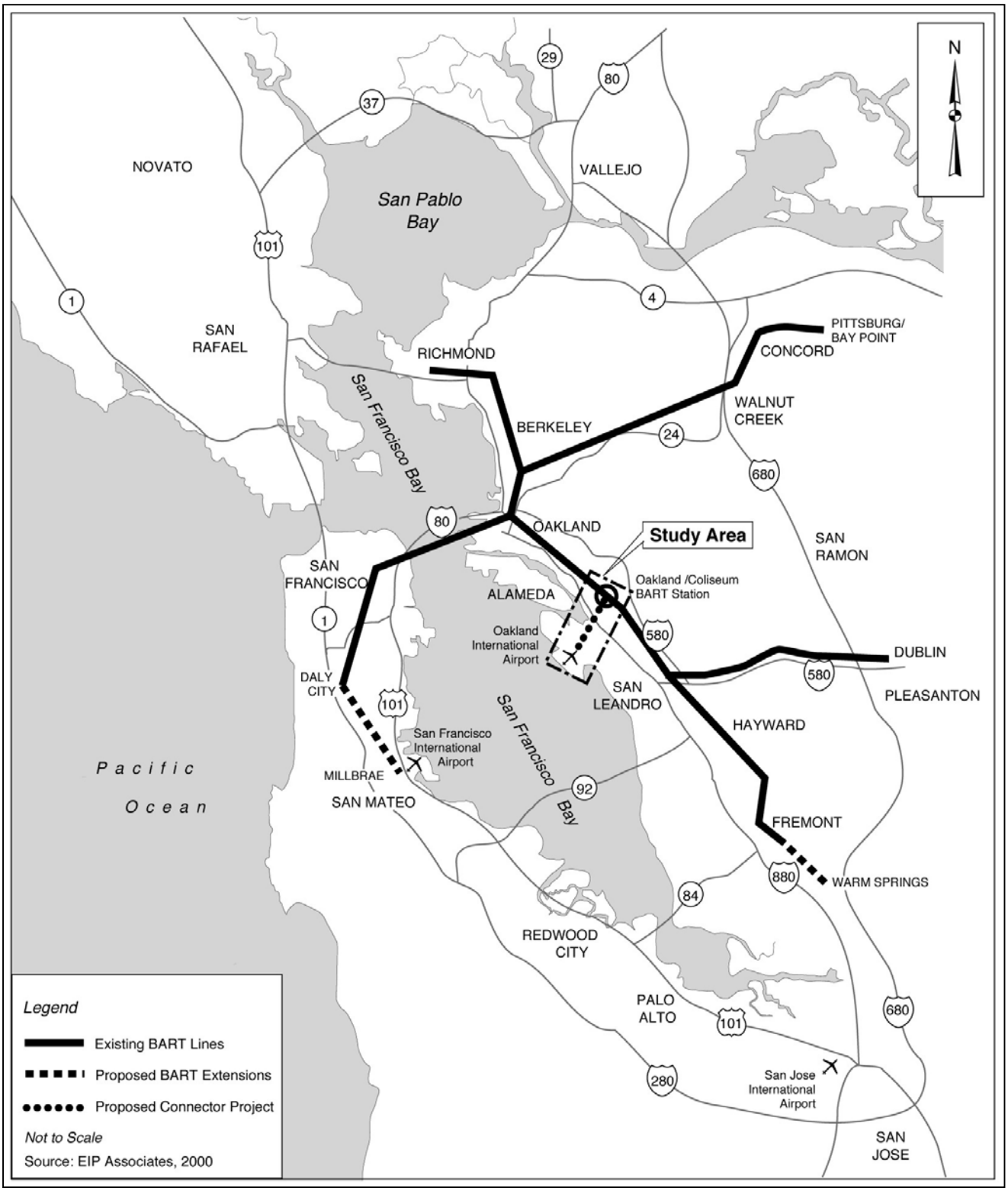


Figure S-1
Regional Setting

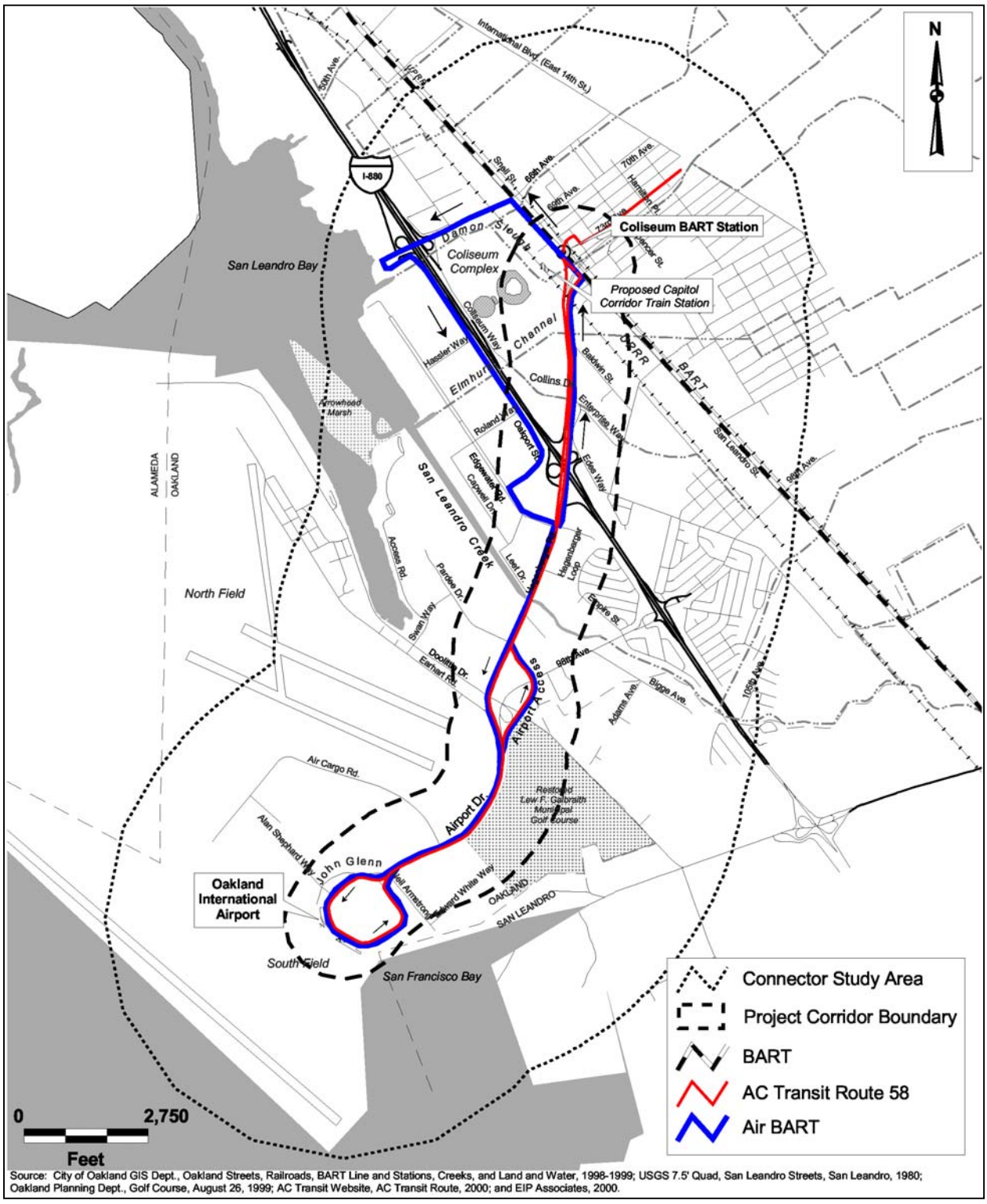


Figure S-2
Connector Study Area and Project Corridor

and corrections to the focused analysis of the preferred alternative, resulting from comments received on the DEIR/DEIS. All comments on the DEIR/DEIS received from federal, state and local agencies, public groups and individuals, and the responses thereto, are presented in Volume II of this FEIR/FEIS.

The AGT is designed to improve service by providing an exclusive aerial guideway for transit vehicles. Table S-1 summarizes some of the key characteristics of the preferred alternative in 2020. The AGT would be composed of one vehicle, or two vehicles in a train, and could be automated and driverless. A peak operating fleet of eight new AGT vehicles (total fleet of 10 vehicles) would allow the 3.5-minute peak period headways required to carry the projected passenger demand in 2020. AGT stations would be constructed at Oakland International Airport and the Coliseum BART Station, with two intermediate AGT stops at sites along the Hegenberger Road alignment. Fares would be collected at the airport AGT station or intermediate stations, rather than at the Coliseum BART station, allowing for a seamless transfer between BART and the AGT. A maintenance facility would be located at the end of the guideway in the Coliseum BART Station parking lot. Three or four power substations would be required depending on the selected AGT technology; these would be located at each end of the guideway and at intermediate points along the alignment.

Table S-1
Characteristics of Preferred Alternative – 2020

Features	***AGT***
Vehicle Type	2-vehicle "trains"
Capacity	60 passengers
Average Speed (mph)	36
Total Fleet	10
Annual Ridership	4,943,900
Average Daily Ridership	13,540
Peak Day (Friday) Daily Ridership	19,900
Mode Share of Local Air Passengers	13.2%
Mode Share of Local Air Passengers and Airport Employees	10.2%
Peak Period Headway (in minutes)	3.5
Average Wait Time (in minutes)	1.8
Capacity (in Persons) per Peak Hour per Direction	1,895
Average Total Trip Time Between BART and OIA (in minutes)	11.2
Maintenance Facility	At Coliseum AGT Station
Initial Capital Cost (in 2000 $)	$229.6M
Annual O&M (in 2000 $)	$7.7M

Note: Total trip time includes wait/transfer time, in-vehicle travel time and walk time. The trip time presented is an average of the range of trip times that would be expected during the peak period.

Is this Project a New Idea?

The Connector project has had a long history, dating back to the early 1970s. Since then, the concept of an improved transit link between OIA and BART system has been explored, and various feasibility, engineering, and environmental studies have been undertaken. Over the past 30 years, a number of milestones have brought this important regional connection closer to fruition. Table S-2 identifies some of the more significant studies and milestones.

Table S-2
Milestones in BART-Oakland International Airport Connector Project Planning

- 1970: Phase I Transit Access Feasibility Study for Oakland Airport Access Task Force (Kaiser Engineers)
- 1975: Phase II Oakland Airport Transit Access Project (Kaiser Engineers)
- 1979: Oakland Airport Transit Connector Working Paper (DeLeuw, Cather & Company)
- 1980: Preliminary Design and Engineering Phase (DeLeuw, Cather & Company)
- 1981: Oakland Airport Transit Connector Draft Environmental Impact Statement (UMTA)
- 1993: Project Update Report: BART-Oakland Airport Intermodal Connector Project (BART, Port of Oakland)

A public scoping meeting was held in November 1999 for this EIR/EIS to solicit public ideas about the scope of the environmental analysis. The open house and scoping meeting were publicized through a mailer sent to over 400 property owners, residents, business owners, special interest groups, public agencies, and other interested parties, inviting them to attend the meeting. A press release was sent to five area newspapers. Thirty-four people attended the meeting.

Written comments were accepted throughout the meeting. The open house was followed by a more formal comment forum that was facilitated by a moderator. A court reporter was provided to record verbal comments during the comment forum. A Public Scoping Open House Summary Report was prepared which included all verbal and written comments received. All written and verbal comments were addressed as the scope of the environmental analysis was established. In addition, a number of alternative routes and technologies, including an extension of the BART technology and a route through the business park, have been investigated previously for the Connector, as described in the studies listed in Table S-2. As summarized in Section 1.1.2, and described at length in Appendix A of the FEIR/FEIS, these alternatives were determined not to meet screening criteria for connector alternatives to be analyzed in the DEIR/DEIS.

What is this Project Supposed to Accomplish?

Because of foreseeable growth in airport use, local and regional roadway congestion and delay, the demand for transit alternatives is expected to rise, particularly for a reliable system that air passengers can depend on to meet their scheduled flights. To meet these challenges, and to maintain the capacity, convenience, and reliability of transit services, BART is proposing a Connector project. Specifically, the Connector project has the following objectives:

- Provide reliable scheduled service between BART and OIA.
- Provide flexibility to increase transit vehicle frequencies during periods of increased travel demand.
- Offer a competitive alternative over those who drive to OIA by providing predictable connections and travel time savings.
- Provide a convenient, safe, and comfortable connection between BART and OIA.

- Maximize BART ridership.
- Be cost-effective, recognizing budget constraints and available funding.
- Be consistent with BART's expansion policy, providing flexibility to accommodate potential intermediate stops that support local economic growth.
- Minimize significant environmental consequences of construction and operation.

The combination of the AGT with two intermediate stations and the Option A alignment is identified as the preferred alternative because it performed best in achieving the project objectives as described in Section 2.3.3.

In November 2000, the voters of Alameda County approved a sales tax increase to finance transportation improvements and a list of transportation projects. The Connector project was among the list of recommended projects and thus BART's pursuit of this improvement would help fulfill a public objective. The Connector would also provide an alternative to airport parking congestion during peak periods as well as traffic congestion relief at the airport terminal. The enhanced transit service afforded by the Connector would alleviate some of the congestion along the terminal curbside by reducing the number of individual automobiles loading and unloading air passengers.

Why Do We Need This Project?

The need for the Connector project is based on a recognition of existing transportation constraints in the study area, increased growth at OIA, anticipated future public and private development, and related congestion along roadways that serve the study area. Improvements to the existing transit service to OIA would encourage some current motorists to ride transit to OIA, thereby providing some relief to the congested traffic conditions in the study area.

Two main circumstances, highlighted below, underscore the need for this connection of BART service to OIA. They are the principal reasons why the project is being advanced and why it is especially timely.

Transportation Problems in the Study Area

Interstate 880 (I-880) is the major regional travel corridor linking communities in Santa Clara, Alameda, Contra Costa, and Solano Counties, and is the major highway near OIA. The I-880 freeway is subject to severe congestion and currently operates at unacceptable levels (traffic volumes are at or exceed the theoretical capacity of the roadway) during peak hours in the vicinity of OIA and the Coliseum BART Station (from Davis Street to 66th Avenue). No capacity improvements, such as widenings or high occupancy vehicle lanes, are planned for I-880 in the vicinity of the study area.

Some intersections near OIA are heavily congested. During the p.m. peak hour, the Airport Drive/Doolittle Drive and Hegenberger Road/Edes Avenue intersections both operate at or near capacity. The average delay for vehicles at these signalized intersections is over 40 seconds during the evening commute period. In 2020, travel along Hegenberger Road south of I-880 is

projected to experience significant delays and low average speeds. Future travel conditions along roadways and at intersections in the study area are presented in greater detail in Section 3.1, Transportation, of this document.

Transit services to OIA are important, but only a relatively small percentage of air passengers currently use buses, shuttles, or other alternate modes of travel. In 1998, 7 percent of the air passengers traveling to OIA used door-to-door shuttles, taxis, or limousines; 5 percent used public transit; 2 percent used private scheduled buses; and 1 percent used hotel shuttles, chartered buses, or other similar services. These figures are far less than the 85 percent of air passengers who used private or rental cars to reach OIA in 1998 (MTC, 2000).

Transit services to OIA, which include AirBART, Alameda-Contra Costa Transit District (AC Transit), taxis and airport shuttles, provide various levels of service. The unpredictability of traffic congestion, the potential for stalls, and the extra crowds during Oakland Coliseum events raise concerns for air passengers seeking to use transit, shuttles, or taxis to access OIA. AirBART is also subject to delays related to traffic congestion. Travel times for AirBART between the Coliseum BART Station and OIA are highly variable, as are the wait times for AirBART at the station and at the airport. Purchasing tickets at the Coliseum BART Station and OIA can be confusing and inconvenient for passengers, which results in additional lost time and frustration for travelers.

The Connector would provide a transit alternative to driving individual automobiles and the overall airport traffic situation would benefit from reducing the number of cars on the road, reducing congestion during the peak hour, reducing parking congestion at the airport, and alleviating some of the curbside confusion at the terminal, thereby enhancing the overall traffic flow at the airport.

In November 2000, the voters of Alameda County approved a sales tax increase to finance transportation improvements (Measure B) by 81 percent. The Connector project was among the list of recommended projects. Thus, BART's implementation of this project would be consistent with an acknowledged public transportation objective.

Projected Growth at OIA

By 2020, the number of air passengers using OIA is projected to increase about 270 percent compared to 1998. This rate of increase is greater than any other airport in the San Francisco Bay Area. Air cargo operations are projected to increase by almost 100 percent in the same time period. To serve the increased demand for aviation services, the Port of Oakland has prepared an Airport Development Program. The program includes the consolidation of the two existing terminals into one larger, two-level structure, roadway improvements including a two-level roadway in front of the terminal, and construction of a multi-story parking structure in a portion of the existing surface lot in front of the terminals. Increasing passenger and air cargo activity at OIA will increase airport area employment, placing additional demands on the ground transportation system to move people and goods to and from the airport.

Purpose of the EIR/EIS

The proposed Connector project is subject to both the federal requirements for preparation of an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) and the state requirements for preparation of an Environmental Impact Report (EIR) under the California Environmental Quality Act (CEQA). In any instance in which a project is subject to both NEPA and CEQA, federal and California state or local agencies are encouraged to work closely with one another to prepare a single document that complies with both NEPA and CEQA. Thus, this joint FEIR/FEIS is the result of BART and FTA working in concert to meet both the spirit and the letter of NEPA, CEQA, and all other applicable federal and state laws.

The requirements of NEPA and CEQA are not necessarily one and the same: certain requirements differ in that either the state or the federal requirement is more stringent. In addition, both CEQA and NEPA incorporate requirements, which are not duplicated in the other statute. Finally, the preferred alternative is subject to federal and state environmental statutes and regulations separate and apart from NEPA and CEQA, which require analyses to be incorporated into the EIR/EIS. In any of these circumstances, the joint EIR/EIS has been prepared in compliance with the more stringent or more complete requirements, whether they be federal or state. For example:

- CEQA requires that each significant impact of a project be identified in the EIR and feasible mitigation measures or alternatives be identified and implemented. NEPA, however, requires only a consideration of potentially significant adverse environmental impacts, evaluation of all reasonable alternatives, and the suggestion of appropriate mitigation measures. Thus, the FEIR/FEIS identifies each significant impact of the preferred alternative in order to meet the requirements of CEQA.

- Department of Transportation regulations require that a Section 4(f) evaluation be prepared in compliance with Section 4(f) of the Department of Transportation Act of 1966 (now codified at 49 U.S.C. 1653(f)) and incorporated into the EIS. Therefore, the Section 4(f) evaluation has been included as Chapter 5 of this FEIR/FEIS.

The FEIR/FEIS presents a description of existing conditions (also referred to as the environmental setting) for 16 different environmental topics. These topics include diverse aspects of the physical and social environment, such as transportation, land use, visual quality, cultural resources, biology, hydrology, noise, hazardous materials, and environmental justice. The FEIR/FEIS then assesses how the preferred alternative would change the environmental setting. These changes can be beneficial (e.g., if the project alleviates or eliminates an undesirable existing problem) or they can be adverse (e.g., if the project creates a land use conflict with adjacent land uses). For each significant adverse effect, the FEIR/FEIS recommends mitigation measures, i.e., strategies or approaches that can avoid or substantially lessen the significant effect.

Description of the Preferred Alternative

What is the Preferred Alternative?

The **Automated Guideway Transit (AGT) Alternative** is the preferred alternative (see Table S-1). The AGT considers an array of transit technologies (see Figure S-3), the common elements being that they are generally of proprietary design, operate within their own guideway, would have stations physically integrated with the Coliseum BART Station and the airport terminal, and do not require a vehicle operator. A specific technology has not been selected, because BART wants to encourage competition among various vendors. BART does have minimum performance specifications that will have to be satisfied by prospective suppliers. Such specifications include minimum operating speeds and carrying capacities necessary to serve the ridership forecasts.

The proposed route would proceed largely in the median of Hegenberger Road, except for the segment north of I-880 from where the alignment would pass over the Union Pacific Railroad tracks to I-880 (see Figure S-4). In this segment, the AGT would be adjacent to the west side of Hegenberger Road. South of Doolittle Drive on OIA property, the alignment would run between Airport Drive to the west and the Lew F. Galbraith Municipal Golf Course to the east. Past the golf course, the AGT alignment would proceed southwest to its terminus in the parking structure, across the two-level roadway from the new airport terminal. The AGT vehicles would operate primarily in an elevated guideway, thus providing the AGT with its own exclusive right-of-way separate from other vehicular traffic along its route. For a short stretch, generally adjacent to the Lew F. Galbraith Municipal Golf Course, the alignment would run either below or at grade.

The AGT would include two end terminal stations: one at the Coliseum BART Station and one at the proposed enlarged and consolidated airport terminal. The airport terminal station would be designed like a BART station with its own fare collection, station agent, and amenities. The AGT would also include two intermediate stops: near the intersection of Hegenberger Road/Edgewater Road, and near the intersection of Doolittle Drive/Hegenberger Road. The intermediate stops would be developed as full BART stations, with fare collection, restrooms, and station agents. The City of Oakland has suggested these locations as sites that would support the City's efforts to revitalize the Hegenberger Road Corridor.

Section 2, Preferred Alternative and Other Alternatives Considered, of this FEIR/FEIS focuses on the physical and operational characteristics of the preferred alternative and the other alternatives considered. Specifically, technology, route, stations, operational characteristics (e.g., speed, travel times, frequency, and reliability), ancillary facilities (e.g., maintenance, safety equipment, and power substations), and costs are discussed.

Median Option. The DEIR/DEIS also analyzed an alignment along the Hegenberger Road median for this portion of the project route, as part of the AGT Alternative (proposed project). This optional alignment is herein referred to as the "Median Option." The Median Option would run along the Hegenberger Road median from Elmhurst Channel for approximately 1,400 feet, where it would shift to join up with the preferred alternative alignment to pass over I-880 along the west side of the Hegenberger Road freeway bridge. Although the preferred alternative with Option A represents the alignment proposed by BART, further engineering

Adtranz Monorail at Newark Airport

Doppelmyer Cable Propelled System at Mandalay Bay in Las Vegas

Adtranz C-100 in Downtown Miami

Linked Adtranz vehicles in Miami

Yantrak Belt-Cable System at
Bellagio-Monte Carlo in Las Vegas

Bombardier ALRT II at JFK Airport
in New York (under construction)

Figure S-3
Examples of Different AGT Technologies

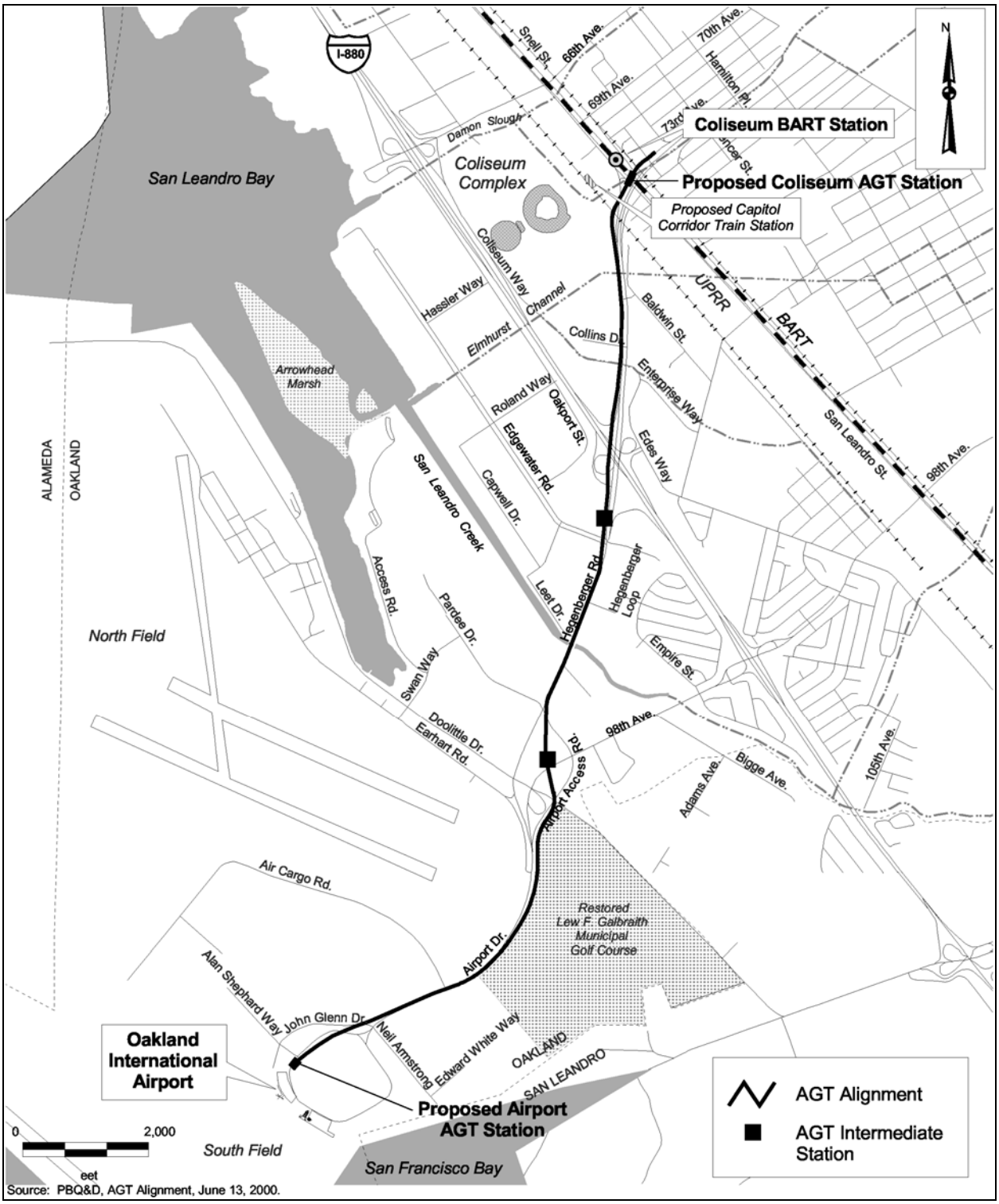


Figure S-4
Alignment of Preferred Alternative

design refinements may require the use of the Median Option in place of Option A for this portion of the alignment. The BART Board of Directors has directed the General Manager to continue to work with the City of Oakland to reach an agreement and implement a refined alignment that satisfies the City's concerns.

Impacts of the Preferred Alternative

What Significant Adverse Impacts Might Occur for the Preferred Alternative?

Measuring and Classifying Project Impacts. Section 3 of the FEIR/FEIS presents the impact analysis, paying particular attention to "significant adverse" effects. The FEIR/FEIS classifies impacts into the following types:

- *Significant Effects (S)* include adverse effects that exceed established or defined thresholds.
- *Potentially Significant Effects (PS)* includes those cases where it is not precisely clear whether a significant effect would occur; the analysis in these instances conservatively assesses the worst foreseeable effects, but the discussion acknowledges that there is uncertainty regarding the extent of the impact.
- *Less-Than-Significant Effects (LTS)* includes adverse effects that do not exceed established or defined thresholds.
- *No Impact (NI)* includes a condition when the project alternative would not result in any impact at all.
- *Beneficial Effects (B)* include effects that enhance or improve an existing condition.

The distinction between a significant and a less-than-significant impact is based on explicit significance criteria that are defined for each environmental issue considered in the FEIR/FEIS. The criteria are based on state and federal standards and guidelines, and professional judgment.

As noted earlier, the AGT Alternative was defined generically in order to attract as many potential manufacturers as possible. The impact analysis was performed, recognizing that the AGT system ultimately implemented could vary in terms of vehicle size and appearance, method of propulsion, guideway design, etc. In order to prepare an environmental document that would account for the variations and options available, the FEIR/FEIS includes a number of conservative assumptions. For instance, the visual analysis assumes a maximum envelope for guideway and vehicles in order to describe the AGT system that would be expected to have the greatest visual impacts. Similarly, the noise analysis assumes use of a steel-wheel system on steel rails at 45 miles per hour, rather than a rubber-tired vehicle or one that would be suspended on an air cushion. These types of assumptions result in a conservative (greatest potential effect), yet realistic, assessment of the AGT technologies under consideration.

Preferred Alternative-Specific Impacts. Potentially significant and significant impacts, or effects, are summarized in Table S-3 and Table S-4. The impacts identified in Table S-3 summarize operational effects, i.e., those that would occur once the project was constructed and operating. In addition to operational effects, there are a number of temporary impacts that would occur during the construction period. These impacts are outlined in Table S-4.

Operational effects found to be less than significant include land use, cultural resources, utilities, geology and seismicity, air quality, hazardous materials, and environmental justice. Construction effects would not be significant for land use, community services or environmental justice.

Cumulative Impacts. While Tables S-3 and S-4 summarize impacts specific to the preferred alternative, the FEIR/FEIS also identifies cumulative impacts. These impacts result from the proposed project in combination with other known and foreseeable projects. The City of Oakland and the Port of Oakland were consulted to identify projects currently approved and anticipated to be constructed and occupied by 2005, when the Connector is projected to be in revenue service. Projects in the project corridor are expected to add about 730 hotel rooms and nearly 2 million square feet of office, research and development, and distribution space. These projects, regional growth forecasts prepared by the Association of Bay Area Governments, and the construction of the Connector are included in the cumulative scenario.

For most of the environmental issues examined, the Connector was expected to contribute impacts that would be less than cumulatively considerable. As a result, the Connector in conjunction with the other projects and background growth would not result in a significant cumulative impact. The project does not contribute to cumulative effects on cultural resources, community services, utilities, geology, hydrology, biological resources, hazardous materials, and environmental justice. The Connector's contribution to cumulative impacts is anticipated to be beneficial relative to transportation, land use, socioeconomics, air quality, and regional energy consumption.

- **Transportation.** The AGT would result in reductions to traffic volumes in the project corridor and on the regional highways. As such, the AGT would have a cumulative beneficial impact on future traffic and intersection conditions, except for cumulative construction impacts discussed below. The AGT would also result in greater ridership on BART. As such, the AGT has a cumulatively beneficial impact on transit ridership.

- **Land Use/Socioeconomics.** The AGT plus the Capitol Corridor project (an intercity rail project with a proposed station at the Coliseum) would support the socioeconomic changes underway and planned for in the Coliseum BART Station area and along the project corridor. The City's General Plan and Coliseum BART Station Area Plan call for strong transit orientation in the project corridor. The combined operations of the Capitol Corridor and the Connector would establish an intermodal facility that would complement the public policy, land use, and socioeconomic changes envisioned in the area by strengthening it as a transit-oriented district, increasing transit ridership, and supporting the City's and BART'S joint development policies**.**

- **Air Quality/Energy.** The AGT would have cumulative beneficial effects on air quality and regional energy consumption, since they reduce the number of automobiles on the road, and thus reduce regional air emissions and consumption of nonrenewable fuel sources.

Significant adverse cumulative effects are expected for visual quality, noise, electricity supply, construction traffic, and construction noise.

Table S-3
Summary of Potentially Significant and Significant Operational Impacts

Topic/Impact Subject	*Mitigation Measures*	*Impact Significance after Mitigation*
TRANSPORTATION		
Impact TR-2. Effects on left-turn movements and access to businesses in project corridor	*TR-2(i) Accommodate any displaced left-turn movements at alternate locations.* Any displaced left-turn movement shall be accommodated by providing a new left-turn lane at a new location or by providing additional capacity (with longer left-turn lane or longer green phase) at another existing left-turn lane. Provision of a new left-turn lane may require the reconstruction of the median of Hegenberger Road and possibly the provision of a new traffic signal to accommodate the relocated left-turn movement. This mitigation measure would require the cooperation and approval of the City of Oakland and the Port of Oakland. BART shall be responsible for coordinating with these agencies and assuring that appropriate intersection modifications are made.	Less than significant
Impact TR-4. Parking impacts	*TR-4(i) Permanent Replacement Parking Spaces for Affected Businesses.* BART shall provide on-site replacement parking facilities for properties that would have parking spaces permanently removed by the Connector. If on-site replacement parking facilities cannot be identified, BART shall compensate the property owners for the permanent removal of the parking spaces. *TR-4(ii) Parking Monitoring: Parking Management Program:* (a) BART will institute a monitoring program on streets adjacent to the BART station. A baseline survey of parking conditions in the vicinity of the station will be conducted prior to commencement of Connector operations. The baseline survey will establish parking conditions in the vicinity of the station during weekday morning hours. Monitoring will be conducted during the first six months of operation of the Connector to verify if spillover parking is occurring. Such monitoring will be based on field surveys and any complaints received by BART and local parking authorities. After the first six months of operation of the station, BART Community Relations staff will respond to parking complaints and BART will investigate such complaints to verify parking concerns. *(b) If a parking spillover problem is confirmed by this monitoring,* BART staff will assist the City of Oakland in implementing a parking management program. The program shall incorporate appropriate parking control measures based on BART's Parking Management Toolkit (attached as Appendix B in the FEIR/FEIS). The Toolkit identifies a detailed process for understanding local parking issues, evaluating parking conflicts, and implementing specific parking control measures. These measures could include time limits and time-based restrictions, increased enforcement, or parking fees. The parking management program would be implemented by the City of Oakland. BART staff will assist the City to ensure that the parking control measures, adapted as appropriate for site-specific conditions, are implemented and are achieving the necessary effect. BART staff would also continue discussions as necessary with the City to help adjust any parking control measures in response to issues that may arise during implementation of such measures.	Less than significant
SOCIOECONOMICS		
Impact SE-1. Acquisition of property	*SE-1(i) Relocate Displaced Facilities or Compensate.* BART shall negotiate with the property owners of all affected parcels to minimize economic loss. For all displacement BART shall comply with the Federal Uniform Relocation Act (Public Law 91-646) and the California Relocation Act (Chapter 16, 7260 et. seq. of the Government Code) and related laws	Less than significant

Table S-3 ***Summary of Potentially Significant and Significant Operational Impacts***		
Topic/Impact Subject	***Mitigation Measures***	***Impact Significance after Mitigation***
	and regulations. Appropriate mitigation could involve relocating affected uses to another location on the property or compensation for the existing property. Mitigation could also involve compensation for modification of existing property like Sam's Hofbrau, which does not involve relocation. If on-site relocation or modification of the affected uses is not feasible, BART will compensate the property owners in conformance with the state and federal relocation laws. *SE-1(ii) Provide Replacement Parking.* BART shall provide on-site replacement parking facilities (including fencing, as appropriate) for properties that would have parking spaces permanently removed by the proposed project. If on-site replacement parking facilities cannot be identified, BART shall compensate the property owners for the permanent take of the parking spaces in accordance with state and federal relocation laws.	
VISUAL QUALITY		
Impact VQ-1. Visual compatibility of Connector with built environment and streetscape	*VQ-1(i) Integrate Connector Site Planning and Design Details with the Concepts and Themes Contained in the Hegenberger Road-98th Avenue Gateway Development Plan and the Airport Roadway Plan.* BART shall consult with the City of Oakland and Port staff and then identify site planning and design guidelines for the AGT guideway, stations, and auxiliary facilities that are consistent with the Gateway Development Plan and the Airport Roadway Plan, which both have the objective of improving the image and function of the Gateway. *VQ-1(ii) Improve Guideway and Support Column Appearances.* To improve the appearance of the guideway structure and columns, and assist in visually reducing the apparent mass, bulk and overhead dominance of the guideway structure, during the design phase, BART shall incorporate design and aesthetic treatments to the extent possible. Such features may include: 1) minimizing the depth and width of the overhead guideway, 2) incorporating cast-in textures and patterns into the columns and guideway concrete surfaces to create cadence and shadow effects, and 3) maximizing the span distance between columns to achieve a more graceful structural appearance. In addition, in lieu of constructing supporting columns of uniform diameter, expanding the diameter of the columns where they join and support the bottom of the guideway would provide for a more symmetrical, balanced and visually appealing structural transition from the ground. The visual appearances of the guideway could also be enhanced by imparting the suggestion of an arched form between columns to relieve its uneventful horizontal form. *VQ-1(iii) Screen the Maintenance and Central Control Facility.* BART shall establish a planting plan that will shield views of the Maintenance and Control Facility from adjacent areas. The use of evergreen (non-deciduous) trees compatible with the local climate and capable of growing no less than 40 feet high shall be located around the structure to visually screen the building. *VQ-1(iv) Relocate Proposed Plant Materials in the Gateway Design Plan that Conflict with the AGT.* BART in coordination with the City of Oakland and Port shall identify the planting areas that would be affected, and develop alternative planting schemes that would both accommodate the guideway and enhance appearances along the guideway route. Emphasis shall be placed on seasonal color, flowering species and	Significant and unavoidable

Table S-3
Summary of Potentially Significant and Significant Operational Impacts

Topic/Impact Subject	*Mitigation Measures*	*Impact Significance after Mitigation*
	textures that offer visual interest at ground and above grade level.	
Impact VQ-3. Light or glare effects	*VQ-3(i) Control Spillover from System Lighting.* BART shall ensure that the lighting fixtures along the alignment and at stations be designed control light intensity on adjacent land uses. BART shall incorporate specifications into its bid documents to focus illumination downward and to restrict light from extending beyond the project site or causes illumination/glow above the light fixtures. To achieve this, the light fixtures shall be fitted with lenses, hoods, and reflectors to minimize spillover light and glare while maintaining safety and security. *VQ-3(ii) Limit Intensity of AGT Vehicle Lighting.* BART shall ensure that the headlights used for the AGT vehicles shall be designed to avoid significant safety hazards for building occupants, motorists, and pedestrians. The lights used inside the AGT vehicles shall be of the necessary wattage or candlefoot power necessary for passenger safety and comfort while not affecting adjacent land uses. BART shall include this specification in its bid documents and require its contractors to comply with these lighting standards. *VQ-3(iii) Specify Material to be Used for AGT Vehicle Exterior.* BART shall ensure that materials with low reflective capabilities be chosen for the body of the AGT vehicle. BART shall include this specification in its bid documents and require its contractor to comply with these standards to reduce glare. Measures such as tinting of glass or using a substitute material to achieve a daylight reflective factor that would not cause significant glare can be implemented by the contractor.	Less than significant
COMMUNITY SERVICES		
Impact CS-1. Increased need for fire protection and emergency response during operation phase	*CS-1(i) Incorporate Fire Protection Measures Into the Tunnel Under Doolittle Drive.* Water supply, lighting, and communication systems shall be incorporated into the design of the tunnel beneath Doolittle Drive consistent with BART design criteria to ensure that the Oakland Fire Department can provide necessary fire protection and emergency response.	Less than significant
Impact CS-2. Increased need for police services during operation phase.	*CS-2 (i) Incorporate a Full BART Police Reporting Station into the Airport Station.* If the Airport BART Station is under the jurisdiction of the BART Police, then provision of police reporting facilities at OIA shall be incorporated into the design of the new OIA station. This shall include a secure parking area for two BART Police vehicles at OIA. *CS-2 (ii) Improve Coliseum BART Police Reporting Station.* If the Airport BART station is not under the jurisdiction of the BART Police, reporting facilities at the Coliseum BART station will be improved as necessary to accommodate the extra police activity related to the intermediate stops.	Less than significant
HYDROLOGY		
Impact HY-1. Effects of storm water pollution	*HY-1(i) Prepare and Implement Storm Water Pollution Prevention Plan.* BART or its contractor shall obtain an Industrial Storm Water General Permit and prepare a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP is required by the Clean Water Act and it must be approved by the Regional Water Quality Control Board. The SWPPP shall recommend site-specific Best Management Practices (BMPs) that reduce storm water pollution. BMPs shall include, but not be limited to, housekeeping practices intended to reduce pollutant loading at the maintenance facility, and techniques and equipment to collect and treat storm water pollution. Implementation of the adopted BMPs shall be included as a provision of the contractor.	Less than significant

Table S-3
Summary of Potentially Significant and Significant Operational Impacts

Topic/Impact Subject	*Mitigation Measures*	*Impact Significance after Mitigation*
BIOLOGICAL RESOURCES		
Impact BR-2. Loss of trees	*BR-2(i) Install Replacement Trees.* For removal of any California or Coast Live Oak with trunk size measuring four inches dbh or larger, or any other tree measuring nine inches dbh or larger (except Eucalyptus and Monterey Pine), BART shall require that replacement trees be planted in the project corridor. Replacement trees will belong to a native tree species (e.g., Coast Redwood, Coast Live Oak, Madrone, California Buckeye, California Bay Laurel, or other appropriate species native to Oakland). At a minimum, each removed tree meeting the above size standards will be replaced either with (i) one replacement tree of twenty four inch box size, or (ii) three replacement trees of fifteen gallon size. *BR-2(ii) Perform Preconstruction Survey for Nesting Birds.* BART shall require that a survey be conducted prior to construction to identify potential nesting habitat. If no nests are identified, no further mitigation is necessary. If nests are identified, construction activity shall be restricted. Mitigation Measure C-BR-3(i) defines these restrictions (see Section 3.16, Construction Impacts).	Less than significant
NOISE AND VIBRATION		
Impact NV-1. Noise from vehicle passby	*NV-1(i) Mitigate Passby Noise.* BART shall incorporate into its contract documents a specification that the contractor reduce operational noise to or below the BART design criteria for passby noise. The thresholds can be achieved for diesel-powered equipment by incorporating engine compartment treatments with sound absorbing materials and low-noise engine mufflers, and for rail equipment by incorporating spin-slide wheel traction control, wheel truing, and rail grinding to eliminate wheel flats and rail corrugation.	Less than significant
Impact NV-2. Noise from operation of ancillary facilities	*NV-2(i) Provide Noise Buffer or Sound Barrier between Power Substations and Noise-Sensitive Receptors.* If the site(s) selected for development of AGT power substations is (are) within 250 feet of a commercial or outdoor recreational use, BART shall require that the contractor reduce operational noise to or below the BART design criteria for noise from ancillary facilities. The thresholds can be achieved by incorporating noise barriers, facility enclosures, or other noise reduction features. *NV-2(ii) Mitigate Noise from Ancillary Vehicle Washing Facility.* BART shall require that the contractor reduce noise from outdoor vehicle washing to or below the BART design criteria for noise from ancillary facilities. The thresholds can be achieved by incorporating noise barriers, facility enclosures, or other noise reduction features such as low-noise washing equipment.	Less than significant
Impact NV-3. Vibration from vehicle passby	*NV-3(i) Mitigate Passby Vibration.* BART shall require the following provisions in the contract documents: a) Vehicle interactions with the guideway and the guidance and running structures and surfaces shall be designed to minimize the transmission of vibration through the guideway structure to the surrounding buildings and terrain during the passage of AGT cars. b) System-induced vibrations shall be imperceptible at or in surrounding buildings. The threshold of perception shall be as defined by the Guide to the Evaluation of Human Exposure to Vibration in Buildings, ANSI Standard S3.29-1983.	Less than significant

Table S-3
Summary of Potentially Significant and Significant Operational Impacts

Topic/Impact Subject	*Mitigation Measures*	*Impact Significance after Mitigation*
ENERGY		
Impact EN-2. Demand and supply of energy resources (electricity)	Unless the electrical energy supply is increased sufficiently to accommodate additional demand in the future, any project or action that requires electric energy will have a significant impact. The AGT (both with and without diesel buses) could potentially have significant impact on the electrical energy supply. In the event engineering design refinements require the use of the median instead of the preferred alternative alignment, consumption of energy would not differ from the preferred alternative. There are no reasonable mitigation measures other than an increase in the electric energy supply. If the supply of electric energy increases sufficiently before the alternatives begin to demand electricity, the impact would be eliminated. The availability of electric energy in the future is unknown and so the impact is potentially significant and unavoidable. BART customarily adopts energy conservation techniques such as operation of fewer cars during off-peak hours to reduce the load to be pulled by the engine, low power consuming propulsion systems, and low power consuming light bulbs. However, considering the uncertainty of electricity supplies in the coming years, these conservation measures would not be sufficient to alleviate the impact to a less-than-significant level.	Potentially significant and unavoidable

Table S-4
Summary of Potentially Significant and Significant Construction Impacts

Topic/Impact Subject	*Mitigation Measures*	*Impact Significance after Mitigation*
CONSTRUCTION		
Impact C-TR-1. Temporary effects on traffic operations	*C-TR-1(i) Restripe Hegenberger Road.* BART shall restripe Hegenberger Road where the portions of the two inside lanes along the Hegenberger Road median would be closed in order to facilitate construction of the AGT guideway columns to shift the travel lanes outward (toward the curb) and maintain the current number of travel lanes in each direction along Hegenberger Road. Although this measure would mitigate the traffic impacts associated with closing the two travel lanes on either side of the median, it would require the removal of 123 on-street parking along Hegenberger Road, and an additional 25 on-street parking spaces associated with incorporation of the Median Option. The permanent removal of these spaces is discussed in Section 3.1, TR-4 Parking Impacts. *C-TR-1(ii) Develop and Implement a Construction Traffic Management Plan.* BART shall direct the contractor to prepare and implement a construction phasing plan and traffic management plan that defines how traffic operations would be managed and maintained during each phase of construction. The plan shall be developed with the direct participation of BART, the City of Oakland, the Airport, AC Transit, and Caltrans. In	Less than significant

Table S-4 ***Summary of Potentially Significant and Significant Construction Impacts***		
Topic/Impact Subject	***Mitigation Measures***	***Impact Significance after Mitigation***
	addition, the property owners of all businesses adjacent to the construction areas shall be consulted. To the maximum practical extent, the plan shall: ▪ Plan, schedule, and coordinate construction activities to reduce impacts on AC Transit bus lines and dead-heading times, so that additional buses are not required on any route to maintain on-time performance, and so that larger buses are not required on any route to maintain on-time performance. ▪ Detail how access will be maintained to individual businesses where construction activities may interfere with ingress and egress. Any driveway closures shall take place during non-business hours. ▪ Specify predetermined haul routes from staging areas to construction sites and to disposal areas by agreement with the City prior to construction. The routes shall follow streets and highways that provide the safest route and have the least impact on traffic. ▪ During construction, require the contractor to provide information to the public using signs, press releases, and other media tools of traffic closures, detours or temporary displacement of left-turn lanes ▪ Identify a single phone number that property owners and businesses can call for construction scheduling, phasing, and duration information, as well as for complaints. A BART Connector website will contain similar information, and BART will coordinate with the Port so that all construction information will be available to the Port. ▪ Identify construction activities that must take place during off-peak traffic hours or result in temporary road closures due to concerns regarding traffic safety or traffic congestion. Any road closures will be done at night under ordinary circumstances. If unforeseen circumstances require road closing during the day, the City of Oakland will be consulted. *C-TR-1(iii) Coordinate with ADP Construction Management Plans for Vehicular Circulation.* BART shall coordinate with the OIA to assure that the traffic management plans coordinate construction of the Airport AGT station with the overall construction of the ADP. If the construction of the ADP does not occur concurrently with an AGT station, then the Construction Traffic Management Plan, prepared under Mitigation Measure C-TR-1(ii), shall also include measures to address construction-related impacts on traffic at OIA.	
Impact C-TR-2 Temporary effects on pedestrian and bicycle conditions	*C-TR-2(i) Construct Temporary Walkways.* Where an existing sidewalk or pedestrian/bicycle path would be closed during construction, BART shall require the contractor to provide a temporary walkway or a clearly marked detour with appropriate markings, barriers, and signs to safely separate pedestrians from vehicular traffic. At no time shall the temporary walkway or detour be located on the west side of Airport Drive. If access to pedestrian/bicycle trails or the continuity of the trails is impacted, a properly signed and marked detour shall be provided. *C-TR-2(ii) Coordinate with ADP Construction Management Plans for Pedestrian Circulation.* BART shall coordinate with the OIA to ensure that the pedestrian management plans for the construction of the Airport AGT station is coordinated with the overall construction of the ADP. If the construction of the ADP does not occur concurrently with the AGT station, then BART shall require the Contractor to provide the temporary walkways recommended under Mitigation Measure C-TR-2(i) in consultation with OIA.	Less than significant

Table S-4
Summary of Potentially Significant and Significant Construction Impacts

Topic/Impact Subject	*Mitigation Measures*	*Impact Significance after Mitigation*
Impact C-TR-3 Temporary effects on parking conditions	*C-TR-3(i) Provide Temporary Replacement Parking for Affected Businesses.* BART shall provide on-site or off-site replacement parking facilities on a one space-for-one space basis for properties whose parking supply is reduced below demand by construction. If on-site or off-site replacement parking facilities cannot be identified, BART shall financially compensate the property owners for the use of the parking spaces during the period that construction activities affect on-site parking. *C-TR-3(ii) Coordinate with ADP Construction Management Plans for Parking Conditions.* BART shall coordinate with the OIA to assure that the parking management plans coordinate the construction of the Airport AGT stations with the overall construction of the ADP. Even if the ADP and the Connector facilities are not constructed concurrently, a parking plan shall be developed with the direct participation of BART and the Port and is intended to maintain parking supply equivalent to the on-airport parking supply at the time of construction, similar to the mitigation measure identified in the ADP EIR, which identified four locations where replacement parking spaces could be accommodated: the Air Cargo Road Lot, the Neil Armstrong Way Lot, the Swan Way Lot, and the New Inside Terminal Loop Lot. To provide these spaces, other temporary parking locations may need to be identified. These could include locations on Airport property that can be used temporarily for parking, off-site locations, arrangements with existing commercial parking lots, or use of the Coliseum BART Station lot. Any temporary off-airport parking will require shuttle service. BART shall pay for any shuttle service needed beyond those already necessary for the ADP construction.	Less than significant
Impact C-SE-1. Loss of access or use of property during construction	*C-SE-1(i) Provide Replacement Parking.* During construction, BART shall provide on-site replacement parking facilities (including fencing, as appropriate) for any off-street parking that is displaced as required for construction, in an amount equivalent to the parking affected. If on-site replacement parking facilities cannot be identified, BART would compensate the property owners for the use of the parking spaces during the construction period.	Less than significant
Impact C-VQ-2. Construction light and glare effects	*C-VQ-2(i) Adopt Measures to Reduce Light and Glare During Construction.* BART shall specify maximum lighting standards for staging areas and construction sites. The lighting shall focus illumination downward to restrict light from extending beyond the construction boundaries. To achieve this, the light fixtures shall be fitted with lenses, hoods, and reflectors to minimize spillover light and glare. This measure shall be incorporated into the construction bid documents to ensure that the contractors conform to these lighting specifications.	Less than significant
Impact C-CR-2. Disturbance to significant archaeological resources	*C-CR-2(i) Conduct Subsurface Archaeological Testing/Exploration.* If the guideway columns are sited within 500 feet of the known locations of the Nelson sites, BART shall retain a qualified archaeologist to conduct subsurface testing to characterize the subsurface archaeological deposits. The methods of archaeological testing shall be approved by the State Historic Preservation Office, and the testing shall be performed prior to construction. Should potentially significant archaeological resources be found during testing or exploration, BART shall retain a qualified archaeologist to prepare a cultural resources management plan for submittal to and approval by the State Historic Preservation Office. This plan shall address the recovery of important data from the sites prior to and during construction, and shall describe the research design, data recovery and analysis methodology, curation procedures, technical reporting	Less than significant

Table S-4 ***Summary of Potentially Significant and Significant Construction Impacts***		
Topic/Impact Subject	***Mitigation Measures***	***Impact Significance after Mitigation***
	requirements, and any other information deemed necessary by the State Historic Preservation Office. The plan shall also include a Native American Coordination Plan to be executed in the event of the recovery of human remains during the course of the work. *C-CR-2(ii) Conduct Spot-Checks for Archaeological Resources During Construction Activities.* BART shall retain a qualified archaeologist to conduct spot-checks during ground-disturbing activities in the project corridor. The archaeologist shall have the authority to halt all construction activities in the vicinity upon the discovery of archaeological remains, pending an evaluation of the nature and significance of the materials found. If any materials found are determined to be potentially significant, the provisions of Mitigation Measure C-CR-2(i) regarding preparation of a cultural resources management plan shall apply.	
Impact C-UT-1. Relocation of utility lines	*C-UT-1(i) Minimize Interruption of Utility Services.* BART shall require construction contractor to install all re-routed utility lines (drinking water, wastewater, stormwater, telephone, natural gas, electricity), and conduct tie-in activities during off-peak service periods approved by the affected utility purveyor. No stormwater piping relocation tie-ins shall be conducted during or within 24 hours of a rain event. All relocations of wastewater piping shall utilize pumps and diverted flows to maintain full service capabilities.	Less than significant
Impact C-GE-1. Excavation instability caused by shallow groundwater	*C-GE-1(i) Dewatering and Groundwater Control in Excavations. Best Management Practices.* BART shall require the contractor to design and implement a temporary dewatering system during excavation and construction of structures that interface with the groundwater table. In addition, the extracted groundwater may be sediment-laden or contaminated and would require mitigation under measures C-HM-1(i), and C-HM-1(ii).	Less than significant
Impact C-GE-2. Settlement due to construction-related activities	*C-GE-2(i) Monitor Settlement During Construction.* BART shall require the contractor to implement a settlement monitoring program to detect potential construction-induced settlement at an early stage. If settlement is detected, additional support measures would be required to strengthen the affected adjacent structures. These additional measures could include shoring or grouting of affected underlying soil or strengthening of affected foundations. *C-GE-2(ii) Control Groundwater During Dewatering.* Settlement potentially caused by dewatering shall be controlled by installation of a cut-off wall between the area needing dewatering and potentially affected structures. The cut-off wall can be sheet piling, a grout curtain, or an injection well array that would limit the amount of dewatering that takes place beneath structures adjacent to the construction corridor. *C-GE-2(iii) Limit Vibration.* In areas of loose sand layers underlying adjacent structures, alternative construction methods shall be used that do not create significant vibration. For example, if pile-type foundations are selected, pre-construction design investigations will determine if loose sand layers are present beneath structures in close enough proximity to the construction corridor such that settlement could be induced by vibration from pile driving equipment. If loose sand layers are present, an alternative foundation design (e.g., drilled piers) shall be used. By another example, movement of heavy equipment can cause significant vibration and cause settlement. In this case, the equipment traveling speed shall be reduced to limit vibration.	Less than significant

Table S-4
Summary of Potentially Significant and Significant Construction Impacts

Topic/Impact Subject	*Mitigation Measures*	*Impact Significance after Mitigation*
Impact C-HY-1. Stormwater erosion	*C-HY-1(i) Implement Stormwater Best Management Practices.* BART will be required by the State to implement best management practices (BMPs) under General Permit Requirements for Storm Water Discharges Associated with Construction Activities, SWRCB Water Quality Order 99-08-DWQ. BART shall require the contractor to comply with these requirements and develop an acceptable Stormwater Pollution Prevention Plan. The plan shall contain BMPs that have demonstrated effectiveness at reducing stormwater pollution. Examples of BMPs that reduce erosion include, but are not limited to, precluding grading operations during the rainy season, hydro-mulching bare ground, installing silt fences, and placing hay bales to stop entrained sediments from reaching waterways.	Less than significant
Impact C-HY-2. Discharge of construction water	*C-HY-2(i) Notify Treatment Plant.* BART shall require the contractor to coordinate and schedule discharges to the sanitary sewer with the treatment authority to prevent plant upsets. *C-HY-2(ii) Control Discharges to Sanitary Sewer.* At the direction of the treatment plant personnel, coordination efforts would involve limiting the flow rate or total volume of groundwater discharged or allowing discharges only at times when total plant flows are large and adequate dilution of high salinity water can occur. *C-HY-2(iii) Treatment Prior to Discharge.* If required to meet influent standards imposed by the treatment plant, BART shall require the contractor to pre-treat and test the construction water as necessary. This mitigation measure is an alternative to C-HY-2(ii). *C-HY-2(iv) Discharge to Waterways with Regional Water Quality Control Board Authorization.* Discharges can be routed to alternative areas or back into saline water bodies to prevent discharges to the sanitary sewer. For construction of subsurface excavations adjacent to saline water bodies, direct discharge back to the water body shall be arranged only under special allowances from the Regional Water Quality Control Board (RWQCB). In this case, the discharger is required to demonstrate to the satisfaction of the RWQCB that the discharge is not causing pollution or otherwise impacting the environment. Alternatively, groundwater could be routed to temporary percolation basins on OIA property subject to prior authorization from the Port of Oakland. Further discussion of potential impacts related to water discharges to water bodies is presented in Mitigation Measure C-BR-1(iii).	Less than significant
Impact C-BR-1. Wetlands impacts	*C-BR-1(i) Protect and Reduce Construction Corridor to Avoid Wetland Disturbance.* In the areas where the construction rights-of-way are adjacent to tidal creeks, drainages or non-tidal wetlands, BART shall require that the construction right-of-way be narrowed to the extent possible to avoid temporary construction impacts. The jurisdictional wetlands shall be staked by a qualified biologist, and the construction corridor shall be no closer than five feet from the staked wetland. To ensure that equipment and personnel do not enter the wetland, a solid fence a minimum of 4-feet tall shall be constructed a minimum of 5 feet from the edge of the wetland. The fence can be built with metal t-stakes and plywood. This fence would have the added effect of limiting intrusion by animals into the work area. In addition, a qualified biologist shall be retained by BART to monitor the site during construction to ensure implementation of Best Management Practices (see Mitigation Measure C-BR-1(ii)). This measure may involve temporary closure or narrowing lanes of Airport Drive to allow access for construction equipment and activities from the roadway side. Temporary closure or narrowing of lanes shall be	Less than significant

Table S-4 ***Summary of Potentially Significant and Significant Construction Impacts***		
Topic/Impact Subject	***Mitigation Measures***	***Impact Significance after Mitigation***
	coordinated with the Port of Oakland. Access to and from OIA shall be maintained at all times. *C-BR-1 (ii) Adhere to Sound General Construction Practices in Areas Adjacent to Wetlands.* BART shall require that construction contractors implement Best Management Practices to reduce construction-related impacts from sedimentation and contamination. Best Management Practices shall include, but not be limited to, the flagging of all wetland areas adjacent to construction activities and the installation of silt fencing between wetland areas and all construction activities prior to the commencement of construction activities. *C-BR-1(iii) Mitigate Discharge of Excess Water from Tunnel Construction under Doolittle Drive.* If dewatering into surface drainages is necessary, BART shall require that construction contractors use sediment basins or settling tanks located in upland habitats (avoiding all designated wetlands) immediately adjacent to the dewatered construction site but also within the designated construction right-of-way. All waters pumped from the site would first be discharged into these sediment basins/tanks, for settling of silts and sediments. Only after treatment would this cleaner surface water be discharged into surface drainages with approval of the RWQCB.	
Impact C-BR-3. Impacts to nesting birds	*C-BR-3(i) Perform Preconstruction Survey for Nesting Birds.* If construction or tree removal is conducted outside the breeding season, generally February 1 to August 31, no action is necessary. It is not necessary to replace potential nesting habitat of common birds occurring on site because they are well adapted to nesting in developed areas. If tree removal is required during the breeding season (February 1 to August 31), a preconstruction survey shall be conducted to identify the presence, or lack thereof, of nesting bird species. Surveys shall be performed by a qualified wildlife biologist no more than two weeks prior to the start of construction. If no nests are identified in trees to be removed during the preconstruction surveys, no further mitigation is necessary. If nests are identified, all construction activity, including pile driving, within 150 feet of the active nest shall be postponed until the nest is vacated and juveniles have fledged (typically 3 to 4 weeks).	Less than significant

Table S-4
Summary of Potentially Significant and Significant Construction Impacts

Topic/Impact Subject	***Mitigation Measures***	***Impact Significance after Mitigation***
Impact C-NV-1. Effects of construction-related noise	*C-NV-1(i) Implement Best Management Practices to Reduce Construction Noise.* BART shall incorporate the following practices into the construction documents to be implemented by the contractor: a. Maximize the physical separation between noise generators and noise receptors. Such separation includes, but is not limited to, the following measures: ▪ provide enclosures for stationary equipment and barriers around particularly noisy areas on the site or around the entire site; ▪ use shields, impervious fences, or other physical sound barriers, to inhibit transmission of noise to sensitive receptors; and ▪ locate stationary equipment to minimize noise impacts on the community; b. Schedule construction activity that produces higher noise levels during less noise-sensitive hours (normally 7 a.m. to 7 p.m.). Minimize noise intrusive impacts during the most noise-sensitive hours (normally 7 p.m. to 7 a.m.) by planning noisier operations during times of highest ambient noise levels. Sheet pile driving will be restricted to daylight hours under ordinary circumstances. Should unforeseen circumstances require sheet pile driving at night, BART will advise the immediate neighbors. c. Select haul routes for removal of excavation materials in conjunction with the City of Oakland such that noise-sensitive areas, including residences, hotels, and outdoor recreation areas, are avoided as much as possible. *C-NV-1(ii) Provide Noise Buffer or Sound Barrier between Construction Activities and Noise-Sensitive Receptors.* If the construction right-of-way is within 700 feet of a residential area, 400 feet of a hotel, or 220 feet of another commercial use, BART shall require that the contractor reduce construction noise to or below BART's construction noise thresholds. The thresholds can be achieved by enclosing noisy equipment or constructing temporary noise barriers to the appropriate height(s) (approximately 8 to 12 feet). *C-NV-1(iii) Reduce Noise from Pile Driving.* If pile driving is planned within 1,200 feet of residences, or within 650 feet of hotels or in-use outdoor recreation areas, the following technologies shall be used as an alternative to meet BART's noise and vibration criteria: cast-in-drilled-hole (CIDH) piles, pre-drilled piles, soil-mix wall technology, shielded pile drivers, or vibratory pile drivers. This measure will either eliminate the need to drive piles, or reduce the force and duration necessary to install piles. Shielded pile drivers or vibratory pile drivers shall be used only where geotechnical conditions allow.	Significant and unavoidable
Impact C-NV-2. Construction-related vibration annoyance	*C-NV-2(i). Mitigate Construction Vibration Effects on Occupants of Nearby Land Uses.* If pile driving is planned within 400 feet of hotels, office buildings, or restaurants, the following technologies shall be used as an alternative to meet BART's noise and vibration criteria: cast-in-drilled-hole (CIDH) piles, pre-drilled piles, soil-mix wall technology, shielded pile drivers, or vibratory pile drivers.	Significant and unavoidable

Table S-4
Summary of Potentially Significant and Significant Construction Impacts

Topic/Impact Subject	*Mitigation Measures*	*Impact Significance after Mitigation*
Impact C-NV-3. Construction-related vibration structural damage	*C-NV-3(i) Reduce Construction Vibration Effects on Structures.* BART shall conduct a pre-construction survey of existing conditions. The survey shall include buildings and other infrastructure, including, but not limited to, roadway support structures, utility lines, or the OIA airport instrumentation lighting system. If recommended by the geotechnical engineer, for structures or facilities within 50 feet of pile driving, BART shall require ground-borne vibration monitoring of vibration-intensive activities.	Significant and unavoidable
Impact C-AQ-1. Temporary air emissions	*C-AQ-1(i) Implement Best Management Practices to Reduce Construction-Related Air Emissions.* BART shall require that its contractor implement the following practices during the construction of the Connector and related facilities. ▪ Watering all active construction areas twice daily. ▪ Covering all trucks hauling soil, sand, and other loose materials or requiring all trucks to maintain at least two feet of freeboard ▪ Applying water three times daily to paved or applying non-toxic soil stabilizers on all unpaved access roads, parking areas, and staging areas at the construction site. ▪ Sweeping all paved access roads, parking areas, and staging areas, at construction sites, daily with water sweepers. ▪ Sweep adjacent public streets daily with water sweepers if visible soil material is carried onto them. The Port requires the following measures be included within the plans and specifications for construction projects at the Airport. These additional mitigation measures will further ensure that PM10 impacts remain less than significant at construction sites. ▪ Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles. ▪ Install hay bales, sandbags, or other erosion control measures to prevent silt runoff to public roadways and wetlands. ▪ Require that the construction contractor use California regulated diesel fuel for all diesel powered equipment. ▪ Require that the construction contractor use construction equipment that is properly tuned and maintained in accordance with manufacturer specifications.	Less than significant
Impact C-EN-1. Consumption of energy	*C-EN-1(i) Develop and Implement Construction Energy Conservation Plan.* BART shall require the contractors to adopt the construction energy conservation measures including, but not limited to, those listed below: ▪ use energy-efficient equipment and incorporate energy-saving techniques in the construction of the Connector; ▪ avoid unnecessary idling of construction equipment; ▪ consolidate material delivery as much as possible in order to ensure efficient vehicle utilization; ▪ schedule delivery of materials during non-rush hours to maximize vehicle fuel efficiency; ▪ encourage car-pooling by construction workers; and ▪ maintain equipment and machinery, especially those using gasoline and diesel, in good working condition.	Less than significant
Impact C-HM-1. Exposure to known contaminated sites or to accidental	*C-HM-1 (i) Conduct a Phase I Environmental Site Assessment.* BART shall require that a Phase I Environmental Site Assessment be prepared for the selected alignment and station locations, according to established ASTM guidelines. As necessary, BART will require the development and	Less than significant

Table S-4 ***Summary of Potentially Significant and Significant Construction Impacts***		
Topic/Impact Subject	***Mitigation Measures***	***Impact Significance after Mitigation***
releases of hazardous materials	implementation of a soil and groundwater characterization program at all excavation locations in proximity to listed hazardous waste sites identified in the Phase I Site Assessment. The soil and groundwater characterization program shall identify those excavation areas that will require development and implementation of appropriate remediation measures. The mitigation measures described below apply only to areas where contact with contaminated soil or groundwater is suspected. *C-HM-1 (ii) Prepare and Implement a Worker Health and Safety Plan Prior to Start of Construction Activities.* The Health and Safety Plan shall, at a minimum, identify: ▪ all contaminants that could be encountered during excavation activities; ▪ all appropriate worker, public health, and environmental protection equipment and procedures; ▪ emergency response procedures; ▪ the most direct route to a hospital; and ▪ the site Safety Officer. The plan shall require documentation that all workers have reviewed and signed the plan. The plan shall be prepared by the contractor. *C-HM-1 (iii) Prepare and Implement a Soil Management Plan.* The Soil Management Plan shall identify the soil sampling and handling procedures necessary to avoid or minimize worker and public exposure and to avoid or minimize the potential for off-site migration of contaminants. The Soil Management Plan shall also identify the range of pre-determined soil disposition options (reuse, landfill disposal, etc.) according to the concentrations of contaminants in the excavated soil. The Soil Management Plan shall also identify the construction procedures to be implemented that will minimize the excavation and excess handling of contaminated soil. The Soil Management Plan shall be prepared by the contractor for submittal, review, and approval by the RWQCB. *C-HM-1 (iv) Prepare and Implement an Excavation Water Treatment and Handling Plan.* The Water Treatment and Handling Plan shall present an engineering design for an on-site excavation water treatment system, designed to reduce contaminant concentrations in excavation water to levels acceptable for permitted discharge. The treated water can be discharged to either the stormwater system or the sanitary sewer system, as long as all the appropriate permits are obtained by the contractor. The Water Treatment and Handling Plan shall be prepared by the contractor for submittal, review, and approval by either the RWQCB (for stormwater discharge) or by EBMUD (for sanitary sewer discharge).	

Table S-4 ***Summary of Potentially Significant and Significant Construction Impacts***		
Topic/Impact Subject	***Mitigation Measures***	***Impact Significance after Mitigation***
Impact 4(f)-1. Impacts on Lew F. Galbraith Golf Course	*4(f)-1(i) Obtain Temporary Easement for Use of Golf Course Property.* BART shall obtain right of entry permission (temporary construction easement) for construction activities within the Lew F. Galbraith Golf Course property from the Port of Oakland, the City of Oakland and the golf course operator. This easement shall contain provisions to minimize impact on the golf course operation and provisions for BART to pay for the cost of clean up, grading, and restoration of the golf course property. *4(f)-1(ii) Adjust Construction Schedule and Plans to minimize effects on Golf Course.* BART shall consult with the Port of Oakland and the City of Oakland park officials regarding the construction plans and schedule of the project near the golf course. The Traffic Management Plan (proposed as Mitigation Measure C-TR-1(ii)) and other construction plans and schedules that would be prepared for the project shall be submitted to these agencies for review and BART shall adjust its plans to minimize impacts to the proposed restoration of the golf course and other projects proposed by the East Bay Regional Park District and the Port of Oakland in the vicinity of the golf course.	Less than significant
Impact 4(f)-2. Impacts on San Leandro Creek Trail	*4(f)-2(i) Plan Location of Columns for the Guideway.* The distance between the north and south legs of the San Leandro Creek Trail is about 300 feet. Because the maximum allowable span between two columns is 160 feet, the AGT guideway would have at least one column in this 300-foot segment of the alignment. BART shall require the contractor to place the columns so as to avoid precluding the extension of the San Leandro Creek Trail east of Hegenberger Road, shall not block access to the trail from Hegenberger Road, and shall not impede sight lines for vehicles exiting the driveway of the trail parking facility onto Hegenberger Road that could create a safety impact. The column shall also avoid the City of Oakland sewer lift station and cleanout located at the entrance to the trail. *4(f)-2(v)*[1] *Adjust Construction Schedule and Plans to minimize effects on San Leandro Creek Trail.* BART shall consult with the East Bay Regional Park District park officials regarding the construction plans and schedule of the project near the San Leandro Creek Trail. The Traffic Management Plan (proposed as Mitigation Measure CTR-1(ii)) and other construction plans and schedules that would be prepared for the project shall be submitted to these agencies for review and BART shall adjust its plans to minimize project impacts to the East Bay Regional Park District in the vicinity of the San Leandro Creek Trail.	Less than significant
Impact 4(f)-3. Impacts on proposed Bay Trail extension	*4(f)-3(i) Reroute Bay Trail Temporarily.* BART in coordination with the City of Oakland, Port of Oakland, City of San Leandro, and the Bay Trail extension operator shall temporarily reroute the Bay Trail extension from Oyster Bay Regional Shoreline Park to Doolittle Drive. The temporary route shall generally follow Davis Street (heading north) and Doolittle Drive (heading west). These streets are designated as scenic routes in the City of San Leandro General Plan. In addition, the City of San Leandro in its General Plan identifies Doolittle Drive as a bikeway and recommends that as development occurs, roadway improvements including bikeways be constructed along Doolittle Drive (City of San Leandro, 1989).	Less than significant

[1] The DEIR/DEIS proposed additional mitigation measures 4(f)-2(ii) through 4(f)-2(iv) for impacts that would be specific to another AGT alignment option (Option B). Since those mitigation measures do not apply to the preferred alternative or the Median Option, they are not presented here.

Table S-4 ***Summary of Potentially Significant and Significant Construction Impacts***		
Topic/Impact Subject	***Mitigation Measures***	***Impact Significance after Mitigation***
	4(f)-3(ii) Place Signs Showing Temporary Rerouting of the Bay Trail Extension. BART shall place appropriate signs at the ends of the trail at Oyster Bay Regional Shoreline Park and Martin Luther King Jr. Regional Shoreline Park indicating temporary rerouting of the Bay Trail Extension. *4(f)-3(iii) Obtain Temporary Easement for Use of Bay Trail Extension Property.* BART shall obtain a temporary easement for the construction activities within the right-of-way of the Bay Trail extension from the Port of Oakland, the City of Oakland and the Bay Trail extension operator. The easement shall contain provisions for BART to pay for the cost of clean up and reconstruction of the Bay Trail extension after construction of the Connector. *4(f)-3(iv) Adjust Construction Schedule and Plans to minimize effects on the Bay Trail Extension.* BART shall consult with the Port of Oakland and the East Bay Regional Park District park officials regarding the construction plans and schedule of the project near the proposed Bay Trail Extension. The Traffic Management Plan (proposed as Mitigation Measure C-TR-1(ii)) and other construction plans and schedules that would be prepared for the project shall be submitted to these agencies for review and BART shall adjust its plans to minimize impacts to the proposed Bay Trail Extension and other projects proposed by the East Bay Regional Park District and the Port of Oakland in the vicinity of the Bay Trail Extension.	

Can the Impacts be Reduced or Eliminated?

For every significant adverse impact identified in the FEIR/FEIS, mitigation measures are proposed to reduce or eliminate the effects, as shown in Tables S-3 and S-4. Almost all significant impacts can be mitigated to a less-than-significant level. In a few instances, however, the proposed mitigation measure will not reduce the impact to a less-than-significant level. In these cases, the impact remains significant and is said to be "unavoidable." Unavoidable, significant effects identified in the FEIR/FEIS are denoted "Significant and Unavoidable" in Table S-3 and Table S-4 and include:

- Significant and unavoidable visual compatibility impacts (both project and cumulative);
- Significant construction noise impacts (with or without pile-driving) on hotels, recreational areas, and other commercial uses along the project corridor;
- Ground-borne vibration impacts to building occupants from pile driving and longer-term construction activities associated with construction of the AGT guideway, stations, and ancillary facilities;
- Potential vibration damage to buildings within 50 feet of pile driving activities;
- Significant and unavoidable cumulative traffic noise effects, especially on the Hegenberger Road hotels;
- Significant and unavoidable impacts on electricity supply (both project and cumulative); and
- Though temporary, significant and unavoidable cumulative construction impacts due to construction traffic and construction noise.

Pursuant to CEQA, before the project can be approved, the BART Board will be required to examine each of these unavoidable, significant impacts and determine whether the benefits associated with the project outweigh the unavoidable adverse effects.

Are There Any Areas of Controversy?

Areas of controversy may include concerns over the project merits, the range of alternatives investigated, and the nature and significance of potential environmental impacts. The following list of concerns is drawn from the comments received during the public review of the DEIR/DEIS and from the public hearing on September 12, 2001.

- **Aerial Guideway:** How disruptive will the guideway be to vehicle access, left turns, and businesses along Hegenberger Road?
- **Recreational Facilities:** What impacts will the project have on the Lew F. Galbraith Golf Course and on the Bay Trail?

- **Transit System Impacts:** What impact would the project construction and operation have on existing bus service and ridership in the area?
- **Project Alternatives:** Should other alternatives have been considered in the DEIR/DEIS?
- **Cost Effectiveness:** Would there be other benefits from selecting a less expensive Connector alternative?

Are There Unresolved Issues?

Issues to be resolved as BART and FTA move forward in the environmental review process include:

- adoption of project and project alignment including retaining the Median Option between Elmhurst Channel and Coliseum Way as a possible alignment;
- selection of a preferred technology for the AGT;
- financing for the AGT and intermediate stations, and the level of federal participation in funding the project;
- coordination between the implementation schedule for the AGT and the schedule for design refinements to the OIA terminal, parking structure, and roadway improvements;
- inclusion and approval of the AGT alignment and facilities on the Airport Layout Plan, as required by the Federal Aviation Administration;
- coordination between the AGT and the streetscape and landscape improvements proposed as part of the City of Oakland Gateway Development Plan;
- while the conceptual engineering has indicated that columns to support the AGT guideway can be sited to reduce disturbances to existing left-turn lanes, this will need to be confirmed during preliminary engineering; and
- coordination with Caltrans and Union Pacific Railroad since the AGT guideway would cross their rights-of way.

Section 1
Introduction

This section provides an overview of the proposed improved transit link between the Oakland International Airport (OIA) and the San Francisco Bay Area Rapid Transit District (BART) system. This overview includes a description of the study area, a brief history of the planning, engineering, and environmental studies; a description of the purpose and need for the project; and an outline of the organization and content of this document.

Section 1.1
Project Overview

Since the early 1970s, the concept of an improved transit link between OIA and the BART system has been explored, and various feasibility, engineering, and environmental studies have been undertaken. The major expansion program proposed for OIA reflects a substantial increase in travel by air passengers arriving and leaving the airport, as well as employees commuting to the airport. The need for a better link to BART is greater now than ever.

Passengers and employees reach the airport predominantly in automobiles traveling on Interstate 880 (I-880), Interstate 580 (I-580), State Route 24 and local roads. Those who take transit to the airport either ride BART to the Oakland Coliseum Station and transfer to the AirBART bus shuttle, or they ride Alameda-Contra Costa Transit District (AC Transit) local Route 58. The anticipated growth in the numbers of passengers and employees at OIA, however, is expected to create periods of traffic congestion and delay, even with programmed improvements to remedy local and regional congestion along these Interstates and State Route 24 and with increased capacity on the local roadways. As a result, the minimum running time on AirBART between the Oakland Coliseum Station and the airport is projected to lengthen and, more significantly for air passengers, is likely to become less reliable.

1.1.1 Description of the Study Area

The Connector study area lies in Alameda County, California within the nine-county San Francisco Bay Area (see Figure 1.1-1). Within Alameda County, the Connector would link OIA and the Coliseum BART Station. OIA is one of three primary commercial aviation airports in the San Francisco Bay Area. It is located in the southern portion of the City of Oakland adjacent to the San Francisco Bay. OIA is south of downtown Oakland and the City of Alameda, and north of the City of San Leandro.

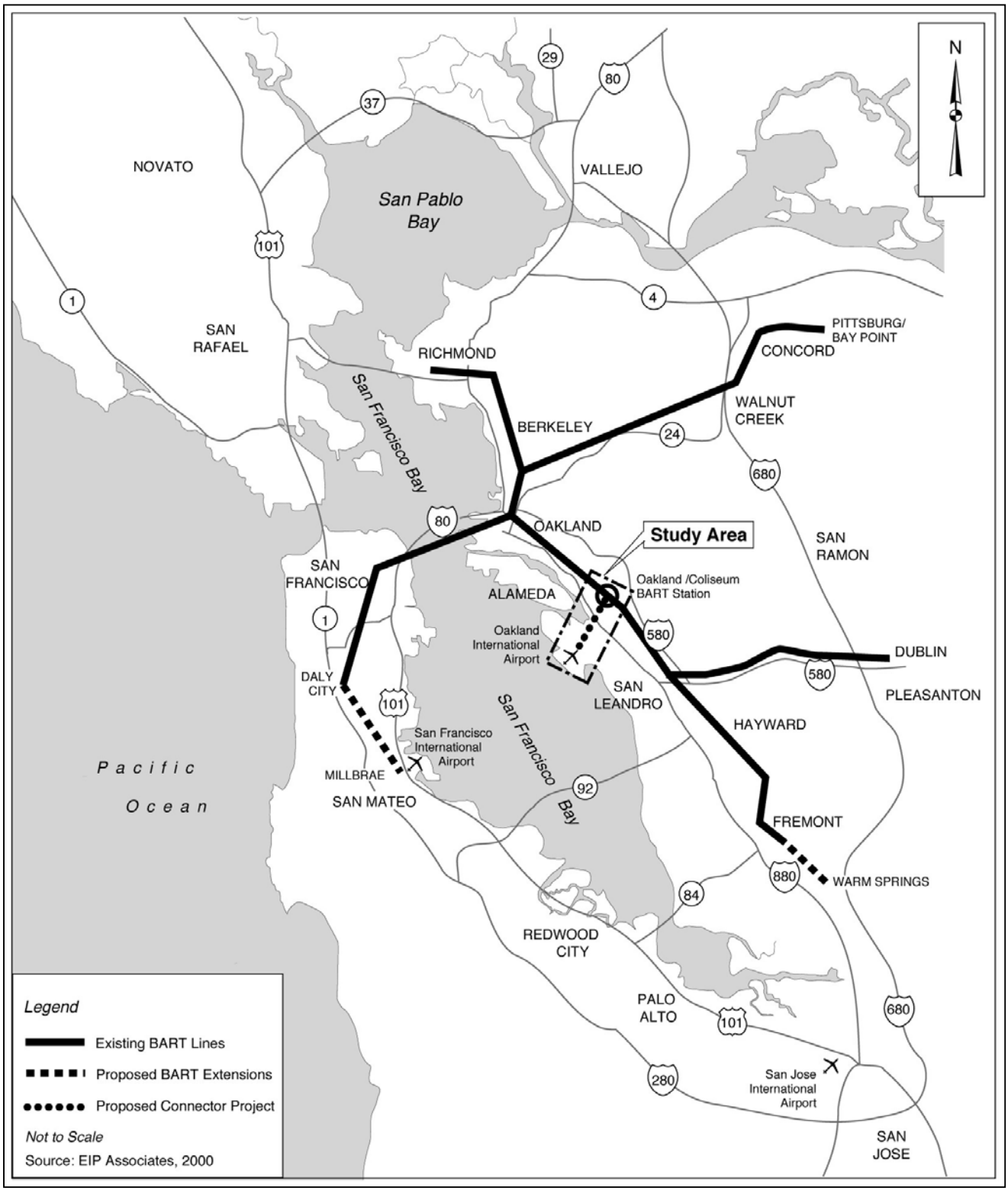


Figure 1.1-1
Regional Setting

The project "study area" is defined as the area between the Coliseum BART Station and Oakland International Airport (OIA), and approximately a mile east and west of Hegenberger Road and Airport Drive. (See Figure 1.1-2.) The study area is relevant for the evaluation of the overall land use patterns, socioeconomic characteristics, jurisdictional context, and traffic flows. Most of the direct project impacts would be concentrated in the immediate vicinity of the Connector service. Therefore, the "project corridor" is defined as an area of approximately one-quarter of a mile on either side of Hegenberger Road and Airport Drive between the Coliseum BART Station and OIA. The project corridor is also illustrated in Figure 1.1-2. The project corridor is used in this Final Environmental Impact Report/Final Environmental Impact Statement (FEIR/FEIS) for the study of site specific impacts such as the loss of sensitive resources, land acquisition, disturbance of utilities, local circulation, property access, and impacts on local geo-seismic, hydrologic, air quality, and noise conditions.

For the purpose of providing a consistent geographic orientation throughout this report, all maps have been prepared with the north direction at the top of the figure. As shown on Figure 1.1-2, for example, the Project Corridor generally follows Airport Drive and Hegenberger Road, which, in turn, generally follow a north-south orientation. Interstate I-880 in the Connector Study Area follows a northwest-southeast orientation. Since San Francisco Bay Area residents typically consider I-880 traversing an overall north-south direction, this document will continue to refer to "southbound" and "northbound" on and off-ramps and lanes of traffic when discussing I-880. When referring to the project alignment along the Hegenberger Road/Airport Drive corridor, the document will often refer to features being "west" or "east" of Hegenberger Road or Airport Drive. If these geographic orientations become confusing, the reader is encouraged to refer to the figure associated with the discussion for clarification of the particular compass-point reference.

The Coliseum BART Station is approximately 3.3 miles north of OIA. The station is located at Hegenberger Road and San Leandro Street, immediately north of the Oakland-Alameda County Coliseum Complex, a large, regional indoor arena and outdoor stadium. The primary freeway serving the area is I-880, with OIA to the south and the BART right-of-way to the north. From the Coliseum BART Station, Hegenberger Road crosses over I-880 and then, once it passes Doolittle Drive, becomes Airport Drive and proceeds onto OIA property.

The study area is characterized primarily by industrial, commercial, and airport-related land uses. Land uses south of Doolittle Drive are primarily industrial, supporting airport-related activities, such as aircraft maintenance and fuel storage. The Lew F. Galbraith Municipal Golf Course borders the east side of Airport Drive in this area. A variety of regional and automobile-oriented business and commercial uses exists along Hegenberger Road between Doolittle Drive and I-880. The Coliseum sports/entertainment complex is west of Hegenberger Road, between I-880 and the Union Pacific Railroad (UPRR) tracks. North of the BART tracks and the Coliseum BART Station is a mix of commercial, light industrial, and residential uses.

1.1.2 Historical Background

The proximity of San Francisco Bay Area Rapid Transit District (BART) to Oakland International Airport (OIA) has long suggested the opportunity for an efficient intermodal

connector. The need for an improved link between OIA and the Coliseum BART Station was recognized before BART opened in 1972 and has been documented in various feasibility, engineering, and environmental studies since 1970. The major expansion program proposed for OIA reflects a substantial increase in travel by air passengers arriving and leaving the airport, as well as employees commuting to the airport. The need for a better link to BART is greater now than ever. The following chronology summarizes the planning history and evolution of the Connector project. A more detailed description of these previous studies, including discussions of alternative routes, technologies, and operating characteristics, is contained in Appendix A.

Phase I Transit Access Feasibility Study for Oakland Airport Access Task Force (OAATF) (Kaiser Engineers, 1970)

The OAATF was created under a joint exercise-of-powers agreement and was composed of six agencies: Alameda-Contra Costa Transit District, San Francisco Bay Area Rapid Transit District, County of Alameda, City of Oakland, Port of Oakland, and Oakland-Alameda County Coliseum Complex, Inc. OAATF's main objective was to examine the feasibility of transit service between OIA, BART, the Coliseum Complex, and the industrial park on the west side of Hegenberger Road. Two transit systems were considered, a BART Extension System (that would extend the existing BART facilities to OIA) and a Connector System (that would introduce a new facility to link the BART system with OIA). Four vehicle types were considered: 1) use of the existing BART vehicle; 2) a modification of the existing BART vehicle; 3) use of a small, automatically controlled vehicle on its own guideway (including tracked air-cushion, rubber tire, steel wheel, or other vehicle concepts); and 4) motor buses, appropriately sized to operate on an exclusive guideway. Four routes were identified and are described in greater detail and graphically displayed in Figure A-1 in Appendix A.

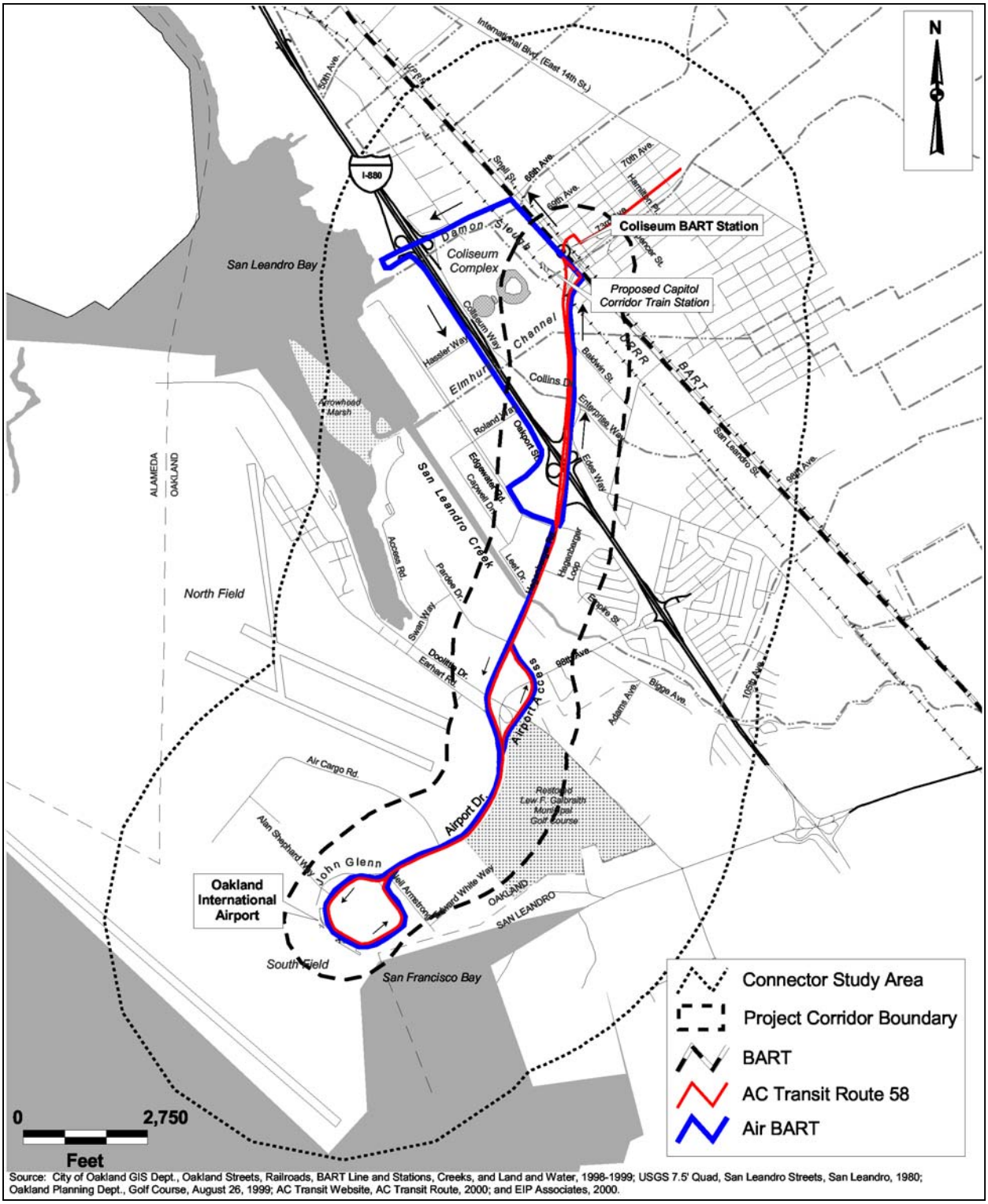
The study concluded that the combination of lower costs and better service, with little or no degradation of BART's regular service, made the Connector System with a modified BART vehicle more desirable than the BART Extension System.

According to the study the Connector System would not have prohibitive operating and capital costs, would generate good patronage, would offer good service, could be incorporated into a future airport expansion, and would support extension of direct BART service to the airport from all points in the BART system.

Phase II Oakland Airport Transit Access Project (Kaiser Engineers, 1975)

Following the 1970 Phase I, Phase II further compared the two transit systems, the BART Extension System (a direct extension of BART service to the airport) and the Connector System (using a technology other than BART). The report did not recommend a preferred alternative. Key features of the Connector System included:

- right-of-way separate from BART;
- automatic and separate control system;
- fare system integrated with the BART system; and



Source: City of Oakland GIS Dept., Oakland Streets, Railroads, BART Line and Stations, Creeks, and Land and Water, 1998-1999; USGS 7.5' Quad, San Leandro Streets, San Leandro, 1980; Oakland Planning Dept., Golf Course, August 26, 1999; AC Transit Website, AC Transit Route, 2000; and EIP Associates, 2000.

Figure 1.1-2
Connector Study Area and Project Corridor

electrically propelled, rubber-tired, bottom-supported vehicle light transit system (other systems were also acceptable, including dual-rail guidance, side guidance, or center guidance with high or low guide beam/and steel-wheel, rubber-tired, or air-cushion support).

Four alternative routes were considered for the study based on length of line, travel time, major environmental impacts, interference with existing structures or recreational facilities, service to the intermediate area between San Leandro Street and OIA, and compatibility of alignment with OIA terminal expansion plans. All alternatives follow Airport Drive from Doolittle Drive to the OIA terminal. Alternative 1, which follows the Airport Channel route (from the Coliseum BART Station southwest along Hegenberger Road, southwest along the Elmhurst Channel, southeast along Doolittle Drive and continuing to Airport Drive), was selected for further consideration, because it caused least interference with the commercial and industrial areas, resulted in low disruption during construction, had low construction costs, and was expected to provide an airport passenger service equal to that of other alternatives. Under Alternative 1, the Connector route would be 3.9 miles in length, three-fourths of which would be aerial. The remainder would be at grade, in subway, or in retained cut.

Oakland Airport Transit Connector Working Paper Preliminary Design and Engineering Phase (DeLeuw, Cather & Company 1979, 1980)

A 1979 working paper by DeLeuw, Cather & Company restudied earlier alternatives. Along with the BART Connector System and BART Extension System, the working paper investigated new options including an All-Highway Solution, a Low-Cost Bus Option, a Capital-Intensive Bus System, and the No Build Alternative. The working paper concluded that the All-Highway Solution and the BART Extension System were not viable options for a Connector and were dropped from further consideration. Consequently, the working paper concluded that the BART Connector System, a Low-Cost Bus Option, a Capital-Intensive Bus System, and the No Build Alternative remained as viable options. In 1980, an Automated Guideway Transit system was identified as the preferred technology for a connector between OIA and BART, and preliminary engineering drawings were prepared to illustrate the horizontal and vertical alignment for such a system.

Oakland Airport Transit Connector Draft EIS (UMTA, 1981)

Based on results and recommendations of the 1979 and 1980 studies, this 1981 environmental document focused on five alternatives:

- Alternative 1: No Build, defined as the existing AirBART service between OIA and the Coliseum BART Station with some improvements to the system
- Alternative 2: Medium Range Bus
- Alternative 3: Capital-Intensive Bus
- Alternative 4: Automated Guideway Transit Systems (AGT) with Intermediate Stations
- Alternative 5: AGT without Intermediate Stations

Alignment options, both horizontal and vertical, were considered for the various system and route alternatives. The route between OIA and the BART station was divided into several segments and several variations were proposed for each segment. Each segment alignment was rated according to engineering factors, environmental considerations, and socioeconomic effects. Based on these factors, a final route alignment was to have been selected after public hearings and preparation of the final EIS. However, the EIS was not completed, and, subsequently, a final route alignment was never selected.

Project Update Report: BART-Oakland Airport Intermodal Connector Project (BART, Port of Oakland, 1993)

This 1993 report updated the information that was contained in the 1981 Oakland Airport Transit Connector Draft EIS. The report studied busways, light rail transit, personal rapid transit, rapid transit, and AGT technology for the Connector System. The report discussed performance criteria and, based on those criteria, developed service and physical characteristics for a proposed system. Various operating patterns and terminal station configurations were studied and found to meet the performance criteria for the Connector. The report concluded that only an exclusive guideway could meet or exceed all the performance criteria required of the transit service. The report also determined that there was a need for more extensive engineering and operational studies in order to find the optimum solution.

Alternative alignment routes were analyzed as well. Six basic alignment alternatives were considered for the screening exercise and two basic alignments, one following Hegenberger Road and the other following Elmhurst Canal and Edgewater Road were further developed and evaluated. The Hegenberger Corridor is shorter and has fewer curves than the Edgewater Corridor, which reduces travel times, construction costs, and operating costs. Because this alignment primarily stays within the highly developed Hegenberger Corridor, it also poses fewer potential impacts to environmentally sensitive areas.

A secondary purpose of the 1993 report was to support efforts by BART to secure special funding for the development of the Connector. BART, in its effort to implement a Connector, was awarded a Federal Transit Administration (FTA) grant to evaluate the feasibility of using Suspended Light Rail Transit (SLRT) technology for the Connector. BART's application was one of three being considered for eventual capital funding by the FTA. A separate SLRT feasibility study was also funded and prepared by ATI Corporation, who was the developer of SLRT technology, and Parsons Brinckerhoff. After the 1993 report and the feasibility study, the FTA decided to abandon the SLRT concept, and no further action has occurred.

1.1.3 Existing Conditions

The public transit network in the study area includes BART and Alameda/Contra Costa Transit District (AC Transit). AC Transit serves much of Alameda County and western Contra Costa County, and AC Transit Route 58 serves OIA. The BART system offers indirect access to OIA from Alameda, Contra Costa, San Francisco, and San Mateo Counties. BART riders use the AirBART shuttle bus to get to OIA from the Coliseum BART Station. Leaving the BART station, the AirBART shuttle follows 66th Avenue, Edgewater Road, Hegenberger Road, and Airport Drive. Returning to the BART station from OIA, the AirBART shuttle takes Airport Drive and

Hegenberger Road. The shuttle operates at approximately 10- to 15-minute intervals throughout the day. The average total trip time (that is, the wait time plus the time traveling in the vehicle) between the Coliseum BART Station and Terminal 2 at OIA is currently 18 minutes, although surveys performed for this EIR/EIS show the trip can be as much as 29 minutes. (Additional information on AirBART service from field surveys conducted for this FEIR/FEIS is presented in Section 3.1, Transportation.)

In 1992, the AirBART shuttle served about 283,000 riders, or about 4.4 percent of OIA employee and air passenger arrivals and departures. In 1999, the shuttle served about 463,100 riders, or about 4.5 percent of OIA employees and passengers (CCS Planning and Engineering, Inc., 2000a). Although AirBART's share of OIA employees and passengers has increased marginally (0.1 percent), the number of actual riders has increased 64 percent, indicating a large overall growth in employee and passenger traffic to OIA.

The anticipated growth in the numbers of passengers and employees at OIA, however, is expected to create periods of traffic congestion and delay, even with programmed improvements to remedy local and regional congestion along these Interstates and State Route 24 and with increased capacity on the local roadways. As a result, the minimum running time on AirBART between the Oakland Coliseum Station and the airport is projected to lengthen and, more significantly for air passengers, is likely to become less reliable.

Because of foreseeable growth in airport use, local and regional roadway congestion and delay, the demand for transit alternatives is expected to rise. To maintain the capacity, convenience, and reliability of transit services, BART is proposing a BART-Oakland Airport Connector (Connector) project to improve access to the airport using direct and convenient connections to the existing BART system. For over 30 years the San Francisco Bay Area has grappled with how best to link OIA with its regional rail system. Much has been learned from the numerous studies that evaluated alternative alignments, modes, station locations, and funding mechanisms. Despite the volumes of data and analyses, the basic question remains to be answered: To what degree should the Connector be separated from roadway traffic? Given that both the Connector's cost and service quality (and, therefore, ridership levels) are directly linked to the outcome of this decision, another way of stating the question is, What is the optimum level of investment for shifting people from their cars to transit for the trip to the Oakland Airport?

Section 1.2
Project Need

The purpose of the proposed Connector project is to construct and operate a high quality and extremely reliable transit service linking the BART Coliseum Station with the Oakland International Airport (OIA) by replacing the existing less reliable AirBART shuttle bus service. The Connector is envisioned as another important link in a regional transit network that would allow people from throughout the San Francisco Bay Area to access either OIA or San Francisco International Airport (SFO) using BART trains. Implementation of the Connector would greatly enhance the reliability and quality of the BART service to and from OIA and would complement planned BART service improvements now under construction at SFO. The Connector could improve the attractiveness and competitiveness of OIA air passenger services within the region thereby providing some potential relief of growing air traffic congestion at SFO.

The BART Connector to OIA has been the subject of intense study for many years. Implementation of the Connector would expand transit capacity in a highly congested subarea of the region, provide a practical alternative to driving to OIA on increasingly congested roadways leading to and from the airport, improve reliability of transit service connections to the airport, provide environmental benefits and improve mobility for transit dependent residents living in the BART service area.

The need for the Connector project is based on recognition of existing and future transportation constraints in the study area. The anticipated future public and private development in the Coliseum and OIA area, increased air travel growth at OIA, and related congestion along roadways that serve the airport and study area establish an overarching need to improve public transportation linkages in the area. Improvements to the existing transit service to OIA would encourage some current motorists to use BART services to OIA, thereby providing some relief to the congested traffic conditions in the study area and beyond.

1.2.1 Transportation Problems in the Study Area

Traffic Congestion

The I-880 freeway is the major regional travel corridor linking communities in Santa Clara, Alameda, Contra Costa, and Solano Counties, and is the major roadway near OIA. The I-880 freeway is subject to severe congestion. It operates at unacceptable levels (traffic volumes are at or exceed the theoretical capacity of the roadway) during peak hours in the vicinity of OIA and the Coliseum BART Station (from Davis Street to 66th Avenue). For example, during the p.m. peak hour, average southbound travel speeds are less than 40 miles per hour (Port of Oakland, 1997). In this segment of I-880, nearly 90 percent of the southbound road capacity is used during the a.m. peak period and over 90 percent in the p.m. peak. Travel is better in the northbound direction, but nearly 70 percent of the capacity is used in the a.m. peak period and

over 80 percent in the p.m. peak period (MTC, 2000). No capacity improvements such as freeway widenings or high occupancy vehicle lanes are planned in the vicinity of the study area.

Some intersections near OIA are heavily congested. During the p.m. peak hour, the Airport Drive/Doolittle Drive and Hegenberger Road/Edes Avenue intersections both operate at or near capacity. Traffic operations are often assigned letter grades (A-F) to signify the level of congestion. A level of service (LOS) A indicates minimal delays; LOS F is considered unacceptable to most drivers. The average delay for vehicles at these signalized intersections during the evening commute period is equivalent to LOS E, which most communities also regard as unacceptable. In 2020, travel along Hegenberger Road between I-880 and Doolittle Drive is projected to experience significant delays and low average speeds. Future travel conditions along roadways and at intersections in the study area are presented in greater detail in Section 3.1, Transportation, of this document.

In 1998, 85 percent of the air passengers traveling to OIA used private or rental cars; door-to-door shuttles, taxis, or limousines accounted for 7 percent; public transit, 5 percent; private scheduled buses, 2 percent; and hotel shuttles, chartered buses, or other similar services, 1 percent (MTC, 2000). The reliability of these different "modes" is most notably affected by existing and forecasted traffic conditions along the routes taken to access OIA. As noted above, forecasted traffic conditions indicate greater delays for all modes of transportation.

Transit Reliability

AirBART, AC Transit, taxis and airport shuttles provide service to OIA with various levels of convenience. However, all these services operate in mixed flow traffic and are subject to delays due to traffic congestion. The unpredictability of traffic congestion, the potential for stalls, and the extra crowds during Coliseum events raise reliability concerns for air passengers using transit, shuttles, or taxis to access OIA.

AirBART is scheduled to operate every 10 minutes between 6:00 a.m. and 12:05 a.m., Monday through Saturday, and 8:00 a.m. to 12:00 p.m. Sundays. For purposes of comparison, the typical auto trip from Coliseum Station to OIA ranges from 6.5 to 8.8 minutes with an average of approximately 8 minutes during weekday, off-peak hours with no Coliseum events. AirBART's scheduled headway is ten minutes, but is subject to variation due to traffic congestion. Issues specific to AirBART, the current service connecting the regional BART system with OIA, are summarized below.

- **Trip Times.** On-board surveys performed for the DEIR/DEIS showed that total passenger trip times (the time it took to wait for the bus, to load the bus, and to travel from point to point) from BART to OIA varied substantially. The average wait time (time spent waiting for the bus) for AirBART was five minutes, but the wait time for AirBART at the BART station ranged from one minute (when a bus was at the AirBART stop when the passenger arrived) to 26 minutes, and the wait time at OIA ranged from one to 35 minutes. The travel time (time spent traveling in the bus) for any given bus run also varied substantially from the average travel times. The travel time from the BART station to Terminal 1 averaged 11 minutes, but

varied between 6 and 25 minutes. Between Terminal 2 and the BART station, the travel time averaged 9 minutes, but varied between 6 and 14 minutes.

These variations were not isolated events. Between the BART station and Terminal 1, 15 percent of AirBART users experienced travel times of over 13 minutes and some as long as 25 minutes. Between Terminal 2 and the BART station, 15 percent of AirBART users experienced travel times over 11 minutes. The average total trip time (including time to travel from BART to the AirBART shuttle stop, wait time, and in-vehicle travel time) between the BART station and Terminal 2 at OIA was 17.7 minutes, but the total trip time in this direction was observed to be as much as 29 minutes and exceeded 20 minutes 15 percent of the time.

These observations were made over three days within normal air travel and without major traffic problems or major Coliseum events. Travel on the roadways becomes even more difficult during holidays and when major events occur at the Coliseum. In the future, traffic congestion along the AirBART route will increase and the average AirBART running time will increase accordingly. The variability in AirBART running time will also increase as traffic conditions become more congested. As the AirBART running time becomes more variable, the reliability of AirBART service worsens, thereby affecting travelers' decisions to use transit for travel to and from OIA.

- **Convenience.** AirBART passengers must buy a ticket before exiting the BART station and wait at the shuttle stop on San Leandro Street, before boarding the shuttle. This can be inconvenient for passengers with luggage and those unfamiliar with the service. At OIA, passengers must purchase tickets inside the terminal building before walking to the curb where the AirBART stop is located. The confusion about how to transfer from AirBART to BART results in additional lost time and frustration.

1.2.2 Projected Growth at OIA

Airport Operations

By 2020, the number of air passengers using OIA is projected to increase about 270 percent compared to 1998. This rate of increase is greater than any other airport in the San Francisco Bay Area. Key statistics demonstrating this trend, particularly in the near future to 2010, are presented in Table 1.2-1. The Regional Airport Planning Committee of the Metropolitan Transportation Commission estimates that air passenger activity at OIA will increase to 24.7 million annual air passengers by 2020. The expected increase in air passenger activity is based on projected levels of air passenger activity in the Bay Area and the portion of regional air passengers within each Bay Area airport's "catchment" area, as well as the way in which airlines at each Bay Area airport would most likely expand their service. OIA is expected to carry an increased portion of the regional air passenger demand with new flights that were not in place in 1998.

Table 1.2-1
OIA Growth Forecasts, 1998 - 2020

	1998	2010	2020	% Change 1998-2010	% Change 2010-2020
Total Operations (flights)	487,760	563,325	633,000	10.0	12.4
Air Cargo Operations (flights)	54,016	84,100	105,600	55.7	25.6
Air Passengers	9,158,536	17,471,912	24,739,663	90.8	41.6

Source: Roberts Roach & Associates for MTC, 2000.

Note: In 1999, OIA served 9.8 million air passengers, which includes total enplanements, deplanements, and transfers from one plane to another (Port of Oakland, 1999).

In 1998, OIA handled 54,000 air cargo-related flights. The OIA is projected to handle nearly 106,000 air cargo flights by 2020 (MTC, 2000). This growth in air cargo reflects the presence at OIA of two of the most successful air cargo "integrator" carriers, Fed Ex and UPS (an integrator airline picks up and delivers cargo from its customers). These carriers are based at OIA, due to its freeway access to the region (Roberts Roach & Associates, 2000).

Increasing passenger and air cargo activity will increase airport area employment, placing additional demands on the ground transportation system to move people and goods to and from the airport. In 1996, about 10,200 full-time equivalent jobs were directly related to OIA operations, including general aviation, air cargo, airline maintenance, and rental car operations. By 2020, about 16,700 jobs are expected to be directly related to OIA operations, primarily at OIA (Whittington, 2000).

Airport Development Program (ADP)

The ADP planning process began in the mid 1990s, and the program consists of physical improvements at OIA to address deficiencies in the ability of existing facilities to accommodate current activity levels and to accommodate, at industry standard levels of service, the increases in air passenger and air cargo activity forecast for 2000. Although air passenger forecasts exist for longer time horizons, the Port has acknowledged that these forecasts of aviation activity are subject to considerable uncertainty due to the variability of consumer demand for aviation services and the intensely competitive nature of the aviation industry. Consequently, the Port deliberately developed the ADP to address short-range projections (to 2000) that would be more likely to satisfy actual market conditions for both air passenger and air cargo activity. However, information in the Port ADP EIR (1997) extends through 2010 in order to comply with requirements of the Metropolitan Transportation Commission and to be consistent with state CEQA Guidelines for analyzing cumulative impacts of the ADP.

The Port of Oakland has adopted an ADP that involves numerous airport improvements. The development program is intended to accommodate the increasing numbers of air passengers and amount of air cargo, while maintaining an acceptable level of accessibility, convenience, and comfort for OIA's users. Terminal 1 will expand by about 265,000 square feet and Terminal 2 by about 40,000 square feet, approximately doubling their sizes. Other elements of the ADP include roadway and parking improvements and the expansion of cargo facilities and the aircraft maintenance facility (Port of Oakland, 1997).

The City of Alameda, City of San Leandro and a citizen group sued the Port of Oakland in state court, challenging the EIR prepared by the Port for the ADP under CEQA. On August 30, 2001, the California Court of Appeal issued an opinion concluding that the Port's EIR failed to adequately address noise and toxic air contaminant emissions associated with jet flights, and lacked appropriate mitigation for impacts on burrowing owls. The Port is required to revise the EIR to address these concerns.

The Federal Aviation Administration (FAA) must approve any physical improvements proposed for on-airport property. On December 21, 2000, the FAA issued a Record of Decision (ROD)/Finding of No Significant Impact (FONSI) for the Airport Development Program federal environmental review. The FAA also issued an unconditional approval of the associated Airport Layout Plan based on the analysis contained in its December 2000 Final Environmental Assessment. The approved Airport Layout Plan includes a preliminary route for the Connector project[1]. The City of Alameda and citizen groups have sued the FAA, challenging the ADP FONSI under NEPA. This litigation is currently pending in federal court.

On November 14, 2001, the Port entered into a settlement agreement with plaintiffs in both the federal and state litigation, allowing the Port to proceed with certain ADP projects. The resolution of the remaining issues in these lawsuits is not expected to affect the Connector project.

Increased activity resulting from the ADP and anticipated growth will affect traffic volumes within the Airport Drive-Hegenberger Road corridor and along I-880. Peak hour trips would increase 86 percent between 2000 and 2010, and I-880 (between Davis Street and 66th Avenue) in the northbound and southbound directions during the commute peak hours would operate in gridlock conditions (Port of Oakland, 1997). The poor freeway operating conditions in 2010 were noted as significant and unavoidable cumulative impacts under both the No Project and the ADP Alternatives in the Port's Final ADP EIR. No feasible mitigation for freeway impacts was proposed as part of the ADP or identified in the Final ADP EIR. The FEIR analyzed the impacts associated with 22.4 million annual passengers in 2010. The updated air passenger forecasts by MTC used for this FEIR indicate that 24.7 million annual passengers are expected to travel to and from OIA in 2020, and traffic analyses conducted for this FEIR indicate that in 2020 there would be approximately 300 to 400 more vehicle trips traveling to and from OIA during the a.m. peak hour and p.m. peak hour, compared to those projected for 2010 in the ADP EIR.

Airport Roadway Project (ARP)

The Port of Oakland is undertaking an Airport Roadway Project as part of the ADP. The Airport Roadway Project will add and widen several roadways at OIA. The four modifications that are of most importance to the Connector project include:

- Modifications to intersections along Airport Drive and Hegenberger Road, including a grade-separation at the intersection of 98th Avenue/Doolittle Drive.

[1] Airport Layout Plan, Metropolitan Oakland International Airport, approved December 21, 2000.

- Widening of the southbound approach to the intersection of Hegenberger Road and Pardee Drive.
- Reservation of a 35-foot wide corridor along the east side of Airport Drive for use by the proposed Connector.
- Widening of 98th Avenue from OIA to Empire Street.

The portion of the Airport Roadway Project at 98th Avenue and Doolittle Drive is already under construction.

Section 1.3
Project Purpose

OIA is expanding and its operations are growing. The population of the Bay Area is also growing. BART's facility improvements have increased its capacity and extended its service to serve new communities, including east to Bay Point and Dublin/Pleasanton and to the San Francisco International Airport and Millbrae. As the number of OIA and BART passengers increases, the demands placed on the existing road-based transit connections between OIA and BART will also increase. These transportation options are already hindered by traffic congestion during peak periods, and conditions are expected to worsen. Convenient and reliable ground access to OIA is an important goal for BART, the City of Oakland, and the Port of Oakland. To meet these challenges, BART, the City, and Port initially developed the primary objectives for the Connector project, as shown in Table 1.3-1. In addition to these primary objectives, BART developed preliminary criteria, which were instrumental in evaluating the merits of the alternatives and technologies, as provided in Table 1.3-2.

Increased Transit Ridership

By improving transit services, the Connector will attract air passengers and employees who would otherwise drive to OIA. As presented in Section 2, Preferred Alternative and Other Alternatives Considered, the diversion of people from autos to transit increases as the transit vehicles are increasingly separated from roadway traffic. The Automated Guideway Transit system operates in its own exclusive guideway and thus attracts passengers and also reduces auto trips. The reduction in the number of auto trips offers several benefits:

- lessening of projected traffic congestion in the Hegenberger Road Corridor and I-880;
- reduction in regional air emissions (up to 21 tons/year of oxides of nitrogen, 3 tons/year of reactive organic gases, and 49 tons/year of carbon monoxide in 2020); and
- reduction in overall regional energy consumption (as measured in Btus).

These benefits of the Connector are positive features typically associated with transit-related projects. These benefits were also acknowledged by the Alameda County voters when they demonstrated their widespread support for transportation expenditures in November 2000 by approving an increase in local sales tax to help finance such projects. Of note, however is how the Connector can also support land use and development policies of the City of Oakland and Port of Oakland, as discussed below.

Table 1.3-1 ***BART-Oakland Airport Connector Project Objectives***
1. Provide reliable scheduled service between BART and OIA.
2. Provide flexibility to increase transit vehicle frequencies during periods of increased travel demand.
3. Offer a competitive alternative to those who drive to OIA by providing predictable connections and travel time savings.
4. Provide a convenient, safe, and comfortable connection between BART and OIA.
5. Maximize BART ridership.
6. Be cost-effective, recognizing budget constraints and available funding.
7. Be consistent with BART's expansion policy, providing flexibility to accommodate potential intermediate stops that support local economic growth.
8. Minimize significant environmental consequences of construction and operation.

Source: BART

Table 1.3-2 ***BART-Oakland Airport Connector Evaluation Criteria***
1. Provide reliable scheduled service between BART and OIA.
2. Provide on-time performance equal to BART.
3. Accommodate a minimum of 700 passengers per hour per direction.
4. Ensure that transit vehicles arrive at least every 6 minutes.
5. Ensure that the maximum wait time is no greater than 6 minutes.
6. Complete trips between OIA and the Coliseum BART Station at least as quickly as motorists during off-peak weekday traffic.
7. Allow capacity adjustments throughout the day.
8. Provide flexibility to expand and upgrade the system to accommodate increases in ridership.
9. Provide flexibility to serve intermediate stops.
10. Minimize significant negative environmental effects.
11. Be constructed and operated within reasonable costs
12. Avoid substantial impacts to sensitive residential, public, and commercial land uses.
13. Minimize the amount of private property needed for rights of way.
14. Minimize the extent of displacement (e.g., businesses or parking).
15. Avoid constraining known development plans.
16. Avoid creating odd-shaped land areas with limited development potential.
17. Support increased transit service for targeted redevelopment and revitalization areas to facilitate economic growth.
18. Conform to the Airport Development Program.

Source: BART

Development Catalyst

The Connector has the opportunity to serve as a catalyst for public and private ventures to economically revitalize the study area. With or without the Connector, the area has witnessed a substantial amount of reinvestment and redevelopment activity, with primary examples including the Holiday Inn Express, Marriott Inn, and Zhone Technologies. The Connector study area has been recognized for its role in the City's economic future and vitality, as shown in the plans described below. A Connector project can trigger investment by public and private developers. The prospects for improved linkages along the project corridor and to BART and OIA are attractive to corridor property owners, businesses, and OIA air passengers and employees.

Oakland Showcase Districts

Oakland "Showcases" are districts in Oakland that are specially recognized for their regional importance and comprise the economic engines that enable the City to respond to broad trends and market demands. The study area includes two of these districts that the City seeks to promote as keys to economic success and potential for revitalization: the Coliseum Area Showcase and the Airport/Gateway Showcase.

The Coliseum Area Showcase reflects the City's commitment to promote expanded job generation and retail opportunities along the I-880 corridor, enhance existing regional entertainment and recreation activities, and provide expanded visitor services in this important gateway area. The Coliseum Complex hosts over 250 events in a typical year and can accommodate 81,700 people (stadium and arena) at one time. The total annual attendance exceeds 2.5 million persons. It is at the heart of the City's largest concentration of regional commercial uses, and the Coliseum BART Station is acknowledged as a great opportunity to provide transit access to this dynamic area.

The Airport/Gateway Showcase is devoted to the safe and efficient movement of people and cargo, promoting economic growth and mobility. Airport operations stimulate cargo and distribution operations, as well as visitor-serving businesses in the Hegenberger Road Corridor. Annual economic impact of airport activities was estimated in 1994 at over $3 billion, with over $50 million annually paid in state and local taxes. The Oakland General Plan, in designating this area as a Showcase District, seeks to capitalize on the economic benefits of the airport and jobs created by its growth, and to improve the Hegenberger gateway into a regional attraction. Key areas for new hotels and regional-serving commercial areas, as well as business mix areas are proposed along Hegenberger Road both north and south of the freeway.

Hegenberger Road-98th Avenue Gateway Development Plan

The *Hegenberger Road-98th Avenue Gateway Development Plan* is a development improvement plan sponsored by the City of Oakland and the Port of Oakland. The plan identifies how public and private investment, City and Port initiatives, and land use controls can be marshaled to enhance economic development opportunities and create a positive image for the City of Oakland, the Port, and private developers. The City and the Port have each contributed about $2 million towards implementation of this improvement plan.

Economic Investment Areas

Envision Oakland, the City of Oakland's General Plan (adopted in March 1998) identifies both the Coliseum BART Station area and the Hegenberger Gateway as "target areas for community and economic development," where growth and change in the land use mix and opportunities are to be fostered. The city's policy directives promote economic investment into these areas.

The Coliseum BART Station is specifically designated by the General Plan as a Transit Oriented District, to become a major intermodal transfer point, connecting BART, Amtrak, and the airport. Since the General Plan was adopted, a Capitol Corridor Station, serving commuter rail passengers between Sacramento and San Jose, has also been proposed within one block of the Coliseum BART Station, further enhancing the BART station's intermodal role. The station is recognized to be strategically located at the edge of two districts: neighborhoods of largely single-family homes and the Coliseum Area Showcase. Future development should aid in the land use transition between neighborhoods and the regional attractions at the Coliseum/Airport and vicinity.

Section 1.4
Intended Use and Organization of the FEIR/FEIS

1.4.1 Intended Use of the FEIR/FEIS

As use of federal funds is contemplated in order to implement the proposed project, the FEIR/FEIS will be used as part of the federal approval process for funding. Similarly, BART and other local agencies will use these environmental documents in their funding decisions. Other agencies may also use this FEIR/FEIS, either for review or as part of the process of issuing permits or approvals required prior to construction. Table 1.4-1 provides a list of agencies that may use this document and areas over which these agencies have authority. Public agencies with review responsibilities over the Connector project have been consulted as part of the preparation of this document. Section 7.3, Summary of Public Agency Coordination, identifies the agencies contacted in compliance with other federal environmental legislation and protocols.

Because implementation of the Connector requires approval from local state, and federal entities, compliance with California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) legislation is necessary. Both state and federal laws require that a document be prepared to inform the public of environmental consequences of the proposed project, and alternatives, and possible mitigation measures to reduce the significance of identified impacts. Both CEQA and NEPA regulations encourage the preparation of a single document to satisfy both state and federal laws. Accordingly, BART and the Federal Transit Administration (FTA), the lead agencies under CEQA and NEPA, respectively, combined the state and federal processes to produce a joint Environmental Impact Report/Environmental Impact Statement (EIR/EIS).

CEQA requires that each significant impact of a project be identified in the EIR and feasible mitigation measures or alternatives be identified and implemented. NEPA, however, requires only a consideration of potentially significant adverse environmental impacts, evaluation of all reasonable alternatives, and the suggestion of appropriate mitigation measures. Thus, this FEIR/FEIS identifies each significant impact of the preferred alternative in order to meet the requirements of CEQA.

Department of Transportation regulations require that a Section 4(f) evaluation be prepared in compliance with Section 4(f) of the Department of Transportation Act of 1966 (now codified at 49 U.S.C. 1653(f)) and incorporated into the EIS. Therefore, the Section 4(f) evaluation has been included as Chapter 5 of this FEIR/FEIS.

Table 1.4-1
Agencies with Review, Permit and/or Approval Authority

Agency	*Statutory Authority*	*Permit or Approval Jurisdiction, Actions Covered*	*Documentation or Prior Actions Required*
Federal			
Federal Transit Administration	NEPA, Clean Air Act of 1970 as amended	Lead Federal Agency for EIS; granting of funding; conformity evaluation of project with State Implementation Plan under Clean Air Act (CAA)	Approval of this EIS and Record of Decision; and CAA Conformity Analysis
U.S. Environmental Protection Agency	Section 404 permit (Clean Water Act Amendment of 1977); Clean Air Act of 1970 as amended	Section 404 oversight; CAA Conformity determination	Review of this EIR/EIS
U.S. Department of Interior	Section 4(f) (Department of Transportation Act of 1966)	Section 4(f) - Approval of a transportation project for use of publicly owned land such as a park recreation area, wild refuge, land from a historic site of national, state, or local significance	Section 4(f) Evaluation
Federal Highway Administration	Encroachment Permits	Review of project for encroachment into U.S. Highway	Proposed project plans
Federal Aviation Administration	Airport and Airway Improvement Act of 1982; Title 14 of the Code of Federal Regulations 14CFR Part 77, Objects Affecting Navigable Airspace	Approval of revised OIA Airport Layout Plan for Connector right-of-way and Connector airport station; review of potential encroachment into airport safety zones; review of long-term leaseholds and easements on airport property, encumbered by existing federal airport grant agreement	Airport Layout Plan; Review of this EIR/EIS
Advisory Council on Historic Preservation	Section 106 review (National Historic Preservation Act of 1966)	Review of project for potential disturbance to significant historic and archaeological resources	Finding of Effect
State			
Department of Fish and Game	California Endangered Species Act (CESA); Fish and Game Code, Sections 1601-1603 review; Fish and Game Code, Sections 3503, 3503.5, 3513, 3800	CESA – Review of project for "take" (altering habitat) of endangered and other special status plant or animal species Sections 1601-1603 – Streambed Alteration Agreement, review of project for potential to alter streamflows or the bed and bank of a stream, lake, or pond Sections 3503, 3503.5, 3513, 3800 – prohibition to take possess, or needlessly destroy the nests or eggs of any bird, except as otherwise provided by this Code or any regulation made pursuant thereto	EIR Form # FG2023 "Notification of Removal of Materials Game and/or Alteration of Lake, River, or Streambed Bottom or Margin," map of area indicating public access, and environmental documentation
Department of Transportation (Caltrans)	Caltrans Encroachment Permit	Encroachment of federal and state-funded highways requiring the use of a Caltrans Encroachment Permit	Proposed project plans
Public Utilities	Operating/Safety Approvals	Operating/safety approvals within	Proposed project plans

Table 1.4-1
Agencies with Review, Permit and/or Approval Authority

Agency	*Statutory Authority*	*Permit or Approval Jurisdiction, Actions Covered*	*Documentation or Prior Actions Required*
Commission		railroad rights-of-way	
State Historic Preservation Office	CEQA; Section 106 of National Historic Preservation Act of 1966	Review and final approval of Historic Property Survey and Effects Reports (statement indicating whether or not it has any concerns about projects which will disrupt soil or alter buildings); party to Memorandum of Agreement for any adverse effects to historic properties	Finding of Effect
Native American Heritage Commission	Public Resource Code Section 5097	Review of project for potential disturbance to native American heritage/burial sites	Consultation letter; Review of this EIR/EIS
Regional			
Regional Water Quality Control Board	Section 401 and 402 of Clean Water Act; Porter-Cologne Act	Section 401 and Porter Cologne Act - Water Quality Certification, or waiver thereof, for potential construction in wetlands areas determined to be under Corps' jurisdiction (certification required before Corps' Section 404 permit may become effective Section 402 – National Pollutant Discharge Elimination System (NPDES) permit which regulates discharge into surface waters	Copy of application to federal agency for permit (e.g., for Section 404 permit), EIR, copy of Section 404 (b) (1) alternative analysis, proposed mitigation plan, if any; update existing Storm Water Pollution Prevention Plan
Bay Area Air Quality Management District	Section 176 (c) of Clean Air Act of 1970 as amended	Air quality conformity	Review of this EIR/EIS
Metropolitan Transportation Commission (MTC)	Section 176 (c) of Clean Air Act of 1970 as amended; MTC Resolution 3075	Review all applications for state or federal funding; Air quality conformity	Proposed project plans and EIR
San Francisco Bay Conservation Development Commission	McAteer-Petris Act	Development permit for fill and uses within certain tidal creeks and waterways that empty into San Francisco or San Leandro Bay and lands 100 feet inland of mean tide line	"Application for Permit" form, certified environmental documentation, if applicable, any required local approvals, vicinity map, and project plans
Local			
BART	CEQA	Lead agency for EIR; approval of project and expenditure of funds	Certification of EIR and approval of Findings and Statement of Overriding Considerations
Alameda County Airport Land Use Commission	Public Utilities Code 21670	Coordination, planning, design, and construction of proposed project on OIA	Review of this EIR/EIS
Alameda County Flood Control District and Water Conservation Department	CEQA	Approval for channel modification and overcrossing approval	Three sets of project plans with hydraulic calculations
Port of Oakland		Airport Layout Plan (ALP)	Prepare ALP

Source: EIP Associates, 2000; BART, 2000

The DEIR/DEIS was available for a 45-day public review period from August 3 until September 17, 2001. A public hearing was held September 12, 2001, to receive verbal and written comments on the DEIR/DEIS. The written and verbal comments received on the DEIR/DEIS, and the responses to those comments, are presented in Volume II of this FEIR/FEIS.

1.4.2 Organization of the FEIR/FEIS

The FEIR/FEIS consists of a Final Environmental Impact Report (FEIR) prepared in compliance with CEQA and a Final Environmental Impact Statement (FEIS) prepared in compliance with NEPA. The FEIR consists of a Draft Environmental Impact Report/Environmental Impact Statement (DEIR/DEIS) containing evaluation of impacts and proposed mitigation measures for a proposed project and alternatives; a Responses to Comments volume containing comments received during public review of the DEIR/DEIS, responses to those comments and revisions to the DEIR/DEIS; and related appendices. The FEIS consists of this Volume I, containing a focused environmental analysis of the preferred alternative in accordance with FTA procedures for preparing final NEPA documents; the same Responses to Comments volume (Volume II); and appendices. The relationship among these documents for CEQA and NEPA purposes is illustrated in Figure 1.4-1.

This Volume I of the FEIS identifies and provides a focused environmental analysis of a preferred alternative, consisting of the AGT alternative with Alignment Option A and Intermediate Stops. The overall structure and organization of Volume I is identical to that of the DEIR/DEIS. The fundamental difference is that the environmental analyses in this document address only the preferred alternative. This focus on the preferred alternative is undertaken in accordance with FTA procedures for preparing final NEPA documents. Section 2 of this Volume I presents a description of the preferred alternative and other alternatives considered in the DEIR/DEIS. This Volume I also incorporates clarifications and corrections to the focused analysis of the preferred alternative that resulted from comments received on the DEIR/DEIS. Volume I also incorporates modifications and corrections to the text of the DEIR/DEIS that are necessary due to certain changes in regulatory requirements applicable to the project and changes in the Port of Oakland's planned layout for the OIA terminal, as well as correction of minor typographical errors.

Volume II of the FEIR/FEIS contains all comments on the DEIR/DEIS received from federal, state and local agencies, public groups and individuals, and the responses thereto. Volume II also provides all revisions to the text of the DEIR/DEIS as a result of the comments received. In addition, Volume II of the FEIR/FEIS, together with the DEIR/DEIS, constitute the FEIR that is being considered by the BART Board in its review of the proposed project pursuant to CEQA.

If the BART Board of Directors decides to adopt the project and selects the preferred alternative as identified herein, the Board must make specific findings that the FEIR complies with CEQA in order to adopt the project. Similarly, the FTA must approve the FEIS pursuant to NEPA.

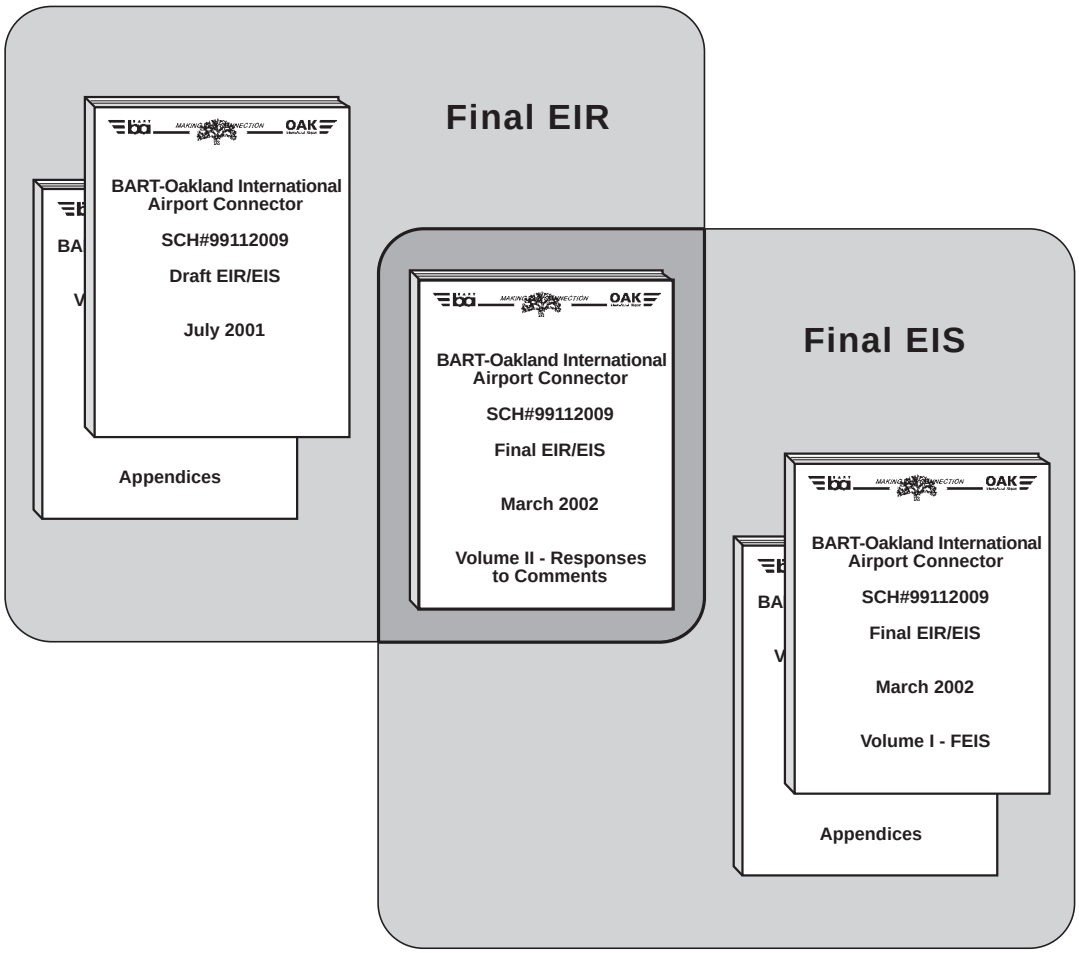


Figure 1.4-1
Graphical Representation of Relationship Between NEPA and CEQA Documents

Section 1.5
Organization of Volume I

This "Introduction" section provides an overview of the project, the study area, and the organization and purpose of this report.

Section 2 presents a description of the preferred alternative and the other alternatives considered in the draft environmental documents. Section 3 addresses both project-related impacts and cumulative effects, and provides an environmental analysis of the preferred alternative for the following areas:

- 3.1 Transportation
- 3.2 Land Use
- 3.3 Socioeconomics
- 3.4 Visual Quality
- 3.5 Cultural Resources
- 3.6 Community Services
- 3.7 Utilities
- 3.8 Geology, Soils, and Seismicity
- 3.9 Hydrology and Water Quality
- 3.10 Biological Resources
- 3.11 Noise and Vibration
- 3.12 Air Quality
- 3.13 Energy
- 3.14 Hazardous Materials
- 3.15 Environmental Justice
- 3.16 Construction Impacts

Section 4 presents a discussion of other required CEQA and NEPA topics, including unavoidable adverse impacts, irreversible and irretrievable commitment of resources, significant cumulative impacts, and growth-inducing impacts.

Section 5 addresses Section 4(f) of the U.S. Department of Transportation Act of 1966, concerning use of parklands, wildlife and waterfowl refuges, and significant cultural resources. Much of the relevant information in this section is contained in Section 3.2, Land Use, and Section 3.5, Cultural Resources, but is summarized and formatted per Section 4(f) requirements. This section is required for transportation-related federal projects.

Section 6 presents financial information regarding the capital, operating, and maintenance costs, and preliminary funding plans by BART.

Section 7 describes the community participation activities undertaken in conjunction with the environmental analysis efforts; Section 8 indicates the agencies, organizations, and individuals receiving copies of the FEIR/FEIS; and Section 9 presents the individuals responsible for preparing the FEIR/FEIS. Section 10 is a glossary of terms and acronyms.

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Section 2
Preferred Alternative and Other Alternatives Considered

Section 2.1
Introduction

This section of the FEIR/FEIS defines and describes the proposed action that satisfies the purpose and need discussed in Section 1, Introduction. The proposed action, a transit connection between the San Francisco Bay Area Rapid Transit (BART) system and the Oakland International Airport (OIA), can be accomplished with various transit technologies and following different alignments. Proposals for a Connector, however, have been discussed for 30 years, and the last comprehensive effort to examine possible technologies was completed in 1993. As a result of these prior studies, advances in transit technology, and based upon the analysis and public review of the DEIR/DEIS, a generic Automated Guideway Transit (AGT) comprises the preferred alternative presented in this FEIR/FEIS:

- The AGT embraces a family of transit technologies, the common thread being that they are generally of proprietary design, operate within their own guideway, would have stations physically integrated with the Coliseum BART station and airport, and do not require an operator.

- Alignment along the west side of Hegenberger Road between San Leandro Street and Edgewater Road; in the median of Hegenberger Road between Edgewater Road and Doolittle Drive; and adjacent to the east side of Airport Drive between Doolittle Drive and the OIA terminal.

- Four stations along the guideway: at the Coliseum BART station; at the Airport terminal; an intermediate station near the intersection of Hegenberger Road/Edgewater Road; and an intermediate station near the intersection of Airport Drive/Hegenberger Road.

Three Alternatives Considered

This preferred alternative was identified following analysis of environmental impacts of three alternatives in the DEIR/DEIS, each representing a different level of traffic separation:

- The first alternative, the **No Action Alternative**, is to retain the same level of service that exists today with AirBART transit vehicles. The existing fleet size would be increased. This

system operates in the street, along with autos, trucks, buses, and other motor vehicles. There is no separation from road traffic and no preferential treatment of any kind.

- The second alternative, the **"quality bus,"** separates the transit vehicles from auto traffic at both ends of the trip, uses signal management techniques along the route that provide preferential treatment for the transit vehicles along the route to minimize delays, and includes customer amenities, such as improved passenger loading and unloading at the Coliseum BART Station and at the new OIA terminal area, that improve the transit experience.

- The third alternative, an **"automated guideway transit"** system, separates the transit vehicles from auto traffic for the entire trip on an exclusive right-of-way, offers automated vehicles and also includes customer amenities.

- For the AGT alternative, in addition to the proposed project (AGT with median alignment), three alignment options (Options A, B, and D) and the option of including intermediate stops were also analyzed.

Other potential technologies have been discussed over the years and were raised again during the scoping meeting held for the Connector project. The scoping meeting was held November 4, 1999 to solicit comments from the public about the project. Examples of previously evaluated proposals include highway/roadway improvements and extension of the BART heavy rail technology. These particular alternatives have been rejected and were not evaluated in the DEIR/DEIS. A detailed history of past studies and alternatives considered is provided in Appendix A and a summary of the alternatives considered but rejected is provided in Section 2.3.5 of this FEIR/FEIS.

2.1.1 Project Features

The presentation of the project focuses on its physical and operational characteristics. Specifically, the AGT is discussed in terms of:

- Technology – the guideway, the type of AGT vehicle, and the fuel source to operate the AGT;

- Route – the vertical and horizontal alignment followed by the Connector vehicles;

- Stations – the location and design of Connector stops;

- Operational characteristics

  - Speed

  - In-vehicle travel time (the elapsed time between departure from one station and the arrival at the next station)

- Wait time (the elapsed time between a passenger's arrival at the transit stop and the transit vehicle's arrival at the stop; the average passenger wait time is typically assumed to be half of the headway when passengers arrive at the stop randomly)
- Dwell time (the elapsed time between the transit vehicle's arrival at a stop and departure from the same stop)
- Total passenger trip time (composed of walk time to transfer from BART to transit vehicle, wait time at fare machines, wait time for the transit vehicle, in-vehicle travel time and walk time from transit vehicle to the security gate)
- Headway (or frequency) between vehicles
- Reliability
- Patronage (sometimes expressed as the percent of local, or non-connecting, air passengers and airport employees);

- Ancillary Facilities - maintenance and necessary subsystems (such as power, safety, and communications); and
- Costs – the capital, operating, and maintenance costs to construct and operate the Connector system.

2.1.2 Related Airport Improvements

Airport Development Program

For the purpose of evaluating alternatives, it is necessary to take the Airport Development Program (ADP) into account. The Port of Oakland, operator of the OIA, has prepared an ADP that involves major expansion of the landside facilities and minor additions to airside facilities at the airport. Of particular relevance to the Connector project are the consolidation of the two existing terminals into one larger, two-level structure, roadway improvements including a two-level roadway in front of the terminal, and construction of a multi-level parking structure in a portion of the existing surface lot in front of the terminals. Consequently, the need to coordinate the ADP and the Connector projects closely throughout the planning and design phase is essential. Key components of the ADP are illustrated in Figure 2.1-1 and identified in Table 2.1-1. The analyses in this FEIR/FEIS assume that the ADP will be fully implemented.

The Port of Oakland is currently investigating a number of changes to the proposed ADP. These changes include an expanded and relocated airport terminal, relocated multi-level parking structure, and changes to the terminal's road system. While subject to further revisions, the airport terminal design and road system layout currently proposes a "straight in" AGT alignment that follows Airport Drive into the terminal area to a station integrated into the new parking garage. Another AGT alignment option known as Option D (over the wetlands) was also considered by the Port. This alignment option, however, may not be feasible given the current terminal, roadway, and parking structure designs.

Table 2.1-1
OIA Airport Development Program

	ADP	***Partial ADP***
A. Consolidation and Expansion of Existing Terminals into an Enlarged Single Terminal	Yes	No
A.1 Terminal 1 expansion		
A.2 Terminal 2 expansion		
B. Landside Access Projects		
B.1 Airport Roadway Project (ARP)[1]		
• Realign Harbor Bay Parkway/Maitland Drive intersection and Maitland Drive	Yes	No
• Build four lanes from Harbor Bay Parkway to Airport Drive	Yes	No
• Construct Taxiway B bridge to accommodate six roadway	Yes	No
• Build grade-separated intersection at new Airport Road and Airport Drive	Yes	No
• Modify intersections at Hegenberger Road/Doolittle Drive, Airport Access Road/Doolittle Drive and Airport Access Road/98th Avenue	Yes	Yes
• Build all drainage, traffic signals, signing, striping, and utility relocations for the full six-lane project	Yes	Yes
• Build grade-separated intersection at Doolittle	Yes	Yes
• Build six lanes along 98th Avenue from Doolittle Drive to I-880	Yes	Yes
• Widen 98th Avenue San Leandro Creek Bridge to six lanes	Yes	Yes
B.2 Airport Drive Access Reconfiguration	Yes	No
B.3 Ground Transportation Center and Parking Garage	Yes	No
B.4 Replacement Parking Lots	Yes	Yes
B.5 Replacement Rental Car Service Facilities	Yes	Yes
C. Airline and Airport Support	Yes	No
C.1 Provisioning Building		
C.2 Ground Equipment Service Center		
C.3 Jet Fuel Dispensing Facility		
D. Air Cargo (Air Freight and Air Mail) Relocation and Facility Development	Yes	No
D.1 FedEx Metroplex		
D.2 United States Postal Service Airmail Distribution Center		
D.3 Multi-Tenant Air Cargo Facility		
D.4 North Airport Air Cargo Facilities		
D.5 Replacement T-Hanger Facilities		
E. Remote Runway Parking	Yes	No
E.1 Remote aircraft parking		
E.2 Runway 11/29 Taxiway Access Widening		
E.3 Taxiway U Widening		

Source: Port of Oakland, 1997.

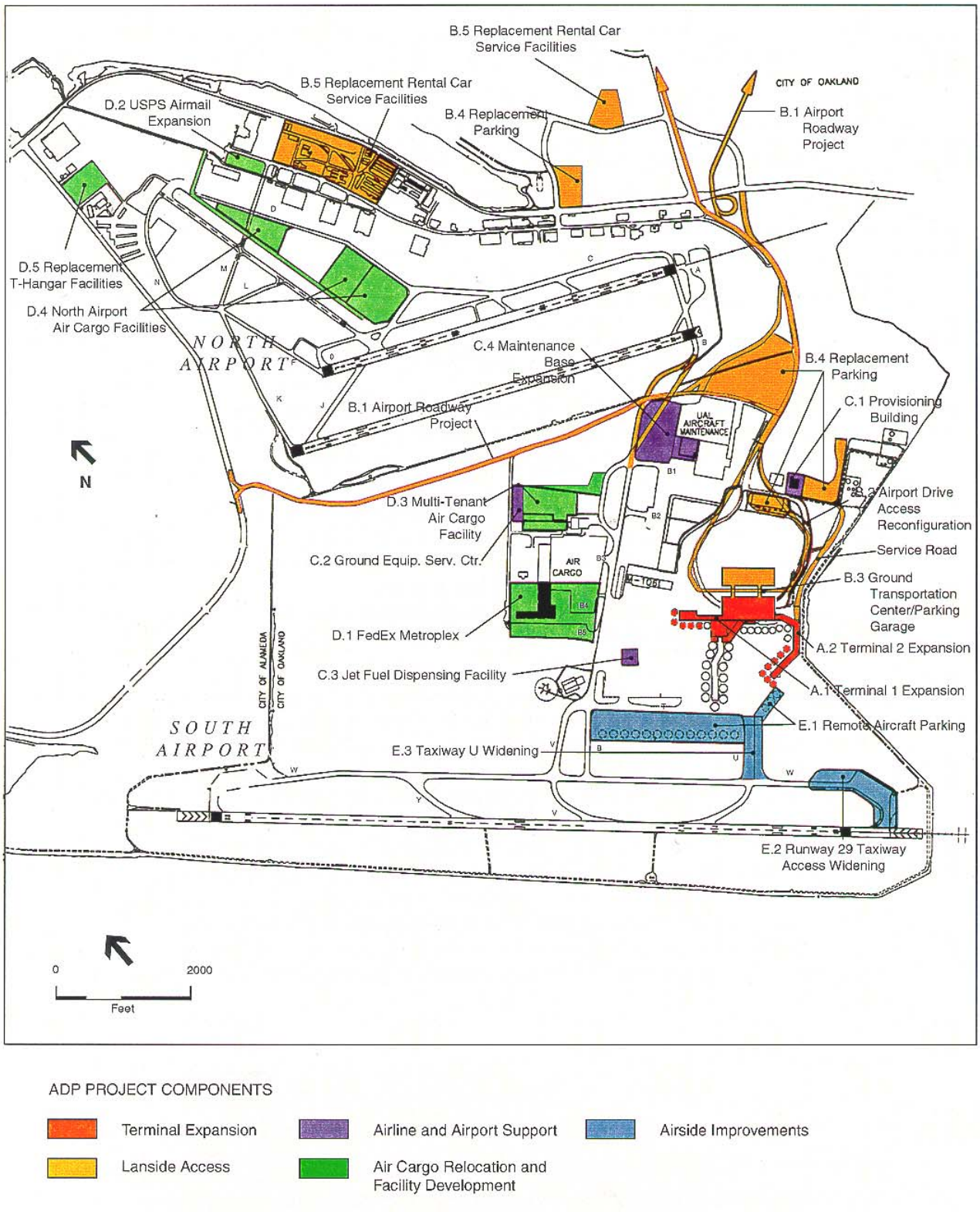
[1] Development of the ARP would provide an arterial roadway extending 98th Avenue from I-880 to Doolittle Drive, along Airport Drive, and through the airport to Bay Farm Island in Alameda.

The ADP was also subject to environmental review by the Federal Aviation Administration (FAA). The FAA issued a Record of Decision/Finding of No Significant Impact on December 21, 2000.[1] The FAA has also issued an unconditional approval of the associated Airport Layout Plan, which identifies all physical improvements proposed for on-airport property. The Airport Layout Plan includes a preliminary alignment for the Connector project. Changes to the Airport Layout Plan must be approved by the FAA.

Partial Airport Development Program

While some components of the ADP are underway, other components are suspended because of legal challenges to the EIR prepared for the ADP (Port of Oakland, 1997). Given the uncertainty over the timing of some ADP components, this FEIS also examines a "Partial ADP" scenario that assumes only certain components are implemented. These components are those that 1) have already been completed, or 2) are currently under construction (see Table 2.1-1). The list of ADP components in Table 2.1-1 is from the Port's ADP FEIR/FEIS (Port of Oakland, December 1997).

[1] The City of Alameda and citizen groups have sued the FAA, challenging the ADP FONSI under NEPA. This litigation is currently pending in federal court. In addition, the City of Alameda, City of San Leandro and a citizen group sued the Port of Oakland in state court, challenging the EIR prepared by the Port for the ADP under CEQA. On August 30, 2001, the California Court of Appeal issued an opinion concluding that the Port's EIR failed to adequately address noise and toxic air contaminant emissions associated with jet flights, and lacked appropriate mitigation for impacts on burrowing owls. The Port is required to revise the EIR to address these concerns. On November 14, 2001, the Port entered into a settlement agreement with plaintiffs in both the federal and state litigation, allowing the Port to proceed with certain ADP projects. The resolution of the remaining issues in these lawsuits is not expected to affect the Connector project.



Source: Port of Oakland, Metropolitan Oakland International Airport – Proposed Airport Development Program, Final Environmental Impact Report, December 1997.

Figure 2.1-1
Major Components of the Oakland Airport Development Program

Section 2.2
Description of the Preferred Alternative

This Volume I of the FEIR/FEIS identifies and provides a focused environmental analysis of a preferred alternative in accordance with FTA procedures for preparing Final NEPA documents.

The Automated Guideway Transit (AGT), the preferred alternative for NEPA purposes, would operate in an exclusive right-of-way on a dual lane guideway running approximately three miles. The guideway would be elevated for its entire length, except for a short tunnel passing beneath the Airport Drive/Doolittle Drive interchange and in the vicinity of OIA's North Field runways, where the guideway would be at grade to avoid an "obstacle free zone" for the runways established by the Federal Aviation Administration. The operation of the AGT could be automated. The AGT Alternative emphasizes rider comfort, reliability, convenience, reduced travel time, and a "seamless" transition between the AGT system and BART.

2.2.1 System Operations - Technology

There are a variety of AGT technologies available today. The preferred alternative is not technology specific and encompasses any number of technologies that may be suitable for a Connector. Five key attributes of AGT are noted below to illustrate the number of combinations and technologies possible under an AGT system:

- **Propulsion system:** The AGT can be propelled by numerous systems including cables, forced air, wayside motors, linear induction motors, petroleum self-propelled (gas, diesel, or CNG[1]) or electrically self-propelled.
- **Vehicle support:** The AGT can operate on rubber tires or steel wheels, or can be air or magnetically-levitated.
- **Guideway:** AGT guideways can be elevated. Aerial guideways have the benefit of requiring less right-of-way and create less impact on other land uses. In general, aerial guideways are often supported on concrete columns; the guideways themselves are constructed of various materials, although most systems involve concrete or steel structures. The physical dimensions, materials, and appearance vary with the system, the fleet size, the number of switches (if necessary), and the manner by which the vehicles will be supported. In general, dual lane AGT guideways can be as wide as 26 feet.
- **Cruise speed:** The AGT speed would vary depending on vehicle technology, the horizontal and vertical alignment, the number of stops, and the dwell time at each stop. Nevertheless, the typical maximum cruise speed of the various AGT technologies considered for the Connector range between about 25 mph and 55 mph.

[1] Compressed natural gas.

- **Operating configuration:** The AGT vehicles can operate on a single guideway or dual guideway. With a single guideway, only one vehicle can travel back and forth on the guideway unless dual-lane bypass areas are provided. Consequently, single-guideway configurations inherently limit the system capacity. With dual guideways, there are two lanes and two vehicles (or groups of vehicles traveling in trains), with each vehicle or train traveling back and forth on its own lane. Switches could be added to the dual guideway system to allow more vehicles (or trains) and to enable them to change lanes when they change direction. This concept is called a pinched loop. As the operating pattern adds bypass lanes or switches, and hence complexity, each upgraded configuration retains the ability to operate under all of the lower capacity concepts. The additional lanes or switches provide for increased passenger capacity, improved failure management (ability to continue system operation while removing a disabled vehicle or repairing a switch or lane), vehicle storage, and possibly an increased operating fleet.

The optimal combination of propulsion, guideway, headway, cruise speed, and operating configuration would depend largely on the passenger capacity desired for the Connector and considerations of reliability, failure management, and future expansion potential. There is a wide range of potentially applicable technologies that could meet the Connector functional requirements. Moreover, these technologies are commercially available from a large field of potential suppliers. Thus, a generic AGT description has been used for planning purposes. Figure 2.2-1 illustrates various vehicles and guideways for a range of AGT technologies, from monorails and elevated light rail to guided buses.

The number of vehicles in each train would depend on the proprietary technology of the AGT supplier, but an AGT vehicle would not exceed 40 to 50 feet in length. For the purposes of this analysis, each AGT vehicle is assumed to have a capacity for 60 passengers with luggage, including seats and some standees. The number of seats per car will depend upon the specific AGT technology chosen.

2.2.2 Route and Alignment

As shown in Figure 2.2-2, the preferred AGT route would leave the Coliseum BART Station on an aerial guideway and proceed along the west side of Hegenberger Road southbound on-ramp, over the Union Pacific Railroad tracks. The guideway would continue along the west side of Hegenberger Road above the sidewalk and breakdown lane towards I-880, then cross I-880 along the west side of the Hegenberger Road overpass.

This portion of the preferred alternative – an aerial guideway along the west side of Hegenberger Road between Elmhurst Channel and Coliseum Way – was referred to as Design Option A in the DEIR/DEIS.

Adtranz Monorail at Newark Airport

Doppelmyer Cable Propelled System at
Mandalay Bay in Las Vegas

Adtranz C-100 in Downtown Miami

Linked Adtranz vehicles in Miami

Yantrak Belt-Cable System at
Bellagio-Monte Carlo in Las Vegas

Bombardier ALRT II at JFK Airport
in New York (under construction)

Figure 2.2-1
Examples of Different AGT Technologies

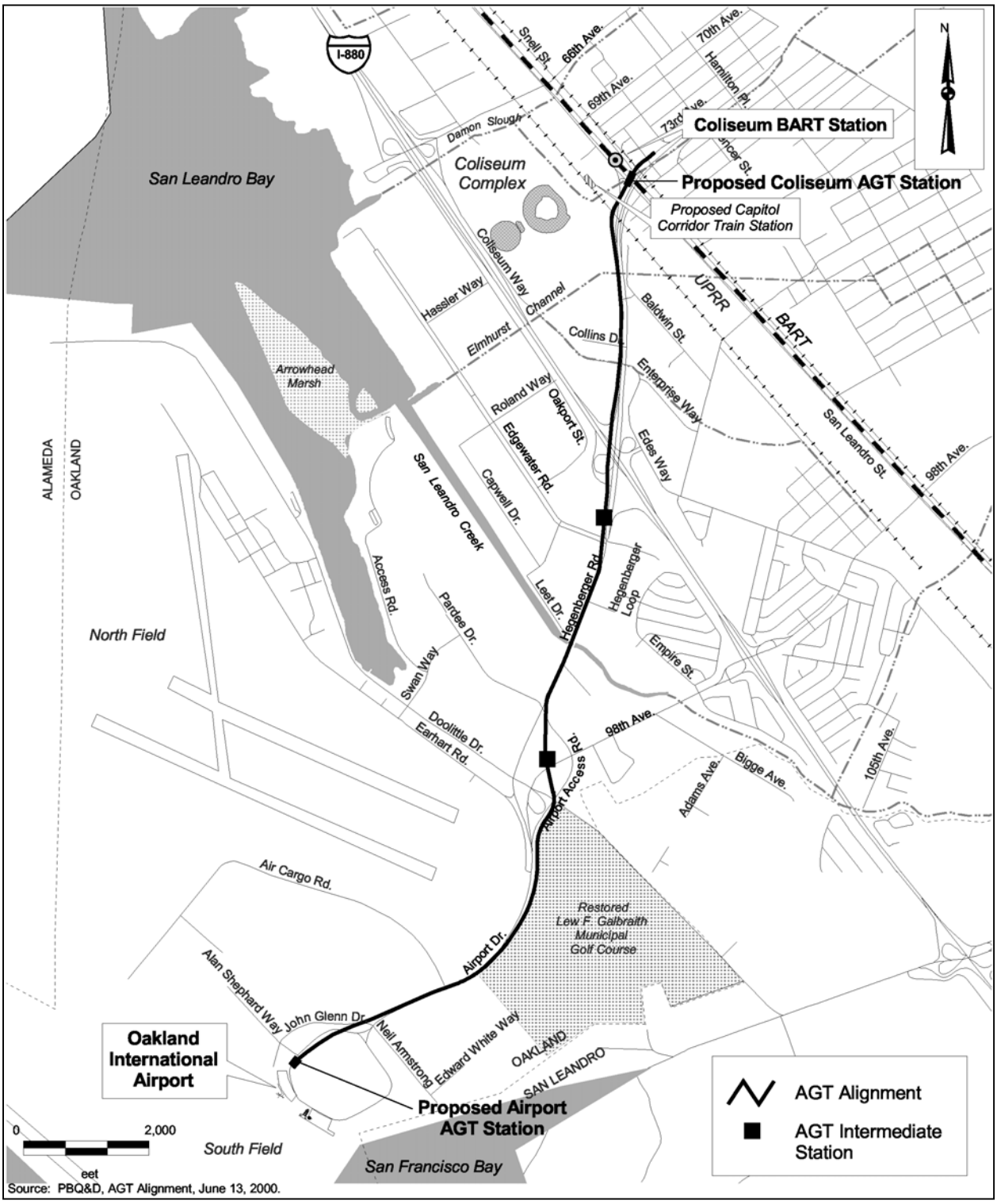


Figure 2.2-2
Alignment of Preferred Alternative

Figure 2.2-2(a)
Location Map of Preferred Alternative Route

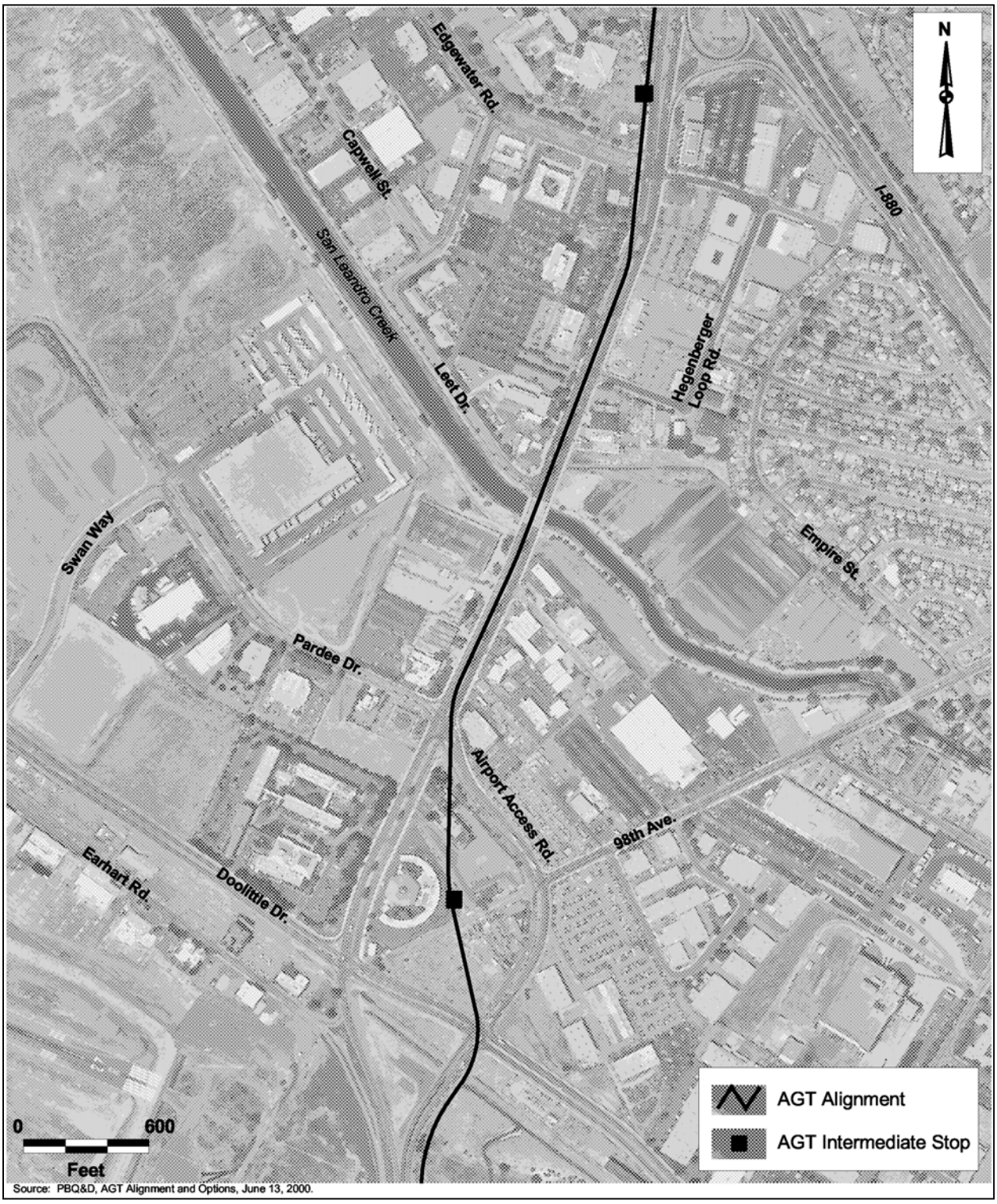


Figure 2.2-2(b)
Location Map of Preferred Alternative Route

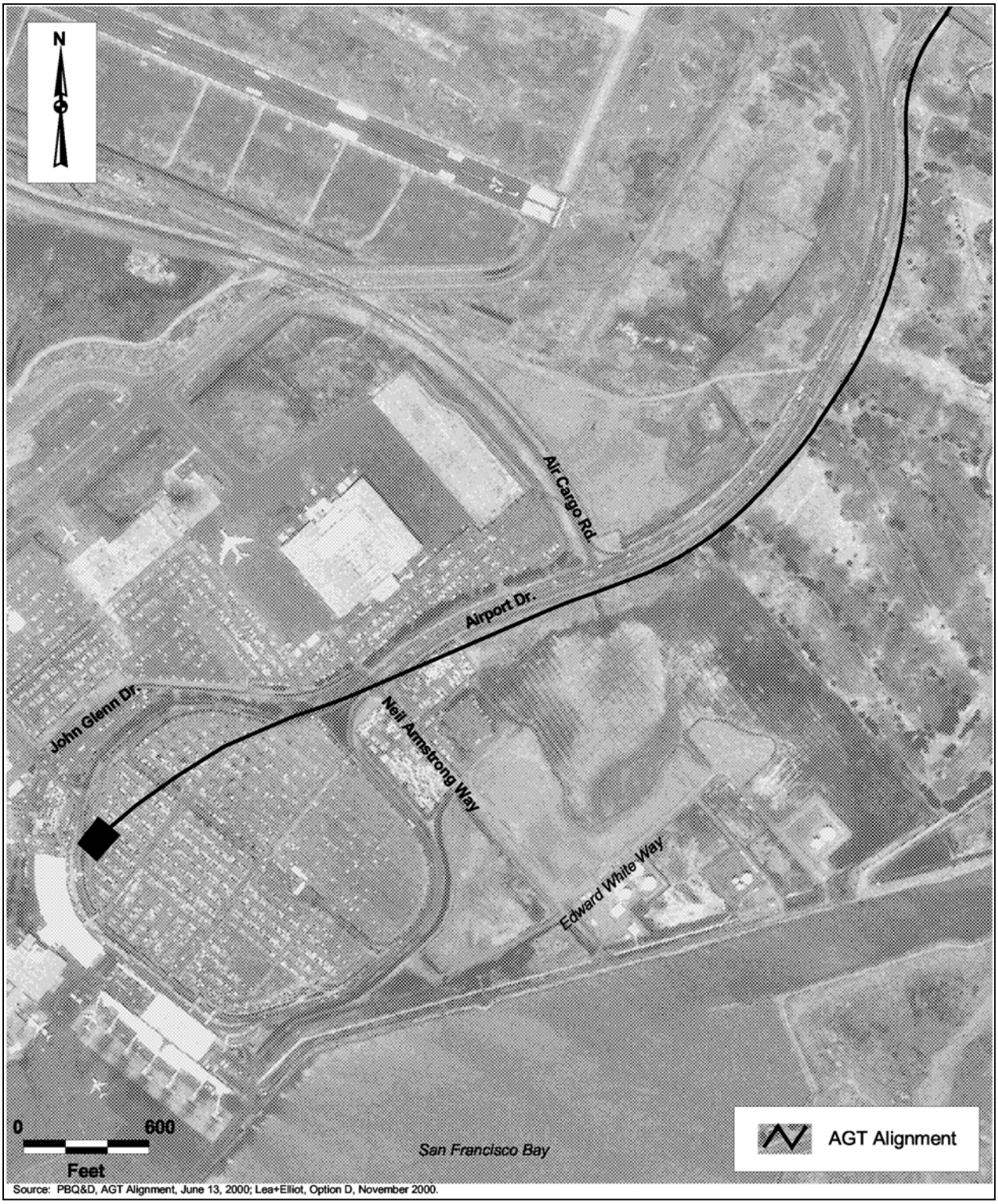


Figure 2.2-2(c)
Location Map of Preferred Alternative Route

The AGT alignment would be located in the curb/breakdown lane along the west side of Hegenberger Road. The guideway would overhang portions of the curb and sidewalk to the west and Hegenberger travel lanes to the east. This is a no parking zone and no parking spaces would be lost.

After crossing I-880 and Edgewater Drive, the alignment would move to the Hegenberger Road median and continue in the median until Pardee Drive/Airport Access Road. Based on field surveys and preliminary investigations by BART's general engineering consultant, the columns can be placed along the length of the median alignment while retaining existing left-turn and travel lanes along Hegenberger Road. Where necessary, BART would widen the existing median within Hegenberger Road to provide sufficient space for the support columns and a safe clearance on all sides of the columns. The installation of a wider median in some segments would require restriping traffic lanes, but these street modifications can be accommodated within the existing Hegenberger Road right-of-way. Figure 2.2-3 presents a street cross-section showing the guideway within the median.

At this point, the alignment would transition eastward. The route would pass over 98th Avenue and then enter into a 430-foot tunnel under Doolittle Drive. The tunnel alignment is designed to avoid any encroachment into the Lew F. Galbraith Golf Course, jurisdictional wetlands, and the FAA-defined obstacle-free zone at the end of the North Field runways. The alignment would return to grade within the 35-foot right-of-way adjacent to Airport Drive, reserved by the Port of Oakland for the Connector as part of its ADP.

The reserved right-of-way extends along the frontage of the restored Lew F. Galbraith Golf Course. Once past the golf course, as the alignment approaches the intersection of Airport Drive and Air Cargo Drive, it would transition to an aerial alignment and follow the east side of the airport entry road to the new garage. The AGT station would be in the new garage facing the airport terminal and connected to it by a moving walkway.

As part of the ADP, the Port is currently redesigning the OIA terminal area. The major elements of the redesign include construction of a new passenger terminal, construction of a multi-level parking structure, and construction of a double-decked roadway between the terminal and the parking garage. The current design proposal from the Port of Oakland incorporates the AGT alignment parallel to the terminal complex entrance roadway, thereby minimizing conflicts with other on-site support facilities and avoiding the adjacent wetland areas. BART does not have authority to unilaterally decide where the alignment should be on airport property. Land use decisions on airport property are governed by the Port and FAA.

At the time that the DEIR/DEIS was prepared, the Port of Oakland's ADP provided for the aerial Airport AGT Station to be sited at the center of the new consolidated terminal, located perpendicular to and above the terminal access roads. At the south end of the station, platform passengers would proceed down one level to the airline ticketing and baggage claim areas. The Port has subsequently made design refinements to the OIA terminal layout. While subject to further refinement, the airport terminal design and road system layout currently propose a "straight in" AGT alignment parallel to Airport Drive into a station integrated into the new multi-story parking garage. Passengers would proceed along an elevated moving walkway

between the AGT station and the terminal, but would not need to change levels. In addition, because passenger walk time between airport facilities and the AGT station is an important factor in the model used to estimate Connector ridership, refinements to the DEIR/DEIS ridership numbers to reflect the change in passenger walk time are provided in this document.

The AGT would have a one way in-vehicle travel time of 8.2 minutes. Total passenger walk time at OIA would be 3 minutes. Due to the improved reliability and integration of the AGT station into the Coliseum BART station and the airport terminal complex, ridership is expected to increase compared to AirBART. Table 2.2-1 highlights key aspects of the AGT system operating, patronage, and cost features.

Table 2.2-1
Operating, Patronage, and Cost Features of the Preferred Alternative

Configuration: Dual-lane pinched loop

Alignment: Hegenberger Road median, adjacent to Airport Drive, proceeds southeast to its terminus next to the parking structure, across the two-level roadway from the new airport terminal.

Stations: (4) Coliseum BART, Oakland Airport Terminal, Edgewater/Hegenberger site, Doolittle Gateway site

Auxiliary Features: Maintenance facility, power substations

	2005	***2020***
Vehicles		
Capacity: 60 passengers		
Average Speed (mph)*	36	36
Peak Operating Fleet	8	8
Total Fleet	10	10
Train Configuration	4, 2-vehicle trains	4, 2-vehicle trains
System Capacity (pphpd)*	1,895	1,895
Average Travel Times		
One-Way Trip Time* (minutes)	8.2	8.2
Round-Trip In-vehicle Time* (minutes)	14.0	14.0
Headway* (minutes)	3.5	3.5
Total Trip Time Between BART and OIA* (minutes)	11.2	11.2
Ridership		
Average Daily	7,382	13,540
Peak Day (Friday in August)	10,850	19,900
Annual	2,694,450	4,943,900
Mode Share (daily)		
Local Air Passengers (%)	13.2	13.2
Airport Employees (%)	1.9	1.9
Combined Local Air Passengers and Airport Employees (%) (1)	9.4	10.2
Cost		
Capital (in 2000 $)	229.6 million	
Annual O&M (in 2000 $)	7.6 million	7.7 million

*Notes:
Average Speed = average vehicle speed not including dwell time
pphpd = persons per hour per direction
One-Way Trip Time = ½ the round-trip in-vehicle time plus average wait time (½ headway)
Round-Trip In-vehicle Time = round-trip in-vehicle time includes vehicle dwell times at stations
Headway = time between departure of vehicles
Total trip time = wait/transfer time, in-vehicle travel time and walk time. The trip time presented is an average of the range of trip times that would be expected during the peak period.
(1) Mode share percentages do not include passengers using intermediate stations; however, intermediate station passengers are included in the daily and annual ridership numbers in this table.

If guided buses are used as AGT vehicles, the guideway would have the same alignment as other technologies, except at the end stations. Buses can operate only in the forward direction, and the guideway in the station areas would require a loop configuration to allow buses to pull through and allow right-side boarding. This additional length of guideway could be dispensed with if guided buses were developed that could be driven from either end.

In order to maximize system capacity and flexibility to adjust system capacity as future ridership warrants, the proposed project would consist of a dual guideway with vehicles operating back and forth in a pinched loop. For purposes of this analysis, it is assumed that poured-in-place concrete columns, spaced between 60 and 100 feet, depending on existing topography and sensitive resources, would support the guideway. In certain segments (such as across I-880 and at transitions from the median to west side of Hegenberger Road), longer spans of up to 160 feet would be used. Columns would be approximately 5 to 7 feet in diameter. For purposes of this analysis, the guideway width has been assumed to be a maximum of 26 feet and the minimum vertical clearance between the bottom of the guideway and the street level has generally been assumed to be 15.5 feet, although a clearance of 17 feet is required for the 98th Avenue overcrossing near the Doolittle Drive/98th Avenue interchange, for on-airport portions of the AGT alignment, and over Interstate I-880. The minimum clearance of 15.5 feet could be increased to 17 feet if the City of Oakland determines that the increased clearance is appropriate at other locations along the alignment as well.

Median Option

A portion of the preferred alternative – an aerial guideway along the west side of Hegenberger Road between Elmhurst Channel and Coliseum Way – was referred to as Design Option A in the DEIR/DEIS. The DEIR/DEIS also analyzed an alignment along the Hegenberger Road median for this portion of the project route, as part of the AGT Alternative (proposed project). This optional alignment is herein referred to as the "Median Option." The Median Option would run along the Hegenberger Road median from Elmhurst Channel for approximately 1,400 feet, where it would shift to join up with the preferred alternative alignment to pass over I-880 along the west side of the Hegenberger Road freeway bridge. Although the preferred alternative with Option A represents the alignment proposed by BART, further engineering design refinements may require the use of the Median Option in place of Option A for this portion of the alignment. The BART Board of Directors has directed the General Manager to continue to work with the City of Oakland to reach an agreement and implement a refined alignment that satisfies the City's concerns.

Throughout this document, where use of the Median Option would have additional potentially significant impacts as compared to the preferred alternative, discussion of those potential impacts is provided and contingent mitigation measures are included. In addition, the discussion identifies situations in which the use of the Median Option in place of Option A would reduce an impact and modify a mitigation measure for the preferred alternative.

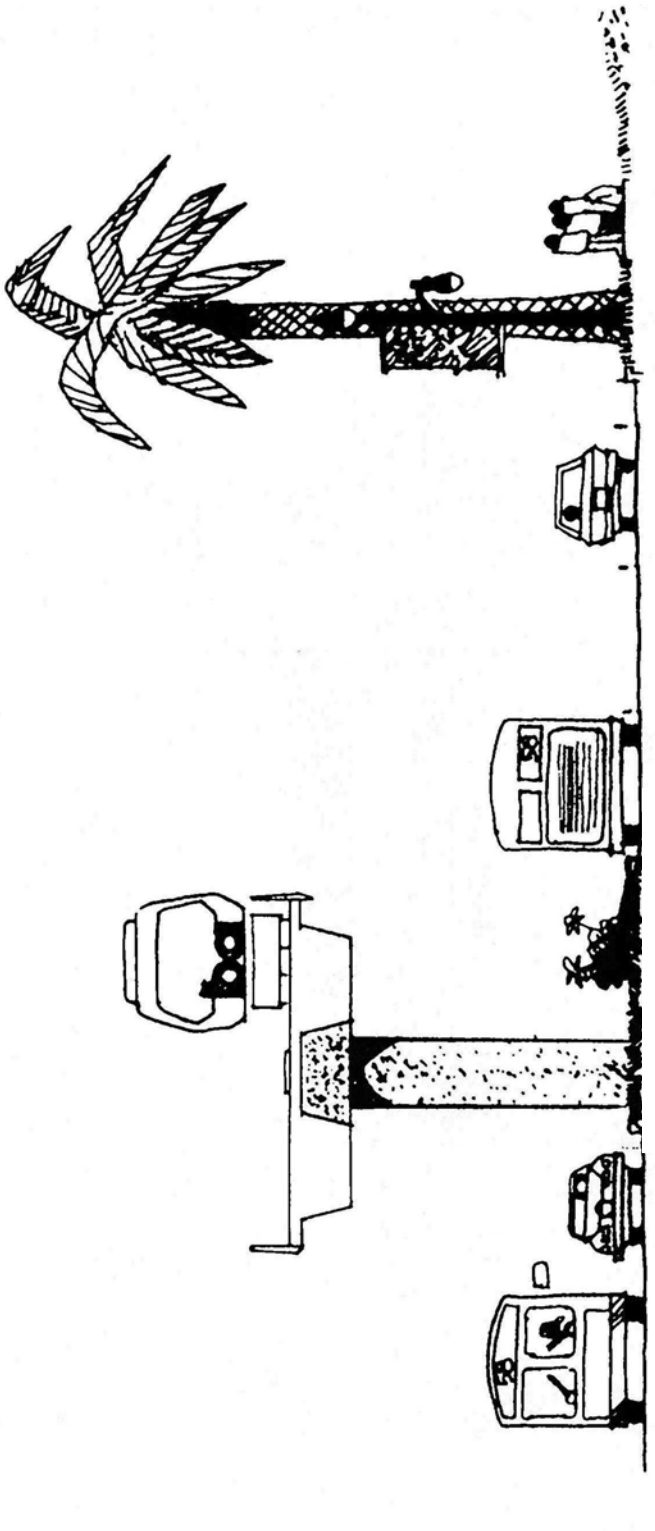


Figure 2.2-3
Cross-Section of AGT Guideway in Median of Hegenberger Road

Source: BART. 2000

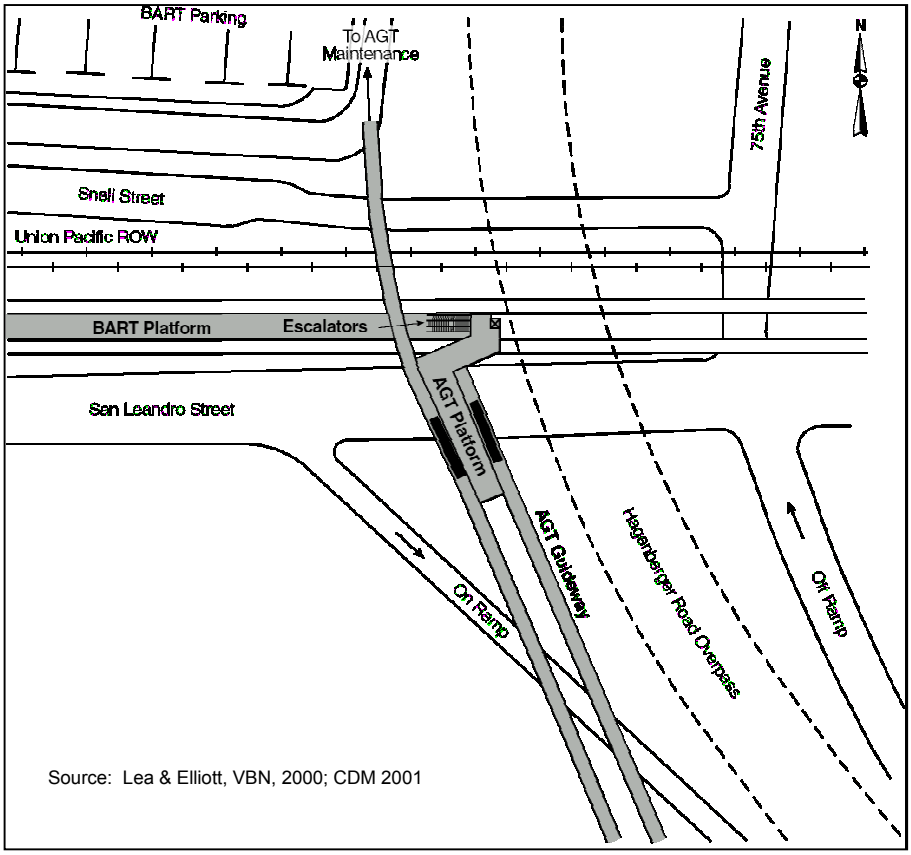
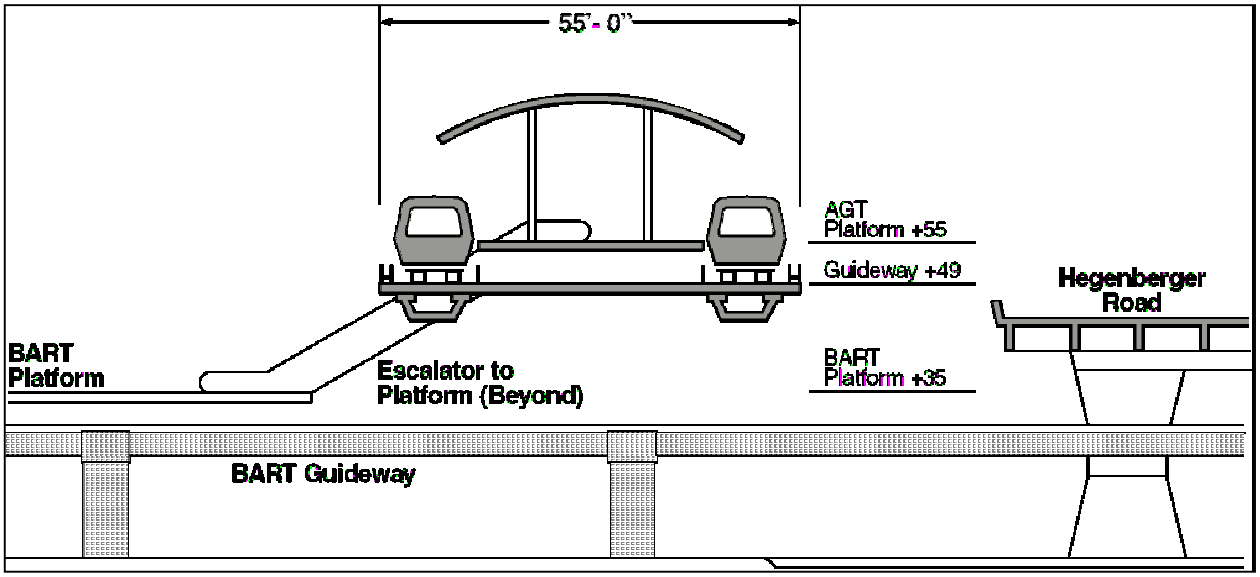


Figure 2.2-4(a)
Coliseum AGT Station Layout



Source: Lea & Elliott, VBN, 2000; CDM 2001

Figure 2.2-4(b)
Coliseum AGT Station Sections

2.2.3 Stations/Stops Design Features

Coliseum AGT Station

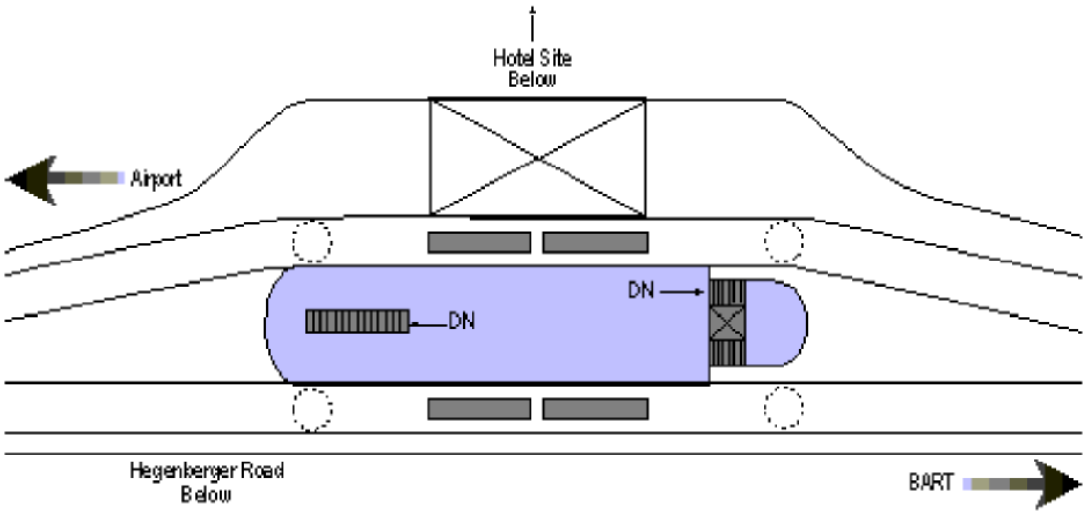
The AGT station at the Coliseum BART Station would allow barrier-free transfers between BART and the AGT. The AGT station would be constructed at the east end of the BART train platform. At this location, the station would span San Leandro Street (see Figures 2.2-4(a) and (b)). The AGT passenger platform would be approximately 55 feet above San Leandro Street and approximately 20 feet above the BART tracks and BART platform. The AGT platform height is necessary to provide clearance for Fremont-bound BART trains. The AGT guideway would extend over the BART platform and continue toward the BART parking lot where the AGT maintenance facility is proposed to be located. Passengers would use stairs, escalators, or elevators to transfer between the BART platform and the AGT platform.[2] The estimated total walk time is 3 minutes, or 1 minute less than that for the No Action Alternative. The AGT platform would allow passengers to board the vehicles on either side of the platform without having to step up into the vehicle. This configuration would facilitate passenger loading and unloading times, particularly for those passengers with luggage. The platform design would also be ADA compliant, allowing disabled passengers to board and alight easily and quickly. Initial operations would likely consist of four one-vehicle trains. The 30-foot wide AGT station platform would be designed to accommodate two-vehicle trains and thus allow for future expansion of service. Accordingly, the AGT station platform berthing area would be approximately 120 feet long, assuming the vehicles are 40 to 50 feet in length.

Intermediate Stops

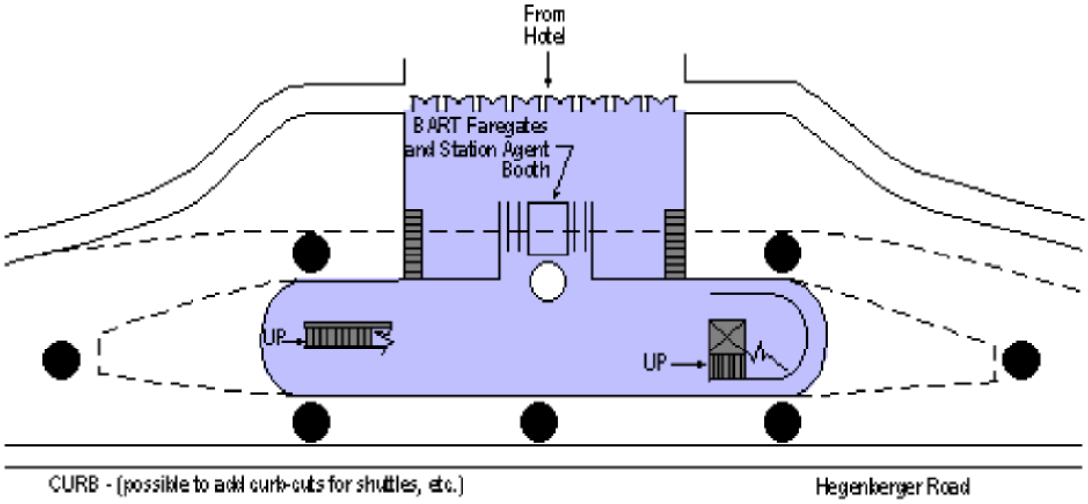
Two locations for intermediate stops are included as part of the preferred alternative: near the intersection of Hegenberger Road/Edgewater Road and near the intersection of Airport Drive/Hegenberger Road. The intermediate stops would be developed as full BART stations, with fare collection, restrooms, and station agents. Parking areas for maintenance and service vehicles, employees and emergency vehicles would also need to be provided at the intermediate stations. The City of Oakland has suggested these locations as sites that would support the City's efforts to revitalize the Hegenberger Road corridor. Figure 2.2-5 shows a conceptual station layout for the AGT intermediate station west of Hegenberger Road near Edgewater Road.

The additional patronage would justify the two intermediate stops. The one-way total trip time increases from 7.2 minutes to 8.2 minutes. As a result, the 2005 patronage for airport passengers and airport employees is projected to decline from 1,881,900 to 1,813,700 annual passengers. However, use of the Connector by employees and visitors to the businesses around the intermediate stations is projected to add 880,750 annual passengers, resulting in a net increase in ridership of 812,550 annual passengers.

[2] Structural constraints preclude use of a same-level transfer from BART to the AGT. See the discussion of the alternative referred to as Scheme H, in Section 2.3.5 for a more detailed discussion of a same-level transfer.



AGT INTERMEDIATE STATION *PLATFORM LEVEL*
+22´ elevation
not to scale



AGT INTERMEDIATE STATION *STREET LEVEL CONCOURSE**
+´ elevation
not to scale

*Note: *Another option for concourse is on lobby of hotel or in platform connecting two or more land uses at +/- 35 feet elevation*

Source: BART 2000; CDM 2001

Figure 2.2-5
Conceptual Layout of AGT Intermediate Station West of Hegenberger Road

Similarly, in 2020, the number of air passengers and airport employees is projected to decline from 3,413,100 to 3,295,200 annual passengers due to the added trip time associated with the intermediate stops. However, 1,648,700 employees and visitors are projected to utilize the intermediate stops, providing a net increase of 1,530,800 passengers.

Airport AGT Station

The AGT aerial guideway would lead to an aerial Airport AGT Station. The aerial Airport AGT Station design, while conceptual at this time, would be located along the edge of the multi-level parking structure, near the entrance to the moving walkway connecting the parking structure to the main terminal. Passengers traveling to or from the airport ticketing area and the AGT station would not need to change levels. The Airport AGT Station would include space, equipment, facilities, and staff to accommodate BART fare collection and station agent functions. The Airport AGT Station, like the Coliseum AGT Station, would have a central loading platform, capable of accessing trains on either side of the platform. The platform vehicle berthing area would be approximately 30 feet wide and about 120 feet long, adequate to accommodate a two-vehicle train on each side of the platform to allow for future expansion of service.

The total passenger walk time between the AGT and airport security screening is estimated to be 3 minutes.

Fare and Fare Collection

Fares are assumed to be $2.00 per trip in the future. Since the Coliseum BART AGT Station would be within the BART paid area, no fare collection device would be required there. This arrangement would provide additional timesaving and convenience for passengers because they would not have to buy a ticket before boarding the AGT vehicle and there would be no ticket collection on the AGT. Those passengers boarding the AGT that do not have sufficient fare on their tickets to exit at the Airport station would use BART ADD FARE machines at the Airport AGT Station before exiting into OIA. BART ticket machines would also be provided at the Airport AGT Station and intermediate stations so that passengers could purchase a BART ticket for both the AGT ride to the Coliseum AGT Station and the remainder of their trip on BART. The Airport AGT Station and intermediate stations would act as any other BART station, and transferring between BART and AGT would be similar to any other transfer within the BART system.

2.2.4 Operational Characteristics

AGTs are transportation systems that operate on exclusive guideways, and have the ability to operate without drivers. This form of public transportation provides service to millions of passengers per year at airports, in urban areas, and in special activity center settings. They are especially suited to patronage levels that are somewhat lower than large regional transit systems such as the current BART system. Furthermore, AGTs can operate on alignments with more constrained geometric limitations (curves and grades) than conventional rail transit.

Patronage

In order to determine the projected ridership on the AGT system, a mode choice model was used to calculate the "utility" or rating of relative attractiveness of each available travel mode (including AGT) based on time and cost factors. The utility was then used in an exponential function to calculate the percentage of travelers that would be likely to choose each mode, as described in Appendix B of this FEIR/FEIS.

Due to the reduced in-vehicle travel time, the preferred alternative would capture more than two and a half times the current market share of AirBART, with 13.2 percent of the air passengers originating and terminating their trips at OIA and 1.9 percent of OIA employees expected to use the AGT system and BART. The projected average annual daily ridership to and from OIA in 2020 is 9,020 passengers (including 8,560 air passengers and 460 airport employees). The total annual ridership in 2020 including airport and intermediate station destinations, is projected to be 4,943,900 passengers.

Operating Configuration

As noted in the introduction to the AGT, there are several operating configurations, the selection of which will depend on system capacity, fleet size, and system reliability. Based on BART's current study of these parameters, the AGT would be configured operationally as a pinched loop in order to maximize system capacity and retain the most flexibility to adjust capacity in the future as ridership levels warrant.

One train would depart the east (towards Fremont) side of the Coliseum AGT Station and travel to the Airport AGT Station on the west lane of the guideway. As the trains approach the Airport AGT Station, they would maneuver through a crossover to the east guideway lane and enter the east side of the station. After loading and unloading passengers at the Airport AGT Station, the vehicles would depart and travel back to the Coliseum AGT Station on the east guideway lane, through a crossover to the west guideway, and enter the west side of the station. After loading and unloading passengers, the next round trip would begin. A second train would operate in the opposite configuration.

In addition to higher capacity, this configuration offers greater level of service, and better failure management response than single lane shuttles. If a vehicle were to fail on one of the two guideways, operations could continue on the other guideway, maintaining at least 50 percent of the system's operating capacity.

Reliability

The AGT system would operate completely within an exclusive right-of-way, totally separated from other traffic. The separation from other traffic would allow the AGT to operate without being delayed by congested traffic conditions, Coliseum events, automobile accidents, or other roadway incidents. Therefore, except in cases of vehicle failure, the AGT would be able to maintain a consistent headway and travel time between the Coliseum BART Station and OIA. Due to its ability to adhere to the schedule, the AGT service would operate with a high level of reliability.

Schedule and Headway

At the start of revenue service, there would be four AGT vehicles operating in a pinched loop configuration[3] during peak ridership periods. Each vehicle would have a capacity of approximately 60 persons with luggage. A number of vehicles could be connected to operate a single unit, thereby providing greater capacity in future years. Maximum cruise speed would be approximately 45 miles per hour, with average speeds about 36 miles per hour. The one-way in-vehicle travel time would be 6.4 minutes and round trip time would be approximately 14.0 minutes, assuming a dwell time of approximately 40 seconds at each end station and 20 seconds at each intermediate station.

Hours of operation would be the same at those of BART. Schedule and headways for both weekdays and weekends are listed in Table 2.2-2:

Table 2.2-2
AGT - Opening Year Schedule and Headways

Time	*No. of Trains Operating*	*Headway (minutes)*
5am – 6 am	1 (single vehicle)*	14.0
6am – 8pm	4 (single vehicle)	3.5
8pm – midnight	3 (single vehicle)	4.7
Midnight – 1am	1 (single vehicle)*	14.0

Source: Lea+Elliott, Inc., July 2000.

Note:

*Could be shuttle operation on one guideway lane.

In 2020, there would be four two-vehicle trains operating in a pinched loop configuration during the peak ridership periods as above, and each train would have a capacity of approximately 120 persons with luggage. Each train would consist of two vehicles, with a maximum length of 80 to 100 feet depending on the specific AGT supplier. Maximum cruise speed would be 45 miles per hour, and round trip time would be approximately 14.0 minutes, with a 40-second dwell time at each end station and 20 seconds at each intermediate station, identical to the performance characteristics when the system opens for revenue service (see Table 2.2-1). The passenger wait time (the elapsed time between a passenger's arrival at the AGT platform and the AGT arrival at the platform, with an average wait time equal to one-half the headway) would range from 7.0 minutes during early morning hours (5:00 a.m. to 6:00 a.m. and midnight to 1:00 a.m.) to about 1.8 minutes between 6:00 a.m. and 8:00 p.m. to about 2.4 minutes between 8:00 p.m. and midnight.

Schedule and headways in 2020 for both weekdays and weekends would be as shown in Table 2.2-3:

[3] A pinched loop configuration is used where site limitations do not permit a loop. A pinched loop uses switches at each end of the two parallel tracks to provide benefits similar to a standard loop design.

Table 2.2-3 AGT - Schedule and Headways in 2020		
Time	**No. of Trains Operating**	**Headway (minutes)**
5am – 6 am	1 (single vehicle)*	14.0
6am – 8pm	4 (two vehicles)	3.5
8pm – midnight	3 (single vehicle)	4.7
Midnight – 1am	1 (single vehicle)*	14.0

Source: Lea+Elliott, Inc., July 2000.
Note:
*Could be shuttle operation on one guideway lane

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2.2.5 Ancillary Facilities

Maintenance Facility

Typically, maintenance facilities are located beyond the operational end of an AGT system, where storage areas can either be external to the maintenance facility or within the building enclosure. Under the AGT System, the maintenance and central control facility would be located in the existing BART surface parking lot, north of the BART tracks and Coliseum station. Other functions accommodated at the maintenance facility would include vehicle maintenance, vehicle washing and cleaning, and the repair shops. Spare equipment, expendable parts and tools, and cleaning supplies and equipment would also be stored at the maintenance facility. If guided buses were used, an off-site maintenance facility could be used.

In addition, system central control, supervisory offices, restrooms, lockers, and a breakroom would be located at the maintenance facility. Central control facilities would allow staff to monitor activities in the system with using automated train control consoles and closed-circuit television (CCTV) cameras. The maintenance facility would be designed to be fully-enclosed for operational, security, and noise reasons. The initial footprint of the facility would be approximately 85 feet wide by 210 feet long. As vehicles are added to the fleet, the width of the maintenance facility would need to increase to approximately 105 feet. Conceptual plans for the maintenance facility are presented in Figure 2.2-6.

Propulsion Power and Substations

If electrical self-propelled vehicles are chosen, AGT systems could operate with alternating current (AC) at 480-600 volts or direct current (DC) at 600, 750, or 1500 volts. In order to reduce the number of power substations required to operate the vehicles, the AGT system would use DC electric power. Conduits would carry power feeder cables from the substation to the aerial guideway. Other conduits would be routed on top of, or within, the guideway structures to continuous electrical third rails that would provide propulsion power to the AGT vehicles.

Three to four electric power distribution substation rooms would be required, located at each end and near the midpoint of the alignment, depending on the selected AGT technology. Each room would be located at grade and be approximately 1,000 square feet in size. At the Coliseum end of the AGT alignment, the substation room would be within the footprint of the

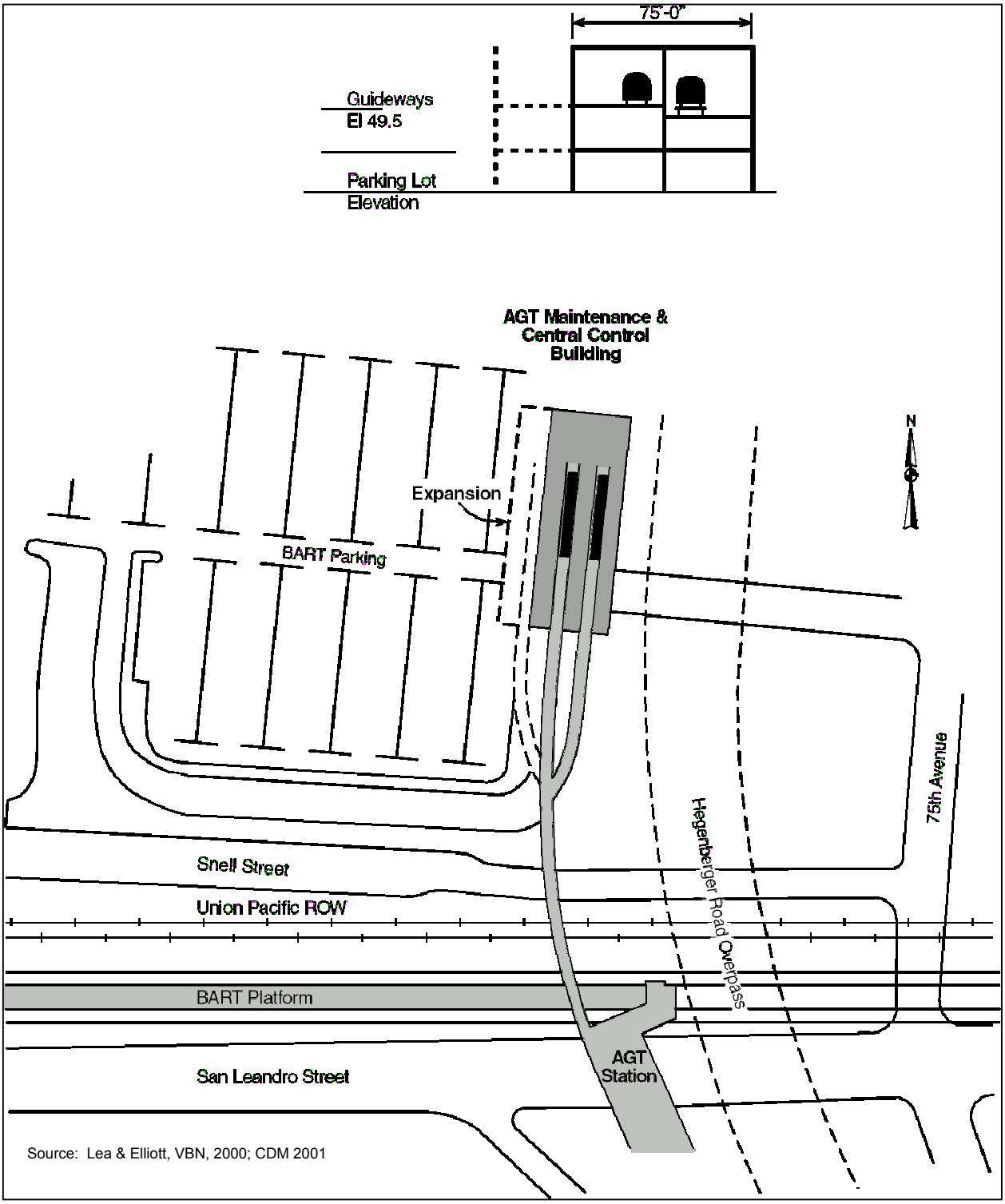


Figure 2.2-6
AGT Maintenance Facility

AGT Maintenance Facility located in the existing Coliseum BART Station parking lot. At the airport terminal end, a location would be coordinated with the Port of Oakland. The third location could be contiguous with an intermediate station (see design options below) or located directly below the guideway, in which case the maximum width would be 26 feet to correspond with the width of the guideway above. These rooms, approximately 14 feet high, would include concrete slab on grade floors, precast concrete walls, and lightweight roof panels. There would be a roll-up door for placement of transformers, switchgear and other power conditioning equipment, and a separate personnel access door. Primary commercial power feeders would enter the rooms through underground duct banks. Secondary power feeders would exit the top or side of the rooms in steel conduits and connect to guideway borne conduits above.

Safety and Security

The National Fire Protection Association Standard for Fixed Guideway Transit Systems (NFPA 130) requires an emergency walkway to facilitate self-evacuation of passengers anywhere along the alignment. The AGT stations would be equipped with emergency access/egress, blue light stations to call emergency responders, communications systems, and closed circuit television that can be monitored by station agents and central control. Because distances between stations are relatively long, stairs would be provided periodically along the aerial alignment connecting the guideway to the ground level for use in emergency evacuations and to provide access for operation and maintenance, and emergency response personnel. On the vehicles, emergency phones would be installed and possibly closed circuit television. In those portions of the alignment that are at grade, a security fence would be installed, similar to at-grade BART segments, to prevent unauthorized access to the AGT right-of-way.

2.2.6 Costs

The AGT system would require a major investment in a guideway, stations and vehicles. The capital cost estimate for the preferred alternative configuration is $229.6 million in 2000 dollars. Costs for operations and maintenance (O&M) in 2005 are projected to be $7.6 million in 2000 dollars.

The chief cost for the AGT is the cost of building an exclusive right-of-way. Elevating the right-of-way to an aerial guideway and tunneling below grade further increases the cost. The increased ridership and long-term nature of the AGT investment offset somewhat the higher AGT capital cost. Section 6 of this document provides the annualized cost of the AGT.

2.2.7 Partial ADP Scenario

Without completion of the Port's ADP, new, expanded passenger terminals and a new parking garage would not be constructed. However, the AGT alignment would be the same as proposed with the full ADP. In addition, the grade-separated structure at the intersection of Airport Drive and Airport Road would not be constructed, and the guideway would not need to be elevated in order to go above this interchange. The AGT would approach the OIA terminals in an elevated guideway over the surface parking lot and terminate at an aerial station in the current VIP parking area between the two terminals. Covered passageways would

extend down to the existing two terminals. The station would be similar to that described for the preferred alternative with the ADP.

Median Option

Since the Median Option is located north of I-880 and distant from the Airport ADP, it has no impact on and is not impacted by the partial ADP. Discussions in Section 3 of relative impacts associated with the partial ADP do not, therefore, include any evaluation of the Median Option.

Section 2.3
Alternatives Analysis

2.3.1 Alternatives Analyzed in DEIR/DEIS

Based on the numerous studies performed over the years, the DEIR/DEIS focused on the environmental impacts of the following three alternatives – each representing a different level of traffic separation:

No Action Alternative assumed that the existing direct bus shuttle called AirBART between the BART system and OIA would continue. This system operates in the street, along with automobiles, trucks, buses, and other motor vehicles. There is no separation from road traffic and no preferential treatment of any kind. The service is jointly provided by BART and the Port of Oakland and operated by a private contractor. The shuttle service operates with 40-foot, low-floor diesel buses, each with a two-tier luggage rack, and capacity for 32 seated passengers and ten standees with their luggage. By 2020, the air passenger demand is expected to increase such that to maintain the same mode share, an operational fleet of eight 40-foot vehicles would be required, or five more buses than currently operate on the route. As shown in Figure 2.3-1, the current AirBART route from OIA to the Coliseum BART Station follows Airport Drive, Hegenberger Road, and San Leandro Street, and ends in front of the Coliseum BART Station on San Leandro Street. In the opposite direction, AirBART buses leave the BART station along San Leandro Street, and then travel along 66th Avenue, Oakport Street, Edgewater Road, Hegenberger Road, and Airport Drive, before stopping at each OIA terminal. This route would remain unchanged in the future.

Quality Bus Alternative proposed a bus system that would be separated from auto traffic at both ends of the trip, would use preferential signal treatment for the transit vehicles along the route to minimize delays, and would include customer amenities, such as improved passenger loading and unloading at the Coliseum BART Station and at the new OIA terminal area, that improve the transit experience. It would have stations physically integrated with the Coliseum BART Station and the airport to create a more efficient transit connection. The Quality Bus Alternative would be designed to be more convenient than the current AirBART shuttles. Efficient passenger boarding and alighting would be emphasized, and would be facilitated by three features of the vehicles: low floors, telescoping ramps, and three doors. Articulated buses[1], typically about 60 feet in length, would be needed to accommodate the projected average peak- hour passenger demand. Such buses can handle 47 seated passengers and 13 standees for a total of 60 passengers with luggage.

[1] Extra-long (54- to 60-foot) bus with the rear body section connected to the main body by a joint mechanism. The joint mechanism allows the vehicle to bend when in operation for sharp turns and curves and yet have a continuous interior. (Source: Federal Transit Administration National Transit Database)

As shown in Figure 2.3-2, the Quality Bus from OIA to the Coliseum BART Station would be identical to the route of AirBART today: the buses would use Airport Drive to reach Hegenberger Road, and then travel on Hegenberger Road to San Leandro Street. The buses would exit Hegenberger Road at the San Leandro Street off-ramp, turn left onto San Leandro Street, and stop under the Hegenberger overpass at the Coliseum BART Station. To return to OIA, buses would proceed directly to Hegenberger Road from San Leandro Street, rather than follow the AirBART route. OIA-bound buses would travel on Hegenberger Road through the intersection with Doolittle Drive and onto Airport Drive to OIA.

Approaching the airport terminal, Quality Bus vehicles would use an exclusive bus lane that would divert from Airport Drive. The exclusive bus lane would provide access to the Quality Bus station on the ground floor of the parking garage. The exclusive Quality Bus lane would help bypass traffic congestion near the terminal. Operation of the Quality Bus system would also include signal preemption on Hegenberger Road and Airport Drive, which provides the Quality Buses with additional "green" time to pass through the signalized intersections. Signal preemption would be provided for both directions at all signalized intersections along the Quality Bus route.

Automated Guideway Transit (AGT) Alternative separates the transit vehicles from automobile traffic for the entire trip on an exclusive right-of-way, offers automated vehicles and also includes customer amenities. An array of transit technologies is being considered, the common elements being that they are generally of proprietary design, operate within their own guideway, would have stations physically integrated with the Coliseum BART Station and the airport terminal, and do not require an operator. A specific technology has not been selected, because BART wants to encourage competition among various vendors. BART does have minimum performance specifications that will have to be satisfied by prospective suppliers. Such specifications include minimum operating speeds and carrying capacities necessary to serve the ridership forecasts. The proposed project in the DEIR/DEIS was an AGT with an alignment in the median of Hegenberger Road both north and south of I-880. The three alignment options are described below.

- **Design Option A:** Under this option, the AGT alignment would travel along the west side of Hegenberger Road, between Elmhurst Channel and Coliseum Way (see Figure 2.3-3). The support columns for this option would be placed within the existing Hegenberger Road right-of-way, in the curb/breakdown lane. The aerial guideway would extend over private property. Option A has been incorporated as part of the preferred alternative.

- **Design Option B:** Under this option, the AGT alignment would travel along the west side of Hegenberger Road, between Edgewater Road and Pardee Drive (see Figure 2.3-3). As part of the City of Oakland's Hegenberger Road beautification project, the City intends to extend the sidewalk into the existing breakdown lane and plant street trees. Under Option B, the centerline of the AGT alignment would generally be about 20 feet west of the existing curbline. As such, the AGT guideway would be situated within the 65-foot front building setback in this segment, between the building entrances and the sidewalk.

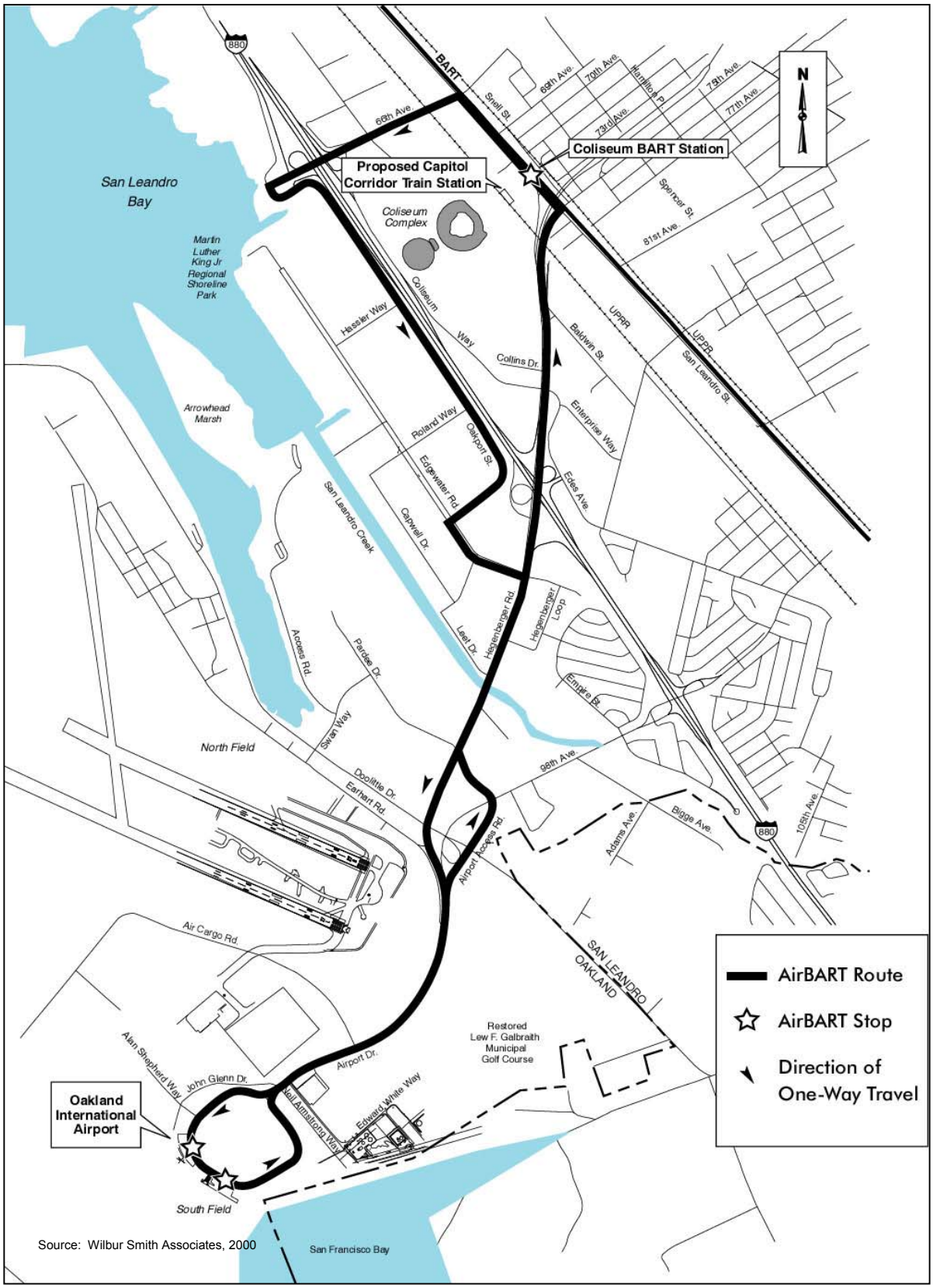
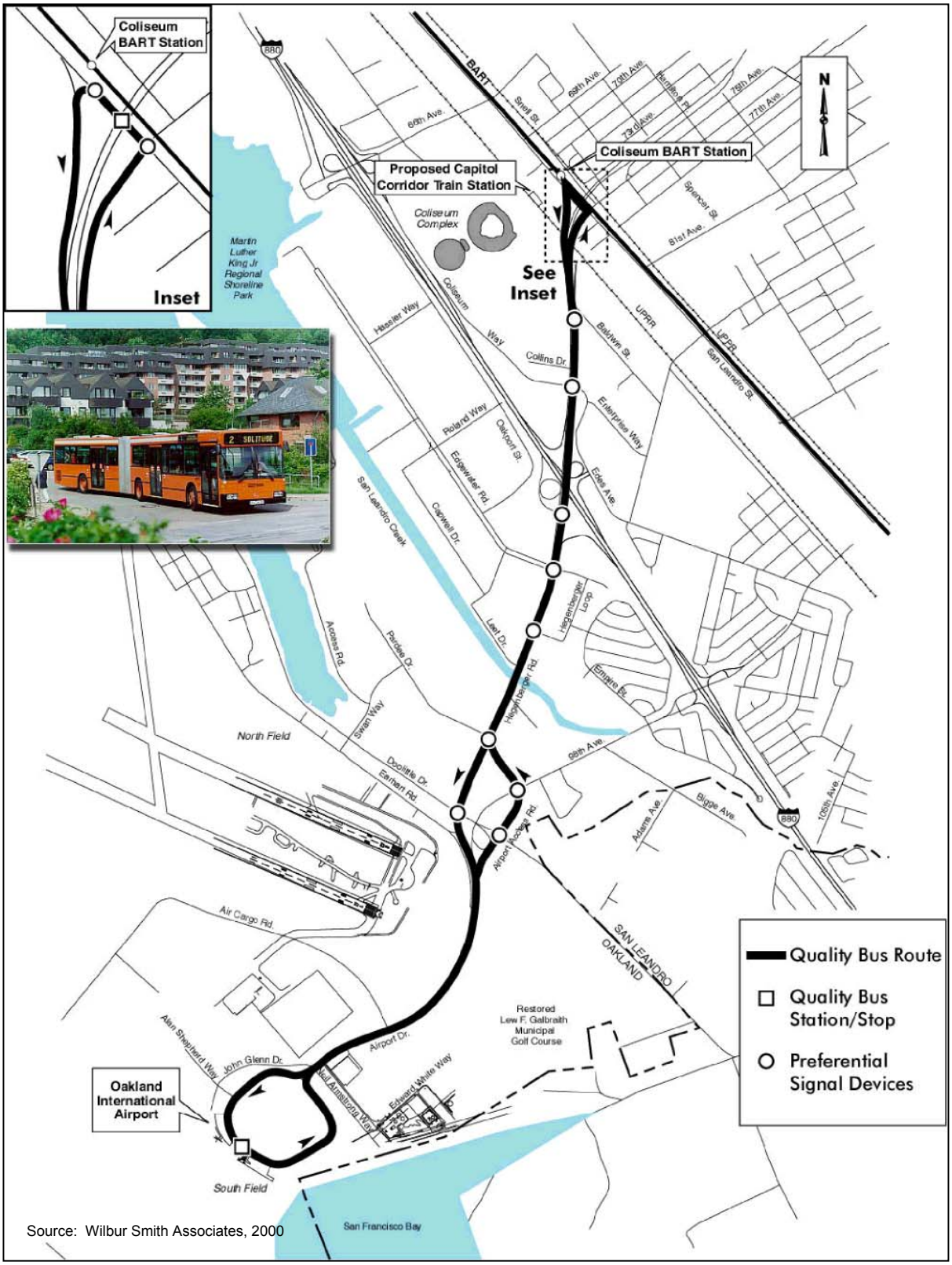


Figure 2.3-1
AirBART Route



Source: Wilbur Smith Associates, 2000

Figure 2.3-2
Quality Bus Route and Preferential Treatment

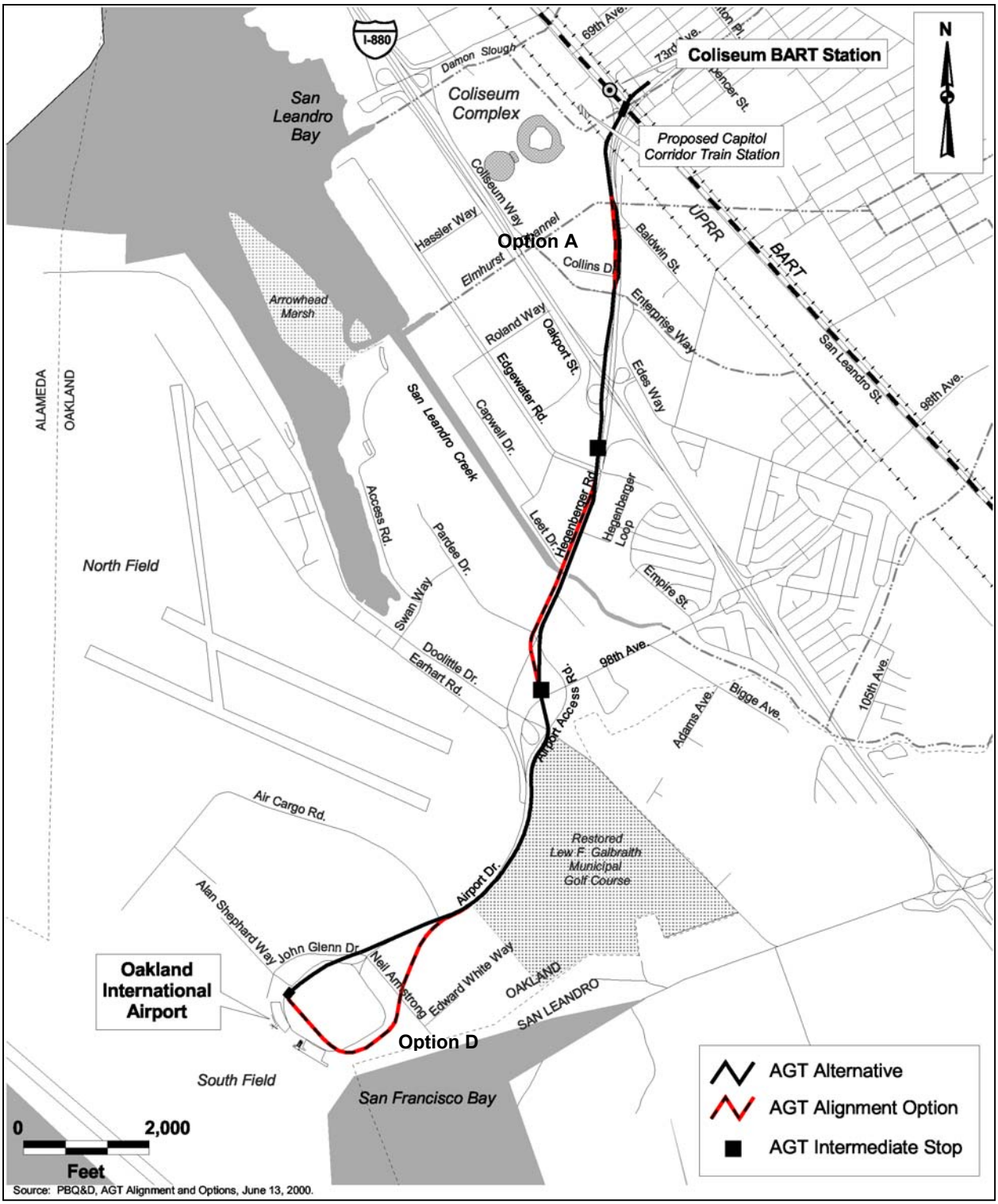


Figure 2.3-3
Location Key Map of AGT Alternative – Design Options

- **Design Option D:** Under this option, the AGT alignment would travel at-grade along the east side of Airport Drive adjacent to Lew F. Galbraith Golf Course, as with the proposed project. As the alignment approaches the intersection of Airport Drive and Air Cargo Drive, Option D would transition to an aerial alignment and veer to the east away from Airport Drive. The alignment would skirt the outside perimeter of the Airport Drive loop road (see Figure 2.3-3) and enter the terminal area from the east. This alignment option would entail crossing jurisdictional wetlands located east of Airport Drive and between Lew F. Galbraith Golf Course and the Airport Drive loop. These wetlands are known as the "fuel farm marsh", also referred to as the "Airport Drive marsh". The reference to the fuel farm is based on the cluster of large fuel tanks that exist at the east edge of the wetlands, located east of Airport Drive.

  Due to the airport terminal design modifications proposed by the Port of Oakland, the Option D terminal entry may be infeasible.

2.3.2 Comparison of Alternatives Analyzed in DEIR/DEIS

The three Connector project alternatives described in the preceding sections have different operating and service characteristics. These characteristics are highlighted below in Table 2.3-1. More detailed background data on the derivation of the operating and service characteristics can be found in background reports available for review at the BART-Oakland Airport Connector planning office at 212 9th Street, 4th Floor, Oakland.

The table also presents information from Section 3, Environmental Analysis. The service and environmental information is not intended to be exhaustive, but selective in order to indicate some of the chief differences among the alternatives. For this comparative table, the preferred alternative (4-station AGT with alignment Option A) is used. Where the other AGT options are notably different from the preferred alternative, the information is presented.

For more detailed information, please refer to the DEIR/DEIS.

Table 2.3-1
Performance and Environmental Comparison of Project Alternatives - 2020

Features	*No Action*	*QB Alternative*	*Preferred Alternative*
Ridership and Service			
Average Daily Ridership	3,340	6,030	13,540
Annual Ridership	1,219,100	2,200,950	4,943,900
Peak Day (Friday) Daily Ridership	4,910	8,860	19,900
Mode Share of Local Air Passengers	5.1%	8.8%	13.2%
Mode Share of Local Air Passengers and Airport Employees	3.8%	6.8%	10.2%
Peak Period Headway (in minutes)	5	4	3.5
Average Wait Time (in minutes)	2.5	2	1.8
System Capacity (Persons per Peak Hour per Peak Direction (Friday in August))	504	900	1,895
Average Total Trip Time Between BART and OIA[(1)] (in minutes)	24.5	20.0	11.2
Capital Costs (million 2000$)	0.39	30.2	229.6

Source: EIP.

Note:

(1) Total trip time includes wait/transfer time, in-vehicle travel time and walk time. The trip time presented for each alternative is an average of the range of trip times that would be expected during the peak period. Trip times would be most variable for the No Action Alternative, while trip times for the AGT Alternative would be least variable due to the constant in-vehicle travel time and headway.

Table 2.3-1 Cont'd.
Performance and Environmental Comparison of Project Alternatives - 2020

Features	*No Action*	*QB Alternative*	*Preferred Alternative*
Traffic and Parking ▪ Reduction in p.m. peak hour vehicular trips	▪ 0 (No Action is the baseline)	▪ 200	▪ 590
▪ Loss of left turn lanes	▪ None	▪ None	▪ None anticipated, although column placement could interfere
▪ Effect on study intersections during a.m. peak hour	▪ One intersection at unacceptable service level in 2020	▪ All intersections operate at acceptable levels	▪ All intersections operate at acceptable levels
▪ Effect on study intersections during p.m. peak hour	▪ All intersections operate at acceptable levels	▪ All intersections operate at acceptable levels	▪ All intersections operate at acceptable levels
▪ Loss of parking spaces	▪ None	▪ Some spaces at proposed OIA parking garage	▪ Some off-street spaces on Hegenberger; some spaces at the OIA terminal; some spaces in BART station parking lot.
Land Use/Economic Development ▪ Support of public policies	▪ Does not conflict with policies promoting economic development in the Hegenberger Corridor	▪ Does not conflict with policies promoting economic development in the Hegenberger Corridor	▪ Does not conflict with policies promoting economic development in the Hegenberger Corridor; inclusion of intermediate stops offers greater potential to serve as a development catalyst
▪ Land acquisition/displacement	▪ None	▪ None	▪ land acquisition of several parcels.
▪ Regional job growth	▪ None	Operation (permanent) ▪ 36 direct jobs ▪ 21 indirect jobs Construction (temporary) ▪ 73 direct jobs ▪ 111 indirect jobs	Operation (permanent) ▪ 45+ direct jobs ▪ 23+ indirect jobs Construction (temporary) ▪ 273+ direct jobs ▪ 416+ indirect jobs

Table 2.3-1 Cont'd. ***Performance and Environmental Comparison of Project Alternatives - 2020***			
Features	***No Action***	***QB Alternative***	***Preferred Alternative***
Visual Quality ▪ Change to visual setting	▪ No change to visual setting	▪ No change to visual setting.	▪ Introduction of large-scale, elevated guideway; would be visually dominant within the Hegenberger Road Corridor; conflicts with proposed landscape and streetscape enhancement features in Oakland's Gateway Study; would have less-than-significant effects on significant views in the project corridor.
Community Services ▪ Demand for community services	▪ None	▪ Increased demand on BART Police	▪ Increased demand on City of Oakland Fire Department and BART Police. Inclusion of intermediate stop would increase these demands.
Environmental Quality ▪ Ground failure/ground shaking	▪ None	▪ Few new structures. Risk of strong ground shaking is less than significant due to BART design criteria.	▪ Aerial guideway subject to strong ground shaking. Risk is less than significant due to BART design criteria.
▪ Settlement	▪ No new structures. Risk of settlement along roadways is less than significant.	▪ Few new structures. Risk of settlement is less than significant due to BART design criteria.	▪ Risk of settlement along guideway is less than significant due to BART design criteria.
▪ Flood risk	▪ None	▪ None	▪ Some facilities within dam inundation areas
▪ Storm water pollution impacts	▪ None	▪ Maintenance activities could affect quality of storm water runoff, potentially impacting surface water quality.	▪ Maintenance activities could affect quality of storm water runoff, thus affecting quality of surface water and groundwater.
▪ Susceptibility to uplift forces from shallow groundwater	▪ None	▪ None	▪ Less than significant effect on tunnel and retained cut segments due to BART design criteria.
▪ Sensitive biological habitats	▪ None affected	▪ None affected	▪ No permanent loss of wetland. Construction could temporarily affect 0.18 acre of wetland.

Table 2.3-1 Cont'd.
Performance and Environmental Comparison of Project Alternatives – 2020

Features	*No Action*	*QB Alternative*	*Preferred Alternative*
▪ Noise	▪ None from vehicle passby	▪ Significant impact to recreational areas nearest QB route	▪ Significant impact to proposed Bay Trail Extension and potentially significant to Sam's Hofbrau; significant to tenants at 675 Hegenberger Rd. and Denny's
▪ Vibration	▪ None from vehicle passby	▪ None from vehicle passby	▪ Possible impact from vehicle passby vibration at Sam's Hofbrau and the Edgewater West hotel property and potentially significant impacts to tenants at 675 Hegenberger Rd. and at Denny's
▪ Construction noise and vibration	▪ No impacts to sensitive receptors	▪ No impacts to sensitive receptors	▪ AGT could cause noise impacts to certain receptors within 1,200 feet during pile-driving; could cause vibration impacts to receptors within 400 feet.
▪ Regional air emissions	▪ Increases in oxides of nitrogen and carbon monoxide but reductions in reactive organic gases and particulate matter (relative to 2000 emissions)	▪ Reduced regional emissions relative to No Action	▪ Substantial reductions to regional emissions relative to No Action
▪ Localize carbon monoxide emissions	▪ Below state and federal ambient air quality standards	▪ Below state and federal ambient air quality standards	▪ Below state and federal ambient air quality standards
▪ Energy consumption	▪ Expansion of AirBART service would reduce regional energy consumption.	▪ Reduced regional energy consumption relative to No Action	▪ Greater reductions to regional energy consumption relative to No Action
▪ Supply of energy	▪ Less-than-significant impacts in diesel supplies. ▪ Reduced use of petroleum-based fuels. ▪ Potentially significant and unavoidable impacts on the state's and region's electricity supplies.	▪ Less-than-significant impacts on diesel supplies. ▪ Reduced use of petroleum-based fuels. ▪ Potentially significant and unavoidable impacts on the state's and region's electricity supplies.	▪ Potentially significant and unavoidable impacts on the state's and region's electricity supplies. ▪ Reduced use of petroleum-based fuels.
▪ Construction	▪ No new construction ▪ No Impact	▪ Two QB stations, signal modifications ▪ Less-than-significant impacts	▪ Four new AGT stations and aerial guideway ▪ Potentially significant and unavoidable impacts from cumulative construction traffic and noise

2.3.3 Comparison of the Alternatives to Project Objectives and Criteria

The combination of the AGT alignment with two intermediate stations and the alignment along the west side of Hegenberger Road, between Elmhurst Channel and Coliseum Way (Option A) was identified as the preferred alternative, compared to the No Action, Quality Bus, and AGT Design Options B or D, for the following reasons:

- **Provides Reliable Scheduled Service between BART and OIA.** The AGT, on an exclusive guideway, can provide on-time performance equal to BART, a factor that is more difficult to emulate with the No Action or QB alternatives (Project Objective 1, Evaluation Criteria 1 and 2, page 1.3-2).

- **Provides Flexibility.** This alternative provides flexibility to increase transit vehicle frequencies during periods of increased travel demand (Project Objective 2, Evaluation Criteria 7 and 8).

- **Travel Time Savings.** The AGT would provide travel time savings compared to other alternatives and those who drive (Project Objective 3, Evaluation Criteria 6).

- **Provide Convenient, Safe and Comfortable Connection.** The preferred alternative would provide rider amenities not available with other alternatives and a convenient, safe, and comfortable connection between the Coliseum Station and OIA (Project Objective 4). The inclusion of Option A in the preferred alternative eliminates two closely spaced horizontal curves (into and out of the median), resulting in a smoother and more comfortable ride.

- **Maximizes Transit Ridership.** The AGT generates the highest projected ridership and increases new transit ridership, compared to the No Action or QB. The AGT with intermediate stations provides the highest ridership for the AGT scenarios. This scenario also provides the greatest increase in BART ridership (Project Objective 5).[2]

- **Cost Effectiveness.** The preferred alternative is the most cost effective of the AGT scenarios. While the QB alternative is the most cost effective alternative, it is not as successful as the AGT alternatives in achieving other project goals (Project Objective 6, Evaluation Criteria 11).

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[2] Note that as analyzed in the DEIR/DEIS and as summarized in Tables 2.4-4 and 2.4-5 and 6-3 of the DEIR/DEIS, the AGT Option D alignment with the intermediate stations is the option that provides the highest ridership estimate among all AGT configurations. This is because the AGT airport station associated with the Option D alignment was located within the airport terminal, reducing the passenger walk time between the AGT station and the terminal ticket area. Since passenger walk time is an important parameter in the ridership model, reducing passenger walk time increased the projected ridership for the Option D alignment compared to the straight-in AGT alignment as evaluated in the DEIR/DEIS. Based on the Port's design refinements for the airport terminal, the AGT station configuration associated with Option D is no longer feasible. The preferred alternative generates the highest transit ridership among all feasible AGT alternatives.

- **Provides Opportunities for Economic Development.** The preferred alternative with intermediate stations would further the economic development in the Hegenberger corridor (Evaluation Criteria 9 and 17), a specific goal of the Oakland General Plan, and would be consistent with BART's expansion policies (Project Objective 7).

The preferred alternative also minimizes significant environmental consequences (Project Objective 8 and Evaluation Criteria 10) as highlighted in the following bullets:

- **Minimizes Impacts to Wetlands.** The preferred alternative would minimize potential wetland impacts compared to Option D (Objective 8 and Evaluation Criterion 10).

- **Provides Long-term Benefits to Local Traffic Congestion.** Compared to the No Action and QB, the AGT provides the largest reductions in vehicle traffic to OIA and greatest reduction in anticipated vehicle congestion along the Hegenberger Road and Airport Drive corridor, thereby improving airport access to both AGT riders and vehicle riders.

- **Provides Long-term Benefits to Regional Air Quality.** The AGT, through its high projected ridership, shifts more airport passengers from vehicles than the No Action and QB alternatives, thereby reducing vehicle-related emissions.

- **Provides Highest Energy Efficiency per Passenger.** At the projected ridership levels, the AGT alternative is the most energy-efficient mode of transportation for airport passengers compared to the No Action and QB.

- **Provides Regional Job Growth.** The preferred project provided the highest level of regional job growth, both permanent employment related to operation of the system and temporary construction jobs.

- **Conforms to Airport Development Plan.** The "straight in" alignment, terminating at the planned parking garage is specifically designed to accommodate planned development at OIA (Evaluation Criteria 18).

- **Has Community Support.** The City of Oakland, the Port of Oakland, the San Leandro Chamber of Commerce, the Airport Area Business Association, and the Coliseum Neighborhood Council have registered their support for an AGT system. (See Volume 2, Responses to Comments on the DEIR/DEIS.).

2.3.4 Environmentally Superior Alternative

CEQA requires that an environmentally superior alternative be selected among the alternatives analyzed. In general, the environmentally superior alternative is defined as that alternative with the least adverse impacts to the project site and its surrounding environment. The No Action Alternative would best avoid impacts identified for the QB and the preferred alternative. In particular, the No Action Alternative would not involve land acquisition, alteration to the project corridor streetscape, increased demand for community services, risk to structural or public safety due to geoseismic hazards, disturbance to biological species or habitat, vibration effects, and construction-related effects.

The State CEQA Guidelines indicate that when the No Action Alternative is environmentally superior, the EIR shall also identify an environmentally superior alternative among the other alternatives. Between the QB Alternative and the preferred alternative, the bus system would result in fewer environmentally damaging effects and require less mitigation. Compared to the preferred alternative, the QB Alternative would not result in alteration of left turn movements along Hegenberger Road, streetscape characteristics, light and glare effects, increased demand for fire protection, vibration and various construction effects.

While the QB Alternative would impose the least environmental effects, it is noted that the beneficial effects of the Connector project (i.e., reduction in freeway and arterial traffic volumes, improvement in intersection operations, increased transit ridership, creation of construction-related and operational jobs, reductions in air emissions, and reduction in regional energy consumption) are greatest with the preferred alternative. Furthermore, in terms of satisfying the project objectives, the QB Alternative would offer an efficient, high quality service but would not be as successful as the preferred alternative in the following areas: provide reliable scheduled service between BART and OIA (Objective 1); offer a competitive alternative to those who drive to OIA by providing predictable connections and travel time savings (Objective 3); and maximize BART ridership (Objective 5).

For the AGT Alternative and its alignment options, the two-station AGT with the median alignment would have the fewest environmental impacts. Option A, along the west side of Hegenberger Road, between Elmhurst Channel and Coliseum Way, and Option B, which shifts the alignment westward between Edgewater Road and Pardee Drive, would cross additional private property, involve additional land acquisition, introduce greater noise and vibration impacts to sensitive receptors, and introduce greater visual encroachment impacts to land uses on the west side of Hegenberger Road. Option D would have the disadvantage of crossing and permanently impacting wetlands.

The Intermediate Stations Option would not introduce any new environmental impacts that could not be mitigated beyond those identified for an AGT. The intermediate station near Edgewater Drive would require acquisition of additional property along the alignment. The Intermediate Stations Option is projected to generate greater ridership than the AGT Alternative with only the Coliseum BART and airport stations. As a result, the Intermediate Station Options would result in greater benefits from a regional air emissions perspective. Accordingly, among all AGT options, the median alignment and Intermediate Stations Option is considered the environmentally superior alternative.

The preferred alternative, with intermediate stations and Option A alignment provides the highest level of Connector ridership and the greatest reduction in automobile traffic and corresponding reduction in air emissions and regional energy usage.

2.3.5 Alternatives Considered But Rejected

This section identifies a number of alternatives that have been previously considered but are not evaluated in the FEIR/FEIS. The alternatives include different technologies and routes that have surfaced during prior studies, during the scoping meeting for the DEIR/DEIS, and during

the conceptual engineering design to support the DEIR/DEIS. The reasons why these alternatives have not been carried forth for analysis in this document are presented in this section.

Prior Studies

As presented in Section 1, the idea of a Connector between the BART regional transit system and OIA has been studied for about 30 years. As a result of these studies, a variety of routes and technologies have been considered over the years. Alternative technologies considered and rejected include high-speed, high-capacity systems like the existing BART vehicles that can operate at 80 miles per hour; all-highway solutions that rely on expansion of the road network; high-capacity, capital intensive bus systems that require their own exclusive and predominantly elevated busway; and personal rapid transit systems that operate on their own guideway but tend to be slow-moving and limited in their carrying capacity. A summary of the past studies and the rationale for rejecting certain technologies and routes are presented in Appendix A of this FEIR/FEIS.

Alternatives Raised During the Scoping Meeting

In written response to the Notice of Preparation and the Notice of Intent, and during the public scoping meeting in November 1999 for the FEIR/FEIS, several alternatives were suggested, including:

- Extension of the existing BART system;
- Development of a higher technology bus with preferential treatment to enhance travel;
- An alternative route using Edgewater Road, rather than Hegenberger Road; and
- An overhead cable-supported system.

The first three suggestions have been considered in various past reports and the fourth was a new proposal, as summarized below.

BART Extension. A BART Extension System was specifically analyzed in 1970, 1975, and 1979 and was rejected for the following reasons (see also Appendix A):

- High capital expense (cost of $230 million at the time of the 1970 studies) [3]
- Service degradation for non-airport BART patrons
- Operational and scheduling problems for BART.

[3] For the purposes of comparison and assuming an average annual inflation rate of 3 percent a year, the original project cost of $230 million in 1970 would represent approximately $575 million in 2001. This estimate is necessarily an approximation, because inflation rates for many sectors of the construction industry would vary from the assumed 3 percent inflation rate.

These same reasons apply today and discourage further consideration of extending the existing BART system into OIA.

Bus System on Exclusive Busway. A motor bus system operating in an exclusive guideway was considered in the 1970, 1979, 1981, and 1993 reports. Reasons for rejecting this alternative include the greater capital costs for the exclusive elevated busway and the higher operational and maintenance costs for personnel, relative to an AGT system. The 1993 report explains that a busway on its own elevated guideway must be relatively massive to provide sufficient width for bus operation. This means that a 30-foot wide structure is needed for an aerial busway. Consequently, the construction cost per mile of an aerial busway structure approaches that of rapid transit. Once other factors are taken into consideration (e.g., the larger size and weight of buses and the labor costs for drivers), AGT systems generally have lower per-mile costs for aerial structures than elevated busways.

It is noted that an elevated busway, with specially modified buses, is considered a type of AGT and is assessed in the FEIR/FEIS.

Furthermore, a less capital-intensive version of the earlier motor bus alternatives, without the exclusive elevated busway, is a viable option. Therefore, this concept was included in the DEIR/DEIS as the QB Alternative.

Edgewater Route. The 1993 report focused not only on alternative technologies but also on the advantages and disadvantages of the Edgewater Road Corridor versus the Hegenberger Road Corridor. The advantages of the Hegenberger Road Corridor still apply. Consequently, this route was examined in the DEIR/DEIS. The 1993 report concluded that the Hegenberger Road Corridor is shorter which reduces travel time, construction costs, and operating costs. It also has fewer curves, which further reduce travel time. Because the alignment stays along the highly developed Hegenberger Road, the Hegenberger Road Corridor option has less impact on sensitive environmental areas. The Edgewater Road Corridor is superior in its ability to provide an intermediate station in the center of the business park, but the Edgewater Road Corridor's major weaknesses are its length and additional curves. Finally, the City's 1998 General Plan and design studies for Hegenberger Road include provisions for a Connector along Hegenberger Road, so that this route would be more consistent with local public policies.

Cable-Supported System. This system is an aerial tramway type of AGT. Passengers are transported in gondolas hanging from a wide-spaced pair of steel ropes rapidly moving in unison on rubber-tired sheaves that are mounted on towers 50 to 150 feet high. Typical cars can carry 12 to 24 persons and may be spaced as closely as 36 seconds apart when maximum capacity is required. Cable-supported systems must use an aerial alignment, consisting of straight lines connected by angle stations. As a result, this system functions differently than ground-based AGT systems.

The proposed alignment for the tramway system would involve two straight-line segments (see Figure 2.3-4). The first would extend from the Coliseum BART Station to a point near Doolittle

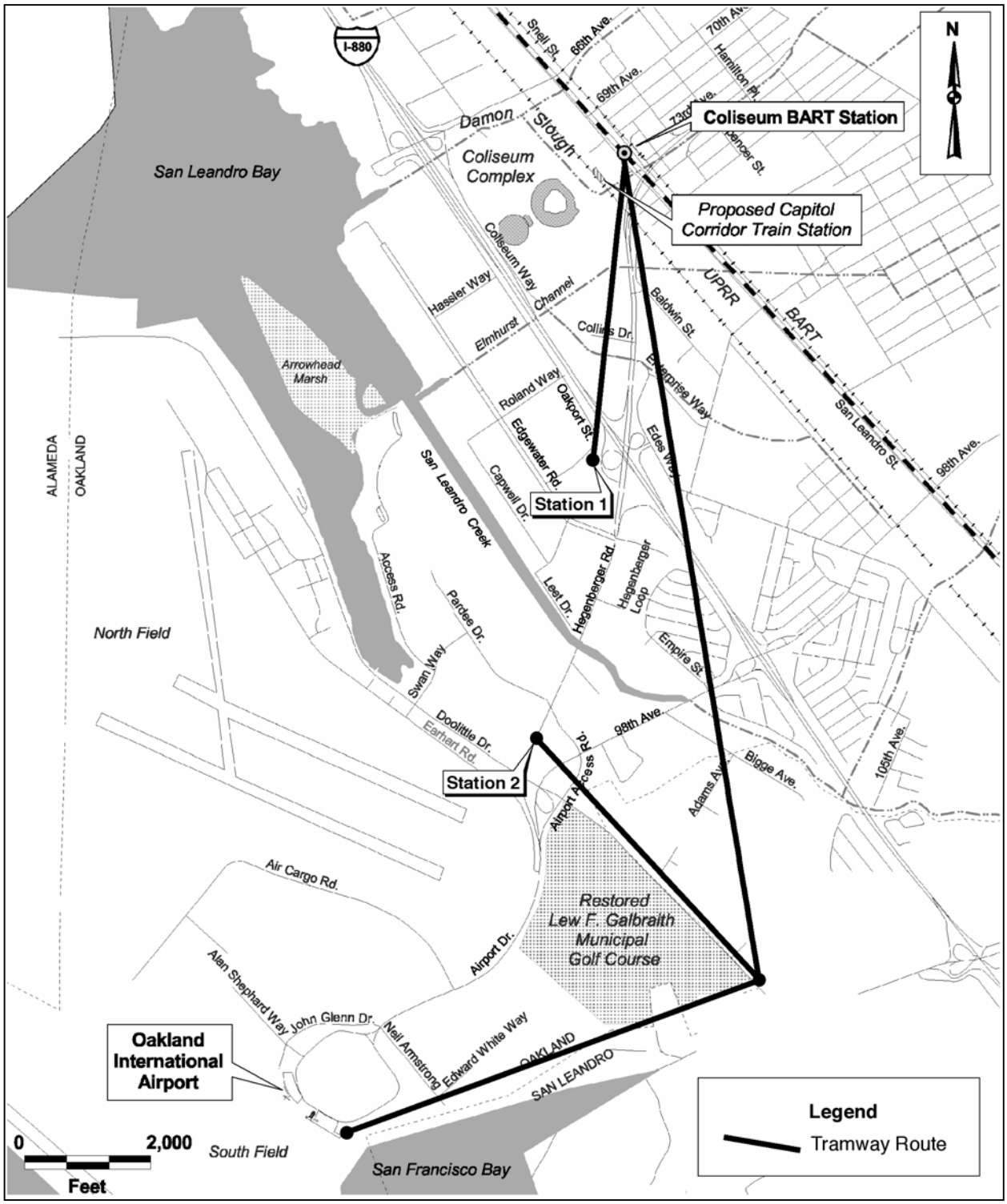

Figure 2.3-4
Conceptual AGT Tramway Alignment

Source: Garaventa CTEC

Drive, east of the restored Lew F. Galbraith Golf Course. The tramway would be between 50 and 150 feet above the ground to allow ample clearance over the Hegenberger/San Leandro Street overpass, industrial buildings, I-880, and residential neighborhood below this first segment. The tramway would then use the angle station to direct it towards the OIA terminal. The angle station would house the drive machinery, power input, central control, car storage, maintenance facility, and other auxiliary equipment. Angle stations can be designed as through stations or as a loading/unloading station. To support the tramway cable, about 25 towers would be required along the route.

Cable-supported installations can be found at various ski resorts. The system operates at about 18 miles per hour. At this speed, the travel time from the Coliseum BART Station to the OIA terminal is about 14 minutes.

The cable-supported aerial tramway system is not being considered further in the FEIR/FEIS. The criteria in Table 1.3-2 were considered, and the tramway would not satisfy the following:

- Provide flexibility to serve intermediate stops – The tramway can make intermediate stops but the system requires new line segments from a terminal or angle station to the intermediate stop. For example, the optional AGT intermediate stops are at Hegenberger Road/Edgewater Road and at Hegenberger Road/Doolittle Drive. These stops are along the proposed AGT route and a passenger can easily board or alight the system at any of the stops. With the tramway, one separate line segment would be needed to connect the Coliseum BART Station to the Hegenberger Road/Edgewater Road stop, and a second segment would connect the Hegenberger Road/Doolittle Drive stop to the angle station on Doolittle Drive. Passengers boarding at Hegenberger Road/Edgewater Road wishing to go to the airport would need to travel back to the Coliseum BART Station (away from OIA), travel southeast along the segment going to the angle station, and then to the terminal. A two-mile trip from Hegenberger Road/Edgewater Road to OIA would be more circuitous and would traverse about five miles.

- Avoid significant and obvious negative environmental effects; avoid substantial impacts to land uses; minimize the amount of private property needed for rights-of-way – An aerial system using gondolas is suspended from cables high above the ground. The cables and gondolas would be highly visible and pose potential visual effects. The system would travel over industrial and residential areas, raising possible safety concerns. The approximately 25 50-foot towers required to support the cables would themselves pose visual impacts, require land acquisition and possible displacement, and traverse the wetlands adjacent to Airport Drive between the golf course and the terminals.

In addition to the above, the cable-supported tramway raises concerns of emergency response in the event of an accident or failure of the system. Access to the alignment is difficult since it does not simply follow an existing public right-of-way, and emergency responders may have difficulties reaching passengers since the gondolas may be as high as 150 feet above the ground.

Alternatives Considered During Preliminary Environmental Screening and Conceptual Engineering

As part of the DEIR/DEIS, BART has considered several alignment options but rejected them in favor of the proposed route and options described earlier in this chapter. Two particular options that should be mentioned include:

- Scheme H, which would integrate a Coliseum AGT Station parallel to the Coliseum BART Station, enabling AGT passengers to cross the loading platform and board BART; and

- Option C, which would follow an aerial alignment along Airport Access Road and over Doolittle Drive, rather than transitioning to a tunnel segment under Doolittle Drive as included in the proposed project.

Scheme H

Scheme H is a design of the Coliseum AGT Station that would require expansion of the existing BART platform to allow the AGT vehicle loading area to be at the same level as the BART platform (see Figures 2.3-5(a) and 2.3-5(b)). Under this configuration, the AGT "Station" would actually be fully integrated with an expanded BART Station. The AGT guideway would approach the BART station above the southbound BART tracks, turn parallel to the tracks over the station and descend between the BART tracks to the BART loading platform, which the AGT vehicles would share with BART trains. This configuration would provide a shorter and more direct passenger connection between the AGT and BART without any level changes.

No stairs, escalators, or elevators would be necessary. In addition to providing the best link between the AGT and BART for airport-related passengers, the expanded platform area would improve overall Coliseum Station BART operations and accommodate anticipated growth in system-wide BART ridership. Because of these advantages, both BART and the City of Oakland are interested in Scheme H as a long-term concept worthy of continued consideration. Current funding constraints and the need for much more engineering evaluation, as described below, preclude this option from further consideration at this time. If funding becomes available, however, this scheme should be examined more rigorously.

As currently designed, Scheme H would involve the widening of the existing BART platform to the north, toward the BART parking lot. At least one of the two UPRR tracks may need to be removed and the second may need to be relocated to accommodate the support columns for the wider BART platform. The northbound BART track also would be relocated approximately 36 feet to the north, and the platform would widen from 24 feet to approximately 60 feet. Scheme H would cost significantly more than other Coliseum AGT station schemes, because it could require relocation or removal of the UPRR tracks, construction of an expanded BART platform, and relocation of the BART tracks, as well as construction of the AGT station itself.

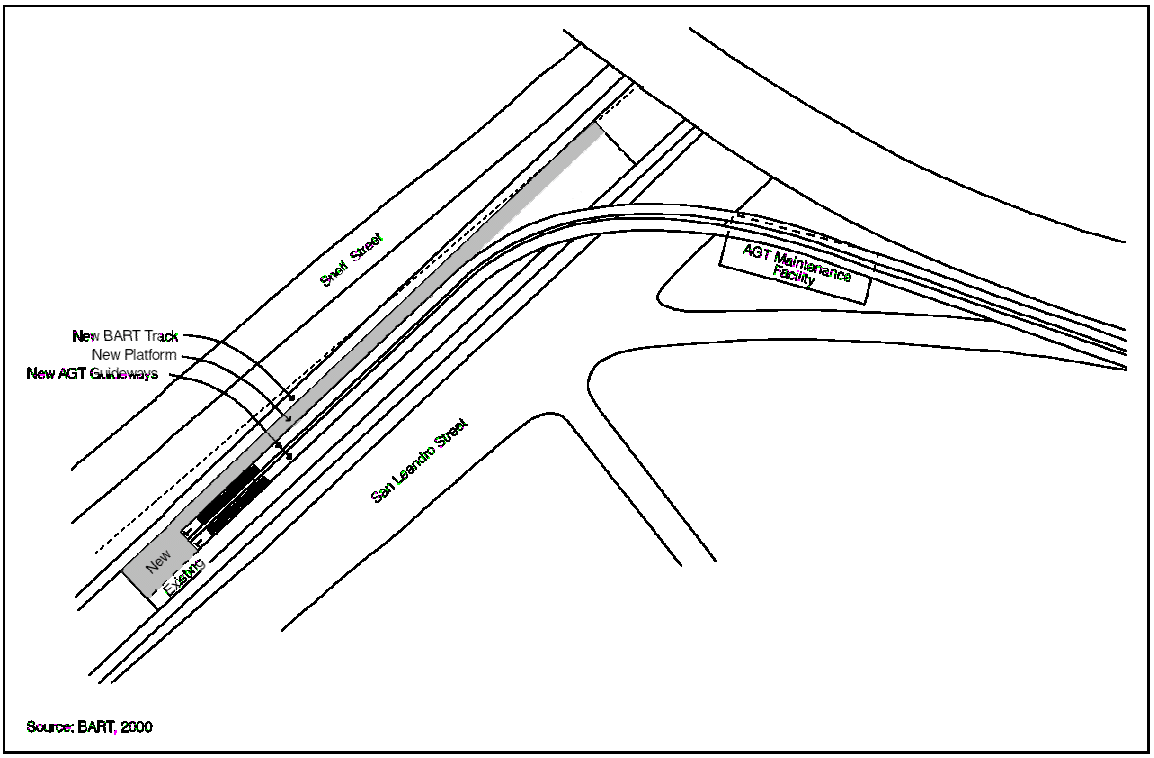

Figure 2.3-5a
Coliseum AGT Station
Scheme H Plan View

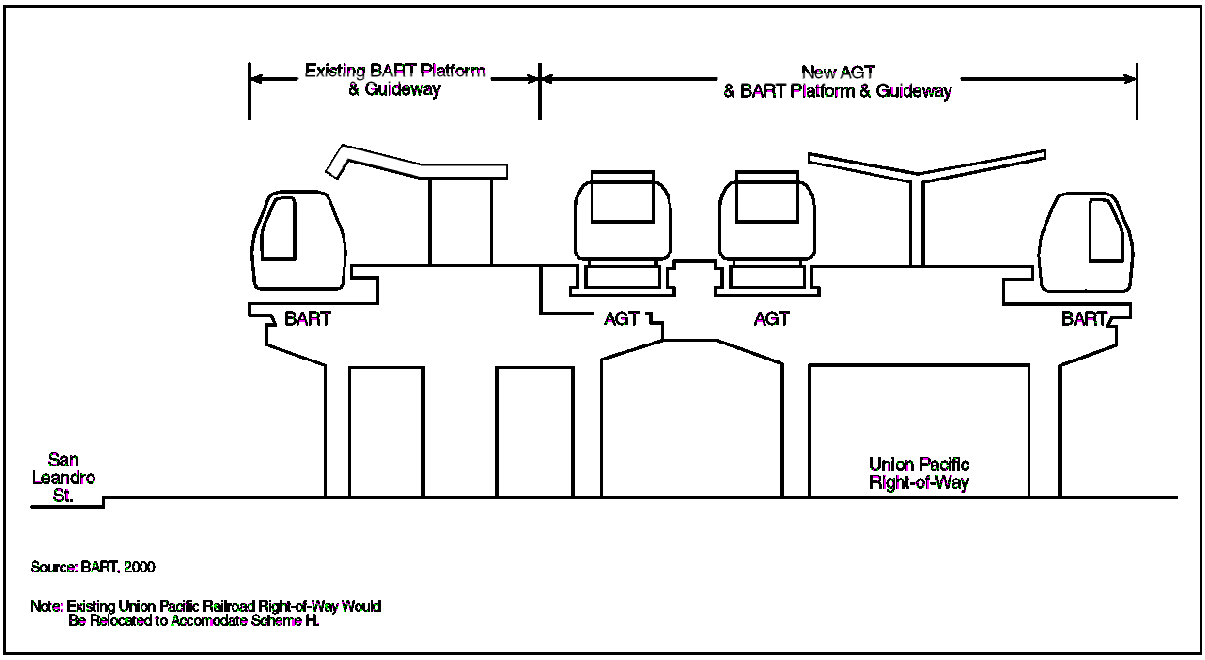

Figure 2.3-5b
Coliseum AGT Station
Scheme H Cross-Section

Option C

Option C is a design initially considered for the AGT alignment in the vicinity of the OIA entrance and the Lew F. Galbraith Golf Course (see Figure 2.3-6). Approaching this area from the north along Hegenberger Road, the AGT would be in an aerial configuration. The Option C design requires the AGT alignment to travel above the Airport Drive/Doolittle Drive/98th Avenue interchange. Once over the interchange, the AGT alignment must descend steeply to provide the necessary vertical clearance at the end of the North Field runways required by FAA.

In order to achieve the required clearance between the guideway and the FAA obstacle-free zone, the AGT alignment also would have had to curve further to the east. Such an alignment would conflict with the City's proposed restoration of the Lew F. Galbraith Golf Course and constitute a "use" of public parklands, which are protected under Section 4(f) of the Department of Transportation Act. In addition, depending on the precise alignment of Option C, there was a potential to disturb jurisdictional wetlands. As a result, BART elected to abandon this option and halted further consideration of this aerial design option.

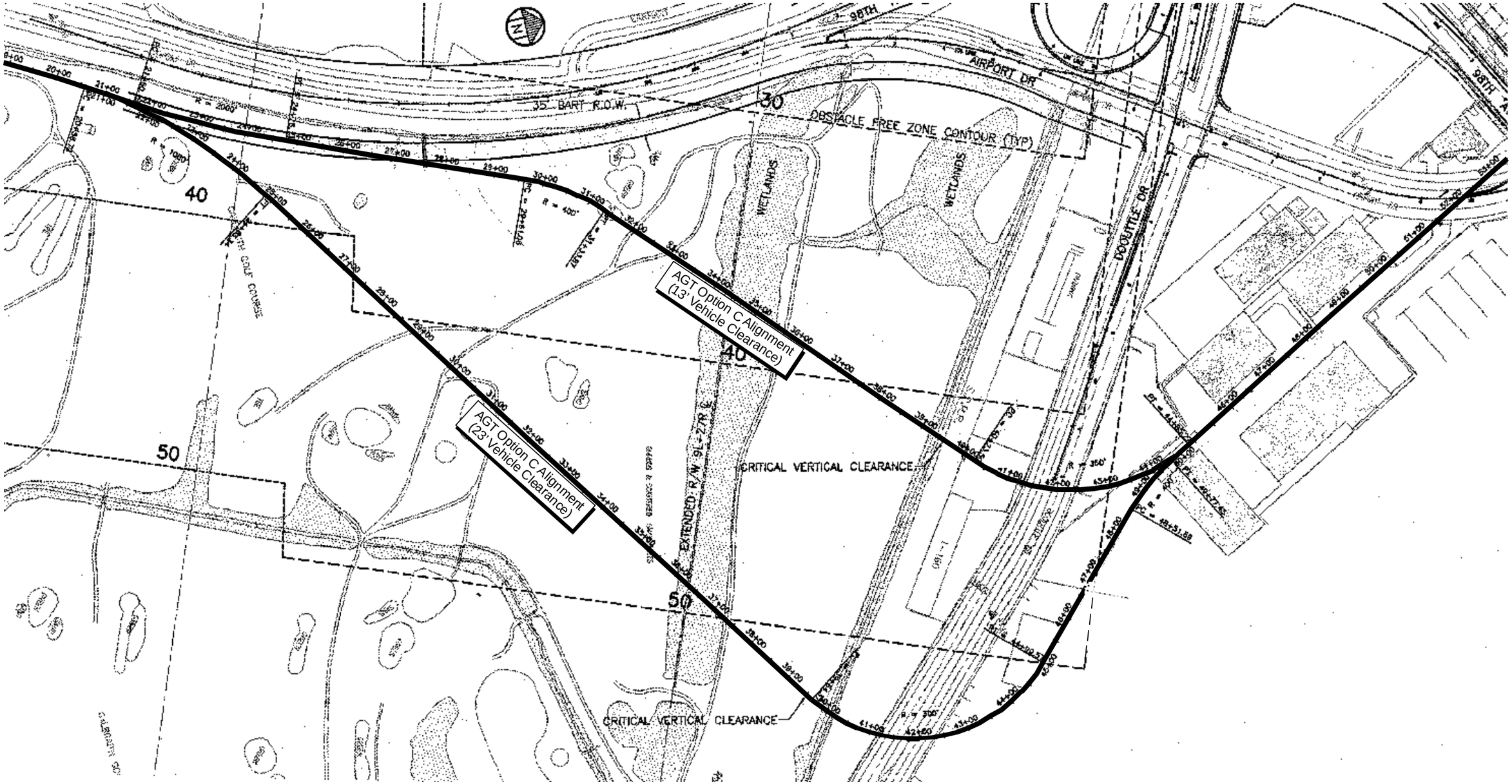

Figure 2.3-6
AGT Option C