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1. Background and Overview
2. Summary of Aviation Activity Forecasts
3. Potential Airline Passenger Development
4. Potential Air Cargo Development
5. Potential General Aviation Development
6. Potential Airfield Development
7. Airline-Related Support Facilities
8. Airport Ground Access
9. Environmental Considerations
10. Financial Plan
11. Land-Use Maps and Recommended Studies

**Background and Overview**

**Background**

The Port of Oakland executed various settlement agreements with the surrounding communities in which the Port agreed to prepare a 20-year master plan for Oakland International Airport in accordance with Federal Aviation Administration (FAA) Advisory Circular (AC) No. 150/5070-6A, Airport Master Plans. The Port’s Aviation Planning and Development staff prepared the master plan, with assistance from specialized consultants for graphics, airfield simulation, aircraft noise analysis, and administration.

**Stakeholder Advisory Committee Process**

The central process for conducting the master plan was a series of meetings with a Stakeholder Advisory Committee. The role of the Stakeholder Advisory Committee was to (1) advise Port staff on long-range, high-level planning issues at OAK, (2) provide input on master plan technical issues, and (3) identify potential impacts early on in the planning process. The Stakeholder Advisory Committee consisted of representatives (community members and/or staff) from the cities of Alameda, San Leandro, and Oakland, San Leandro Unified School District, Alameda County, and Airport users, including fixed base operators, passenger and cargo airlines, the Port’s Airline Liaison Office, and flight training / light general aviation aircraft operators. Each member of the Stakeholder Advisory Committee had formal representation in the formulation of the master plan and all members were given the opportunity to participate in development and consideration of objectives, alternatives, evaluations, etc. Some members of the Stakeholder Advisory Committee performed independent technical work to verify master plan analyses and draw their own conclusions, including preparation of simulations, spreadsheet analyses, and use of outside consultants for peer review. Committee meetings were scheduled every one to two months and were structured around master plan technical elements and topics. There were 11 Stakeholder Advisory Committee meetings (June 2004 through December 2005).

**Overview**

This master plan for OAK is a concept-level planning and feasibility study that identifies potential near-term projects (5-year timeframe) and provides long-term (20-year) airport general land-use guidance. It has been prepared in accordance with the Federal Aviation Administration (FAA) Advisory Circular (AC) No. 150/5070-6A, Airport Master Plans. The following bullets provide a high-level overview of the results of the master plan:

- The primary products of the master plan are near-term (2010 to 2012) and long-term (2025) airport land-use maps (see Chapter 8 and Figures 8.1, 8.2, and 8.3).
- The primary focus of the master plan is on potential near-term projects (2010 to 2012) and accommodating forecast airline passenger activity in the near-term.
- Projects are not proposed to accommodate long-term (2025) forecasts, which are speculative and not reasonably foreseeable at this time. Further, the long-term, unconstrained airline passenger forecasts are not likely to be realized due to limitations on South Field (air carrier) runway capacity (i.e., a new runway is not proposed in this master plan).
- Air cargo growth is focused on existing air cargo tenants; a low-growth air cargo forecast is recommended as the Port intends to de-emphasize marketing new air cargo airlines and service.

**Summary of Aviation Activity Forecasts**

One of the first steps in preparing an airport master plan is to forecast unconstrained future aviation activity. Unconstrained forecasts are not constrained by any assumptions about the availability (or lack of availability) of existing and/or future Airport facilities, such as aircraft gates or runways. In other words, these forecasts represent the “natural” activity that would occur at OAK, absent any constraints on the availability of facilities. As noted throughout the master plan, the unconstrained forecast of airline passengers in 2025 is likely not achievable without an additional air carrier runway, which is not recommended in this master plan.
Estimating constrained airline passenger demand for 2025 (e.g., given capacity limitations of the existing South Field runway) is difficult and dependent on many future variables. Constrained airline passenger forecasts are dependent on many factors, including the types of airplanes the airlines choose to fly (i.e., fleet mix and the number of seats per airplane), assumed taxiway and other airfield improvements, amount of delay that the airlines and airline passengers are willing to tolerate, air travel market constraints, air traffic control rules and procedures, required aircraft-to-aircraft separations due to wake vortices, etc., all of which are likely to change between now and 2025. Table E.1 summarizes the unconstrained master plan forecasts.

### Potential Airline Passenger Development

Based on the forecasts of airline passenger and passenger airline operations, it was estimated that the Airport will need between 46 and 50 total aircraft gates (between 17 and 21 gates more than the current 24 gates plus those 5 under construction) to accommodate passenger demand in the 2010 to 2012 timeframe at a reasonable level of service (e.g., with less crowding in holdrooms, the ability to take facilities out of service to allow for routine cleaning and maintenance, etc.). From a level of service perspective, 46 to 50 total aircraft gates results in between 6 to 6.5 departures per gate per day, and 37,000 to 42,000 passengers per gate in the peak month (August). This compares to 8-9 daily departures per gate per day in August 2004 (from 24 gates), and 56,500 passengers per gate in August 2004. The national average is about 5.5 departures per gate per day.

Three possible areas at South Field were considered for the near-term potential future terminal development described above. The three areas include (1) the Central Basin (west of the FedEx Metroplex and north of Taxiway W), (2) the existing terminal area and Oakland Maintenance Center site, and (3) east of Terminal 2 in San Francisco Bay. Thirteen potential general terminal development concepts were considered in these three areas. For each concept, the following planning considerations were discussed:

- Runway access / taxiways
- Remote aircraft parking area
- Landside access roads, wayfinding, curbside length, parking (area and revenue)
- Walking distances
- Environmental constraints
- Constructability (existing facilities must remain operational)
- Total project cost (including replacement facilities)
- Other considerations specific to a particular concept

Based on the planning considerations and input from the Stakeholder Advisory Committee, it is recommended that the area designated for potential future terminal development at OAK be located in the existing terminal area and Oakland Maintenance Center site. This area is (1) less challenging environmentally, (2) more likely to be financially affordable, and (3) farthest from residences in both Alameda and San Leandro. Some of the Stakeholder Advisory Committee representatives are concerned about any future development at OAK. Other representatives indicated that mitigation measures need to be explored to offset potential environmental effects associated with existing and future aircraft operations. The representatives from the City of San Leandro indicated that terminal development in this area should be kept as far south as possible to discourage passenger airlines from using runways at North Field. Port staff explained that terminal development located anywhere in the existing terminal area and Oakland Maintenance Center site would not likely change the airlines use of the runways at OAK. However, all such concerns will continue to be considered as the Port performs more detailed planning and evaluation of potential future development. Also, input and recommendations provided by members of the Stakeholder Advisory Committee on potential future terminal development should not necessarily be considered implicit endorsement of future terminal expansion.
Potential Air Cargo Development

Various areas on the Airport were evaluated for potential future air cargo development. The master plan recommends accommodating the lowest forecast of air cargo activity, rather than an aggressive forecast that would require a significant amount of new development. Instead, only a modest amount of additional on-Airport area would be needed to accommodate future air cargo growth, and this area would likely be needed adjacent to existing air cargo facilities. Although several areas were examined, including the Central Basin and North Field, the recommended areas to be designated for potential future development to accommodate growth in air cargo are (1) north of the existing FedEx Metroplex, south of Ron Cowan Parkway (to allow a modest expansion of the Metroplex) and (2) the now abandoned Oakland Maintenance Center site, which could be used for replacement air cargo facilities. The Stakeholder Advisory Committee generally agreed that the Port should consider only the lowest amount of air cargo growth (essentially modest growth of existing air cargo tenants).

Potential General Aviation Development

Except for flight training schools, it was determined that there is not a strong link between general aviation aircraft operations and the number of general aviation aircraft based at OAK. Various areas (mostly at North Field) were evaluated for potential future general aviation development. In 2010, it is estimated that an additional 3 to 7 acres would be required to base jets and turboprops at OAK, and an additional 9 to 15 acres would be required to base piston airplanes and helicopters at OAK. The area anticipated to be needed to base additional piston airplanes and helicopters is for hangars to park private airplanes, not aircraft associated with flight schools. Today, there is one flight school at North Field that trains students to fly helicopters. There are also two smaller flying clubs / businesses that offer flight instruction in small, piston airplanes.

While a specific development plan is not proposed, it is recommended that the area designated for potential new general aviation development (primarily hangars and aircraft aprons) occur at North Field, either in currently undeveloped sites (such as adjacent to Hangar 10 or off Harbor Bay Parkway) or through the redevelopment of existing general aviation facilities at North Field, subject to market interest and conditions. This type of development is well-suited for a third-party developer (where the Port leases the land to a developer who then constructs and manages the aircraft hangars). The Stakeholder Advisory Committee provided comments, but did not recommend any changes to potential general aviation development.

Potential Airfield Development

The airfield (taxiways and runways) was simulated using the 2010 operations forecasts. The major airfield simulation assumptions were as follows (note: these potential projects are not designed or proposed for approval, but were assumed as hypothetical projects for purposes of modeling the airfield):

- A new 21-gate unit terminal (for 50 total gates) would be constructed parallel to and east of Taxiway B (north of Taxiway T).
- The cargo building (now housing UPS and belly cargo) would be relocated to the northern part of the Oakland Maintenance Center site.
- A new taxiway parallel to and east of Taxiway B would be constructed.

The simulation showed that in 2010, there would be about 20 minutes of queue delay per aircraft, on average, accessing Runway 29 during the morning departures peak, with only occasional queue delays averaging less than a few minutes each for the remainder of the day.

Twenty minutes of delay per aircraft in the morning departures peak in 2010 is not desirable, so two airfield improvements were tested using the simulation model:

- Taxiway access improvements to Runway 29
- A new high-speed taxiway exit off Runway 29

The taxiway access improvements would provide additional queuing space and allow air traffic control to sequence departures more efficiently. The new high-speed taxiway exit would allow landing aircraft to exit the runway sooner, allowing departing aircraft to take-off sooner. With these two improvements, there would be about 10 minutes of queue delay per aircraft, on average, accessing Runway 29 during the morning departures peak. These two airfield improvements are not considered runway capacity improvements; rather, they reduce the number of peak-hour flights that would spill over (be delayed) into the following hour.

Although these airfield improvements would not be required in 2010 (with a new 21-gate unit terminal), they would allow the airfield to operate more efficiently, reducing delay during the morning departures peak and continuing to provide benefits beyond 2010.

Beyond 2010, Runway 11-29 will continue to experience increases in delay (although less if the two improvements above are implemented), as the morning departures peak continues longer into the morning and during other peak activity periods. Detailed simulation analyses
were not performed beyond 2010, however, it is anticipated that delay on Runway 11-29 will increase so as to warrant additional runway capacity at South Field between 2015 and 2025. Any potential new runway at South Field would have considerable environmental issues associated with filling wetlands and San Francisco Bay, as well as financial issues (e.g., several billion dollars). Therefore, it is recommended that the Port not pursue a new South Field runway at this time due to environmental and financial constraints. However, it is recommended that the Port work with its regional partners (e.g., the Regional Airport Planning Committee) to continue discussions about the future demand and capacity of runways at Bay Area airports and possible alternatives. Providing additional runway capacity for the Bay Area should be discussed and decided by the entire region. For example, other options for providing additional Bay Area runway capacity could include air service development at other regional or military airports.

The master plan examined new taxiways to provide an additional connection between North Field and South Field (e.g., a new taxiway parallel to existing Taxiway B). Currently, Taxiway B can become congested with aircraft taxing northbound (e.g., a FedEx aircraft that landed on Runway 29 taxiing to the Metropolitan) versus other aircraft taxing southbound (e.g., a corporate jet complying with the Port’s voluntary noise abatement procedures, which asks that corporate jets (and large turboprops) depart on Runway 29 at South Field, instead of using one of the runways at North Field where they typically park). The Alameda representatives on the Stakeholder Advisory Committee were interested in studying this additional taxiway in order to keep access to South Field as convenient as possible for corporate jets (and large turboprops) so that they continue to comply with the Port’s voluntary noise abatement procedures (today, about 98% of these aircraft comply). Based on measured taxi distances and estimated taxi times, as well as the airfield simulation described above, it was demonstrated that a new taxiway parallel to Taxiway B on South Field (e.g., between Taxiways T and B2) would resolve most of the Taxiway B congestion and head-to-head taxi issues. Continuing this taxiway to North Field would not be required in the 2010 to 2012 timeframe.

In addition to taxiway and runway considerations, the master plan examined the need for new runway capacity in the long-term; others saw some potential aircraft noise reduction with the outboard runway options (south of existing Runway 11-29).

The master plan examined new taxiways to provide an additional connection between North Field and South Field (e.g., a new taxiway parallel to existing Taxiway B). Currently, Taxiway B can become congested with aircraft taxing northbound (e.g., a FedEx aircraft that landed on Runway 29 taxiing to the Metropolitan) versus other aircraft taxing southbound (e.g., a corporate jet complying with the Port’s voluntary noise abatement procedures, which asks that corporate jets (and large turboprops) depart on Runway 29 at South Field, instead of using one of the runways at North Field where they typically park). The Alameda representatives on the Stakeholder Advisory Committee were interested in studying this additional taxiway in order to keep access to South Field as convenient as possible for corporate jets (and large turboprops) so that they continue to comply with the Port’s voluntary noise abatement procedures (today, about 98% of these aircraft comply). Based on measured taxi distances and estimated taxi times, as well as the airfield simulation described above, it was demonstrated that a new taxiway parallel to Taxiway B on South Field (e.g., between Taxiways T and B2) would resolve most of the Taxiway B congestion and head-to-head taxi issues. Continuing this taxiway to North Field would not be required in the 2010 to 2012 timeframe.

Airline-Related Support Facilities

Airline-related support facilities include belly cargo, provisioning and catering, fuel load rack, ground service equipment (GSE) maintenance facility, GSE storage and GSE parking areas, ground runup enclosure (GRE), airport rescue and firefighting (ARFF) station, tritrunators, and fuel storage. Potential areas on the Airport for these types of facilities were evaluated. Many airline-related support facilities should be located close to the terminal complex.

After the Terminal 2 renovation / extension project is complete, there will be approximately 33 acres of apron dedicated to RON aircraft parking, of which 23 to 26 acres is anticipated to be required on any given night. In the 2010 to 2012 timeframe, it is estimated that between 23 and 46 acres (total) would be required. By 2025, it is estimated that between 33 and 68 acres (total) could be required (unconstrained). These estimates are not constrained by any assumptions about the availability (or lack of availability) of existing and/or future Airport facilities, such as terminal buildings, taxiways, and runways. That is, these estimates represent the “natural” amount of remote RON aircraft parking that would need to be accommodated at OAK, absent any constraints on the availability of terminal buildings, runway capacity, etc.

Airport Ground Access

The need for future airport ground access improvements was analyzed. Essentially, with the completion of the Airport Roadway Project, which rebuilt 98th Avenue and Airport Drive (up to Neil Armstrong Way) and the recent start of construction on the new terminal loop roadway and curbside project, the Airport’s primary roadway system is well situated to accommodate forecast airline passenger, air cargo, and general aviation ground access needs. Areas to accommodate future airline passenger and employee parking were also evaluated. Generally, airline passenger and employee parking should be located as close to the terminal complex as possible. However, the terminal area is already quite congested and will likely be more so in the future. Areas around the existing terminal complex should be considered for future airline passenger and employee parking (to the extent that they are available). The upland area of the Central Basin, south of Ron Cowan Parkway, near Harbor Bay Parkway, could be considered to meet additional demand for future airline passenger and employee parking because of this location’s good roadway access to/from the terminal complex and the availability of a large, upland area.
Environmental Considerations

Potential environmental opportunities and constraints associated with future growth at the Airport were evaluated, both in terms of footprint or site environmental considerations associated with new facilities (such as a potential new terminal building), and operational environmental considerations associated with increased aviation activity (i.e., more airline passengers, more air cargo weight, more flights, etc.). It is important to note that throughout the master planning process, Port staff considered environmental issues at a screening-level (identifying key environmental benefits and constraints). Because this master plan is a concept-level planning and feasibility study, it does not provide details on development plans, engineering feasibility, or environmental constraints that would be needed before the Port could decide whether to proceed with any particular project.

The environmental consideration that was studied in some detail in the master plan is aircraft noise. The aircraft noise analysis looked at both single aircraft overflight noise events. However, the Port anticipates a decrease in the number of operations of the noisiest aircraft, the Boeing 727, going from 16 daily operations in 2004 to an anticipated 6 daily operations in 2010, with only 2 departures at night (compared to 4 on average in 2004). This anticipated decrease is due to FedEx’s slow phase-out of its older and noisier Boeing 727 aircraft. Because of the reduction in Boeing 727 operations, especially at night, the forecast CNEL contours to the northwest of the Airport (adjacent to the City of Alameda) are smaller than the existing CNEL contours. Members of the Stakeholder Advisory Committee requested that the Port investigate community-requested environmental projects in the master plan. The Port and Stakeholder Advisory Committee studied a barrier to block noise from aircraft on the ground (taxi and take-off roll, except low-frequency noise) that affects residents in the Neptune Drive neighborhood in San Leandro. The noise barrier could be constructed on the Airport or in the back yards of the homes on the west side of Neptune Drive. Although such a noise barrier would provide some noise relief to residents along the west side of Neptune Drive (especially if it were to be constructed in their back yards), the residents indicated that they did not want a noise barrier constructed in their back yards, and it was determined that the best solution is to continue with the residential sound insulation program already underway in San Leandro, based on input from the Neptune Drive neighbors and the San Leandro members of the Stakeholder Advisory Committee.

The Alameda representatives on the Stakeholder Advisory Committee requested that the Port conduct a follow-on study to the master plan to investigate why some corporate jets (less than 2%) choose not to comply with the Port’s voluntary noise abatement procedures, which requests that they taxi to and depart from South Field instead of North Field (during west plan, except those that can depart on Runway 33).

Finally, both the Alameda and San Leandro representatives on the Stakeholder Advisory Committee requested that the Port, in association with these cities, conduct an Airport ground traffic study to determine the amount of traffic to/from the Airport, including trucks, that uses local streets in these cities.

Financial Plan

A financial plan was prepared to evaluate the feasibility of funding the projects recommended for further analysis in the master plan, including a potential third terminal (east of Taxiway B, north of existing Terminal 1, and south of Ron Cowan Parkway), a new high-speed exit taxiway (off Runway 29), and Runway 29 taxiway access improvements. The analysis assumed that Passenger Facility Charges (PFCs) and Airport Improvement Program (AIP) grants would be used to fund a majority of the costs associated with implementing these projects. PFCs would be bonded for 30 years, and there would be a small incremental increase in airline rates and charges. The basic idea is to keep the costs that the airlines pay at a reasonable level to keep the Port attractive to low-fare and other airlines. The financial plan suggests that these master plan projects are affordable, given certain assumptions in the analysis, which are subject to change in the future. Further, the financial plan does not consider Port-wide financial issues; it is focused solely on Airport capital projects and potential revenues. Closer to implementation of projects, the Port will need to conduct more thorough analyses on the financial feasibility of these and other Port projects from a Port-wide capital and funding perspective based on then updated financial information.

Land-Use Maps and Recommended Studies

Three land-use maps were prepared: (1) existing on-Airport land uses (e.g., airfield, passenger facilities, cargo, airline-related support, general aviation, aviation-related business, recreation, and undesignated uses), (2) near-term on-Airport land uses (2010 to 2012 timeframe), and (3) long-term on-Airport land uses (2025). These three graphics are the heart of the master plan. The primary new land-use designation in the 2010 to 2012 timeframe...
is a passenger facilities area east of Taxiway B, north of existing Terminal 1, and south of Ron Cowan Parkway. If a new terminal project is proposed and approved in this area, the Oakland Maintenance Center (OMC) site would be redeveloped to support the new terminal land-use area to the south by accommodating replacement air cargo facilities, potential airline provisioning and GSE maintenance facilities, and remain overnight (RON) aircraft parking and/or airline passenger / employee vehicle parking. At North Field, the new land uses are for general aviation aircraft parking ramps and/or hangars.

The primary new land-use designation in the 2025 time-frame is additional passenger facilities at South Field, mostly to accommodate additional airline passenger / employee vehicle parking and RON aircraft parking, and additional general aviation land-use designation at North Field. A new runway at South Field (parallel to Runway 11-29) and additional aircraft gates are not shown on the long-term land-use map (2025) because such a runway is not recommended for further study and development due to environmental and financial considerations.

Finally, it is recommended that Port staff and the Stakeholder Advisory Committee continue to work together on the following projects and studies:

- Continue to study a potential Runway 29 aircraft noise barrier, on-Airport, which would provide some aircraft noise reduction for the homes on the west side of Neptune Drive in the City of San Leandro under certain, limited conditions, or other methods to reduce the effects of aircraft noise in the community (including the City of Alameda), and continue to work with the City of San Leandro on their residential sound insulation program, which is currently underway.
- Conduct a study to investigate why some corporate jets (less than 2%) choose not to comply with the Port’s voluntary noise abatement procedures, which requests that they taxi to and depart from South Field instead of North Field (except those that can depart on Runway 33).
- Conduct an Airport ground traffic study (work with the cities of Alameda, San Leandro, and Oakland to develop a study to determine the amount of traffic to/from the Airport, including trucks, that uses local streets in these cities).
- Continue the Stakeholder Advisory Committee after the master plan, with a new name, so that the Port’s Planning and Development staff can continue to meet, annually or semi-annually, with community stakeholders and Airport users to provide updates on various projects and Airport activity, as well as receive input.
Chapter 1: Introduction and Background

"Oakland is setting an example to the cities of the country. You have here one of the finest airports I have seen... I hope that you will not forget that Oakland will continue to be in the future the guide of American aviation."

— Charles A. Lindbergh, September 18, 1927

1.1 Introduction

Section 1.1 outlines the goals and objectives of the master plan for Oakland International Airport (OAK or the Airport) and describes the process by which it was prepared.

1.1.1 Goals and Objectives

This master plan for OAK is a concept-level planning and feasibility study that identifies potential near-term projects (5-year timeframe) and provides long-term (20-year) general land-use guidance. It has been prepared in accordance with the Federal Aviation Administration (FAA) Advisory Circular (AC) No. 150/5070-6A, Airport Master Plans. This AC states that the goal of a master plan is "to provide guidelines for future airport development which will satisfy aviation demand in a financially feasible manner, while at the same time resolving the aviation, environmental and socioeconomic issues existing in the community" (Chapter 1, Section 3). The AC recognizes the need for flexibility in preparing master plans. "The information presented in this AC covers the planning requirements for all airports, regardless of size, complexity or role. However, the scope of study must be tailored to the individual airport, with the level of effort limited to its specific needs and problems. Based on an airport's specific needs, certain master planning elements may be emphasized while others will not be considered at all."

In addition to following the FAA AC, the master plan has been a vehicle for community participation in airport planning and the long-term future of the Airport. A central component of the master plan has been a series of meetings with a Stakeholder Advisory Committee, which consists of staff and community members from the surrounding cities (Alameda, Oakland, and San Leandro), San Leandro Unified School District, Alameda County, and Airport users, including fixed base operators, passenger and cargo airlines, the Port's Airline Liaison Office, and flight training/light general aviation aircraft operators. (Berkeley Keep Jets Over the Bay Committee was invited to appoint members to the Stakeholder Advisory Committee but did not.)

Finally, the master plan meets the requirements of various settlement agreements with the surrounding communities. It should be noted that the master plan for OAK does not (1) focus on detailed plans for individual Airport projects or facilities, (2) include every project that the Port might propose during the 20-year planning horizon, or (3) approve any specific projects (see Section 1.4).

1.1.2 Master Planning Process

Figure 1.1 illustrates the technical and community input process followed to prepare the OAK master plan. The technical process started with an inventory of existing conditions and forecasts of aviation activity. The forecasts were then used to develop requirements (e.g., number of aircraft gates required in a certain timeframe or area that should be allocated for a particular airport use). Based on the forecasts and requirements, various areas on the Airport were examined to determine if the potential use would be suitable for that area. A list of planning considerations was developed for each potential development area, highlighting operational, financial, and environmental opportunities and constraints. Environmental and financial considerations were then developed; finally, short-term (2010 to 2012) and long-term (2025) land-use plans were prepared.

As shown on Figure 1.1, the Stakeholder Advisory Committee participated throughout the preparation of the master plan technical work. Port staff (1) hosted two open houses/public meetings to present and discuss work on the master plan, (2) provided update briefings to the Aviation Committee of the Board of Port Commissioners at three different meetings and the staff reports were posted on the Airport website, (3) presented a summary of the master planning process and key findings to the Alameda, San Leandro, and Oakland city councils at regular or special meetings, and finally (4) presented a summary of the master planning process and key findings to the Regional Airport Planning Committee and the Alameda County Airport Land Use Commission.

1.1.3 Stakeholder Advisory Committee

As described in Sections 1.1.1 and 1.1.2, the central process for conducting the master plan has been a series of meetings with the Stakeholder Advisory Committee. The members of the Stakeholder Advisory Committee are listed in Appendix A, and the Stakeholder Advisory Committee meeting agendas and minutes are included in Appendix B. Port staff and consultants completed master plan technical analyses and then presented the analyses and results to the Stakeholder Advisory Committee. Committee members received an “insider’s look” at master plan technical analyses. Table 1.1 summarizes the Stakeholder Advisory Committee meeting topics and dates.

The Stakeholder Advisory Committee (1) advised Port staff and consultants on long-range high-level planning issues at OAK, (2) provided input on master plan technical issues and identified potential impacts, and (3) reported back to their respective appointing agency or organization to keep these groups informed on master plan issues and results. Each member of the Stakeholder Advisory Committee had formal representation in the formulation of the master plan and all members were
given the opportunity to participate in development and consideration of objectives, alternatives, evaluations, etc. Some members of the Stakeholder Advisory Committee performed independent technical work to verify master plan analyses and draw their own conclusions, including preparation of simulations, spreadsheet analyses, and use of outside consultants for peer review. Members of the Stakeholder Advisory Committee did not vote on particular projects or issues and were not asked to make any official decisions. However, Port staff agreed to document their concerns and issues in the master plan. This documentation occurs throughout the document, as appropriate, and Appendix C contains official comment letters, as well as comments received from the two open houses / public meetings on the master plan.

### 1.1.4 Port of Oakland Master Plan Team

The Port of Oakland is an "independent department" of the City of Oakland established under the City’s Charter. The exclusive control and management of the Port is vested in the Board of Port Commissioners. Per the Charter, Commissioners are nominated by the Mayor and appointed by the City Council. The Port of Oakland owns and operates OAK. Port staff responsible for managing and operating the Airport is part of the Port’s Aviation Division, which is one of three Port revenue divisions (the other two are Maritime and Commercial Real Estate).

This master plan was prepared by the Port of Oakland’s Aviation Planning and Development staff, with assistance from Port staff in other Aviation Division departments and the Engineering Division. Port staff was also assisted by specialty consultants for airfield simulation (ATAC Corporation and HNTB Corporation), aircraft noise analysis (Mestre Greve Associates and Brown-Buntin Associates), and graphics (Finger Design Associates).

### 1.2 History of Master Planning at OAK

Oakland Municipal Airport, the current OAK North Field, was dedicated in September 1927. From its opening through the 1930s, the Airport was the site for many historic aviation events. During World War II, OAK North Field served as the pacific base of the Naval Transport Service and the supply operations of the Army Air Forces. By the early 1950s, nine major airlines served OAK, also the site of a Naval Reserve Air Station. In 1953, over half a million airline passengers enplaned or deplaned at OAK, and a total of 190,000 aircraft movements were made by air carriers and other civilian and military aircraft. In July 1954, the Port published “Development Plan for the Metropolitan Oakland International Airport” (by Knappen-Tapperts-Abbett-McCarthy, Airport Consultants), outlining expansion plans and showing the proposed new South Field with a 10,000-foot-long runway for new jet aircraft. Reclamation work began in 1955, and construction of Runway 11-29 and Terminal 1 began in 1960. South Field was dedicated in September 1962.

In 1977, the Port prepared a master plan and environmental impact report (EIR). The EIR and new Airport Layout Plan (ALP) were approved by the Board of Port Commissioners in July 1977. In 1978, the Board adopted "Oakland Airport Master Plan: 1976-1986." This 10-year master plan examined a development plan for South Field air carrier facilities, and to a lesser degree, North Field general aviation facilities.

Due to rapid increases in general aviation activity in the late 1970s and early 1980s, a North Airport Master Plan was initiated by the Port to update and extend the analysis of general aviation expansion and development capabilities through 2000. Additionally, a supplemental EIR was prepared to study potential environmental impacts beyond those discussed in the 1977 master plan and EIR. The “Oakland North Airport Master Development Plan” (dated July 1984) and supplemental EIR were adopted by the Board of Port Commissioners in January 1985.

New planning efforts (by TRA Airport Consulting and P&D Aviation) were started in 1988 that culminated in the Airport Development Program (ADP) and related environmental documents, concluding in November 2001 when the Board of Port Commissioners certified a Final EIR, along with several addenda and a first supplemental EIR, and adopted a second supplemental EIR for the ADP projects. The ADP projects are best documented in the various ADP environmental review documents. Up until this master plan, the ADP has been serving as the Port’s planning guidance document. The Port committed to prepare this master plan with community participation as a result of various agreements settling litigation over the ADP environmental review documents.

<table>
<thead>
<tr>
<th>Stakeholder Advisory Committee Meeting Topic and Dates</th>
<th>Table 1.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Meeting Date(s)</td>
</tr>
<tr>
<td>Introductions, process, schedule, and inventory of existing conditions</td>
<td>June 10, 2004</td>
</tr>
<tr>
<td>Airline passenger forecasts and potential terminal development areas</td>
<td>August 19, 2004 and September 30, 2004</td>
</tr>
<tr>
<td>Air cargo forecasts and potential air cargo development areas</td>
<td>October 28, 2004</td>
</tr>
<tr>
<td>General aviation forecasts and potential general aviation development areas</td>
<td>December 9, 2004</td>
</tr>
<tr>
<td>Airfield issues</td>
<td>March 3, 2005 and March 31, 2005</td>
</tr>
<tr>
<td>Airline-related support facilities and ground access issues</td>
<td>April 21, 2005</td>
</tr>
<tr>
<td>Environmental and financial considerations</td>
<td>June 30, 2005</td>
</tr>
<tr>
<td>Land-use plan</td>
<td>August 11, 2005</td>
</tr>
<tr>
<td>Review master plan document</td>
<td>December 8, 2005</td>
</tr>
</tbody>
</table>
1.3 Organization of the Master Plan

The master plan is organized into the eight chapters as shown in Table 1.2.

In addition to the eight chapters, there are a number of appendices with useful information on the master plan. Appendices are referred to in relevant chapters and sections of the master plan as needed. Appendix D contains a glossary of acronyms used in this master plan, and Appendix E contains three staff reports to the Aviation Committee of the Board of Port Commissioners, updating them on the progress of the master plan. These reports provide a brief summary of progress on the master plan while it was being prepared.

1.4 Approval of the Master Plan

The Board of Port Commissioners approved this master plan as a planning and feasibility study for the future development of the Airport. It is important to note that this master plan is a concept-level planning and feasibility study, and it does not provide details on development plans, engineering feasibility, or environmental constraints that would be needed before the Port could decide whether to proceed with any particular project. For example, the Port would need to complete additional planning and engineering on a potential terminal concept before it could know whether it was going to be affordable and what the environmental effects might be, if any. As such, the Board of Port Commissioners has not proposed, approved, or funded any specific project or groups of projects when it approved this master plan. Rather, any project identified in the master plan would need to undergo more detailed planning, engineering and environmental review before it could proceed, including understanding how much it might cost, how it is going to be funded, and importantly, its environmental effects (in accordance with the California Environmental Quality Act and National Environmental Policy Act, as appropriate). Only then could a project or groups of related projects be approved by the Board and proceed into construction.
Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan presented many possible ideas and planning concepts. This graphic is conceptual in nature and the planning process only. It does not propose any particular course of action. It might represent a concept that was discarded, and must be interpreted in the context of the entire master plan document.
2.1 Background

OAK is located in the City of Oakland, about 6.5 statute miles southeast of downtown Oakland in Alameda County along San Francisco Bay. The Airport is 2,600 acres, including 327 acres of wetlands under jurisdiction of the U.S. Army Corps of Engineers. The surrounding cities include Alameda (to the northwest), Oakland (to the north), and San Leandro (to the southeast). Access to OAK is primarily by Interstate Highway 880, Hegenberger Road, and 98th Avenue to Airport Drive (to access South Field). Other major roadways serving OAK include Doolittle Drive / State Route 61, Harbor Bay Parkway, Ron Cowan Parkway, and Davis Street / State Route 61.

OAK is a primary commercial service airport with four runways: one primary air carrier runway at South Field (Runway 11-29) and three runways at North Field (Runway 9R-27L, Runway 9L-27R, and Runway 15-33). The Airport is served by several passenger and cargo airlines. In calendar year 2004, OAK accommodated approximately 14 million annual passengers (enplaning plus deplaning) and was the 33rd busiest in the U.S. in terms of total passengers, according to Airports Council International-North America. The Airport is served by several passenger and cargo airlines. In calendar year 2004, OAK accommodated approximately 14 million annual passengers (enplaning plus deplaning) and was the 33rd busiest in the U.S. in terms of total passengers, according to Airports Council International-North America. The Airport is served by several passenger and cargo airlines.

In calendar year 2004, OAK accommodated approximately 0.7 million annual tons of air cargo (freight plus mail) and was the 12th busiest in the United States in terms of cargo weight, according to Airport Council International-North America. The Airport is served by FedEx, the largest air cargo operator at OAK, handling over 80% of the air cargo in and out of the Airport (by weight, in calendar year 2004), as well as United Parcel Service (at almost 15% by weight in calendar year 2004), ABX Air / DHL, Ameriflight, as well as some smaller air cargo feeders.

2.2 Existing Land-Use Map

Figure 2.1 shows an existing land-use map of OAK. The colors on the map represent the types of aviation land use, which are summarized in Table 2.1.

The largest aviation land use at OAK is Airfield, which is approximately 1,078 acres. South Field, which is defined as the Airport area south of Ron Cowan Parkway, is dominated by Passenger Facilities (approximately 208 acres), including Terminals 1 and 2, and air cargo facilities (approximately 104 acres), the largest of which is the FedEx Metropolis (their west coast hub operation). North Field (the Airport area north of Ron Cowan Parkway) contains a variety of aviation land uses, the largest of which is general aviation (approximately 85 acres), including aircraft hangars, ramps, and two fixed base operators, KaiserAir and Business Jet Center. North Field also accommodates some air cargo facilities (approximately 30 acres), including ABX Air / DHL and Ameriflight.

2.3 Existing Airport Data

Figure 2.2 presents existing conditions data for OAK. It summarizes general Airport characteristics, Airport employment data, operational statistics, North Field and South Field land-use data, runway data, and instrument approach capabilities.

Of particular interest is the intensity of usage of the passenger terminal facilities at South Field (see right-most column in Figure 2.2). In June 2004, each of the existing 24 aircraft gates at OAK had, on average, 8.6 departures
per day, with over 10 departures per day on average for the 12 aircraft gates used by Southwest Airlines. This compares to just over 6 departures per gate per day (from 31 gates) at Mineta San José International Airport and just over 4 departures per gate per day (from 98 gates) at San Francisco International Airport. The national average is about 5.5 departures per gate per day. Although it is generally considered good management practice to maximize use of resources such as aircraft gates, the terminal facilities (Terminals 1 and 2) at OAK are generally overstressed and provide a poor level of service for airline passengers. Examples of poor level of service in Terminals 1 and 2 include crowded corridors, hold rooms, restrooms, and concessions.

A better measure to compare gate use at different airports is passengers per gate because airports can be served by different size aircraft (in terms of the number of seats per aircraft). Some types of aircraft can take longer to unload, load, and service, increasing the time the aircraft must be parked at the gate and decreasing the number of possible departures per gate per day. For example, San Francisco International Airport is a major international gateway served by many widebody aircraft, such as Boeing 747s. Although these widebody aircraft use the gate longer, they seat more airline passengers than the smaller narrowbody fleet (e.g., in the case of a Boeing 747, almost three times as many as a typical new Boeing 737, a typical narrowbody aircraft at OAK). In April 2004, OAK accommodated 49,618 passengers per gate on average (from 24 aircraft gates), and 58,727 passengers per gate from the 12 gates used by Southwest Airlines. This compares to slightly over 30,000 passengers per gate at Mineta San José International Airport and slightly over 28,000 passengers per gate at San Francisco International Airport for all of April 2004.

This concept of departures and passengers per gate and level of service will be important in Chapter 4, where the number of aircraft gates required to serve future airline passenger demand is discussed in detail.
Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.

March 2006

Existing Land-Use Map

Oakland International Airport
Master Plan

LEGEND

Field
Passenger Facilities
Cargo
Aviation-Related Support
General Aviation
Aviation-Related Business
Recreation
Undeveloped
Buildings
Runways
Taxiways
Roadways
Future Roadways
Land
Water
Wetlands
Bay Trail

Figure 2.1

Oakland International Airport
Master Plan

San Francisco Bay
San Leandro Bay

13
South Field

South Field has one runway (11/29), which provides service to larger commercial aircraft, including turbo-jet and turbo-fan aircraft, four-engine reciprocating powered aircraft and turbo-props over 17,000 pounds.

Passenger-Related Facilities (208 total acres)
- Passenger terminals (142,000 gross square feet, plus 127,000 gross square feet with the Terminal Expansion Program)
- Terminal 1 (16 gates) and Terminal 2 (8 gates)
- Parking: 7,800 public and 1,500 employee parking spaces totaling 73 acres
- Remote overnight aircraft parking (33 acres)

Status of Terminal Expansion Program*

<table>
<thead>
<tr>
<th>Project</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal 2</td>
<td>Remodel and Expansion (5 new gates) Under construction, completion in early 2007 (approx)</td>
</tr>
<tr>
<td>Terminal Roadways, Curbside, and Parking</td>
<td>Remodel and Expansion Under construction, completion in early 2008 (approx)</td>
</tr>
</tbody>
</table>

Air Cargo

Air Cargo

- South Field

Bay Area Air Cargo Market Share

Daily Gate Usage (June 2004 data, departures)

- 8.6 departures per gate per day (all 24 gates)
- 10.3 departures per day from 12 Southwest Airlines gates
- This compares to 6.3 departures per day from 31 gates at SJC
- This compares to 4.3 departures per day from 98 gates at SFO
- This compares to a national average of 5.5 departures per gate per day (Solomon Smith Barney 2003 Hub Fact Book)

Airport Setting

The original Oakland Airport was built in 1927 at North Field and is still in operation today serving smaller aircraft for air cargo, general aviation and corporate jet activities.

Commercial passenger and cargo jet aircraft operate from South Field, which opened in 1962.

General Characteristics
- Location: 6.5 statute miles south of the downtown area of Oakland in Alameda County along San Francisco Bay
- Elevation: 9 feet above mean sea level at the Airport Reference Point (Federal Aviation Administration)
- Size: Approximately 2,600 acres (including 327 acres of wetlands under jurisdiction of the U.S. Army Corps of Engineers)
- Employment: Over 10,000 air-related employees on-site, 25% are cargo-related (Bay Area Economic Forum, 1999 data)

Aviation-Related Employees On-Site

<table>
<thead>
<tr>
<th>Location of Residence</th>
<th>Percent of On-Site Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda County</td>
<td>52%</td>
</tr>
<tr>
<td>City of Alameda</td>
<td>1%</td>
</tr>
<tr>
<td>City of Oakland</td>
<td>10%</td>
</tr>
<tr>
<td>City of San Leandro</td>
<td>6%</td>
</tr>
</tbody>
</table>

Note: All data provided by the Port of Oakland unless otherwise noted.

Footnotes
1. Square footage does not include Terminal 2 expansion. Upon completion there will be a total of 11 gates at Terminal 2 (see additional 16 gates noted).
2. Upon completion of the Terminal Roadways, Curbside, and Parking Expansion and Renovation, there will be 4,691 public and 1,126 employee parking spaces totaling 79 acres.

Source: Bay Area Economic Forum, 1999 data

Airline-Related Business/Support

- Rental car facilities
- Cargo Facilities and Support (30 total acres)
- AXB Air/DHL, U.S. Postal Service, Ameriflight
- Airline-Related Business/Support (10 total acres)
- Aircraft maintenance
- General Aviation (85 total acres)
- Fixed Base Operators, flight training, charter, and corporate aviation
- Tiedowns (102), hangars (175) (Port inventory in 1997)
- Aviation-Related Business (45 total acres)
- Aircraft engine testing and repair, Port facilities (e.g. facilities maintenance)
- Enplanements (173 total acres)
- Golf course, soccer fields
- Airside/Airfield Facilities
- Runway 15/33 (75' x 3,372')
- Runway 9R/27L (150' x 6,212')
- Runway 9L/27R (150' x 6,545')
- Parallel Runways are 1,000' apart (centerline to centerline)
- Helicoper pads
- Navigational and Landing Aids
- Runway 27R Instrument Landing System
- Runway 9R DME approach
- Runway 27L DME approach
- Oakland VOR (regional navigation for Northern California)
3.1 Introduction to Master Plan Forecasting

3.1.1 Background

The cornerstone of a master plan is the master plan forecasts of aviation activity. Forecasts of unconstrained aviation activity, including the number of airline passengers, passenger airline operations (an operation is a take-off or landing), air cargo weight, cargo airline operations, general aviation operations, and based general aviation aircraft, are used to inform the need for future airport facilities, such as airline passenger terminals and aprons, air cargo buildings and aprons, general aviation hangars, taxiways, runways, etc. For example, an estimate of the future number of airline passengers and passenger airline operations can be used to assess the need and timing for future terminal facilities, including the required amount of future aircraft gates and the required amount of land area for a new or expanded terminal building. An estimate of the future number of aircraft operations (airline passenger, air cargo, and general aviation) can be used to assess the taxiway and runway system and identify the need and timing for new taxiways and runways.

3.1.2 Planning Horizon, Planning Activity Level (PAL), and Planning Day

The basic concept of forecasting is to analyze past trends and project them forward to the planning horizon (i.e., the timeframe that is being studied). The Port and surrounding communities agreed to conduct a 20-year master plan; therefore the long-term planning horizon for this master plan is 2025 (or 2005, plus 20 years). The near-term planning horizon is the 2010 to 2012 timeframe. Because the near-term future is inherently more certain than the long-term future, the forecasts for the near-term planning horizon are more detailed than those for the long-term planning horizon. This approach is consistent with FAA AC No. 150/5070-6A.

More important than specific timeframes is the concept of planning activity level (PAL). Future airport development should be tied to activity warranting that particular level of development, not specific years. Exact years are less important than tracking the actual passenger traffic, air cargo weight, aircraft operations, etc. For example, if airline passenger traffic does not grow as quickly as anticipated, then the demand for additional aircraft gates would occur later. Conversely, if the actual passenger traffic grows more quickly than forecast, then the demand for additional gates will happen sooner.

For a given planning horizon or PAL, it is useful to look at forecast activity on a specific planning day, usually the average annual day (AAD, or the total annual activity divided by 365 days per year) or the average day of the peak month (ADPM, or the activity in the peak month divided by 30 or 31 days per month). The planning day forecast is useful because it allows for a more detailed look at facility requirements (compared to looking at facility requirements based on annual activity levels), and in the case of ADPM, can account for peaking characteristics that would be lost if annual or AAD activity levels were used alone. For example, in the case of airline passengers, future terminal buildings (i.e., the number of aircraft gates) should be sized to reasonably accommodate the forecast passenger activity for the ADPM, and not an annual forecast or even the AAD, because the resulting facility would generally be too small and might not provide an adequate level of service during busy periods experienced during the peak month.

3.1.3 Accuracy of Forecasting

Forecasts of aviation activity are important for near-term and long-term planning; however, forecasts are almost always wrong, especially for the long-term future. In other words, the actual number of passengers realized in a particular year rarely ever matches the forecast number of passengers for that year exactly. Differences between what was predicted to occur and what actually occurred usually happen because of trend-breakers. Example trend-breakers include airline deregulation, the Gulf War, September 11, 2001, jet fuel availability and prices, SARS, economic downturns, low-fare carrier competition, new types of airplanes, etc. Because of this reality, airport planners must focus on providing plans, programs, and projects that are flexible and workable for a range of possible future conditions.(1)

3.1.4 Master Plan Forecasting Process

The forecasts for this master plan were prepared in accordance with the recommendations in FAA AC No. 150/5070-6A (Chapter 5, Aviation Forecasts). Figure 3.1 summarizes the forecasting process (and forecasts) for each of the three aviation activity categories: (1) Airline Passengers / Passenger Airline Operations (top row of Figure 3.1 and Section 3.2 below), (2) Air Cargo Weight / Cargo Airline Operations (middle row of Figure 3.1 and Section 3.3 below), and (3) General Aviation / Military Operations and Based General Aviation Aircraft (bottom row of Figure 3.1 and Section 3.4 below). In each row, starting assumptions are summarized, calculations and brief explanations are presented, and forecast activity is shown. Also, each row contains a "What is this data used for?" box, which provides summary bullets of how the forecast activity is used in following master plan analyses. The following three sections provide more detail on how the master plan activity forecasts were derived. Section 3.5 summarizes the forecasts.

3.2 Airline Passengers and Passenger Airline Operations

The basic steps for forecasting the number of airline passengers and passenger airline operations are as follows:

1. Estimate the number of annual airline passengers in 2010 and 2025.
2. Determine how many annual passengers fly on the planning day, in this case, the average day of the peak month (ADPM).
3. For 2010, estimate the future aircraft fleet (i.e., types of airplanes by airline serving OAK).
4. For 2010, put the ADPM passengers on the fleet of airplanes, up to a maximum load factor (recognizing that all airplanes departing / arriving at the Airport will not be 100% full) and determine the number of airplanes by type required to accommodate the ADPM passengers.
5. For 2010, adjust for through passengers (passengers that arrive at OAK, do not get off the airplane, and depart to the next destination), and
6. For 2010, put the required number of airplanes on a flight schedule (by airline, assuming an airline market share scenario).

Because the distant future (20 years out) is so uncertain (as described above), only basic unconstrained airline passenger forecasts are estimated for 2025 (to the ADPM level); however, the number of passenger airline operations and a detailed flight schedule are not prepared for 2025.

3.2.1 Million Annual Passengers (MAP)

Figure 3.2 shows historic and forecast number of million annual passengers (MAP) for OAK. The blue line shows historic data from 1976 through 2004. In 2004, OAK served just over 14 MAP. From 1976 to 2004, the number of passengers using OAK has grown approximately 6.9% annually, on average. The dark purple line shows the future number of airline passengers if this trend continued through 2025.

The yellow line on Figure 3.2 shows the forecast number of annual passengers prepared for the ADP environmental review documents (the solid yellow line is the actual forecast; the dashed yellow line is the trend continued past the last forecast year to 2025).

The red line on Figure 3.2 shows the FAA’s 2005 Terminal Area Forecast or TAF (the solid red line is the actual forecast; the dashed red line is the trend continued past the last forecast year to 2025). The FAA TAF is a nationwide “top down” forecast of annual airline passengers. The FAA forecasts the national growth in airline passengers, and then allocates the passengers to various terminal areas and airports, including OAK. The FAA uses the TAF primarily to estimate manpower requirements and workload for various air traffic control facilities, such as the OAK air traffic control towers.

The orange line on Figure 3.2 shows the 2000 Regional Airport System Plan (RASP) forecasts. The 2000 RASP forecasts were prepared by the Regional Airport Planning Committee (RAPC), comprised of members of the Metropolitan Transportation Commission (MTC), Association of Bay Area Governments (ABAG), San Francisco Bay Conservation and Development Commission (BCDC), and representatives of the three Bay Area air carrier airports (OAK, San Francisco, and Mineta San José international airports). Again, the solid orange line is the actual forecast; the dashed orange line is the trend continued past the last forecast year to 2025. The RASP is a “bottom up” forecast for each Bay Area airport. That is, to prepare the RASP forecasts, RAPC estimated the natural catchment area for each Bay Area airport, the types of airline passenger service expected at each Bay Area airport (e.g., primarily domestic vs. international service, primarily short-haul vs. long-haul service, etc.), and existing and new air service markets (destination cities) from each Bay Area airport. Although the RASP forecasts were prepared before the events of September 11, 2001, they are still reasonably reflective of future trends at OAK because airline passenger traffic at OAK recovered quickly after September 11, 2001 (in fact, by April 2002), and continued prior growth trends.

Finally, the light purple line on Figure 3.2 shows the short-term forecast prepared by the Port’s Aviation Marketing and Communications Department staff. Based primarily on the FAA TAF and RASP forecasts, the master plan forecasts approximately 18 MAP in 2010 and 30 MAP in 2025 (unconstrained). The 6.9% annual growth trend — the purple line on Figure 3.2 — and the ADP environmental document trend — the yellow line on Figure 3.2 — represent an extremely aggressive growth in the number of airline passengers compared to the recent trends, are unlikely to materialize, and are not used as a basis for the master plan forecasts, except for reference.) The master plan forecasts represent a 4.2% average annual growth rate from 2004 through 2010, and a 3.5% average annual growth rate from 2010 through 2025. These forecasts are not constrained by any assumptions about the availability (or lack of availability) of existing and/or future Airport facilities, such as terminal buildings, taxiways, and runways. That is, these forecasts represent the “natural” amount of airline passengers that would need to be accommodated at OAK, absent any constraints on the availability of terminal buildings, runway capacity, etc. The master plan forecasts (18 MAP in 2010 and 30 MAP in 2025) are generally consistent with the 2005 FAA TAF (a “top down” forecast) and the 2000 RASP forecasts (a “bottom up” forecast). Note that these forecasts are rounded to the nearest whole MAP. As described in Section 3.1.3, the actual number of airline passengers in 2010 will not be exactly 18 MAP (and there will not be exactly 30 MAP.
A high-level airline passenger market analysis is presented in Appendix F.

### 3.2.2 Average Day Peak Month (ADPM) Passengers

The next step in the airline passenger forecasting process is to estimate the number of passengers expected on the average day of the peak month (ADPM), assuming the annual passengers described in Section 3.2.1. The planning day (in this case ADPM) forecasts are useful for evaluating existing facilities and estimating future requirements, which typically cannot be done with any precision using annual passenger forecasts.

The first step in estimating ADPM passengers is to determine the peak month and how many of the annual airline passengers typically fly in the peak month. Figure 3.3 shows the number of airline passengers by month for each year from 1995 through 2004. The graph shows that in each year, August is the peak month (i.e., more passengers fly through OAK in August than any other month). The pattern of monthly passenger variation has remained relatively constant over the 10 years shown on Figure 3.3, with each month of each year generally having more passengers than the previous year. A notable exception is September 2001, which had fewer passengers than September 1995 due to the events of September 11, 2001 (the Airport was closed for several days, and many people canceled their regular travel plans after the events of September 11, 2001). Therefore, August is considered the peak month for analyzing airline passengers and passenger airline operations in the master plan.

Figure 3.4 plots the percentage of annual airline passengers for each year from 1994 through 2004 for each month of the year. Historically, approximately 9.7% of the annual airline passengers fly in August. This trend is slightly off in 2001 and 2002 due to the events of September 11, 2001. Because relatively few airline passengers flew in September 2001, the other months of 2001, including August, had slightly more passengers in terms of percent of annual passengers. Further, airline passenger traffic did not recover until April 2002 at OAK; therefore, the other months of 2002, including August, had slightly more passengers in terms of percent of annual passengers. The 9.7% trend continued in 2003 and 2004. Therefore, for the master plan, August will be the peak month, with 9.7% of the annual number of airline passengers.

Multiplying the number of forecast annual passengers in 2010 (18 MAP), 2012 (20 MAP), and 2025 (30 MAP) by 9.7% yields peak month (August) passengers for these years (unconstrained). Dividing the peak month (August) passengers by 31 days in August yields the number of ADPM passengers (unconstrained).

### Existing and Forecast Airline Passengers (Unconstrained)

<table>
<thead>
<tr>
<th>Existing and Forecast Airline Passengers (Unconstrained)</th>
<th>Table 3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Peak Month (August) Passengers</strong></td>
<td><strong>ADPM Passengers</strong></td>
</tr>
<tr>
<td>MAP / Year (Approximate)</td>
<td></td>
</tr>
<tr>
<td>14 MAP / 2004</td>
<td>1,356,100</td>
</tr>
<tr>
<td>18 MAP / 2010</td>
<td>1,737,457</td>
</tr>
<tr>
<td>20 MAP / 2012</td>
<td>1,957,903</td>
</tr>
<tr>
<td>30 MAP / 2025</td>
<td>2,895,761</td>
</tr>
</tbody>
</table>

ADPM — Average Day Peak Month; MAP — Million Annual Passengers

Existing and Forecast Airline Passengers (Unconstrained) Table 3.1

For the purposes of planning for future terminal facility needs, the master plan also assumes 20 MAP in about 2012. This assumption is consistent with the 2005 FAA TAF and 2000 RASP forecasts (see Figure 3.2). Realistically, the Port could not plan, design, and construct future terminal facilities by 2010, so a slightly more distant year and PAL is required. To summarize, the master plan forecasts about 18 to 20 MAP in 2010 to 2012.
of aircraft operations and flight schedules. Figure 3.5 shows average monthly load factors for all airlines serving OAK for 2001 through 2004. Over all months of the year, the average load factor for all airlines serving OAK is approximately 73% (which was the load factor used in the ADP environmental review documents). However, the average load factor for August, which is the peak month, is slightly higher at about 80%. The master plan assumes that the average load factor for all airlines is 80% for the ADPM.

The next step in the forecasting process is to adjust for through airline passengers. Through airline passengers are passengers that fly into OAK, stay on the airplane, and depart after the airplane boards new passengers. These passengers do not get off the airplane. The through airline passenger does not want to fly to OAK, but must do so to get to another destination. In essence, an airline with through passengers must fly more seats in and out of OAK than would otherwise be required to accommodate these passengers to other destinations. Although this is a minor consideration at OAK (i.e., it could easily be overlooked without affecting the overall forecast results), it is analyzed here for thoroughness. Figure 3.6 illustrates the number of one-way through passengers by month for each year from 1996 through 2004. Generally, the graph shows that one-way through passengers as a percent of total passengers has also been declining. For the master plan, it is assumed that one-way through passengers are 2% of the total passengers. Therefore, on the ADPM in 2010, there are approximately 2,242 two-way (in plus out) through passengers at OAK (or 2 x 2% of 56,047 airline passengers).

3.2.4 ADPM Aircraft Fleet, Flights (Operations), and Flight Schedule

The next step in the forecasting process is to determine the number and type of airplanes required to serve the forecast number of airline passengers. The number of airplanes translates to operations (take-offs and landings), and is used to estimate the number of required airport gates and evaluate the airfield (e.g., taxiway and runway congestion).

A detailed 17.2 MAP flight schedule from the ADP environmental review documents was used as a starting point. A detailed flight schedule contains the scheduled arrival / departure time, aircraft type, airline name, and number of seats per aircraft for each arrival / departure (flight) at OAK on the planning day (ADPM). This flight schedule was developed for the ADP environmental review documents based on considerable research about new flights and markets expected at OAK. The only change that was made to the base 17.2 MAP flight schedule was the substitution of Boeing 737-700 aircraft for Boeing 737-800 aircraft assumed in the 17.2 MAP flight schedule for Southwest Airlines. When the 17.2 MAP flight schedule was developed, the Port and its consultants thought that Southwest Airlines was going to purchase Boeing 737-800 aircraft (which has more seats than the Boeing 737-700 aircraft). These purchases have not occurred; thus, for the purposes of this master plan, it is assumed that Southwest Airlines is going to continue to purchase and fly Boeing 737-700 aircraft.

Also, the names of the airlines in the 17.2 MAP schedule have been generalized (Airline A, Airline B, etc.), except Southwest Airlines. The airline names have been generalized because the forecasts are not airline specific. That is, the forecasts assume an approximate aircraft fleet with 10 airlines, including Southwest Airlines as the dominate airline serving OAK. Using this slightly modified flight schedule as a starting point, the next step is to load the 18 MAP ADPM passengers onto the airplanes in the flight schedule and compute the load factor. The resulting load factor is 92.5%, which is greater than the 80% target load factor, as would be expected for loading 18 MAP ADPM passengers onto a flight schedule intended to accommodate only 17.2 MAP. The next step is to calculate the required number of seats for 18 MAP ADPM at an 80% load factor and compare it to the available seats in the modified 17.2 MAP schedule. This analysis suggests that 9,439 seats must be added to the 17.2 MAP flight schedule to accommodate 18 MAP at the 80% load factor target. The required number of new seats is then distributed to the airlines according to their existing market share at OAK. Seats must be added to each airline’s fleet in whole airplane units and in accordance with airplane fleet preferences of each airline.

The final step is to summarize the new 18 MAP flight schedule. Table 3.2 shows the daily flights by aircraft type for each airline for the 18 MAP flight schedule. As shown, the master plan forecasts approximately 542 flights (take-offs and landings, or operations) on the ADPM (18 MAP in about 2010). This compares to 430 flights in August 2004 (or a 3.9% average annual increase). The Boeing 737-series aircraft continues to be the workhorse of the airline passenger fleet at OAK with about 81% of the operations (flights).

The calculations summarized above are contained in detail in Appendix G. Also, the full (detailed) 18 MAP ADPM airline passenger flight schedule is contained in Appendix H. The flight schedule shows the actual arrival and departure time by airline and aircraft type. Appendix H also contains the flight schedule for the cargo airlines and general aviation aircraft.
3.3 Air Cargo Weight and Cargo Airline Operations

The air cargo forecasting process differs from the airline passenger forecasting process because there is less data available for air cargo (much of the data is proprietary) and because the number of flights cannot predict the amount of air cargo weight carried (or visa versa).

Almost all of the air cargo weight at OAK is carried on FedEx and UPS aircraft, while smaller air cargo carriers, such as Amerijet, contribute a significant number of cargo flights but carry a small proportion of the weight.

Forecasting air cargo activity (by weight) and air cargo operations was based on the following methodology:

1. Establish 2003 air cargo activity by weight, number of operations, and fleet mix,
2. Determine potential air cargo market options for near-term and long-term growth at OAK,
3. Estimate growth potential for air cargo at OAK relative to the Bay Area air cargo market considering historical growth rates and maturity of the OAK air cargo market to identify the appropriate growth option for the master plan,
4. Develop current and 2010 Average Annual Day (AAD) air cargo schedules, based on air cargo flight schedules prepared for previously developed environmental studies, and
5. Interpolate between the current and 2010 AAD air cargo schedule to correspond to 2010 air cargo activity levels and fleet mix established for the master plan.

Air cargo activity by weight for 2025 is also estimated; however, due to the uncertainty of long-term forecasts, an air cargo flight schedule was only prepared for 2010.

3.3.1 Million Annual Tons (MAT)

Figure 3.8 shows air cargo activity in million annual tons (MAT) for Bay Area airports. Air cargo activity for OAK in 2003 was approximately 700,000 tons (or 0.7 MAT); it was approximately 800,000 tons (0.8 MAT) in 2010. The figure includes historical air cargo activity (by weight) for San Francisco and Mineta San Jose international airports, as well as a cumulative total for air cargo activity at the three major Bay Area airports.

Future air cargo growth projections are shown on the figure using dashed lines. The RASP growth rate of 4.98% for the Bay Area is shown using a thin blue dashed line. The historical growth rate since 1990 of 3.59% for the Bay Area is shown using a thick blue dashed line. Three future growth projections for OAK are shown using purple lines on the figure as well: a high annual growth rate of 5.14% is depicted using a thin line, the medium annual growth rate of 4.52% using a medium thickness line, and the low annual growth rate of 3.59% using a thick line. All three air cargo growth forecasts are significantly lower than those presented in the ADP environmental review documents or by RAPC. The OAK growth projections are presented in greater detail on subsequent figures.

The OAK air cargo growth projection from the ADP environmental review documents, shown with an orange dashed line on Figure 3.8, begins in 1997 and increases 7.84% annually to approximately 2.2 MAT in 2010. The RASP growth projection established in 1998 for OAK, shown with a yellow dashed line, increases at 4.52% annually to approximately 2.1 MAT in 2020. The ADP environmental review documents and RASP growth rates were based on the rapid growth experienced in air cargo at OAK from 1990 through 1998, neither of which accounted for maturing of the domestic air cargo market in the Bay Area that resulted in a slight reduction in activity from 1998 through 2004.

Due to the reduction in air cargo activity at OAK since 1998, the ADP environmental review documents and RASP growth projections no longer correlate to air cargo conditions at OAK.

The OAK air cargo forecast attempts to remain somewhere in the middle of inevitable fluctuations in activity. One reason cargo has dropped and stabilized at the present level (aside from the Silicon Valley dot

### Table 3.2

<table>
<thead>
<tr>
<th>Airline</th>
<th>Airbus A319/320</th>
<th>Boeing 737-Series</th>
<th>Boeing 757-Series</th>
<th>Boeing 747-Series</th>
<th>Regional Jets</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airline A</td>
<td>0</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>10</td>
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<tr>
<td>Airline B</td>
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<td>68</td>
<td>0</td>
<td>0</td>
<td>10</td>
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<tr>
<td>Airline D</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Airline E</td>
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<td>0</td>
<td>0</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>Airline F</td>
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<td>0</td>
<td>0</td>
<td>26</td>
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</tr>
<tr>
<td>Airline G</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Airline H</td>
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<td>2</td>
<td>0</td>
<td>2</td>
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<td>10</td>
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<tr>
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<td>8</td>
<td>4</td>
<td>0</td>
<td>42</td>
<td></td>
</tr>
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<td>Southwest Airline</td>
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<td>328</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>328</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>440</td>
<td>8</td>
<td>2</td>
<td>32</td>
<td>542</td>
</tr>
</tbody>
</table>

MAP = Million Annual Passengers
... growth has matured and reached a plateau. Also, approximately half of the Bay Area air cargo by weight moves through OAK, which limits the opportunity to further increase market share by capturing market share from other Bay Area airports. Moreover, the Port does not intend to pursue an aggressive air cargo marketing strategy (including construction of speculative air cargo facilities) to encourage new, aggressive growth in air cargo activity at OAK. Therefore, future OAK air cargo activity is projected to follow the low growth forecast.

Figure 3.9 shows the low growth forecast of 3.59% annual growth in air cargo weight at OAK which reflects the historical average annual growth in air cargo weight for the Bay Area from 1990 through the present. Forecast activity for the two major carriers, FedEx and UPS, are depicted using orange and blue lines respectively. As shown on the figure, OAK activity is closely tied to projections of future FedEx activity, which comprises approximately 80% of the OAK air cargo market (by weight). Using the low growth forecast, OAK air cargo (by weight) projects to 0.9 MAT in 2010 and 1.5 MAT in 2025.

Two other growth projections considered for OAK, identified as medium and high forecasts, are presented on separate figures. Both figures show the forecast activity (by weight) for major air cargo carriers at OAK, as well as the total for the Airport. Figure 3.10 shows the medium growth forecast that reflects the RAPC growth rate (4.52% annual growth in air cargo weight), starting from the current activity level. Using the medium growth forecast, OAK air cargo activity (by weight) projects to 0.95 MAT in 2010 and 1.8 MAT in 2025. Figure 3.11 shows the high growth forecast, 5.14% annual growth in air cargo weight, which was developed to show the growth rate that would be necessary to reach by 2025 the weight level that was projected in the ADP environmental review documents for 2010 (2.1 MAT). At 2010 using the high growth forecast, OAK air cargo activity (by weight) projects to 1.0 MAT. The medium and high forecasts might be achievable if the Port were to pursue an aggressive air cargo marketing strategy and construct a significant amount of new air cargo facilities, which is not recommended as described above.

3.3.2 Annual Air Cargo Operations

Annual air cargo operations from 1999 through June 2003 at OAK for the main carrier runway at South Field are shown on Figure 3.12. Consistent with air cargo activity by weight, FedEx (shown with an orange line on the figure) comprises approximately 80% of the operations. The decline in total operations at South Field is a result of a number of air cargo carriers that have stopped operations at OAK, primarily U.S. mail flights (U.S. mail is now carried on FedEx aircraft). The air cargo data presented on Figure 3.12 comes from the Port's landing reports.

Annual air cargo operations from 1999 through June 2003 at OAK for North Field, recorded by the Port's Airport Noise and Operations Monitoring System, are shown on Figure 3.13. North Field tends to handle most of the air cargo feeder aircraft, with the number of operations closely tied to Ameriflight, which comprises approximately 85% of the activity. In 2000, the annual number of flights (operations) was approximately 20,000; in 2003, the annual number of flights had dropped to approximately 16,000 (a 20% decrease).

3.3.3 Average Annual Day (AAD) Cargo Activity

Air cargo flight schedules developed for the master plan and from the ADP environmental review documents depict average annual day (AAD) activity. Use of average day peak month (ADPM) activity, as used for flight schedules for airline passengers, would misrepresent typical air cargo activity. Unlike airline passenger activity, air cargo volume is fairly constant from month-to-month throughout the year, with the exception of December (due to end-of-year holiday shipping activity). Most December activity is handled by expansion onto the ramp and by using larger aircraft. Therefore, it is generally unnecessary to plan cargo facilities to accommodate a single month of heavy activity. Due to the heavy activity during December and relatively constant air cargo activity throughout the year, the AAD air cargo flight schedule represents activity that is slightly busier than the average for non-December months.

3.3.4 Air Cargo Flight Schedule

The air cargo flight schedule is used with the airline passenger flight schedule and estimated general aviation operations to evaluate the airfield (e.g., taxiway and runway congestion).

The 2000 0.8 MAT air cargo flight schedule and fleet mix developed for the ADP environmental review documents were used as a starting point to determine the number of aircraft arrivals and departures by individual air cargo airlines. This flight schedule was then revised to address a decrease in air cargo flight activity observed between 2000 and 2003 at North and South Fields. The total number of flights (operations) decreased from 164 to 156, corresponding to a small air cargo weight decrease from 0.8 to 0.7 MAT. The fleet mix in the 2000 0.8 MAT schedule was also adjusted to correspond to aircraft observed in 2003, as FedEx began to incorporate more Airbus aircraft into their OAK fleet.

The ADP environmental review documents also discussed a 2010 1.4 MAT flight schedule with 180 total flights, with the majority of the increase comprised of small turboprop and small twin-engine aircraft on North Field.
Table 3.3 and Table 3.4 present a summary of the master plan 0.9 MAT flight schedule for OAK, which is an interpolation for flights between the 2003 flight schedule (for 0.7 MAT), and the 2010 1.4 MAT flight schedule from the ADP environmental review documents. By 2010, air cargo airlines are assumed to have completed their conversion to the fleet mix assumed for the 2010 ADP environmental review documents flight schedule. The air cargo master plan flight schedule for 2010 has 102 flights on South Field and 62 on North Field, the same number of total flights (164) as the 2000 ADP environmental review documents flight schedule. Most of the changes in aircraft type by 2010 will occur in the FedEx fleet, with a majority of Boeing 727 and DC-10s replaced by Airbus 300 and Airbus 310 aircraft. The OAK master plan flight schedule for 2010 includes two nighttime Boeing 727 aircraft departures (i.e., of the six total operations shown in Table 3.3, two are nighttime departures). The calculations summarized above are contained in detail in Appendix G, and the detailed air cargo flight schedule is contained in Appendix H.

### 3.4 General Aviation / Military Operations and Based General Aviation Aircraft

This section provides an overview of general aviation, forecasts the number of general aviation operations and aircraft based at OAK, and discusses military operations at OAK.

#### 3.4.1 Overview of General Aviation

General aviation operations (take-offs and landings) are all operations that are not by passenger airlines, cargo airlines, or the military. General aviation aircraft range from corporate jets to small single-engine, two-seat training aircraft. According to the General Aviation Manufacturers Association (GAMA), general aviation aircraft are used for access to remote locations, aerial applications (i.e., crop dusting), business travel, emergency medical evacuation, firefighting, flight training, law enforcement, border patrols, news reporting, pipeline and power line inspection, personal or recreational travel, search and rescue operations, sightseeing or air tours, traffic reports, and weather reporting / storm tracking.
According to GAMA, over 160 million annual passen-
gers are carried on general aviation aircraft including
helicopters, single-engine airplanes, mid-size turbo-
props, and large intercontinental corporate jets. General
aviation is relied on exclusively by more than 5,000
communities for their air transportation needs
(compared to scheduled airlines, which serve about
500 communities). Nearly 70% of the hours flown by
general aviation are for business purposes.

The next two sections of this chapter present forecasts
for general aviation operations and based general
aviation aircraft at OAK. Military aircraft operations
are then discussed.

3.4.2 General Aviation Operations

Figure 3.1 (bottom row) summarizes the general avia-
tion forecasting process. Figure 3.14 shows historic and
forecast number of general aviation operations from
1976 through 2025. The purple line shows the FAA’s TAF
data for general aviation in the 2000 RASP. The
solid blue line shows actual general aviation opera-
tions counts maintained by the Port through its
Airport Noise and Operations Management System
(ANOMS). The Port data (blue line) is less than (below)
the FAA TAF data (purple line) because in some cases,
the FAA counts small cargo aircraft operations as
general aviation operations. Further, in some cases
the FAA data is estimated (not actually counted) by
the air traffic control tower personnel. The Port’s
ANOMS data is more accurate because it is derived
from air traffic control radar data and excludes all
passenger and cargo airline operations. Based on the
Port’s ANOMS data, there were less than 150,000
general aviation operations in 2004, or less than 410
operations each day, on average. The dashed blue line
on Figure 3.14 shows the forecast number of general
aviation operations for the master plan (the basis for
this forecast is discussed in the following paragraphs).

Figure 3.15 shows the same solid and dashed blue lines
shown on Figure 3.14 (ANOMS actual and forecast
general aviation operations data). The other lines on
Figure 3.15 show the number of operations by four
types of general aviation aircraft: piston, helicopter, jet,
and turboprop (i.e., the sum, or total, of the operations
by type of aircraft is shown with the solid and dashed
blue lines). Piston aircraft are powered by one or two
piston engines (similar to car engines) that spin a
propeller; these aircraft typically seat between two and
six passengers, including the pilots. For the purposes
of the master plan, piston aircraft include blimps, which
are typically powered by two piston engines, and motor
gliders, which are typically powered by one small piston
engine. There are two types of piston aircraft operations:
a normal operation (which is a take-off or landing) and a
touch and go operation, which is a landing followed by
an immediate take-off (for a total of two operations).
Touch and go operations are typically used in flight
training. Turboprop aircraft are powered by one or two
jet engines that spin a propeller; these aircraft typically
seat between six and ten passengers, including the
pilots. Jet aircraft are powered by jet engines (including
turbofan jet engines) and include very light jets or
micro-jets (which seat between four and six passengers,
including the pilots), as well as corporate jets and large
corporate jets, such as Boeing 727s or 737s (the number
of seats varies widely on corporate jets, depending on
seating and amenity configurations).

As shown on Figure 3.15, it is anticipated that the
number of piston aircraft operations will continue to
decrease at 1% each year (dashed purple line).
These operations are split almost evenly between
normal operations (dashed red line) and touch and
go operations (dashed light purple line).

The dashed green line shows the anticipated number
of helicopter operations. Prior to 2001, the Port had a
significant number of helicopter operations (over
30,000 annual operations) due to a flight training
school located at OAK North Field, which is now
closed. Between 2001 and 2004, OAK had relatively
few helicopter operations (between 2,000 and 4,000
annually, or between 5 and 11 operations each day,
on average). In 2004, a new helicopter flight training
school opened at OAK North Field. They are ramping
up their training classes and flight operations through
2006. During this period, the number of helicopter
operations is anticipated to grow from between 2,000
to 4,000 to just over 34,000 annual operations. After this
ramp-up period, it is anticipated that helicopter opera-
tions would grow 1% annually.

The dashed orange line shows the anticipated number
of general aviation jet operations at OAK. Based on
manufacturer and other industry indicators, the
number of general aviation jet operations is anticipated
to increase at a rate of 3% each year through 2025.
The dashed yellow line shows the anticipated number
of turboprop operations at OAK. Based on historic
trends at OAK and manufacturer / industry indicators, the number of turboprop operations is not anticipated to change over the planning horizon. Table 3.5 summarizes the number of general aviation operations anticipated in 2010 (from Figure 3.15).

The next step is to convert annual general aviation operations into daily operations, which is used along with the passenger and cargo airline flight schedules to evaluate the airfield (e.g., taxiway and runway congestion). For general aviation, the planning day is the average annual day (or AAD) in 2010 (versus ADPM, because there is less overall monthly variation in general aviation operations compared to airline passengers using the terminal facilities).

The number of operations by type of general aviation aircraft on the AAD is computed by dividing the annual number of operations (by type, from Table 3.5) by 365 days per year. On the AAD in 2010, there would be approximately 434 general aviation aircraft operations, as shown in Table 3.6. The calculations summarized above are contained in detail in Appendix G, and the full (detailed) general aviation AAD flight schedule is contained in Appendix H. The flight schedule shows the actual arrival and departure time by aircraft type.

It is important to note that general aviation operations occur predominantly at North Field. For noise abatement purposes, general aviation jets and large turboprops are requested to comply with the Port’s noise abatement policies (described in detail in Chapter 6), which allows them to land at North Field but requests that they take-off from South Field during the “normal, good-weather” landing direction to the west, called west plan. During the “poor weather” landing direction, called southeast plan, which occurs less than 10% of the time, general aviation jets and large turboprops are requested to land at South Field, but are allowed to take-off from North Field. The Port’s noise abatement policies are voluntary and have over a 98% compliance rate. The forecasts presented above are not anticipated to change in any way the Port’s existing noise abatement policies or procedures.

Finally, it is important to consider the relation between general aviation operations and based general aviation aircraft (those aircraft that are based at OAK and park in a hangar or tie-down on a ramp or at one of two fixed base operators (FBOs) at North Field. For general aviation operations that are not associated with flight training schools, there is not a strong link between the number of based aircraft and operations (take-offs and landings) at OAK, especially for corporate jets and turboprops. In fact, in some cases, having additional aircraft based at OAK might actually reduce the number of general aviation operations. For example, if a corporate jet is based at OAK, it would perform two operations (one take-off and one landing) to pick-up and then deliver passengers back to OAK. However, if the aircraft were based at another airport near OAK (e.g., Hayward or Livermore), the aircraft would need to perform four operations (two take-offs and two landings) to accomplish the same flight, assuming the passengers desire to fly out of OAK because of its proximity to downtown Oakland and San Francisco, as well as other business centers. However, aircraft based at flight training schools do create a substantial amount of operations. It is also important to note that pilots of based aircraft, including those at flight training schools, are more likely than pilots of transient aircraft to comply with noise abatement policies (both because the pilots are more familiar with local flight procedures and they are part of the local community and more likely to be good neighbors). The following section describes the existing and forecast number of based general aviation aircraft at OAK.

### Existing and Forecast Annual General Aviation Operations by Aircraft Type

<table>
<thead>
<tr>
<th>General Aviation Aircraft Type</th>
<th>2004 Operations</th>
<th>2010 Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helicopter</td>
<td>2,704</td>
<td>35,507</td>
</tr>
<tr>
<td>Jet</td>
<td>16,574</td>
<td>19,937</td>
</tr>
<tr>
<td>Piston</td>
<td>103,542</td>
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<tr>
<td>Turboprop</td>
<td>5,822</td>
<td>5,822</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>128,642</strong></td>
<td><strong>158,504</strong></td>
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</tbody>
</table>

### Existing and Forecast Daily General Aviation Operations by Aircraft Type

<table>
<thead>
<tr>
<th>General Aviation Aircraft Type</th>
<th>2004 Average Daily Operations</th>
<th>2010 Average Daily Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helicopter</td>
<td>7</td>
<td>97</td>
</tr>
<tr>
<td>Jet</td>
<td>45</td>
<td>55</td>
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<tr>
<td>Piston</td>
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<td>266</td>
</tr>
<tr>
<td>Turboprop</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>352</strong></td>
<td><strong>434</strong></td>
</tr>
</tbody>
</table>

(2) FBOs are businesses located at North Field that provide services, such as fuel sales, aircraft parking, aircraft repair, etc., to based and transient aircraft. In some cases, FBOs also offer charter services. FBOs lease land and buildings (e.g., hangar) from the Port. Currently, the two FBOs at North Field are KaiserAir and Business Jet Center.)
Oakland International Airport Master Plan

Chapter 3: Forecasts of Aviation Activity

3.4.3 Based General Aviation Aircraft

Table 3.7 summarizes the existing number of general aviation aircraft based at OAK, and presents the forecast number of based general aviation aircraft in 2010 and 2025. There are about 175 general aviation aircraft parked in hangars at North Field and about 102 general aviation aircraft tied-down on one of the ramps at North Field, for a total of ... by type of general aviation aircraft. For example, the number of based corporate jets was increased proportionally to the corporate jet fleet forecast prepared by Rolls-Royce (i.e., Rolls-Royce estimates the number of corporate jets in the entire fleet, given new orders and anticipated retirements). The number of based piston aircraft was increased based on the Port’s waiting list for hangars at North Field. In all cases, the forecasts are unconstrained; that is, these forecasts are not constrained by any assumptions about the availability (or lack of availability) of existing and/or future Airport facilities, such as hangars or ramps. In other words, these forecasts represent the “natural” number of general aviation aircraft that would want to be based at OAK, absent any constraints on the availability of facilities.

Table 3.7: Existing and Forecast Based General Aviation Aircraft by Type

<table>
<thead>
<tr>
<th>General Aviation Aircraft Type</th>
<th>Existing (2004)</th>
<th>2010</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helicopter</td>
<td>6</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Jet</td>
<td>29</td>
<td>36</td>
<td>56</td>
</tr>
<tr>
<td>Piston</td>
<td>228</td>
<td>320</td>
<td>320</td>
</tr>
<tr>
<td>Turboprop</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>277</td>
<td>384</td>
<td>406</td>
</tr>
</tbody>
</table>

(1) Does not directly relate to aircraft operations (see discussion in Section 3.4.2)

3.4.4 Military Aircraft Operations

The various branches of the U.S. military operate a wide variety of aircraft including fighter jets, large jet troop and cargo transports, corporate-type jets, and helicopters. Currently, there are no U.S. military aircraft based at OAK. However, U.S. military aircraft, as well as military aircraft from other countries, operate at OAK on a transient basis. These military aircraft typically park at one of the two FBOs at North Field and typically follow appropriate noise abatement procedures (i.e., which require jets to depart from South Field during west plan). Examples of military operations at OAK include a U.S. Air Force corporate-type jet using OAK when a high-ranking U.S. government official visits the San Francisco Bay Area, high-performance flight demonstration teams (e.g., the U.S. Navy Blue Angels) using OAK as a temporary base during Fleet Week, or a Coast Guard search-and-rescue helicopter landing at OAK for fuel.

Based on recent trends and ANOMS data, there are less than 365 annual military operations at OAK (or less than one per day, on average). For the 2010 forecast and flight schedule, one military jet operation is assumed to occur on the planning day.

3.5 Summary

This chapter described the development of unconstrained forecasts for (1) airline passengers and passenger airline operations, (2) air cargo weight and cargo airline operations, and (3) general aviation operations and based general aviation aircraft. Each of these forecasts was developed for the near-term horizon (about 2010, and in the case of airline passengers, between 2010 and 2012). Less detailed forecasts were prepared for the long-term planning horizon, which focuses only on airline passengers, air cargo weight, and based general aviation aircraft, but not the number of operations.

A composite planning day flight schedule was developed for the near-term planning horizon (2010) based on the discussion and forecasts presented in this chapter (see Appendix H). This flight schedule was used to study the number of aircraft gates required for future terminals at OAK (Chapter 4) and evaluate airfield operations (e.g., taxiway and runway congestion) and possible solutions (Chapter 5). Table 3.8 and Table 3.9 summarize the forecasts, present the total number of composite planning day operations, and summarize the number of operations by type of aircraft on the composite planning day.
### Summary of Unconstrained Master Plan Forecasts

#### Table 3.8

<table>
<thead>
<tr>
<th>Summary</th>
<th>Existing</th>
<th>2010</th>
<th>2012</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airline Passengers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Million Annual Passengers (MAP)</td>
<td>14.1(5)</td>
<td>18</td>
<td>20</td>
<td>30(10)</td>
</tr>
<tr>
<td>Planning Day Passengers (Average Day, Peak Month)</td>
<td>43,745(6)</td>
<td>56,047</td>
<td>63,158</td>
<td>93,412</td>
</tr>
<tr>
<td>Daily Operations** ([A])</td>
<td>430(6)</td>
<td>542</td>
<td>598</td>
<td>n/a</td>
</tr>
<tr>
<td>Percent of Total Daily Operations</td>
<td>45.8%</td>
<td>47.5%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Air Cargo</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Million Annual Tons (MAT)</td>
<td>0.74(5)</td>
<td>0.9</td>
<td>n/a</td>
<td>1.5</td>
</tr>
<tr>
<td>Daily Operations** ([B])</td>
<td>156(7)</td>
<td>164</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Percent of Total Daily Operations</td>
<td>16.6%</td>
<td>14.4%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>General Aviation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Operations**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helicopter**</td>
<td>2,704(8)</td>
<td>35,507</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Jet</td>
<td>16,574(9)</td>
<td>19,937</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Piston</td>
<td>103,542(8)</td>
<td>97,238</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Turboprop</td>
<td>5,822(8)</td>
<td>5,822</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Subtotal</td>
<td>128,642(8)</td>
<td>158,504</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Daily Operations** ([Annual Operations–365])</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helicopter ([C])</td>
<td>7</td>
<td>97</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Jet</td>
<td>45</td>
<td>55</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Piston</td>
<td>284</td>
<td>266</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Turboprop</td>
<td>16</td>
<td>16</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Subtotal ([D])</td>
<td>352</td>
<td>434</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Percent of Total Daily Operations</td>
<td>37.5%</td>
<td>38.1%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Based Aircraft</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helicopter</td>
<td>6*</td>
<td>14</td>
<td>n/a</td>
<td>14</td>
</tr>
<tr>
<td>Jet</td>
<td>29*</td>
<td>36</td>
<td>n/a</td>
<td>58</td>
</tr>
<tr>
<td>Piston</td>
<td>228*</td>
<td>320</td>
<td>n/a</td>
<td>320</td>
</tr>
<tr>
<td>Turboprop</td>
<td>14*</td>
<td>14</td>
<td>n/a</td>
<td>14</td>
</tr>
<tr>
<td>Subtotal</td>
<td>277*</td>
<td>384</td>
<td>n/a</td>
<td>406</td>
</tr>
<tr>
<td>Summary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composite Planning Day Operations ([A]+[B]+[D])</td>
<td>938</td>
<td>1,140</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Airfield Simulation Operations ([A]+[B]+[C])</td>
<td>n/a</td>
<td>1,043</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

#### Composite Planning Day Flights by Aircraft Type, 2010

#### Table 3.9

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger Airline Flights (18 MAP ADPM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A319/320</td>
<td>60</td>
<td>11.1%</td>
</tr>
<tr>
<td>B737–Series</td>
<td>440</td>
<td>81.2%</td>
</tr>
<tr>
<td>B757–Series</td>
<td>8</td>
<td>1.5%</td>
</tr>
<tr>
<td>B747–Series</td>
<td>2</td>
<td>0.4%</td>
</tr>
<tr>
<td>Regional Jets</td>
<td>32</td>
<td>5.9%</td>
</tr>
<tr>
<td>Total</td>
<td>542</td>
<td>100.0%</td>
</tr>
<tr>
<td>Cargo Airline Flights (0.9 MAT AAD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A310–Series</td>
<td>10</td>
<td>6.1%</td>
</tr>
<tr>
<td>A300–Series</td>
<td>24</td>
<td>14.6%</td>
</tr>
<tr>
<td>B767–Series</td>
<td>14</td>
<td>8.5%</td>
</tr>
<tr>
<td>B747–Series</td>
<td>2</td>
<td>1.2%</td>
</tr>
<tr>
<td>B727–Series</td>
<td>6</td>
<td>3.7%</td>
</tr>
<tr>
<td>DC–10</td>
<td>8</td>
<td>4.9%</td>
</tr>
<tr>
<td>MD–11</td>
<td>20</td>
<td>12.2%</td>
</tr>
<tr>
<td>Large Turboprop</td>
<td>2</td>
<td>1.2%</td>
</tr>
<tr>
<td>Small Jet</td>
<td>4</td>
<td>2.4%</td>
</tr>
<tr>
<td>Small Single Engine</td>
<td>8</td>
<td>4.9%</td>
</tr>
<tr>
<td>Small Turboprop</td>
<td>36</td>
<td>22.0%</td>
</tr>
<tr>
<td>Small Twin Engine</td>
<td>30</td>
<td>18.3%</td>
</tr>
<tr>
<td>Total</td>
<td>164</td>
<td>100.0%</td>
</tr>
<tr>
<td>General Aviation Operations (Flights)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helicopter</td>
<td>97</td>
<td>22.4%</td>
</tr>
<tr>
<td>Jet</td>
<td>53</td>
<td>12.7%</td>
</tr>
<tr>
<td>Piston (50% Touch &amp; Go)</td>
<td>286</td>
<td>61.3%</td>
</tr>
<tr>
<td>Turboprop</td>
<td>16</td>
<td>3.7%</td>
</tr>
<tr>
<td>Total</td>
<td>434</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

** An operation is take-off or landing. (1) One ton is equal to 2,000 pounds (also called a short ton), which is equal to approximately 0.9 metric tons. (2) In 2005, a new helicopter flight training school started operations at North Field. (3) The planning day is the annual average day for general aviation. (4) Calendar year 2004. (5) August 2004. (6) 2003 annual average day. (7) 12 months ending September 30, 2004. (8) Inventory as of December 2004. (9) Inventory in December 2004. (10) Unconstrained, could not be accommodated without additional runway facilities, which are not recommended in this master plan. (a) — not available (the number of aircraft operations cannot be predicted with reliability and is dependent on many future variables).
This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.

### Cargo/Cargo Airline Operations

*Current Activity Million Annual Tons (MAT)*

- **2003:** 0.7 MAT

Graph 1C

*Market Options (MAT)*

- **Growth:** 2010 - 2025
  - Low: 0.9
  - Medium: 0.95
  - High: 1.0

Graph 2C

*Current Average Annual Day (AAD) Activity*:

- **2000 AAD air cargo schedule as starting point**
- **Reconcile 2000 schedule and fleet mix with current (2003) operations by carrier and runway**

Graph 3C

*Adjust Current AAD Schedule to 2010 Air Cargo Activity Levels*:

- **Use 2000 AAD air cargo schedule as starting point**
- **Maintain air cargo market share (FedEx approximately 85%, by weight)**
- **Interpolate flights between air cargo schedules for 0.7 MAT, air cargo schedule**

Graph 4C

### General Aviation/Military Operations

*Historic and Forecast Annual General Aviation (GA) Operations*

- **2010:**
  - Piston: 97,238
  - Jet: 19,937
  - Turboprop: 5,822
  - Helicopter: 35,507

Graph 1G

*2010 Average Annual Day (AAD) GA Flight Schedule*:

Adjust 2000 SEIR GA flight schedule by type (piston, jet, turboprop, helicopter) and fleet mix with current (2003) operations by carrier and runway

Graph 2G

*What is this data used for?*

- **GA aircraft operations**
- **Runway delay/capacity**
- **Taxiway congestion**
- **Other operational issues**

Graph 3G

### Based General Aviation Aircraft

*Inventory of Based GA Aircraft (Dec. 2004)*

- **Piston:** 139
- **Jet:** 28
- **Turboprop:** 5
- **Helicopter:** 3

Total: 175

Graph 4P

*2010 Based GA Aircraft Demand*

- **Piston:** 139
- **Jet:** 28
- **Turboprop:** 5
- **Helicopter:** 3

Total: 175

Graph 5P

*What is this data used for?*

- **Facility (hangar) requirements**
- **Policy discussions**
- **Constrained forecast development**
Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not represent any particular course of action (i.e., it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.
Monthly Passenger Variation

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptually oriented and for planning purposes only; it does not prescribe any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.

Figure 3.3

Forecasts

Legend:

- 1995
- 1996
- 1997
- 1998
- 1999
- 2000
- 2001
- 2002
- 2003
- 2004

Thousands of Passengers

January February March April May June July August September October November December
Figure 3.4

Forecasts

Percent of Annual Passengers Each Month

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and is for planning purposes only. It does not propose any particular course of action (it might represent an idea as a concept that was discarded), and must be interpreted in the context of the entire master plan document.
Monthly Load Factors, All Airlines

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only; it does not represent any particular course of action (it might represent an idea or concept that was discarded) and must be interpreted in the context of the entire master plan document.
This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only; it does not propose any particular course of action (i.e., it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.
Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action or represent an idea or concept that was discarded, and must be interpreted in the context of the entire master plan document.
Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only; it does not propose any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.

Million Annual Tons of Cargo (Rolling) — Bay Area Airports

Legend:
- Bay Area Actual
- Bay Area Regional Airport System Plan (BARS) 4.93%
- Bay Area Historical Growth 3.59%
- OAK Actual
- OAK High Growth 5.14%
- OAK Medium Growth 4.52%
- OAK Low Growth 3.59%
- SFO Actual
- SJC Actual
- Supplemental Environmental Impact Report (SEIR) 7.84%
- OAK (RASP) 4.52%

Forecasts
Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action. It might represent an idea or concept that was discarded, and must be interpreted in the context of the entire master plan document.
Figure 3.10

Million Annual Tons of Cargo (Rolling) — OAK Medium Growth Forecast (4.52%)

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only; it does not propose any particular course of action. It might represent an idea or concept that was discarded, and must be interpreted in the context of the entire master plan document.

Legend:
- Purple - OAK
- Orange - FedEx
- Blue - UPS
- Gray - All Other Cargo

Forecasts

Year:
- 1986
- 1988
- 1990
- 1992
- 1994
- 1996
- 1998
- 2000
- 2002
- 2004
- 2006
- 2008
- 2010
- 2012
- 2014
- 2016
- 2018
- 2020
- 2022
- 2024
- 2026

Million Annual Tons of Cargo (Rolling) — Air Freight and Air Mail

- OAK: 0.5, 0.8, 0.95, 1.5, 1.8
- FedEx: 0.3, 0.6, 0.8, 1.1, 1.2
- UPS: 0.1, 0.3
- All Other Cargo: 0.0, 0.1, 0.2, 0.3

Years:
- 1986
- 1988
- 1990
- 1992
- 1994
- 1996
- 1998
- 2000
- 2002
- 2004
- 2006
- 2008
- 2010
- 2012
- 2014
- 2016
- 2018
- 2020
- 2022
- 2024
- 2026
This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action. It might represent an idea or concept that was discarded, and must be interpreted in the context of the entire master plan document.
Figure 3.12

Annual Air Cargo Operations (Rolling) — South Field

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and the planning processes only does not propose any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.
Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only; it does not propose any particular course of action. It might represent an idea or concept that was discarded, and must be interpreted in the context of the entire master plan document.
Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not represent any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.
Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not represent any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.

Figure 3.15

<table>
<thead>
<tr>
<th>Year</th>
<th>Piston - Actual</th>
<th>Piston - Forecast</th>
<th>Jet - Actual</th>
<th>Jet - Forecast</th>
<th>Turboprop - Actual</th>
<th>Turboprop - Forecast</th>
<th>Helicopter - Actual</th>
<th>Helicopter - Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>34,121*</td>
<td>-</td>
<td>19,937</td>
<td>13%</td>
<td>5,822</td>
<td>0%</td>
<td>19,937</td>
<td>13%</td>
</tr>
<tr>
<td>2001</td>
<td>15,507</td>
<td>14%</td>
<td>8,000</td>
<td>0%</td>
<td>1,400</td>
<td>1%</td>
<td>8,000</td>
<td>0%</td>
</tr>
<tr>
<td>2002</td>
<td>97,238</td>
<td>1%</td>
<td>22,000</td>
<td>-1%</td>
<td>35,507</td>
<td>+3%</td>
<td>22,000</td>
<td>-1%</td>
</tr>
<tr>
<td>2003</td>
<td>158,504</td>
<td>+1%</td>
<td>35,507</td>
<td>+0%</td>
<td>51,822</td>
<td>+1%</td>
<td>35,507</td>
<td>+0%</td>
</tr>
<tr>
<td>2004</td>
<td>210,000</td>
<td>+0%</td>
<td>42,300</td>
<td>+1%</td>
<td>59,600</td>
<td>+0%</td>
<td>42,300</td>
<td>+1%</td>
</tr>
<tr>
<td>2005</td>
<td>240,000</td>
<td>+1%</td>
<td>49,230</td>
<td>+2%</td>
<td>68,400</td>
<td>+2%</td>
<td>49,230</td>
<td>+2%</td>
</tr>
<tr>
<td>2006</td>
<td>260,000</td>
<td>+2%</td>
<td>56,270</td>
<td>+3%</td>
<td>77,200</td>
<td>+3%</td>
<td>56,270</td>
<td>+3%</td>
</tr>
<tr>
<td>2007</td>
<td>280,000</td>
<td>+3%</td>
<td>63,310</td>
<td>+4%</td>
<td>86,000</td>
<td>+4%</td>
<td>63,310</td>
<td>+4%</td>
</tr>
<tr>
<td>2008</td>
<td>300,000</td>
<td>+4%</td>
<td>70,350</td>
<td>+5%</td>
<td>94,800</td>
<td>+5%</td>
<td>70,350</td>
<td>+5%</td>
</tr>
<tr>
<td>2009</td>
<td>320,000</td>
<td>+5%</td>
<td>77,400</td>
<td>+6%</td>
<td>103,600</td>
<td>+6%</td>
<td>77,400</td>
<td>+6%</td>
</tr>
<tr>
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<td>84,450</td>
<td>+7%</td>
<td>112,400</td>
<td>+7%</td>
<td>84,450</td>
<td>+7%</td>
</tr>
<tr>
<td>2011</td>
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</tr>
<tr>
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<td>+9%</td>
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<tr>
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<td>156,400</td>
<td>+12%</td>
<td>119,700</td>
<td>+12%</td>
</tr>
</tbody>
</table>

4.1 Introduction

This chapter presents a discussion and calculations that translate the forecasts of aviation activity developed in Chapter 3 into facility and/or land area requirements to accommodate the forecast aviation activity. It then presents possible development areas and/or concepts to accommodate the requirements, including relevant planning considerations, such as operational, financial, environmental, and other issues. The chapter has five main parts: (1) airline passenger development, (2) air cargo development, (3) general aviation development, (4) airline-related support facilities development, and (5) ground access development. Potential airfield development is discussed in Chapter 5.

FAA AC No. 150/5070-6A, Chapter 6, discusses requirements, analysis, and concepts development. Although Chapter 6 of the AC does not directly address individual master plan elements (i.e., airline passenger development, air cargo development, general aviation development, etc.), it does provide planning principles and guidance. Chapter 6 of the AC discusses comparing requirements for various facilities and/or land areas (based on the forecasts of aviation activity) to the existing facilities and land areas to determine if there are any deficiencies and, if new facilities and/or land areas are required, if there is area on the airport to do so (see Chapter 6, Sections 2 (Demand-Capacity Analysis), 3 (Development Assessment), 4 (Land-Use Criteria), 5 (Terminal Planning Criteria), and 6 (Alternatives Review)). According to Chapter 6, Section 3 (Development Assessment), “In addition to determining the physical capability for expansion, as well as its timing based on development costs versus delay reduction benefits, operational reliability and safety are critical considerations.” This chapter of the master plan is based on the planning principles and guidance contained in FAA AC No. 150/5070-6A.

4.2 Airline Passenger Development

This section presents aircraft gate requirements for the near-term planning horizon (2010 to 2012) and land area requirements for potential terminal development for the long-term planning horizon to accommodate the airline passenger forecasts developed in Chapter 3. This section then presents potential terminal development areas on the Airport and potential terminal development concepts.

4.2.1 Requirements (2010 to 2012)

In Chapter 3, it was determined that the Airport would need to accommodate between 18 to 20 MAP in the 2010 to 2012 timeframe. These airline passengers (and the associated aircraft that they arrive or depart on) would use existing terminal buildings and gates (29 gates total in Terminals 1 and 2 combined, after completion of current construction projects), plus additional terminal buildings and gates, if required. This section presents discussion and calculations to determine if new gates (more than the 29) would be required to meet the near-term airline passenger forecasts (18 to 20 MAP).

The first estimate of aircraft gates requirements was calculated based on targets for average daily departures per gate and peak month (August) passengers per gate. This estimating technique considers the concept of passenger and airline level of service or intensity of usage of the facilities. Although it is important to maximize use of expensive resources like terminal buildings and aircraft gates, excessive usage can lead to uncomfortable conditions for airline passengers, challenging operations for the airlines, and difficulty for the Port in maintaining the facilities. A balance is required. For example, although it might be possible to “stuff” 18 MAP through 29 aircraft gates, it would likely result in an extremely poor level of service for passengers and airlines (e.g., dirty restrooms, overcrowded holdovers and concessions, long security checkpoint lines, “tight” aircraft parking positions, cancelled flights to replace or maintain facilities, etc.).

For planning purposes, the master plan assumes between 6 and 6.5 average daily departures per gate per day. This assumption is considerably less than existing conditions (at 8.6 average daily departures per gate per day, see Section 2.3), but greater than other Bay Area airports (which range from about 4 to 6 average daily departures per gate per day) and the national average (of 5.5 average daily departures per gate per day).

Table 4.1: Total Aircraft Gate Requirements

<table>
<thead>
<tr>
<th>Gate Use Assumption</th>
<th>Total Aircraft Gates Requirement (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td>46</td>
</tr>
<tr>
<td>6.5</td>
<td>42</td>
</tr>
</tbody>
</table>

For planning purposes, the master plan assumes between 6 and 6.5 average daily departures per gate per day. This assumption is considerably less than existing conditions (at 8.6 average daily departures per gate per day, see Section 2.3), but greater than other Bay Area airports (which range from about 4 to 6 average daily departures per gate per day) and the national average (of 5.5 average daily departures per gate per day).

Table 4.1 shows gate use in terms of peak month passengers per gate. Again, compared to the...
passenger per gate data presented in Section 2.3, the proposed peak month passengers per gate is reduced over existing conditions (offering an improved level of service and the ability to perform maintenance without ceasing operations), but still greater than other airports (making better use of facilities).

In addition to the aircraft gate planning methods described above, the airline passenger flight schedule (contained in Appendix H) was used to test the number of gates required. Based on this hypothetical flight schedule, the number of gates occupied simultaneously was counted ... gates would be required to reasonably accommodate the flight schedule driven by demand for 20 MAP in about 2012.

It should be noted that the prior ADP environment documents evaluated up to 34 total aircraft gates at OAK, or 5 more than currently exist plus those under construction. Compared to 34 gates evaluated in the ADP environmental review documents, the requirements presented above represent between 12 and 16 more aircraft gates.

4.2.2 Requirements (2025)

For 2025, the anticipated number of aircraft gates is calculated and translated into a land area requirement. Terminal concepts for 2010 to 2012 can then be evaluated for the relative ease to grow beyond the 46 to 50 aircraft gates described above. Detailed aircraft gate or terminal building planning beyond the 2010 to 2012 timeframe is highly speculative. As described in detail in Chapter 5, the main air carrier runway at OAK (Runway 11-29) can accommodate the aircraft operations anticipated in the 2010 to 2012 timeframe and perhaps slightly beyond, with some modest increase in delay. However, Runway 11-29 would not be able to accommodate aircraft operations likely to be associated with 30 MAP (i.e., the long-term planning horizon in about 2025), assuming that there is no significant changes in the aircraft fleet serving OAK (see Chapter 5 for further discussion). Therefore, it is unlikely that many more aircraft gates would be required beyond the 46 to 50 gates described in Section 4.2.1 (required in the 2010 to 2012 timeframe). So, while it is prudent to look at the potential expandability of future terminals and aircraft gates, the need for additional gates might not ever come to fruition (due to the capacity of Runway 11-29), and therefore additional gates (beyond 46 to 50 total gates) are not recommended in the master plan.

The first step is to determine a range of gate requirements to accommodate 30 MAP (in about 2025). Based on calculations shown in Appendix G, it is estimated that between 65 and 75 total aircraft gates would be required to serve 30 MAP, assuming a similar aircraft fleet mix as today, or between 15 and 25 gates beyond what is required in 2010 to 2012 timeframe. The next step is to estimate how much land area is required per aircraft gate. Based on data from prior Port studies, it is estimated that 2.2 acres is required for each aircraft gate. The final step is to calculate the likely range in area required for the additional 15 to 25 aircraft gates. It is estimated that 33 to 55 acres would be required to provide an additional 15 to 25 aircraft gates over and above the area required for the 46 to 50 aircraft gates required in 2010 to 2012. The calculations summarized above are contained in detail in Appendix G.

The following section discusses potential terminal development areas and concepts based on 18 to 20 MAP terminal building and aircraft gate requirements (i.e., 46 to 50 total aircraft gates, or between 17 and 21 more gates than existing plus those under construction). The long-term area requirements to accommodate 30 MAP can be used to evaluate the various areas and concepts for relative future expandability (again, assuming additional air carrier runway capacity is available).

4.2.3 Potential Terminal Development Areas and Concepts

Figure 4.1 shows three potential areas for future terminal development at OAK. Area 1 is located in the Central Basin, south of Ron Cowan Parkway, west of the FedEx Metroplex. Any terminal development in Area 1 would require a substantial amount of wetlands fill. Area 2 is located in the existing passenger terminal area, south of Ron Cowan Parkway, east of Taxiway B, north of Taxiway T, including the Oakland Maintenance Center. Area 3 is located east of Terminal 2, largely in San Francisco Bay. Planning considerations for each area are shown on the various potential terminal development concepts located in each of the three areas. Potential terminal development Concepts 1A and 1B are located in Area 1; potential terminal development Concepts 2A through 21 are located in Area 2; and potential terminal development Concepts 3A and 3B are located in Area 3. Planning considerations examine operational, environmental, financial, engineering, and other issues associated with each potential terminal concept.

Figure 4.2 and Figure 4.3 show two potential terminal development concepts (1A and 1B) in Area 1 with appropriate planning considerations. Potential terminal development Concept 1A could be constructed to replace the entire existing terminal complex (plus those gates under construction) as well as provide the new 17 to 21 aircraft gates required in the 2010 to 2012 timeframe (for a total of 46 to 50 total aircraft gates). The existing terminal complex could then be redeveloped. Potential terminal development Concept 1B shows a new 20-gate unit terminal. Both potential terminal development concepts allow for “greenfield” site development and provide good access to the main air carrier runway, Runway 11-29. However, both concepts in Area 3 have considerable issues involving development in wetlands that would need to be overcome, including environmental, engineering, and financial challenges, as outlined in the planning considerations on each concept.
Figure 4.4 and Figure 4.5 show two potential terminal development concepts (2A and 2B) in Area 2 with appropriate planning considerations. For all of the potential terminal development concepts in Area 2 with the exception of Concept 2G, the cargo building would need to be relocated out of the center of the planning area. The cargo building houses United Parcel Service (UPS), belly cargo, the United States Post Office, as well as airline operations and provisioning space. For the purposes of considering terminal concepts in the master plan, it is assumed that the cargo building would be relocated to the Oakland Maintenance Center site south of Ron Cowan Parkway. Potential terminal development Concepts 2A and 2B add 20 gates onto the existing Terminal 1 complex. Although Concept 2A has several benefits outlined in the planning considerations, it would likely have difficult curbside operations. Concept 2B is similar to Concept 2A, but enhances landside circulation by providing a separate, consolidated baggage claim building and new baggage claim curbside roadway (splitting the enplaning and deplaning curbsides). This concept shows the existing baggage claim areas in Terminals 1 and 2 also being relocated (consolidated) in a new baggage claim building with a new curbside. Although it would likely improve landside access and circulation, it is unclear how the existing baggage claim areas in Terminals 1 and 2 would be reused and how passenger circulation would work. Further, underground or elevated baggage conveyors would need to be constructed to transport baggage from arriving flights on the airside, under or over the roadways, to the new baggage claim building.

Figure 4.6, Figure 4.7, Figure 4.8, Figure 4.9, and Figure 4.10 show potential terminal development concepts (2C through 2G) in Area 2 with appropriate planning considerations. Each concept shows a 20-gate unit terminal (not directly connected to the existing Terminals 1 and 2 complex) east of and parallel to Taxiway B. In each case, a new taxiway is also shown parallel and east of Taxiway B. This taxiway would be required to allow unimpeded, two-way aircraft taxi movements to and from the unit terminal. As described in more detail in Chapter 5, this new taxiway would also minimize delay and congestion associated with head-to-head taxi events on Taxiway B (for example, when a corporate jet at North Field taxis southbound to depart Runway 11-29 versus an aircraft taxiing northbound on Taxiway B, such as a FedEx aircraft going to the Metroplex after landing). Arrows on the drawings indicate potential future expansion areas, if such expansion was ever pursued.

Potential terminal development Concept 2C (Figure 4.6) shows a terminal layout farther to the south in Area 2; Concept 2D (Figure 4.7) shows a more northerly terminal layout; Concept 2E (Figure 4.8) shows a more southerly layout with some of the more northerly aircraft pushing back onto the new taxiway parallel to Taxiway B. Concept 2F (Figure 4.9) shows a terminal complex where the terminal building (e.g., ticket counters and baggage claim) is separated from the concourse (e.g., holdrooms) to allow for a bypass roadway to the existing Terminals 1 and 2 complex; and finally, Concept 2G (Figure 4.10) shows a terminal complex on the Oakland Maintenance Center site. The planning considerations for each concept are shown on the figures.

Figure 4.11 and Figure 4.12 show potential terminal development concepts suggested by a City of Alameda and a City of San Leandro representative on the Stakeholder Advisory Committee, respectively. As stated before, input and recommendations provided by members of the Stakeholder Advisory Committee on potential future terminal development should not necessarily be considered implicit endorsement of future terminal expansion at OAK. Figure 4.11 (Concept 2H) shows only the concourse (e.g., holdrooms) in Area 2, while the terminal building (e.g., ticket counters and baggage claim) is located off-Airport. The two separate facilities would be connected by an automated people mover. That is, airline passengers would check-in at a remote (off-Airport) terminal and then take a people mover to the airport gates. Arriving passengers would deplane and take the people mover to the terminal building to collect checked baggage and access parking and other ground transportation. Although this concept does have the potential to locate parking and other ground transportation modes closer to Interstate Highway 880, it has a number of significant issues outlined in the planning considerations on Figure 4.11. Figure 4.12 shows a potential terminal development concept with landside facilities (e.g., parking and roadways) located farther north (closer to Ron Cowan Parkway) and the existing surface parking lot and landside portion of Terminals 1 and 2 converted to airport ramp and gates. Although this concept creates a consolidated terminal building, it would likely be very expensive due to the extensive renovation of existing facilities and provides relatively long walking distances to some of the aircraft gates. Other planning considerations are shown on the figure.

Figure 4.13 and Figure 4.14 show two potential terminal development concepts (3A and 3B) in Area 3 with appropriate planning considerations. Concept 3A (Figure 4.13) shows a 7-gate extension of the Terminal 2 extension project. This concept does not meet the requirements described in Section 4.2.1 (i.e., 17 to 21 aircraft gates in the 2010 to 2012 timeframe). Although this concept provides additional aircraft gates, it does not provide any additional terminal building facilities, such as ticket counters, baggage claim, security checkpoint lanes, curbside roadways, etc., which would likely be required to accommodate the increased number of aircraft gates and airline passengers. It is also unclear whether this concept could be constructed due to height limitations imposed by protected airspace for the approach to Runway 29. Concept 3B (Figure 4.14) shows a 20-gate expansion of Terminal 2 into San Francisco Bay. Both figures contain relevant planning considerations.

4.2.4 Recommended Terminal Development Area

It is recommended that the Port further study potential near-term terminal development concepts in Area 2 in accordance with the requirements outlined in Section 4.2.1 (i.e., 17 to 21 aircraft gates in the 2010 to 2012 timeframe).
timeframe). It appears that Areas 1 and 3 would be difficult to develop from an engineering and environmental perspective, requiring considerable fill of wetlands and/or San Francisco Bay. Further, because of the engineering and environmental challenges, Areas 1 and 2 would likely be considerably more expensive (possibly unaffordable) to develop for terminal uses than Area 2. From a land-use perspective, Area 2 is convenient to the existing terminal area. Now that the Oakland Maintenance Center is available, it is possible to demolish it and use the area for terminal or facilities displaced by terminal development in Area 2, such as the cargo building.

Potential terminal development Concept 2C (Figure 4.6) is assumed for the purposes of the airfield analyses discussed in Chapter 4. This is not a preferred concept, but one example of many possible terminal concepts (several of which are described above and shown in the figures). For the airfield analysis, the modeler must know where the required aircraft gates are located in order to simulate aircraft taxiing on the taxiway system.

It is important to note that although several potential terminal development concepts were developed and evaluated, the master plan is focused on overall airport land-use guidelines. The concepts simply demonstrate that there are a variety of possible terminal configurations that are possible in each area. Even though this master plan recommends future terminal development be considered in Area 2, this master does not recommend a specific terminal development concept. The Port will be proceeding with separate studies to develop and further evaluate the feasibility of terminal concepts within Area 2.

As described above, potential long-term (2025) terminal development (i.e., a significant number of additional gates beyond 46 to 50 total aircraft gates required in the 2010 to 2012 timeframe) is not recommended in the master plan due to capacity constraints on Runway 11-29.

4.2.5 Stakeholder Advisory Committee Recommendations

Although some Stakeholder Advisory Committee representatives are concerned about any airport development, the majority favored potential terminal development in Area 2. According to the stakeholders, Area 2 has fewer environmental challenges, already contains the other terminals, and is farther away from the surrounding communities.

The City of San Leandro representatives to the Stakeholder Advisory Committee indicated that they prefer potential terminal development concepts that are farther south, closer to the existing terminal area. They felt that terminal development farther north could encourage airlines to start using the runways at North Field, especially for landings, as Runway 11-29 at South Field becomes more congested. Port staff explained that the exact placement of terminal facilities within Area 2 would not likely influence whether airlines would choose to use the runways at North Field. Compared to other U.S. airports, any aircraft gates constructed in Area 2 would still be quite conveniently located relative to Runway 11-29 at South Field (i.e., taxi times to/from Runway 11-29 would still be quite reasonable). Also, aircraft landing at North Field have a considerable distance to travel to get to any gates at South Field due to circuitous taxi routes and at least two runway crossings (three if landing on Runway 27L). Further, from a runway capacity perspective, it would not be desirable to mix lighter general aviation aircraft that operate at North Field with larger aircraft flown by the passenger airlines.

As stated before, input and recommendations provided by members of the Stakeholder Advisory Committee on potential future terminal development should not necessarily be considered implicit endorsement of future terminal expansion at OAK.

4.3 Air Cargo Development

Just as there is not a strong link between air cargo weight and cargo airline operations (see discussion in Section 3.3), there is also not a strong link between these metrics and the amount of land area required for air cargo facilities at OAK. Professional judgment and experience, however, suggest that if the Port pursued an aggressive air cargo marketing and development strategy, a significant amount of new facilities and land area would be required. However, as described in Section 3.3, it is recommended that the Port not pursue an aggressive air cargo development program, and instead allow existing tenants to grow at their existing and/or relocated facilities, with modest expansions, as necessary. This strategy results in the low air cargo growth forecast described in Section 3.3, and forms the basis of the potential air cargo development areas described below.

Figure 4.15 shows four areas that were considered to potentially accommodate future air cargo needs at the Airport. Planning considerations for each of the four areas are shown on the figure. The areas include:

- Area 1, North Field (north of Runway 9L/27R) — this area would provide approximately 180 acres for potential new air cargo development;
- Area 2, the Central Basin (south of Ron Cowan Parkway and north of Taxiway W) — this area would provide approximately 330 acres for potential new air cargo development;
- Area 3, south of Ron Cowan Parkway and north of the existing FedEx Metroplex — this area would allow for a modest expansion of existing FedEx facilities; and
- Area 4, the existing air cargo area at South Field and the Oakland Maintenance Center site — this area would allow modest expansion and/or relocation of existing air cargo facilities (e.g., the existing UPS / cargo building).
Figure 4.16 shows a sample air cargo development concept developed for Area 1. As shown on the figure, the Infield Road from the Airport Development Program would provide landside access from Doolittle Drive and Earhart Road to the North Field cargo area. Runway 15-33 would be closed to accommodate a large multi-tenant cargo facility. Additional facilities would potentially be provided east of Hangar 10. These facilities could potentially accommodate all air cargo activity at the Airport.

Figure 4.17 shows sample air cargo development concepts developed for Area 2 and Area 4. As shown on the figure, the air cargo development in Area 2, the Central Basin, would accommodate non-FedEx cargo carriers at OAK but is confined by existing roadways (i.e., Airport Drive and Ron Cowan Parkway). The Area 2 site could potentially accommodate all air cargo activity at the airport.

Development of Area 4, near the current Oakland Maintenance Center, would accommodate non-FedEx cargo carriers at OAK but is confined by existing roadways (i.e., Airport Drive and Ron Cowan Parkway) and Taxiway B. Development in this area would separate air cargo facilities from the passenger airline facilities while retaining the existing access on both landside and the airfield. Regardless of any future terminal development plans, UPS, which currently operates from the cargo building, has expressed interest in relocating their operation to Area 4 near the Oakland Maintenance Center to consolidate their operation so that it runs more efficiently with improved ground access (i.e., their trucks would be able to exit Airport Drive sooner and not mix with airline passenger traffic as long).

A development concept for Area 3 is not shown as this site could only really be used for an expansion of the FedEx Metroplex.

Based on (1) the low growth in air cargo weight and operations anticipated through 2010 (due to not pursuing an aggressive air cargo growth strategy described above) and (2) input from the Stakeholder Advisory Committee, it is recommended that the area designated for potential growth in air cargo be located at existing air cargo facility locations (such as the FedEx Metroplex), with small expansions, as needed, into Area 3 (for FedEx) and a possible relocation of air cargo facilities within Area 4 (e.g., to accommodate potential new terminal development).

4.4 General Aviation Development

This section presents land area requirements for the near-term planning horizon (2010) and long-term planning horizon (2025) to accommodate based general aviation aircraft forecasts developed in Chapter 3. This section then describes potential general aviation development areas on the Airport.

### Area Required for General Aviation Aircraft (Acres)

<table>
<thead>
<tr>
<th>Year</th>
<th>Jet/Turboprop</th>
<th>Piston/Helicopter</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>3 to 7</td>
<td>9 to 15</td>
<td>12 to 22</td>
</tr>
<tr>
<td>2025</td>
<td>14 to 29</td>
<td>9 to 15</td>
<td>23 to 44</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Area (Existing plus new area required)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>47 to 51</td>
</tr>
<tr>
<td>2015</td>
<td>58 to 73</td>
</tr>
</tbody>
</table>

4.4.1 Requirements (2010 and 2025)

Section 4.3.3 describes the forecasts of based general aviation aircraft at OAK. The first step is to convert these forecasts to land area requirements based on existing general aviation area allocations and associated number of aircraft parking positions (either on a ramp or in a hangar). Based on existing hangar and ramp area used for general aviation at OAK, the approximate area required is between 0.47 and 1 acres for jets and turboprops (per aircraft), and between 0.09 and 0.15 acres for piston airplanes and helicopters (per aircraft). Multiplying these area requirements by the forecast number of based aircraft yields the total land area required to accommodate the forecast number of based general aviation aircraft. In 2010, it is estimated that an additional 3 to 7 acres would be required to base jets and turboprops at OAK, and an additional 9 to 15 acres would be required to base piston airplanes and helicopters at OAK.

In 2025, it is estimated that an additional 11 to 22 acres of land (beyond the area required for 2010, or 14 to 29 acres more than existing) would be required to base jets and turboprops at OAK. It is estimated that no additional land would be required for piston aircraft and helicopters (beyond the area required for 2010).

Table 4.2 summarizes the estimated land areas required to meet the forecasts for based general aviation aircraft. The calculations summarized above are contained in detail in Appendix G.
It is important to note that not all of this demand may be met at OAK. The forecasts of based general aviation aircraft and associated land area requirements are unconstrained and represent an estimate of what would “naturally” occur at OAK, assuming appropriate facilities, such as ramps and hangars, are available for use. The following section examines possible areas on the Airport to meet the projected general aviation land requirements described above. Any actual development would be subject to further study, engineering and environmental evaluations, and financial constraints.

4.4.2 Potential General Aviation Development Areas

Figure 4.18 shows four possible areas for general aviation development at North Field, as well as relevant planning considerations for each. In general, future general aviation development at North Field consists of ramps and hangars for aircraft parking (i.e., for based aircraft). Most future general aviation development will likely be large hangars for jets and turboprops and smaller groups of hangars (like T-Hangars or Box-Hangars) for piston aircraft and helicopters. Ramp area is also required to support aircraft maneuvering and access to hangars.

The brown areas on Figure 4.18 are areas that are currently undeveloped (except for taxiways, in some areas) and could support future general aviation development. Area 1 would be most suited for smaller piston aircraft and helicopters (as opposed to corporate jets and turboprops), whereas Areas 2 and 3 would be suited for any type of general aviation development. Because Areas 1 through 3 are undeveloped, any general aviation development in these areas would require considerable site preparation (e.g., grading, engineered fill, etc.) and utility upgrades and extensions (e.g., power, sewer, storm water drainage, communications, etc.). Appropriate planning considerations for possible general aviation development in Areas 1 through 3 are shown on Figure 4.18.

The blue area on Figure 4.18, Area 4, shows existing facilities (hangars and ramps) at North Field (many of which are currently used for general aviation) that could be redeveloped and/or renovated to provide state-of-the-art general aviation facilities to meet future demand. Many of the existing buildings (hangars) and/or sites in Area 4 are either not well configured compared to modern aircraft hangars, or do not meet current fire and seismic design requirements. Planning considerations associated with redeveloping the existing general aviation uses in Area 4 are presented on Figure 4.18.

Another possibility (not shown on Figure 4.18) is to locate general aviation facilities, such as fixed base operators, at South Field, in the Central Basin, north of Taxiway W and west of Taxiway B, for example. The basic premise is that aircraft accessing this new facility may be more inclined to use Runway 11-29 at South Field (as opposed to the runways at North Field), reducing the number of general aviation aircraft (e.g., corporate jets) that land and take-off at North Field, and possibly reducing the associated noise effects in the surrounding communities. However, developing general aviation facilities at South Field has some challenges that would likely be difficult to overcome and may not reduce the effects of aircraft noise. First, any general aviation development at South Field would likely require filling a significant amount of wetlands. It might be difficult to obtain permits to fill these wetlands because North Field is a viable alternative (as evidenced by its use today for general aviation operations). Not only are there potential environmental consequences associated with filling wetlands, but there are associated engineering and financial issues as well. Many of the existing on-Airport wetlands are used to support the overall storm water drainage system at the Airport. Although most corporate jets and large turboprops (98%) already take-off on Runway 29 in West plan (in accordance with voluntary noise abatement procedures), locating large general aviation facilities at South Field may cause a significant increase in the number of corporate jets and large turboprops that also land on Runway 29, increasing congestion and delay at South Field. Finally, there might be some small piston aircraft and helicopter operations that would occur with the development of such facilities at South Field. From a runway capacity perspective, these smaller, lighter aircraft do not mix well with the larger aircraft flown by the passenger and cargo airlines.

Therefore, it is recommended that Areas 1 through 3 be considered to meet the land area requirements for based general aviation aircraft at OAK, subject to market conditions and developer interest. Areas 1 through 3 could be developed either by the Port or a tenant or a third-party developer in association with the Port (which might need to extend and upgrade utilities and/or other basic infrastructure). Further, Area 4 could be considered for redevelopment as opportunities arise.

4.5 Airline-Related Support Facilities Development

Airline-related support facilities include belly cargo, provisioning and catering, fuel load rack, ground service equipment (GSE) maintenance, GSE storage and GSE parking areas, ground runway enclosure (GRE), airport rescue and firefighting (ARFF) station, tractor, and fuel storage. Some airline-related support facilities are currently located on the Airport, and new facilities would only be required if the existing facilities are displaced by another (presumably higher and better) use. Examples include belly cargo, provisioning and catering, fuel load rack, GRE, and the ARFF station.
Because a potential future terminal was identified in the area east of Taxiway B, north of existing Terminal 1, and south of Ron Cowan Parkway, some airline-related support facilities in this area, such as belly cargo and some airline provisioning facilities, may need to be relocated to other areas, if a terminal were indeed pursued in this area.

Some airline-related support facilities are not currently located at OAK, such as GSE maintenance. Based on airline requests for such a facility, a new GSE maintenance facility is required and recommended for further study. Additionally, the airlines have requested that the triturator facility be expanded and upgraded. A renovated and upgraded triturator facility is also required and recommended for further study in the master plan.

Figure 4.19 shows various areas on the Airport that might be suitable to locate the various airline-related support facilities. The matrix on the figure identifies which airline-related support facilities would be suitable in each of the 12 potential on-Airport development areas. Planning considerations for each type of use are also presented.

Many of the airline-related support facilities should be located as close to the terminal complex as possible, making Area 1 (and some of the surrounding areas) attractive. However, the terminal area is already quite congested and will likely be more so in the future (e.g., with potential future terminal development). The need for airline-related support facilities in Area 1 will need to be balanced with other uses competing to be located in Area 1.

4.6 Ground Access Development

4.6.1 Introduction

FAA AC No. 150/5070-6A, Chapter 6, Requirements Analysis and Concepts Development (Section 3, Development Assessment) provides scant information on the study of ground access. Development criteria and goals used in recent ground access development at OAK (including the recently completed Airport Roadway Project and the new roadway and curbside expansion project) have been applied to the development of any future sites. An important planning consideration in ground access development is proximity of parking sites to activity centers at the terminals and transport between the two. There are 13 different potential ground access development areas identified on Figure 4.20, for the following four categories: potential parking development (nine areas), access and roadway (two areas), ferry access (two areas), and a preferred regional rail connection corridor (i.e., BART Connector). Planning considerations for each of the ground access development area categories are shown on the figure.

4.6.2 Parking Areas

The potential Airport parking areas are shown in Areas 1 through 9 on Figure 4.20. Area 1 depicts the extent to which the current parking bowl will expand after the current roadway and curbside expansion project is complete. It includes the current Hourly and Daily Lot A parking areas, and serves both Terminals 1 and 2.

Areas 2 and 3 would be accessed from Airport Drive via the new John Glenn Drive. Area 2 encompasses the current Daily Lot B, Southwest Provisioning Building, Oakland Maintenance Center (OMC) hangar and airfield ramp area, and the OMC employee parking area. Area 3 is the current Economy parking lot.

Areas 4 and 5 would be accessed from Neil Armstrong Way via the Ron Cowan Parkway underpass at Airport Drive. Area 4 includes the Neil Armstrong Way employee lot and adjacent construction lay-down areas; Area 5 is currently used as a construction lay-down area.

Area 6, north of the FedEx Metroplex that includes wetlands and other undeveloped land parcels, could be accessed from Ron Cowan Parkway or Air Cargo Way. Area 7, the 65-acre Matiland upland site, would use Ron Cowan Parkway to access both the site and the terminal facilities. Area 8, parallel to Runway 15-33 at North Field, is adjacent to and accessed from Harbor Bay Parkway. A possible terminal area connection to Area 9 (located adjacent to Doolittle Drive) may require development of an access route within Area 11.

4.6.3 Access / Roadways

Airport Drive provides public and non-public access and is the main circulation roadway at the Airport, with direct connection to Interstate Highway 880 via Heggenberger Road and 99th Avenue, and to the surrounding communities via State Highway 61 (Doolittle Drive and Davis Street). Access to on-Airport FedEx cargo facilities from Airport Drive is provided via Ron Cowan Parkway and Air Cargo Way. An important planning consideration is to separate airline passenger traffic from other vehicles on the main inbound roadway to enhance safety and simplify wayfinding. Airport Drive becomes a one-way, two-lane (soon to be three-lane, with the new roadway and curbside expansion project) loop roadway in the terminal area that provides access to public and employee parking lots and the terminal curb sides. Adjacent to the terminal curbsides, the roadway is comprised of three inner and two outer lanes, in addition to single loading lanes at the terminal and island curbsides.

The current roadway system, which is under construction in the loop area until 2008, is expected to accommodate passenger demand increases anticipated due to the expansion and renovation of Terminal 2.
Future roadways on the Figure 4.18 are shown in white. As the Airport expands, it may become necessary to consider other access options for either egress from the Airport or expanding the loop roadway and parking bowl in Area 1. Area 10 ties the existing outbound roadway into the outbound roadway at the perimeter of the golf course (over a viaduct or supported by fill). The Area 10 roadway would allow for expansion of the loop roadway system and parking bowl, but would encroach on existing wetlands. Area 11 would provide a new connection to Doolittle Drive, potentially for both public and non-public access.

Area 10 is considered an attractive option for future roadway development, as compared with Area 11. The Area 11 concept is based on gaining access to the potential Eden Road improvements that could provide long-term subsidiary access useful for non-public or construction purposes. However, access through Area 11 would be an expensive non-public option and would encourage the undesirable use of Davis Street if developed for public Airport access. The City of San Leandro representatives on the Stakeholder Advisory Committee discouraged the Port from considering Area 11 for potential future roadway development, and it is therefore not recommended in the master plan.

### 4.6.4 BART Connector

The currently planned corridor for the BART Connector, the automated people-mover connection to the regional rail transit system, is shown on the figure with a blue dashed line. Following are BART Connector planning considerations:

- Constrained access corridor between outbound lanes of Airport Drive and the golf course;
- At-grade alignment preferred (where possible) to minimize the cost of the guideway;
- Airport station should serve existing and potential future terminal, and allow for potential new garage and other on-Airport facility development;

The estimated time of completion for the BART Connector is uncertain and depends on when the project starts, which depends on the availability of funding. In the meantime, the Port is examining all available options for incorporating the BART Connector into the Port’s planning. If the BART Connector project begins, it would require at least 4 years to be constructed. The development of the Airport station will be planned and designed to tie into terminal facilities built on the Airport, as well as any potential parking garage. The BART Connector is a joint project between the Port and BART, with the Port providing significant funding and staff involvement in acquiring other funding. BART is the contracting agent and will construct and operate the system.

### 4.6.5 Ferry Access

Areas 12 and 13 on Figure 4.20 depict two potential cargo ferry areas (Areas 12 and 13). In 1996, FedEx commissioned a team to investigate the potential for cargo ferry service between the Peninsula and OAK using hovercraft. FedEx had previously considered such an option for transit from John F. Kennedy International Airport to Wall Street in New York. FedEx, UPS, Airborne Express and DHL (now ABX Air / DHL) were interested but unable to agree on the location of the facility on the Peninsula and configuration of the inside of the hovercraft. Alaska Airlines and United Airlines were also interested in using the service to transport parts for their maintenance facilities at OAK, but those have since closed. After further study, it is evident that the potential environmental effects would also be substantial and may be cost prohibitive. Consequently, no action has been taken on the cargo ferry project and none is anticipated in the near-term (2010) planning horizon.

Areas 12 and 13 on Figure 4.20 could also be considered for passenger ferry access to and from OAK. Passenger ferries could provide service to/from Bay Area ferry terminals (e.g., the Ferry Building in downtown San Francisco or the Larkspur Ferry Terminal in Marin County) or San Francisco International Airport.

Because these ferries would be accessing the airfield, there are significant safety and security issues that would need to be addressed. Passenger ferry access is not anticipated in the near-term (2010) planning horizon, but could be considered longer-term depending on roadway congestion and markets served at OAK and San Francisco International Airport.
Figure 4.1

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Planning Considerations

- Possible replacement terminal facilities (could more easily allow for parallel runway north of Runway 11/29)
- Greenfield site (less disruption to operations during construction, no design constraints/efficient terminal layout/minimized walking distances, no existing facilities to relocate)
- Expensive site preparation (i.e., large amount of fill, grading, soil preparation, environmental/wetlands mitigation)
- Environmentally constrained site (i.e., wetlands, wildlife, etc.)
- Good airfield access (gates near runway/site can accommodate remote aircraft parking)
- Adequate area for new access roads and parking lots
- Separate terminal operations area
- Difficult wayfinding for airline passengers (i.e., there would be two distinct terminal areas)
- Difficult/expensive BART Connector alignment
- Possible increase in vehicle trips to/from Airport through Alameda
- Moves terminal closer to residential areas

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Planning Considerations

- Greenfield site (less disruption to operations during construction, no design constraints, efficient terminal layouts, short walking distances, no existing facilities to relocate)
- Expensive site preparation (i.e., large amount of fill, grading, soil preparation, environmental/wetlands mitigation)
- Environmentally constrained site (i.e., wetlands, wildlife, etc.)
- Good airfield access (gates near runway/site can accommodate remote aircraft parking)
- Adequate area for new access roads and parking
- Separate terminal operations area
- Difficult wayfinding for airline passengers (i.e., there would be two distinct terminal areas)
- Difficult/expensive BART Connector alignment
- Possible increase in vehicle trips to/from Airport through Alameda
- Adds terminal closer to residential areas

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Planning Considerations
• Adds onto existing Terminal 1
• Relatively short walking distances (no longer than existing)
• Relatively inexpensive site preparation and terminal development
• Must relocate existing facilities (e.g., cargo and airport operations buildings)
• May need to demolish Oakland Maintenance Center hangar
• Possible impact to international arrivals aircraft parking
• Minimal/no environmental site impacts
• Good airfield access (gates near runway)
• Difficult curbside operations (insufficient curbside length and the Terminal 1 curbside is already congested)
Planning Considerations

- Adds onto existing Terminal 1 and consolidates
  baggage claim in new facility (north of existing
  terminal(s))
- Relatively inexpensive site preparation and
  terminal development
- Must relocate existing facilities (e.g., cargo and
  airport operations buildings)
- May need to demolish Oakland Maintenance
  Center hangar
- Possible impact to international arrivals
  aircraft parking
- Minimal/no environmental site impacts
- Good airfield access (gates near runway)
- Expands landside access capability/capacity
  by separating vehicles picking up arriving
  passengers (at the baggage claim curbside) and
  vehicles dropping off departing passengers
  (at the ticket curbside)
- Modifies existing garage design.

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Planning Considerations

- New unit terminal northwest of Terminal 1 (near Terminal 1)
- Relatively short walking distances
- Relatively inexpensive site preparation and terminal development
- Must relocate existing facilities (e.g., cargo building)
- May need to demolish Oakland Maintenance Center hangar
- Impact to international arrivals aircraft parking
- Minimal/no environmental site impacts
- Good airfield access (gates near runway) likely requires new taxiway parallel to Taxiway B
- Difficult curbside operations (short weave distance between new unit terminal and Terminal 1)
- May require new pedestrian connection from proposed BART Connector station to new unit terminal
Planning Considerations

- New unit terminal northeast of Terminal 1 (near Oakland Maintenance Center)
- Relatively short walking distances
- Relatively inexpensive site preparation and terminal development
- Must relocate existing facilities (e.g., Southwest Airlines' new provisioning building, cargo building)
- Must demolish Oakland Maintenance Center hangar
- No impact to international arrivals aircraft parking
- Minimal/no environmental site impacts
- Long taxi distances to northernmost gates; likely requires new taxiway parallel to Taxiway B
- Less difficult curbside operations (longer weare distance between new unit terminal and Terminal 1)
- Consumes considerable amount of vehicle parking (in existing Daily B)
- Would require additional BART Connector station at new unit terminal

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**Planning Considerations**
- New unit terminal northwest of Terminal 1
- Preserves more landside area for access/curbsides and/or vehicle parking
- Relatively short walking distances
- Relatively inexpensive site preparation and terminal development
- Must relocate existing facilities (e.g., cargo building)
- May need to demolish Oakland Maintenance Center hangar
- Impact to international arrivals airport parking
- Minimal/no environmental site impacts
- Likely requires new taxiway parallel to Taxiway B at north of airport; gates push onto new taxiway parallel to Taxiway B
- Difficult curbside operations (short weave distance between new unit terminal and Terminal 1)
- May require new pedestrian connection from proposed BART Connector station to new unit terminal

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Planning Considerations:

- New unit terminal northwest of Terminal 1 splits terminal from concourse to allow for bypass roadway access to existing Terminals 1 and 2
- Improved roadway and curbside operations/minimal weaving
- Longer walking distances than other Area 2 terminal options
- Relatively inexpensive site preparation but more expensive terminal development than other Area 2 terminal options
- Must relocate existing facilities (e.g., cargo building)
- Must demolish Oakland Maintenance Center hangar
- Impact to international arrivals aircraft parking
- Minimal/no environmental site impacts
- Good airfield access (opposite runway) likely requires new taxiway parallel to Taxiway B
- Consumes considerable amount of surface vehicle parking area
- May require new pedestrian connection from proposed BART Connector station to new unit terminal

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Planning Considerations

- New unit terminal on Oakland Maintenance Center site
- Relatively short walking distances
- Relatively inexpensive site preparation and terminal development
- Must relocate Southwest Airlines’ new provisioning building
- Must demolish Oakland Maintenance Center hangar
- May need to demolish a portion or all of the cargo building
- No impact to international arrivals aircraft parking
- Minimal/no environmental site impacts
- Long taxi distances to/from South Field runway/Very requires new taxiway parallel to Taxiway B
- Less difficult curbside operations (longer weave distance between new unit terminal and Terminal 1)
- Cargo truck traffic must mix with airline passenger traffic
- Would require new BART Connector station at new unit terminal

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Planning Considerations

- New remote (off-Airport) unit terminal with automated people mover link to/from concourse
- New remote unit terminal would not impact traffic operations in existing on-Airport terminal area
- Limited available off-Airport sites for new unit terminal
- Port would need to purchase additional land for new remote unit terminal
- Expensive automated people mover link
- Separate terminal operations area
- Would require mechanism to securely transfer checked baggage to/from concourse
- Must relocate existing facilities (e.g., cargo building)
- Impact to international arrivals aircraft parking
- Minimal/no environmental site impacts on Airport
- Good airfield access (gates near runway)/likely requires new taxiway parallel to Taxiway B
- Difficult wayfinding for airline passengers (i.e., there would be two distinct terminal areas)
- Airlines may not staff remote unit terminal and concourse
- Possible conflicts with BART Connector alignment and/or golf course

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**Planning Considerations**

- New consolidated terminal north of existing terminals (consolidates existing terminal functions – bag claim, ticketing, etc. – in new building north of existing terminals)
- May need to demolish a portion or all of the cargo building
- Must demolish the Oakland Maintenance Center hangar
- No impact to international arrivals aircraft parking
- Minimal/no environmental site impacts for terminal; roadways would likely need to traverse wetlands
- Good airfield access (gates near runway)
- Likely requires new taxiway parallel to Taxiway B
- Requires a two-level curbside roadway (which is relatively expensive)
- Relatively short walking distances to new gates; relatively long (excessive) walking distances to existing gates
- Relatively expensive, must replace existing facilities (bag claim, ticketing, etc.) in new consolidated terminal and remodel existing buildings into a different use (e.g., hold rooms)
Planning Considerations

- Extension of current Terminal 2 extension project
- Expansion site preparation (i.e., large amount of H1 grading, soil preparation, environmental/wetlands mitigation)
- Does not provide new terminal facilities (e.g., ticket counters, security checkpoint, baggage claim, etc. to accommodate passengers through new gates)
- Does not provide new curbside (the Terminal 2 curbside is already congested)
- Good airfield access (gates near turnpikes/site can accommodate remote aircraft parking)
- Long walking distances
- Adds terminal closer to residential areas
- May not be feasible due to airspace height restrictions

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Planning Considerations

- Expansion of current Terminal 2 renovation and extension project
- Expensive site preparation, including 30+ acres of Bay fill (likely not affordable)
- Environmentally constrained site (i.e., Bay fill, wetlands, wildlife, etc.)
- Good airfield access (gates near runway)/site can accommodate remote aircraft parking
- Difficult curb side development (the Terminal 2 curbside is already congested)
- Adds terminal closer to residential areas
Potential Air Cargo Development Areas

**Planning Considerations**

**Area 1**
- Provides a significant amount of area for new air cargo development (± 180 acres)
- Requires closure of Runway 15/33 (for full site development)
- For larger aircraft, long taxi distances to/from South Field runways (for noise abatement procedures)
- Significant mixing of larger air cargo aircraft and lighter general aviation aircraft at North Field
- Would require new roadway connections to Doolittle Dr (State Rte. 61) and/or Harbor Bay Parkway to provide sufficient landside access
- Requires a significant upgrade to North Field infrastructure (e.g., storm drains, sewers, power, data/communications, etc.)

**Area 2**
- Provides a significant amount of area for new air cargo development (± 330 acres)
- Expensive site preparation (i.e., large amount of fill, grading, soil preparation, environmental wetlands mitigation)
- Environmentally constrained site (i.e., wetlands, wildlife, etc.)
- Possible conflicts with potential terminal development area (still being considered by Stakeholder Advisory Committee)
- Good airfield access (site near South Field runways for noise abatement procedures)
- Possible good site access via Ron Cowan Parkway

**Area 3**
- Would allow for modest expansion of FedEx's existing site/facilities (± 29 acres)
- Some environmental constraints (i.e., wetlands)

**Area 4**
- Provides for modest expansion and/or relocation of existing cargo facilities in this area (± 40 to 90 acres)
- Possible conflicts with potential terminal development area (still being considered by Stakeholder Advisory Committee)
- Adequate airfield access (site near South Field runways for noise abatement procedures)
- Depending on site within this area, may require mixing of cargo truck traffic and airline passenger vehicle traffic

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Planning Considerations

Area 1
- Provides 20 acres ± for new general aviation (e.g., hangar) development
- Access would likely need to be from Harbor Bay Parkway
- Good site to consolidate smaller general aviation hangars (e.g., replacement facilities for older hangars, such as the new "T" hangars and Port-A-Ports)
- Somewhat longer taxi distances to Runways 27L/R and 33 than from existing new "T" hangars and Port-A-Ports
- Extensive use of the site would require relocating the City of Oakland soccer fields
- Unknown site preparation requirements and utility upgrades (possibly extensive and expensive)
- Moves general aviation development closer to residential areas (compared to existing Area 4)

Area 2
- Provides 65 acres ± for new general aviation (e.g., hangar) development
- Access would likely need to be from Harbor Bay Parkway
- Possible site for new corporate jet facilities (i.e., hangars and related offices)
- Taxiway infrastructure may need to be upgraded
- Extensive use of the site would require some taxiway realignment/reconstruction
- Short taxi distances for landing aircraft (Runways 27L/R), but long taxi distances for departing aircraft (Runway 29 for noise abatement)
- Possible conflicts with potential air cargo development area (still being considered by Stakeholder Advisory Committee)
- Unknown site preparation requirements and utility upgrades (possibly extensive and expensive)
- Moves general aviation development closer to residential areas (compared to existing Area 4)

Area 3
- Provides 15 acres ± for new general aviation (e.g., hangar) development
- Hangar development in this area would likely require a new landside roadway with a connection to Earhart Rd. and/or Doolittle Dr. (Site Rte 61)
- Possible site for new corporate jet facilities (i.e., hangars and related offices)
- Short taxi distances for landing aircraft (Runways 27L/R), but long taxi distances for departing aircraft (Runway 29 for noise abatement)
- Possible conflicts with potential air cargo development area (still being considered by Stakeholder Advisory Committee)
- Unknown site preparation requirements and utility upgrades (possibly extensive and expensive)
- Moves general aviation development closer to residential areas (compared to existing Area 4)

Area 4 (Redevelopment)
- Upgrades and/or redevelops existing (but aging) general aviation (or other aviation) facilities at North Field
- Relatively good landside access on existing roadways at North Field
- Taxi distances the same as existing
- Less site preparation and utility upgrades likely required
- Possible asbestos and lead paint issues
- Requires mixing of various types of aircraft (piston, jet, cargo, etc.)
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Planning Considerations

Parking Areas

Area 1
- Central location, convenient access to existing terminals
- Adjacent to terminal access corridor
- Currently used for public parking
- Preferred area for future parking garage

Area 2
- Within walking distance of potential new terminal
- Adjacent to terminal access corridor
- Potential area for terminal
development

Area 3
- Adjacent to terminal access corridor
- Currently used for public parking

Area 4
- Currently used for employee parking
- Difficult public access

Area 5
- Currently used for contractor lay-down area
- Difficult public access

Area 6
- Would impact wetlands
- Adjacent to freight/cargo use
- Site confined by proximity to Taxiway B

Area 7
- Upland site remotely located
- Challenge to connect to terminals

Area 8
- Poor access to terminals at South Field

Area 9
- Isolated parcel from on-Airport facilities
- Limited to informed users
- May be too small to operate efficiently

Access/Runways (Only)

Area 10
- Would impact wetlands
- May require significant (off) of drainage basin
- (could be constructed on viaduct)

Area 11
- Would impact wetlands
- Would require significant land acquisition
- Could provide non-public (e.g., service vehicles) access to Airport
- Close to jet fuel storage facility
- Would increase traffic through City of San Leandro
5.1 Introduction

This chapter presents discussion and analyses of the taxiways, runways, and remain overnight (RON) aircraft parking facilities at OAK. Airfield simulation modeling was used to identify congested areas on the airfield (taxiways and runways) and test potential improvements to minimize congestion and delay. This chapter also analyzes (1) potential congestion caused by aircraft transiting between North Field and South Field, (2) the need for a new taxiway at North Field, parallel to and south of Runway 9R-27L, (3) the need for a new air carrier runway at South Field, and (4) the need for additional remain overnight (RON) aircraft parking.

As described in Chapter 4, FAA AC No. 150/5070-6A, Chapter 6, discusses requirements, analysis, and concepts development. Although Chapter 6 of the AC does not directly address the airfield, it does provide planning principles and guidance. This chapter of the master plan is based on the planning principles and guidance contained in FAA AC No. 150/5070-6A.

5.2 Airfield Simulation, Potential Improvements, and Results

This section provides the background on the airfield simulation undertaken for this master plan, describes potential airfield improvements that minimize congestion identified in the simulations (assuming the aircraft operations anticipated in 2010, as developed in Chapter 3), and finally presents the anticipated reduction in delay and congestion that would follow if the potential airfield improvements were implemented.

5.2.1 Background

A detailed airfield simulation model was prepared using the 2010 aircraft operations forecasts presented in Chapter 3. ATAC Corporation prepared the simulation using Simmod PRO!, which is an ATAC Corporation-derivative of the FAA’s Airport and Airspace Simulation Model or SIMMODTM. Simmod PRO! simulates the movement of each individual aircraft on the airfield and in the airspace over a 24-hour day. For each aircraft in the flight schedule, Simmod PRO! can track almost any measurement of interest, such as runway occupancy time, delay in queue, taxi-in time, taxi-out time, taxi routes, etc.

The following summarizes the key assumptions used in the airfield simulation model:

(1) A new 21-gate unit terminal (for 50 total gates at OAK) would be constructed parallel to Taxiway B (generally between Taxiway B2 and Taxilane S) and would be used exclusively by Southwest Airlines (all other airlines would operate from Terminals 1 and 2);

(2) The cargo building (now housing UPS and belly cargo) would be relocated to the northern part of the Oakland Maintenance Center site;

(3) A new taxiway parallel to Taxiway B between Taxiway B2 and Taxiway T would be constructed;

(4) Air cargo and general aviation aircraft would taxi to/from and park at existing air cargo and general aviation facilities, as appropriate, except for the relocated cargo building described above (i.e., no new air cargo or general aviation facilities are assumed);

(5) General aviation touch and go operations would occur on Runway 27L (as most do today);

(6) Between 12 and 15 daily departures on Runway 29 would start from Taxiway U, as opposed to using the full-length of Runway 29 as accessed from Taxiway W (similar to the percent that use Taxiway U today);

(7) Helicopter operations are not included in the simulation model because they have virtually no impact on taxiway and runway capacity and delay at OAK;

(8) Only west plan (landings and take-offs to the west on Runways 27L, 27R, 29, and 33) and visual flight rule (VFR) weather rules are modeled (i.e., southeast plan and instrument flight rule (IFR) weather conditions are not simulated);

(9) Only OAK’s airspace is modeled (i.e., interactions with San Francisco International Airport's airspace are not modeled); and

(10) Aircraft comply with all noise abatement procedures at OAK (i.e., large turboprops and corporate jets must taxi to South Field for take-off, except those that are capable of departing on Runway 33), similar to today with a 98% compliance rate.

Additional background on Simmod PRO! and discussions of other key modeling assumptions are presented in Appendix I, which contains a technical report prepared by ATAC Corporation.

Although the entire airfield was simulated (including North Field), all congestion points in 2010 occurred at South Field (Runway 11-29 and associated taxiways). Figure 5.1 shows the total number of operations (take-offs and landings) on Runway 11-29 by time rolling throughout the 2010 planning day (purple line). It also shows the number of take-offs / departures (blue line) and landings / arrivals (green line). Runway 11-29 accommodated these aircraft operations with an increase in delay, particularly in the morning departures peak between 7 AM and 9 AM. In the morning departures peak, the average queue delay per aircraft exceeded 20 minutes. For the remainder of the day, the average queue delay per aircraft was less than 10 minutes. Queue delay is the delay experienced while waiting in line to depart Runway 29. The queue extended from Runway 29, back along Taxiway W, up Taxiway U, almost to the east apron near the Terminal 2 extension. For comparison purposes, the average queue delay per aircraft was estimated to be less than 10 minutes during the morning departures peak, with only occasional queue delays averaging less than a few minutes for the remainder of the day, in August 2005. The potential airfield improvements described in the next section are designed to minimize this congestion and reduce the queue accessing Runway 29 and the associated delay.
5.2.2 Potential Airfield Improvements

Two potential improvements to minimize the queue delay accessing Runway 29 in the morning departures peak were examined. The first potential improvement would be a new taxiway parallel to Taxiway W between Runway 29 and Taxiway U and parallel to Taxiway U between Taxiways T and Taxiway U, as shown in green on Figure 5.2. The facilities shown in blue on Figure 5.2 (a new taxiway parallel to and east of Taxiway B, potential terminal development Concept 2C, and relocation of the cargo building) are assumed for the purposes of the simulation modeling. These new access taxiways would allow for additional aircraft queuing distance and minimize the possibility that the morning departure queue would extend to the east apron. More importantly, dual taxiways feeding Runway 29 would allow air traffic control to optimize departure sequencing to take full advantage of existing runway capacity. Generally, aircraft turning in the same direction after take-off (e.g., two aircraft heading to Southern California) require more spacing between consecutive departures than aircraft turning in different directions (e.g., one aircraft going to Southern California and a second aircraft going to the east coast). Therefore, these taxiways would allow ATC to queue aircraft with different departure turns in two distinct queues and allow them to depart alternately, minimizing delay. Today, the only opportunity to “jump” the queue to achieve improved sequencing is for an aircraft to access Runway 29 from Taxiway U (resulting in a shorter runway length). The second potential improvement would be a new high-speed exit from Runway 29, between existing high-speed exits at Taxiways V and Y, as shown as Taxiway Z on Figure 5.3. As with Figure 5.2, the facilities shown in blue on Figure 5.3 are assumed for the purposes of the simulation modeling. Based on aircraft breaking performance estimates, only about 13% of the 2010 aircraft fleet mix would be able to exit Runway 29 at Taxiway V (i.e., the aircraft, after landing, is going too fast to exit here). Meanwhile, the high-speed exit at Taxiway Y is too far down the runway (i.e., aircraft are going quite slow by the time they arrive at Taxiway Y and then because of its geometry, it takes aircraft farther away from the terminal area increasing taxi times). Port staff and airfield consultants simulated a new high-speed exit between Taxiways V and Y, about 700 feet east of Taxiway V.

Figures 5.2 and 5.3 contain relevant planning considerations associated with each potential airfield improvement. It is important to note that these two taxiway improvements are independent of one another and a potential future terminal. That is, each one individually (without the other one) would reduce airfield congestion and delay, as summarized below. Moreover, these two improvements (either one or both) would also reduce airfield congestion and delay, even if a new terminal is not pursued.

5.2.3 Airfield Simulation Results

The purple line on Figure 5.4 shows the average queue delay per aircraft by time of day in 2010 on the existing airfield (i.e., with no airfield improvements), assuming the master plan flight schedule developed in Chapter 3 and contained in Appendix H. Queue delay is experienced while waiting in line on Taxiways W and U to access Runway 29 (during west plan). In August 2005, the average queue delay per aircraft was estimated to be less than 10 minutes during the morning departures peak (between about 7 and 9 AM), with only occasional queue delays averaging less than a few minutes each for the remainder of the day. In 2010, the average queue delay per aircraft jumped to about 20 minutes during the morning departures peak. Although a 20-minute average delay during the peak hour in 2010 may not cause the airlines serving OAK to change their flight schedules, it is severe enough to consider improvements to minimize it.

First, the potential Runway 29 access improvements (Figure 5.2) were simulated in the airfield simulation model. If this improvement was implemented, it is estimated that the average queue delay per aircraft would be reduced by up to 23% (over the entire planning day), and the average queue delay per aircraft in the morning peak hour drops from about 20 minutes to about 12 minutes (see the blue line on Figure 5.4).

Second, the new high-speed taxiway was simulated (Taxiway Z on Figure 5.3). Approximately 79% of the 2010 aircraft fleet mix would be able to exit here, as opposed to only 13% being able to exit at Taxiway V, reducing runway occupancy time upon landing by about 15% (because aircraft do not have to taxi all the way to Taxiway Y to exit Runway 29). Taxi time and distance is reduced by approximately 9%, saving the airlines fuel and providing a potential air quality benefit. Moreover, because landing aircraft would be able to exit the runway sooner, aircraft queued for departure can depart sooner. It is estimated that the average departure queue delay per aircraft would be reduced by up to 21% over the entire planning day, and the average queue delay per aircraft in the morning peak hour drops from about 20 minutes to just over 15 minutes (see the green line on Figure 5.4).

Taken together, these two potential taxiway improvements allow Runway 11-29 to operate more efficiently during the morning departures peak period. The average queue delay per aircraft in 2010 with both improvements is plotted by time of day on Figure 5.4 in red. The average queue delay per aircraft during the morning departures peak drops to about 10 minutes (from about 20 minutes with no improvements).

These potential improvements were discussed with the Stakeholder Advisory Committee. Although there were no strong objections to either potential improvement, the Committee did ask several questions about whether
these potential improvements increase the capacity of Runway 11-29. These types of improvements reduce delay during the peak period and allow the runway to operate more efficiently, closer to its maximum potential capacity (i.e., capacity limited by required FAA aircraft separation standards). Without these potential airfield improvements, the airlines would simply accept the delay, and some aircraft would not depart in the peak hour, but be delayed to the subsequent hour. Delay costs the airlines money and is inconvenient for airline passengers. The capacity of a single runway is fixed, given a fleet mix, arrival/Departure schedule, and weather. In other words, in 2010, it is unlikely that the airlines would choose to add or cancel a flight or even change their flight schedule due to these potential improvements. Runway 11-29 can accommodate the anticipated 2010 flight schedule (with the associated assumptions, such as 21 additional aircraft gates) with some increase in delay (less with the two airfield improvements described above). Finally, it should be noted that these potential airfield improvements may improve air quality because aircraft would be idling in queue for a shorter duration on average.

Therefore, it is recommended that the Port further study both of these potential airfield improvements, including additional engineering, environmental, and economic feasibility studies.

5.3 Potential North Field Taxiway Improvement

Shown in Figure 5.5, a potential new taxiway at North Field, parallel to Runway 9R-27L, was also evaluated (but not simulated) as part of the overall airfield evaluation. This taxiway would improve safety by minimizing the number of runway crossings required for an aircraft that lands on Runway 27L (the longest runway at North Field) that needs to taxi to South Field (e.g., passenger airplanes that land at North Field when Runway 11-29 is closed). For example, if an aircraft landed on Runway 27L and needed to taxi to South Field today, it would exit Runway 27L to the right at Taxiway J, cross Runway 9L-27R, taxi eastbound on Taxiway C, cross Runway 9L-27R, and then cross Runway 9R-27L, before proceeding southbound on Taxiway B to South Field, for a total of three runway crossings. With the potential new taxiway shown on Figure 5.5, aircraft landing on Runway 27L could make a left turn off the runway, taxi eastbound on the new taxiway to Taxiway B, and proceed to South Field without crossing any runways. It also provides a shorter taxi route for these aircraft. Although this taxiway does provide some benefits, it is not required and its benefits may not outweigh its costs (construction costs may be substantial due to poor soil conditions and drainage issues in this area).

Several members of the Stakeholder Advisory Committee from the City of San Leandro expressed concern that this potential new taxiway at North Field would make North Field more convenient for use by passenger and cargo airline aircraft parking at South Field. Because of the likely marginal benefit to cost comparison and because of concerns raised by the Stakeholder Advisory Committee, this potential taxiway improvement is not recommended for further study and development.

5.4 Potential North Field–South Field Taxiway Connector

A potential new North Field–South Field taxiway connection was analyzed to reduce taxi time and delays. The only existing connection is Taxiway B, which runs between Taxiway W at South Field and Taxiway C at North Field, and crosses Ron Cowan Parkway on a bridge. Taxiway B currently only allows one-way taxi flow (southbound or northbound) at any one time, with two bypasses provided on Taxiway R and Taxiway V. For example, if a FedEx aircraft landed on Runway 29 and received permission to taxi to the Metroplex, then a corporate jet taxiing southbound on Taxiway B to depart on Runway 29 would have to wait (e.g., north of Taxiway R) until the FedEx aircraft pulls into the Metroplex (clear of Taxiway B) before proceeding southbound on Taxiway B. Alternately, the northbound FedEx aircraft might have to hold on Taxiway V to allow the southbound corporate jet to bypass. Once the corporate jet is past Taxiway T, the FedEx aircraft could then taxi to the Metroplex on Taxiway B. All aircraft movements, including the use of Taxiway B and bypass issues, are directed by air traffic control tower personnel.

Several members of the Stakeholder Advisory Committee expressed interest in minimizing taxi time and delays in order to encourage compliance with voluntary noise abatement procedures, which require corporate jets and large turboprops, which land and park at North Field, to depart from Runway 29 (taxing from North Field to South Field southbound on Taxiway B). Some Committee members were interested in minimizing head-to-head taxi events on Taxiway B, which require one aircraft to hold so another one can taxi safely bypass it, which could discourage the use of Runway 29 if excessive delay is incurred due to this holding / bypassing. Further, some Committee members were interested in studying if any of these taxiways shorten the taxi distance and time between North Field and South Field (Runway 29), thereby encouraging compliance with the voluntary noise abatement procedures described above.

Using the airfield simulation for 2010 described above, it was determined that most head-to-head taxi events on Taxiway B occur south of Taxiway B1 (south of Ron Cowan Parkway) and Runway 11-29, thereby requiring compliance with the voluntary noise abatement procedures described above. Several members of the Stakeholder Advisory Committee expressed interest in minimizing taxi time and delays in order to encourage compliance with voluntary noise abatement procedures. Some members of the Committee were interested in minimizing head-to-head taxi events on Taxiway B, which require one aircraft to hold so another one can taxi safely bypass it, which could discourage the use of Runway 29 if excessive delay is incurred due to this holding / bypassing. Further, some Committee members were interested in studying if any of these taxiways shorten the taxi distance and time between North Field and South Field (Runway 29), thereby encouraging compliance with the voluntary noise abatement procedures described above.
Cowan Parkway) on South Field. These occur, for example, when a FedEx aircraft is traveling northbound on Taxiway B (after landing) to the FedEx Metroplex, while a FedEx aircraft is traveling southbound on Taxiway Y (after landing) to the FedEx Metroplex, and when a FedEx aircraft is traveling northbound on Taxiway B (after landing) to the FedEx Metroplex, while a FedEx aircraft is traveling southbound on Taxiway Y (after landing) to the FedEx Metroplex. These events would be required to support a new terminal in this vicinity (as simulated), solves the head-to-head taxi issues on Taxiway B, without the need for a new connection between North Field and South Field (and crossing Ron Cowan Parkway). For additional details on the airfield simulation results, see ATAC Corporation’s technical memorandum contained in Appendix I.

The second study was to determine if any of the potential North Field–South Field taxiway alternatives (T0 through T4) significantly shorten the taxi distance and time from North Field, Taxiway 1 (T1) has potential to shorten taxi distance and time, up to about one minute (on average) on an otherwise almost 10 minute taxi (over almost 3 miles), or about a 10% reduction in taxi distance and time. Although this taxiway alignment would provide a slightly shorter taxi distance and time, it is unlikely that a time savings of just one minute over an otherwise 10 minute taxi would encourage additional compliance with noise abatement procedures. It was pointed out to the Stakeholder Advisory Committee that almost 90% of the corporate jets and large turboprop comply with the voluntary noise abatement procedures already, and those that do not are typically daytime flights.

In summary, a new taxiway parallel to Taxiway B between Taxiway B2 (i.e., south of Ron Cowan Parkway) and Taxiway T would reduce most head-to-head taxi events on Taxiway B, minimizing delay for aircraft taxiing between North Field and South Field. This taxiway would also be required to support a new terminal in this vicinity, if such a terminal is proposed and approved. However, a full new connection between North Field and South Field, as shown on Figure 5.6, does not appear to be warranted, at least in the near-term, as it does not significantly shorten taxi distance or time, and the head-to-head taxi events are solved with a new taxiway parallel to Taxiway B, as described above.

### 5.5 Potential New South Field Runway

Beyond 2010, Runway 11-29 will continue to experience increases in delay (although less if the two taxiway improvements described in Section 5.2.2 are implemented), as the morning departures peak continues longer into the morning and at other peak activity periods. Detailed simulation analyses were not performed beyond 2010; however, it is anticipated that delay on Runway 11-29 will increase so as to warrant additional runway capacity at South Field between 2015 and 2025.\(^1\) A high-level approximation of runway capacity and delay was prepared using the Annual Service Volume (ASV) methodology outlined in FAA AC No. 150/5060-5, Airport Capacity and Delay (see Appendix J.). Because additional runway capacity at South Field will likely be required before the end of the long-term planning horizon in the master plan (2025), Figure 5.7 was prepared showing five potential new runways at South Field, one inboard (north) of existing Runway 11-29 (Runway I1) and four outboard (south) of existing Runway 11-29 (Runways O1, O2, O3, and O4). The graphic presents planning considerations outlining the benefits and issues associated with each runway. All of the potential new runways have considerable environmental issues associated with filling wetlands and San Francisco Bay, as well as financial issues (e.g., the outboard options are expected to cost several billion dollars).

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\(^1\) In accordance with various settlement agreements with the surrounding communities, the Port has agreed not to construct any new runways on any portion of North Field. The Port has also agreed not to realign, lengthen, widen, or strengthen the uses of accommodating larger or heavier aircraft on the existing runways at North Field, unless such improvements are necessary to maintain Runway 9R-27, as an alternate runway to Runway 11-29 or such improvements are necessary to comply with FAA standards. For details, please refer to the relevant settlement agreements.
Therefore, it is recommended that the Port not pursue a new South Field runway at this time due to environmental and financial constraints. However, it is recommended that the Port work with its regional partners (e.g., the Regional Airport Planning Committee, the San Francisco Bay Water Transit Authority) to continue discussions about the future demand and capacity of runways at Bay Area airports and possible alternatives. Providing additional runway capacity for the Bay Area should be discussed and decided by the entire region. For example, other options for providing additional Bay Area runway capacity could include air service development at other regional or military airports, or exploring the possibility of linking OAK and San Francisco International Airport with passenger ferry service (see discussion of ferry service in Section 4.6.5, which highlights some of the challenges associated with ferry service at OAK).

The Stakeholder Advisory Committee discussion about new runway capacity at South Field was mixed. Most members preferred not to discuss the need for new runway capacity in the long-term; others saw some potential aircraft noise reduction with the outboard runway options (Runways O1, O2, O3, and O4 in Figure 5.7).

### 5.6 Remote Remain Overnight (RON) Aircraft Parking

The need for future remote (off-gate, on-Airport) RON aircraft parking apron was evaluated. Remote RON aircraft parking demand at OAK is considerable. Because OAK is a west coast spoke (as opposed to hub) airport, many airlines want to park their aircraft overnight so that they can start the next day at OAK with an early morning departure (typically between 6 and 8 AM). Further, the largest airline at OAK, Southwest Airlines, has a crew base at OAK, increasing the number of aircraft needing to be parked overnight for early morning departures. It should also be noted that currently, Southwest Airlines does not fly their aircraft through the night (i.e., on red-eye flights), but parks them for maintenance and servicing. For the purposes of the master plan, remote RON aircraft parking apron is described in terms of area (acres), as opposed to the number of aircraft parking positions. In February 2005, there were 26 acres of apron dedicated to RON aircraft parking, of which 21 acres was in use on any given night. After the Terminal 2 renovation / extension project is complete, there will be approximately 33 acres of apron dedicated to RON aircraft parking, of which 23 to 26 acres is anticipated to be required on any given night. As new aircraft gates are constructed at OAK, RON aircraft parking will continue to be required. However, less apron area per gate may need to be dedicated to RON, as more aircraft will be able to park overnight at aircraft gates (rather than on remote RON aprons). It is anticipated that additional gate construction would allow the gate-use intensity to decrease such that it will not be required to push an aircraft off a gate for a subsequent arrival (i.e., it can remain parked on the gate until its morning departure and the later arrival can use its own gate and also remain there until morning).

The first step to estimate future remote RON aircraft parking requirements is to develop appropriate planning factors. As of February 2005, between 0.8 and 0.9 acres of remote RON aircraft parking apron per aircraft gate is required depending on the number of aircraft gates that are also used for RON aircraft parking (90% vs. 70%, respectively). Based on RON aircraft parking data from McCarran (Las Vegas) International Airport (a large, west-coast airport with Southwest Airlines operations), the anticipated reduction in remote RON aircraft parking demand due to the availability of aircraft gates could result in requirements closer to 0.5 acres of remote RON aircraft parking apron per aircraft gate. Using this data, low (0.5 acres per aircraft gate), medium (0.8 acres per aircraft gate), and high (0.9 acres per aircraft gate) requirements are then calculated for the 2010 to 2012 timeframe (with 46 to 50 total aircraft gates) and 2025 timeframe (with 65 to 75 total aircraft gates). As shown in Table 5.2, the required area for remote RON aircraft parking apron ranges from about 23 acres to 46 acres in the 2010 to 2012 timeframe and from about 33 to 68 acres in the 2025 timeframe. The calculations summarized above are contained in detail in Appendix G.

Providing the required amount of remote RON aircraft parking will be challenging, as shown in Figure 5.8. All areas except Area 1 require wetlands to be filled / impacted. Providing remote RON aircraft parking in Area 1 will be challenging, because potential future terminal concepts in this area likely eliminate existing remote RON aircraft parking aprons. Planning considerations for each potential area are shown on Figure 5.8.

<table>
<thead>
<tr>
<th>Total Aircraft Gates</th>
<th>2010 to 2012</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (1)</td>
<td>Medium (2)</td>
</tr>
<tr>
<td>46</td>
<td>23</td>
<td>36</td>
</tr>
<tr>
<td>50</td>
<td>25</td>
<td>39</td>
</tr>
</tbody>
</table>

(1) Assumes the gate to remote RON aircraft parking area ratio will increase in the future; (2) Assumes existing gate to remote RON aircraft parking area ratio with 10% of gates not used for RON aircraft parking; (3) Assumes existing gate to remote RON aircraft parking area ratio with 30% of gates not used for RON aircraft parking.
Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examines many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action. It might represent an idea or concept that was discarded, and must be interpreted in the context of the entire master plan document.
Planning Considerations
- Provides additional aircraft queuing area for Runway 29.
- Provides greater aircraft sequencing capabilities.
- Negates the need for midfield take-offs.
- Impacts wetlands (approximately 1.6 Acres).
- Reduces Runway 29 queuing by 23% (39% with new high-speed exit taxiway).

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action (i.e., right informed action concept that was discarded), and must be interpreted in the context of the entire master plan document.
Planning Considerations

- Reduces Runway Occupancy Time (ROT) (approximately 15%)
- Impacts wetlands (approximately 1.2 Acres)
- Decreases taxi distances and time (approximately 9%)
- Reduces airfield congestion
- Reduces Runway 29 queue delay by 21% (39% with new Runway 29 access)

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not represent any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.
Master Plan 2010 Forecast — Runway 29 Queue Delay Comparison

Average Delay per Aircraft (min)

Time of Day (hr)

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.
Planning Considerations

- Minimizes runway crossings (improves safety) for aircraft landing at North Field that need to taxi to South Field (e.g., passenger airlines that land at North Field when Runway 11-29 is closed)
- Provides a shorter taxi route (distance and time) for aircraft landing at North Field that need to taxi to South Field (Runway 9R-27L is a designated air carrier alternate runway and used when Runway 11-29 is closed)
- Allows for more taxiway redundancy for extended maintenance activities (e.g., when Runway 11-29 needs to be overlaid in the future)
- Provides a more standard airfield layout for North Field
- Difficult/expensive construction (e.g., poor soil and drainage conditions)

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only; it does not represent any particular course of action. It might represent an idea or concept that was discarded and must be interpreted in the context of the entire master plan document.
This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examines many possible ideas and planning concepts. The graphics are conceptual in nature and are not meant to represent any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.

**Planning Considerations**

**Taxiway 0**
- Allows aircraft taxiing to South Field to bypass the departure queue for Runways 27R and 27L (improves airfield flow)
- Merges with Taxiway B north of the bridge over Ron Cowan Parkway, negating the need to construct a new (second) taxiway bridge over Ron Cowan Parkway
- Does not impact wetlands
- Provides a more standard airfield layout (compared to existing Taxiway B)
- May not be required if a new taxiway parallel to and east of Taxiway B is constructed south of the Oakland Maintenance Center site (to Taxiway T)

**Taxiway 1**
- Provides additional taxiway connection between North Field and South Field
- Improves airfield flow and minimizes head-to-head aircraft operations on Taxiway B
- Provides taxiway access to Central Basin
- Of Central Basin options (T1, T2, and T4), minimizes impact to wetlands (3 acres of wetland impact)
- Requires a portion of Ron Cowan Parkway to be reconstructed below-grade with a difficult connection to Harbor Bay Parkway
- Provides relatively long taxi distances for corporate jets taxiing from North Field to depart South Field on Runway 29
- Moves taxiing aircraft closer to the City of Alameda
- Expansive construction (i.e., large amount of fill, grading, soil preparation, environmental/wetlands mitigation)
- May not be required if a new taxiway parallel to and east of Taxiway B is constructed south of the Oakland Maintenance Center site (to Taxiway T)

**Taxiway 2**
- Provides additional taxiway connection between North Field and South Field
- Improves airfield flow and minimizes head-to-head aircraft operations on Taxiway B
- Provides taxiway access to Central Basin
- Requires large wetlands impact (35 acres)
- Expansive construction (i.e., large amount of fill, grading, soil preparation, environmental/wetlands mitigation)
- May not be required if a new taxiway parallel to and east of Taxiway B is constructed south of the Oakland Maintenance Center site (to Taxiway T)

**Taxiway 3**
- Provides additional taxiway connection between North Field and South Field, connecting to Taxiway B and a new taxiway parallel to and east of Taxiway B
- Improves airfield flow and minimizes head-to-head aircraft operations on Taxiway B
- Requires minor wetlands impact (2 acres)
- Requires a portion of Ron Cowan Parkway to be reconstructed below-grade in proximity to existing Taxiway B bridge/ Ron Cowan Parkway undercrossing
- May not be required if a new taxiway parallel to and east of Taxiway B is constructed south of the Oakland Maintenance Center site (to Taxiway T)

**Taxiway 4**
- Provides additional taxiway connection between North Field and South Field
- Improves airfield flow and minimizes head-to-head aircraft operations on Taxiway B
- Provides taxiway access to Central Basin
- Requires large wetlands impact (27 acres)
- Expansive construction (i.e., large amount of fill, grading, soil preparation, environmental/wetlands mitigation)
- May not be required if a new taxiway parallel to and east of Taxiway B is constructed south of the Oakland Maintenance Center site (to Taxiway T)
Figure 5.7

Potential New South Field Runways

LEGEND
- Future Runways
- Future Taxiways
- Future Landfill
- Displaced Threshold
- Wetlands
- Airport Land
- Buildings
- Runways
- Taxiways
- Roadways
- Future Roadways
- Land
- Water

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not present any particular course of action (in whole or in part) that has been discarded, and must be interpreted in the context of the entire master plan document.

Planning Considerations

Runway 21 (700 ft. Inboard of Runway 11-29)
- Provides an increase in runway capacity during visual meteorological conditions (VMC)
- Allows for parallel, simultaneous departures of 14 divergent headings (15 degrees or more) available and 12 for departing aircraft; do not need to turn in the same direction
- Allows one runway to be used for approaching aircraft and the other runway to be used for departing aircraft, eliminating the need to preserve gaps for disparate operations
- Moves aircraft existing or departing Runway 21 closer to residential areas in San Leandro or Alameda (respectively, in West Plan)
- Minimizes aircraft queuing distance available between terminal area and Runway 25, further congesting the terminal area
- Requires demolition or relocation of the Ground Run-up Enclosure (GRE)
- Possible wake turbulence concerns (may limit simultaneous operations even in VMC)
- Only offers limited or no benefit to passenger airline operations
- Somewhat expensive/difficult construction

Runway 22 (2,500 ft. Outboard of Runway 11-29)
- Allows independent (paired, simultaneous) operations (take-offs and landings) with/without wake turbulence concerns in VMC
- Allows for independent (simultaneous) arrivals to one runway and departures from the other runway in instrument meteorological conditions (IMC)
- Allows for staggered (not simultaneous) paired arrivals in IMC
- Provides a moderate to substantial increase in runway capacity in VMC and IMC conditions (and associated reduction in delay)
- May be able to use new GPS-based technologies to further improve runway capacity (e.g., allowing for paired, simultaneous arrivals)
- Provides limited or no benefit to passenger airline operations
- Somewhat expensive/difficult construction

Runway 23 (3,400 ft. Outboard of Runway 11-29)
- Allows independent (paired, simultaneous) operations (take-offs and landings) in VMC and IMC with special radar equipment to monitor arriving and departing aircraft
- Provides a substantial increase in runway capacity in VMC and IMC conditions and associated reduction in delay
- Moves aircraft existing or departing Runway 23 farther away from residential areas in San Leandro or Alameda (respectively, in West Plan)
- Possible wake turbulence interaction issues with arrivals to San Francisco International Airport (SFO)
- Expensive/difficult construction

Runway 24 (4,300 ft. Outboard of Runway 11-29)
- Operates similar to Runway 23, without special radar equipment
- Expands the influence of wake turbulence effects
- Provides additional runway capacity in VMC and IMC conditions
- Provides additional runway capacity in low-visibility conditions
- May cause an increase in runway safety area available
- Provides limited or no benefit to passenger airline operations
- Somewhat expensive/difficult construction

Runway 25 Extension
- Extends Runway 11-29 by 1,600 feet for a total length of 11,600 feet, including runway safety areas
- Would require associated taxiway extensions
- May require the runway be shifted 500 feet farther west to provide a full runway safety area on approach to Runway 29 (not shown)
- Does not increase runway capacity
- Allows large air cargo aircraft to depart with heavier loads on larger flights (e.g., air cargo flights to Asia)
- Provides limited or no benefit to passenger airline operations
- Somewhat expensive/difficult construction

Note: The graphic also includes a list of potential impacts and considerations associated with each proposed runway option, such as the impact on air traffic, noise, and environmental considerations.
Planning Considerations

Area 1 (Terminal Area)
- Provides RON aircraft parking around the perimeter of taxiways, terminals, buildings, etc. (areas not used for other terminal area functions)
- Provides RON aircraft parking in proximity to gates, with no taxiway crossings
- Competes for area for other terminal area functions, such as automobile parking
- Area available for RON aircraft parking depends on the future terminal concept (some concepts allow for more RON aircraft parking area, and some less)

Area 2
- Provides approximately 11 acres for RON aircraft parking
- Impacts wetlands
- Must use/cross active taxiways when repositioning aircraft between RON parking positions and gates

Area 3
- Provides approximately 20 acres for RON aircraft parking
- Impacts wetlands
- Must use/cross active taxiways when repositioning aircraft between RON parking positions and gates
- May be affected by longer-term need for new South Field runway and associated taxiway system

Area 4
- Provides approximately 28 acres for RON aircraft parking
- Impacts wetlands
- Impacts a major storm water drainage basin
- May avoid the need to use/cross active taxiways when repositioning aircraft between RON parking positions and gates
- May be affected by new taxiways to improve access to Runway 29
- May not be feasible due to airspace height restrictions

Area 5
- Provides approximately 9 acres for RON aircraft parking
- Possible impacts to wetlands (depending on the exact size and shape of the area)
- Must use/cross active taxiways when repositioning aircraft between RON parking positions and gates
- May impact first possible future expansion of Federal Express (Area 3 from graphic showing Potential Air Cargo Development Areas)

North Field (not shown)
- Significant area available to develop RON aircraft parking
- Long reposition distances on taxiways between North Field and gates (inefficient for airline operations)
- May lead to excessive delay on Taxiway B

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and is not planning proposals only. It does not represent any particular source of action (i.e., right of way, area or concept that was discarded), and must be interpreted in the context of the entire master plan document.
Chapter 6: Environmental Considerations

“How long can men thrive between walls of brick, walking on asphalt pavements, breathing the fumes of coal and of oil, growing, working, dying, with hardly a thought of wind, and sky, and fields of grain, seeing only machine-made beauty, the mineral-like quality of life?”

— Charles A. Lindbergh, Reader’s Digest, November 1939

6.1 Introduction

This chapter presents screening-level analyses for potential environmental effects of the aircraft operations forecasts and potential master plan projects discussed in Chapters 3 through 5. It is important to note that there may or may not be a correlation between potential master plan projects and the number of aircraft operations. That is, in some cases, potential projects might reduce or at least not increase the number of aircraft operations, or aircraft operations might occur in any event, even if some of the potential master plan projects are not constructed.

This chapter has the following five sections:

• Wetlands (Section 6.2)
• Aircraft Noise (Section 6.3)
• Other Airport Environmental Programs and Policies (Section 6.4)
• Preliminary Environmental Screening Matrix (Section 6.5)
• Community-Requested Environmental Projects (Section 6.6)

The analyses presented in this chapter have been prepared in accordance with FAA AC No. 150/5070-6A. The AC states that the two essential components of environmental analysis in the OAK master plan, the following principle, as outlined in the AC, was used: “The information presented in this AC covers the planning requirements for all airports, regardless of size, complexity or role. However, the scope of study must be tailored to the individual airport, with the level of effort limited to its specific needs and problems. Based on an airport’s specific needs, certain master planning elements may be emphasized while others will not be considered at all.”

As a concept-level planning and feasibility study, the OAK master plan focuses on short-term planning strategies and long-term planning principles, not specific airport projects or facilities. If and when any possible development contemplated in the OAK master plan should ripen into a project that the Port may wish to pursue and approve, the Port will follow all environmental regulations and permit requirements required of specific project-level planning, including environmental review in accordance with the National Environmental Policy Act (NEPA) and/or the California Environmental Quality Act (CEQA).

As such, when it considers approval of the OAK master plan, the Board of Port Commissioners will not be deciding to propose or approve any specific project or groups of projects. Rather, any project identified in the OAK master plan would need to undergo more detailed planning, engineering and environmental review before it could proceed, including understanding how much it might cost, how it is going to be funded, and importantly, its environmental effects (through a CEQA and NEPA process). Only then could a project or groups of related projects be approved by the Board and proceed into construction. For additional discussion on environmental considerations in the master plan, see Appendix K.

6.2 Wetlands

Figure 6.1 shows the wetlands and other water bodies on the Airport that are under jurisdiction of the U.S. Army Corps of Engineers. According to the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency, wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. As described in Figure 2.2, there are approximately 327 acres of jurisdictional wetlands, the majority of which are located on South Field in the Central Basin and around Runway 11-29.

The list of planning considerations for each of the potential development areas (Chapter 3) and the potential airfield development (Chapter 4) noted if the potential development would likely impact on Airport wetlands. If a potential project that impacts wetlands were to proceed, the Port would need to obtain permits to fill the wetlands and would be required to mitigate the effects by replacing wetlands at another (preferably off-Airport) location. It is important to note that while wetlands are environmentally beneficial and, in some locations on the Airport, serve an important drainage function (e.g., filtering storm water runoff), they also attract birds, which can pose a serious safety hazard to aircraft operations.

6.3 Aircraft Noise

This section presents background on aircraft noise (Sections 6.3.1 through Section 6.3.5), discusses existing aircraft noise control programs at OAK (Section 6.3.6), and presents the results of aircraft noise modeling, which compares existing (2004) aircraft noise contours with anticipated 2010 aircraft noise contours, assuming the aircraft operations forecasts developed in Chapter 3 (Sections 6.3.7 through 6.3.9).
6.3.1 Background

This section presents background information on the characteristics of noise. Noise analyses involve the use of technical terms that are used to describe aviation noise. This section provides an overview of the metrics and methodologies used to assess the effects of noise.

Characteristics of Sound

Sound Level and Frequency — Sound can be technically described in terms of the sound pressure (amplitude) and frequency (similar to pitch). Sound pressure is a direct measure of the magnitude of a sound without consideration for other factors that may influence its perception.

The range of sound pressures that occur in the environment is so large that it is convenient to express these pressures as sound pressure levels on a logarithmic scale that compresses the wide range of sound pressures to a more usable range of numbers. The standard unit of measurement of sound is the Decibel (dB) that describes the pressure of a sound relative to a reference pressure.

The frequency (pitch) of a sound is expressed as Hertz (Hz) or cycles per second. The normal audible frequency for young adults is 20 Hz to 20,000 Hz. Community noise, including aircraft and motor vehicles, typically ranges between 50 Hz and 5,000 Hz. The human ear is not equally sensitive to all frequencies, with some frequencies judged to be louder for a given signal than others. See Figure 6.2. As a result of this, various methods of frequency weighting have been developed. The most common weighting is the A-weighted noise curve (dBA). The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear. In the A-weighted decibel, everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Most community noise analyses are based upon the A-weighted decibel scale. Figure 6.3 shows the A-weighted scale compared to other scales such as the C-weighted scale, which is more sensitive to low frequency noise and used in assessing hearing loss in occupational or recreational exposures to noise. The C-weighted scale has also been used to quantify low frequency noise in the environment, but such use is crude and can be misleading. Changes in C-weighted scale noise do not mean changes in low frequency noise. The C-weighted scale also measures higher frequency sounds, and therefore a change in the C-weighted scale measurement could be due to low or high frequency sounds. If low frequency noise impacts are to be identified, measurements in frequency bands are the best method of defining low frequency noise.

Sources of Aircraft Noise — The noise generated by an aircraft flight is quite complex. The sound sources can be described in four broad categories: jet noise (the mixing of high velocity exhaust gases with ambient air), combustor noise (the noise associated with the rapid oxidation of jet fuel and the associated release of energy), turbomachinery noise (often noticed as an aircraft is coming towards you), and aerodynamic noise (the noise associated with rapid air movement over the airframe and control surfaces). New technologies in modern aircraft have achieved significant reductions in jet noise and combustor noise. Turbomachinery noise has also been reduced in newer aircraft. Aerodynamic noise is a current area of acoustic research to reduce aircraft noise. As jet noise, combustor noise and turbomachinery noise are reduced, aerodynamic noise may remain as the major noise source on aircraft of the future.

Propagation of Noise — Outdoor sound levels decrease as the distance from the source increases, and as a result of wave divergence, atmospheric absorption and ground attenuation. Sound radiating from a source in a homogeneous and undisturbed manner travels in spherical waves. As the sound wave travels away from the source, the sound energy is dispersed over a greater area decreasing the sound power of the wave. Spherical spreading of the sound wave reduces the noise level at a rate of 6 dB per doubling of the distance.

Atmospheric absorption also influences the levels received by the observer. The greater the distance traveled, the greater the influence of the atmosphere and the resultant fluctuations. Atmospheric absorption becomes important at distances of greater than 1,000 feet. The degree of absorption varies depending on the frequency of the sound as well as the humidity and temperature of the air. For example, atmospheric absorption is lowest (i.e., sound carries farther) at high humidity and high temperatures. Schematic atmospheric effects diagrams are presented in Figure 6.4. Turbulence and gradients of wind, temperature and humidity play a significant role in determining the propagation of sound over a large distance. At short distances between the source and receiver, atmospheric effects are minimal. Certain conditions, such as inversions, can channel or focus the sound waves resulting in higher noise levels than would result from simple spherical spreading. Absorption effects in the atmosphere vary with frequency. The higher frequencies are more readily absorbed than the lower frequencies. Over large distances, the lower frequencies become the dominant sound as the higher frequencies are attenuated.

The effect of sound reflecting across a water surface has an even more profound effect than weather. Sound propagating over water is louder than propagating over land as the result of the reflective characteristics of water. Shielding of noise by a structure also can have significant effects on noise. Structures such as buildings, homes, sound walls, etc., block the straight line propagation of sound. Homes shielded by these structures receive a lower noise level than without the intervening structures.
Duration of Sound — Annoyance from a noise event increases with increased duration of the noise event (i.e., the longer the noise event, the more annoying it is). The ‘effective duration’ of a sound is the time between when a sound rises above the background sound level until it drops back below the background level. Psycho-acoustic studies have determined the relationship between duration and annoyance and the amount a sound must be reduced to be judged equally annoying for increased duration. Duration is an important factor in describing sound in a community setting.

The relationship between duration and noise level is the basis of the equivalent energy principal of sound exposure. Reducing the acoustic energy of a sound by one half results in a 3 dB reduction. Doubling the duration of the sound increases the total energy of the event by 3 dB. This equivalent energy principal is based upon the premise that the potential for a noise to impact a person is dependent on the total acoustical energy content of the noise. Defined in Section 6.3.2, noise metrics such as CNEL, DNL, Leq and SEL are all based upon the equal energy principle.

Change in Noise — The concept of change in ambient sound levels can be understood with an explanation of the hearing mechanism’s reaction to sound. The human ear is a far better detector of relative differences in sound levels than absolute values of levels. Under controlled laboratory conditions, listening to a steady unvarying pure tone sound that can be changed to slightly different sound levels, a person can just barely detect a sound level change of approximately 1 decibel for sounds in the mid-frequency region. When ordinary noises are heard, a young healthy ear can detect changes of two to 3 decibels. A 5 decibel change is readily noticeable while a 10 decibel change is judged by most people as a doubling or a halving of the loudness of the sound. It is typical in environmental documents to consider a 3 dB change as potentially discernable.

6.3.2 Sound Rating Scales

The description, analysis, and reporting of community sound levels is made difficult by the complexity of human response to sound and myriad of sound-rating scales and metrics developed to describe acoustic effects. Various rating scales approximate the human subjective assessment to the “loudness” or “noisiness” of a sound. Noise metrics have been developed to account for additional parameters such as duration and cumulative effect of multiple events.

Noise metrics are categorized as single event metrics and cumulative metrics. Single event metrics describe the noise from individual events, such as one aircraft flyover. Cumulative metrics describe the noise in terms of the total noise exposure throughout the day. Noise metrics used in this study are summarized below.

Single Event Metrics

Frequency Weighted Metrics (dBA) — In order to simplify the measurement and computation of sound loudness levels, frequency-weighted networks have obtained wide acceptance. The A-weighting (dBA) scale has become the most prominent of these scales and is widely used in community noise analysis. Its advantages are that it has shown good correlation with community response and is easily measured. The metrics used in this study are all based upon the dBA scale.

Maximum Noise Level — The highest noise level reached during a noise event is called the “Maximum Noise Level,” or Lmax. For example, as an aircraft approaches, the sound of the aircraft begins to rise above ambient noise levels. The closer the aircraft gets, the louder it is until the aircraft is at its closest point directly overhead. Then as the aircraft passes, the noise level decreases until the sound level again settles to ambient levels. Such a history of a flyover is plotted at the top of Figure 6.5. It is this metric to which people generally instantaneously respond when an aircraft flyover occurs.

Single Event Noise Exposure Level (SENEL) or Sound Exposure Level (SEL) — Another metric that is reported for aircraft flyovers is the Sound Exposure Level (SEL). This metric is essentially equivalent to the metric Single Event Noise Exposure Level (SENEL). It is computed from dBA sound levels. Referring to Figure 6.5, the shaded area, or the area within 10 dB of the maximum noise level, is the area from which the SEL is computed.

The SEL value is the integration of all the acoustic energy contained within the event. Speech and sleep interference research can be assessed relative to Sound Exposure Level data.

The SEL metric takes into account the maximum noise level of the event and the duration of the event. For aircraft flyovers, the SEL value is typically about 10 dBA higher than the maximum noise level. Single event metrics are a convenient method for describing noise from individual aircraft events. This metric is useful in that airport noise models contain aircraft noise curve data based upon the SEL metric. In addition, cumulative noise metrics such as Leq, CNEL and DNL can be computed from SEL data.

Cumulative Metrics

Cumulative noise metrics assess community response to noise by including the loudness of the noise, the duration of the noise, the total number of noise events, and the time of day these events occur into one single number rating scale.

Equivalent Noise Level (Leq) — Leq is the sound level corresponding to a steady-state A-weighted sound level containing the same total energy as several SEL events during a given sample period. Leq is the “energy” average noise level during the time period of the sample. It is based on the observation that the potential for noise annoyance is dependent on the total acoustical energy content of the noise. This is
Leq can be measured for any time period, but is typically measured for 15 minutes, 1 hour, or 24 hours. Leq for a 1-hour period is used by the Federal Highway Administration for assessing highway noise impacts. Leq for 1 hour is called Hourly Noise Level (HNL) in the California Airport Noise Regulations and is used to develop Community Noise Equivalent Level (CNEL) values for aircraft operations.

**Community Noise Equivalent Level (CNEL)** — CNEL is a 24-hour, time-weighted energy average noise level based on the A-weighted decibel. It is a measure of the overall noise experienced during an entire day. The term “time-weighted” refers to the penalties attached to noise events occurring during certain sensitive time periods. In the CNEL scale, noise occurring between 7 PM and 10 PM is penalized by approximately 3 dB. This penalty accounts for the greater potential for noise to cause communication interference during these hours, as well as typically lower ambient noise levels during these hours. Noise that takes place during the night (10 PM to 7 AM) is penalized by 10 dB. This penalty was selected to attempt to account for the higher sensitivity to noise in the nighttime and the expected further decrease in background noise levels that typically occur in the nighttime.

CNEL is graphically illustrated in the bottom of Figure 6.6. Another way to think of a cumulative noise metric like CNEL is to compare CNEL to a “noise bucket.” Each single event noise event contributes to the overall “noise bucket.” An event during evening hours counts as 3 events and an event at night counts as 10 events. This is shown schematically in Figure 6.7. Examples of various noise environments in terms of CNEL are presented in Figure 6.8. CNEL is specified for use in the California Airport Noise Regulations and is used by local planning agencies in their General Plan Noise Element for land-use compatibility planning.

**Day Night Noise Level (DNL)** — The DNL index is very similar to CNEL but does not include the evening (7 PM to 10 PM) penalty that is included in CNEL. It does however include the nighttime (10 PM to 7 AM) penalty. Typically DNL is about 1 dB lower than CNEL, although the difference may be greater if there is an abnormal concentration of noise events in the 7 AM to 10 PM time period. DNL is specified by the FAA for airport noise assessment and by the Environmental Protection Agency (EPA) for community noise and airport noise assessment. The FAA guidelines (described later) allow for the use of CNEL as a substitute to DNL.

### 6.3.3 Factors Influencing Human Response To Sound

Many factors influence sound perception and annoyance. This includes not only physical characteristics of the sound but also secondary influences such as sociological and external factors. Molino, in the Handbook of Noise Control, describes human response to sound in terms of both acoustic and non-acoustic factors. These factors are summarized in Table 6.1.

Sound rating scales are developed in reaction to the factors affecting human response to sound. Nearly all of these factors are relevant in describing how sounds are perceived in the community. Many non-acoustic parameters play a prominent role in affecting individual response to noise. Fields, in his analysis of the effects of personal and situational variables on noise annoyance, has identified a clear association of reported annoyance and various other perceptions or beliefs. In particular, Fields stated: “There is therefore firm evidence that noise annoyance is associated with: (1) the fear of an aircraft crashing or danger from nearby surface transportation; (2) the belief that aircraft noise could be prevented or reduced by designers, pilots or authorities related to airlines; and (3) an expressed sensitivity to noise generally.” Thus, it is important to recognize that non-acoustic factors such as the ones described above as well as acoustic factors contribute to human response to noise.

### 6.3.4 Effects of Noise on Humans

Noise, often described as unwanted sound, is known to have several adverse effects on humans. From these known adverse effects of noise, criteria have been established to help protect the public health and safety and prevent disruption of certain human activities. These criteria are based on effects of noise on people such as hearing loss (not a factor with typical community noise), communication interference, sleep interference, physiological responses, and annoyance. Each of these potential noise impacts on people are briefly discussed in the following narrative.

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**Table 6.1**

<table>
<thead>
<tr>
<th>Primary Acoustic Factor</th>
<th>Secondary Acoustic Factors</th>
<th>Non-acoustic Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound Level</td>
<td>Spectral Complexity</td>
<td>Physiology</td>
</tr>
<tr>
<td>Frequency</td>
<td>Fluctuations in Sound Level</td>
<td>Adaptation and Past Experience</td>
</tr>
<tr>
<td>Duration</td>
<td>Fluctuations in Frequency</td>
<td>How the Listener’s Activity Affects Annoyance</td>
</tr>
<tr>
<td>Rise-time of the Noise</td>
<td>Predictability of When a Noise will Occur</td>
<td></td>
</tr>
<tr>
<td>Localization of Noise Source</td>
<td>Is the Noise Necessary?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Individual Differences and Personality</td>
</tr>
</tbody>
</table>

Source: C. Harris, 1979
Annoyance

Annoyance is the most difficult of all noise responses to describe. Annoyance is a very individual characteristic and can vary widely from person to person. What one person considers tolerable can be quite unbearable to another of equal hearing capability. The level of annoyance, of course, depends on the characteristics of the noise (i.e., loudness, frequency, time, and duration), and how much activity interference (e.g., speech interference and sleep interference) results from the noise. However, the level of annoyance is also a function of the attitude of the receiver. Personal sensitivity to noise varies widely. It has been estimated that 2% to 10% of the population is highly susceptible to annoyance from any noise not of their own making, while approximately 20% are unaffected by noise. Attitudes are affected by the relationship between the person and the noise source (is it our dog barking or the neighbor’s dog?). Whether we believe that someone is trying to abate the noise will also affect our level of annoyance.

Annoyance levels have been correlated to CNEL levels. Figure 6.9 relates CNEL noise levels to community response based on community response surveys. It displays the percent of a population that can be expected to be annoyed by noise exposure levels in airport related studies.

Sleep Interference

Sleep interference is a major noise concern in noise assessment and, of course, is most critical during nighttime hours. Sleep disturbance is one of the major causes of annoyance due to community noise. Noise can make it difficult to fall asleep, create momentary disturbances of natural sleep patterns by causing shifts from deep to lighter stages and cause awakening. Noise may even cause awakening that a person may or may not be able to recall.

Extensive research has been conducted on the effect of noise on sleep disturbance. Recommended values for desired sound levels in residential bedroom space range from 25 to 45 dBA, with 35 to 40 dBA being the norm. In 1981, the National Association of Noise Control Officials published data on the probability of sleep disturbance with various single event noise levels. Based on laboratory experiments conducted in the 1970s, this data indicated noise exposure at 75 dBA interior noise level event will cause noise induced awakening in 30% of the cases.

However, recent research from England has shown that the probability for sleep disturbance is less than what had been reported in earlier research. These recent field studies conducted during the 1990s and using new sophisticated techniques indicate that awakenings can be expected at a much lower rate than had been expected based on earlier laboratory studies. This research showed that once a person was asleep, it is much more unlikely that they will be awakened by a noise. The significant difference in the recent English study is the use of actual in-home sleep disturbance patterns as opposed to laboratory data that had been the historic basis for predicting sleep disturbance. Some of this research has been criticized because it was conducted in areas where subjects had become habituated to aircraft noise. On the other hand, some of the earlier laboratory sleep studies had been criticized because of the extremely small sample sizes of most laboratory studies and because the laboratory was not necessarily a representative sleep environment.

The Federal Interagency Committee on Noise (FICON) in 1992 in a document entitled Federal Interagency Review of Selected Airport Noise Analysis Issues recommended an interim dose-response curve for sleep disturbance based on laboratory studies of sleep disturbance. In June of 1997, the Federal Interagency Committee on Aviation Noise (FICAN) updated the FICON recommendation with an updated curve based on the more recent in-home sleep disturbance studies that show lower rates of awakening compared to the laboratory studies. The FICAN recommended a curve based on the upper limit of the data presented and therefore considers the curve to represent the “maximum percent of the exposed population expected to be behaviorally awakened,” or the “maximum awakened.” The FICAN recommendation is shown on Figure 6.10. This is a very conservative approach. A more common statistical curve for the data points reflected in Figure 6.10, for example, would indicate a 10% awakening rate at a level of approximately 100 dBA SEL, while the “maximum awakened” curve reflected in Figure 6.10 shows the 10% awakening rate being reached at 80 dBA SEL. (The full FICAN report can be found on the internet at www.fican.org.)

Hearing Loss

Hearing loss is generally not a concern in community noise problems, even very near a major airport or a major freeway. The potential for noise induced hearing loss is more commonly associated with occupational noise exposures in heavy industry, very noisy work environments with long term exposure, or certain very loud recreational activities such as target shooting, motorcycle or car racing, etc. The Occupational Safety and Health Administration (OSHA) identifies a noise expo-
sure limit of 90 dBA for 8 hours per day to protect from hearing loss (higher limits are allowed for shorter duration exposures). Noise levels in neighborhoods, even in very noisy neighborhoods, are not sufficiently loud to cause hearing loss.

Communication Interference
Communication interference is one of the primary concerns in environmental noise problems. Communication interference includes speech interference and interference with activities such as watching television. Normal conversational speech is in the range of 60 to 65 dBA and any noise in this range or louder may interfere with speech. There are specific methods of describing speech interference as a function of distance between speaker and listener and voice level.

Physiological Responses
Physiological responses are those measurable effects of noise on people that are realized as changes in pulse rate, blood pressure, etc. While such effects can be induced and observed, the extent is not known to which these physiological responses cause harm or are a sign of harm. Generally, physiological responses are a reaction to a loud short-term noise such as a rifle shot or a very loud jet overflight.

Health effects from noise have been studied around the world for nearly 30 years. Scientists have attempted to determine whether high noise levels can adversely affect human health, apart from auditory damage that is amply understood. These research efforts have covered a broad range of potential impacts from cardiovascular response to fetal weight and mortality. Yet while a relationship between noise and health effects seems plausible, it has yet to be convincingly demonstrated (i.e., shown in a manner that can be repeated by other researchers while yielding similar results).

While annoyance and sleep / speech interference have been acknowledged, health effects, if they exist, are associated with a wide variety of other environmental stressors. Isolating the effects of aircraft noise alone as a source of long-term physiological change has proved to be almost impossible. In a review of 30 studies conducted worldwide between 1993 and 1998, a team of international researchers concluded that, while some findings suggest that noise can affect health, improved research concepts and methods are needed to verify or discredit such a relationship. They called for more study of the numerous environmental and behavioral factors than can confound, mediate, or moderate survey findings. Until science refines the research process, a direct link between aircraft noise exposure and non-auditory health effects remains to be demonstrated. The World Health Organization (WHO) has made quite specific findings on the potential of environmental noise to cause health impacts:

“The overall conclusion is that cardiovascular effects are associated with long-term exposure to LAeq, 24h values in the range of 65–70 dB or more, for both air- and road-traffic noise. However, the associations are weak and the effect is somewhat stronger for ischemic heart disease than for hypertension. Other observed psychophysiological effects, such as changes in stress hormones, magnesium levels, immunological indicators, and gastrointestinal disturbances are too inconsistent for conclusions to be drawn about the influence of noise pollution.” (Source: WHO Guidelines, Section 3.5, Cardiovascular and Physiological Effects). In other words, the World Health Organization believes that health effects do not occur at noise levels less than 65 CNEL.

School Room Effects
Interference with classroom activities and learning from aircraft noise is an important consideration and the subject of much recent research. Studies from around the world indicate that vehicle traffic, railroad, and aircraft noise can have adverse effects on reading ability, concentration, motivation, and long term learning retention. A complicating factor in this research is the extent of background noise from within the classroom itself. The studies indicating the most adverse effects examine cumulative noise levels equivalent to 65 CNEL or higher and single event maximum noise levels ranging from 85 to 95 dBA. In other studies, the level of noise is unstated or ambiguous. According to these studies, a variety of adverse school room effects can be expected from interior noise levels equal to or exceeding 65 CNEL and/or 85 dBA SEL.

Some interference with classroom activities can be expected with noise events that interfere with speech. As discussed above, speech interference begins at 65 dBA, which is the level of normal conversation. Typical construction attenuates outdoor noise by 20 dBA with windows closed and 12 dBA with windows open. Thus some interference of classroom activities can be expected at outdoor levels of 77 to 85 dBA.

6.3.5 Noise / Land-Use Compatibility Guidelines

Noise metrics are used to quantify community response to various noise exposure levels. The public reaction to different noise levels has been estimated from extensive research on human responses to exposure of different levels of aircraft noise. Noise standards generally are expressed in terms of the DNL 24-hour averaging scale (CNEL in California) based on the A-weighted decibel. Utilizing these metrics and surveys, agencies have developed standards for assessing the compatibility of various land uses with the noise environment. There are no single event noise based land-use compatibility criteria that have been adopted by the federal government or State of California.

A summary of some of the more pertinent regulations and guidelines are presented in the following paragraphs.
Federal Aviation Administration
Federal Aviation Regulations (FAR), Part 36, "Noise Standards: Aircraft Type and Airworthiness Certification" — Originally adopted in 1960, FAR Part 36 prescribes noise standards for issuance of new aircraft type certificates. Part 36 prescribes limiting noise levels for certification of new types of propeller-driven, small airplanes as well as for transport-category, large airplanes. Subsequent amendments extended the standards to certain newly produced aircraft of older type designs. Other amendments have at various times extended the required compliance dates. Aircraft may be certified as Stage 1, Stage 2, or Stage 3 aircraft based on their noise level, weight, number of engines and in some cases number of passengers. Stage 1 aircraft are no longer permitted to operate in the U.S. Stage 2 aircraft are being phased out of the U.S. fleet as discussed below on the Airport Noise and Capacity Act of 1990. Although aircraft meeting Part 36 standards are noticeably quieter than many of the older aircraft, the regulations make no determination that such aircraft are acceptably quiet for operation at any given airport. Stage 4 noise limits are in the process of being adopted.

Aviation Safety and Noise Abatement Act of 1979 — Further weight was given to the FAA’s supporting role in noise compatibility planning by Congressional adoption of this legislation. Among the stated purposes of this act is “To provide assistance to airport operators to prepare and carry out noise compatibility programs.” The law establishes funding for noise compatibility planning and sets the requirements by which airport operators may apply for funding. This is also the law by which Congress mandated that FAA develop an airport community noise metric that would be used by all federal agencies assessing or regulating aircraft noise. The result was DNL. Because California already had a well-established airport community noise metric in CNEL, and because CNEL and DNL are so similar, FAA expressly allows CNEL to be used in lieu of DNL in noise assessments performed for California airports. The law does not require any airport to develop a noise compatibility program.

Federal Aviation Regulations (FAR), Part 150, "Airport Noise Compatibility Planning" — As a means of implementing the Aviation Safety and Noise Abatement Act, the FAA adopted regulations on Airport Noise Compatibility Planning programs. These regulations are contained in FAR Part 150. As part of the FAR Part 150 Noise Control Program, the FAA published noise and land-use compatibility charts to be used for land-use planning with respect to aircraft noise. An expanded version of this chart appears in FAA AC No. 150/5020-1 (dated August 5, 1983) and is provided in summary form in Figure 6.11.

These guidelines represent recommendations to local authorities for determining acceptability and permissibility of land uses. The guidelines recommend a maximum amount of noise exposure (in terms of the cumulative noise metric DNL) that might be considered acceptable or compatible to people in living and working areas. These noise levels are derived from case histories involving aircraft noise problems at civilian and military airports and the resultant community response. Note that residential land use is deemed acceptable for noise exposures up to 65 dB DNL. Recreational areas are also considered acceptable for noise levels above 65 dB DNL (with certain exceptions for amphitheaters). However the FAA guidelines indicate that ultimately “the responsibility for determining the acceptability and permissible land uses remains with the local authorities.”

Airport Noise and Capacity Act of 1990 — The Airport Noise and Capacity Act of 1990 (PL 101-508, 104 Stat. 1388), also known as ANCA or the Noise Act, established two broad directives to the FAA: (1) establish a method to review aircraft noise, airport use or airport access restrictions, imposed by airport proprietors; and (2) institute a program to phase-out Stage 2 aircraft over 75,000 pounds by December 31, 1999. Stage 2 aircraft are older, noisier aircraft (Boeing 737-200, Boeing 727, and Boeing / McDonnell Douglas DC-9); Stage 3 aircraft are newer, quieter aircraft (Boeing 737-300, Boeing 757, Boeing / McDonnell Douglas MD80/90). To implement ANCA, FAA amended Part 91 and issued a new Part 161 of the Federal Aviation Regulations. Part 91 addresses the phase-out of large Stage 2 aircraft and the phase-in of Stage 3 aircraft. Part 161 establishes a stringent review and approval process for implementing use or access restrictions by airport proprietors.

Part 91 generally required that all Stage 2 aircraft over 75,000 pounds be out of the domestic fleet by December 31, 1999. The State of Hawaii and Alaska are not affected by this regulation. The agency may, for individual cases, grant waivers through 2002. But for the most part, only Stage 3 aircraft greater than 75,000 pounds are in the domestic fleet as of that date.

Part 161 sets out the requirements and procedures for implementing new airport use and access restrictions by airport proprietors. Proprietors must use the DNL metric to measure noise effects and the Part 150 land-use guideline table, including 65 dB DNL, as the threshold contour to determine compatibility, unless there is a locally adopted standard that is more stringent. CNEL is an acceptable surrogate for DNL.

The regulation identifies three types of use restrictions and treats each one differently: (1) negotiated restrictions, (2) Stage 2 aircraft restrictions, and (3) Stage 3 aircraft restrictions. Generally speaking, any use restriction affecting the number or times of aircraft operations will be considered an access restriction. Even though the Part 91 phase-out does not apply to aircraft under 75,000 pounds, FAA has determined that Part 161 limitations on proprietors’ authority applies as well to the smaller aircraft.
Negotiated restrictions are more favorable from the FAA's standpoint, but still require unwieldy procedures for approval and implementation. In order to be effective, the agreements normally must be agreed to by all airlines using the airport.

Stage 2 restrictions are more difficult because one of the major reasons for ANCA was to discourage local restrictions more stringent than 1999 phase-out already contained in ANCA. To comply with the regulation and institute a new Stage 2 restriction, the proprietor must generally do two things: (1) prepare a cost / benefit analysis of the proposed restriction and (2) give proper notice. The cost / benefit analysis is extensive and entails considerable evaluation. Stage 2 restrictions do not require approval by the FAA.

Stage 3 restrictions are even more difficult to implement. A Stage 3 restriction involves considerable additional analysis, justification, evaluation, and financial discussion. In addition, a Stage 3 restriction must result in a decrease in noise exposure of the 65-dB DNL to noise sensitive land uses (residences, schools, churches, parks). The regulation requires both public notice and FAA approval.

ANCA applies to all new local noise restrictions and amendments to existing restrictions proposed after October 1990.

State of California
California Airport Noise Regulations — The Aeronautics Division of the California Department of Transportation (Caltrans) enforces the California Airport Noise Regulations. These regulations establish 65 CNEL as a noise impact boundary within which there shall be no incompatible land uses. This requirement is based, in part, upon the determination in the Caltrans regulations that 65 CNEL is the level of noise which should be acceptable to “a reasonable man residing in the vicinity of an airport.” Airports are responsible for achieving compliance with these regulations. Compliance can be achieved through noise abatement alternatives, land acquisition, land-use conversion, land-use restrictions, or sound insulation of structures. Airports not in compliance can operate under variance procedures established within the regulations.

California Noise Insulation Standards — California Noise Insulation Standards apply to all multi-family dwellings built in the State. Single-family residences are exempt from these regulations. With respect to community noise sources, the regulations require that all multi-family dwellings with exterior noise exposures greater than 60 CNEL be sound insulated such that the interior noise level will not exceed 45 CNEL. These requirements apply to all roadway, rail, and airport noise sources.

State of California
Noise Analysis Methodology
The methods used for describing existing noise and forecasting the future noise environment rely heavily on computer noise modeling. The noise environment is commonly depicted in terms of lines of equal noise levels, or noise contours. The computer noise models used for master plan aircraft noise analyses are described below.

Noise contour modeling is a key element of the aircraft noise analyses performed for this master plan. Generating accurate noise contours is largely dependent on the use of a reliable, validated, and updated noise model. The computer model can then be used to predict the changes to the noise environment as a result of any alternatives under consideration.

For the master plan, the FAA’s Integrated Noise Model (INM) Version 6.01c was used to model aircraft operations at OAK. The INM has an extensive database of civilian and military aircraft noise characteristics, and this most recent version of INM incorporates advanced plotting features. Noise contour files from the INM were loaded into Arcview Geographic Information System (GIS) software for plotting and land-use analysis. All of the noise contours presented in this master plan were developed by Brown-Buntin Associates as a subcontractor to Mestre Greve Associates.
6.3.7 Existing Noise Control Program

The Port has adopted a comprehensive noise control program to minimize and mitigate the effects of aircraft noise. This program affects various modeling assumptions. For example, it is assumed that all elements of the Port’s existing noise control program would remain in effect through the 2010 to 2012 timeframe. This program can be described in terms of the following broad categories:

- Noise Management Measures
- Noise Abatement Procedures
- Community Outreach and Public Participation
- Community Land-Use Measures
- Noise Reduction Programs, Studies and Other Commitments

These elements of the program are described in outline form in Figure 6.12, and a detailed explanation of each program is contained in a program description from the Port’s Aviation Noise / Environmental Management Office.

6.3.8 Aircraft Single Event Noise Contours

Single event noise levels, reported here in terms of Sound Exposure Level (SEL), vary by aircraft type. Even for a given aircraft type, airlines operate at different weights depending on destination and load factor. SEL contours are presented to compare the difference in noise level that different aircraft make. Figure 6.13 and Figure 6.14 show the SEL contours for arrivals and departures to Runway 29 for a variety of the major aircraft that use this runway. In Figure 6.13, single event contours are shown for the Boeing 727 Hushkit aircraft and the narrow-body twin-engine jet aircraft, such as the Boeing 737 and Airbus A320 family. The Boeing 727 Hushkit is one of the noisiest aircraft that operates at OAK, and the scale of the map used for the Boeing 727 contour set is much smaller than the scale used for the other contour sets. The Boeing 737 and Airbus A320 families are the main workhorses for air carrier operations at OAK. Figure 6.14 shows single event contour sets for the wide-body twin-engine aircraft such as the Boeing 767 and Airbus A300 family and contour sets for the 3-engine wide-body aircraft such as the Boeing / McDonnell Douglas MD-11 and older Boeing / McDonnell Douglas DC-10. The Boeing 767 and Airbus A300 contours are important because these are the aircraft that will likely replace the noisier, aging Boeing 727 Hushkit aircraft. Figure 6.13 and Figure 6.14 include tables comparing the existing number of average daily operations in 2004 and the forecast number in 2010 for these types of aircraft. Data are provided for the day, evening, and night hours (corresponding to the CNEL time periods) for departures and arrivals. These data show a decrease in the number of operations forecast for the B727 Hushkit aircraft, and an increase in the number of operations for the newer types of aircraft.

6.3.9 Existing CNEL Noise Contours

CNEL contours for 2004 are presented in Figure 6.15. These contours were developed by Brown-Buntn Associates for the Oakland Annual Noise Report for 2004 and are reproduced here on an aerial photograph. The 65 CNEL contour, shown as a dashed blue line, encroaches on the southern edge of Bay Farm Island and the southern end of San Lorenzo near San Francisco Bay.

6.3.10 Future (2010) CNEL Noise Contours

CNEL contours for the forecast number of operations in 2010 (as developed in Chapter 3) are shown in Figure 6.16. The 2010 CNEL contours are compared with existing (2004) CNEL contours in Figure 6.17. Existing 2004 CNEL contours are shown as dashed lines, and forecast 2010 CNEL contours are shown as solid lines. The forecast 2010 CNEL contours are slightly smaller than the current (2004) contours. Because of the forecast change in the aircraft fleet mix, the contours are smaller even though the operations increase. In particular, the number of B727 Hushkit operations decrease (but are not eliminated) in 2010. It is important to note that all of the new technology aircraft being built today are quieter than the aircraft they replace. This is true for the newest members of the Boeing 737 family and particularly true for aircraft like the Boeing 777 and new Boeing 787. The transition to the newer, quieter technology aircraft is being enhanced by the lower fuel consumption of these aircraft, which provides a strong incentive for airlines to modernize their aircraft fleet.

6.4 Other Airport Environmental Programs and Policies

The Port attempts to promote a sustainable operating environment at OAK, whether looking at current day-to-day operations or forecasting future needs and requirements.

In November 2000, the Board of Port Commissioners adopted a policy directing Port staff to “implement a sustainable development strategy as an overarching principle guiding the Port of Oakland’s operations and development programs, with the goal of making the Port a sustainable public agency and business enterprise.” The November 2000 Port Sustainability Policy seeks to support all of the “Three E’s”: environmental responsibility, economic vitality, and social equity. The Airport supports this policy through a variety of programs and policies that are coordinated through the Port’s Aviation Noise / Environmental Management Office and Environment and Safety Department in the Engineering Division. Environmental responsibility and stewardship is incorporated into many different aspects of Airport projects, including engineering / design, project development, environmental review, construction (contracts / plans and specifications), and monitoring (health and safety compliance).
In addition, the Airport has several on-going environmental programs at the Airport, including:

- Air Quality and Alternative Fuels
- Construction Mitigation
- Green Building and LEED Certification
- Recycling / Waste Reduction
- Water Quality
- Water and Wetlands
- Wildlife Management

Each of these environmental programs is described in more detail in the following sections, and are summarized in Figure 6.18.

The Port has received several awards for its efforts in environmental stewardship through the programs described in the following sections. For example, the Port was recognized as one of the best examples of urban sustainability at the 2005 United Nations World Environment Day conference in San Francisco. Below is a partial list of accomplishments and awards.

**Alternative Fuel Program**
- Over $1 million in grant funding was awarded for the purchase of cleaner burning fueled vehicles and supporting infrastructure at the Airport.
- Over 600,000 gasoline gallon equivalents (gge) were pumped at the OAK compressed natural gas (CNG) refueling station for the first five months of 2005.
- Awards include Natural Gas Vehicle Coalition, 2004 National Natural Gas Vehicle Achievement Award; Department of Energy, 2004 Finalist in the National Partner Award for Advancing Alternative Fuels; American Lung Association, 2003 Clean Air Award for Outstanding Leadership in increasing use of alternative fuels in the East Bay; and Bay Area Air Quality Management District, 2003 Clean Air Champion Award for outstanding leadership in advancing clean air vehicles.

**Airport Recycling Program**
- Over 450 tons of Airport-related material was recycled in 2004.
- Awards include Alameda County Stop Waste for recycling efforts, 2003; and Port Sustainability Award for the Airport’s recycling efforts, 2003.

**Design**
- Assisted FedEx in design of the 904-kilowatt photovoltaic system atop the roof of its leased facility (installed in 2005), which is expected to fuel 80% of the 81,000 square-foot facility’s energy needs.
- Awards include the Port 2003 Sustainability Awards for lighting retrofit in the terminal buildings, incorporating Green Design into the Terminal 2 renovation / extension project, and starting the “Dark Skies” program aimed at decreasing the impact of exterior lighting on the surrounding community and to conserve energy.

**Public Access and Wetlands / Habitat**
- Martin Luther King Jr. Regional Shoreline, located on Port property adjacent to the Airport, is a 1,220-acre regional shoreline offering picnicking, fishing, hiking, bicycling, boating, and bird-watching opportunities for the public.
- A bike trail on Ron Cowan Parkway has been completed, providing bike access between the Airport and Alameda.
- Oro Loma is approximately 16 acres of tidal and seasonal wetland that wascreated as mitigation for the Airport Development Program (ADP). It has achieved all the performance criteria established during the review and permitting process.

**Compressed Natural Gas**
OAK began incorporating alternative fuel vehicles into its fleet in 1999 because it recognized that it would contribute locally to cleaner air in the surrounding communities. OAK directed its energies towards vehicles using CNG, which are up to 95% cleaner than gas- or diesel-powered vehicles. Currently, OAK has 40 CNG vehicles in its fleet, including 11 buses that transport workers from the employee parking lot to the terminals.

In 2002, OAK and its partner, Clean Energy (formerly Pickens), opened a public access, self-service CNG station at North Field. The CNG station is always open and provides fuel to Port-owned vehicles; private ground transportation operators such as taxis, shuttle vans and limos making frequent trips to OAK; other public agencies; and the general public. The fuel station has four dispensers. As of June 2005, approximately 600,000 gallons (more accurately, gge) of fuel has been pumped compared to 430,000 gallons the previous year. With the growing popularity of this station, Clean Energy will open a second CNG station located at an off-Airport site on San Leandro Street in early 2006.

The Port’s Board of Port Commissioners passed two ordinances requiring taxis and ground transportation providers, such as door-to-door and hotel shuttles, that have two or more permits to have 50% of their fleet be powered by alternative fuel. And, through the use of incentives and grants, OAK’s alternative fuel vehicle program has been greatly expanded. To date, approxi-
mately 70% of taxis serving OAK are alternative fuel vehicles. Other ground transportation providers have converted 50% of their fleets to alternative fuel vehicles. The Port has secured two more grants to help offset the cost of purchasing 15 additional off-airport parking shuttles and five CNG AirBART shuttle buses. DHL also owns and operates four CNG delivery vans at OAK.

**Biodiesel**

Shuttles buses transporting passengers between the terminals and the rental car center at North Field are now using B20 Biodiesel, a cleaner-burning diesel fuel. The B20 Biodiesel fuel, a blend of 20% soybean-based Biodiesel and 80% diesel, is now powering the Airport’s fleet of 21 shuttle buses that serve the rental car center at North Field. The fleet averages a total of 304 trips daily between the terminal at South Field and the rental car center. Each bus has a 100-gallon fuel capacity.

B20 Biodiesel reduces the amount of harmful emissions from diesel engine vehicles into the air and is recognized as an alternative fuel by the Department of Energy and the U.S. Environmental Protection Agency. One of its major advantages is that it can be used in existing diesel engines and fuel injection equipment with little impact to operating performance.

**Rechargeable Batteries**

As the number and types of alternative fuel vehicles increase in popularity in the San Francisco Bay Area, OAK has installed a free battery charging program for travelers using the on-Airport parking lots. OAK’s electric vehicle charging stations are located in the Daily Parking, Lots A and B, and in the valet parking lot. The four charging stations have both conductive and inductive hook-ups. Additionally, OAK has introduced a fleet of 15 electric vehicles that are used by staff to monitor parking lots and roadways in an effort to reduce vehicle emissions.

**Ground Service Equipment (GSE) Alternative Fuel Program**

Most current GSE run on gasoline or diesel fuel. OAK is committed to working toward converting the entire GSE fleet to alternative fuel to mitigate for the potential increase in air emissions. The conversion of these vehicles is expected to reduce emissions at OAK. Currently, the Port is conducting an inventory of the equipment used at the Airport, as well as exploring grant opportunities to help airlines offset the cost of purchasing alternative fuel GSE.

**Solar Energy**

FedEx has implemented a solar-power energy program at the Metroplex. In 2005, FedEx installed a 904-kilowatt photovoltaic system atop the roof of its 81,000 square-foot facility that is expected to fuel 80% of the facility’s energy needs. At peak output, the system can produce the equivalent of power used by more than 900 homes during the daytime. In addition to generating electricity, the solar panels will help insulate the buildings, further reducing heating and cooling costs.

Over its expected 30-year lifespan, the system’s clean solar electricity will replace most of the fossil fuel-generated electricity that would have been purchased on the open market for the facility. Additionally, by avoiding the purchase of fossil-fuel generated electricity and implementing energy efficiency measures, this project will reduce carbon dioxide emissions by 10,800 tons over 30 years, equivalent to planting 3,000 acres of trees or removing almost 2,100 cars from California roadways.

The system will reduce demand on the utility grid and will serve as an additional source of power capacity to benefit businesses and residents of California. During periods when the energy generated by the system is greater than is needed to power the facility, the surplus energy will be transferred into the utility grid for general use.

**Ground Power and Pre-Conditioned Air Loading Bridges for Aircraft**

OAK is installing aircraft ground power and pre-conditioned air units at newly constructed and renovated terminal gates, and will also retrofit existing gates. By providing these services at the gate, aircraft will not have to use their own auxiliary power units (APUs) to generate electricity while it is parked at the gate. Because an APU is typically powered by the aircraft’s jet fuel, the installation of the new ground power and pre-conditioned air units helps to reduce air emissions associated with the use of APUs.

**Trip Reduction Program**

The Port coordinates and provides commuter information such as shuttle schedules and timing, frequency, and stopping points of public transportation providers to serve the transportation needs of Airport employees and the various tenants. The Port conducted an employee commute survey of Airport tenants and staff in April 2004.

While 87% of respondents indicated they drive to work alone, a significant number of them indicated they would, if given some incentive, consider using alternative transportation. The Port is analyzing the data and will develop a trip reduction program that will identify on-site amenities, provide travel demand recommendations, develop communication material and work with the airlines and other major tenants to provide ongoing commute program support.
AirBART

AirBART is a bus system operated by the Port that links the Coliseum BART station with Terminals 1 and 2 (BART and the Port jointly share operating revenues and costs). In fiscal year 2005, AirBART carried over 1,171,000 riders. For the past several years, AirBART has experienced a 12.5% annual increase in ridership. OAK employees receive a discount for riding AirBART and approximately 3% of the ridership is attributed to employees. As ridership grows, the Port can add additional buses to the system to increase capacity, as is done today during peak periods (e.g., the Wednesday before Thanksgiving).

Aircraft Emissions

The Port is continuing its leadership role in aviation environmental issues through its participation in a recent study on aircraft-related emissions. Currently there is little data on emissions from commercial aircraft engines in the U.S. As a result, Port staff have been involved with recent efforts to collect important aircraft emissions information. The Port agreed to host a new study that involved collecting emissions data from aircraft engines. Southwest Airlines also joined this project by volunteering its aircraft for the experiment. The FAA and the University of Missouri-Rolla are working with scientists from National Aeronautics and Space Administration (NASA) and the California Air Resources Board to conduct the study.

6.4.2 Construction Mitigation

Construction associated with maintaining and upgrading existing facilities and pavement, or building new facilities at OAK generates construction debris. The Port has implemented several programs to address this issue.

Materials Management

The Terminal 2 extension / renovation project is currently underway. Because most of the construction is taking place on already developed land, tons of recyclable construction materials are being generated.

Established in 2004, the airport’s Materials Management Program (MMP) diverts from public landfills recyclable construction materials such as concrete, asphalt and rebar from this and other Port projects, and converts it into reusable material for new airport construction and maintenance projects. The MMP has designated three on-airport sites for material stockpiling and recycling, allowing for the reduction of disposal and material purchasing costs and reduction of truck emissions associated with landfill disposal of waste.

It is estimated that over the next 5 years, the MMP will recycle and reuse over 200,000 cubic yards of construction materials and will save $5 million.

Construction Mitigation

A major component of project-level environmental mitigation measures are those related to construction projects. As such, the Airport has developed a construction site inspection checklist and field-monitoring follow-up to ensure contractor compliance with those measures identified in final plans and specifications. The field visits and checklists assist the Airport staff in:

- Monitoring and tracking compliance with mitigation measures identified in the EIR,
- Enforcing compliance,
- Assessing and tracking the effectiveness of applicable measures,
- Identifying mitigation measures that may require revision,
- Making recommendations for corrective action, and
- Maintaining clear communications among all responsible parties.

6.4.3 Green Building and LEED Certification

In accordance with the Port Sustainability Policy, the Airport has incorporated green building measures into the Terminal 2 renovation / extension project that is currently under construction. Green building strives to improve design and construction practices to protect natural resources and produce buildings that last longer, cost less to operate, and provide better environments for workers or residents. The Port is using the Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ as a framework and will apply for LEED certification upon completion of the project. LEED is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings. It emphasizes state-of-the-art strategies for sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. Examples of green building measures in the project include:

- Water-efficient plumbing fixtures,
- Energy-efficient building design, lighting, heating, and cooling systems,
- Substantial recycling and salvaging of construction and demolition debris,
- Use of recycled-content and renewable building materials where feasible, and
- Use of low volatile organic compound (VOC)-emitting carpet, composite wood panels, glues, and paints.

OAK is one of the first airports in the nation to seek LEED certification.
6.4.4 Recycling / Waste Reduction

In-Terminal Recycling
With more than 8,000 Airport employees and 14 MAP traveling through OAK, there is a lot of trash generated, much of it recyclable material. On Earth Day 2002, the Port launched its recycling program to divert discarded newspapers and magazines, office paper, and aluminum and plastic beverage cans and bottles from landfills. The Port has recently enhanced it further by installing 35 new recycling stations in the terminals. These additional recycling stations are conveniently located adjacent to trash receptacles and will encourage greater recycling by identifying the types of acceptable material through visuals on the top and sides of each station. The Port is well on its way to achieving its goal of diverting over 50% of post-consumer trash from landfills through this enhancement. In 2004, the program diverted over 298 tons of material (260 tons of cardboard / fiber and 38 tons of bottles / cans) from landfills.

Food Waste Recycling
In 2004, the Port added food waste to its recycling efforts. The food waste program collects pre-consumer waste such as vegetable trimmings, coffee grounds and filters, milk cartons, cheesy pizza boxes and used paper towels from airport food concessionaires for use as high-nutrient fertilizer in the production of organic food and fiber. Over 51 tons of food waste was diverted from the landfill in 2004.

Airline Consolidated Waste and Recycling Program
Prior to 2003, each airline contracted separately with a waste company, resulting in inefficient garbage disposal and inconsistent recycling. In 2003, the Port worked with the airlines to consolidate their waste and recycling into one coordinated program. The airlines now recycle magazines, newspapers, cardboard and bottles, diverting over 101 tons of recycling from landfills in 2004, resulting in less waste going to the landfills and about $14,000 in cost savings monthly.

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Airline Pillow Recycling
OAK is one of the first airports in the nation to participate in a pillow recycling program. Normally, airline pillows are immediately disposed of following the completion of a flight. This waste goes directly into landfills. The pillow recycling program collects these pillows for use as insulation or as material in making furniture.

6.4.5 Water Quality

Storm Water Program
The Port has developed a monitoring program for Port facilities, industrial tenants, and construction contractors to raise awareness of water quality issues and assist in compliance with the State Water Resources Control Board’s industrial permit. The Port organizes workshops, conducts pollution prevention training, collects and analyzes storm water samples, and inspects approximately 40 Port and tenant facilities annually. The Port also reviews storm water regulations with contractors and assists them in the development of storm water pollution prevention plans.

6.4.6 Water and Wetlands

Oro Loma
In 1999, the Port purchased and restored a 16-acre site adjacent to the existing Oro Loma Marsh that had been diked and filled by the Oro Loma Sanitary District. Known as the Sonoma Baylands project, restoration of the 320-acre tidal wetland began in 1996 and was completed in September 2000, using clean dredge materials excavated from the Port of Oakland’s minus 42-foot harbor deepening project. Monitoring and maintenance of the project will continue through 2005, whereupon the property likely will be transferred to a resource agency.

Damon Slough
In the fall of 2004, the Port completed the enhancement and expansion of a 9-acre seasonal wetland along Damon Slough and adjacent to the existing Martin Luther King Jr. Regional Shoreline. Also, as part of this project, a ¼-mile connection has been constructed to fill in a gap in the San Francisco Bay Trail, a planned recreational corridor that, when complete, will encircle San Francisco and San Pablo Bays with a continuous 400-mile network of bicycling and hiking trails. To date, approximately 240 miles of the alignment—over half the Bay Trail’s ultimate length—have been completed.

6.4.7 Wildlife Management

Burrowing Owl Mitigation Program
Burrowing owls are one of the many species recognized by the State of California as a “species of concern.” As such, special measures have been developed and implemented to ensure that the impacts to this species are minimized. The Port has developed a plan to mitigate construction impacts to burrowing owls and their burrows, and to provide long-term maintenance of a stable burrowing owl population.

A 70-acre property in eastern Alameda County was purchased to establish an off-Airport Burrowing Owl Management Area to preserve burrowing owl habitat in perpetuity. Ownership of this property was transferred to the California Department of Fish and Game for use as burrowing owl habitat and additional money was provided by the Airport to undertake initial protection, enhancement measures, and long-term management of the property.
6.5 Preliminary Environmental Screening Matrix

A preliminary environmental screening matrix was prepared to screen the potential development areas and the aircraft operations forecasts against several environmental planning considerations. Environmental planning considerations include site planning (or footprint) considerations and operational planning considerations. The distinction between site and operational planning is important. Site planning considerations, such as aesthetics, wetlands/wildlife, and geology and soils, are used to screen the potential development of certain areas on the Airport, and operational planning considerations, such as aircraft noise and air quality, are used to screen the aircraft operations forecasts. It is important to note that the development of facilities in any particular area may or may not generate new aircraft operations, and thus may or may not have any operational planning considerations. Also, an increase in the number of aircraft operations (as forecast in Chapter 3) may or may not require additional facilities, and thus may or may not result in any site planning considerations.

Table 6.2 shows the preliminary environmental screening matrix. In all cases, the evaluation is relative to existing conditions at OAK. Each potential development area is referenced to a figure shown in Chapters 4 and 5 and is evaluated against the environmental planning criteria using the following symbols:

- Red dot (•) means that there is a potential opportunity for environmental benefit,
- Gold dot (•) means that there is a potential environmental constraint,
- Green dot (-) means that there is no potential environmental benefit or constraint, and
- Black dot (-) means that it is unknown (without further study) if there is an environmental benefit or constraint.

It should be noted that the preliminary environmental screening matrix presents a high-level environmental screening of potential development areas and aircraft operational forecasts, and is subject to change upon further study and environmental review (see Note on bottom of Table 6.2). This high-level environmental screening was prepared by Port staff. Also, several of the site planning considerations have already been discussed in the general planning considerations for each area (as presented on the various graphics). In fact, some of the areas have already been recommended for discontinuation from further consideration based on potential environmental constraints (e.g., potential terminal development Areas 1 and 3).

6.5.1 Site Planning Considerations

This section summarizes the site planning considerations for each potential development area.

Aesthetics

In most cases, potential development areas are not anticipated to have an aesthetic benefit or constraint. However, in the case of potential terminal development Area 3, potential remain overnight (RON) aircraft parking Area 4, potential airline support facility Areas 2 and 7, and potential roadway Area 11, it is unclear whether there would be any aesthetics constraint due to potential effects on views from the City of San Leandro (additional study would be required).

Wetlands/Wildlife

If potential development in an area is anticipated to disturb or take wetlands that are under jurisdiction of the U.S. Army Corps of Engineers, it is noted as a potential environmental constraint. It should be noted that it is, of course, possible to disturb or fill wetlands, but appropriate environmental review and permits are required, in addition to providing appropriate mitigation (e.g., restoring or creating wetlands off-Airport). If potential development in an area might disturb wildlife, it is noted as an unknown benefit or constraint because appropriate wildlife surveys would need to be conducted. However, the Port is aware that potential development areas at North Field are potential habitat for burrowing owls (recognized by the State of California as a “species of concern”) and would require surveys and treatment before development in these areas could proceed (along with appropriate environmental reviews, engineering, etc.). In the case of potential airline support facility Areas 4 and 6 and potential parking Area 7, it is unknown at this time whether there would be an environmental benefit or constraint because the environmental benefit or constraint would depend the exact location of the potential development within the areas.

Historic Values

In most cases, potential development areas are not anticipated to have a benefit or constraint due to historic values of the community. However, in the case of potential general aviation development Area 4 and potential airline support facility Area 5, there may be potential effects due to some portions of North Field potentially being eligible for historic designation.

Geology and Soils

Almost all of the geology and soils at the Airport is challenging from an engineering and construction perspective. At North Field, the soil is mostly unconsolidated clays (bay mud) on top of older, consolidated clays. These soil conditions mean that significant structures (i.e., buildings) must be constructed on piles and that drainage conditions are often challenging (e.g., ground water does not percolate into the soil). Conditions at South Field are similar, except that there is usually a layer of sand over the bay mud. Significant structures (e.g., buildings) must be constructed on piles,
### Master Plan Preliminary Environmental Screening Matrix (Compared to Existing Conditions)

**Table 6.2**

**Potential Development Areas**

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<th>General Aviation (Fig. 4.10)</th>
<th>Airfield (Fig. 5.5)</th>
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<th>Ground Access Parking (Fig. 4.20)</th>
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**Operational Planning Considerations**

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<tr>
<td>Transportation/Traffic</td>
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<tr>
<td>Safety</td>
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</tbody>
</table>

**2010 Activity Forecast**

- **Airline Passengers**: 14 MAP increasing to 18 MAP and 156,050 aircraft operations increasing to 197,830 aircraft operations
- **Air Cargo**: 0.7 MAT increasing to 0.9 MAT and 56,940 aircraft operations increasing to 59,860 aircraft operations
- **General Aviation**: 126,642 aircraft operations increasing to 158,504 aircraft operations

**Footnotes**

1. Same as Potential Terminal Development Area 1
2. Same as Potential Terminal Development Area 2
3. Runway 29 Access Improvements (because this potential improvement reduces taxi times, it may also improve air quality) – Fig. 5.2
4. New High-Speed Exit Taxiway – Runway 29 (because this potential improvement reduces taxi times, it may also improve air quality) – Fig. 5.3
5. Million Annual Passengers (MAP)
6. Million Annual Tons (MAT)
7. CHNL = Community Noise Equivalent Level (a time-weighted cumulative noise metric)
8. SEL/SENEL = Single Event Noise Exposure Level (a single aircraft overflight noise metric)

**Notes**

This is a preliminary screening level evaluation matrix for master planning purposes only and subject to change. Preliminary evaluations in this matrix may change as projects are defined in these areas and upon further environmental review in all cases, evaluations are compared to existing conditions if and when a project or group of related projects are proposed, the Port will complete more detailed environmental reviews as that time is consistent with the California Environmental Quality Act (CEQA).

**Legend**

- Potential Opportunity for Environmental Benefit
- Potential Environmental Constraint
- No Potential Environmental Benefit or Constraint
- Unknown Benefit/Constraint

This table was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This table must be interpreted in the context of the entire master plan document.
but drainage conditions in some locations are improved (due to the sandy soil being more pervious). The Airport is also located in a seismically active region, which can compound the effects of poor geology and soils. Although most of potential development areas have geology and/or soils constraints, these can usually be overcome with appropriate engineering treatments, such as piers or surcharging the development site to accelerate settlement, as required.

Generally, undeveloped areas present a constraint due to geology and soils, as described above. However, it is anticipated that these constraints could likely be overcome with appropriate engineering solutions. Already developed areas being considered for additional development do not present any benefits or constraints because appropriate engineering solutions are known and available to solve any potential geology and soils issues (as demonstrated by the existing development). Also, geotechnical data is generally available in the developed areas, as opposed to the more undeveloped areas. For the potential parking development areas, it is anticipated that poor geology and soils will be less critical to the development of surface parking lots (as opposed to parking structures), except Area 6, which is anticipated to have geology and soil challenges because of a large drainage basin in this area (significant fill would be required and settlement could be an issue). However, appropriate engineering solutions could likely overcome these challenges, but might be cost-prohibitive.

Hazards and Hazardous Materials
The most likely hazard or hazardous material encountered at the Airport is contaminated soils (e.g., hydrocarbons from aircraft operations and maintenance found in the soil). As with geology and soils, appropriate clean-up and engineering solutions can usually overcome any potential hazard or hazardous materials constraint. In general, currently or previously developed sites might have a constraint due to hazards and hazardous materials, while largely undeveloped sites, such as the central basin might have fewer hazards or hazardous materials constraints (because aircraft have never been operated or maintained there). However, even these could contain some contaminants due to runoff from adjacent developed areas. Localized hazards or hazardous materials could always be a challenge and must be cleaned up or engineered during the appropriate phase of project development.

In the case of potential general aviation development Area 3, this would normally be shown with no potential constraint, except that this area has historically been used for general aviation operations and might contain some limited soil contamination. Therefore, this area is marked with an unknown benefit or constraint from a hazards and hazardous materials perspective. Also, any areas adjacent to the existing fuel farms might contain contaminated soil.

Hydrology and Water Quality
For the purposes of environmental screening, it was assumed that any newly created impervious surfaces (e.g., pavement in a parking lot or aircraft apron, buildings, etc.) might create a potential environmental constraint. Pervious surfaces allow rainwater to percolate into the soils and/or traverse the surface through dirt, grass, and other vegetation, improving water quality. As with geology and soils, and hazards and hazardous materials, hydrology and water quality constraints created by new impervious surfaces can be addressed through appropriate environmental engineering solutions, such as the construction of bioswales and detention basins. In the case of potential airline support facility development Areas 6 and 7, the potential hydrology and/or water quality constraints are unknown because any potential benefit or constraint depends on the exact location of any development within the area.

Land Use and Planning
There are no potential land-use benefits or constraints associated with any of the development areas, with the possible exception of terminal development Area 3, which might be partially located within the City of San Leandro.

Public Access
There are no potential public access benefits or constraints associated with any of the development areas. As with the other site planning considerations, this preliminary assessment could change as projects in these areas are more fully developed and undergo detailed environmental review, engineering, etc.

Utilities and Service Systems
There are no potential utilities and service systems benefits or constraints associated with any of the development areas. As with the other site planning considerations, this preliminary assessment could change as projects in these areas are more fully developed and undergo detailed environmental review, engineering, etc.

6.5.2 Operational Planning Considerations
This section summarizes the operational planning considerations for the master plan forecasts developed in Chapter 3. As shown on Table 6.2, airline passengers and passenger airline operations, air cargo weight and cargo airline operations, and general aviation operations are all anticipated to increase (at varying rates described in Chapter 3). This increase in aviation activity is evaluated against the following five operational planning criteria:

Aircraft Noise — CNEL
Although CNEL noise contours are developed assuming all aircraft operations (airline, cargo, and general aviation), the evaluations here attempt to show how each type of operation contributes to the overall CNEL contours. As described in Section 6.3.9, the overall CNEL noise contours in 2010 (assuming the master plan aircraft operations forecasts) are smaller (less noise footprint).
than the existing (2004) noise contours. In general, the modest increase in the number of passenger airline and general aviation operations do slightly increase the CNEL noise contours. However, anticipated changes in the air cargo fleet have a significant effect in reducing the CNEL contours in the future (2010 timeframe). That is, when the cargo airlines retire their older and noisier Boeing 727 aircraft and replace them with larger (to accommodate the increase in air cargo weight), quieter aircraft, the CNEL contours are anticipated to get smaller (less noise footprint).

**Aircraft Noise — SEL / SENEL**
Generally, this evaluation criteria represents a potential constraint as the number of operations increases because there will be more noise events (one with each operation, which is anticipated to increase as shown on Table 6.2). However, in the case of the cargo airlines, the increase in the number of operations is quite small (in fact, there are no anticipated new cargo airline flights at South Field in 2010 compared to 2004) and the cargo aircraft in 2010 are anticipated to be quieter than the existing air cargo fleet, as described above.

**Air Quality**
The increase in aircraft operations has an unknown benefit or constraint on air quality, and additional environmental review would be required to determine the relationship between the increase in the number of operations and air quality. Also, assumptions would need to be made regarding future facilities, such as the airfield improvements shown in Figure 5.2 and 5.3, because they could provide air quality benefits, which might offset any constraint associated with the anticipated increase in operations.

**Transportation / Traffic**
It is anticipated that the increase in the number of airline passengers and air cargo weight would generate additional traffic and transportation requirements to and from the Airport. As with other planning considerations, it is anticipated most constraints could be overcome with appropriate traffic and transportation engineering solutions. Additional study would be required to determine how increases in traffic associated with increased aviation activity would affect the surrounding communities. For example, it is not known how much of the traffic accessing OAK uses local streets in the cities of Alameda and San Leandro. General aviation is not a significant generator of traffic and transportation demand, and thus it is assumed that it has no potential environmental benefit or constraint, even with the anticipated increase in activity.

**Safety**
There are no potential safety benefits or constraints associated with the anticipated increase in aircraft operations at OAK.

### 6.5.3 Environmental Constraints / Benefits of Recommended Development Areas

For each development area discussed in Chapters 4 and 5, the preliminary environmental screening matrix (Table 6.2) highlights potential environmental benefits or constraints (vertically, in each column under the development area). For example, potential terminal development in Area 2 is not anticipated to have any major environmental constraints, with the exception of hazards and hazardous materials, such as contaminated soils, that might need to be cleaned up or engineered, as appropriate, before development occurs (or as otherwise required by regulatory agencies).

### 6.6 Community-Requested Environmental Projects

Port staff asked members of the Stakeholder Advisory Committee to consider any environmentally beneficial projects that they may wish request be included in the master plan (in addition to all of the environmental programs and policies the Port already has underway). The City of San Leandro representatives requested that the Port consider constructing a noise barrier to block aircraft ground noise in the Neptune Drive neighborhood. The City of Alameda representatives requested that Port and City of Alameda jointly undertake a ground traffic study to determine how much traffic going to or from the Airport uses local streets in the City of Alameda. The City of San Leandro representatives requested that the study be expanded to include local streets in the City of San Leandro. It is recommended that the Port undertake an Airport traffic study, with assistance from the cities of Alameda, San Leandro, and Oakland. Finally, the City of Alameda representatives requested that the Port and City of Alameda jointly conduct a study to investigate why some corporate jets (less than 2%) choose not to comply with the Port’s voluntary noise abatement procedures, which requests that they taxi to and depart from South Field instead of North Field (during west plan, except those that can depart on Runway 33). It is recommended that the Port undertake this study, with assistance from the City of Alameda.

The following sections summarize the Port’s investigation into a San Leandro noise barrier.

#### 6.6.1 Noise Barrier Background

The noise from jet aircraft operating on Runway 29 has been a concern to residents living along Neptune Drive in the City of San Leandro. In particular, the issue of jet back blast noise at the beginning of takeoff roll has been raised as an issue that might be addressed by some kind of noise barrier located adjacent to the runway. In the following sections the feasibility of such a barrier located near the runway or near the residences is examined.
6.6.2 The Noise Barrier Effect

A noise barrier is effective at reducing noise when the barrier is located between the noise source and the receiver and is high enough to block the direct line of sight between the source and the receiver. The barrier must be long enough to prevent flanking around the sides of the barrier, have no holes or cracks, and have sufficient density so that sound does not pass through the barrier. Barriers are most effective when placed very near the source or the receiver and is least effective when placed half way between the source and the receiver. Figure 6.19 shows schematically the direct line of sight and the path over the top of a barrier for a barrier located near the source and for a barrier located near the receiver.

Noise barriers are commonly used to mitigate roadway noise, particularly adjacent to freeways. Barriers are not typically used for airport noise with the exception of barriers around locations where aircraft engine maintenance runup noise is performed (such as the ground runup enclosure, GRE, located on the South Field at OAK). It is rare to use a barrier to mitigate pre-takeoff engine runup noise.

Noise barriers are very good at mitigating high frequency noise and very poor at mitigating low frequency noise. The amount of noise reduction that a barrier will achieve is dependent on the height of the barrier and frequency of the noise. A noise barrier will not effectively reduce the low frequency rumble associated with some of the louder, older technology jets that operate at Oakland, such as the Boeing 727.

The noise barrier has no effect unless the barrier is high enough to block line of sight between the source and the receiver. For a typical noise source such as a diesel truck or an aircraft without major low frequency rumble, a noise barrier that is just high enough to block line of sight will result in a 5 dBA noise reduction, provided that the barrier is long enough to prevent flanking around the ends (i.e., sound leaks around the ends). The higher the barrier, the greater the noise reduction (there is a practical limit of about 20 dBA noise reduction for very tall barriers).

Noise barriers are very good at mitigating high frequency taxi and Runway 29 take-off roll noise in the Neptune Drive neighborhood could be constructed either on-Airport (near the end of Runway 29 along San Francisco Bay) or in the rear yards of the homes along the west side of Neptune Drive (along San Francisco Bay). It is important to note that only the homes along the west side of Neptune Drive would benefit from a potential noise barrier, whether constructed on-Airport or along the rear yards of the homes along the west side of Neptune Drive. This limited benefit is because the homes along the west side of Neptune Drive already serve as a noise barrier and block much of the high frequency taxi and Runway 29 take-off roll noise from the rest of the neighborhood.

6.6.3 Barrier Near the End of Runway 29

The potential to locate a noise barrier near the end of Runway 29 is severely constrained by the mandatory Object Free Area associated with a runway of this type. The Object Free Area is designed to minimize aircraft damage and loss of life in the event of an aircraft excursion from the runway. Object Free Areas have fixed dimensions and are mandated by the FAA. Figure 6.20 shows the potential location of the noise barrier at the departure end of Runway 29. The Object Free Area sets a southern limit to the barrier (shown in yellow). This barrier would just barely block line of sight for an aircraft located at the start of Runway 29 relative to the homes on Neptune Drive. The barrier would need to extend farther south (into San Francisco Bay) to prevent sound flanking around the southern end of the barrier. In order to examine the potential effectiveness of such a noise barrier, a detailed analysis of the effectiveness of a barrier was completed for aircraft in various positions as shown in Figure 6.20.

Aircraft in positions A, B, C, D and E were considered in the analysis. Aircraft at positions A and B would be taxiing and therefore at a low engine thrust level. For position C an aircraft may be stopped at the hold position and use a higher thrust level to get the aircraft moving (break-away thrust). Aircraft at positions D and E would be at a very high thrust setting for takeoff.

In order to examine the effect of a barrier near the end of Runway 29 an example case was calculated for a Boeing 727 Hushkit aircraft. This is one of the types of aircraft that FedEx uses at night and of which the community has expressed concern. This aircraft has 3 engines, one of which is a centerline engine that is located 15 feet above the pavement (to engine centerline). This analysis was done for an observer located in the rear yard of the southern most home on the Bay side of Neptune Drive.

The barrier assumed for this analysis was a 25 foot high barrier located on top of the dike (levee) that separates the Airport from San Francisco Bay. This dike has a top elevation of about 10.5 feet, thus the top of barrier elevation assumed for this analysis was about 35.5 feet above mean sea level (MSL). The runway and taxiway elevation used was 5.5 feet MSL. The elevation of the rear yard of the home on Neptune Drive is about 6 feet MSL.

The noise barrier reduction was calculated for a case of no wind and no vertical temperature gradient, in other words a very calm condition where the ambient noise levels along Neptune Drive would be very low. The noise barrier noise reduction is about 6 dBA (the actual calculation vary from 5.6 to 6.3 dBA for the 5 aircraft positions shown in Figure 6.20), except when the aircraft is located at the runway threshold (position D). At position D there will be flanking around the south end of the barrier, and the barrier noise reduction will be closer to 3 dBA instead of 6 dBA, unless the barrier could be extended into San
Francisco Bay, as shown in Figure 6.20, in which case a 6 dBA noise reduction would be possible. Extending the barrier into San Francisco Bay prevents the flanking of noise around the end of the barrier at the start of the take-off roll. It should also be noted that the noise levels at the observer on Neptune Drive are heavily influenced by the thrust setting on the engines. The table on Figure 6.20 summarizes the maximum noise level and effectiveness of the noise barrier.

A 6 dBA noise reduction is noticeable but not dramatic. A 10 dBA reduction would sound half as loud. A 3 dBA reduction would be barely perceptible. These results show that a barrier is of marginal value and may not be worth pursuing. At these levels of noise reduction, one would not expect residents to express great relief from existing noise levels as a result of installing this barrier. If this barrier is pursued it is important to emphasize to neighbors the limited benefit of the barrier and be careful not to raise expectations. Further, if the barrier is pursued, it need not extend as far north as is shown in Figure 6.20.

6.6.4 Barrier Adjacent to the Homes on Neptune Drive

An alternative to building the barrier near the runway is to build the barrier along the rear yards of homes on Neptune Drive. Figure 6.20 shows an aerial photograph of this alternative. Of course, one of the main disadvantages of such a barrier is that a tall barrier would block views of San Francisco Bay, a highly undesirable side effect of a barrier. This barrier would be effective only for first row of homes on the Bay.

An alternative to a solid opaque barrier such as that used adjacent to the Interstate Highway 880 in San Leandro is to use a transparent barrier. To be effective for the 2-story homes that are located along Neptune Drive, the barrier would have to be at least 15 feet high to get the minimum 5 dBA noise reduction for a second story observer. A 15-foot barrier would provide 12 dBA noise reduction for an observer in the rear yard of these homes, as shown in the table on Figure 6.20. In this concept, the barrier would consist of a low 4-foot solid wall, probably cement block, with 11 feet of transparent panel located above. The 11-foot panel would be installed in two 5½-foot sections in either a metal or wood frame. Block or cement pilasters would have to be spaced such that the wall would meet seismic and wind loading requirements. The footings for the pilasters for such a tall wall would have to be engineered for the type of soil, water content, and design wind loads for the area.

A transparent barrier will have a much greater maintenance requirement than an opaque barrier in order to keep the barrier clear and maintain views of the Bay. The moist salt air will be the biggest problem keeping the barrier clear. Glass would be easiest material to maintain, with maintenance being similar to cleaning the windows on a home. However, glass would be subject breakage either by vandals or objects blown into the glass by the wind. Plastic materials such as Plexiglass or Lexan are much more resistant to breakage, but will tend to pit, yellow, or fog with time. To maintain clear views, a plastic barrier will require occasional polishing and waxing. In either case, glass or plastic, the surface density of the material used shall be at 4 pounds per square foot to maintain the desired sound reduction (surface density is the density of the material divided by the thickness of the material).

Finally, the construction of such a barrier either on Airport or in the rear yards of the homes along the west side of Neptune Drive would be subject to the approval and permitting from the San Francisco Bay Conservation and Development Commission (BCDC) because these locations are within their jurisdiction. A barrier extending into San Francisco Bay would also require bay fill.

6.6.5 Comparing a Barrier at the Airport with a Barrier near the Shore of Neptune Drive

The top of Figure 6.21 shows a comparison of noise levels when a Boeing 727 departs on Runway 29, beginning at the time the aircraft reaches the runway threshold (Position D on Figure 6.20). The bottom graph (blue line) shows the noise level in the rear yards of the homes on Neptune Drive as the aircraft progresses down the runway and there is no barrier. The next graph down (red line) shows the noise level at Neptune Drive if a 25-foot barrier is constructed at the Airport on top of the perimeter levee (outside of the Object Free Area). The lower graph (green line) shows the noise level in the rear yard of the Neptune Drive homes if a 15-foot barrier is constructed along the rear of these homes (along the Bay).

For an on-Airport barrier, there is only a 3 dBA noise reduction for the first 10 seconds of the event (assuming no extension of the barrier into San Francisco Bay), then the noise reduction increases as the aircraft proceeds down the runway and the barrier flanking is reduced. By about 18 seconds into the event, a 6 dBA noise reduction is realized. As the aircraft proceeds farther down the runway, the barrier effectiveness is reduced to about 5 dBA, and finally has no effect when the aircraft rotates and climbs. If the barrier could be extended into San Francisco Bay, there would be a 6 dBA noise reduction until the barrier effectiveness is reduced to about 5 dBA, and finally has no effect when the aircraft rotates and climbs. When the aircraft rises above the noise barrier, the noise increase will be sudden. However, since the noise barrier reduction at this point is about 5 dBA, the increase would not be considered dramatic. The bottom graph (green line) shows that a barrier along Neptune Drive provides a constant 12 dBA noise reduction until the aircraft rotates and climbs high enough to be seen above the barrier. When the aircraft rises above the noise barrier, the noise increase will be sudden and very noticeable.
Similar data are shown in the middle and bottom of Figure 6.21 for the Boeing / McDonnell Douglas MD-11 / DC-10 aircraft types and the Boeing 737 (-600, -700, -800, and -900 models) and Airbus A319 / A320 families of aircraft respectively. The scales of the figures are identical, and it shows that the Boeing 727 is much louder than the MD-11 / DC-10 types of aircraft and the much more frequently operated Boeing 737 / Airbus A319 / A320 family of aircraft.

In the case of the MD-11 / DC-10 aircraft, there is no noise barrier reduction for an on-Airport barrier while the aircraft is at the end of the runway at the start of takeoff roll. This is because the tail-mounted third engine is located over 32 feet above the ground and is not shielded by the barrier until the aircraft rolls down the runway some distance.

In the case of the Boeing 737 / Airbus A319 / A320 families of aircraft, the noise reduction of an on-Airport barrier is greater than for the other aircraft because the engines are located much closer to the ground (under 5 feet from the surface to the engine centerline), making the barrier more effective at reducing noise. However, these aircraft are much quieter and probably only audible along Neptune Drive during the calmest and quietest times.

The noise level calculations for with and without barrier conditions were computed for an observer standing in the backyard of a home along the Bay side of Neptune Drive. The computations assume no wind whatsoever (less than 1 knot). Under these conditions, the aircraft application of power at the start of take off roll would be audible at the homes on Neptune Drive. For conditions where the wind is not calm, the presence of wind noise and noise caused by the wind (such as the water lapping on the rocks on the shore) would mask the aircraft noise, and affect the propagation sound in such a way that the noise barrier computations made here would not be realized. This is due either to wind noise masking the aircraft noise or wind gradients affecting the propagation of sound over a long distance. The potential benefit of a noise barrier is greatest when the wind is calm and diminishes rapidly as the wind speed increases.

As described earlier, it is important to note that only the homes along the west side of Neptune Drive would benefit from a potential noise barrier, whether constructed on-Airport or along the rear yards of the homes along the west side of Neptune Drive. This limited benefit is because the homes along the west side of Neptune Drive already serve as a noise barrier and block much of the high-frequency noise taxi and Runway 29 take-off roll noise from the rest of the neighborhood.

In January 2006, the City of San Leandro hosted a meeting with the Neptune Drive neighborhood so that the Port could present the above analyses on a potential noise barrier either on-Airport or along the rear yard of the homes on the west side of Neptune Drive. All homeowners along the west side of Neptune Drive that expressed an opinion indicated that they did not want a noise barrier constructed in their rear yards despite the potential noise reduction benefit (up to 12 dBA during certain conditions, as described in Section 6.6.4). Instead, they requested that the Port continue to study the costs and benefits of constructing on-Airport noise barriers. Further, the community requested that the City of San Leandro and Port continue to pursue sound insulation as one of the most effective methods of reducing the effects of aircraft noise.
This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only; it does not represent any particular course of action that was discarded, and must be interpreted in the context of the entire master plan document.

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Sound and Noise — What We Hear

**Acronyms**
- **dB**: Decibels
- **Hz**: Hertz
- **SPL**: Sound Pressure Level

**Legend**
- March 2006
- Oakland International Airport
- Master Plan
- **Figure 6.2**

**Sound and Noise — What We Hear**

- **Audible Range**
- **Music**
- **Speech**

**Frequency, Hz**

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Sound and Noise — Frequency Weighting

Frequency Weighting

is an effort to approximate the sensitivity of the human ear. The human ear is not equally sensitive to all frequencies.

Weighted Decibel Scales

The A-weighted decibel scale (dBA) discriminates against frequencies in a manner approximating the sensitivity of the human ear. In the A-weighted decibel scale, everyday sounds normally range from 10 to 140 dBA (very quiet to very loud). Most community noise analyses are based upon the A-weighted decibel scale.

The C-weighted decibel scale is used in assessing hearing loss in occupational environments and exposure to noise and is more influenced by low frequency noise than the A-weighted scale.

Typical Frequency Range for Community Noise

Acronyms

dB Decibels
Hz Hertz

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Effects of Weather on Sound

- Decreasing Temperature
- Increasing Temperature
- Wind
- Overcast Sky
- Shielding Provided by Structures and Reflection of Sound by Water

Legend:
- Sound Source
- Sound Direction

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Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examines many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.

LEGEND

- Hourly Leq’s (No Penalty)
- 5 dB Evening Penalty
- 10 dB Nighttime Penalty

Time Periods:
- Day: 7 am – 7 pm
- Evening: 7 pm – 10 pm
- Night: 10 pm – 7 am

* Time axis not drawn to scale.
Aircraft Events are much shorter than shown here.

Acronyms:
CNEL: Community Noise Equivalent Level
dBA: A-Weighted Decibels
Leq: Equivalent Noise Level
The master plan for Oakland International Airport includes an analysis of noise levels. The figure illustrates the calculation of Single Event Noise to Cumulative Noise (CNEL) using the following formula:

\[ SEL + 10 \log (1 \times Ops_{day} + 3 \times Ops_{evening} + 10 \times Ops_{night}) - 49.4 = CNEL \]

The figure also includes a legend explaining the terms and acronyms used in the calculation:

- **SEL**: Sound Exposure Level, also known as SENEL
- **Ops**: Operations, sum of departures and arrivals
- **CNEL**: Community Noise Equivalent Level

The time periods considered are:
- **Day**: 7 am – 7 pm
- **Evening**: 7 pm – 10 pm
- **Night**: 10 pm – 7 am

This document is part of the master plan for Oakland International Airport, prepared by the Port of Oakland. The plan examines various ideas and concepts, which may or may not be used in the final plan.
Note: This graphic is a work-in-progress and was prepared by the Port as part of a master plan for Oakland International Airport. The master plan examined many possible development and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any actual course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.

This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any actual course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.

Examples of Community Noise Equivalent Levels (CNEL)

Typical Outdoor Locations:

- Apartment Next to Freeway
- 3/4 Mile From Touchdown at Major Airport
- Downtown With Some Construction Activity
- Urban High Density Apartment
- Urban Row Housing on Major Avenue
- Old Urban Residential Area
- Wooded Residential
- Agricultural Crop Land
- Rural Residential
- Wilderness Ambient

CNEL in dB

Acronyms:
- CNEL Community Noise Equivalent Levels
- dB Decibels

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any actual course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.
Annoyance and Community Noise Equivalent Level (CNEL)

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Sleep Interference

Indoor Sound Exposure Level (SEL) in dB

Percentage Awakening

Acronyms:
- dB: Decibels
- FICAN: Federal Interagency Committee on Aircraft Noise
- FICON: Federal Interagency Committee on Noise
- SEL: Sound Exposure Level

Legend:
- Field Studies
- FICAN 1997
- FICON 1992

Notes:
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Summary of FAA Part 150 Noise and Land Use Guidelines for New Development

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<th>Permitted Land Use</th>
<th>Yearly CNEL, dB</th>
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<td>Hospitals</td>
<td>Yes</td>
</tr>
<tr>
<td>Churches</td>
<td>Yes</td>
</tr>
<tr>
<td>Offices</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Legend:
- Residential
- Schools
- Hospitals
- Churches
- Offices

Acronyms:
- CNEL: Community Noise Equivalent Level
- FAA: Federal Aviation Administration

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of other master plan graphics, documents, and meeting discussions.
Oakland Noise Management Measures

**Aircraft Noise Abatement Procedures for North Field Program**

_**General Policy**_
- Safety permitting, aircraft flying by visual flight rules are to avoid flying over nearby residential areas when arriving or departing the Airport.

_**Day and Night Aircraft Restrictions**_
- The following aircraft shall not depart Runways 27L/R, nor land on Runways 9R/L, except during emergencies. These aircraft must use Runway 11/29:
  - Turbojet and turbofan powered aircraft
  - Turboprop aircraft over 17,000 pounds
  - Four-engine reciprocating powered aircraft
  - Military aircraft over 12,500 pounds
  - Regularly scheduled passenger and cargo airlines or regional jet commercial passenger aircraft operations shall not land on Runways 27L/R at the North Field, except for emergencies or when Runway 11/29 is closed for maintenance or repair.

_**Helicopter Restrictions**_
- Helicopters should fly over freeways and water as much as possible to avoid hotels and residential areas.
- Local training flight patterns (touch-and-go operations, etc.) should be restricted to Airport boundaries or adjacent commercial and industrial areas to the maximum extent possible.

_**Daytime (6:00 a.m. to 10:00 p.m.) Aircraft Restrictions**_
- Single and Twin Piston-engine Aircraft
  - Aircraft departing Runways 27L/R, turn over San Leandro Bay, continue to the I-880 freeway.
  - Straight out departures should not be approved.
  - Aircraft departing Runway 33 turn right and fly over San Leandro Bay, continue to the I-880 freeway.
  - Straight out or left crossover downwind departures should not be approved.

_**VFR Arrivals**_
- Aircraft should avoid flying over residential areas as much as possible on arrival to any North Field runway.
- Straight in arrivals to Runway 15 are not allowed unless required by wind or safety.

_**Touch-and-Go Operations**_
- Runway 27L, is the preferred runway for these procedures.
- Aircraft should fly the standard traffic pattern thereby avoiding flying over residential areas.

_**Nighttime Quiet Hours (10:00 p.m. to 6:00 a.m.)**_
- Aircraft should use Runway 9R (not 9L) as the preferred departure runway.
- Aircraft should use Runway 27R (not 27L) as the preferred departure runway.
- Aircraft should not turn left from Runways 9R/L on departure.
- Aircraft should not depart straight out from Runway 9L.
- All aircraft over 75,000 pounds are directed to use Runway 11/29.
- Aircraft should use only full-length departures on the elected runway.
- Stage 2 corporate turbojet aircraft are directed to use Runway 11/29.

_**Pilots**_
- Pilots may choose between the following noise abatement departure procedures, wind and weather permitting:
  - For Runway 9L departures, use 140-180 degree departure headings.
  - For Runway 9L departures, use right turn over the Airport for north/northeast departures.

_**Aircraft Departures**_
- Aircraft should use Runway 27L, as the preferred arrival runway.

**Aircraft Noise Abatement Procedures for South Field Program**

_**Day and Night**_
- Runway 11/29 is preferred for departures and arrivals of all turbojet and heavy aircraft.

_**Runway 29 Departures**_
- Turbojets shall not be turned north over Oakland Hills until leaving 3,000 feet.
- VFR aircraft that depart Runway 29 and request a right turn shall be instructed to proceed to at least 2 miles west or climb to at least 1,500 feet before starting right turn.

_**Runway 29 Arrivals**_
- Air traffic controllers require turbojet aircraft on a visual or VFR approach northeast of OAK to cross the Oakland 100 radial at or above 3,000 feet.
  - Between the hours of 10:00 p.m. to 6:00 a.m., and at other times when traffic permits, air traffic controllers keep turbojet aircraft over the Bay when approaching from the west, south of OAK.

_**Daytime (6:00 a.m. to 10:00 p.m.)**_

_**Touch-and-Go Operations**_
- Turbojet aircraft practicing instrument approaches south of OAK are to remain over the Bay when using Runway 29.

_**Nighttime (10:00 p.m. and 7:00 A.M.)**_
- Runway 29 Silent 7 Departure Procedure:
  - Reduces noise on Alameda and other East Bay communities
  - Turns turbojet aircraft to the west and further out over the Bay when departing from Runway 29

_**Runway 11 Quiet Departure Procedure**_
- Reduces noise on San Leandro and other East Bay communities
- Turns turbojet aircraft to the right and further out over the Bay when departing from Runway 11

_**Rolling Take-off Departure Procedure**_
- Used for takeoffs in which engine power is applied and the takeoff roll commenced immediately as an aircraft is lased onto the runway
- Reduces “back blast” noise
- Applied to turbojet departures between 1:00 a.m. and 5:00 a.m.
Community Outreach and Public Participation

Oakland Airport Community Noise Management Forum
Public participation is encouraged at the Oakland Airport Community Noise Management Forum, which meets quarterly to address community noise concerns.

North Field Research Group
A technical sub-committee of the Forum, the North Field Research Group meets quarterly with community representatives, the FAA and Airport users.

South Field Research Group
Another technical sub-committee of the Forum, the South Field Research Group meets quarterly with community representatives, the FAA and Airport users.

Board of Port Commissioners Aviation Committee
The Aviation Committee of the Board of Port Commissioners holds meetings with representatives from the City of Alameda, CLASS and KJOB, and the San Leandro City Council Airport Committee three times per year for each group.

Pilot Brochure — Noise Abatement Procedures for North Field
Designed for pilots, this brochure includes a diagram of the Airport and an aerial photograph of the community.

Noise Management Brochure
This brochure describes the overall noise management program at Oakland International Airport.

Noise Management Program Website
Located at www.flyoakland.com, this website provides:
- Basic information on Airport and aircraft noise programs
- Preferred daytime and nighttime aircraft flight procedures
- All routine noise abatement reports
- A flight replay system
- Educational materials such as ad-hoc reports, an airport noise glossary, Forum meeting information, and links to important and relevant websites

Oakland International Noise Abatement Procedures

Noise Reduction Programs, Studies and Other Commitments

City of Alameda — Residential Sound Insulation Program
To date, approximately 500 homes have been insulated on Bay Farm Island. The final one will be completed in 2006.

City of San Leandro — Residential Sound Insulation Program
The Port will fund insulation expenses for 200 homes in San Leandro that are located south of I-880, and will also fund up to $100,000 for city administration costs.

City of San Leandro — School Sound Insulation Program
The Port will fund insulation for the following schools in San Leandro:

- Munger, Wilson, Monarch, Garfield and Crockett Schools.

City of San Leandro Sound Studies
The Port conducted sound studies of the Mulford Gardens Branch Library and eight schools in San Leandro. The studies showed that existing conditions were sufficient to meet state law standards and that additional sound insulation was not required for the library and three schools identified in the Settlement Agreement.

Crosswind Runway Alignment Study
The Port, City of Alameda, and CLASS jointly undertook a noise study of single event and low frequency noise impacts associated with the cross wind runway alignments previously proposed by CLASS. The results showed that benefits were offset by noise increases in other communities east and south of the Airport.

Airport Tenant Orientation Program
The Port agreed to provide its existing and future tenants with information about the Airport’s noise abatement procedures and to gain their commitment to follow the procedures. Statements are attached to lease agreements.

General Aviation VFR Aircraft Study
The Port of Alameda, and CLASS agreed to jointly undertake an evaluation of general aviation aircraft departures from Runways 27L/R and 33 under visual flight rules. This project was completed in 2002.

Preferential Runway Use Agreement for San Leandro
The City of San Leandro, CLASS, and Port agreed to operate the airport in a manner to minimize impacts of aircraft operations on the City of San Leandro. The Port will work to coordinate with and prepare to coordinate with FAA a preferential runway use agreement for North Field that addresses the mutual noise mitigation concerns relative to North Field nighttime operations and touch-and-go operations.

Ongoing Noise Abatement Work with the FAA
The Port agreed to continue to work with the FAA to gain their cooperation in implementing the Airport’s noise abatement procedures on the behalf of the City of Alameda, CLASS, and KJOB.

Master Plan
The Port agreed to prepare a 20-year Master Plan for the Airport in accordance with FAA Advisory Circular 150/5070-6A. Members of the Master Plan Stakeholder Committee include representatives from the cities of Alameda, San Leandro and Oakland, CLASS, and the San Leandro Unified School District. KJOB also was invited to participate.

Runway 11/29 Length Agreement
The Port agreed not to propose, approve, or construct any extension of Runway 11/29 that would have caused a total effective length in excess of 11,600 feet.

Meet and Confer Agreement
The petitioners agree to meet and confer in good faith with Port on any future efforts by Port to secure amendments for and construct an outboard runway at the Airport.

USPS Facilities Agreement
The Port agreed not to construct or enter into new leases that authorize construction or modification of USPS facilities identified in the Aldo as Project D.2 at any location on the Airport for at least 20 years.

Additional Noise Monitors Agreement
The Port agreed to install, operate, and maintain two remote monitoring terminals at the locations identified by KJOB when KJOB provides Port with written notice of the location for the noise monitoring sites and submits easements for the sites.

No New Runway Construction on North Field
The Port agreed not to construct any new runways on any portion of the North Field.

No Runway Expansion on North Field
The Port agreed that existing North Field runways may not be realigned or lengthened, or widened, etc., if the purpose of doing so is to increase the runway weight and load capacities to accommodate operations beyond alternate use by air carriers.

Acronyms and Definitions

ANOMS Airport Noise and Operations Management System
CLASS Citizens League for Airport Safety and Serenity
FAA Federal Aviation Administration
GRE General runway expansion
KFR Instrument flight rules
KJOB Berkeley Keep Aris
OCD Over-the-Bay Committee
UALAD An association of area airlines
USPS United States Postal Service
VFR Visual flight rules

Sources
San Francisco, CA
Monteray Grove Associates
San Leandro
Brown Buxton Associates

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not purport to present particular courses of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.
Boeing 727 HK Departure

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<th>Night</th>
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Boeing 727 HK Arrival

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Boeing 737 & A319/320* Departure

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Boeing 737 & A319/320* Arrival

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*These aircraft do not have identical noise contour footprints, but are very similar and are grouped here for display purposes.
**Most night operations of B737 aircraft occur between the hours of 10pm and 11pm and between 6am and 7am.

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideal and planning scenarios. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.

Legends:
- 80 dB SEL
- 85 dB SEL
- 90 dB SEL

Time Periods:
- Day: 7 am – 7 pm
- Evening: 7 pm – 10 pm
- Night: 10 pm – 7 am

Acronyms:
- dB: Decibels
- SEL: Sound Exposure Level (also known as SENEL)

Figure 6.13

Night Single Event Noise Contours

Oakland International Airport Master Plan
May 2006
<table>
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<th>Aircraft Type</th>
<th>Time Period</th>
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<th>Year 2010</th>
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<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Boeing 767 &amp; A300/310* Arrival</td>
<td>Evening</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Boeing MD11/DC10* Departure</td>
<td>Night</td>
<td>5</td>
<td>5</td>
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<tr>
<td>Boeing MD11/DC10* Arrival</td>
<td>Night</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

*These aircraft do not have identical noise contour footprints, but are very similar and are grouped here for display purposes.

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only; it does not represent any particular course of action. It might represent an idea or concept that was discarded, and must be interpreted in the context of the entire master plan document.
Figure 6.15

Community Noise Equivalent Level (CNEL) Contours 2004

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Figure 6.17

Community Noise Equivalent Level (CNEL) Contours 2004 and 2010

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Air Quality Programs

Alternative Fuel Program
- Ground transportation providers are required to have 50% of their fleet in alternative fuel vehicles (taxis, door-to-door shuttles, off-airport parking shuttles, hotel shuttles, etc.).
- Airport light duty fleet, where practical, is alternative fuel vehicles.
- Airport heavy duty fleet uses ultra low sulfur diesel.

Airport Compressed Natural Gas (CNG) Fueling Facility
- Facility opened in July 2002
- Open 24 hours
- Serves Port vehicles, private operators and general public

CNG Refueling Station Fueling Volumes, 2002–2005

Aircraft Ground Power and Pre-Conditioned Air Loading Bridges
Newly constructed loading bridges provide pre-conditioned air and reduce air emissions. Without pre-conditioned air and ground power, aircraft generate electricity by running on the aircraft’s jet fuel.

Trip Reduction Program
- Airport coordinates and provides shuttle schedule information to Airport tenants.
- Discount A/BART tickets are available to employees.
- Vanpool parking is available.
- Employee commute survey was completed in April 2004. 87% of respondents indicated they drive to work alone but would consider alternative transportation, if given incentives. Airport is analyzing data and will develop a trip reduction program including travel demand recommendations, communication materials for use by tenants and provide on-going commute program support.

Water Quality Program
Stormwater Programs
- Port has a monitoring program to raise awareness of water quality issues and assist in compliance with State Water Resources Control Board’s industrial permit.
- Port holds workshops, training, collects and analyzes stormwater samples, and inspects facilities.
- Port provides assistance to contractors on developing storm water pollution prevention plans.

Wetlands Management Program
Oro Loma
The program restored a 16-acre diked and filled area of former bylands on Oro Loma Sanitary District land. Restoration was completed in September 2000 and monitoring of the project continues through 2005.

Damon Slough
The program enhanced and expanded a 9-acre seasonal wetland adjacent to Martin Luther King Jr. Regional Shoreline.

Burrowing Owl Mitigation Program
Burrowing Owls are a California “Species of Concern.” To provide long-term maintenance of a stable Burrowing Owl population, construction impacts on their habitat are mitigated on an ongoing basis. Accordingly, the Port purchased 70 acres in eastern Alameda County to establish off-Airport mitigation. Ownership of 70 acres was transferred to California Department of Fish and Game.

Recycling Programs
Recycling in the Passenger Terminals
- Port launched first passenger recycling program on Earth Day 2002.
- The program has since expanded to collect newspapers, magazines, office paper, cars and bottles.
- In 2004, the program diverted over 298 tons of material from the landfill.

Food Waste Program
- Food waste recovery was added in 2004.
- Program collects pre-consumer waste such as vegetable trimmings, coffee grounds and filters, milk cartons, cheesy pizza boxes and used paper towels from Airport food concessionaires.

Port purchased 70 acres in eastern Alameda County to establish off-Airport mitigation.

Recycling Programs Information on Website
The Airport website is currently being updated to provide basic information on the Airport environmental programs.

Figure 6.18

CNG Refueling Station Fueling Volumes, 2002–2005
Potential Takeoff Noise Barrier Near Source or Receiver

Barrier Near Source

Barrier Near Receiver

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan considered many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.

Legends:
- Sound Source
- Sound Direction
- Line of Sight Between Source and Receiver

Note: Graphics are not to scale.
Figure 6.20

Potential Takeoff Noise Barriers

Lmax, dBA at Neptune Drive Backyard

<table>
<thead>
<tr>
<th>Aircraft Position &amp; Thrust</th>
<th>25 ft Barrier at Airport Without Extension</th>
<th>25 ft Barrier at Airport With Extension</th>
<th>15 ft Barrier at Neptune Dr.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without Barrier</td>
<td>Noise Reduction</td>
<td>Noise with Barrier</td>
</tr>
<tr>
<td>A Tool</td>
<td>53</td>
<td>6</td>
<td>47</td>
</tr>
<tr>
<td>B Tool</td>
<td>54</td>
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<td>48</td>
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<tr>
<td>C Break-away</td>
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<td>D 100%</td>
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<td>E 100%</td>
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</tbody>
</table>

Notes:
- Aircraft are not to scale.
- Noise estimates are for a very calm wind.
- Noise barrier calculations include only one barrier, either at the airport or at Neptune Dr.
- Noise barriers will have little effect on low frequency noise.
Potential Effect of Barrier on Departure Noise
No Wind, Outdoor Noise Level, Neptune Drive Backyard

Boeing 727

Boeing MD-11/DC-10

Boeing 737–700

Average Daily Departures

Year 2004
Year 2010

Day Evening Night
3 1 4
1 0 2

Day Evening Night
5 1 6
5 1 8

Time Periods
Day 7 am – 7 pm
Evening 7 pm – 10 pm
Night 10 pm – 7 am

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action. It might represent an idea or concept that was discarded, and must be interpreted in the context of the entire master plan document.
Chapter 7: Financial Considerations

“Customers demand low fares. Low cost, efficient airports are vital in meeting that demand.”
— Gary C. Kelly, Vice Chairman of the Board and Chief Executive Officer, Southwest Airlines Company

7.1 Introduction

This chapter provides an overview of airport finances and then presents a financial plan for the potential near-term master plan projects (see Chapter 8). The financial plan is a screening-level analysis to determine if the potential master plan projects should even continue to be explored from a financial perspective. That is, if the potential master plan projects (either collectively or individually) appear to be well beyond the range of potential affordability, then they need not be considered for inclusion in the master plan.

It is important to note that this chapter is intended to provide a general overview of airport finances as they relate to the Port of Oakland and Oakland International Airport. It is not intended to give a comprehensive assessment of the Port or Airport for purposes of making investment or other decisions. The information contained in this chapter (like information contained in the other chapters) will change over time, and no obligation to update or revise it is created. Any potential investor in the Port’s long-term or short-term debt should review appropriate disclosure documents provided by the Port in connection with such debt, and should not rely on the master plan or this chapter in making investment decisions.

FAA AC No. 150/5070-6A, Chapter 10 (Plan Implementation), Section 3 (Financial Plan), discusses various funding mechanisms for airport development projects and the need for a financial feasibility and economic analysis. This chapter of the master plan is based on the planning principles and guidance contained in FAA AC No. 150/5070-6A.

7.2 Overview of Airport Finances

The purpose of this section is to provide a brief overview of finances at Oakland International Airport (OAK). It summarizes Airport Ownership, Airline Agreement, Operating Budget, and the Capital Improvement Program as of June 2005.

7.2.1 Airport Ownership

The Port of Oakland is an “independent department” of the City of Oakland established under the City’s Charter. The Port of Oakland is the City of Oakland, a municipal corporation, acting by and through its Board of Port Commissioners. The exclusive control and management of the Port is vested in the Board of Port Commissioners. Per the Charter, Commissioners are nominated by the Mayor and appointed by the City Council. The Port of Oakland owns and operates Oakland International Airport (OAK). Port staff responsible for managing and operating the Airport are part of the Port’s Aviation Division, which is one of three Port revenue divisions (the other two are Maritime and Commercial Real Estate). The Port’s Aviation Division is supported by several other divisions including Engineering, Social Responsibility, Finance, Communications, and the Port Attorney’s Office.

7.2.2 Airline Agreement

Each airline serving OAK operates under a 10-year Airline Operating Agreement that is cancelable by either party (the airline or Port) on 30 days written notice. This cancellation policy is somewhat unusual in the aviation industry, but becoming more common. Many airports have long-term lease agreements with the airlines (sometimes as long as 20 or 30 years) for use of specific airport facilities, such as a terminal building or specific gates and holdrooms in a terminal building. Often, these long-term lease agreements give the airlines considerable control over the airport’s operating budget and capital improvement program (called Majority-In-Interest clauses). This is not the case at OAK, and the Port retains considerable control over the Airport’s facilities. Under the Agreement, the airlines must pay various rates and charges established by the Board of Port Commissioners by Ordinance (Port Ordinance No. 3634, as amended) for their use of Airport facilities, including the airfield and passenger terminals.

Airlines with a minimum number of daily flights are assigned one or more preferential (but not exclusive use) gates. The Port reserves the right to assign another airline to any gate as long as the preferential airline is not using it. The Port can also keep some gates unassigned for use directed by the Port. Terminal 1 ticket counters and gates are equipped with Common Use Terminal Equipment (CUTE), which allows any airline to log into their host computer system at any ticket counter or gate.

7.2.3 Operating Budget

Like most local government agencies, the Port of Oakland and its Aviation Division have an operating budget and capital improvement program. Operating revenues and expenses are collected in seven cost centers.

Cost Centers

- Terminals
- International Arrivals Building (IAB)
- Contract Fueling
- Airfield and Ramp
- Ground Access and Parking
- Leased Area / Cargo / Oakland Maintenance Center (OMC)
- North Field (including a number of its own cost centers: Aircraft Operations and Parking Area, Leased Aircraft Hangars, T-Hangars, and Leased Area without Ramp)

These cost centers are either residual or compensatory.

Residual Cost Centers

In a residual cost center, the airlines are charged for the Port’s net operating (and capital) costs after allowing for any non-airline revenue attributable to the cost center. The following cost centers at OAK are residual: Terminals, Contract Fueling, and Airfield and Ramp.
For example, the Port incurs costs associated with operating and maintaining the terminal buildings. The Port must pay janitors to clean the concourses, building engineers to change light bulbs and repair jet bridges, and police to provide security. These labor and materials costs are collected in the Terminals cost center. The Port also generates revenue from concessions located in the terminals (typically as a percentage of individual concessionaire’s gross revenues). The airlines reimburse the Port for the operating costs collected in the Terminals cost center less concessions or other non-airline terminal revenues. Essentially, the airlines assume the financial risk of operating and maintaining the terminal buildings. For the Terminals cost center, costs are divided by the leasable terminal building area (to get a cost per sq. ft.) and then allocated to the individual airlines depending on how much area each airline leases from the Port. Operating and capital costs recoverable through airline rates and charges also include costs of capital improvements, including financing costs, except on capital projects funded using Airport Improvement Program (AIP) grants or Passenger Facility Charges (PFCs), or unless otherwise prohibited by federal law.

The Airfield and Ramp cost center operates in a similar fashion. For example, in the Airfield and Ramp cost center, costs are allocated to individual airlines based on landed weight (i.e., weight of the specific aircraft times the number of operations of that aircraft type in each accounting period). Rates and charges for these cost centers are based on the recovery of actual, audited net costs for the most recently completed fiscal year. For example, calendar year 2005 airline rates and charges are based on fiscal year 2004 (July 1, 2003, through June 30, 2004) audited data.

### Compensatory Cost Centers

The following cost centers are compensatory: IAB, Ground Access and Parking, Leased Area / Cargo / OMC Hangar, and North Field. The Port negotiates lease amounts and other charges to cover its fully allocated costs of providing facilities subject to market conditions, and assumes the financial risk associated with operating and maintaining the facilities. For example, the Port leases to the air cargo airlines, such as FedEx and UPS, certain facilities (e.g., buildings) at South Field. The Port charges airline passengers for parking on-airport parking lots and commercial vehicle operators for accessing the Airport to pick-up airline passengers. The Port attempts to set lease amounts, fees, charges, etc. to cover its fully allocated costs for these facilities, including depreciation and for major maintenance or improvement projects. The airlines and other tenants pay only for facilities that they use and the Port keeps revenues to offset its direct costs, pay other Airport operating costs, and invest in its facilities (referred to as internal cash flow).

The largest compensatory cost center is Ground Access and Parking, which generated almost $44.5 million in revenue in fiscal year 2004, or about 41% of all Airport revenues.

### Rates and Charges

The airline cost per enplaned passenger can be compared to industry averages, other airports, other airline costs, air fares, and can be used to evaluate the financial impact on airlines of increasing (or decreasing) airport operating expenses in the Terminals or Airfield and Ramp cost centers (e.g., a major taxiway maintenance project or debt service on a new or remodeled terminal building). When comparing an airport’s airline...
cost per enplaned passenger to industry averages or to other airports, it is often difficult to get an "apples to apples" comparison because each airport collects costs in different cost centers and those cost centers may or may not be in the airline rate base. For example, at OAK, the Ground Access and Parking cost center is not part of the airline rate base (but it could be at another airport).

Table 7.2 shows the calculation of airline cost per enplaned passenger at OAK.

As shown in the table above, the passenger airlines pay the Port approximately $4.79 on average per enplaning passenger through terminal rent (Terminals cost center) and landing fees (based on landed weight, through the Airfield and Ramp cost center). At airports nationwide, airline costs per enplaned passenger range from under $3 to over $15.

Increasingly, airlines are struggling to reduce operating costs, including the costs that they pay to airports. Many passenger airlines are struggling financially and some are in bankruptcy. Airlines must constantly evaluate and justify increases in operating costs that impact the airline cost per enplaned passenger. In some instances, the cost to the airlines for operating at a particular airport becomes too great, an airline might choose to discontinue or reduce air service at the airport, or move flights to another less expensive airport (if there is another airport in the region). As do other airport operators, the Port attempts to balance the need to operate and maintain its existing facilities and develop new ones, with the need to maintain airline costs at a reasonable level in order to serve community demand for air service and mix of airlines.

Other Important Regulations and Requirements

Accounting, Financial Reporting, and FAA Regulation of Rates and Charges — Like other local government agencies, the Port follows Generally Accepted Accounting Principles (GAAP) and Government Accounting Standards Board (GASB) regulations for audits of its financial statements. The Port and Airport are also subject to Federal Aviation Administration (FAA) accounting and financial reporting requirements. The FAA regulates how airports set airline rates and charges and determine aeronautical revenues.

Revenue Diversion — The Airport and Airway Improvement Act (AAIA) prohibits revenue diversion. Essentially, all revenues generated by an airport must be expended by the airport owner / operator for capital or operating costs of the airport. Also, when an airport owner / operator receives a grant from the federal government, the FAA requires that the airport owner / operator agrees to grant assurances, including assurance 25 on airport revenues. Assurance 25 requires that all revenue generated by an airport, including local taxes on aviation fuel, be expended by it for capital or operating costs of the airport, the local airport system, other local facilities owned or operated by the airport that are directly and substantially related to the actual air transportation of passengers or property, or noise mitigation purposes on or off the airport. Revenue diversion may include payments for services and/or facilities not provided or not reflective of airport use, use of revenues for general economic development / marketing / promotional activities, payments to compensate for lost tax revenues, and loss of revenue when airports charge non-airport-related entities less than full market value for leased space or property. The FAA ensures compliance by (1) airport self-certification (i.e., in grant applications), (2) audits, and (3) third party complaints. Penalties for revenue diversion include withholding of grants and civil penalties.

7.2.4 Capital Improvement Program

In addition to an operating budget, the Port maintains a Capital Improvement Program (CIP) and funds capital projects, including major maintenance and construction of new airport facilities. The Port’s overall CIP includes approximately $1.23 billion in projects from fiscal year 2002 through 2007. Approximately $671 million of the total CIP are aviation-related projects. As of June 30, 2005, the Port estimates that approximately $347 million in aviation-related projects are still to be completed.

Generally, the Port can pay for capital improvements using grants, Passenger Facility Charges (PFCs), Customer Facility Charges (CFCs), debt financing...
Airport Improvement Program (AIP)
The Airport Improvement Program (AIP) is an FAA-administered grant program established by the Airport and Airway Improvement Act of 1982 (originally dating back to 1970 in various laws and forms). The FAA provides AIP grants to airport owners/operators for airport construction and safety projects. AIP grants are funded from the Airport and Airway Trust Fund, which gets its revenue from user taxes on airline passenger tickets, aviation fuel, and air cargo. In addition to AIP grants, the Trust Fund pays for FAA operating costs (e.g., costs associated with operating the air traffic control system) and air traffic control system upgrades.

In federal fiscal years 1992 through 1997, the FAA awarded almost $9.8 billion in AIP grants to airport owners/operators. Almost 75% of these grants were for airdrome projects, such as construction or reconstruction of runways, taxiways, aprons, and safety improvements. In federal fiscal year 2004, the Port received $13.3 million in AIP grant funding for a variety of projects, including $2 million for sound insulation. From federal fiscal year 2001 through 2004, the Port received $13 million in AIP grant funding for sound insulation. AIP grants pay for up to 80.59% of the eligible costs of eligible capital projects at OAK.

AIP grants can be used for airport planning, airport development, or noise compatibility projects. Grants for airport development generally focus on projects associated with construction, improvement, and preservation of airport infrastructure, or the acquisition of land or equipment. Typical work items included under AIP development are (1) site preparation, (2) construction, alteration, or repair of runways, taxiways, aprons, and ground access roadways on airport property, (3) construction and installation of lighting, utilities, navigational aids, and aviation weather-related reporting equipment, (4) safety equipment required for certification of an airport facility, (5) security equipment required by rule or regulation, (6) snow removal equipment, (7) limited public-use terminal development at commercial service airports, (8) equipment to measure runway surface friction, (9) land acquisition, and (10) airport noise mitigation. AIP grants have not been made available for routine maintenance, construction of hangars, and revenue-producing public parking areas.

AIP grants are either entitlement or discretionary. Entitlement funds are awarded to airport owners/operators through a formula, based on the number of enplaning passengers and cargo tonnage. Discretionary funds are intended to provide flexibility for the FAA to meet important national airport system needs. They are used to fund capacity enhancement, noise abatement, and compatibility projects, and safety and security improvements.

AIP funds are distributed as a grant (reimbursed as funds are expended by the airport owner/operator) or under a Letter of Intent (LOI). An LOI is a document that conveys the FAA’s intention to obligate AIP funds to an airport for a specific project over a multi-year period (because the federal budget is only appropriated on a 1-year cycle). With an LOI, an airport can begin a project using bonds or short-term loans with the expectation of receiving reimbursement as the project progresses. The Port does not currently have any LOIs.

In order to obtain AIP funds, the FAA requires an airport to have a 5-year Airport Capital Improvement Program (ACIP), which details and prioritizes the airport’s capital improvement needs for AIP funding. The ACIP is updated annually. The Port’s ACIP for OAK includes projects such as reconstructing taxiways and aprons around Terminals 1 and 2 and at North Field, Runway Safety Area (RSA) improvements, storm water management/drainage improvements, and in the outer years, potential construction of taxiway improvements identified in the master plan.

State / Local Government Grants
Like other local government agencies in the San Francisco Bay Area and Alameda County, the Port can apply for and receive grants for the design and construction of transportation projects (usually runways or transit projects) from the Alameda County Congestion Management Agency, the Metropolitan Transportation Commission, and the Alameda County Transportation Improvement Authority (which administers the Measure B sales tax revenues for Alameda County transportation projects). These grants can have both federal funds (e.g., from the Transportation Equity Act for the Twenty-First Century (TEA-21)) and state funds (e.g., from the State Transportation Improvement Program (STIP)). For example, in fiscal year 2002, the Port received a grant for $1.5 million (a combination of federal and state highway funds) for the construction of Langley Street at North Field and related improvements (including a traffic signal) on Doolittle Drive (State Route 61). Also, the Port received a Measure B sales tax grant for over $70 million to design and construct the Airport Roadway Project, which includes improvements to 98th Avenue and Airport Drive and construction of the cross-Airport roadway, now Ron Cowan Parkway.

Passenger Facility Charges (PFCs)
Passenger Facility Charges (PFCs) are imposed on enplaning passengers when approved for a project, usually $3 or $4.50 per enplaning passenger, in accordance with FAA regulations. PFCs are collected by the airlines when passengers purchase tickets, and forwarded to the airport owner/operator, less a handling charge. To be eligible for PFC funding, a project must (1) preserve or enhance capacity, safety, or security, (2) reduce noise or mitigate noise impacts, or (3) enhance airline competition. PFCs are considered local (not federal) funds, but the FAA still approves the imposition and use of PFCs, and PFC-funded projects require consultation with the airlines. Like AIP grants,
PFCs may be used to construct non-exclusive use terminals and related facilities, but excludes certain revenue-producing portions, such as concessions, parking facilities, rental car facilities, etc.

In federal fiscal years 1992 through 1997, the FAA approved collection of over $16.1 billion in PFC collections by airport owners/operators. Almost 29% of these PFC collections have been used to fund land-side construction (mostly terminal buildings), 17.1% for construction of airside projects, 10.6% for construction of on-airport roads, and 6.1% for construction of noise mitigation projects. The Port collects PFCs at $4.50 per enplaned passenger.

PFCs may not be collected on airline tickets purchased with frequent flyer miles, and airports collecting PFCs must be in compliance with the Airport Noise and Capacity Act of 1990 (ANCA). If PFCs are collected at $4.50 per enplaned passenger, the airport owner/operator must forgo 75% of its AIP entitlement funds.

Customer Facility Charges (CFCs)
Under Section 1936 of the California Civil Code, the Port, along with certain other airports in California, may collect a single, fixed Customer Facility Charge (CFC) of $10 on each rental contract from rental car companies that operate concessions at the Airport. CFC revenues are to be used only to finance the design and construction of consolidated airport rental car facilities and the design, construction, and provision of common use transportation system that moves passengers between the airport terminals and consolidated rental car facilities, including debt service and other financing costs on bonds issued to finance such projects. Effective April 2002, the rental car companies operating at the Airport are required to collect a $10 per transaction CFC from their rental car customers. CFCs currently generate approximately $7.5 million in revenue each year.

Debt Financing
The Port has the ability to finance capital projects by borrowing money and incurring either short-term or long-term debt. The Port has covenanted that it will not pay any general obligation bonds of the City of Oakland out of the Port's gross revenues as long as its revenue bonds are outstanding. Financing options currently available to the Port include revenue bonds and short-term debt, such as commercial paper.

General Obligation Bonds — As stated above, the Port is currently restricted from supporting any general obligation bonds of the City of Oakland with its revenues. General obligation bonds, which usually require voter approval, pledge the full faith and credit of a municipal entity, such as the City of Oakland, as security to the investor. This commitment is based on the entity's ability to levy property, sales, or income taxes. The entity gives the bondholders (investors) a first claim on its general fund, and the community pledges the ability to pass any legislation needed to increase general fund revenues to pay the debt service. The citizens of Oakland approved general obligation bonds backed by the City's general credit for harbor development in 1925 and for Airport development in 1953 (for construction of South Field). The Port has repaid all principal and interest on these bonds, and has not had any outstanding general obligation bond debt for its benefit since 1968.

Revenue Bonds — Revenue bonds are issued by an airport owner/operator for projects that are anticipated to generate sufficient revenue to pay the debt service. Unlike general obligation bonds of a municipal entity, they are backed by a specific source or sources of revenue. They do not usually require voter approval. However, because the payment of debt service is limited to the revenue generated by the project, a feasibility study analyzing the projected revenues and operations of the facility being financed or improved is typically required to market and sell the bonds.

Revenue bonds may be issued tax-exempt for qualifying projects, including terminals, runways, hangars, repair shops, and land-based navigational aids. Construction of facilities such as airport hotels, retail facilities, industrial parks, and commercial office buildings on-airport, generally do not qualify for tax-exempt status.

Generally, most types of airport projects can be financed using revenue bonds. At OAK, for example, airline rates and charges (i.e., terminal lease rates and landing fees) are set to include debt service on terminal projects (Terminals cost center) and airfield projects (Airfield and Ramp cost center) to repay any revenue bonds issued for terminal or airfield projects.

From time to time, the Port has issued revenue bonds to finance or refinance its maritime and aviation capital projects, as well as certain commercial real estate projects. The Port's revenue bonds are not secured on a project by project basis or from specific project revenues; they are secured by the Port's gross revenues, excluding proceeds from certain restricted sources (collectively, the "Pledged Revenues"). As of May 31, 2005, the Port's revenue bonds were outstanding in the aggregate principal amount of $1.4 billion. The Port has covenanted not to issue any additional bonds or other obligations payable from or secured by a lien on the Pledged Revenues if such bonds or obligations would have claims or security interest superior to that of the currently outstanding revenue bonds. The Port may, however, issue additional revenue bonds with parity claim or security in the Pledged Revenues if certain requirements are met.

Revenue bonds may also be issued and backed by PFCs, either alone (stand-alone) or in combination with other sources of airport revenue (called double-barreled bonds). To date, the Port has not issued any PFC-backed revenue bonds.
7.2.5 Reference Materials

The following reference materials were used in preparation of Section 7.2:

- Port Ordinance No. 3634 (adopted April 3, 2001), as amended
- Airport Finance (Powerpoint slides), Leigh Fisher Associates
- 2002 Hub Factbook (Figure 2, Airport Hub Key Statistics Summary), Salomon Smith Barney, April 15, 2002
- American Association of Airport Executives (AAAE) Accreditation and Certification Programs, Body of Knowledge Module 9 (Airport Fees, Rate, and Charges) and Module 10 (Capital Development and Funding for Airports), 2004/2005

7.3 Financial Plan

A financial plan was prepared to determine if the potential master plan projects are fundable. Like individuals and other local government agencies, the Port has to live within its financial means. Therefore, if any of the potential master plan projects are well beyond the ability of the Port to pay for them, then they do not need any further study and would not be recommended in the master plan. As described above, the Port can pay for capital projects using a number of potential funding sources, such as AIP grants, PFCs, Port cash, and debt financing (i.e., borrowing money and paying it back over time using anticipated future revenues). The financial plan presented here represents one possible funding scenario, which might change in the future as facts and assumptions change and present themselves if and at the time the Port actually pursues any of the projects.

The basic steps used to prepare the financial plan are as follows:

1. Estimate how much the potential master plan and other capital improvement projects might cost (including escalation),
2. Estimate potential revenues that might be available to pay for these projects, and
3. Evaluate if there are enough potential revenues (now and bonded over time) to pay for the projects.

Table 7.3 summarizes potential master plan and non-master plan projects, including those projects not yet constructed from the Airport Development Program (ADP), and what they might cost, escalated to account for inflation and anticipated increases in the cost of construction materials (wood, steel, asphalt, concrete, etc.) and labor. The rough, order-of-magnitude costs presented in Table 7.3 are assumed to be all-inclusive, including soft costs (design, construction and program management, etc.) and environmental mitigation costs, if any.
While each project would have its own timeline for implementation, it is assumed that these projects would start within a few years (after appropriate environmental reviews, detailed financing plans, and designs are complete) and be more or less complete by 2013.

The next step is to estimate potential revenues that might be available to fund these projects. Through 2013, it is estimated that the Port might be able to generate approximately $440,000,000 in PFCs, AIP grants, airline rates and charges (increment dedicated to capital projects, as opposed to operations and maintenance costs), and cash. Therefore, the Port cannot afford these projects without borrowing against anticipated future revenues (i.e., selling revenue bonds backed by PFCs, airline rates and charges, and Port cash).

Through 2040, it is estimated that the Port might be able to generate almost $5,000,000,000 in PFCs, airline rates and charges (41%), airline rates and charges (38%), and Port cash (21%), which could be available for bonding (borrowing against). The following presents some basic assumptions about this estimated revenue stream:

• An overriding goal is to keep airline rates and charges at a reasonable level (see discussion on airline cost per enplaned passenger in Section 7.2.3). Therefore, it is assumed that the total airline cost per enplaned passenger would increase to only $8.50 (in 2008 dollars), with increases for inflation, and only between 35% and 40% of this total would be available for bonding to pay for these new projects.

• For the purposes of calculating revenues generated from airline rates and charges and PFCs, it is assumed that the maximum number of airline passengers that will use OAK on an annual basis is just over 22 MAP due to capacity limitations of OAK’s main air carrier runway (Runway 11-29). Because there is no absolute runway capacity (i.e., delays just continue increase as flights are added), it may be possible that the actual number of airline passengers could continue to grow slightly each year (e.g., 1%) beyond 22 MAP. Also, the passenger airlines could decide the “upgauge” their fleet (use new aircraft that seat more passengers), in which case they could carry more airline passengers without generating additional operations and runway delay. However, for the purposes of the financial plan, the number of airline passengers is assumed to be limited to just over 22 MAP. It should be noted that airline passenger facilities, such as a new terminal, are not being planned for 22 MAP (as discussed in Chapter 4, new terminal facilities were studied to accommodate 18 to 20 MAP in the 2010 to 2012 timeframe). However, for debt financing (bonding) purposes, it is necessary to look at potential revenues well beyond the planning horizon (in this case, out to 2040).

• The amount of future Port cash (e.g., net parking revenues) that could be pledged to pay the projects in the above table is limited to between $20,000,000 and $35,000,000 each year, which is conservative (i.e., there might be additional Port cash available each year). However, cash over and above this could be used to pay for other, unanticipated projects not included in the master plan projects or in the other Capital Improvement Program projects.

• It is assumed that about $70,000,000 in AIP grants would be available between 2007 and 2013 to directly offset the costs of the projects summarized in Table 7.3. These grant funds may or may not actually be available.

With these project costs and revenue assumptions, it appears that these master plan projects could be affordable, based on a rough, high-level debt capacity analysis. The analysis assumed that bonds would be sold in two issuances at a 5.5% interest rate. Further, the analysis assumed a coverage ratio of 1.4 (i.e., the Port has to demonstrate that it can generate 40% more revenue than it will take to pay back the bonds).

As a reminder from the beginning of this chapter, the financial plan is not intended to give a comprehensive assessment of the Port or Airport for purposes of making investment or other decisions. The information contained in this chapter (like information contained in the other chapters) will change over time, and no obligation to update or revise it is created. Any potential investor in the Port’s long-term or short-term debt should review appropriate disclosure documents provided by the Port in connection with such debt, and should not rely on the master plan or this chapter in making investment decisions.
8.1 Introduction

This chapter summarizes the recommended potential development areas from Chapters 4 and 5 on land-use maps. The land-use maps show the recommended development pattern on the Airport for the 2010 to 2012 timeframe (the near-term planning horizon) and for 2025 (the long-term planning horizon). The chapter then summarizes the near-term master plan projects that are recommended for further study and outlines other anticipated near-term (and some longer-term) projects.

FAA AC No. 150/5070-6A, Chapter 9 (Airport Plans), Section 1 (General), states that “Upon completion of the requirements analysis . . . the master planning proceeds to the synthesis of airside and landside concepts and the development of plans.” In determining the appropriate level and type of plans for the OAK master plan, the following principle, as outlined in the AC, was used: “The information presented in this AC covers the planning requirements for all airports, regardless of size, complexity or role. However, the scope of study must be tailored to the individual airport, with the level of effort limited to its specific needs and problems. Based on an airport’s specific needs, certain master planning elements may be emphasized while others will not be considered at all.”

Therefore, the land-use maps below represent a synthesis of the potential development for OAK in the 2010 to 2012 timeframe, in accordance with FAA AC No. 150/5070-6A. These maps are subject to change as the airport and demand for its various facilities evolve over time, especially further into the future (e.g., the long-term / 2025 land-use map). Further, additional environmental review, financial planning, and engineering must be performed before any of the land uses or projects within those land uses could proceed.

8.2 Existing Land-Use Map

Figure 8.1 presents the existing aviation land uses (by color) on the airport. It is the same graphic presented in Chapter 2 (Section 2.2), Figure 2.1, using the same land-use designations and color scheme. It is presented again here for comparison purposes.

8.3 Near-Term Land-use Map (2010-2012)

Figure 8.2 presents the forecast land uses in 2010 to 2012. The land-use abbreviations (i.e., A, PF, C, ARS, GA, ARB, R, and U) highlight areas of significant change from the prior land-use map (in this case, changes from Figure 8.1). As shown on the graphic, the primary new land-use designation is a Passenger Facilities (or PF) area east of Taxiway B, north of existing Terminal 1, and south of Ron Cowan Parkway, as recommended in Chapter 4. If a new terminal project is proposed and approved in this area, the Oakland Maintenance Center (OMC) site would be redeveloped to support the new terminal land-use area to the south including replacement air cargo facilities, such as the belly cargo and United Parcel Service building (C land use), potential airline provisioning and GSE maintenance facilities (ARS land use), and remain overnight (RON) aircraft parking and/or passenger/employee vehicle parking (PF land use).

Other new land-use designations in the 2010 to 2012 timeframe include Airfield (or A) land uses for a potential new taxiway parallel to Taxiway B, a potential new high-speed taxiway off Runway 29 (shown as Taxiway Z), and potential new Runway 29 taxiway access improvements, as described in Chapter 5. The PF land use on the west side of Taxiway B, just south of Ron Cowan Parkway could be for RON aircraft parking, and the PF land use in the Central Basin, just south of Ron Cowan Parkway could be for long-term/remote airline passenger vehicle parking and/or employee parking.

At North Field, new land uses are designated for general aviation aircraft parking ramps and/or hangars (GA land use). The area just north of Runway 15-33 could be used for larger corporate jet parking, while the area adjacent to Harbor Bay Parkway could be used for hangars for small (e.g., single-engine or light multi-engine) aircraft hangars. It is anticipated that these areas would be developed only as market conditions warrant using a third party developer model. The amount of area shown is consistent with the requirements for potential general aviation development (see Chapter 4).

8.3.1 Summary of Near-Term Master Plan Projects Recommended for Further Study

This section presents a summary of the near-term master plan projects recommended for further study as a result of the analyses in Chapters 4 and 5 and the screening-level environmental and financial analyses presented in Chapter 6 and 7. This master plan is a planning and feasibility study, and is therefore not intended to be used by the Port to approve any specific projects. Further development and refinement of the recommended near-term projects is required, including financial planning, engineering, and detailed environmental reviews, before the Port could decide whether to pursue them.

The following are the master plan projects recommended for further study. These projects should continue to be developed by the Port, including additional planning, financial feasibility and funding, preliminary engineering, and detailed environmental review:

1. 17 to 21-gate airline passenger terminal, which might include a new parking garage, in potential terminal development Area 2, for a total of 46 to 50 aircraft gates to accommodate 18 to 20 MAP in the 2010 to 2012 timeframe at a reasonable level of service,

2. Relocation of the cargo building and other functions to the Oakland Maintenance Center site south of Ron Cowan Parkway (UPS has expressed interest in this location, whether or not a new terminal is constructed in Area 2,
New taxiway parallel and east of Taxiway B, generally between Taxiways T (or possibly Taxilane S) and B2 (this project solves most of the congestion and delay issues associated with head-to-head taxi events on Taxiway B and supports the potential new terminal in Area 2).

Taxiway access improvements to Runway 29, including a taxiway parallel to Taxiway U (between Taxiways T and W) and W (between Taxiways U and the Runway 29 threshold).

New high-speed taxiway exit from Runway 29 between high-speed Taxiways V and Y, and 

Airline passenger or employee vehicle parking in the non-wetlands area of the Central Basin (off Ron Cowan Parkway near Harbor Bay Parkway).

In addition to these projects, it is recommended that Port staff and the Stakeholder Advisory Committee continue to work together on the following projects and studies:

- Continue to study a potential Runway 29 aircraft noise barrier, on-Airport, which would provide some aircraft noise reduction for the homes on the west side of Neptune Drive in the City of San Leandro under certain, limited conditions, or other methods to reduce the effects of aircraft noise in the community (including the City of Alameda), and continue to work with the City of San Leandro on their residential sound insulation program, which is currently underway.
- Conduct a study to investigate why some corporate jets (less than 2%) choose not to comply with the Port’s voluntary noise abatement procedures, which requests that they taxi to and depart from South Field instead of North Field (except those that can depart on Runway 33).
- Conduct an Airport ground traffic study (work with the cities of Alameda, San Leandro, and Oakland to develop a study to determine the amount of traffic to/from the Airport, including trucks, that uses local streets in these cities).
- Establish a committee (i.e., continue the Stakeholder Advisory Committee after the master plan, with a new name, so that the Port’s Planning and Development staff can continue to meet, annually or semi-annually, with community stakeholders and Airport-users to provide updates on various projects and Airport activity, as well as receive input).
- Continue the Port’s commitment to other environmental programs, such as those outlined in Chapter 6, including continued operation of AirBART (until the BART Connector can be constructed) and funding for the BART Connector project.
- Airfield pavement renovation / rehabilitation / reconstruction, as follows:
  - East and West Aprons (around Terminals 1 and 2, on-going)
  - Taxiway T between Taxilane S and Taxiway U (with East Apron)
  - Taxiway B (South Field)
  - Runway 11-29 (in approximately 2015)
  - Apron at Hangars 1 through 5 (North Field, on-going)
  - Other North Field aprons, taxiways, and roadways
  - Runway 15-33 (requires cost-benefit analysis)
  - Others as determined by the Port’s pavement management system
  - Infeld Roadway (North Field)
- Utility system and airfield lighting rehabilitation and upgrades
- Runway Safety Area (RSA) improvements (all runways)
- Storm water system rehabilitation and upgrades
- Runway 11-29 perimeter levee seismic strengthening
- Airport-wide security system upgrades and expansions
- Terminal 1 rehabilitation (including seismic and utility system upgrades)
- FAA air traffic control tower
- FAA navigational aid upgrades (e.g., replacing the VOR at North Field with a new one using doplar to improve accuracy and reduce interference)
8.4 Long-Term Land-Use Map (2025)

Figure 8.3 presents the forecast land uses in 2025. The land use abbreviations highlight areas of significant change from the prior land-use map (in this case, changes from Figure 8.2). The graphic shows an expansion of the PF land-use designations in and around the existing terminal area, mostly to support potential additional remain overnight (RON) aircraft parking and some potential airline passenger and/or employee vehicle parking. The graphic also shows additional expansion of GA land-use designation at North Field, mostly for potential additional small aircraft or corporate jet hangars (consistent with the requirements developed in Chapter 4). Although potential land uses are shown, no specific projects are identified for this time period, which would be too speculative and not reasonably foreseeable that far into the future.

A new runway at South Field (parallel to Runway 11-29) is not shown on this figure, although one would likely be required before 2025 to meet anticipated unconstrained demand at OAK. As discussed in Chapter 5, it is recommended that the Port not pursue a new South Field runway at this time due to environmental and financial constraints. However, it is recommended that the Port work with its regional partners (e.g., the Regional Airport Planning Committee) to continue discussions about the future demand and capacity of runways at Bay Area airports. Providing additional runway capacity for the Bay Area should be discussed and decided by the entire region.
Existing Land-Use Map

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.

Figure 8.1
Oakland International Airport Master Plan
March 2006

LEGEND

Airfield
Passenger Facilities
Cargo
Airline-Related Support
General Aviation
Aviation-Related Business
Recreation
Undesignated
Buildings
Runways
Taxiways
Roadways
Future Runways
Land
Water
Wetlands
Bay Trail
Map not to scale

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.
Important Note: This graphic depicts potential airport land uses in the 2010 to 2012 timeframe at Oakland International Airport (OAK). This drawing is part of the study and analysis phase of the master plan, which is conceptual in nature. The Port may or may not actually propose any of the uses depicted in this graphic or service. The Interim Airports Reference Guide, which is the master plan, is the document that will actually propose the proposed airport land uses. Each individual land use depicted in the master plan may be independent of or may be related to other uses. This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and is for planning purposes only. It does not propose any particular course of action. It might represent an idea or concept that was discarded, and must be interpreted in the context of the entire master plan document.

Figure 8.2 Near-Term Land-Use Map (2010–2012)

Note: White letters on map highlight land uses that have changed from the prior time period.
Important Note: This graphic depicts potential airport land uses in the 2025 timeframe at Oakland International Airport (OAK). This drawing is part of the study and adoption of a master plan for OAK. Because the master plan is conceptual in nature, the Port may or may not actually propose any of the uses depicted in the graphic or within the timeframe referenced. Whether any land use will be proposed is subject to a number of factors, including market conditions, availability of funding, environmental constraints, etc. Each individual land use depicted may be independent of or may be related to other uses.

Note: This graphic was prepared by the Port of Oakland as part of a master plan for Oakland International Airport. The master plan examined many possible ideas and planning concepts. This graphic is conceptual in nature and for planning purposes only. It does not propose any particular course of action (it might represent an idea or concept that was discarded), and must be interpreted in the context of the entire master plan document.
# Appendix A
## Stakeholder Advisory Committee Members

### City of Alameda
- David Needle: Community Representative
- Red Wetherill: Community Representative
- Walt Jacobs: Community Representative (alternate)
- Andrew Thomas: City of Alameda Staff Representative
- Marge McLean: City of Alameda Staff Representative (alternate)

### City of San Leandro
- Carmen Fewless: Community Representative
- James Reynolds: Community Representative
- Dennis Rosucci: Community Representative (alternate)
- Kathy Ornelas: City of San Leandro Staff Representative
- Debbie Pollart: City of San Leandro Staff Representative (alternate)

### City of Oakland
- Pat Mossburg: Community Representative
- Marianne Dreisbach: Community Representative
- Niccolo De Luca: City of Oakland Staff Representative
- Dave Grenell: City of Oakland Staff Representative (alternate)

### San Leandro Unified School District
- Heidi Finberg: Community Representative
- Francois Gallo: Community Representative (alternate)
- Leon Glaster: School District Staff Representative
- Mike Murphy: School District Staff Representative (alternate)

### Citizens League for Airport Safety and Serenity (CLASS), Alameda
- Barbara Tuleja: Community Representative
- Eileen Bitten: Community Representative (alternate)
- Laurel Impett: CLASS Staff Representative

### Alameda County
- Cindy Horvath: Alameda County Staff Representative

### Fix Base Operators
- Sandy Waters: KaiserAir, Inc.
- Gregg Rorabaugh: KaiserAir, Inc. (alternate)
- David Mills: Business Jet Center - Oakland Ltd.
- Adam Moyer: Business Jet Center - Oakland Ltd. (alternate)

### Passenger and Cargo Airlines
- Alex Fedor: Port of Oakland Airline Liaison Office (AvAirPros)
- Robin Van Galder: FedEx (Cargo Airline Representative)
- Michael Graham: FedEx (Cargo Airline Representative, alternate)
- John MacPherson: Southwest Airlines (Passenger Airline Representative)

### Flight Training / Light General Aviation
- Nathan Todd: Silver State Helicopters
- Mike Hill: Silver State Helicopters (alternate)
Meeting 1
June 10, 2004

AGENDA

Welcome and introductions

Master plan overview

- Background
- Goals, objectives, and expectations (below No. 1)
- Process (below No. 2)
  - Aviation Stakeholder Advisory Committee composition and role (below No. 3 and No. 4)
  - Proposed meeting topics (below No. 5)
- Overall schedule (12 to 18 months)

Summary of existing conditions

- Land use map
- Statistics

Concluding remarks

- Web site (www.oaklandairport.com/masterplan)
- Sign-in sheet and primary method of communication
- Meeting minutes
- Schedule next meeting (in about 2 months)
- Transportation (parking and AirBART)

Questions/comments

NO. 1: WHAT IS A MASTER PLAN AT OAK?

A master plan at OAK will:

- Follow FAA Advisory Circular (AC) No. 150/5070-6A (Airport Master Plan)
- Identify near-term projects (5-year timeframe) and provide long-term (20-year) Airport general land-use guidance
- Provide a vehicle for community participation in airport planning
- Provide input on master plan technical issues and identify potential impacts early-on in the planning process
- Advise Port staff on long-range high-level planning issues for OAK
- Report back to appointing agency/organization to keep these groups informed on latest master plan issues and progress

The Stakeholder Advisory Committee will NOT:

- Meet the requirements in the settlement agreements with the City of Alameda, Citizens League for Airport Safety and Serenity (CLASS), and Berkeley Keep Jets Over the Bay (KJOB) Committee for a master plan on Airport site selection (not applicable)
- Approve specific projects

A Master Plan at OAK will NOT:

- Focus on detailed plans for individual projects or facilities
- Include every project that the Port might propose during the 20-year planning horizon
- Make decisions regarding the master plan

NO. 2: MASTER PLAN PROCESS

FAA AC No. 150/5070-6A

- Allows for flexibility in scope, depending on the type and size of airport and nature of issues
- Elements
  - Existing conditions and issues
  - Aviation demand forecasts
  - Requirements analysis and concepts development
  - Airport site selection (not applicable)
  - Environmental procedures and analysis
  - Simulations
  - Airport plans
  - Implementation plans

Future FAA updates to AC No. 150/5070-6A

NO. 3: STAKEHOLDER ADVISORY COMMITTEE COMPOSITION

Individual Stakeholder Advisory Committee members and alternates are appointed by their respective cities or organizations (and in the case of airport tenants and regulatory agencies, the Port) to advise Port staff on preparation of the master plan for OAK. The Committee composition is as follows:

City of Alameda
- 2 community members
- 1 staff person (plus 1 alternate)

City of Oakland
- 2 community members
- 1 staff person (plus 1 alternate)

San Leandro Unified School District
- 1 community member
- 1 staff person (plus 1 alternate)

City of San Leandro
- 2 community members
- 1 staff person (plus alternate)

Berkeley KJOB Committee
- 2 community members

Fixed Base Operators
- KaiserAir (1 representative, plus 1 alternate)
- Business Air Center (1 representative)

Airlines
- Steve Swanson, Airline Liaison Office
- Federal Express (1 representative)
- 1 passenger airline representative

Flight Training / Light General Aviation
- 1 flight training / light general aviation representative

Regulatory Agencies
- 1 FAA representative
- Others as-needed (e.g., environmental resource agencies)

Port Staff

The Stakeholder Advisory Committee will:

- Provide input on master plan technical issues and identify potential impacts early-on in the planning process
- Report back to appointing agency/organization to keep these groups informed on latest master plan issues and progress
- Make decisions regarding the master plan

NO. 5: PROPOSED MEETING TOPICS

Meeting 1:
Introductions, process, schedule, and inventory of existing conditions

Meeting 2:
Forecasts, market analyses, airline passenger issues

Meeting 3:
Air cargo issues

Meeting 4:
Airfield, access, and airline support issues

Meeting 5:
General aviation issues

Meeting 6:
Environmental and financial issues and constraints

Meeting 7:
Discussion of alternative land use plans (prepared based on Meetings 1 through 6)

One meeting every 2 months or so, with each meeting about 4 hours (with more or less time, as necessary, to cover specific topics)

Additional meetings will be scheduled, as requested by the Stakeholder Advisory Committee, to address specific topics as necessary

Acknowledgements

City of San Leandro
City of Oakland
San Leandro Unified School District
CLAS
City of Alameda
KaiserAir
Business Air Center
Airlines
Steve Swanson
Federal Express
1 passenger airline representative
Flight Training / Light General Aviation
Regulatory Agencies
1 FAA representative
Others as-needed (e.g., environmental resource agencies)
Port Staff
MINUTES
Meeting 1
Aviation Stakeholder Advisory Committee
Oakland International Airport
Thursday, June 10, 2004

The meeting was the first of a series of planned meetings of the Aviation Stakeholder Advisory Committee (the Committee) for the Oakland International Airport (OAK) master plan. These minutes correspond to an Agenda that was distributed at the meeting; a copy of the Agenda is provided on the OAK master plan web site to be used as an administrative tool. New postings will be accompanied by e-mail notices to Committee members. The web site address is www.oaklandairport.com/masterplan.

Attendees: See sign-in sheet (including email addresses) to be used as distribution list.

Handouts: Agenda; Existing Land-Use Map (with Existing Conditions data on reverse)

Following introductions, Ms. Kristi McKenney, Master Plan Project Director, provided a brief master plan history at OAK. The master plan is an element necessary to address requirements of the Airport Development Program (ADP) settlement agreement.

Mr. Doug Mansel, Master Plan Project Manager, distributed the Agenda and Existing Land-Use Map, then provided an overview of the master plan process and a summary of existing conditions. Following are the major topics presented on the Agenda, including questions/comments and responses from meeting attendees.

No. 1: What is a Master Plan at OAK?

The existing Federal Aviation Administration (FAA) Advisory Circular (AC) No. 150/5070-6A, (Airport Master Plan) allows flexibility with regard to preparing a master plan; the FAA is currently in the process of updating the circular, dated 1985. The Port is aware of the FAA's work, and will keep informed on any proposed changes to the AC.

Master plans for other airports are sometimes developed in greater detail than Port staff anticipates for this effort. The master plan for OAK may identify near-term projects. However, projects that are moved forward will go through the normal Port project development process, which includes:

- Project planning
- Design
- Environmental documentation
- Permitting
- Project bidding

The scope of the master plan includes proposed land uses for areas within the property boundary of the Port. Land uses located outside the Port property boundary will be noted as existing conditions when Airport-related impacts (e.g., noise contours) exist.

Recommendations by the Committee will be recorded in the master plan, to be used for reference when projects are raised. For specific projects, there will be future opportunities for public review and comment at various stages, including the environmental review stage and project-related Board of Port Commissioners (Board) meetings/actions.

The Port Board will adopt the master plan with amendments made as needed. The master plan is a planning document only that will provide a sense of planning opportunities considered by the Port; it is not to be treated like a city's general plan or used to approve specific projects. Deviation by the Port Board from the plan, once adopted, would be noted at Port Board meetings.

OAK master plans were prepared in 1954 (Development Plan for the Metropolitan Oakland International Airport, July 1954) and 1978 (Oakland International Airport Master Plan: 1976–1986, Summary Report); a master plan was conducted for North Airport in 1984 (Oakland North Airport Master Development Plan, July 1984). For the past 10 to 15 years, the Airport has relied on the Airport Development Program (ADP) for airport planning purposes.

No. 2: Master Plan Process

Elements of the master plan area listed in the Agenda and will be discussed during subsequent Committee meetings. Consultants are under contract to assist with airfield simulations, aircraft noise analyses, and master plan-related graphics. It was suggested that financial analyses be included in evaluation of implementation plans.

No. 3: Stakeholder Advisory Committee Composition

Committee meetings are not open to the public. The Port requested that meetings be attended by either (1) the appointed member or (2) the appointed alternate. After discussion, it was agreed that appointed alternates may accompany the primary appointed member to meetings for informational purposes, but only as an observer, except when officially standing-in for the primary appointed member. The intent of limiting participation to primary appointed members is to keep meetings manageable and allow for discussion.

Note: no representatives have yet been named to represent Berkeley Keep Jets Over the Bay Committee (KJOB).

No. 4: Role of the Stakeholder Advisory Committee

As the name implies, the Stakeholder Advisory Committee will provide advice and input to Port staff, with final plans and decisions made by the Port Board. Although the final configuration of layouts will be developed by Port staff, discussions and recommendations of various options from the Committee that may differ will be brought to the Port Board's attention through Committee meeting minutes and text in a section of the master plan that will document the Committee's ideas.
and concerns (similar to a response to comments section in environmental documents). Both the meeting minutes and the master plan will be drafted by Port staff, with support from consultants and input from the Committee.

To ensure sufficient time for review of materials, information will be posted on the Port web site a few days prior to meetings. Data will be provided electronically, if available.

No. 5: Proposed Meeting Topics

Elements of the master plan generally correspond to future meeting topics.

Description of the Existing Land-Use Map:
During the meeting, Mr. Larry Berlin, North Field Manager for the Port, identified locations of existing and planned air traffic control towers (ATCT) on an Airport aerial plot. The Remain-Over-Night (RON) area between Taxiways Tango and Whiskey was identified as passenger facilities for the Committee. Terminal plans will be discussed in future Committee meetings including potential uses of the area currently occupied by the Oakland Maintenance Center hangar. Reference was made to graphics showing a terminal described in a separate meeting by Ms. Deborah Ale-Flint. Port staff indicated that there are currently no firm plans for the hangar site, and many options, including terminals, will be discussed as part of the master plan.

Additional Existing Conditions data:
Requests were made to determine the number of the estimated 10,000 employees at OAK that are local. General Aviation (GA) comprised 60% of total aircraft operations in 2002 partly due to the manner in which they are counted. For example, if a small aircraft is practicing landings by briefly landing on a runway, then immediately taking-off (i.e., touch and go), that would count as one departure. Previously, OAK was home to more than 500,000 operations (8th in the world, 5th in the U.S.).

Rental car ready/return facilities currently located at North Field northwest of Langley Street will return to garage after its completion.

Currently, there are 24 gates; construction of Terminal 2 extension and renovation will add 5 net new gates.

Next meeting
Meetings will be scheduled every other month. The next meeting is scheduled for Thursday, August 19, 2004, from 1 to 5 p.m., at the Airport, Terminal 1, In-Transit Lounge.

Items specifically requested by Committee members:
- Information such as data, charts, and graphics in an electronic format
- Residency of employees working at the Airport
- Economic and budgetary figures associated with the Airport
- Gate turns upon the completion of the ADP
- Show location of proposed ATCT
- Documentation of concerns and direction the Airport is headed on an issue early-on in the process—even if there is disagreement with the Committee
This meeting was the second in a series of planned meetings of the Aviation Stakeholder Advisory Committee (the Committee) for the Oakland International Airport (OAK) master plan. These minutes correspond to an Agenda that was distributed at the meeting; a copy of the Agenda is provided on the master plan web site. New postings to the web site will be accompanied by email notices to Committee members. The web site address is www.oaklandairport.com/masterplan.

Attendee: See sign-in sheet (to be used as distribution list); a copy of the sign-in sheet is provided on the master plan web site.

Handouts:
- Agenda
- Wetlands Map
- Forecasting Process
- The Committee discussed and agreed that a question/answer period should occur at each Committee meeting. Between meetings, questions can be emailed to Mr. Doug Mansel (dmansel@portoakland.com).
- Residency data for Airport employees: Provided on revised Existing Conditions data sheet (posted on the web site, and hard copies will be provided at the next committee meeting)
- Airport revenue by major function: Provided on revised Existing Conditions data sheet
- Gate use upon completion of current construction: Discussion prepared and posted on the web site
- Existing wetlands map: Distributed during the meeting and posted on the web site
- Location of proposed air traffic control tower: Provided on revised Existing Conditions data sheet

The Committee discussed the following master plan issues:
- Near-term forecasts will be developed with more detail, and long-term forecasts will be developed with significantly less detail, corresponding to the overall level of detail of the master plan (i.e., more specific projects in the near-term, with general land-use guidance for the long-term).
- Environmental review will occur as projects or groups of related projects are proposed. The Port does not intend to have the master plan undergo environmental review because it is a planning study/document, providing general, non-binding land use guidance. It will not approve any specific project or groups of projects. However, the master plan will discuss environmental issues and constraints, as appropriate.
- The Committee discussed the following master plan issues:
  - Residency data for Airport employees: Provided on revised Existing Conditions data sheet (posted on the web site, and hard copies will be provided at the next committee meeting)
  - Airport revenue by major function: Provided on revised Existing Conditions data sheet
  - Gate use upon completion of current construction: Discussion prepared and posted on the web site
  - Existing wetlands map: Distributed during the meeting and posted on the web site
  - Location of proposed air traffic control tower: Provided on revised Existing Conditions data sheet

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- The Committee discussed and agreed that a question/answer period should occur at each Committee meeting. Between meetings, questions can be emailed to Mr. Doug Mansel (dmansel@portoakland.com).
- The Committee discussed opening the web site to the public. The Port prefers this site to be available only to Committee members, as some of the information on it is not suitable for public review without significant explanation and discussion (i.e., the information posted on the site may or may not be best interpreted by the public at large). The web site is merely an administrative tool (like an FTP site) to allow for easy transfer of master plan documents to the Committee members. Port staff recommended that Committee members act as a portal for the information for their constituents.
- The Committee discussed the level of detail for this master plan, and why the Port was taking a more conceptual approach in the long-term. The FAA Advisory Circular on Airport Master Plans (see discussion below) allows for considerable flexibility in preparation of a master plan and the level of detail in a master plan, because needs vary from airport to airport. For OAK, the master plan will focus more detail on the near-term (when things are more certain), and less detail on the long-term (when things are much less certain), showing general land-use information.
- The Committee asked if the master plan will result in an Airport Layout Plan (ALP) update. Port staff responded that ALP updates will be prepared as individual projects or related groups of projects are proposed.
The Committee asked if FAA representatives will attend these meetings. Port staff indicated that the FAA will not likely attend these meetings. FAA staff will, however, review and approve the forecasts.

Master Plan Forecast Development

FAA Advisory Circular (AC) No. 150/5070-6A (Airport Master Plans). Chapter 5 (Aviation Forecasts). This AC describes the process and requirements for master plan forecasting. The forecasting process discussed at this meeting generally follows the approach outlined in the AC. The AC and this chapter allows for considerable flexibility in the overall approach and detail of the forecasts.

Why forecast activity? Forecasts allow the Port to estimate when it should start planning, designing, and constructing future facilities. If facilities come on-line too early, the Port has spent its limited capital resources too early (i.e., facilities would be underutilized, and the money used to develop them could have been used for other projects); if facilities come on-line too late, the Airport could experience overcrowding and uncomfortable facilities.

Forecasts are always wrong. No matter how detailed or scientifically/mathematically based, forecasts of aviation activity are almost always wrong. In other words, the actual number of passengers realized in a particular year rarely ever matches the forecast number of passengers for that year exactly. This difference occurs because of trend-breakers. Example trend-breakers include airline deregulation, the Gulf War, September 11, jet fuel availability and prices, SARS, economic downturns, low-cost carrier competition, etc. Because of this reality, airline planners must focus on providing plans, programs, and projects that are flexible and workable for a range of possible future conditions.

Level of detail. Near-term forecasts will be more detailed than long-term forecasts, paralleling the overall level of detail in the master plan.

Horizon. The near-term planning horizon will be 5-years out, or 2010. The long-term planning horizon will be 20-years out, or 2025. Intermediate years can be examined, depending on the airport planning topic. Although forecasts are generally for specific years, it is important to note that the projected activity (operations, passengers, etc.) might occur before or after the project year, or in the case of long-term forecasts, not at all. For this reason the master plan will focus on ranges of activity and years. The master plan focus is on what level of activity requires new facilities, rather than a specific year (this is sometimes called “planning activity level”). For example, for terminal development, it will be necessary to look beyond 2010 (see discussions below). Forecasts for 2025 will look at land requirements (in terms of acreage) for possible future terminal development.

Forecast Elements/Process – Airline Passenger and Passenger Airline Operations: Mr. Doug Mansel reviewed existing airline passenger forecasts for Oakland International Airport, including those prepared for (1) the Federal Aviation Administration’s (FAA’s) Terminal Area Forecast (TAF), (2) the Regional Airport Planning Committee’s (RAPC’s) Regional Airport System Plan (RASP), and (3) the Port’s Airport Development Program (ADP) 2003 Supplemental Environmental Impact Report (DEIR). Based on this data and a review of historic growth, Port staff has determined that the Airport can expect approximately 18 million annual passengers (MAP) in 2010 and 30 MAP in 2025. For comparison, the Airport accommodated 13.5 MAP in calendar year 2003 and 13.9 MAP for the 12 months ending in June 2004. The following paragraphs detail the methodology of passenger forecast process. The Committee asked for historic FAA TAFs for OAK. Port staff explained that this data has been requested, but is not generally available.

For planning purposes, the number of annual passengers was translated into the number of passengers expected on the average day of the peak month (ADPM). Historically, August has been the peak month at the Airport, during which 9.7% of the annual passengers fly. To get the number of passengers on the ADPM, the number of annual passengers that fly during August (9.7% of the annual passengers) is divided by 31 (the number of days in August). This calculation yields 56,047 passengers and 93,412 passengers on the ADPM in 2010 and 2025, respectively. This compares to 42,582 passengers on the average day in August 2003.

Once ADPM passengers are computed, one can assign these passengers to airlines, which fly certain types of aircraft with certain seating configurations. It was assumed that on the ADPM, the airlines serving the Airport would achieve an 80% load factor (i.e., 80% of the seats departing and arriving would be occupied, on average, on the ADPM). A flight schedule from the ADP SEIR was used as a starting point, modified as appropriate, and then flights were added to this base schedule to achieve the assumed 80% load factor. It was assumed that the Airport would have approximately 10 airlines, with Southwest Airlines continuing to be the dominant air carrier with a market share (based on seats) of slightly over 40%. These assumptions yielded the need for 542 flights (arrivals and departures) on the ADPM in 2010. For comparison, the Airport had 430 passenger flights on the ADPM in August 2004. The Boeing 737-series aircraft would continue to be the dominant aircraft at the Airport, with just over 80% of the flights. The new 18 MAP ADPM flight schedule would be used for follow-on master plan tasks, such as studying future terminal and gate requirements, runway congestion, runway capacity, and other operational issues. The Port and Committee also discussed the development of a 20 MAP (2012) flight schedule, based on a flight schedule from the ADP SEIR, which yields 63,158 passengers and 598 flights on the ADPM. 18 to 20 MAP (and the associated ADPM passengers and flights) provides a good range to consider for the next round of passenger facility planning, design, and construction at the Airport.

Based on simulation analyses that count the number of aircraft by airline on the ground throughout the day, and more traditional master plan calculation techniques, it was estimated that the Airport will need between 46 and 50 total aircraft gates (between 12 and 16 gates more than was proposed in the ADP) to accommodate passenger demand in the 2010 to 2012 timeframe. From a level of service perspective, 46 to 50 total aircraft gates results in between 6 to 6.5 departures per gate per day, and 37,000 to 42,000 passengers per gate in the peak month (August). This compares to 8.9 daily departures per gate per day in August 2004 (from 24 gates), and 55,000 passengers per gate in August 2003. The national average is about 5.5 departures per gate per day, with Mineta San José International Airport having approximately 6.3 departures per gate per day from 31 gates (based on June 2004 data). The Committee discussed airl ine gate sharing. Although some airlines can share gates because of Common Use Terminal Equipment (CUTE) computers, there are some limitations due to operations factors, such as positioning of ground service equipment (airlines in the U.S. do not typically share ground handling responsibilities).

Although runway capacity/delay/congestion will be the topic of a future Aviation Stakeholder Advisory Committee meeting, it appears, based on preliminary analyses, that the number of aircraft operations required to serve 18 to 20 MAP can be accommodated on the existing South Field runway (Runway 11-29), with some reasonable increase in delay (there is almost no delay today).
The Potential Terminal Development Areas handout was distributed, and Mr. Doug Mansel concluded his discussion on the forecast process by describing three possible on-Airport areas for future terminal development (12 to 16 new gates beyond ADP, or 17 to 21 gates beyond existing plus under-construction gates). In order for an area to be considered for future terminal development, it had to be feasible from one of the following perspectives: environmentally, operationally, or financially.

Ms. Kristi McKenney introduced a series of detailed drawings entitled Conceptual Terminals from Non-Terminal Planning Studies. These drawings showed examples of conceptual terminals that were drawn in the process of studying other issues at the Airport, such as siting a parking garage and studying possible re-use alternatives of the former United Airlines maintenance hangar.

Forecast Elements/Process – Air Cargo and Cargo Airline Operations: As an introduction to air cargo, Mr. Hugh Johnson, Aviation Planner, detailed the cargo components and their relationship to the passenger figures distributed at the beginning of the meeting. FedEx is the largest air cargo airline at the Airport, handling over 80% of air cargo tonnage. Analysis shows month-to-month changes have historically been linked to economic factors, including Sept. 11, 2001, which triggered a consistent downward trend in growth. Currently, Oakland’s cargo growth rate has stabilized and is expected to parallel the growth rate for Bay Area airports at 3.59% annually. The Airport accommodated 0.68 million annual tons (MAT) during calendar year 2003, and is at 0.70 MAT for the 12 months ending in June 2004. Future cargo activity is projected to reach 0.9 MAT in 2010 and 1.5 MAT in 2025, less than both the 2.1 MAT projection used for the ADP SEIR and 2.06 MAT projection for 2020 used in the RASP. Cargo airline operations estimates and development will be presented in the upcoming air cargo meeting in October 2004.

Forecast Elements/Process – General Aviation Operations: General aviation consists of corporate jets and light general aviation aircraft (including student pilots/flight training and touch-and-go operations). Data reported by the SEIR, RASP and FAA in the same year vary due to differences in data collection and reporting. The Port will be developing forecasts of general aviation operations in 2010 and 2025 for the December 2004 meeting.

Wrap-up Items

Schedule Upcoming Meetings:
Thursday, September 30, 2004 (SUBJECT: Passenger Terminal Development)
Thursday, October 28, 2004 (SUBJECT: Air Cargo)
Thursday, December 9, 2004 (SUBJECT: General Aviation)

These meetings are scheduled in Terminal 1, 2nd Fl., Rear Conference Room.
This meeting was the third in a series of planned meetings of the Aviation Stakeholder Advisory Committee (the Committee) for the Oakland International Airport (OAK) master plan. These minutes correspond to an Agenda that was distributed at the meeting; a copy of the Agenda is provided on the master plan web site. New postings to the web site will be accompanied by e-mail notices to Committee members. The web site address is www.oaklandairport.com/masterplan.

Attendees: See sign-in sheet (to be used as distribution list); a copy of the sign-in sheet is provided on the master plan web site.

Handouts:
- Agenda
- Potential Terminal Development Concept
  - 1A (Central Basin unit terminal/replacement facilities)
  - 1B (Central Basin unit terminal)
  - 2A (Add on to Terminal 1)
  - 2B (Add on to Terminal 1 and centralize baggage claim)
  - 2C (Unit terminal, south)
  - 2D (Unit terminal, north)
  - 2E (Unit terminal, split terminal/concourse)
  - 2F (Unit terminal, push onto Taxiway B/maximize landside area)
  - 3A (Add on to Terminal 2 extension/south)
  - 3B (Add on to Terminal 2 extension/renovation, double-load/north)

Mr. Doug Mansel, Master Plan Project Manager, distributed the Agenda and the potential terminal development concepts and reviewed the items requested by Committee members from the previous meeting (see second agenda item below).

Agenda Item:
Approval of meeting minutes from August 19, 2004

The committee approved the minutes with no comments.

Follow-up items from the last meeting
A hardcopy of the updated Existing Land-Use Map and Existing Conditions data (July 2004) was distributed (it was previously posted on the web site).

The Committee discussed the following master plan issues:

- A Committee member indicated that the Port provided extensive background information on the forecasts discussed at the last Committee meeting, and that the forecast methodology appears thorough and accurate.
- A Committee member asked how to reconcile expectations of a 20-year master plan with the focus of the passenger forecasts being on the 2010 to 2012 (near-term) horizon. Port staff responded that the Committee has already started discussing the 2025 horizon by projecting 30 million annual passengers (MAP) for that timeframe, but that it is not useful to create highly detailed forecasts (e.g., the number of operations by airline, by aircraft type, by time of day, etc.) for 2025, as these forecasts would be too speculative given inherent uncertainties in forecasting, forecast methods, and the aviation industry. It is, however, useful to discuss land use for 2025. That is, how much land should be reserved for potential terminal uses in 2025? Port staff produced a spreadsheet discussing terminal land use in 2025 to be discussed later in the agenda at this meeting.
- Port staff discussed the concept of planning activity levels (PALs). Future airport development should be tied to activity warranting that particular level of development, not specific years. For example, the Committee learned at the last meeting that approximately 46 to 50 total gates would be required in the 2010 to 2012 timeframe. However, the exact years are less important than tracking the actual passenger traffic. If airline passenger traffic does not grow as quickly as anticipated, then the need for additional gates would occur later. Conversely, if the actual passenger traffic grows more quickly than forecast, then the need for additional gates will happen sooner.
- Port staff asked the Committee to consider the Airport's role in providing air transportation services. Why has the Airport grown? Why is it expected to continue to grow (e.g., location, population growth in the region, access/highways, etc.)? Should the Airport grow to accommodate anticipated demand (e.g., up to its natural market share or catchment area for the Bay Area or even beyond)? Should the Port consider not allowing the Airport to grow, forcing other airports in the region, or even outside the region, to take more of the market share or causing that demand to go unmet?
- The Committee and Port staff discussed air cargo market share. The Committee pointed out that OAK has a large share of the cargo market, accommodating more than its “fair share” of the natural market or catchment area for the Bay Area or even beyond? Should the Port consider not allowing the Airport to accommodate more cargo within the Bay Area? The Committee learned at the last meeting that approximately 46 to 50 total gates would be required in the 2010 to 2012 timeframe. However, the exact years are less important than tracking the actual passenger traffic. If airline passenger traffic does not grow as quickly as anticipated, then the need for additional gates would occur later. Conversely, if the actual passenger traffic grows more quickly than forecast, then the need for additional gates will happen sooner.
- The Committee and Port staff discussed air cargo market share. The Committee pointed out that OAK has a large share of the cargo market, accommodating more than its “fair share” of the natural market or catchment area for the Bay Area or even beyond? Should the Port consider not allowing the Airport to accommodate more cargo within the Bay Area? The Committee learned at the last meeting that approximately 46 to 50 total gates would be required in the 2010 to 2012 timeframe. However, the exact years are less important than tracking the actual passenger traffic. If airline passenger traffic does not grow as quickly as anticipated, then the need for additional gates would occur later. Conversely, if the actual passenger traffic grows more quickly than forecast, then the need for additional gates will happen sooner.
The Committee discussed the inherent uncertainty in forecasting and therefore the need to consider activity at the airport vs. the actual year (i.e., planning activity level). 18 to 20 MAP could occur before or after 2010 to 2012. Flexible plans are required. For example, if it appears that OAK will serve 18 MAP earlier than 2010, the Port may need to accelerate terminal development plans. If it appears that OAK will serve 18 MAP at some time beyond 2010 to 2012, the Port could choose to delay the start of construction. The forecasts are approximate and provide a planning guide.

Port staff reviewed the approximate facility requirements discussed at the last Committee meeting. The aircraft operations derived from the forecasts (18 to 20 MAP) require 46 to 50 total gates, or 12 to 16 gates beyond the Airport Development Program (ADP), or 17 to 21 gates beyond our existing facility plus what is under construction (the Terminal 2 renovation and extension).

Potential terminal development areas. Port staff reminded the Committee of the three possible areas under consideration for terminal facilities: (1) Area 1 – the central basin east of FedEx, south of North Field, and north of Taxiway W; (2) Area 2 – east of Taxiway W, west of the existing terminal area, south of Ron Cowan Parkway, and north of Taxiway T; (3) Area 3 – east of Terminal 2, north of Taxiway W. The terminal development concepts are labeled according to each of the three areas (e.g., Concept 1A is Concept A in Area 1, Concept 2C is Concept C in Area 2, etc.).

Potential terminal development concepts. Port staff and the Committee reviewed and discussed the 10 potential terminal development concepts. Planning considerations for each concept were presented on each graphic. Arrows show the direction of possible future terminal expansion (if warranted).

- Concept 1A constructs a new terminal in the central basin, replacing the existing terminal complex (in addition to adding the new gates). A Committee member indicated that his concept may encourage more traffic to access the Airport through Alameda. Another Committee member pointed out that this concept could more easily allow for a new runway inboard of Runway 11/29 as the existing terminal buildings could be demolished. The Committee discussed that this concept as drawn takes a considerable amount of wetlands.

- Concept 2B constructs a new terminal near the existing terminal complex and north of Taxiway Bravo. This option too may encourage more traffic to access the Airport through Alameda. The Port's analysis suggests a continuation of existing conditions and other mechanisms to reduce the impact of expansion (i.e., air pollution, noise, other traffic). Examples include additional roadways and/or taxiways to decrease aircraft traffic congestion. Port staff suggested that some of the terminal concepts may exacerbate a problem and some may mitigate a problem.

- Concept 3A constructs a new terminal in the area east of Taxiway W, south of North Field, and north of Taxiway T. The Committee discussed that this concept as drawn takes a considerable amount of wetlands.

- Concept 4A constructs a new terminal in the area east of Taxiway W, south of North Field, and north of Taxiway T. The Committee discussed that this concept as drawn takes a considerable amount of wetlands.

- Concept 5A constructs a new terminal in the area east of Taxiway W, south of North Field, and north of Taxiway T. The Committee discussed that this concept as drawn takes a considerable amount of wetlands.

- Concept 6A constructs a new terminal in the area east of Taxiway W, south of North Field, and north of Taxiway T. The Committee discussed that this concept as drawn takes a considerable amount of wetlands.

- Concept 7A constructs a new terminal in the area east of Taxiway W, south of North Field, and north of Taxiway T. The Committee discussed that this concept as drawn takes a considerable amount of wetlands.

- Concept 8A constructs a new terminal in the area east of Taxiway W, south of North Field, and north of Taxiway T. The Committee discussed that this concept as drawn takes a considerable amount of wetlands.

- Concept 9A constructs a new terminal in the area east of Taxiway W, south of North Field, and north of Taxiway T. The Committee discussed that this concept as drawn takes a considerable amount of wetlands.

- Concept 10A constructs a new terminal in the area east of Taxiway W, south of North Field, and north of Taxiway T. The Committee discussed that this concept as drawn takes a considerable amount of wetlands.

The Committee also discussed the near-term planning horizon, 2010 to 2012, with a projected 18 to 20 MAP.

A Committee member suggested that the Committee look at mitigation measures or other mechanisms to reduce the impact of expansion (i.e., air pollution, noise, other traffic). Examples include additional roadways and/or taxiways to decrease passenger and aircraft traffic congestion. Port staff suggested that some of the terminal concepts may exacerbate a problem and some may mitigate a problem.

The Committee discussed the near-term planning horizon, 2010 to 2012, with a projected 18 to 20 MAP.
between $50 and $60 million to reconstruct the facility, which would likely not be cost-effective, given the existing and projected level of international operations.

- Concept 2B adds onto Terminal 1 and constructs a consolidated baggage claim north of the existing terminal, which provides for more efficient curbside operations (arrival and departure traffic would be split into two separate curbsides).

- Concept 2C constructs a new unit terminal northwest of Terminal 1. The Committee discussed possible security considerations in terminal planning.

This concept (and the remaining Area 2 concepts) likely requires a new taxiway parallel to Taxiway B to allow for more efficient flow to/from the new terminal. A Committee member asked how environmental considerations are taken into account, and pointed out that a concept that does not take wetlands is probably more cost-effective. Port staff indicated that known environmental considerations are listed with the other planning considerations.

- Concept 2D constructs a new unit terminal farther to the north than Concept 2C.

Port staff pointed out that this concept displaces a considerable amount of surface parking, and a replacement garage parking is expensive to construct. The Port must ensure that the revenue a garage could generate will balance the cost of building it. Airports generally require a mix of structured and surface parking to satisfy the demand for various parking rates. A Committee member asked if the area north and/or east of the FedEx buildings (adjacent to Taxiways B and R) would be available for terminal development and/or related taxiways. Port staff indicated that this area is currently being used to park FedEx aircraft.

- Concept 2E constructs a new unit terminal northeast of Terminal 1, but shifts the terminal/concourse towards Taxiway B on the north end in order to maximize landside area. Aircraft must push back onto Taxiway B at the north end of the proposed terminal. The Committee asked why the curbside was depicted so far away from the terminal building. Port staff indicated that this is a graphical error and will be corrected. The curbside roadways should be near the face of the proposed terminal building.

A Committee member suggested a different concept with a remote (off-Airport) unit terminal (with ticketing, baggage claim, etc.). Port staff agreed to sketch this concept and develop the planning considerations.

- Concept 2F constructs a new unit terminal to the east of Terminal 1, but splits the terminal from the concourse to allow a bypass roadway to the existing terminals. This concept also requires a significant portion of the surface parking lots. The circulation and overall layout is similar to the new international terminal at SFO. The Committee and Port staff discussed the decreasing need for traditional terminal facilities (i.e., ticket counters) due to electronic self-check-in kiosks and the ability to print boarding passes at home (from the airlines website). This trend is forcing the curbside to become shorter and more expensive to maintain. The Port staff indicated that the master plan process must consider a wide range of concepts, some of which are more feasible or likely than others.

A Committee member provided Port staff with another Area 2 terminal concept. Port staff agreed to sketch this concept and develop the appropriate planning considerations.

Preferred terminal development concept area for 2010 to 2012:

The Committee asked the status of the Oakland Maintenance Center. The site currently serves as office space for Turner Construction and for advertising. Port staff agreed to note in the planning considerations of each drawing if this structure needs to be demolished. Port staff and some Committee members agree that a unit terminal should be drawn on the Oakland Maintenance Center site (as opposed to relocating the air cargo building to this site). Port staff agreed to sketch this concept and develop the appropriate planning considerations.

- Concept 3A extends the Terminal 2 extension. This option places gates in close proximity to Runway 11/29, but is likely not feasible because it does not add any facilities except new gates. That is, other facilities, such as ticket counters, baggage claim, security checkpoints, etc. are required to support additional gates (to achieve balanced airport throughput capability).

- Concept 3B constructs additional gates and terminal facilities east of Terminal 2. This concept is expensive and requires 30+ acres of Bay fill. The Committee indicated that this concept would likely have noise impacts for residents in San Leandro.

- Concept 3C constructs additional gates and facilities east of Terminal 2. This concept is not feasible because it does not add any facilities except new gates. That is, other facilities, such as ticket counters, baggage claim, security checkpoints, etc. are required to support additional gates (to achieve balanced airport throughput capability).

- Concept 3D constructs additional gates and terminal facilities east of Terminal 2. This concept is possible if the Port has any control over the number of passengers or the days of the week that the airlines fly. Port staff responded that the airlines decide when and what number of passengers fly in and out of OAK, not the Port. As the market is open and competitive, if airlines do not accommodate demand by providing frequent service, some other carrier will. For the first time ever, the FAA is discussing the possibility of controlling the number of flights, in cases of severe delay congestion at Chicago O'Hare.
This is generally a hub-airport phenomenon. We’re not in any danger of this now, but we could be by 2025.

Port staff closed the meeting by encouraging Committee members to give input as to which areas/stations they prefer and asked that they elaborate why they do (i.e., design, community impact, etc).

Wrap-up Items

Schedule Upcoming Meetings:
- Thursday, October 28, 2004 (SUBJECT: Air Cargo)
- Thursday, December 9, 2004 (SUBJECT: General Aviation)
- Thursday, March 3, 2005 (SUBJECT: Airfield/Taxiway Development)

These meetings are scheduled in Terminal 1, 2nd Fl., Rear Conference Room.

AGENDA

Welcome and Introductions

Approval of meeting minutes from September 30, 2004

Follow-up items from last meeting and questions/answers (open forum):
- Review airline passenger market analysis (requested by the Stakeholders at the September 30, 2004, meeting)
- Review updated potential terminal development concepts
- Focus area for potential terminal development (Areas 1, 2 and/or 3) for 2010 to 2012
- Questions, answers, and discussion

Air Cargo Development
- FAA Advisory Circular (AC) No. 150/5070-6A (Airport Master Plans), Chapter 5, Aviation Forecasts, and Chapter 6, Requirements Analysis and Concepts Development (Sections 4 and 5)
- Review air cargo data from August 19, 2004, meeting
  - Planning horizon: 2010 (near-term, 5 years out) and 2025 (long-term, 20 years out)
  - 0.9 and 1.5 million annual tons (MAT)
- Market analysis/discussion
- Cargo aircraft operations
- Potential air cargo development areas (Areas 1 through 4)
- Sample air cargo development concepts

Wrap-up Item
- Schedule meeting on access and airline support issues in April 2005
- Upcoming meetings reminder:
  - Dec. 3, 2004, 1:00 PM, Rear Conf. Room (general aviation forecasts' issues)
  - March 3, 2005, 1:00 PM, Rear Conf. Room (airfield issues)
  - Sign-in sheet
  - Web site
  - Transportation (parking and AirBART)

Oakland International Airport
Aviation Stakeholder Advisory Committee
Meeting 4
October 28, 2004

Questions / comments
This meeting was the fourth in a series of planned meetings of the Aviation Stakeholder Advisory Committee (the Committee) for the Oakland International Airport (OAK). The meeting minutes correspond to an Agenda that was distributed at the meeting: a copy of the Agenda is provided on the master plan web site. New postings to the web site will be accompanied by email notices to Committee members. The web site address is www.oaklandairport.com/masterplan.

Agenda:
- Approval of meeting minutes from September 30, 2004

The committee approved the minutes with no comments.

Airline Passenger Market Analysis (including Table A and B)
- Mr. Mansel explained that Table A describes the potential market share for Oakland International Airport (OAK), based on population by Bay Area county. The primary catchment area share was estimated by the Port’s Aviation Marketing and Communications Department. For example, in Alameda County, approximately 90% of the estimated population (1,314,927 people) is closest to OAK and would naturally use OAK assuming competitive air service is available (i.e., with the right airlines, destinations, schedules, air fares, etc.). The potential catchment area for Sacramento International Airport, which likely has some influence in the northern Bay Area counties (e.g., Solano County), has been excluded from this analysis. As shown in Table A, approximately 48.6% of the total Bay Area population would naturally want to use OAK, again assuming competitive air service is available (i.e., with the right airlines, destinations, schedules, air fares, etc.).

- Mr. Mansel explained that Table B shows the Airport’s actual market share. Of all passengers traveling to/from those markets choose OAK (vs. the other two Bay Area airports). Looking at both well-served and under-served markets, the total actual market share for OAK was estimated to be 34.2%. That is, of all the domestic passengers beginning or ending their journey in the Bay Area, approximately 34.2% choose OAK.

Potential Terminal Development Concept
- Mr. Mansel explained that the passenger forecasts, as discussed at previous meetings, suggest that OAK would serve approximately 18 million annual passengers (MAP) in 2010 (give or take) and 20 MAP in 2012 (give or take). OAK is currently serving approximately 14 MAP. The anticipated growth from 14 MAP to 18 to 20 MAP will occur as airlines add flights, realize increased load factors, or upgauge aircraft size in existing markets (capturing an increase in market share at OAK) or add flights to new markets, as suggested in the above market analysis.

Sample Air Cargo Development Concepts (Areas 1, 2, and 4)
- Air Cargo Flight Schedule (Including Tables A through E)
- Potential Air Cargo Development (Areas 1, 2, 3, and 4)
- Sample Air Cargo Development Concepts (Areas 1, 2, and 4)

Following introductions, Mr. Doug Mansel, Master Plan Project Manager, distributed the minutes from the previous meeting, agenda, and Airline Passenger Market Analysis for Oakland International Airport (OAK), and reviewed the items requested by Committee members from the previous meeting (see second agenda item below).

Approval of meeting minutes from September 30, 2004
The committee approved the minutes with no comments.

Follow-up items from the last meeting and open forum
At the previous meeting, the Committee requested that the Port provide data on airline passenger market share. Mr. Mansel explained that Table A describes the potential market share for Oakland International Airport (OAK), based on population by Bay Area county. The primary catchment area share was estimated by the Port’s Aviation Marketing and Communications Department. For example, in Alameda County, approximately 90% of the estimated population (1,314,927 people) is closest to OAK and would naturally use OAK assuming competitive air service is available (i.e., with the right airlines, destinations, schedules, air fares, etc.). The potential catchment area for Sacramento International Airport, which likely has some influence in the northern Bay Area counties (e.g., Solano County), has been excluded from this analysis. As shown in Table A, approximately 48.6% of the total Bay Area population would naturally want to use OAK, again assuming competitive air service is available (i.e., with the right airlines, destinations, schedules, air fares, etc.).

- Mr. Mansel explained that Table B shows the Airport’s actual market share. Of all passengers traveling to/from those markets choose OAK (vs. the other two Bay Area airports). Looking at both well-served and under-served markets, the total actual market share for OAK was estimated to be 34.2%. That is, of all the domestic passengers beginning or ending their journey in the Bay Area, approximately 34.2% choose OAK.

- Mr. Mansel explained that the passenger forecasts, as discussed at previous meetings, suggest that OAK would serve approximately 18 million annual passengers (MAP) in 2010 (give or take) and 20 MAP in 2012 (give or take). OAK is currently serving approximately 14 MAP. The anticipated growth from 14 MAP to 18 to 20 MAP will occur as airlines add flights, realize increased load factors, or upgauge aircraft size in existing markets (capturing an increase in market share at OAK) or add flights to new markets, as suggested in the above market analysis.

Similar airline passenger market share data is not readily available for international airline service, and therefore a similar analysis on international airline passenger market share is not possible.
Currently, the only international flights to/from OAK are to/from Mexico on Mexicana Airlines (on Airbus A320s) and SunTrips charters (on Boeing 757s). North American Airlines will soon start scheduled service to various destinations in Mexico (on Boeing 757s). Mr. Mansel explained that OAK will likely continue to be dominated by domestic airline service, largely because the airlines at OAK primarily serve origin and destination (O&O) airline passengers (passengers starting or ending their trips in the Bay Area). The largest airline at OAK, Southwest Airlines, does not (and has not given any indication they plan to) have interline agreements with other domestic or international airlines, making transfers to international flights difficult or impossible. San Francisco International Airport, on the other hand, serves both O&O airline passengers as well as a connecting hub for several airlines, most notably, United Airlines. Unlike Southwest Airlines, United Airlines has numerous interline agreements, making transfers to other international airlines or even international flights on United Airlines possible. That is, in order to be a significant international hub, the Airport must have a large O&O market, as well as serve as an airline hub for connecting passengers. Examples of large hub airports include San Francisco, Chicago O’Hare, Atlanta, Miami, John F. Kennedy, and Los Angeles international airports. All of these airports serve as hubs for multiple airlines that have interline agreements (also note that of these airports, Southwest Airlines only operates out of Los Angeles International Airport).

Therefore, the Port does not anticipate significant growth in international airline service at OAK, which is consistent with the findings in the Regional Airport System Plan (RASP).

A Committee member asked what “Other” signified in under-served domestic markets on Table B. Port staff explained that “Other” comprised all other cities one could arrive at after starting a trip from OAK.

Port staff emphasized that 18 MAP is not a “goal” (i.e., a goal of the Port), but rather an estimate of airline passenger activity that is likely going to happen at OAK based on the natural market forces (given Bay Area population growth, possible airline service expansion in under-served markets, etc.).

Port staff commented that existing facilities were designed to accommodate approximately 7 MAP, yet for the 12 months ending September 2004, OAK served approximately 14 MAP, albeit at a highly reduced level of service. Although Port staff has not prepared a detailed estimate, it is likely that the Airport could serve 18 MAP or more with its existing gates plus those currently under construction at Terminal 2 (five net new gates), again, at a highly reduced level of service. Port staff indicated that this Committee should consider whether or not to build facilities, based on current and historical growth trends and level of service. As the level of service in existing facilities deteriorates, growth might slow, but it will not likely stop altogether.

The Committee asked for clarification of "level of service." Port staff explained that this is a catchphrase for indicators, such as the number of passengers waiting in hold rooms, the cleanliness of restrooms due to excessive use, gate delay, etc., that reflect the level of passenger comfort, and directed the Committee to earlier handouts which compared data for airports with different levels of service.

A Committee member commented that OAK has a reputation for being consistent and that the existing level of service seems acceptable.

A Committee member (Mr. Andrew Thomas) asked Port staff to explain the business relationship between the Port and its tenants. Port staff indicated that Airport finances are broken into a number of revenue/cost centers, such as airfield, terminal, and landside. Airfield costs include taxiway, runway, and ramp pavement improvements, repair and maintenance, airfield security/safety patrol staff, airport rescue and fire fighting, etc. The airfield revenues come from landing fees (based on aircraft weight) and fuel flowage fees. The airfield revenue/cost center is revenue neutral, meaning that the airlines reimburse the Port for all costs associated with operating the airfield, nothing more, nothing less. Terminal costs include restroom cleaning and maintenance, carpet cleaning, repair, and renovation, terminal security/police staff, and other various terminal improvements, repair and maintenance. Like the airfield, the terminal revenue/cost center is revenue neutral (the airlines reimburse the Port for all costs associated with operating the terminal, minus revenue from in-terminal concessions, nothing more, nothing less). Unlike the airfield and terminal revenue/cost centers, the airlines are not involved with the landside revenue/cost center. The Port is responsible for collecting enough revenue to cover the costs of operating, maintaining, and improving the landside of the Airport. Example costs include pavement maintenance, sign maintenance and improvements, traffic enforcement officers (police and staff, etc. The largest source of landside revenue is from the Airport’s parking lots. By Federal law, all revenue generated at the Airport (from any of the revenue/cost centers) must be used only for Airport operating expenses and capital project expenses, and overall is revenue neutral (i.e., the Port does not make any profits, and must cover its operating and other expenses).

The Committee inquired if there was any quantitative data about what might be causing airport crowding/congestion and asked how the Port determined when congestion warranted action. Another Committee member asked if there might be customer feedback (e.g., comment cards) on the quality of service at OAK. Port staff commented that since September 11, 2001, the number of security checkpoint lanes has increased from 6 to 13, yet crowding, extensive queues, and congestion persist. The airport/airline industry uses standard planning criteria to achieve a certain level of service (e.g., security check point throughput per lane, number of passengers per hold room/gate area, etc.). At present, OAK far exceeds these standards in virtually every area in the Airport. The Port is aware that passengers have expressed dissatisfaction with crowding and overall unsatisfactory levels of service.

A Committee member asked what are the deciding factor in what will be built and when. Port staff responded that this Stakeholder Committee has input on a master planning level, but that the Port has a professional planning staff that makes recommendations to senior Port management and the Board of Port Commissioners.

The Committee asked if there is a physical limit to what OAK can accommodate and if the Port works with airlines to mitigate peak periods. Port staff agreed that there is some theoretical upper physical limit, and that it is possible to reach it; however, at present, OAK is serving over twice the number of passengers (MAP) it was originally planned for, albeit at a significantly reduced level of service. The Port cannot legally dictate what an airline does, as it is a private business; however, the Port works with airlines to spread out the peaks throughout the day. Most of the airlines serving OAK are assigned a preferential gate or gates, and that airline can use its gates as much as it wants. If an airline is not using its gate at a particular time of the day, the Port may assign that gate during those periods. If an airline reduces its schedule enough to not warrant a preferential gate, then the Port may re-assign that gate to another airline. The Airport is part of the public service industry, much like sewage treatment facilities, public schools, etc. and grows in direct proportion to the needs and demands of the larger community it serves.
The Committee asked if the FAA has ever stopped an airline from opening a new route. Port staff responded that the FAA has only done this in the case where runway congestion is extreme, and never in the case of gate capacity or terminal congestion. Even then, the FAA has only implemented slot controls (essentially, a reservation system, and the airlines must have one in order to arrive or depart a flight) at a few U.S. airports (e.g., La Guardia) and even at those airports, severe runway delays and congestion continue.

At this point, Mr. Doug Mansel passed out updated terminal concepts from the previous meeting (also posted to the web site).

Terminal Development Concepts

Potential terminal development concepts. Port staff and the Committee reviewed and discussed the 13 potential terminal development concepts, updated to reflect Committee suggestions from the last meeting. Planning considerations for each concept are presented on each graphic. (Note: arrows show the direction of possible future terminal expansion – if warranted).

- Concept 1A constructs a new terminal in the central basin, replacing the existing terminal complex (in addition to adding the new gates).
- Concept 1B constructs a new unit terminal in the central basin, adding 20 new gates.
- Concept 2A adds onto existing Terminal 1.
- Concept 2B adds onto existing Terminal 1 and consolidates baggage claim in a new facility (north of existing terminal).
- Concept 2C constructs a new unit terminal northwest of Terminal 1 (near Terminal 1).
- Concept 2D constructs a new unit terminal northwest of Terminal 1 (near Oakland Maintenance Center).
- Concept 2E constructs a new unit terminal northwest of Terminal 1 (near Terminal 1).
- Concept 2F constructs a new unit terminal northwest of Terminal 1 (in addition to adding the new gates).
- Concept 2F constructs a new unit terminal on the Oakland Maintenance Center site. The Committee asked that this concept be developed. This option more than likely does not preserve the cargo building and would probably require a separate garage and a dual taxiway, but improved curbside operations.
- Concept 2H constructs a new remote (off-Airport) unit terminal with automated people mover link to/from concourse. The Committee asked that this concept be developed. This option would ease airport traffic, but would require purchasing additional land off the existing Airport. The Port would also need to construct an expensive people mover connection.
- Concept 2I constructs a new consolidated terminal north of existing terminals (consolidates existing terminal functions – bag claim, ticketing, etc. – in a new building north of existing terminals). The Committee requested that this concept be developed.
- Concept 2A extends the current Terminal 2 extension project.
- Concept 3B constructs a new unit terminal on the Oakland Maintenance Center site.
- Concept 2D constructs a new unit terminal on the Oakland Maintenance Center site.
- Concept 2E constructs a new unit terminal northwest of Terminal 1 (near Terminal 1).
- Concept 2F constructs a new unit terminal northwest of Terminal 1 (near Terminal 1).
- Concept 2G constructs a new terminal in the central basin, replacing the existing terminal complex (in addition to adding the new gates).
- Concept 2H constructs a new remote (off-Airport) unit terminal with automated people mover link to/from concourse. The Committee asked that this concept be developed. This option more than likely does not preserve the cargo building and would probably require a separate garage and a dual taxiway, but improved curbside operations.
- Concept 2I constructs a new consolidated terminal north of existing terminals (consolidates existing terminal functions – bag claim, ticketing, etc. – in a new building north of existing terminals). The Committee requested that this concept be developed.
- Concept 2A extends the current Terminal 2 extension project.
- Concept 3B constructs a new unit terminal on the Oakland Maintenance Center site.

A Committee member requested that the planning considerations on each graphic reflect possible impacts to the proposed BART Connector alignment, especially in Area 2. Port staff responded that the planning considerations for each concept have been updated as requested. The planning considerations also reflect that any concept in Areas 1 or 3 move aircraft parking and operations closer to residential areas, and that any option in Area 1 may increase airport traffic through the City of Alameda.

Mr. Steve Swanson of the Port’s Airline Liaison Office observed that from the airlines’ perspective, Area 2 is preferable given (1) the significant capital investment in existing facilities at South Field, (2) the significant capital costs associated with any concept in Areas 1 and 3, and (3) environmental impacts of building in Area 3.

The City of Alameda provided the Port with a comment letter on potential future terminal development at OAK. The Alameda representatives generally agreed that Area 2 appears to be the best option, but given concerns about potential impacts, the Committee would like to continue to discuss mitigation measures of potential expansion, and also continue to explore Concept 3A. Port Staff indicated that there will be an entire session dedicated for discussion of environmental issues and possible mitigations next year.

San Leandro representatives indicated that they generally prefer Area 2, although they would like additional time to discuss it further with their citizens. Port staff agreed to agendize this discussion again at the next Committee meeting.

A Committee member asked if the Port’s noise abatement policy had been updated. Another Committee member responded that there had been a recommendation for better communication, but little change in the policy.

Ms. Pat Mossburg (City of Oakland community representative) indicated that Area 2 is preferable, based on her informal discussions with Councilmember Larry Reid. Ms. Marianne Dreisbach (City of Oakland community representative) indicated that she has not had the opportunity to discuss this with the mayor, but will do so in the near future.

Air Cargo Development

Mr. Doug Mansel introduced the discussion on air cargo issues by referring the Committee to the FAA Advisory Circular (AC) No. 1505070-6A (Airport Master Plans), Chapter 6, Requirements Analysis and Concepts Development, and Chapter 5, Aviation Forecasts. Mr. Mansel commented that the FAA does not specifically address air cargo issues in this AC, but that some of the principles in Chapters 6 and 5 can be useful.

Mr. Hugh Johnson, Aviation Planner, introduced Mr. Ray Keiser, a national expert on air cargo issues and trends available to answer questions from the Committee. Several Committee members asked if the Federal decision to cancel the requirement for transporting checks (Check21) would decrease the amount of air cargo. Port staff and Mr. Keiser responded that this would have little to no effect on air cargo operations at OAK (based on discussions with Ameriflight).

Mr. Hugh Johnson, Aviation Planner, distributed the cargo forecast graphs. The air cargo forecasting process differs from the airline passenger forecasting process because there is less data available for air cargo (much of the data is proprietary) and because of the disconnect between air cargo flights and air cargo weight (i.e., almost all of the air cargo weight is carried on FedEx and UPS aircraft, while the small air cargo carriers, such as Ameriflight, contribute a significant number of operations but carry a very small proportion of the weight). Existing air cargo activity is approximately 700,000 tons for 2004 (0.7 million annual tons or MAT); it was approximately 800,000
reviewed and discussed four possible areas on the Airport to accommodate future air cargo needs:

- Port staff and the Committee

### Potential Air Cargo Development Areas and Sample Concepts

result of a number of air cargo carriers that have stopped operating at OAK, mostly U.S. mail flights

South Field, FedEx has about 80% of the flights. The decline in total operations at South Field is a

Graphs 5C and 6C show air cargo flight activity by carrier at North and South Fields, respectively. At

Using the low growth forecast, the Port used the 2000 SEIR air cargo flight schedule as a starting point, and revised it based on changes observed over the past three years (e.g., decreased air cargo flight activity at North and South Fields). The fleet mix assumptions are consistent with 2010 SEIR fleet mix assumptions (e.g., FedEx will phase out all but one daytime Boeing 727 aircraft arrival and one nighttime Boeing 727 aircraft departure). The next step was to interpolate between the 2003 and 2010 flight schedules to arrive at the master plan 2010 flight schedule for 0.9 MAT. The result shows that FedEx maintains its market share by weight at 85%, and the market share percentages of the other major air cargo carriers are also maintained. The total number of predicted flights (164) matches the number presented in the current year 2000 SEIR flight schedule. There will be different aircraft and slight changes in the distribution between North Field (59 flights) and South Field (105 flights). The Port expects flights to ascend to the levels attained in 2000 by 2010.

On Graph 1C, Port staff converted the timeline to a calendar year, while keeping the data that shows month-to-month changes, in order to enable Committee members to easily correlate air cargo data with the passenger chart data presented at previous meetings. This graph shows growth rates tied to the end of historical air cargo data.

Graphs 2C through 4C show low (3.59%), medium (4.52%) and high annual growth rate (5.14%) forecasts. The low growth rate is consistent with the overall historic Bay Area growth rate. In 2010, the suggested planning level is at 900,000 tons (0.9 MAT) and in 2025, 1.5 million tons (1.5 MAT). A Committee member asked why air cargo would not continue to plateau because of the rising cost of fuel. Port staff responded that the current forecasts are an attempt to remain somewhere in the middle, with the inevitable ups, downs, and level-off/plateau. One reason cargo has dropped and stabilized at the present level (aside from the Silicon Valley dot com bust) is that the demand for overnight deliveries has matured and reached a plateau. Port staff anticipates that this market will grow only as the Bay Area population and economy grow.

Graphs 5C and 6C show air cargo flight activity by carrier at North and South Fields, respectively. At South Field, FedEx has about 80% of the flights. The decline in total operations at South Field is a result of a number of air cargo carriers that have stopped operating at OAK, mostly U.S. mail flights (most mail is now on FedEx aircraft and accounted for in the FedEx weight). The air cargo data presented on Graphs 5C comes from the Port's landing reports.

North Field tends to handle most of the air cargo feeder aircraft, with the number of operations being driven by Ameriflight. Reliable operations data for North Field is available from 1999 to the present. The data used to generate Graph 6C comes from the Port's Airport Noise and Operations Monitoring System. In 2000, the annual number of flights (operations) was approximately 20,000; currently, the annual number of flights has dropped to approximately 16,000 (a 20% decrease). Therefore, the flight schedule for the master plan was adjusted accordingly.

Mr. Johnson then distributed Excel worksheets. For the master plan air cargo forecasts and all SEIR flight schedules, the Port suggests using average annual day (AAD) activity. That is, we would not suggest using average day peak month (ADPM) activity, as was the case for airline passengers, because that would skew the data. Air cargo volume is fairly constant from month-to-month throughout the year, with the exception of December (with its extra weight associated with Christmas shipping needs). Most December activity is handled by expansion onto the ramp and by using larger aircraft. Therefore, it is generally unnecessary to plan facilities for the year around this single month of extra activity. Accounting for December, the percentage of activity by month for every month is below the AAD. The result is the 2000 0.8 MAT air cargo flight schedule (tied to the 2000 SEIR flight schedule), and the number of arrival/departures, which gives the starting point.

Table A shows the same data by individual airline. The 2000 SEIR fleet mix is based on current actual fleet mix.

Table B shows the 2003 air cargo flights that coincide with the 0.7 MAT flight schedule and a reduction in flights (as represented on Graphs 5C and 6C). The Port included fleet mix changes for 2010 for FedEx, as we anticipate the entire fleet change used for 2010 SEIR will be in place at that time. The total number of flights drops to 154.

Table C shows the 2010 (1.4 MAT) SEIR flight schedule, the number of flights is 180, and the majority of the increase is on North Field.

Table D shows the master plan 0.9 MAT flight schedule, which is an interpolation between Tables B and C (using the flights from 2003, the fleet mix from 2010 and the different MAT levels for each of them - based on 0.7 MAT for 2003 and 1.4 MAT for 2010). Table C depicts approximately 0.9 MAT using the 2010 fleet mix and the effect of the past three years on the current flight schedule.

The result is 102 flights on South Field, 62 on North Field, a different fleet mix but with the same number of flights by runway and the same total number of flights. The major effect will be in the fleet mix change for FedEx, while the other (major) carriers remain the same.

A Committee member (Mr. Dennis Rosucci) asked for clarification about the 2003 fleet mix data. A Committee member asked why air cargo would not continue to plateau because of the rising cost of fuel. Port staff responded that the current forecasts are an attempt to remain somewhere in the middle, with the inevitable ups, downs, and level-off/plateau. One reason cargo has dropped and stabilized at the present level (aside from the Silicon Valley dot com bust) is that the demand for overnight deliveries has matured and reached a plateau. Port staff anticipates that this market will grow only as the Bay Area population and economy grow.

Potential Air Cargo Development Areas and Sample Concepts: Port staff and the Committee reviewed and discussed four possible areas on the Airport to accommodate future air cargo needs:
Area 1, at North Field (north of Runway 9L/27R), would provide approximately 180 acres for potential new air cargo development.

Area 2, the Central Basin (south of Ron Cowan Parkway and north of Taxiway W), would provide approximately 330 acres for potential new air cargo development.

Area 3, south of Ron Cowan Parkway and north of the existing FedEx facilities, would allow for a modest expansion of existing FedEx facilities.

Area 4, the existing air cargo area at South Field and the Oakland Maintenance Center hangar site, allows modest expansion and/or relocation of existing air cargo facilities (e.g., the existing cargo building).

Port staff also presented two graphics showing sample air cargo developments in Areas 1, 2, and 4.

A Committee member (Mr. David Needle) suggested that any cargo expansion should be in Areas 3 and/or 4, and suggested eliminating Areas 1 and 2 from further consideration in the interest of time, environmental issues, etc.

Port staff and the Committee members agreed to agendize air cargo development at the next meeting for continued discussion and input.

Wrap-up Items

Schedule Upcoming Meetings:
Thursday, December 9, 2004 (SUBJECT: General Aviation)
Thursday, March 3, 2005 (SUBJECT: Airfield Issues)

Sign-in sheet
Transportation (parking and AirBART)

These meetings are scheduled in Terminal 1, 2nd Fl., Rear Conference Room.
This meeting was the fifth in a series of planned meetings of the Aviation Stakeholder Advisory Committee (the Committee) for the Oakland International Airport (OAK) master plan. These minutes correspond to an Agenda that was distributed at the meeting; a copy of the Agenda is provided on the master plan web site. New postings to the web site will be accompanied by email notices to Committee members. The web site address is www.oaklandairport.com/masterplan.

Attendees: See sign-in sheet (to be used as distribution list); a copy of the sign-in sheet is provided on the master plan web site.

Handouts:
- Agenda
- Forecasting Process chart (with completed general aviation/military operations line)
- General Aviation supplemental data (on master plan web site)
  - National Business Aircraft Association (NBAA) Business Aviation Fact Book 2004
  - General Aviation Manufacturers Association (GAMA) General Aviation Statistical Databook 2003
  - GAMA Media Guide: Profiles of GA Usage
  - Washington Post Article on microjets (Nov. 27, 2004)
- Potential General Aviation Development (Areas 1, 2, 3, and 4)
- Forecasts
  - Annual General Aviation and Military Operations – Graph 1G
  - Annual General Aviation Operations – Graph 2G

Following introductions, Mr. Doug Mansel, Master Plan Project Manager, distributed the minutes from the previous meeting, agenda, and reviewed the items requested by Committee members from the previous meeting (see second agenda item below).

Agenda Item:

Approval of meeting minutes from October 28, 2004

Port staff and the Committee members agreed to delay approval of the minutes from the October 28, 2004, meeting until the upcoming meeting in March 2005. Mr. David Needle (City of Alameda Community Representative) requested that comments in future meeting minutes indicate who made the comment. Port staff agreed to include the name of the commenter in the meeting minutes.

Follow-up items from the last meeting and open forum

The City of Oakland provided the Port with a comment letter on potential future terminal and air cargo development at OAK. Regarding terminal development, the Oakland representatives generally agreed that Area 2 seems to be the best option. Regarding air cargo development, the Oakland representatives believe both Areas 3 and 4 should be considered.

Ms. Kathy Ornelas (City of San Leandro Staff Representative) indicated that Potential Terminal Development Concept 2B appears preferable, but will report San Leandro’s final recommendation at the next meeting. Port staff agreed to agendize this discussion again at the next Committee meeting.

Mr. David Needle (City of Alameda Community Representative) indicated that Potential Terminal Development Concept 2B is preferable, with the stipulation that an additional taxiway between North Field and South Field be given consideration.

Ms. Laurel Impett (CLASS Staff Representative) asked if the Port had received a proposal from FedEx for expansion. Ms. Kristi McKenney, Aviation Planning Manager, responded that the Port has not received a formal proposal from FedEx, and indicated that FedEx has expressed no intent to move and will most likely continue to grow within their existing site.

General Aviation

Mr. Doug Mansel introduced the discussion on general aviation (GA) issues by referring the Committee to FAA Advisory Circular (AC) No. 150/5070-6A (Airport Master Plans), Chapter 6, Requirements Analysis and Concepts Development, and Chapter 5, Aviation Forecasts. The FAA does not specifically address GA issues in this AC, but some of the principles in Chapter 6 can be useful.

Mr. Doug Mansel passed out the GAMA Media Guide: Profiles of GA Usage. GA includes corporate jets/turboprops, flight training (including touch and go operations), aerial applications (e.g., crop spraying), med-evac flights, law enforcement, and news/traffic reporting.

Ms. Barbara Tuleja (CLASS Community Representative) asked if there was any indication of the noise impacts of microjets. Mr. Vince Mestre, Acoustical Consultant, responded that presently noise data is not available and that there have been no aircraft/engine certifications, but that the engines should be relatively quiet (more so than a single-engine piston engine) and that when test data is completed it will be made available to the Committee. Mr. Doug Mansel added that microjets could be popular with smaller businesses.

Mr. Doug Mansel passed out Graphs 1G and 2G. Previous discussions focused on translating the number of airline passengers into aircraft operations or the weight of air cargo into cargo airline operations. General Aviation (GA) looks directly at the number of aircraft operations (take-offs and landings) and based aircraft (the number of aircraft based at OAK).
Mr. Doug Mansel explained that there is no direct relationship between the number of GA operations and the number of based GA aircraft at OAK. For example, a corporate jet that is based elsewhere but frequently flies into OAK to pick up/drop off passengers and then onto other airports (e.g., fractional jet operators, where the aircraft is owned and shared by several owners) generates more operations at OAK than if that aircraft were based at OAK. Conversely, some corporate jets and turboprops based at OAK generate only a few operations each week. Flight schools, which typically generate a significant number of operations when based at an airport, are the exception.

Mr. Doug Mansel noted that an advantage of based aircraft is that they are more likely to follow local noise abatement procedures (compared to transient aircraft).

Ms. Kathy Ornelas asked if there were any new flight schools. Mr. Doug Mansel responded that there is a new helicopter school at the Airport.

Graph 1G shows how many GA operations occur at OAK (excluding air carrier and cargo aircraft) according to the FAA Terminal Area Forecast (TAF), Supplemental Environmental Impact Report (SEIR), and the Port's Airport Noise and Operations Management System (ANOMS). The SEIR data for 2000 was used as the starting point for the GA forecasts. More recent operations data was then obtained through the Port's ANOMS. It is important to note that the FAA TAF data includes some air cargo operations (e.g., Ameriflight operations) and includes only an estimate of the number of GA touch and go operations. The Port believes that the ANOMS data, especially the more recent data, provides the most accurate reflection of GA activity at OAK.

Mr. Doug Mansel pointed out that the Port's ANOMS provides exceptionally good data (albeit not perfect) compared to GA data used in most airport master plan efforts, which is extrapolated from a limited field count.

A Committee member asked if the data on Graph 1G excluded passenger and air cargo carriers. Mr. Doug Mansel responded that both were excluded (e.g., commuter aircraft, United Express, and small cargo aircraft, such as Ameriflight).

A Committee member asked why this was important. Mr. Doug Mansel responded that there are different methodologies for forecasting air cargo, passenger airline, and GA operations, as was described at previous meetings. Ms. Kristi McKenney added that the Port's level of detail is comprehensive in an attempt to adequately address the diverse concerns of the Stakeholders' constituents.

Mr. David Needle asked if a small jet ferry service would be considered GA. Mr. Doug Mansel responded this would depend on how the operating certificates were granted by the FAA (e.g., on-demand service would likely be GA, but scheduled service would likely be considered as airline operations).

Ms. Kathy Ornelas asked if Ameriflight activity would be correlated with North Field activity. Ms. Kristi McKenney and Mr. Doug Mansel responded that in the upcoming meeting there will be an airfield simulation in which aircraft will be assigned to different runways and simulated as one flight schedule. But as different operations grow at different rates, it is necessary to segregate passenger airline from air cargo from GA operations for forecasting purposes.

Mr. Doug Mansel indicated the Port would not present exhaustive military operations data, but that for the purposes of the 2010 flight schedule, OAK will have 1 or 2 military operations per day.

Ms. Laurel Impett asked if Port staff could explain the significant downward trend in GA activity since 1998. Mr. Doug Mansel responded that this was due to several factors, including the elimination of flight training sponsored by the military, the Silicon Valley bust, September 11, and the difficulty in obtaining liability insurance for manufacturers of GA aircraft.

Graph 2G shows the number of GA operations by aircraft type: piston, helicopter, jet (including microjet), and turboprop (a jet engine with a spinning propeller). This graph displays actual data through the third quarter of 2004 (solid lines), and forecast data after that (dashed lines). The Port anticipates a gradual downward trend (1% decline per year) in piston GA operations. Helicopters are expected to experience 1% annual growth, after a significant jump in 2005 when the new flight school at North Field is anticipated to start flight operations.

Port staff and the Committee discussed the increasing demand for helicopter flight training and the potential effects of that demand. Generally, operating flight training in the San Francisco Bay Area is difficult due to the high cost of living for students and instructors, even compared to Central Valley locations. However, there is still a high demand for helicopter training. There is a shortage of helicopter pilots because many of the Vietnam-era helicopter pilots are no longer flying.

A Committee member asked whether or not helicopters were more dangerous than other aircraft. Ms. Kristi McKenney explained that it is uncertain whether or not helicopters are statistically more dangerous, but that they do tend to do more dangerous work, such as flight close to the ground and heavy lifting.

Ms. Barbara Tuleja asked if the noise footprint of a helicopter training school would be larger than for an operator such as Sierra Academy, which primarily flew fixed wing aircraft. Mr. Vince Mestre responded that this would depend on the flight patterns used and how they are integrated into overall flight operations by Air Traffic Control. Ms. Carole Wedl (Noise Abatement and Environmental Programs) added that the Port and FAA met with the new helicopter flight school (Silver State Helicopters) to ensure their cooperation with noise abatement procedures and that Air Traffic Control expects very little impact from helicopter operations.

A Committee member asked if there were FAA certification requirements for helicopters. Mr. Vince Mestre responded that there were.

Mr. Redd Wetherell (City of Alameda Community Representative) expressed concern that helicopters using light construction historically have more accidents, and that in general aerodynamically helicopters pose more safety risks.

Mr. Doug Mansel discussed corporate jet operations, anticipated to increase by 3% per year, which is consistent with the Port's trends (since 2000) and industry forecasts (i.e., NBAA, GAMA, and Rolls-Royce). Turboprops have remained consistent and are expected to remain so, though microjets may replace some turboprop operations in the future. Mr. Doug Mansel reminded the Committee that the forecasts are a best estimate and trend breakers (e.g., a new helicopter school) are always a possibility.

A Committee member requested that the forecast graphic for helicopter growth reflect the actual growth rate, including the jump from the helicopter training school. Port staff agreed to adjust the graphic.
Ms. Laurel Impett asked if the GA forecast was based on historic trends. Port staff responded that the forecast is based on the actual number of aircraft (by type) that have flown in and out of OAK over several years, and is the product of that information and industry projections.

A Committee member asked what percent of overall operations at OAK does GA constitute. Port staff will report that percentage at the next meeting, which is believed to be approximately 40%.

Ms. Kathy Ornelas asked if helicopters are counted as touch and go operations? Mr. Doug Mansel responded that the FAA does count helicopters in their touch and go operations (if they are making touch and go operations).

Mr. Doug Mansel passed out an Excel spreadsheet. Port staff will adjust the GA flight schedule from the 2000 SEIR flight schedule, to create the master plan GA flight schedule that will be used in the airfield simulation model to study taxiway systems and runway issues. The first step was to summarize the historic annual GA operations in 2000, 2001 and the 12 months ending September 2004 (projections start from this point). Step two was to project the annual growth rate for 2010. Step three was to take the annual figures and divide by 365 to get the Average Annual Day (AAD). Table E shows required adjustments to the 2000 SEIR flight schedule to obtain the 2010 master plan GA flight schedule (i.e., increase daily helicopter operations by 55, jet operations by 3, and turboprop operations by 0, and decrease daily piston operations by 328, including touch and go’s).

To forecast based GA aircraft, Port staff (1) counted the number of aircraft by type based at OAK (277), (2) projected the demand expected for 2010 (384) and 2025 (406), and (4) translated based aircraft demand (i.e., demand for hangar space) into area requirements.

Mr. David Needle expressed concern about based aircraft forecasts being based on waiting lists. Mr. Doug Mansel responded that given the extreme difficulty in obtaining hangar space (it can take as long as 10 years), current waiting list demand is a viable data source for developing these forecasts.

Currently, 65 acres are estimated to be dedicated to based aircraft at OAK. The Port anticipates 77 and 87 total acres would be required to accommodate all of the based GA aircraft demand in 2010 (i.e., 12 to 22 net new acres). Mr. Doug Mansel recommended the Committee consider whether or not it is desirable to plan to accommodate the potential future demand.

General Aviation Development

Potential general aviation development areas. Port staff and the Committee reviewed and discussed the four potential general aviation development areas. Planning considerations for each area were presented on the graphic.

- Area 1 provides 20 acres of land for new GA (e.g., hangar) development, and allows for consolidation of smaller aircraft hangars.
- Area 2 provides 65 acres of land for new GA (e.g., hangar) development, and would be good for corporate jet hangars.
- Area 3 provides 15+/- acres of land for new GA (e.g., hangar) development.
- Area 4 (existing) facilities are much older and might require significant upgrading.

Mr. David Needle asked if the area between Ron Cowan Parkway and Runway 9R-27L (in the vicinity of the North Field Air Traffic Control Tower) was available for development of GA facilities. Mr.

Doug Mansel responded that it was probably too narrow, considering runway safety area set-back and taxiway requirements.

Port staff and Committee members agreed to agendize Airport finances for a future meeting.

Wrap-up Items

Schedule Upcoming Meetings:
- Thursday, March 3, 2005 (SUBJECT: Airfield Issues)
- Thursday, April 14, 2005 (SUBJECT: Ground Access/Airline Support Issues)

These meetings are scheduled in Terminal 1, 2nd Fl., Rear Conference Room.
This meeting was the sixth in a series of planned meetings of the Aviation Stakeholder Advisory Committee (the Committee) for the Oakland International Airport (OAK) master plan. These minutes correspond to an Agenda that was distributed at the meeting; a copy of the Agenda is provided on the master plan web site. New postings to the web site will be accompanied by email notices to Committee members. The web site address is www.oaklandairport.com/masterplan.

Attendees: See sign-in sheet (to be used as distribution list); a copy of the sign-in sheet is provided on the master plan web site.

Handouts:
- Agenda
- Summary of Master Plan Forecasts
- Master Plan Progress Report/Update to Aviation Committee of the Board of Port Commissioners
- Runway Safety Area Studies (Update Briefing No. 1, March 2005)
- Process and Timeline (for upcoming Open House)
- Potential North Field-South Field Taxiways
- Potential New High-Speed Ext Taxiway – Runway 29
- Potential Runway 29 Access Improvements
- Projected Master Plan Update to Aviation Committee of the Board of Port Commissioners

Following introductions, Mr. Doug Mansel, Master Plan Project Manager, distributed the minutes from the two previous meetings, agenda, and reviewed the items requested by Committee members from the previous meeting (see second agenda item below).

Agenda Item:
Approval of meeting minutes from October 28, 2004 and December 9, 2004

The Committee approved the minutes with one editorial correction to the meeting minutes from December 9, 2004.

Follow-up items from the last meeting and open forum

The City of San Leandro provided the Port with a comment letter (dated January 21, 2005) on the focus area for potential terminal development for 2010 to 2012 at OAK. The San Leandro representatives generally agreed that potential terminal development Concept 2B is the best option.
Mr. Doug Mansel invited any comments regarding air cargo development and general aviation (GA) forecasts and potential development areas. From the previous meeting, the Port concluded that there is no support for development in the central basin and that air cargo development should be focused at the existing Oakland Maintenance Center (OMC) and/or terminal area at South Field and a modest expansion of the FedEx area.

Mr. David Needle (City of Alameda community representative) requested serious consideration be given to an additional taxiway between North Field and South Field to minimize congestion on Taxiway B and encourage jets at North Field to depart South Field in accordance with noise abatement procedures.

Ms. Kristi McKenney, Aviation Planning Manager, discussed the Board of Port Commissioners’ decision to delay the parking garage project in front of existing Terminals 1 and 2. After working with Turner Construction throughout 2004, pricing drastically increased (by more than 40% of what was originally budgeted) forcing the Port to study a complex set of issues (e.g., the current parking requirements, delays in terminal development, United Airlines leaving OMC, alternatives to the garage, and financial feasibility). Given the new circumstances, the Board decided not to proceed with development of this garage, and that a more practicable garage project could be built in the future. The availability of this space allows the Committee to rethink terminal development options and associated parking needs. As the Port studies a future terminal in Area 2, staff will provide briefings to the Committee.

A Committee member asked Port staff to describe how enough parking could be provided without the parking garage. Ms. Kristi McKenney replied that there would be a greater amount of land area to devote to surface parking within the reconstructed loop roadway in front of the terminals, in addition to surface parking at the OMC.

A Committee member asked if the rental car center would remain at North Field off Doolittle Drive. Ms. Kristi McKenney responded that it would remain there for longer than anticipated, but that from a customer service perspective, the ideal location in the long term would be in front of the terminals.

Mr. Red Wetherill (City of Alameda community representative) asked if the rising trend in construction costs could possibly reverse. Ms. Kristi McKenney responded that the Port is working to understand the abrupt shifts in construction costs and that the rising cost of raw materials appears to correlate with recent construction bids.

Mr. Doug Mansel passed out the Summary of Master Plan Forecasts (on master plan web site). The data is presented in three sections: (1) airline passenger, (2) air cargo, and (3) GA forecasts and includes the percentage of total daily operations: airline passengers (45.8% existing, 47.5% by 2010), cargo (16.5% existing, 14.4% by 2010), and GA (37.7% existing, 38.1% by 2010). This data is from the staff report briefing to the Aviation Committee of the Board of Port Commissioners. The Port will inform Committee members of future Aviation Committee updates should they wish to attend.

Port staff plans to prepare a briefing paper for the Committee on Airport finances, and will agendize Airport finances for a future meeting (June 2005). Mr. Dennis Rosucci (City of San Leandro community representative) suggested that noise mitigations be considered in the master plan. Mr. Doug Mansel replied that the Committee will study this issue and agendize it for a future meeting (June 2005). The master planning steps include (1) complete forecasting, (2) use the forecasts to model (simulate) activity (e.g., the number of operations on each runway, taxiway congestion, etc.), and (3) look at environmental issues, such as noise, and financial feasibility.

Mr. Dennis Rosucci asked if the meeting discussing noise abatement issues would address particularly noisy aircraft. Mr. Doug Mansel responded that the forecasts include assumptions about the future fleet mix, and that this data will be factored into the noise analysis. For example, the forecasts assume that FedEx will eliminate all but one of their nighttime B727 departures by 2010.

Ms. Pat Mosburg (City of Oakland community representative) asked if the number of OAK employees residing in Oakland and other cities was available. Ms. Kristi McKenney responded that the number was included on the Existing Conditions data sheet (on master plan web site). Ms. Doug Mansel added that the data is from the mid-1990s, which was the last time an economic survey was done. Ms. Kristi McKenney added that the Port believes the data should be consistent with current numbers.

Airfield Issues and Development

Mr. Doug Mansel introduced the discussion on airfield planning issues by referring the Committee to the FAA Advisory Circular (AC) No. 150/5070-6A (Airport Master Plans), Chapter 6, Requirements Analysis and Concepts Development, Section 2, Demand-Capacity Analysis and Section 3, Development Assessment. In this AC, the FAA does not provide abundant information on the study of airfield issues, but some of the principles in Chapter 6 can be useful.

Ms. Rosemary Barnes (Aviation Marketing/Media Relations) asked if the FAA had considered updating the AC. Mr. Doug Mansel responded that the FAA is in the process of updating the AC and that the Airport Council International-North America (ACI-NA), which the Port is a contributing member, is reviewing the FAA’s work.

Mr. Doug Mansel reported that the forecasts of activity that have been developed with the Committee over the last 6 months have been used to simulate the airfield to determine impacts on taxiways and runway capacity. The simulation is based on the following assumptions:

1) 2010 master plan operations forecasts
2) Simmod PRO! (ATAc derivative of the Airport and Airspace Simulation Model, SIMMOD)
3) Terminal Concept 2C and new parallel Taxiway B adjacent to new terminal (between Taxiways B and Taxiway T)
4) Relocation of air cargo building to the OMC site (all other air cargo facility locations remain unchanged), as shown on Terminal Concept 2C
5) No new general aviation (GA) facilities at North Field
6) Southwest Airlines operates from new Terminal 2C (all other airlines operate from Terminals 1 and 2)
7) Touch-and-go operations on Runway 27C,
8) 12 to 15 Taxiway U departures per day (which is approximately the number today)
9) Helicopter operations not modeled
10) West plan VFR conditions (no southeast plan or IFR simulations)
11) OAK airspace only (airspace interactions with San Francisco International Airport (SFO) not modeled)
Mr. Jason Bertino (ATAC, the Port’s airfield simulation consultant) presented the Simmod PRO! simulation model to the Committee. The simulation shows delayed and normal airline operations, aircraft operations in a binomial link-node network, and airport interactions during a 24-hour simulation (based on 2010 anticipated operations serving 18 million annual passengers). The simulation identifies potential “hotspots” (e.g., queues on taxiway and less than optimal spacing of high-speed exit taxiways for Runway 29). Port staff noted that the length of the queue getting to Runway 29 might be worse than estimated because airspace interactions with SFO are not modeled.

A Committee member asked if the simulation showed excessive queuing at other periods of the day (beside the morning departure peak). Mr. Jason Bertino responded that the simulation shows 20 minutes of delay on average per aircraft in the morning departure peak, and that for the rest of the day, there is substantially less average delay per aircraft. Mr. Doug Mansel added that this morning departure peak will continue to spread out later in the morning beyond 2010.

Mr. Jason Bertino responded that proposals for airport development (at SFO, OAK) are informed by current demand. The Bay Area region and community has to decide to create solutions, what those will be, and when they will implement them. The Port will continue to look at all practicable solutions.

Mr. Doug Mansel passed out the Potential New High-Speed Exit Taxiway – Runway 29 graphic.

Mr. David Needle asked if the simulator was capable of modeling air traffic control and the larger Bay Area airspace. Mr. Jason Bertino respondend that the simulation does include some limited airspace around OAK and air traffic procedures, but does not model interactions with SFO. The simulation model is capable of simulating airspace over the entire U.S. Ms. Kristi McKenney added that the new parallel taxiway would also impact wetlands.

Mr. Doug Mansel referred to potential terminal development Concept 2C, which now shows an airport engineer’s rendering of a taxiway parallel to Taxiway B between Taxiway T and Taxiway B2. Based on the simulation results, this new parallel taxiway appears to solve most head-to-head taxi issues between North Field and South Field through 2010. Head-to-head taxi issues occur, for example, when a FedEx aircraft taxis to the FedEx facility when a corporate jet comes from North Field to depart South Field in accordance with the noise abatement procedures.

Mr. David Needle respectfully disagrees, citing the lengthiness as a deterrent to pilots.

Ms. Laurel Impett (CLASS representative) asked if there was a level of service component for airfield planning. Mr. Doug Mansel responded that there is no standard definition of acceptable level of service and that what amount of delay is deemed tolerable varies from airport to airport. What is typically discussed is average total delay per aircraft, and “what is acceptable” varies. For example, LaGuardia Airport routinely experiences over 20 minutes of average delay per aircraft for significant portions of the day. Airlines and airline passengers tolerate it. Ms. Kristi McKenney added that the airfield simulation assumes a representative busy day (the average day of the peak month). There will be some days with more delay and many with less.

Mr. Doug Mansel discussed a potential solution to minimize aircraft queuing to depart Runway 29: creating a taxiway parallel to Taxiway U (between Taxiway T and Taxiway W). This solution would enable air traffic control to better sequence aircraft to different destinations, optimize spacing between departures, negate the need for mid-field take-offs (from Taxiway U), reduce queue delay (from between 23% and 39% - if done in conjunction with a new high-speed exit taxiway), and reduce engine idling noise and emissions. This solution would require wetlands encroachment. Aircraft headed in the same general direction could be queued to allow for alternating departures (because aircraft going in same general direction require more spacing between departures than aircraft going in different general directions).

A second potential solution to reduce the aircraft queue accessing Runway 29 is a new high-speed exit taxiway between Taxiway V and Taxiway Y. Currently, it is estimated that only about 13% of the 2010 aircraft fleet would be able to exit Runway 29 at Taxiway V. A new high-speed exit taxiway between Taxiway V and Taxiway Y would reduce runway queue delay by between 21% and 39% - if done in conjunction with the access improvements described above. The new taxiway, if constructed, would be able to get off the runway more quickly, allowing departing aircraft to take-off, reducing the queue accessing Runway 29. This new high-speed exit taxiway would also impact wetlands.

Mr. David Needle asked if it would be possible to view the simulation model in more detail. Mr. Doug Mansel responded that he would try to arrange a more detailed viewing.

Mr. Doug Mansel referred to potential terminal development Concept 2C, which now shows an airport engineer’s rendering of a taxiway parallel to Taxiway B between Taxiway T and Taxiway B2. Based on the simulation results, this new parallel taxiway appears to solve most head-to-head taxi issues between North Field and South Field through 2010. Head-to-head taxi issues occur, for example, when a FedEx aircraft taxis to the FedEx facility when a corporate jet comes from North Field to depart South Field in accordance with the noise abatement procedures.

Mr. David Needle respectfully disagrees, citing the lengthiness as a deterrent to pilots.

Mr. Doug Mansel passed out graphs quantifying the queue delay measured from the simulation model. Graph 1AF shows Runway 29 operations, the number of take-offs and landings by time of day (for any time during the day, the number of take-offs and landings is the number that occurred during the previous hour). Graph 2AF shows average queue delay per aircraft. With a new high-speed exit taxiway and the taxiway access improvements to Runway 29, the peak queue delay during the morning departure peak drops from about 20 minutes per aircraft to about 10 minutes per aircraft on average.

Mr. Dennis Rosucci asked how long the forecast would work. Ms. Kristi McKenney replied that as aircraft operations increase over the forecast (e.g., beyond 2010), the strain on the runway would continue to increase (i.e., delay would continue to increase), but that the amount of delay will consistently be less with the new taxiways than without them.

Mr. Dennis Rosucci asked if the taxiway improvements would increase runway capacity. Ms. Kristi McKenney responded that the capacity of a single runway, given an aircraft fleet mix and percentage of arrivals vs. departures, is fixed. The taxiway improvements allow for improved sequencing of aircraft to take maximum advantage of air traffic control rules, thereby reducing queue delays. These improvements optimize the runway, allowing it to perform closer to its capacity (allowing it to perform to its potential). Any increase in runway capacity would be
encouraging air carriers to use Runway 27. Ms. Kristi McKenney responded that OAK would approach that juncture in the next decade (2012 to 2015). Mr. Doug Mansel added that the FAA has also said that between 2010 and 2020 they believe OAK will be hitting its runway capacity threshold.

Mr. David Needle asked if the Port would consider starting these taxiway improvement projects before 2010. Ms. Kristi McKenney responded that there would not likely be time to do this before completing the master plan.

Mr. Doug Mansel said the upcoming meeting will include a discussion of options for expanding runway capacity at South Field and then passed out Potential North Field–South Field Taxiways Graph (Taxiways 1 – 4). All four options provide an additional taxiway connection between North Field and South Field, improve airfield flow and minimize head-to-head aircraft operations on Taxiway B, and may not be required if a new taxiway parallel to and east of Taxiway B is constructed south of the Oakland Maintenance Center site (to Taxiway T). In addition:

- Taxiway 1 provides taxiway access to Central Basin, requires a portion of Ron Cowan Parkway to be reconstructed, provides relatively long taxi distances for corporate jets (departing South Field on Runway 29), moves taxiing aircraft closer to the City of Alameda, and requires expensive construction.
- Taxiway 2 provides taxiway access to Central Basin, requires large wetlands impact (30+ acres), and requires expensive construction.
- Taxiway 3 requires minimum wetlands impact (2 acres +/-) and may require a portion of Ron Cowan Parkway to be reconstructed.
- Taxiway 4 provides taxiway access to Central Basin, requires wetlands impact (27 acres +/-), and requires expensive construction.

Mr. Doug Mansel added that it was important to note, through the simulation, that in the near-term, building the parallel taxiway at South Field (between Taxiway T and Taxiway B2) solves many head-to-head taxiway problems.

Ms. Kathy Ornelas (City of San Leandro staff representative) asked the City of Alameda representatives what guarantees existed that it would remain a one-way taxiway and not have jets from South Field heading up to North Field for departure.

Mr. David Needle responded that the current noise abatement agreements say no jet departures on North Field, but that there is a need to work with OAK and the FAA to enforce the existing noise abatement procedures. Mr. Doug Mansel stated that there should be no corporate jets taxiing from South Field to North Field (noise abatement procedures permit corporate jets to land at North Field).

Ms. Kathy Ornelas asked why Taxiway 3 was extended to Runway 27R and Runway 27L, thereby encouraging air carriers to use Runway 27. Ms. Kristi McKenney responded that the Port wanted to consider all possible ways to improve taxiway congestion, but that building a terminal farther south may eliminate the need to extend this taxiway as far as it is depicted on the graphic.

Mr. Darron Evans (Airport Operations – Airside) added that it is extremely rare for an air carrier to want to take off from Runway 27, because to do so would require adjusting passenger, cargo and fuel loads because of the shorter runways at North Field, and would be less profitable for the airlines. In fact, when Runway 29 is closed for maintenance, Airside Operations sometimes receives requests from airlines to reopen it to allow for a departure.

Ms. Kathy Ornelas rebutted that there was a concern that Taxiway 3 would make use of North Field by airlines more attractive. Ms. Kristi McKenney rejoined that the cost of doing so was extremely unattractive to carriers and that the marginal benefits to it were not believed to be motivational in a carrier’s decision, but that the Port would be mindful of the concerns about this option and encouraged community input in the decision-making process.

Ms. Kathy Ornelas expressed community concern about the possible use of Runway 27 by regional jets. Mr. Doug Mansel responded that it is difficult for regional jets to use shorter runways and therefore highly unlikely.

Mr. Doug Mansel suggested that even if gates were constructed at the OMC site (proximate to Runway 27L), the taxi time from this location to South Field is still extremely reasonable, considering that at some airports, such as Chicago O’Hare or Dallas/Fort Worth international airports, taxi times frequently exceed 20 minutes (for both take-offs and landings).

Mr. Red Wetherill stated that barring an emergency, there should not be any jets taking off from North Field.

Runway Safety Areas

At the FAA’s request, the Port has initiated Runway Safety Area (RSA) studies. Mr. Doug Mansel passed out Runway Safety Area Studies (OAK) Update Briefing No. 1, March 2005, which details the project background, scope of work, preliminary field survey findings, project schedule, and next steps. The FAA has established the Runway Safety Area Program, which requires RSAs at all airports certified under 14 Code of Federal Regulations (CFR) Part 139, including OAK, to meet current FAA dimensional, grading, drainage, and other engineering standards for RSAs. Improvement of sub-standard RSAs is a national, high-priority goal for the FAA. Runway dimensions are established in FAA Advisory Circular (AC) 150/5300-13, Airport Design. According to this AC, Runways 11-29, 9R-27L, and 9L-27R at OAK require RSAs that are 300 ft. wide (centered on the runway centerline) and extend 1,000 ft. beyond the ends of each of the runways. Runway 15-33 requires an RSA that is 150 ft. wide (centered on the runway centerline) and extends 300 ft. beyond each end of the runway.

The FAA requires RSAs to be (1) cleared and graded and have no potentially hazardous roots, mounds, depressions or other surface variations, (2) drained by grading and storm sewers to prevent water accumulation, (3) capable of supporting equipment and occasional passage of aircraft without causing structural damage to the aircraft, and (4) free of objects, except for objects that need to be located in the RSA because of their function (and then they must be frangible). RSAs are provided to (1) protect an aircraft on take-off or landing that departs the main runway surface (e.g., due to an engine failure or blown tire), and (2) provide an area suitable for access by emergency equipment (so that it can quickly reach an aircraft that has departed the main runway surface).
Though uncommon, there was a runway excursion at OAK in 1991, when Southwest Airlines went off the side of Runway 29 due to a mechanical failure. A picture depicting this was circulated. This example illustrates the utility of RSAs. A fatal accident at Little Rock, Arkansas, where an aircraft overshot the runway and almost went into a river, also highlights the importance of RSAs.

The Port recently conducted a field survey at OAK and concluded that many RSAs do not meet FAA standards. The development of possible solutions to correct/improve sub-standard RSAs is in progress. Possible solutions include (1) extending sub-standard RSAs to meet current standards, (2) shifting runways (along existing centerlines) to achieve standard RSAs, (3) shortening runways to achieve standard RSAs, (4) establishing declared distances, and (5) installing engineered material arresting systems (EMAS).

Mr. Doug Mansel passed around a brochure for EMAS, which achieves an equivalent 1,000 ft. by paving the end of the runway with a soft concrete (the aircraft sinks into it), which functions as an aircraft arresting bed.

Mr. Howard Klein (URS Corporation, the Port's RSA consultant) discussed Runways 11-29 (North Field), Runway 9R-27L (North Field), Runway 9L-27R (North Field), and Runway 15-33 (North Field) in relation to FAA RSA standards.

Runway 11-29 (North Field)
The localizer antenna (an electronic landing aid providing lateral guidance for aircraft on final approach) is located approximately 485 feet from the Runway 29 threshold and does not appear to have frangible mountings. East of the localizer antenna, the ground rises steeply towards the perimeter dike and airfield roadway on top of the dike. San Francisco Bay is on the other side of the dike. Consequently, the required 1,000 feet of RSA is not provided beyond the Runway 29 threshold. There are also wetlands located within the RSA on approach to Runways 29 and 11 that do not meet FAA standards.

Runway 9R-27L (North Field)
There is an airfield roadway that traverses the RSA on approach to Runway 27L (and Runway 27R). The grades on both sides of the roadway do not meet FAA RSA standards. There are also wetlands located in the RSA on approach to Runways 9R and 27L. Harbor Bay Parkway (and the associated Airport perimeter fence) is located approximately 114 feet inside of the west limit of the RSA for Runway 9R, and consequently, the required 1,000 feet of RSA is not provided beyond the Runway 9R threshold. On the sides of Runway 9R-27L (within the RSA), there are several areas where the soil (mostly clay) is too soft to support equipment or the occasional passage of aircraft (and would therefore be unable to support fire fighting equipment, in the even of an emergency). Numerous animal (squirrel) burrows were observed (which do not meet FAA grading requirements for RSAs).

Runway 9L-27R (North Field)
There is an airfield roadway that traverses the RSA on approach to Runway 27R (and Runway 27L). The grades on both sides of the roadway do not meet FAA RSA standards. The Airport perimeter fence is located within the RSA on approach to Runway 27R. There are also wetlands located in the RSA on approach to Runway 27R. Although there were some areas of standing water and soft soils, Runway 9L-27R appeared to have better overall drainage and soil stability (compared to Runway 9R-27L). Numerous animal (squirrel) burrows were observed (which do not meet FAA grading requirements for RSAs).

Runway 15-33 (North Field)
There is an uncontrolled airfield roadway approximately 238 feet from the threshold of Runway 15. This roadway appears to violate the requirement for positive control of all vehicle and aircraft movements within the RSA. Numerous animal (squirrel) burrows were observed (which do not meet FAA grading requirements for RSAs). The south end of Runway 15-33 is fully compliant.

At North Field, standing water and soft soils (that would not support a vehicle) are a primary concern, especially around Runway 9R-27L.

Mr. Howard Klein (URS Corporation, the Port's RSA consultant) discussed Runways 11-29 (South Field), Runway 9R-27L (North Field), Runway 9L-27R (North Field), and Runway 15-33 (North Field) in relation to FAA RSA standards.

Runway 11-29 (South Field)
The localizer antenna (an electronic landing aid providing lateral guidance for aircraft on final approach) is located approximately 114 feet inside of the west limit of the RSA for Runway 29 threshold. There are also wetlands located within the RSA on approach to Runways 29 and 11 that do not meet FAA standards.

Runway 9R-27L (South Field)
There is an airfield roadway that traverses the RSA on approach to Runway 27L (and Runway 27R). The grades on both sides of the roadway do not meet FAA RSA standards. There are also wetlands located in the RSA on approach to Runways 9R and 27L. Harbor Bay Parkway (and the associated Airport perimeter fence) is located approximately 114 feet inside of the west limit of the RSA for Runway 9R, and consequently, the required 1,000 feet of RSA is not provided beyond the Runway 9R threshold. On the sides of Runway 9R-27L (within the RSA), there are several areas where the soil (mostly clay) is too soft to support equipment or the occasional passage of aircraft (and would therefore be unable to support fire fighting equipment, in the even of an emergency). Numerous animal (squirrel) burrows were observed (which do not meet FAA grading requirements for RSAs).

Runway 9L-27R (South Field)
There is an airfield roadway that traverses the RSA on approach to Runway 27R (and Runway 27L). The grades on both sides of the roadway do not meet FAA RSA standards. The Airport perimeter fence is located within the RSA on approach to Runway 27R. There are also wetlands located in the RSA on approach to Runway 27R. Although there were some areas of standing water and soft soils, Runway 9L-27R appeared to have better overall drainage and soil stability (compared to Runway 9R-27L). Numerous animal (squirrel) burrows were observed (which do not meet FAA grading requirements for RSAs).

Runway 15-33 (South Field)
There is an uncontrolled airfield roadway approximately 238 feet from the threshold of Runway 15. This roadway appears to violate the requirement for positive control of all vehicle and aircraft movements within the RSA. Numerous animal (squirrel) burrows were observed (which do not meet FAA grading requirements for RSAs). The south end of Runway 15-33 is fully compliant.

Port staff explained that the FAA has conducted several tests (using its own B727) to determine the practicability of EMAS, and that the FAA’s guidelines arbitrate what is practicable, and that the Port will be following those guidelines closely.

Ms. Kathy Ornelas asked if the FAA has set a deadline and if there was a penalty for exceeding it. Port staff replied that the FAA’s internal deadline for completing all assessments and commencing the project development process is 2007, and that the Port expects to be in sync with the FAA in terms of RSA solutions. However, there may be issues that cannot be resolved practically, and that is an acceptable outcome. FAA funding to improve/repair sub-standard RSAs is also an unknown at this time.

Port staff and Committee members agreed to agendaize additional airfield issues and potential solutions, including remain overnight (RON) aircraft parking (for 2010 and 2025), new runways at South Field, and further discussions on potential RSA solutions at the next meeting.

Wrap-up Items

Schedule Upcoming Meetings:
Thursday, March 31, 2005 (SUBJECT: Ground Access/Airline Support Issues)
Thursday, April 21, 2005 (SUBJECT: Financial and Environmental Issues)
Sign-in sheet
Web site
Transportation (parking and AirBART)

These meetings are scheduled in Terminal 1, 2nd Fl., Rear Conference Room.
This meeting was the seventh in a series of planned meetings of the Aviation Stakeholder Advisory Committee (the Committee) for the Oakland International Airport (OAK) master plan. These minutes correspond to an Agenda that was distributed at the meeting; a copy of the Agenda is provided on the master plan web site. New postings to the web site will be accompanied by email notices to Committee members. The web site address is www.oaklandairport.com/masterplan.

Attendance: See sign-in sheet (to be used as distribution list); a copy of the sign-in sheet is provided on the master plan web site.

Handouts:
- Agenda
- Excel Table: Potential New North Field – South Field Taxiways
- Excel Table: Remain Overnight (RON) Aircraft Parking (Passenger Airlines Only)
- Potential RON Aircraft Parking Areas
- Potential North Field – South Field Taxiways
- Potential New Taxiway Parallel to Runway 9R-27L
- Potential New South Field Runways
- Runway Safety Area Studies: Create Standard Runway Safety Areas (RSAs)
- Runway Safety Area Studies: Install Standard Engineered Materials Arresting System (EMAS)
- Runway Safety Area Studies: Install Non-Standard EMAS
- Runway Safety Area Studies: Displaced Thresholds/Declared Distances
- Runway Safety Area Studies: Maximize Existing RSAs

Following introductions, Mr. Doug Mansel, Master Plan Project Manager, distributed the minutes from the previous meeting, agenda, and reviewed the items requested by Committee members from the previous meeting (see second agenda item below).

Agenda Item:

Approval of meeting minutes from March 3, 2005

The Committee approved the minutes with one editorial correction.
Mr. Doug Mansel, invited comments about potential terminal development areas, air cargo forecasts, and potential cargo development. Ms. Kristi McKenney, Aviation Planning Manager, shared highlights of recent conversations with UPS, which may affect potential cargo development at OAK. UPS is currently located in the cargo building next to Terminal 1 and occupies a portion of the Daily Lot B area and the apron/chop on the south side of the building, as well as aircraft parking across Taxi Lane 5. They have a large off-airport facility for handling small packages (little handling sorting is done on-airport). UPS has expressed interest in reconfiguring their operation out of the terminal area and up to the Oakland Maintenance Center (OMC) hangar site. UPS is interested in this move independent of potential terminal development. They would like to be located outside of the passenger terminal area with separate access to prevent their trucks from mingling with passenger traffic. It would also somewhat shorten their haul distance between their off-Airport and on-Airport sites. If they were to relocate to the OMC site, the development there could be more consolidated and efficient, and they would not have to cross an active taxi lane to access aircraft. The Port responded that this is reasonable, but have neither approved nor disapproved of possible UPS relocation, but this will factor into the master plan process.

Ms. Kathy Ornelas (City of San Leandro Staff Representative) asked if UPS anticipated expanding their operations at OAK and if potential development at the OMC site would require construction of a parking garage?

Ms. Kristi McKenney responded that UPS has not expressed any intention to expand at OAK, and that, to the contrary, they would rather reduce the amount of space they are leasing from the Port in a more efficient layout/operation. Their future growth would correlate incrementally with Bay Area growth. The Committee previously discussed having a replacement cargo facility in this area, but these issues need to be worked out in the context of land use. The Port and Committee need to look at the layout of a future terminal in this area, and the amount of parking required would depend on whether or not new terminal development requires parking.

In continuation of the ongoing discussion of airfield issues, Mr. Doug Mansel summarized the analysis (simulation) of taxiway queuing delay from the previous meeting, which determined that the biggest "hotspot" was accessing Runway 29 during the departure peak. Mr. Mansel reminded the Committee of the two improvements to minimize this congestion: (1) a new high-speed taxiway exit from Runway 29 (between existing high-speed exits, Taxiways Y and Z, and (2) a dual taxiway system accessing Runway 29 (parallel to Taxiways U and X).

Ms. Barbara Tuleja (CLAS Community Representative) stated that Mr. David Needle (Dave) has been conducting independent simulation analyses, and requested that Mr. Needle’s comments from the previous meeting be read into the minutes in light of his absence.

Mr. Doug Mansel invited any interested Committee members to accompany Dave and Port staff on a field trip to the ATAC offices in Sunnyvale to learn about Simmod PROI simulation model (schedule for May 2, 2005). Mr. Mansel also thanked the Committee members for attending the recent master plan open house, in which approximately 50 people attended.

Ms. Kathy Ornelas suggested having subsequent master plan open houses at a venue with less noise.

Follow-up items from the last meeting and open forum

Ms. Barbara Tuleja asked if the residency of the attendees of the open house was known. Port staff responded that comment cards were submitted from citizens from San Leandro and Oakland.

Port staff plans to prepare a briefing paper for the Committee on Airport finances, and will agendas Airport finances for a future meeting (June 30, 2005).

Airfield Issues and Development

Mr. Doug Mansel introduced the discussion on airfield issues by referring the Committee to the FAA Advisory Circular (AC) No. 150/5070-6A (Airport Master Plans), Chapter 6, Requirements Analysis and Concepts Development, Section 2 (Demand-Capacity Analysis) and Section 3 (Development Assessment). In this AC, the FAA does not provide detailed information on the study of airfield issues, but some of the principles in Chapter 6 can be useful.

Taxiways

Mr. Doug Mansel passed out the North Field – South Field Taxiway Connections graphic and an Excel spreadsheet analysis. In the previous meeting, the Committee looked at a series of taxiways (T1 through T4) to improve access between North Field and South Field and the planning considerations for each option. Since then, the Port has added a potential fifth option (T0) which improves access by allowing aircraft traffic to bypass each other and then be merged using the existing Taxiway B bridge over Ron Covan Parkway, which achieves almost full redundancy between North Field and South Field, except at the bridge crossing. Based on the airfield simulation results, building a taxiway parallel to Taxiway B from the Southwest Airlines Provisioning building to Taxiway T would eliminate the need for a North Field – South Field taxiway connector shown on this graphic, as least through 2010 (the near-term planning horizon). This taxiway at South Field (parallel to Taxiway B) solves most head-to-head taxi issues on Taxiway B, which primarily occur when a FedEx aircraft taxis to/from the FedEx facility while a corporate jet transitions from North Field to depart South Field in accordance with noise abatement procedures.

To address Dave’s (City of Alameda community representative) comment from the last meeting that the taxi distance deters pilots from taxiing from North Field to South Field and suggestion that the Committee consider options that shorten this distance, the Port generated an analysis of four alternative taxiways, T1 through T4 (depicted on an Excel spreadsheet in Tables A – E). (Seediscussion below. 98% of corporate jets currently taxi from North Field to South Field to depart in accordance with existing noise abatement procedures. Mr. Needle’s suggestion to provide additional taxiways is intended to increase compliance above 98%. The 2% of corporate jets that do not comply represents about one day per year departure—on average every other day—or 1/5 of a flight each day.) The calculations in the table assume existing corporate jet parking areas at North Field, specifically KaiserAir, near the middle of the North Field ramp (at the intersections of Taxiways J and D), and Business Jet Center, near the landing threshold of Runway 27R. The tables also show a weighted average North Field taxi start location. The tables show the taxi distances (between 2.6 and 3.8 miles) and times (assuming a 16 knot taxi speed from simulation analyses) for the four alternative taxiways, T1 through T4. Taxiway T3 was the only alternative that decreased taxi distances/times (assuming a 16 knot taxi speed from simulation analyses) for the four alternative taxiways, T1 through T4. Taxiway T3 was the only alternative that decreased taxi distances/times (assuming a 16 knot taxi speed from simulation analyses) for the four alternative taxiways, T1 through T4.
Mr. Red Wetherill commented that analysis of North Field – South Field taxiway alternatives appeared to be overemphasizing the importance of sparing corporate jets a marginal amount of taxi time. The calculated taxi time savings is negligible compared to the total flight time.

A Committee member asked how much time head-to-head conflicts incur and whether taxiway development in North Field might be worth considering. Mr. Kristi McKenney responded that the study showed that head-to-head conflicts occur south of Ron Cowan Parkway (a marginal amount occurs at North Field), so the optimal taxiway development would reduce those conflicts on South Field (which T3 and T0 do not). In previous meetings, the Port has presented graphics which demonstrate that the optimal taxiway development (which would create the greatest reduction in head-to-head conflicts, while avoiding other undesirable side effects) would be a taxiway parallel to Taxiway B. The Port’s analysis of options T0 through T4 suggests that they do not significantly reduce taxi times or conflicts.

Mr. James Reynolds (City of San Leandro community representative) asked if the Port had considered developing general aviation facilities south of Rowan Cowan Parkway. Mr. Doug Mansel responded that due to the density of passenger terminal development at South Field, the Port focused its study (in December 2004) on potential general aviation (GA) facilities at North Field. GA development at the South Field would likely require wetlands encroachment and while attractive in terms of noise abatement could increase congestion on the Airport main air carrier runway, Runway 11-29. Port staff offered to factor potential GA development at South Field into the GA analysis of potential land use.

Ms. Barbara Tuleja commented that in accordance with the settlement agreements between the Port and communities, corporate jets should not be taking off from Runway 27L or 27R. Ms. Kristi McKenney responded that the most optimal taxiway development would be a parallel taxiway to Taxiway B (between Southwest Airlines provisioning building and Taxiway Tango) and that the effect of other taxiway developments would be too insignificant to alter existing aircraft operations or to encourage any additional corporate jet pilots to taxi to Runway 29.

Mr. Dennis Roucci (City of San Leandro community representative) asked how expensive it would be to move corporate jet parking facilities to the South Field (south of Ron Cowan Parkway). Ms. Kristi McKenney responded that the Port could show that on the GA land use options and show the planning considerations, but that it would be very expensive and would need to be subsidized.

Ms. Barbara Tuleja asked if T0 was being considered. Port staff responded that in the near-term what would be required would be a new taxiway from the Southwest Airlines provisioning building south to Taxiway T parallel to Taxiway B, which would most of congestion issues on Taxiway B and make it easier for corporate jets to get from North Field to South Field, and reduce taxi delays.

Ms. Barbara Tuleja expressed concern about business jets taking off from North Field, especially given the FAA’s lack of cooperation. Ms. Kristi McKenney responded that the Port’s analysis suggests that there are no new taxiway options available which would induce all corporate jet pilots to take off from Runway 29.

Mr. Christian Valdes (Sr. Noise Abatement Specialist) commented that 98% of corporate jets do indeed taxi to South Field to depart Runway 29 and questioned the potential appeal of any new configuration (designed to improve traffic flow to Runway 29) to the 2% of corporate jet pilots that request to use Runway 27 (North Field). Mr. Valdes added that the 2% of corporate jet departures that do occur at North Field rarely occur at night. The 2% is about one corporate jet departure every other day (or ½ of a flight per day).

A Committee member asked how many corporate jets depart from Runway 27.

Mr. Christian Valdes indicated corporate jets represent 2% of about 800 departures per month from North Field and added that many corporate jets are equipped with expensive “quiet jets” and pilots of these aircraft feel that the noise abatement restrictions are punitive, given that most non-jet aircraft departing Runway 27 are not similarly equipped.

A Committee member asked for an itemized list of corporate jet departures. Ms. Carole Wedl (Noise Abatement and Environmental Programs) offered to e-mail their monthly report to the Committee member. Mr. Christian Valdes indicated that an itemized list of corporate jet departures from Runway 27 is available on the web site, and that those corporate jets that depart at night depart from Runway 29.

Mr. Doug Mansel directed the Committee to look at the Potential New Taxiway Parallel to Runway 9R-27L graphic. When Runway 11-29 is closed (e.g., for maintenance, repair, or in the event of an accident), arriving aircraft bound for South Field must land at North Field and then taxi to South Field, crossing three runways: 9L-27R, 27R and 27L to do so. The potential new taxiway would eliminate the need for runway crossings (improving safety), reduce taxi time and emissions, and improve air quality. However, construction would be difficult and costly.

Mr. Dennis Roucci asked if there would be environmental mitigation in terms of paving. Mr. Doug Mansel responded that the Port would need to do an environmental review, but that this option would not encroach on wetlands and therefore would not require wetlands mitigation.

Ms. Carmen Fewless (City of San Leandro community representative) asked if OAK was subject to the Regional Water Quality Control Board, how often Runway 29 was closed, and if the proposed taxiway parallel to Runway 9R-27L was cost beneficial. Mr. Doug Mansel responded that Runway 29 is not closed often, but it does happen. For example, there is a semi-routine closure for maintenance Monday mornings from about 1:30 AM to 6:00 AM, when there are no scheduled airline departures, but still a few landings needing to go to South Field. Cost-benefit would be difficult to determine at this time. Mr. Mansel added the Port is indeed subject to permits from the Regional Water Quality Control Board.

Another example of when Runway 11-29 was closed for an extended period was during a week in August 2001 when it was closed for resurfacing. The Port set up a one-way flow on Taxiway B: the Port focused its study (in December 2004) on potential general aviation (GA) facilities at North Field. GA development at the South Field would likely require wetlands encroachment and while attractive in terms of noise abatement could increase congestion on the Airport main air carrier runway, Runway 11-29. Port staff offered to factor potential GA development at South Field into the GA analysis of potential land use.

A Committee member asked how much time head-to-head conflicts incur and whether taxiway development in North Field might be worth considering. Mr. Kristi McKenney responded that the study showed that head-to-head conflicts occur south of Ron Cowan Parkway (a marginal amount occurs at North Field), so the optimal taxiway development would reduce those conflicts on South Field (which T3 and T0 do not). In previous meetings, the Port has presented graphics which demonstrate that the optimal taxiway development (which would create the greatest reduction in head-to-head conflicts, while avoiding other undesirable side effects) would be a taxiway parallel to Taxiway B. The Port’s analysis of options T0 through T4 suggests that they do not significantly reduce taxi times or conflicts.

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Mr. Doug Mansel directed the Committee to look at the Potential New Taxiway Parallel to Runway 9R-27L graphic. When Runway 11-29 is closed (e.g., for maintenance, repair, or in the event of an accident), arriving aircraft bound for South Field must land at North Field and then taxi to South Field, crossing three runways: 9L-27R, 27R and 27L to do so. The potential new taxiway would eliminate the need for runway crossings (improving safety), reduce taxi time and emissions, and improve air quality. However, construction would be difficult and costly.

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Ms. Carmen Fewless (City of San Leandro community representative) asked if OAK was subject to the Regional Water Quality Control Board, how often Runway 29 was closed, and if the proposed taxiway parallel to Runway 9R-27L was cost beneficial. Mr. Doug Mansel responded that Runway 29 is not closed often, but it does happen. For example, there is a semi-routine closure for maintenance Monday mornings from about 1:30 AM to 6:00 AM, when there are no scheduled airline departures, but still a few landings needing to go to South Field. Cost-benefit would be difficult to determine at this time. Mr. Mansel added the Port is indeed subject to permits from the Regional Water Quality Control Board.

Another example of when Runway 11-29 was closed for an extended period was during a week in August 2001 when it was closed for resurfacing. The Port set up a one-way flow on Taxiway B: the Port focused its study (in December 2004) on potential general aviation (GA) facilities at North Field. GA development at the South Field would likely require wetlands encroachment and while attractive in terms of noise abatement could increase congestion on the Airport main air carrier runway, Runway 11-29. Port staff offered to factor potential GA development at South Field into the GA analysis of potential land use.
Remain Overnight (RON) Aircraft Parking

Mr. Doug Mansel passed out the Potential Remain Overnight (RON) Aircraft Parking Areas graphic. OAK has a significant RON aircraft parking demand. Aircraft can park at the gate or remotely overnight. The Port's analysis focuses on remote RON aircraft parking demand. At the end of an aircraft's day, it parks at the gate, meanwhile aircraft continue to arrive later and need a gate to off-load passengers. The first aircraft must be pushed to a remote aircraft parking location, allowing incoming aircraft to arrive at the gate and perhaps park at it. It may also have to push off the gate to a remote parking location if that aircraft is not the first one scheduled to depart that gate in the morning. During the morning departure peak, the majority of aircraft departing OAK start their day at the Airport (i.e., they do not fly in from another airport).

Mr. Doug Mansel directed the Committee to look at the Excel spreadsheet entitled RON Aircraft Parking (Passenger Airlines Only). The analysis summarizes the remote RON aircraft parking area available today and extrapolates to show a range in remote RON aircraft parking area that might be required in 2010 and 2025. The analysis is based on a ratio of gates used for RON aircraft parking to remote RON aircraft parking area. The analysis shows that between 23 and 46 acres of remote RON aircraft parking might be required in 2010, depending on ratio assumptions and the total number of gates in 2020. Mr. Mansel pointed out that it will be challenging to find areas suitable for remote RON aircraft parking near the terminal area, as demand increases and more of the terminal area is consumed by terminal and other buildings.

A Committee member asked if aircraft using remote RON aircraft parking at OAK are sometimes not picking up or dropping off passengers at OAK. Port staff stated that OAK does not store aircraft for other airports, but that on rare occasions when aircraft intended to land at SFO must divert to OAK due to weather and fuel situations, they may park on the remote aircraft parking areas until they can reposition the aircraft to SFO. This occurs once or twice a year. The aircraft will park on the ramp area at OAK, refuel, and then depart, often without discharging passengers.

Mr. Doug Mansel directed the Committee to review the Potential Remain Overnight (RON) Aircraft Parking Areas graphic, which depicts five possible areas for remote RON aircraft parking area development (i.e., large ramp areas). Mr. Mansel discussed the planning considerations associated with each area. Area 1 is the most desirable for remote RON aircraft parking because it could provide ramp area that is close to the terminal gates (where aircraft are pushed from and pulled to). However, there are a lot of other uses competing for Area 1, including terminal buildings, air cargo, vehicle parking, etc. Areas 2 through 5 would require filling wetlands and crossing active taxiways to reposition aircraft between the gates and remote RON aircraft parking. Ms. Kristi McKinney added that the OMC site, which is part of Area 1, is being used for remote RON aircraft parking today and could be in the future, balancing other competing uses.

Mr. Red Wetherill asked if anyone had looked at the economics of using a folding wing aircraft (like the Navy uses). Ms. Kristi McKinney indicated that the Port was unaware of such an evaluation.

Ms. Carmen Fewless asked if the Port had considered a two-level RON aircraft parking facility. Port staff responded that no one has ever constructed such a facility before, except for very small general aviation airport inside a hangar.

A Committee member asked if the tugging distance between some of the potential remote RON aircraft parking areas and the terminal gates was too far. Port staff responded that it probably was not, but it would need to be looked at in light of potential terminal development in Area 1.

New South Field Runways and Extensions

Mr. Doug Mansel passed out the Potential New South Field Runways graphic. For the purposes of the master plan, the Port is focusing exclusively on runways parallel to Runway 11-29. The City of Alameda, CLASS, and Port have already conducted an independent study and discarded crosswind runway alternatives (limited or no capacity or noise reduction benefits). By settlement agreement, the Port is precluded from constructing new runways or lengthening existing runways at North Field. Four potential outboard alternatives might be North/South (north of existing Runway 11-29) and one potential inboard alternative (north of existing Runway 11-29) are being considered in the master plan. The planning considerations are:

Runway 11 (700 ft. Inboard of Runway 11-29):
- Provides an increase in runway capacity during visual meteorological conditions (VMC)
- Allows for paired, simultaneous departures if (1) divergent headings (15 degrees or more) are available and (2) the two departing aircraft do not need to turn in the same direction
- Allows one runway to be used for arriving aircraft and the other runway to be used for departing aircraft, eliminating the need to preserve gaps for disparate operations
- Moves aircraft arriving or departing Runway I1 closer to residential areas in San Leandro or Alameda (respectively, in West Plan)
- Minimizes aircraft queuing distance available between terminal area and Runway 29, further congesting the terminal area
- Requires demolition or relocation of the Ground Run-up Enclosure (GRE)
- Possible wake turbulence concerns (may limit simultaneous operations even in VMC)
- Slightly easier/less expensive construction over existing Taxiway W (formerly temporary Runway 12-30)
- Does not require Bay fill
- Impacts wetlands (over 100 acres)

Runway 01 (800 ft. Outboard of Runway 11-29):
- Operates similar to potential runway I1, without impacting aircraft queuing
- Moves aircraft arriving or departing Runway 01 farther away from residential areas in San Leandro or Alameda (respectively, in West Plan)
- Impacts Bay waters (over 150 acres in total in impacted footprint)
- Impacts wetlands (over 80 acres)
- Expensive/difficult construction

Parking (Passenger Airlines Only). The analysis summarizes the remote RON aircraft parking area available today and extrapolates to show a range in remote RON aircraft parking area that might be required in 2010 and 2025. The analysis shows that between 23 and 46 acres of remote RON aircraft parking might be required in 2010, depending on ratio assumptions and the total number of gates in 2020. The analysis shows that between 33 and 68 acres of remote RON aircraft parking might be required in 2025, depending on ratio assumptions and the total number of gates in 2025. Mr. Mansel pointed out that it will be challenging to find areas suitable for remote RON aircraft parking near the terminal area, as demand increases and more of the terminal area is consumed by terminal and other buildings.

A Committee member asked if aircraft using remote RON aircraft parking at OAK are sometimes not picking up or dropping off passengers at OAK. Port staff stated that OAK does not store aircraft for other airports, but that on rare occasions when aircraft intended to land at SFO must divert to OAK due to weather and fuel situations, they may park on the remote aircraft parking areas until they can reposition the aircraft to SFO. This occurs once or twice a year. The aircraft will park on the ramp area at OAK, refuel, and then depart, often without discharging passengers.

Mr. Doug Mansel directed the Committee to review the Potential Remain Overnight (RON) Aircraft Parking Areas graphic, which depicts five possible areas for remote RON aircraft parking area development (i.e., large ramp areas). Mr. Mansel discussed the planning considerations associated with each area. Area 1 is the most desirable for remote RON aircraft parking because it could provide ramp area that is close to the terminal gates (where aircraft are pushed from and pulled to). However, there are a lot of other uses competing for Area 1, including terminal buildings, air cargo, vehicle parking, etc. Areas 2 through 5 would require filling wetlands and crossing active taxiways to reposition aircraft between the gates and remote RON aircraft parking. Ms. Kristi McKinney added that the OMC site, which is part of Area 1, is being used for remote RON aircraft parking today and could be in the future, balancing other competing uses.

Mr. Red Wetherill asked if anyone had looked at the economics of using a folding wing aircraft (like the Navy uses). Ms. Kristi McKinney indicated that the Port was unaware of such an evaluation.
Runway 02 (2,500 ft. Outboard of Runway 11-29)

- Allows independent (paired, simultaneous) operations (take-offs and landings) without wake turbulence concerns in VMC
- Allows for independent (simultaneous) arrivals to one runway and departures from the other runway in instrument meteorological conditions
- Provides a moderate to substantial increase in runway capacity in VMC and IMC conditions (and associated reduction in delay)
- May be able to use new GPS-based technologies to further improve runway capacity (e.g., allowing for paired, simultaneous arrivals)
- Moves aircraft arriving or departing Runway 02 farther away from residential areas in San Leandro or Alameda (respectively, in West Plan)
- Impacts Bay waters (over 550 acres in total impacted footprint)
- Impacts wetlands (over 4 acres for taxiway connections)
- Expensive/difficult construction

Runway 03 (3,400 ft. Outboard of Runway 11-29)

- Allows for independent (paired, simultaneous) operations in VMC and IMC with special radar equipment to monitor arriving and departing aircraft
- Provides a substantial increase in runway capacity in VMC and IMC conditions (and associated reduction in delay)
- Moves aircraft arriving or departing Runway 03 farther away from residential areas in San Leandro or Alameda (respectively, in West Plan)
- Impacts Bay waters (over 750 acres in total impacted footprint)
- Impacts wetlands (over 4 acres for taxiway connections)
- Expensive/difficult construction
- Possible airspace interaction issues with arrivals to San Francisco International Airport (SFO)

Runway 04 (4,300 ft. Outboard of Runway 11-29)

- Operates similar to Runway 03, without special radar equipment
- Impacts Bay waters (over 1,000 acres in total impacted footprint)
- Impacts wetlands (over 4 acres for taxiway connections)
- Expensive/difficult construction

Runway 11-29 Extension

- Extends Runway 11-29 by 1,600 feet for a total length of 11,600 feet, excluding runway safety areas
- Would require associated taxiway extensions
- May require the runway be shifted 500 feet farther west to provide a full runway safety area on approach to Runway 29 (not shown)
- Does not increase runway capacity
- Allows large air cargo aircraft to depart with heavier loads on longer flights (e.g., air cargo flights to Asia)
- Provides limited or no benefit to passenger airline operations
- Somewhat expensive/difficult construction

- Likely does not provide enough benefit compared to probable costs

The additional runway capacity at South Field would be required sometime between 2015 and 2025 (the 20-year, long-term planning horizon in the master plan). As was shown at the last Stakeholder Advisory Committee meeting, the 2010 (near-term) flight schedule (and associated additional aircraft gates) was able to be accommodated on existing Runway 11-29, with some modest increase in delay during the morning departures peak. Proposed taxiway improvements reduced this delay.

Mr. Red Wetherill asked if the five South Field runway alternatives were compliant with the limitations in the settlement agreements. Port staff indicated that they were.

Mr. Dennis Rosucci asked what percentage of runway capacity was presently being used. Mr. Doug Mansel responded that the analysis is not expressed as a percentage but in terms of delay. Ms. Kristi McKenney added that it was difficult to express runway capacity in terms of passengers, but clearer if expressed in terms of increased delay and projects that could reduce that delay. Mr. Rosucci asked how might the Committee answer this question, how much of the runway capacity is used up now and in 2010, for a larger community. Mr. Rosucci also asked if we really need to look at the long-term requirement, which shows these new runways at South Field parallel to existing Runway 11-29.

Ms. Kristi McKenney responded that per the settlement agreements with the communities, the Port is required to do a master plan that looks at long-term needs, but the Committee does not have to decide what will or should be constructed, especially so far out. Ms. McKenney said that Port staff will prepare a brief statement of simplified runway capacity and delay for the Committee's use in explaining these issues to the larger community.

Ms. Kathy Orelas asked if the Committee could review the Airfield Planning Study. Mr. Mansel commented that these alternatives are straight from that report.

Mr. Francois Gallo (San Leandro Unified School District representative) added that it might be useful to review FAA Advisory Circular (AC) No. 150/5060-5, which discusses runway capacity and delay. Mr. Doug Mansel responded that the Port opted to use a more detailed simulation model instead of this AC's more simplified approach to runway capacity and delay. However, Port staff would use the AC to prepare the simplified runway capacity and delay analysis requested by the Committee (using Annual Service Volume methods outline in this AC).

A Committee member asked what would be the noise impact in relation to the avigation easements. Port staff responded that it would research this issue and respond to the Committee at an upcoming meeting.

Mr. Dennis Rosucci asked if new runway construction would result in new terminal construction. Ms. Kristi McKenney responded that it was inconceivable that new runways would be built without new terminals (beyond those shown for 2010 to 2012 timeframe).

Ms. Barbara Tuleja asked what type of construction would be used (e.g., floating runways) and what mitigations would be involved. Ms. Kristi McKenney replied that it would likely be traditional fill, although a lot of study was done on various construction methods when SFO was considering their runway reconfiguration program.
Ms. Barbara Tuleja asked if the Port could demand noise abatement, aside from the FAA.

Mr. Francois Gallo asked if possible airspace interaction with SFO could be reviewed. Port staff responded that most impacts were easily worked out (i.e., SFO and OAK have previously agreed not to impact each other's airspace), but that the Port would incorporate this into the planning considerations.

Mr. Red Wetherill found it questionable that SFO and OAK would respect each other's airspace.

Mr. Dennis Rosucci asked if there were any basis to the rumors that the FAA prefers SFO. Ms. Carole Wedl responded that 10 years ago, SFO had more morning flights than OAK, and that at that time, the FAA adjusted Air Traffic Control (ATC) coordination accordingly.

Mr. Francois Gallo indicated that there were different classes of airspace (e.g., Class B and Class C). Mr. Doug Mansel affirmed that these categories existed, but stated that they had no practical effect on the Airport's operations (e.g., no impact on passenger airlines, cargo aircraft, or corporate jets). The difference between Class B and Class C, for example, is that one requires pilots of small, single-engine aircraft (e.g., a Cessna) to establish communication with Air Traffic Control and receive an affirmative clearance to enter the airspace, while the other just required pilots to establish communication with Air Traffic Control.

Ms. Kristi McKenney stated that a major consideration in the design of the current master planning process was the lack of community involvement during the previous planning process. Subsequently, the Port is reviewing all practicable options and factoring in community input via the Committee.

Mr. Dennis Rosucci asked if it was possible to use Travis Air Force Base. Ms. Kristi McKenney responded that this would be a decision for regional entities (e.g., the Regional Airport Planning Committee) and encouraged the Committee to consider ways to meet the long-term capacity demands (or not) in our master plan discussions focused on OAK.

Runway Safety Areas

Mr. Doug Mansel passed out six Runway Safety Area (RSA) graphics and turned the discussion over to Mr. Howard Klein (URS Corporation, the Port's RSA consultant).

The first graphic (Create Standard RSAs) shows possible solutions that create standard RSAs by relocating roads, constructing an earth platform (on approach to Runway 29), filling wetlands, and stabilizing soils and improving drainage (at North Field). The limits of the RSA for each runway are shown with dashed red lines on all graphics.

The second graphic (Create Standard RSAs: Shift Runways) shows a solution that creates standard RSAs by shifting runways, displacing thresholds, and filling wetlands, as required.

The third graphic (Install Standard EMAS) shows standard EMAS installations, which, according to the FAA, provide an equivalent level of safety as full-length RSAs. Installation of standard EMAS would require filling wetlands (on approach to Runway 9R at North Field) and displacing the Runway 29 threshold, which would require the approach lighting system to be relocated.

The fourth graphic (Install Non-Standard EMAS) shows non-standard EMAS installations. These installations would likely be considered acceptable to the FAA, but do not meet standard EMAS criteria because the EMAS would not stop the design aircraft leaving the end of the runway at 70 knots and/or the suggested 600 ft. installation cannot be provided. At North Field, the wetlands on approach to Runway 9R may not have to be impacted and at South Field, a displaced threshold would not be required (and therefore the approach lighting system would not need to be relocated).

The fifth graphic (Displaced Thresholds/Declared Distances) shows the distances required to displace thresholds to create standard RSAs. The table shows the effective take-off and landing lengths. In all cases, the runways would be effectively shortened, which could impact flight operations. Port staff and consultants are coordinating with relevant airline representatives (i.e., aircraft performance engineers) to determine and document potential impacts to the airlines. This documentation is important in order to determine if this potential solution is practicable.

The sixth graphic (Maximize Existing RSAs) shows possible solutions to improve, but not fully correct, sub-standard RSAs. The resulting sub-standard RSA length is shown.

These graphics illustrate families of potential solutions to correct or improve sub-standard RSAs at OAK. Any actual solution may be a combination of those presented on the various graphics. For example, the FAA might determine that it is practicable to shift Runway 15-33 along its centerline, while standard EMAS is most appropriate for the approach to Runway 27L/R, while a non-standard EMAS is the best solution in the approach in Runway 29.

Ms. Kathy Ornelas asked what options existed for extending the runways. Ms. Kristi McKenney responded that this would involve a NEPA and CEQA process and would depend on the proposed RSA solution.

A Committee member asked how feasible the cost of these options was. Mr. Howard Klein replied that the FAA estimates a maximum practicable cost (sliding scale) based several factors.

Mr. Red Wetherill asked what precautions were there in the event that a airplane landed short. Port staff responded that the FAA has to provide 600 feet from the beginning to the end of the bed and that this factor would be considered in the evaluations.

Wrap-up Items

Schedule Upcoming Meetings:
Thursday, April 21, 2005 (SUBJECT: Ground Access and Airline Support Issues)
Thursday, June 30, 2005 (SUBJECT: Financial and Environmental Issues)
Sign-in sheet
Web site
Transportation (parking and AirBART)

These meetings are scheduled in Terminal 1, 2nd Fl., Rear Conference Room.
This meeting was the eighth in a series of planned meetings of the Aviation Stakeholder Advisory Committee (the Committee) for the Oakland International Airport (OAK) master plan. These minutes correspond to an Agenda that was distributed at the meeting; a copy of the Agenda is provided on the master plan web site. New postings to the web site will be accompanied by email notices to Committee members. The web site address is www.oaklandairport.com/masterplan.

Attendees: See sign-in sheet (to be used as distribution list); a copy of the sign-in sheet is provided on the master plan web site.

Handouts:
- Agenda
- Demand to Annual Service Volume (ASV) Comparison, Runway 11-29, Master Plan 2010 Operations Forecasts (April 2005)
- Potential Airline Support Facility Development Areas
- Potential Ground Access Development Areas

Following introductions, Mr. Doug Mansel, Master Plan Project Manager, distributed the minutes from the previous meeting, agenda, and reviewed the items requested by Committee members from the previous meeting (see second agenda item below).

Agenda Item:
Approval of meeting minutes from March 31, 2005 (approve at the June 30, 2005, meeting)

Follow-up items from the last meeting and open forum

Mr. Doug Mansel invited comments about airline passengers forecasts, potential terminal development concepts, air cargo forecasts, general aviation (GA) forecasts, and airfield issues/potential solutions and passed out the Demand to Annual Service Volume (ASV) Comparison, Runway 11-29, Master Plan 2010 Operations Forecasts, which the Port generated in response to Mr. Dennis Rosucci’s (City of San Leandro community representative) request for a simplified runway demand to capacity analysis at the last meeting. Using the Federal Aviation Administration’s (FAA’s) Annual Service Volume (ASV) methodology, an airport’s demand to ASV (capacity) ratio is determined by dividing annual aircraft operations (demand) by the figure in FAA AC 1150/5060-5 (Airport Capacity and Delay, Chapter 2, Figure 2-1, using the airport’s runway configuration and fleet mix). Based on this analysis, Runway 11-29 is currently running at about 80% of capacity. Based on the 2010 master plan operations forecasts, which include airline passengers, air cargo operations at South Field, and corporate jets departing South Field, Runway 11-29 will be running at about 98% of capacity in 2010. This simplified methodology estimates 3 minutes of delay per aircraft, which may be true on average throughout the day, but based on the Simmod PRO! simulation model, the delay during the morning departure peak is significantly greater. Because the FAA ASV analysis is based on a 13 to 18 hour day, some nighttime air cargo operations were removed from the demand before dividing by the ASV to produce a fair comparison. Although this
analysis is too simplified to justify a new runway or detailed planning. It should be useful for discussing runway capacity with the public and will be posted to the master plan website.

Mr. Dennis Rosucci suggested including a caveat that this is a broad-based analysis (not specific enough to be used in planning a runway) before posting it to the site to avoid confusion. Mr. Doug Mansel responded that he would add additional language to the disclaimer and bold it. Ms. Kristi McKenney, Aviation Planning Manager, added that the FAA ASV analysis includes many assumptions which make it unsuitable for actual planning (e.g., a 13 to 18 hour day) and that given the actual numbers likely in 2010, runway capacity at OAK is likely to be closer to 80%. Many airports operate above 100% of this calculation, which means increased delay. The question for each airport becomes what amount of delay is tolerable.

Ms. Carmen Fewkes (City of San Leandro community representative) requested that Port staff make it clear that this is not a decision-making document. Port staff agreed to make this explicit.

A committee member asked why the ASV analysis does not include North Field. Mr. Doug Mansel responded that North Field was excluded from the analysis because it has plenty of runway capacity throughout the master plan period (given the general aviation operations forecasts).

Port staff will brief the Aviation Committee of the Board of Port Commissioners on airfield work (potential taxiway improvements, potential South Field runways, etc.) on April 25, 2005. Any interested Committee members are invited to attend. Port staff will produce an airport finances briefing paper on or before the June 30, 2005, meeting and will notify the Committee when it is available on the web site. The next meeting will be focused on financial and environmental issues and constraints.

Mr. Doug Mansel invited any interested Committee members to attend the field trip to ATAC's offices in Sunnyvale (scheduled May 2, 2005) where the airfield simulation will be looked at in more detail.

Airline Support Facilities

Mr. Doug Mansel introduced the discussion on airline support facilities by referring to the Committee to the FAA Advisory Circular (AC) No. 150/5070-6A (Airport Master Plans), Chapter 6, Requirements Analysis and Concepts Development (Section 3, Development Assessment). In this AC, the FAA does not provide abundant information on the study of airline support facilities, but some of the principles in Chapter 6 can be useful. Mr. Doug Mansel pointed out the Potential Airline Support Facility Development Areas graphic. Each airline support facility is indicated by the type of access required: (1) airside/landside, (2) airside only, and (3) landside only. Planning considerations provide background information on each facility (Belly Cargo, Provisioning/Catering, Fuel Load Rack, Ground Service Equipment (GSE), Airport Rescue and Firefighting (ARFF), Triturator, and Fuel Storage).

Belly Cargo

A belly cargo facility is a building where the public can pick-up and drop-off cargo (small boxes, packages, etc.) that are transferred to the belly of passenger aircraft. These facilities must have landside access and should be located as close to the terminal as possible. The shows grid possible locations for a belly cargo facility. Area 1 (the terminal area) is optimal, but already overcommitted. Areas 2 and 3 lack the necessary landside access; and Areas 4 through 7 might work. The remaining areas are generally not suitable.

Ms. Barbara Tuleja (CLASS community representative) asked if Area 4 was an option and if there were wetlands there. Ms. Kristi McKenney directed the Committee to the grid chart which indicates the potential areas available for each facility and affirmed that Area 4 is a possible option. Portions of Area 4 have wetlands, but not the entire area.

Provisioning/Catering

Provisioning and catering facilities provide a building for the storage and preparation of in-flight consumables. OAK currently has a catering building depicted in Area 6 on the graphic, which provides catering for all major airlines, except JetBlue and Southwest, which have their own provisioning facilities in the cargo building and in a separate building near Taxiway B (just south of Taxiway B1), respectively. Ideally, these buildings would have airside and landside access. The landside access allows for delivery of consumables, and the airside access is used for loading smaller trucks that take the consumables to individual aircraft. If there is no area that straddles both, the facility can be located on one side or the other. OAK's existing catering facility only has landside access. If the facility is located on the airside, landside deliveries would have to drive through the airfield security gates (past the Alameda County Sheriff's security checkpoint).

Mr. Dennis Rosucci asked if the catering facility could be expanded on the existing site. Mr. Doug Mansel indicated this was a possible solution depending on terminal development (i.e., it might be more desirable to change the roadway exit in front of the terminal or to put a potential new terminal in this area). OAK's catering building could be located anywhere, except Areas 2 and 3, which are close to the airfield, including Area 12 off-Airport (in Oakland, San Leandro, or Alameda). The Port has retained control of approximately four acres in the Metropolitan Golf Links area bordering Eden Road, which could also be used (Area 12).

Mr. Red Wetherill (City of Alameda community representative) asked if it would be easy to get a separate (restricted or non-public access roadway) from Area 6 and 7 to the airfield. Mr. Doug Mansel indicated that this was possible and that another option would be a restricted roadway parallel to the dike going to Terminal 2.

Ms. Barbara Tuleja asked if catering facilities were typically located on-site. Ms. Kristi McKenney replied that most are, but it is not required.

Fuel Load Rack

The fuel load rack provides fuel to airfield vehicles (e.g., belt loaders, push back tugs, and bag cart tugs) that cannot refuel at other fueling stations, and is also the location where jet fuel can be loaded into airport tankers and driven to individual aircraft (this does not happen very often at OAK, because all of the gates and many aircraft parking positions are provided fuel via an underground pipeline and hydrant system). Areas 1 through 5 are optimal for this function.

Mr. Dennis Rosucci asked if there were any federal restrictions as to where the fuel load rack could be located. Ms. Kristi McKenney responded that there are some guidelines, which the Port is following, but that FAA guidelines are more concerned with the location of fuel storage (vs. dispensing).

Ms. Kathy Ornelas (City of San Leandro staff representative) asked if Area 4 encroached upon wetlands. Ms. Kristi McKenney responded that the impact on wetlands and the remoteness of the site make it operationally unattractive. The grid depicts where a facility can be located theoretically, but that some areas are less attractive than others.

Mr. Dennis Rosucci asked if the fuel was stored in the fuel load rack area or Area 7. Mr. Larry Berlin replied that there are two tanks for fuel for GSE located in the fuel load rack area and that Area 7 is currently being used to store jet fuel that is distributed underground, but that for future planning, the Port should have an above-ground airfield gasoline and diesel storage facility for GSE.

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Ground Service Equipment (GSE) maintenance

Mr. Doug Mansel stated that OAK currently does not have a GSE maintenance facility (e.g., a bay or bays which could be rented for the servicing of GSE), and that this is an important facility to be factored into the master planning process. OAK has received requests from airlines for such a facility. A GSE maintenance facility should be located adjacent to the airfield so that GSE does not have to travel on public roadways to get to the facility. All areas, except Areas 3, 10, and 12, would be suitable for such a facility.

Ground Service Equipment (GSE) storage/parking

GSE requires airside storage area and parking, preferably concentrated around the terminal area. This ramp area storage could be accommodated in Areas 1, 2, 3, and 5.

Ground Runup Enclosure (GRE)

The GRE provides a sound-deadening enclosure for airlines and is currently in a suitable location unless/until something needs to replace it. However, there is one technicality that should be considered. During the last overlay of Runway 11-29, Taxiway W was converted into a temporary runway (mostly for departures), the majority of aircraft landed in North Field, taxied southbound on Taxiway B to the terminal and then departed Taxiway W. Some cargo airlines landed on Taxiway W. In the future, with the existing GRE, it might be difficult to convert Taxiway W to a temporary runway. Therefore, the Port recommends factoring this into the planning considerations. Areas 4, 5, 8, and 9 are possible locations for future GRE. Presently the GRE is used approximately 40 times per month.

Mr. Dennis Rosucci asked who uses the GRE now. Port staff responded that KaiserAir does (United Airlines and Alaska Airlines used to) and that the overall amount of usage has dropped.

Ms. Barbara Tuleja commented that she had heard complaints about engine runups. Port staff and Ms. Kathy Ornelas responded that what was probably heard was consistent with departures off Runway 29.

Airport Rescue and Firefighting (ARFF)

The current ARFF facility is in a strategically located position. The FAA requires that the first ARFF truck must be able to arrive on scene within three minutes (i.e., they must be at the midpoint of the farthest air carrier runway) in the event of an incident. For planning considerations, any potential runways built into the San Francisco Bay must be able to comply with these FAA requirements (i.e., they must be close enough for ARFF trucks to reach any incident on the airfield within three minutes -- and if not, a substation would have to be built to comply with this requirement). The graphic grid depicts Areas 2 and 3 as potential fire station locations. The ARFF must respond to all emergencies, but their main concern is aircraft fires (not medical issues inside the terminal or, in general, structural fires). If the ARFF responds to an alternative emergency, they must have backup at the station to serve any potential aircraft incident.

Triturator

The existing triturator is located in Building M-104 (the operations center). The triturator provides a location to unload aircraft lavatory waste and should be located in the terminal area (Area 1).

Fuel Storage

Located in Area 7, fuel storage provides a location to store fuel (e.g., jet fuel, 100LL (low lead), and/or gasoline) in tanks. Distribution of fuel to aircraft can occur via pipelines and hydrants, fuel trucks, or drive-up/airport-fuel locations (for small general aviation airplanes). Other fuel storage locations include: the fuel load rack (two tanks of gasoline and diesel fuel), North Field (at two fixed base operators (KaiserAir and Business Jet Center). From a security perspective, this facility should not be in a highly public location and should utilize hydrant distribution (to minimize fuel truck traffic on the airfield). As a sidebar, the Kinder Morgan incident in Walnut Creek did not affect fuel distribution to OAK; however, their fuel leak near Jack London Square did. In the event of a disruption in fuel delivery by pipeline, the Airports can receive some fuel via tanker trucks and the airlines can purchase fuel at other airports.

Ground Access

Mr. Hugh Johnson introduced the discussion on ground access by referring the Committee to the Potential Ground Access Development Areas graphic and the FAA Advisory Circular (AC) No. 150/5070-6A (Airport Master Plans), Chapter 6, Requirements Analysis and Concepts Development (Section 3, Development Assessment). In this AC, the FAA does not provide abundant information on the study of ground access; however, the Port has significantly developed ground access to the terminal area and will use the proceeding criteria and goals in the development of any future sites. One primary concern in ground access planning is providing the shortest distance from the activity centers at the terminals to the parking sites (and transport between the two).

Parking Areas

Mr. Hugh Johnson reviewed the planning considerations for potential Airport parking areas (Areas 1 through 9). In this graphic (unlike earlier ones), the future terminal loop roadway is more accurately depicted. This gives a good sense of how Area 1 will expand after the roadway and curbside construction is complete.

Areas 2 and 3 would be accessed from Airport Drive. Areas 4 and 5 would be accessed from a new inbound Airport Drive "off ramp" via the Ron Cowan Parkway bridge underpass. Currently, main public access to the Airport is via the Hegenberger Road and 98th Avenue corridors. Separation of access for public and non-public use is an important planning consideration. It is desirable to pull non-airline passenger traffic from the main inbound roadway and disperse it to a non-public use roadway.

Area 6 could be accessed off Ron Cowan Parkway or Air Cargo Way, and Area 7 could be accessed off Ron Cowan Parkway. Development of an access route within Area 11 would provide a possible terminal area connection to Area 9.

Access/Runways (Only)

Mr. Hugh Johnson explained that the current roadway system (which will be under construction in the loop area in the near future) is expected to serve primary access needs to the Airport until 2010 (and possibly beyond 2010); however, as the Airport expands, it may become necessary to consider other access options for either egress from the Airport or expanding the loop roadway and parking bowl in Area 1. Area 10 ties the existing outbound roadway into the outbound roadway at the perimeter of the golf course (over viaduct or through fill). Area 10 roadway would allow for expansion of the loop roadway system and parking bowl, but would take wetlands. Area 11 would provide a new connection to Doolittle Dr., and could be for public or non-public access.
Mr. Dennis Rosucci indicated that Area 10 was an attractive option, but strongly recommended Area 11 not be considered. The Committee members unanimously agreed that Area 11 was an undesirable option.

Mr. Dennis Rosucci asked what the reasoning was behind the Area 11 concept. Ms. Kristi McKenney responded that Area 11 is based on potential improvements to Eden Road and could provide long-term subsidiary access. While it might not be suitable for public access, it could be useful non-public access (or construction access).

A Committee member commented that this seems to encourage use of Davis Street access, and given the present level of congestion, that any increase in traffic (public or non-public) would not be desirable.

Ms. Kathy Ornelas commented that for strictly non-public access this option seems extremely expensive.

BART Connector

Mr. Hugh Johnson presented the following BART Connector planning considerations:

- Constrained access corridor between outbound lanes of Airport Drive and the golf course
- At-grade alignment preferred (where possible) to minimize cost of guideway
- Airport station should serve existing and potential future terminal, and allow for potential new garage and other on-Airport facility development

A Committee member asked the purpose of the jug handle roadway. Mr. Doug Mansel responded that it was originally designed to provide an efficient route from the United Airlines Oakland Maintenance Center exit on Ron Cowan Parkway towards the City of Alameda.

Mr. Dennis Rosucci asked what the estimated time of completion was for the BART Connector. Mr. Hugh Johnson responded that the date is uncertain and depends on when the project starts, which depends on funding. In the meantime, the Port is examining all available options for and incorporating the Connector into the Port's planning. BART projects this will be a 5-year project. The development of the Airport station will be planned and designed to tie into terminal facilities built on the Airport, as will a potential garage.

Mr. Dennis Rosucci asked if the project was a joint (BART/Port) project. Ms. Kristi McKenney responded that it is (the Port is providing significant funding and is involved in acquiring funding), but that BART is the contracting agent, will be constructing it, and will be operating it.

Cargo Ferry Areas

Mr. Hugh Johnson and Mr. Ray Keiser (Port Cargo Consultant) discussed the planning considerations for two potential cargo ferry areas (Areas 12 and 13). Mr. Ray Keiser recalled that about six years ago, FedEx commissioned a team to investigate the potential for cargo ferry service at OAK using hovercraft. FedEx had previously considered such an option for transit from JFK International Airport to Wall Street. FedEx, UPS, Airborne Express and DHL were very interested but unable to agree on the location of the facility and configuration of the inside of the hovercraft. Alaska Airlines and United Airlines were also interested in using the service to transport parts for their maintenance centers at OAK, but those have since closed. After further study, it became evident that the environmental impacts would also be substantial and may be cost prohibitive. Consequently, no action has been or is being taken on this project at this time.

Wrap-up Items

Schedule Upcoming Meeting:
Thursday, June 30, 2005 (SUBJECT: Environmental/Financial Issues/Constraints)
Sign-in sheet
Web site
Transportation (parking and AirBART)

These meetings are scheduled in Terminal 1, 2nd Fl., Rear Conference Room.
This meeting was the ninth in a series of planned meetings of the Aviation Stakeholder Advisory Committee (the Committee) for the Oakland International Airport (OAK) master plan. These minutes correspond to an Agenda that was distributed at the meeting; a copy of the Agenda is provided on the master plan web site. New postings to the web site will be accompanied by email notices to Committee members. The web site address is www.oaklandairport.com/masterplan.

**Attendees:** See sign-in sheet (to be used as distribution list); a copy of the sign-in sheet is provided on the master plan web site.

**Handouts:**
- Agenda
- “Protecting the Bay Area’s Aviation Resources – The Land Use Connection” (Regional Airport Planning Committee)
- Aircraft Noise graphics (9 pages)
- Aircraft Noise Management Program
- Alameda Quarterly Reports Compliance Summary
- North Field Noise Management Program pilot brochure
- Other Environmental Programs graphics (2 pages)
- Master Plan Preliminary Environmental Screening Matrix
- Overview of Airport Finances
- Potential Funding Sources Matrix – Sample Master Plan Projects
- Master Plan Preliminary Financial Plan – 100% Bonding of PFC Revenues

Following introductions, Mr. Doug Mansel, Master Plan Project Manager, distributed the minutes from the two previous meetings, agenda, and reviewed the items requested by Committee members from the previous meeting (see second agenda item below).

**Agenda Item:**
Approval of meeting minutes from March 31, 2005 and April 21, 2005

Mr. David Needle (Dave, City of Alameda community representative) requested that the March 31, 2005 minutes be amended to indicate he represents the City of Alameda.

**Follow-up items from the last meeting and open forum**

Mr. Doug Mansel invited comments about airfield issues/solutions, potential terminal development concepts, air cargo forecasts, and general aviation (GA) forecasts and passed out a brochure entitled "Protecting the Bay Area's Aviation Resources – The Land Use Connection."
“Protecting the Bay Area’s Aviation Resources – The Land Use Connection” prepared by the Regional Airport Planning Committee (RAPC).

Dave expressed appreciation for the competency of the ATAC team and a level of comfort with ATAC simulation methods and model (Simmod PRO). Dennis Rosucci (City of San Leandro community representative) and Mr. François Gallo (San Leandro Unified School District community representative) concurred.

Mr. Doug Mansel indicated that the FAA is updating Advisory Circular (AC) No. 150/5070-6A on Airport Master Plans, and is renaming it AC No. 150/5070-6B (the draft version of the update is available at www.faa.gov/agp/publications/ac150/ac150.htm). Mr. Doug Mansel encouraged Committee members to download the updated AC and make any comments to the FAA. The Port has already submitted its comments through Airports Council International-North America (ACI-NA).

A Committee member asked if there was a deadline to submit comments on the AC. Mr. Doug Mansel replied that the deadline may have passed, but encouraged Committee members to provide any comments, as federal deadlines are often extended and the FAA may still consider the comments.

A Committee member asked if the Committee should adopt FAA AC No. 150/5070-6B for this effort. Mr. Doug Mansel replied that per the settlement agreements, the Port will continue to follow FAA AC No. 150/5070-6A, but that in assessing and commenting on the draft version of 6B, the process that we are following for this master plan closely mirrors what is recommended in 6B. In fact, the public outreach process described in 6B is essentially the Stakeholder Advisory Committee process that we have established here. It is also unclear whether the FAA will officially adopt 6B prior to the completion of this master plan.

In reference to the RAPC brochure, Mr. Dennis Rosucci asked where the statistics listed on page two originated. Ms. Kristi McKenney, Aviation Planning Manager, responded that the references can be found on the RAPC website (www.rapc.ca.gov) and was probably generated from a study done by the Bay Area Economic Forum on the three Bay Area airports a few years ago. Each airport and their counties typically compile this data.

Environmental issues

Mr. Doug Mansel introduced the discussion on environmental issues by referring the Committee to the FAA AC No. 150/5070-6A, Airport Master Plans, Chapter 8 (Environmental Procedures and Analysis), which provides planning guidance and discusses environmental screening for master plans.

The Port recognizes the importance of including environmental planning at the earliest stages of physical planning. Because the master plan is a high-level land-use planning study, it will contain commensurate environmental screening-level analyses. Detailed environmental review in accordance with the California Environmental Quality Act (CEQA) and/or the National Environmental Policy Act (NEPA, for Federal actions) on projects or groups of related master plan projects will commence as projects are proposed and become defined. The Board of Port Commissioners will adopt the master plan, but that action will not approve, fund, construct, etc. any of the projects studied in the master plan. In accordance with settlement agreements, the master plan is a planning and feasibility study that is exempt from CEQA.

Mr. Dennis Rosucci asked if Mr. Doug Mansel was referring to the Berkeley and Alameda settlement agreements, as he was not aware of such an agreement with the City of San Leandro. Mr. Kristi McKenney recalled that there was no discussion of the master plan in the first settlement agreement with San Leandro, but that there was an amendment for San Leandro to be included in the master plan process and bound by the same terms as the Berkeley and Alameda settlement agreements.

Mr. Francois Gallo indicated that his read of the AC suggested that the Port was not exempt from NEPA requirements and asked for a reference in the AC that would clarify this. Mr. Doug Mansel responded that the Port had agendized discussing environmental issues today and that it was possible to do environmental planning at the master plan (screening) level without doing a CEQA/NEPA document. Mr. Danny Wan (Port Attorney’s Office) added that if FAA approval of a new Airport Layout Plan (ALP) is sought, a NEPA process would be required, but that the Port does not intend to seek FAA approval of a new ALP as this time and that the master plan is strictly a planning instrument and does not require this. As with CEQA, as projects or groups of related projects become more defined and a federal action is requested (e.g., approving an ALP), environmental review under NEPA will be undertaken.

Aircraft Noise

The Aircraft Noise graphics (9 pages) were passed out and Mr. Vince Mestre (Port Acoustical Engineer Consultant) introduced the topic by providing background information on aircraft noise, Federal Aviation Administration Part 150 Noise and Land Use Guidelines, the Airport Noise and Capacity Act (and its limitations), existing aircraft noise abatement procedures, public outreach, and mitigations. Mr. Vince Mestre then described contours for single-event aircraft noise, including the number of departures and arrivals by time period (day, evening, and night) for existing conditions and anticipated 2010 master plan operations forecasts. Mr. Mestre also described Community Noise Equivalent Level (CNEL) contours for existing conditions and anticipated 2010 master plan operations forecasts. CNEL contours are a time-weighted cumulative noise metric.

Sound and Noise

Sound is defined in terms of loudness (amplitude) and frequency (pitch). Noise is commonly defined as unwanted sound, which is subjective and objective. Sound pressure or amplitude is measured in decibels (dB). The range of sound pressures (loudness) that occur in the environment is so large that it is convenient to measure them on a logarithmic scale.

The normal hearing range of adolescents is between 20 and 20,000 hertz (pitch) and drops to 16,000 as we grow older. Community noise typically ranges from 50 to 50,000 hertz. Transportation noise tends to be between 500 and 1000 hertz. Jet aircraft are being designed to be quieter by 1) slowing down the velocity of air coming out of the engine, 2) reducing the turbo machinery noise, and 3) cleaning up aircraft to reduce aerodynamic noise (e.g., Boeing's wind tunnel studies have shown that cleaning up the undercarriage would result in a reduction of 5db in approach noise).

In a normal atmosphere (where temperature decreases with altitude), sound decreases with distance. In a temperature inversion, sound increases. Fog by itself has no significant affect on the propagation of sound, but it does tend to influence transport (e.g., automobilis) velocity, which when reduced dramatically reduces the amount of ambient noise levels, which can cause other noises to become more pronounced. Mr. Vince Mestre directed the Committee to the graphic depicting three rows of houses to illustrate the concept of shielding. In the graph, the first row of houses shields the second and the second the third. However, the houses are facing water, and because sound propagates more over water than it does over land, sound or noise increases for structures near water (e.g., residents near the San Leandro Marina). The other factor to consider are structures built on hillocks: with line of sight, no shielding occurs.

Single-event noise is expressed in terms of the Sound Exposure Level (SEL), which incorporates both duration and maximum sound level. The SEL of typical aircraft would about 100 db, which is about

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quieter and therefore will likely not overtake current or future 2010 noise contour levels.

(beyond 2010) will exceed the 2010 noise contours, given the uncertainty of future fleet mix and

time of day. In computing CNEL, one aircraft operation during the day is treated as one operation; one operation during the evening (7 to 10 PM) is treated as if it were 3 operations; and one operation during the night (10 PM to 7 AM) is treated as if it were 10 operations. Logarithmically, these multipliers are the equivalent to adding 10 dB to the noise level of each night operation and about 5 dB to the noise level of each evening operation.

The FAA and EPA use Day-Night Average Sound Level, or DNL, which is similar to CNEL, except that it does not “penalize” aircraft during the evening hours.

For any 65 decibel areas away from major sources of noise, ambient noise levels are somewhere between 55 and 60 CNEL (and usually come from local motor vehicle traffic). This decreases as you move into rural areas. Primary factors (loudness, frequency, and duration of sound), secondary (spectral complexity), and psychological factors define how people are annoyed by noise. In the 1930s, Theodore Schultz studied people's reported noise annoyance level to their noise exposure. This became the Schultz curve. The Shultz curve (as modified and updated over the years) breaks at about 65 CNEL. The FAA's standard for excessive noise annoyance is 65 CNEL.

There have been several studies of sleep pattern response to noise. During Sandy Fidel's study in Los Angeles, people generally reported their sleep being disturbed only by an aircraft flyover that turned out to be an aircraft flying in an unusual direction (i.e., the aircraft noise was coming from an unexpected location). “Regular” aircraft noise (at the same loudness) did not seem to disturb people sleeping as much. The theory is that our subconscious alerts us to unusual events, even while we are sleeping, and we are habituated to sleeping under “normal” noise exposure.

In 1990, Congress passed the Airport Noise and Capacity Act (ANCA) in an attempt to balance aviation industry needs against community needs. Louder Stage II aircraft greater than 75,000 lbs. are not permitted after 2000 (unless they are equipped with hushkits). In exchange, airport access restrictions are not permitted without a Part 161 study, except for those airports that had restrictions prior to 1990. John Wayne Airport (Orange County) Torrance Municipal Airport, and Santa Monica Airport have rules prohibiting Stage II aircraft. For corporate jets (less than 75,000 lbs.), there are more Stage I and I aircraft on the east coast than the west coast. A Part 161 study would not yield any relief at Oakland because the required cost-benefit analysis only considers impacts inside of the 65 CNEL contour. Largely due to the exceptions for aircraft less than 75,000 lbs. and hushkits, a legislative change would be required to achieve the balance sought in 1990.

Aircraft Noise Management Program

Mr. Vince Mestre introduced the discussion on the Airport's Aircraft Noise Management Program and passed out the Aircraft Noise Management Program handbook. Noise management measures consist of aircraft engine run-up restrictions, ground run-up enclosure (GRE), runway signage for noise abatement, and the aircraft noise monitoring system. The Port provides detailed quarterly reports on compliance with aircraft noise abatement procedures (e.g., Quiet Hours Program, VFR aircraft flight departures, noise levels, and noise aircraft levels, and North Field training patterns). Noise reports are provided to the Cities of Alameda and San Leandro, CLASS, and KIJO, and are available on the Airport's website. The Port also provides California airport noise regulations reports quarterly which are available on the Airport's website.

The general policy of the North Field Program dictates that aircraft avoid flying over nearby residential areas when arriving or departing the Airport. Day and night procedures restrict certain aircraft from departing Runways 27R/L or landing on Runways 9R/L, except during emergencies, and dictate that helicopters avoid flying over hotels and residential areas. Local helicopter flight training patterns (e.g., touch-and-go operations) generally occur within the Airport boundaries or the commercial/industrial periphery of the Airport. Some aircraft flight training activities (e.g., instrument operations or instrument training flights, even in good weather) require straight out departures from North Field over Alameda.

Community Outreach and Public Participation

Community outreach and public participation consists of the Oakland Airport-Community Noise Management Forum (including its North Field and South Field Research Groups), Board of Port Commissioners Aviation Committee meetings; a pilot brochure (North Field Noise Management Program); and noise management program website (including flight replay program).

Community Land Use Measures

Community Land Use Measures include: noise and avigation easements (Cities of Alameda and San Leandro); development limits, zoning/land use controls; City of San Leandro general plan; and City of Alameda general plan.

Noise Reduction Programs, Studies and Other Commitments

Noise reduction programs, studies and other commitments include: residential sound insulation program (SP) – Cities of Alameda and San Leandro; school sound insulation program – City of San Leandro; San Leandro sound studies; crosswind runway alignment study; airport tenant orientation program; general aviation VFR aircraft study; preferential runway use agreement for San Leandro; no new runway construction or expansion on North Field; on-going noise abatement work with the FAA; the 20-year master plan; Runway 11/29 length agreement; meet and confer agreement; USFS facilities agreement; and additional noise monitors agreement.

Mr. Red Wetherill (City of Alameda community representative) asked if there were any studies of low frequency annoyance. Mr. Vince Mestre responded that Penn State had done a low frequency study.

Noise Contours

There were eight daily Boeing 727 departures in 2004, four during the night (from 10 PM to 7 AM). The Port predicts there will be three total and two during the night in 2010. This decline is a result of the need to phase out the smaller (and noisier) Boeing 727 and phase larger aircraft to accommodate the projected increase in cargo weight (0.7 million annual tons now, going to 0.9 million annual tons in 2010) and rising fuel prices, which are driving airlines to retire less fuel efficient aircraft, like the Boeing 727.

Mr. Dennis Rosucci asked if there was a way to determine the ratio between aircraft operations and noise contours and how much the noise contours will change as older aircraft are replaced by newer aircraft. Ms. Kristi McKenney replied that it is difficult to predict if and when future noise contours (beyond 2010) will exceed the 2010 noise contours, given the uncertainty of future fleet mix and improvements in engine technology and development. Mr. Vince Mestre added that a sensitivity study could be conducted, but that new “greener” aircraft (e.g., the Boeing 787) will be much quieter and therefore will likely not overtake current or future 2010 noise contour levels.
Mr. Dennis Rosucci commented that the CNEL does not appear to adequately capture the problem Scots Landing residents are having on Neptune Drive between 12 AM and 6 AM. Ms. Kristi McKenney concurred and indicated that the Port has prepared other metrics, such as Single Event Noise Contours, which taken together with CNEL may address this problem more adequately.

Ms. Carmen Fewless asked if there would be an opportunity for the community to request that any increases in cargo aircraft operations occur during the day. Ms. Kristi McKenney responded that the Port or surrounding cities could make this request, but that the Port has no control over private airline operations. For example, the Port has a standing request with FedEx to reduce the number of nighttime Boeing 727 operations, but FedEx has declined to commit to a phase-out date.

Ms. Kathy Ornelas (City of San Leandro staff representative) commented that she had never heard the term “green aircraft” before and asked when they would be available. Mr. Vince Mestre responded that “green aircraft” are the next generation of aircraft by the American Institute of Aeronautics and Astronautics and represent a standard the aviation industry (mostly in Europe) is striving for. They are being designed to reduce greenhouse gas emissions, toxic pollutants, and reduce noise and will not be available until sometime beyond 2010.

Other Environmental Programs

Ms. Renee Dowlin, Airport Environmental Planner, passed out the Other Environmental Programs graphic and reviewed the programs depicted therein, which consist of air quality programs; wetlands management program; water quality program; burrowing owl mitigation program; recycling programs; Terminal 2 extension – Leadership in Energy and Environmental Design (LEED) Certified, and public access. In August, the Port will host the aircraft emissions study with the FAA’s center of excellence, NASA, EPA, CARB, and a local university in which three Southwest Airlines aircraft engines will be tested to determine the quality of aircraft engine emissions. The Airport website is being updated to provide basic information on the various airport environmental programs.

Master Plan Environmental Screening

Mr. Doug Mansel passed out the Master Plan Preliminary Environmental Screening Matrix which is broken into two parts (1) site planning considerations for all potential development areas and (2) operational planning considerations (irrespective of potential facility development). The table shows potential environmental benefits and constraints by comparing existing conditions to future proposed development areas. In general, environmental issues (e.g., wetlands and wildlife) would be deemed a potential environmental constraint. In general, existing “built-up” areas might have soil contamination issues (i.e., hazardous materials). In general, any new potential development area that requires new paving would be deemed a potential environmental constraint from a hydrology and water quality perspective. Finally, North Field has some historic areas, so there might be an environmental constraint from an aesthetics perspective for potential development areas at North Field. Mr. Doug Mansel indicated that the master plan documentation will explain the table and comparisons in more detail and encouraged the Committee to review and challenge any of the assessments in the matrix.

The Master Plan Preliminary Environmental Matrix shows Aircraft Noise broken down by (1) CNEL and (2) SEL/SENL. Passenger aircraft operations for CNEL are deemed of no potential environmental benefit or constraint, but are a potential environmental constraint for SEL/SENL (due to the anticipated increase in operations). Air cargo for CNEL is deemed to have an environmental benefit (due to the anticipated retirement of the hushkitted Boeing 727). GA for SEL/SENL is a potential environmental constraint (due to the anticipated increase in operations). Air cargo for CNEL is deemed a potential environmental constraint in every category except general aviation, which does not generate much traffic on local roadways.

Mr. Dennis Rosucci asked if there was a connection between the Port’s remarks about the environmental impact of transportation/traffic and air quality. Ms. Kristi McKenney explained that other mitigating factors (e.g., the progressively more eco-friendly auto emissions legislation in California) may counteract the assumption that more traffic equals more emissions.

Ms. Debbie Pollart (San Leandro staff representative) asked what the assumptions for determining the criteria (e.g., aesthetic) were. Mr. Doug Mansel responded that more explanation will occur in the master plan document (this matrix is really a summary of the discussion that will occur in the master plan document).

Environmental Projects

Mr. Doug Mansel invited the Committee to recommend potential environmental projects.

Ms. Barbara Tuleja (CLASS community representative) expressed concern that impact on air quality for surrounding communities of aircraft emissions has not been sufficiently addressed (except for the study done in Seattle on aircraft emissions and brain cancer). Ms. Kristi McKenney responded that the Airport was one of the first airports to do an exhaustive study, which included a health-risk assessment in the Port’s last environmental document. Hazardous air pollutants emitted at an airport are consistent with those emitted by transportation at-large and that what needs to be determined are what air pollutants (e.g., chemical compounds) correlate to cancer and then what other industries/activity centers produce them the most.

Ms. Laurel Impett (CLASS staff representative) agrees with Ms. Barbara Tuleja that the health-risk assessment (for cancer and non-cancer-related health risks) supplement to the SERI needs to be updated. Ms. Kristi McKenney responded that the Port’s health-risk assessment was thorough (in that it was based on a 2010 activity-level forecast that is far beyond what is likely to be achieved or is projected in this master plan).

Ms. Kathy Ornelas suggested reviewing a noise barrier wall. Port staff agreed to include it in the master plan and agendize it for the next meeting.

Mr. Dennis Rosucci handed out a letter with five questions about aircraft noise, a potential noise barrier wall, and traffic impacts.

Financial Issues

Mr. Doug Mansel passed out the Overview of Airport Finances (which is available on the master plan document). OAK is owned and operated by the Port of Oakland an “independent department” of the City of Oakland. Each airline serving OAK operates under a 10-year Aircraft Operating Agreement that is cancelable by either party on 30 days written notice; this policy is slightly unusual in the aviation industry, but is becoming more common. A couple of years ago, when airports had longer leases (typically 20 or 30 years), the airlines had veto power over an airport’s operating budget and capital improvement programs (called Minority-in-interest clauses). This is not the case at OAK, and the Port retains considerable control over the Airport’s facilities within the bounds of federal regulations and requirements. Under the Agreement, the airlines must pay various rates and charges established by the Board of Port Commissioners by Ordinance (Port Ordinance No. 3634, as amended). Airlines with a certain number of daily flights are assigned one or more operational planning considerations (irrespective of potential facility development). The table shows potential environmental benefits and constraints by comparing existing conditions to future potential proposed development area conditions. In general, encroachment on wetlands and wildlife (e.g., burrowing owl areas) would be deemed a potential environmental constraint. In general, existing “built-up” areas might have soil contamination issues (i.e., hazardous materials). In general, any new potential development area that requires new paving would be deemed a potential environmental constraint from a hydrology and water quality perspective. Finally, North Field has some historic areas, so there might be an environmental constraint from an aesthetics perspective for potential development areas at North Field. Mr. Doug Mansel indicated that the master plan documentation will explain the table and comparisons in more detail and encouraged the Committee to review and challenge any of the assessments in the matrix.

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Like most governmental agencies, the Port has an operating budget and capital improvement program. Operating revenues and expenses are collected in seven cost centers. There are two types, residual cost centers and compensatory cost centers. In a residual cost center, the airlines are a part of the cost center and pay the Port for any operating costs incurred minus any non-airline revenue. Rates and charges are based on the expenses incurred in the previous fiscal year. For example, calendar year 2005 airline rates and charges are based on fiscal year 2004 (July 1, 2004 through June 30, 2004) audited data. Terminal, Airfield and Fueling are residual cost centers. IAB, Ground Access and Parking, Leased Area / Cargo / OMC Hangar, and North Field are compensatory cost centers. The largest compensatory cost center is Ground Access and Parking. Table 4 in the paper presents the calculation of airline cost per enplaned passenger, which is approximately $4.79 at OAK and between $3 and $15 nationwide. The Port follows Generally Accepted Accounting Principles (GAAP) and Government Accounting Standards Board (GASB) regulations for audits of its financial statements as well as the FAA regulations of airline rates and charges. The Port agrees to grant assurances on airport revenues. The FAA ensures compliance by (1) airport self-certification (i.e., in grant applications), (2) audits, and (3) third party complaints.

The Port maintains a Capital Improvement Program (CIP), which is partially funded by Airport Improvement Program (AIP) grants from the Airport and Airway Trust Fund. AIP grants are either entitlement or discretionary. Entitlement funds are awarded based on the number of enplaning passengers and cargo tonnage. Discretionary funds are intended for high priority national airport system needs. The Port's CIP for the Airport is also funded using Passenger Facility Charges (PFCs). PFCs of $3 to $4.50 per enplaning passenger can be imposed for a project that (1) preserves or enhances capacity, safety, or security, (2) reduces noise or mitigates noise impacts, or (3) enhances airline competition. Customer Facility Charges (CFCs) can be used to fund rental car projects. The Port can use debt (short-term debt and long-term) to finance capital projects, including revenue bonds and short-term debt, such as commercial paper. The Port may also elect to use tenant or third party financing for capital projects. For example, the Port might lease a parcel at the Airport to a tenant to construct a hangar or cargo facility. The Port can also use cash (internally generated revenues) to undertake capital projects.

Mr. Doug Mansel directed the Committee to the Potential Funding Sources Matrix – Sample Master Plan Projects table, which simply indicates potential funding sources for a sample of potential master plan projects.

Ms. Anne Henny, Aviation Capital Programs, directed the Committee to the Master Plan Preliminary Financial Plan – 100% Bonding of PFC Revenue table which is organized by project summary, revenue summary, and debt capacity summary. The project summary shows the rough order of magnitude cost estimates for a new terminal, new high-speed exit taxiway, and Runway 29 access taxiway improvements. (A new hypothetical runway is presented for comparison purposes only.) The aforementioned projects are sample projects, which can be changed, as could the timing, scope, cost estimates, etc. This is a tentatively/primary list. The analysts are simplified as it does not take into account all future revenue and Port-wide debt. Primary sources of revenue include: PFCs (bonded), potential airline rates and charges increment (above what they pay today and normal increases) and potential AIP grant funds. The terminal complex, new high-speed exit taxiway, and Runway 29 access improvements appear financially feasible based on the assumptions in the Port's preliminary analysis because net debt service in each year is less than or equal to the Bond Debt Service Revenue Constraint in each year.

Wrap-up Items

Schedule Upcoming Meetings: Thursday, August 11, 2005 (SUBJECT: Airport Land Use Map)
Sign-in sheet
Web site

Transportation (parking and AirBART)
These meetings are scheduled in Terminal 1, 2nd Fl., Rear Conference Room.
This meeting was the ninth in a series of planned meetings of the Aviation Stakeholder Advisory Committee (the Committee) for the Oakland International Airport (OAK) master plan. These minutes correspond to an Agenda that was distributed at the meeting: a copy of the Agenda is provided on the master plan web site. New postings to the web site will be accompanied by email notices to Committee members. The web site address is www.oaklandairport.com/masterplan.

Attendees: See sign-in sheet (to be used as distribution list); a copy of the sign-in sheet is provided on the master plan web site.

Handouts:
- Agenda
- Environmental Considerations in the Master Plan (July 2005)
- Potential Takeoff Noise Barrier graphic
- Existing Land-Use Map (updated)
- Near-Term Land-Use Map (2010-2012)
- Long-Term Land-Use Map (2025)

Following introductions, Mr. Doug Mansel, Master Plan Project Manager, distributed the minutes from the June 30, 2005, meeting, agenda, and reviewed the items requested by Committee members from the previous meeting (see second agenda item below).

Agenda Item:
Approval of meeting minutes from June 30, 2005

Ms. Carole Wedl (Noise Abatement) asked that Renee Ananda be changed to Renee Dowlin on page 6. Port staff agreed to make the change.

Follow-up items from the last meeting and open forum

Mr. Doug Mansel invited comments about air cargo forecasts, potential air cargo development areas, general aviation forecasts, potential development areas, airfield issues/solutions, environmental issues/benefits/constraints/projects, and financial issues/constraints. Ms. Debbie Pollart (City of San Leandro staff representative) asked about the FedEx expansion reported on www.sfgate.com (also in the S.F. Chronicle). Ms. Kristi McKenney, Aviation Planning Manager, responded that the article referred to a solar panel project recently installed by FedEx, as well as projects previously approved through the Airport Development Program (ADP). Mr. Andrew
Thomas (City of Alameda staff representative) asked where he could find more information on the FedEx solar panel project. Ms. Kristi McKenney directed Mr. Thomas to contact Renee Dowlin (Airport environmental planner). Ms. Carole Wedl offered to provide a fact sheet produced by FedEx and the Board of Port Commissioners.

Mr. Doug Mansel passed out the report “Environmental Considerations in the Master Plan” (previously posted to the web site). This report provides an overview of environmental planning efforts the Port is undertaking as part of the master plan process for OAK. It also describes how the master plan complies with the FAA Advisory Circular on master plans (relative to environmental review), as well as the master plans relationship to the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Mr. Andrew Thomas expressed concern that eliminating the master plan from CEQA review because it is a feasibility study would restrict the Port’s ability to use it to environmentally clear future projects. Ms. Kristi McKenney responded that the master plan for OAK is a planning and feasibility document and as such it fulfills the original intent of the master plan as defined in various settlement agreements. Mr. Dennis Rosucci (City of San Leandro community representative) asked if it would be possible to continue the process of environmental discussion with the Port for future projects. Ms. Kristi McKenney responded that having community involvement in this process has been very beneficial and that depending on the time, nature and legal constraints of a potential project, the Port would like to continue to have community input in some format. Dave (City of Alameda community representative) added that it would be helpful not to wait until an environmental document is produced or a project becomes a Board of Port Commissioners’ agenda item, and suggested that the Port notify a short-list of community representatives when this happens.

Mr. Francois Gallo (San Leandro Unified School District community representative) asked if the Port used anti-icing agents. Mr. Doug Mansel replied that occasionally de-icing agents are used at OAK. Mr. Richard Linkoff added that the Port’s Department of Environment and Safety was responsible for overseeing aircraft de-icing operations. Mr. Francois Gallo asked what steps were being taken to protect existing noise abatement procedures and expressed concern that current helicopter procedures might compromise residential protection. Port staff replied that changes to noise abatement procedures were not anticipated as a result of the master plan and that compliance with the master plan would require local government agencies to be involved in any changes to noise procedures. Ms. Kathy Ornelas (City of Alameda community representative) suggested it might be useful to include a statement of the Port’s intent to monitor noise abatement procedure compliance.

Potential environmental project: sound wall

Mr. Doug Mansel passed out the potential takeoff noise barrier hand-out. Mr. Vince Mestre (acoustical engineer) introduced the discussion on sound walls. The graphic shows three columns depicting (1) a noise barrier (on Airport property near the end of Runway 29) for pre-takeoff engine runup and start of ground roll, (2) a noise barrier (located along the backyard of homes on Neptune Drive in San Leandro) near the receiver, and (3) a transparent barrier concept. Noise barriers must break “line of sight” between source and receiver (in this instance, they would need to be 15 feet or higher, are good for high frequency noise (but poor for low frequency noise), and are most effective close to the source or the receiver. The first option (a noise barrier on Airport) is not a typical application of a barrier and has only been tried at LAX and Long Island. The difficulty with building a noise barrier on Airport property (i.e. the runway) is the Object Free Area required by the Federal Aviation Administration (FAA). This option has significant flanking around the south end of the runways that would not provide the desired noise reduction. The second option (a noise barrier along the back of the homes along Neptune Drive) only benefits homes that front San Francisco Bay (this excludes homes across Neptune Drive). Option two would require approval from the San Francisco Bay Conservation Development Commission which, given the inconsistency of a sound wall with their objectives, might be difficult to achieve. Option two could provide SBDA noise reduction (excluding low frequency noise). (SEE UPDATED ANALYSES IN MASTER PLAN.) To reduce low frequency noise, the sound wall would have to be 30 feet or more high. The third column shows (1) a third hypothetical option, the transparent barrier concept (which would need to be 15 feet high), (2) an existing 12 foot high barrier in Mission Viejo, California and (3) a 20 year old Lexan noise barrier in Newport Beach. The Lexan barrier shows the effect of barrier wearaging (i.e., frosting). Mr. Francois Gallo asked what could be done to protect a Lexan noise barrier. Mr. Vince Mestre responded that they must be cleaned and shined regularly. Dave asked how useful a mile-long, 300 foot noise barrier would be. Mr. Vince Mestre responded that given that a 70 to 80 foot noise barrier would produce 20 DBA noise reduction, a 300 foot noise barrier would be extremely useful. Mr. Dennis Rosucci asked if noise cancellation technology (an indoor sound barrier) was an option. Mr. Vince Mestre responded that the technology (like some Bose headphones that measure outside noise levels and create equal/opposite noise amplitudes) was not yet available for large scale applications. Ms. Kathy Ornelas asked what the cost would be for an airport or landside noise barrier. Mr. Vince Mestre replied that the rough estimate was $1 million/mile (not including habitat restoration, etc.). (ACTUAL COSTS ARE LIKELY TO BE CONSIDERABLY MORE.) Mr. Dennis Rosucci added that unless a specific environmental project was under consideration, the Committee could not provide specific environmental recommendations.

Mr. Andrew Thomas asked if, in light of likely increased traffic through the City of Alameda, there could be a traffic monitoring program. Ms. Kristi McKenney responded that the Port did an environmental review on the ADP and will continue to do them as required by CEQA and NEPA, and that the Port did commit to fund a portion of Airport traffic impacted intersection improvements in the City of Alameda. Ms. Kathy Ornelas commented that there will be a Request for Proposals (RFP) to develop 15,000 feet of Eden Road. Dave commented that the City of Alameda’s analysis of the ADP revealed that there was in many cases no options for mitigating traffic impacts, but that Alameda County had the option of prohibiting trucks from driving on bridges and proposed that the Port could make a recommendation to the County to implement this option where traffic congestion is severe. Ms. Kristi McKenney rejoined that traffic mitigation is not in the Port’s jurisdiction. Local government agencies are responsible for deciding on improvements to intersections; the Port can only provide a portion of improvements as mitigation under CEQA and/or NEPA. Mr. Red Wetherell (City of Alameda community representative) commented that urban studies have historically shown that easing congestion at intersections only increases that traffic flow and in fact increases it and that concentrating on the 98th Avenue corridor would be a more efficacious strategy for possible traffic mitigation. He also commented that possible future car facilities should be relocated back to South Field. Port staff responded that all rental car and Airport signage relates to the 98th Avenue and Hegenberger Road arteries, to direct traffic through these corridors and away from Alameda and San Leandro and that in the long term the Port would also like to move the rental cars to South Field. Port staff indicated that they would be willing to work with the cities of Alameda and San Leandro on a traffic monitoring study.

Draft Land-Use Plans

Mr. Doug Mansel passed out the existing land-use map. The existing land-use map, updated since June 2004, now shows (1) the addition of wetlands, (2) the Alaska Airlines maintenance hangar which is now vacant, as undesignated land uses, and (3) the swap in land use at South Field (cargo vs. passenger facilities) where UPS aircraft parking is now RGN aircraft parking and visa versa. Mr. Doug Mansel passed out the near-term land-use map which predicts future airport land uses in the 2010 to 2012 timeframe at OAK. Because the master plan is conceptual in nature, the Port may not actually propose any of the uses depicted in the graphic. (SEE UPDATED ANALYSES IN MASTER PLAN.) Whether any land use will be proposed is subject to a number of factors, including market conditions, availability of funding, environmental constraints, etc. When used on the map, the land-use categories indicate changes from the previous land-use map (in the case of the near-term map, changes since existing conditions). The near-term map shows potential terminal development in “Area 2” (east of Taxiway B, west of the existing terminal area, and north of
Taxiway T). It shows replacement passenger facilities (RON aircraft parking), replacement air cargo, and airline related support facilities (e.g., airline provisioning facilities and/or Ground Service Equipment maintenance facilities) north of “Area 2” and south of Ron Cowan Parkway. The map shows PF west of Taxiway B, just south of Ron Cowan Parkway for potential future RON aircraft parking. It also shows PF (in this case, economy passenger and/or employee parking) in the upland area of the Central Basin (off Ron Cowan Parkway). The map also shows potential taxiway improvements as follows: (1) new taxiway parallel to Taxiway B between Taxiways R2 and T (approx.), (2) new high-speed taxiway exit from Runway 29, and (3) improved access to Runway 29 (parallel to Taxiways U and W). Finally, the map shows some potential general aviation (GA) development at North Field near Runway 15-33. The former Alaska Airlines maintenance hangar could be developed into a maintenance base for another airline (ARS), or converted into general aviation hangars (GA), or a small cargo facility (C).

The 2025 land-use map shows only a few changes from the 2010-2012 version. Passenger facilities (PF) are projected to expand just a little around the perimeter of the existing passenger facilities to accommodate modest growth in RON aircraft parking and passenger/employee vehicle parking. After 2010 but by 2025, it is anticipated that FedEx would need to expand their facility further north (toward Ron Cowan Parkway), primarily for aircraft and truck parking. Finally, some additional GA is shown at North Field, and a small expansion of passenger or employee parking (PF) in the Central Basin may also be required by 2025 timeframe.

Mr. Andrew Thomas asked if the master plan would discuss projected acres of land-use for parking for 2010 and 2025. Mr. Doug Mansel replied that the Port has already done area projections for terminals, RON aircraft parking, general aviation (GA), and hangars, but does not intend to provide detailed calculations for parking. Mr. Red Wetherill commented on the importance of the time necessary to travel to and from passenger parking in planning considerations and asked why planning seemed to be focused exclusively on Doolittle Drive and Ron Cowan Parkway when the golf course seems like a good option for additional vehicle parking.

Mr. Kristi McKenney responded that the golf course (Metropolitan Golf Links) is leased for another 60+ years, which places it outside of the timeframe of the master plan.

Mr. Dennis Rosucci asked if Stage IV aircraft might be available by 2025. Mr. Vince Mestre responded that all aircraft manufactured today meet Stage IV noise requirements, and almost all aircraft flying out of OAK today meet Stage IV noise requirements (except the hushlaid 727, which are legally Stage III). Mr. Dennis Rosucci commented that in order to see a significant noise reduction, aircraft would need to be upgraded to Stage V noise requirements. Mr. Vince Mestre concurred and indicated that the aircraft industry has a design goal of a 15dbA or greater noise reduction than the Stage IV requirement. Mr. Dennis Rosucci asked if it were possible that by 2025, 50% of the aircraft fleet would be at Stage V. Mr. Vince Mestre responded that by 2025 all airplanes currently 15 years or older will likely be retired; therefore, aircraft that meet current manufacturing standards (which are Stage IV or better) will be the only aircraft in use. In addition, international regulations, which are rapidly advancing towards the “green airplane,” will force domestic aircraft manufacturers to build aircraft that exceed domestic requirements much sooner. In terms of economics, airlines with fuel-efficient fleets are doing better, but it remains difficult to say when the older, noisier aircraft will be retired.

Mr. Doug Mansel stated that the next step would be writing the master plan and asked the Committee to provide any remaining comments by the end of the month. Dave asked if the changes to taxiways to Runway 29 involved wetlands encroachment and if the Port anticipated a serious problem funding these developments. Mr. Doug Mansel responded that both Runway 29 taxiway improvements take wetlands, which will always be costly, and that some elements may be eliminated due to cost. Dave asked for financial considerations to be included in the master plan. Port staff agreed to include them in the master plan.

Update on Runway Safety Area (RSA) studies

Mr. Doug Mansel passed around the RSA studies handout. The Federal Aviation Administration (FAA) has established the Runway Safety Area Program, which requires RSAs at all airports certified under Code 14 of Federal Regulations (CFR) Part 139, including OAK, to meet current FAA standards for RSAs. The FAA seeks to ensure aircraft land safety and to prevent aircraft damage from occurring in the event of an over run (exclusion). All of the RSAs at OAK are deficient in some way. Improvement of sub-standard RSAs is a national, high-priority goal for the FAA. The FAA has requested the Port of Oakland conduct RSA studies to identify and investigate practicable solutions to bring sub-standard RSAs at OAK into compliance with current FAA RSA standards. Possible solutions to correct and/or improve sub-standard RSAs are summarized below. These possible solutions are presented in the order of most preferred to least preferred from the perspective of the FAA, as outlined in FAA Orders 5200 and 5200.9. That is, if the most preferred solution is not practicable (e.g., financially, environmentally, etc.), then the next solution on the list is the most preferred; if this solution is not practicable, then the process continues down the list of possible solutions until a practicable solution is achieved. The possible solutions are:

1) Create standard RSAs (create an earth platform in San Francisco Bay, relocate runways, fill wetlands, where necessary, etc.)
2) Create standard RSAs by shifting runways (and fill wetlands, where necessary)
3) Install standard Engineered Materials Arresting System (EMAS) (and fill wetlands, where necessary)
4) Install non-standard EMAS (and fill wetlands, where necessary)
5) Displace runway thresholds and implement declared distances
6) Maximize existing RSAs not meeting full dimensional standards (eliminate non-complying items, such as wetlands, where necessary, but do not relocate runways, etc.)

Based on the Port and URS’ evaluations of potential solutions for each new runway at OAK which encompassed economic, planning, environmental, stakeholder, construction, maintenance, and other criteria, the Port and URS recommended that the following are the most practicable solutions for correcting and/or improving sub-standard RSAs at OAK:

1) Install non-standard EMAS (and fill wetlands, where necessary) in the approach to Runway 29
2) Maximize existing RSAs (fill wetlands, where necessary, grade, and treat soft soils) around Runway 9R-27L and Runway 9L-27R
3) Create standard RSAs by shifting Runway 15-33

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Wrap-up Items

The Port official of the Aviation Committee of the Board of Port Commissioners explained that port funds for the Oakland and San Leandro city councils and Committee members are welcome to attend. A public hearing on the master plan will be held by the Board of Port Commissioners in early 2006. Port staff said that they would work with the city council prior to the hearing. It was anticipated that the master plan will be adopted by the Board of Port Commissioners in early 2006.

Port staff invited Committee members to think about ways this group might continue after the master plan document is complete. Port staff and Committee members discussed that the cities of Alameda and San Leandro might continue to pursue the process.

Schedule Upcoming Meetings

Thursday, November 10, 2005 (SUBJECT: Draft Master Plan Document) – postponed until December 8, 2005
Sign-in sheet
Web site
Transportation (parking and AirBART)

These meetings are scheduled in Terminal 1, 2nd Fl., Rear Conference Room.

AGENDA

Welcome, introductions, and lunch
Approval of meeting minutes from August 11, 2005

Follow-up items from previous meetings and questions/answers (open forum)
- Airline passenger forecasts and potential terminal development for 2010 to 2012
- Air cargo forecasts and potential air cargo development areas
- General aviation forecasts and potential development areas
- Airfield issue/solutions
- Environmental issues/benefits/constraints/projects
- Financial issues/constraint/plan
- Other questions, answers, and discussion
- Comment letters from San Leandro and Alameda stakeholder groups
- Draft land-use map
- SJ Chronicle article on October 23, 2005 (Business section), “Oakland airport in a growth spurt”

Draft master plan overview
- Review Executive Summary
- Table 4.3: corrected calculation error (general aviation land area requirements)
- Page 6-7: added discussion of potential general aviation development at South Field
- Table 6.1: highlighted cells with changes from prior version (preliminary environmental screening matrix)
- Page 6-20 through 6-23: expanded discussion and analysis of potential noise barrier
- Page 7-7: deleted complicated calculation table from Financial Plan
- Review Section 8.3 (Summary of Near-Term Master Plan Projects) (Recommended for further study)
- Discuss adding North Field noise abatement compliance study to Section 8.3 (Alameda request)

Review Section 8.4 (Other Anticipated Near-Term Projects)
Figure 8.3: added BART connector to land-use map
Page 4-7: added discussion of potential general aviation development at South Field
Table 6.1: highlighted cells with changes from prior version (preliminary environmental screening matrix)
Page 6-20 through 6-23: expanded discussion and analysis of potential noise barrier
Page 7-7: deleted complicated calculation table from Financial Plan
Review Section 8.3 (Summary of Near-Term Master Plan Projects) (Recommended for further study)
Discuss adding North Field noise abatement compliance study to Section 8.3 (Alameda request)

Wrap-up items
- Schedule another meeting on draft master plan (beginning of January 2006)?
- Meeting with Neptune Drive neighborhood on potential noise barrier
  (Thursday, December 5, 2005, 7:00 PM)
- Public meeting/open house (mid-January 2006)
- Final comments on master plan due January 9, 2006
- Master plan approval: Aviation Committee on February 27, 2006, and Board of Port Commissioners on March 7, 2006
- Sign-in sheet
- Web site
- Transportation (parking and AirBART validation)

Questions/comments/happy holidays!
This meeting was the eleventh in a series of planned meetings of the Aviation Stakeholder Advisory Committee (the Committee) for the Oakland International Airport (OAK) Master Plan. These minutes correspond to an Agenda that was distributed at the meeting; a copy of the Agenda is provided on the Master Plan web site. New postings to the web site will be accompanied by email notices to Committee members. The web site address is www.oaklandairport.com/masterplan.

Attendees: See sign-in sheet (to be used as distribution list); a copy of the sign-in sheet is provided on the Master Plan web site.

Handouts:
- Agenda

Following introductions, Mr. Doug Mansel, Master Plan Project Manager, distributed the minutes from the previous meeting, agenda, and reviewed the items requested by Committee members from the previous meetings (see second agenda item below).

Agenda Item:
Approval of meeting minutes from August 8, 2005

Ms. Carmen Fewless (City of San Leandro community representative) asked if the Port would consider Mr. Dennis Rousou’s comments (City of San Leandro community representative) as official comments for the Port to respond. Port staff agreed to include those comments.

Follow-up items from the last meeting and open forum

The Port received comment letters from the City of San Leandro and the City of Alameda stakeholder group and a CLASS addendum to that letter on the draft land-use plans. Ms. Kathy Ornelas (City of San Leandro staff representative) indicated that the City of San Leandro comment letter should include the official correspondence which listed five questions and requested that those questions be addressed in the master plan and included in the appendices. Port staff agreed to include the letter in the appendix and to write a response. Dave (City of Alameda community representative) made the same request for the City of Alameda draft land-use plan comment letter. Port staff agreed to include this letter in the appendix and address their questions in the master plan.

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Mr. Doug Mansel referred to an article in the October 23, 2005 San Francisco Chronicle entitled “Oakland Airport in a Growth Spurt,” which talked about the master plan. The article did not accurately depict the master plan. It suggested the Port was focused on new runway development at South Field and not terminal development, which is the opposite of the recommendations in the master plan.

Dave commented that the City of Alameda and CLASS received some irate calls in response to that article. Both groups are scheduling meetings with the Port to ensure the information they relay to the public is consistent with what the Port is disclosing to the public.

Draft master plan overview

Mr. Doug Mansel introduced the discussion on the draft master plan document. As a working draft (not normally disseminated to the public), it gives the Committee an insider’s view of the master plan drafting process. The appendices to be included in the final version of the master plan are listed on its last page. Appendix A will include Stakeholder Advisory Committee member names. Appendix B will include the Stakeholder Advisory Committee meeting agendas and meeting minutes. Appendix C will consist of comment letters and comment cards from the Port’s public open houses. Appendix D will include Aviation Committee staff reports that Port staff provided to the Aviation Committee.

The reports are available on the Airport and master plan web sites. The Airline Passenger Market Analysis has been distributed to the Committee and is posted on the web site (Appendix E). The 2010 planning day flight schedule, which lists aircraft by type and by arrival and departure times, was used by the Port to simulate the airfield (Appendix F). Port staff offered to distribute this document electronically to interested Committee members. Mr. Doug Mansel is editing the ATAC/HNTB Airfield Simulation Technical, which has not been distributed yet (Appendix G). The Runway 11-29 capacity and delay memo has been disseminated to the Committee and is on the master plan web site (Appendix H). The environmental considerations memo has been distributed to the Committee and is on the master plan web site (Appendix I).

Ms. Kathy Ornelas expressed a desire to have the master plan appendices available to the public. Port staff indicated that most are available to Committee members for download from the master plan web site.

Mr. Doug Mansel stated that the purpose of the meeting was to walk through the document that has resulted from the master planning process over the past 18 months and invited the Committee to provide any comments about the draft master plan document.

Mr. Doug Mansel introduced the discussion of the Executive Summary of the master plan. The primary focus of the master plan is on near-term projects. The plan discusses the airline passenger activity forecasts, terminal planning activities, and air cargo growth. Throughout the master plan process, the Port presented three cargo forecasts (high, medium and low), and of those three, the Port received comment letters from the City of San Leandro and the City of Alameda stakeholder group and a CLASS addendum to that letter on the draft land-use plans. Ms. Kathy Ornelas (City of San Leandro staff representative) indicated that the City of San Leandro comment letter should include the official correspondence which listed five questions and requested that those questions be addressed in the master plan and included in the appendices. Port staff agreed to include the letter in the appendix and to write a response. Dave (City of Alameda community representative) made the same request for the City of Alameda draft land-use plan comment letter. Port staff agreed to include this letter in the appendix and address their questions in the master plan.

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Dave requested that the Executive Summary: (1) clarify “unconstrained,” (2) replace the “**” with a notation to this effect “Note: this is unconstrained which means ——,” and (3) include narrative which indicates the results or achievements derived from the participation of Committee members (e.g., improvements on various propositions) to the master plan process. Dave also requested that referenced drawings indicate which page number they are located on. A Committee member requested that whenever tables continue onto subsequent pages their headers rollover onto those subsequent pages. Port staff agreed to make these adjustments and indicated that the final master plan document will be easier to read from a page numbering and table layout perspective.

The outline of the master plan document follows the Stakeholder meeting topics: forecast summary, potential airline passenger development (16 to 21 aircraft gates), potential air cargo development, potential general aviation (GA) development, airfield development, airline-related support, airport ground access, environmental considerations summary, financial considerations summary and land-use maps.

Mr. François Gallo (San Leandro Unified School District community representative) observed that the master plan provides estimated forecasts for air cargo weight and airline passengers for 2025, but that these are not translated into daily aircraft operations. Port staff agreed to explain why daily operations were not provided for 2025.

Dave requested that helicopter operations be mentioned in potential GA development. Dave observed that the figures for average queue delay have no context with which to measure whether the time indicated is good or bad and asked that current numbers be given so as to provide a basis for comparison in the future. On Page E.5, Dave requested to include a discussion of the possible effects of single event noise (similar to CNEI discussion). Port staff responded that the analysis has been done and that it can be included in the Executive Summary. Mr. Doug Mansel offered to include a paragraph that talks about community requested projects/studies (e.g., the noise barrier).

Mr. François Gallo asked if there were any Committee comments on GA development. Port staff responded that there were no official comments on GA. Mr. François Gallo asked if there were any questions regarding aircraft fleet mix. Mr. Doug Mansel responded that the aircraft fleet mix will be in the appendices by aircraft type and that the master plan GA forecast for 2010 shows GA jets going from about 45 to 55 daily operations. Mr. François Gallo asked if the Committee had any input in a potential takeover of GA development by a third-party developer. Mr. Doug Mansel responded that the Port recommends continuing this group in some way and that if that were to be proposed for GA development, it would be discussed with this new group.

Ms. Barbara Tuleja (CLASS community representative) added that there are no projects for a third-party to take over, and that it was more likely that a new developer may propose building something at OAK, in which case it would still undergo the same environmental review (CEQA and NEPA) review process as any other project at OAK.

Ms. Kathy Ornelas asked if there were a way to express the converse scenario in the master plan (i.e., this same reason is a good one not to have airlines using North Field). Port staff agreed to express the impracticality of mixing GA aircraft and airline aircraft in the master plan.

Table 6.1 depicts a preliminary environmental screening matrix; highlighted cells indicate changes that these are not translated into daily aircraft operations. Port staff agreed to explain why daily operations were not provided for 2025.

Mr. Doug Mansel pointed out a calculation error (general aviation land area requirements) on Table 4.3, Column D, which has been corrected.

Ms. Kathy Ornelas noted an error on Page 1-3: "10,000 runway." Port staff will correct this error.

Mr. François Gallo recommended the Port not market to cargo airlines that operate 24 hours per day. Ms. Kathy Ornelas suggested Mr. François Gallo submit his request in writing to the Port. Port staff indicated that the Port cannot (by federal law) implement a curfew for cargo airlines, and that the comment in the master plan that the Port is not pursuing greater air cargo growth in effect meets his request.

Mr. François Gallo asked if the settlement agreement could be mentioned on Page 1-3. Port staff indicated that they will include this comment.

Mr. François Gallo (San Leandro Unified School District community representative) asked if there shouldn't be some comment in the master plan about the FAA’s project to upgrade VOR at North Field and the lack of sufficient support, airport ground access, environmental considerations summary, financial considerations summary and land-use maps.
The Port will make four recommendations in the master plan, three of which are (1) that the Stakeholder Advisory Committee continue in some form as the Port moves through project development, (2) that the Port conduct an Airport ground traffic study with cities of Alameda and San Leandro, and (3) that the Port continues to work with San Leandro on a potential noise barrier.

Ms. Kristi McKenney emphasized the need to be clear that there may not be a universal 12dbA noise reduction along Neptune Drive with a sound barrier.

Dave recommended an annual analysis of the noise barrier’s impact. Dave commented that a number of general aviation jet pilots persist in using North Field instead of Runway 11-29, which is a nuisance, and that the common excuse appears to be that pilots cannot access Runway 11-29 due to taxiway congestion or closures. Dave suggested doing a study to determine the causes of the deviation.

In response, Mr. Larry Berlin suggested that, in general, pilots accessing North Field are piloting transient aircraft and that sending a letter to advise pilots that this is unacceptable does deter this behavior. Port staff agreed to include a recommendation that the Port and City of Alameda jointly undertake a study to determine the causes of the “deviations.”

Section 8.4 lists other anticipated near-term projects such as repaving aprons at north field, FAA navaid projects, and the infield roadway at North Field. On Figure 8.3, the Port proposes deleting PF area north of Taxiway W and east of Taxiway U where the Port had considered placing remain overnight (RON) aircraft parking. Due to airspace restrictions, this area is probably not suitable for RON.

A Committee member suggested that, in Section 8.3, it would help if the overlap between the ADP and the near-term master plan projects were expressed and asked if the BART Connector project should be recommended in the master plan. Ms. Kristi McKenney responded that although the Port does support the BART Connector project, it is not a Port project.

Mr. Andrew Thomas recommended reorganizing Chapter 8 of the master plan so that the text on introduction to Airport finances overview, Section 7.2 is the overview and Section 7.3 distills in narrative form the master plan preliminary financial plan. The cost for a new 20-gate terminal in Area 2 was revised from about $500 million to about $1 billion.

Ms. Kristi Mckenney pointed out that there are many intersecting variables that have to be considered such as, the type of aircraft engine, the time of day, whether the air is “calm” or not, and where a resident is physically located (inside or outside their home). Mr. Vince Mestre noted that there was no low-frequency noise reduction in any of the five positions.

Mr. Doug Mansel noted that San Leandro will host a meeting with the residents of Neptune Drive and the Port.

A Committee member observed the need for unanimous consent among the neighbors on Neptune Drive to erect a noise barrier.

Doug Mansel directed the Committee to the Financial Analysis Summary. Section 7.1 is the introduction to Airport finances overview, Section 7.2 is the overview and Section 7.3 distills in narrative form the master plan preliminary financial plan. The cost for a new 20-gate terminal in Area 2 was revised from about $500 million to about $1 billion.

Ms. Kathy Ornelas asked if there was any discussion of the garage, if it was still part of the Airport Development Program (ADP).

Ms. Kristi Mckenney responded that the garage is included in the ADP and the cost estimate is included in the above estimate for the new terminal in Area 2. Parking is discussed in the ground access section of the master plan. Ms. Kristi Mckenney added that it is important to emphasize that the master plan is not meant to be mutually exclusive of the projects in the ADP.

Mr. Doug Mansel directed the Committee to Page 8-2, Section 8.3, which shows a hand-dashed in BART Connector on the 2025 land-use map. The left column highlights potential near-term projects stemming from the master plan that are recommended for continued study, environmental review, and financial analysis. The projects include: a 17 to 21 gate terminal in Area 2, the cargo building relocation, a new taxiway parallel to Taxiway Bravo, taxiway access improvements to Runway 11-29, a new high-speed exit from Runway 11-29, and remote airline passenger remain overnight (RON) planning.

Mr. Andrew Thomas (City of Alameda staff representative) suggested that the projects be segregated showing which ones are dependent on other ones and which ones are independent. Port staff agreed to make this change in the final master plan document.

Ms. Kristi McKenney emphasized the need to be clear that there may not be a universal 12dbA noise reduction along Neptune Drive with a sound barrier.

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Mr. Andrew Thomas (City of Alameda staff representative) suggested that the projects be segregated showing which ones are dependent on other ones and which ones are independent. Port staff agreed to make this change in the final master plan document.
October 28, 2004

To: Kristi McKenney, Aviation Planning Manager

From: Alameda Representatives to Airport Master Plan Stakeholders Committee

Subject: Comments on First Three Airport Master Plan Stakeholder Meetings

At the September 30th, Stakeholder Committee meeting, Port staff requested comments on the material presented to date and specifically requested comments and recommendations on the various alternatives presented for terminal facility expansion. On October 7, 2004 the Alameda representatives to the Airport Master Plan Stakeholder Committee met to discuss our recommendations with a larger group of concerned Alamedans. As a result of our discussion, we have prepared the following comments and recommendations for your consideration:

1. **Alameda Concerns:** The Alameda representatives continue to be very concerned about the potential impacts of any airport expansion on the residents of Alameda. The primary impacts of the existing airport operations on the residents of Alameda are aircraft noise and safety, aircraft generated air pollution, and airport related automobile traffic. An increase in annual passengers served will result in an increase in these impacts to the residents of Alameda.

2. **Mitigation:** We recommend that the evaluation of expansion alternatives at future Stakeholder Meetings include discussion of the potential mitigations to eliminate or minimize increases in aircraft noise and safety, aircraft air pollution, and automobile traffic resulting from any airport expansion options.

3. **Demand Management:** We recommend that the evaluation of Airport expansion options include evaluation of options for demand management strategies to minimize the need to increase the size of the facilities. For example, by strategically spreading flight times throughout the day, existing gates which are being underutilized at certain times might be used to accommodate additional flights, thus reducing the demand for new gates and terminal expansion.

4. **Terminal Placement:** Because we believe that the concerns of the neighboring jurisdictions must be considered throughout the planning process and that these concerns represent very real constraints on airport expansion options, any comments and recommendations made by the Alameda representatives regarding alternative terminal or taxiway placements based solely upon the 18 million annual passenger (MAP) forecast or the 30 MAP forecast should not be taken by the Port as an implicit endorsement of a plan to expand the airport to accommodate those forecasts. Regarding terminal expansion locations presented to date, we recommend that:
   a. All terminal options in Area 1 should be removed from consideration. Alameda is not in support of any terminal expansions in this location.
   b. Area 2 appears, based upon the information provided, to be the best location for possible terminal expansions. The specific design suggestions will need to include noise, safety, traffic, and pollution mitigation mechanisms.
   c. In Area 3, Option 3a, should not be discussed prematurely. Based upon the information provided, it appears to us that the problems with terminal length can be overcome with "people movers" or "moving sidewalks" and the option provides several advantages including the reduction of additional terminal complexes to satisfy the SWA expansion.

5. **Taxiways:** At the future meetings, we hope to hear more about the potential advantages of a second taxiway linking North Field to South Field. We are currently of the opinion that a well positioned full size second taxiway will facilitate the movement of smaller jets between the South Field runway and their North Field destination/originations. It is expected that this will reduce the quantity of jets that use the North Field runways.

6. **Stakeholder Committee Materials and Presentation:** The Airport staff has done an excellent job of preparing and presenting information at the meetings to date. The Alameda representatives appreciate all the efforts that have been made by Kristi and Doug to make information available to us.
November 2, 2004

To: Kristi McKenney, Aviation Planning Manager

From: Oakland Representatives to Airport Master Plan Stakeholders Committee

Re: Potential Terminal Development Concepts

The City of Oakland is pleased to respond to a request for comments to the potential terminal and air cargo developments that have been reviewed over the past several months. We have discussed these options with City officials and other interested community members.

Terminal Development Concepts:
- We believe that Options 1A and 1B should be eliminated due to the gross intrusion of wetlands required and also the consequent expense to utilizing this site for development.
- The series of proposals under Option 2 deserve closer scrutiny and seem to provide the most practical and efficient use of space given the indicated needs and proposed growth. In addition, all of Option 2 appears preferable from an environmental consideration. Although all of Option 2 should be looked at in conjunction with possible Air Cargo expansion there are some concerns we have with specific proposals.
  1. We are concerned about Option 2A due to its increase on the curbside congestion for Terminal 1. This is a complaint voiced by many Oakland users of the Airport and should be acknowledged within the analysis.
  2. Option 2F is based on a remote unit terminal off site. We are informed of the land use constraints and demands in the private property within reasonable proximity to the airport and find the proposal to purchase the amount of land needed for this option unfeasible and impractical. We suggest its elimination.
- We find neither Option 3A or Option 3B viable both because of environmental considerations and because of the placement of facilities closer to residential areas.

Cargo Development Concepts:
- We support the proposal to eliminate Area 1 and Area 3 from consideration due to the obvious constraints of both considerations.

- Both Area 2 and Area 3 should be considered. The proposed Area 3 development should be analyzed in conjunction with the various proposals under Option 2 since they will utilize adjacent areas.

We appreciate the opportunity to represent Oakland’s interest in the proposed expansion of the Oakland Airport and specifically acknowledge the outstanding preparation and presentation done thus far by the Ms. McKenney and Mr. Mansel.
January 21, 2005

Ms. Kristi McKenney, Aviation Planning Manager
Mr. Doug Mansel, Aviation Planner
Port of Oakland
539 Water Street
Oakland, CA 94604

Subject: San Leandro’s Recommendations for Potential Terminal Development Concepts

Dear Ms. McKenney and Mr. Mansel:

The San Leandro members of the Airport Master Plan Stakeholder Committee respectfully submit the following recommendations for planning for potential terminal development at the Oakland International Airport. Our recommendations are predicated on the following positions:

1. San Leandro Stakeholder Committee members cannot support any concept that would facilitate diversion of traffic from South Field to North Field.
2. We cannot support any concept that would develop terminal facilities at the space currently occupied by the Oakland Maintenance Center Hangar.
3. San Leandro will not support expansion of any terminal facilities beyond what the current airfield can support. When OAK reaches current airfield capacity, expansion should stop.

Based on these positions, the consensus of our committee members is that Concept 2B as presented to the Master Plan Stakeholder Committee would be the best to consider for possible future study. This appears to be the most comprehensive solution presented to date. It addresses the need for more terminal space, more parking with potential garage expansion, better vehicle circulation, and upgrades to existing facilities.

However we would prefer to see 15 new gates versus 20. We ask that you plan for the low side of anticipated passenger numbers versus the high side. Eliminating the southern five gates proposed to be parallel to existing Terminal 1 would remove the conflicts with the international terminal.

At the most, terminal development should not expand beyond what is proposed as shown. Expansion of the terminal further north cannot be supported.

There should never be any more expansion beyond the number of gates proposed on concept 2B. 2B should meet the passenger demand through 2012. Therefore, there should not be any expansion beyond that volume.

Our comments on the other presented concepts are as follows:

Concepts 1A and 1B

- Both concepts are too close to North Field. Taxiway enhancements could encourage diversion of South Field traffic to the North Field. Therefore, San Leandro would oppose both of these concepts.
- San Leandro cannot support a concept that would fill-in significant portions of wetlands.
- San Leandro will support Alameda’s opposition to any concept that would generate more vehicle traffic through Alameda.

Concepts 2C through 2I

- 2C, 2D and 2F do not show any connection between parking and the new terminal. How will passengers get from parking to the new terminal?
- 2C, 2E and 2F all show potential expansion of gates toward the North Field. Therefore, San Leandro cannot support these concepts. Proximity of the terminal to the North Field at this location will make it too easy to divert flights to the North Field.
- 2D proposes gates too close to the North Field. Therefore, San Leandro cannot support 2D. Proximity of the terminal to the North Field at this location will make it too easy to divert flights to the North Field.
- 2F concepts show the potential for expansion onto the OMC site, which San Leandro cannot support.
- 2H appears too confusing to travelers, with no connection to the existing terminals. This option of having ticketing, baggage handling and etc. at an off-airport location (close to Coliseum BART?) does not appear practical.
• 2G would create ground traffic conflicts for planes between terminals. It would also create significant distance between parking and existing terminals.

Concepts 3A and 3B

• Again, San Leandro cannot support any concept that will eliminate wetlands, including bay in-fill.

• Regarding 3A, adding new gates without other facility enhancements (i.e. parking, drop-off areas) will only add to congestion.

The following questions remain regarding the concepts that have been presented to the committee.

• Please show the existing and potential future surface parking on concept maps.

• Are you still assuming one main runway will support up to 75 gates?

• Would a new parallel taxiway parallel to Taxiway B ultimately be needed to avoid the same conflicts suggested by 2C – 2F?

Thank you for the opportunity to present our committee member recommendations. We look forward to receiving more detailed information about the Port’s vision of future terminal expansion as the Master Plan progresses.

Sincerely,

Kathy Ornelas
Community Relations Representative

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Oakland International Airport
Master Plan Open House / Public Meeting
Metropolitan Golf Links
March 9, 2005

PORT OF OAKLAND

Please Print

Name (optional): Emilia Martins

Organization (optional): Davis West

Neighborled Group

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Comments: I’m glad this international meeting was held. I appreciate the fact that there was not an official program per se allowing people to arrive after the start time. The Port of Oakland staff were knowledgeable and pleasant.

To speak to a Port of Oakland representative directly, please call Robert Bernardo at (510) 627-1401 or e-mail at: rbernard@portoakland.com
PORT OF OAKLAND

COMMENT CARD

Please Print

Name (optional): Wafaai, Abbensted

Organization (optional): DWN9

Comments: Program & intro's by
who is who!

To speak to a Port of Oakland representative directly, please call
Robert Bernardo at (510) 627-1401 or e-mail at:
rbarnard@portoakland.com

PORT OF OAKLAND

COMMENT CARD

Please Print

Name (optional): Jim ProL4

Organization (optional): LABOR

AFSCME

Comments: I'm not in favor of
expansion, but if it's
inevitable - then I favor
plan 2B

To speak to a Port of Oakland representative directly, please call
Robert Bernardo at (510) 627-1401 or e-mail at:
rbarnard@portoakland.com
September 12, 2005

Ms. Kristi McKenney, Aviation Planning Manager
Mr. Doug Mansel, Aviation Planner
Port of Oakland
530 Water Street
Oakland, CA 94604

Subject: San Leandro’s Review of Near-term and Long-term Land-use Maps

Dear Ms. McKenney and Mr. Mansel:

The San Leandro members of the Airport Master Plan Stakeholder Committee have reviewed the drafted Near-term and Long-term land-use maps for the Airport Master Plan. Overall, we have no objections to the two maps as planning tools. We will, of course, want to have ample opportunity to review any projects that are proposed.

As a general rule, San Leandro Stakeholder Committee members continue to maintain the position that we will not support any concept that would facilitate diversion of traffic from the South Field to the North field. Additionally, because the wetlands in and around the airport properties are part of a migratory route, we have concerns regarding any developments that would fill wetlands.

Thank you for the opportunity to review these materials. We look forward to reviewing the drafted Master Plan.

Sincerely,

Kathy Ornelas
Community Relations Representative

Comments: The Port Administration needs to concentrate on improving Oakland’s image around the property you own. Landscape the areas around the landing fields so they are more attractive. Please do not put up any billboards at the airport, the estuary, or anywhere else. Don't create ghettos in Oakland.

To speak to a Port of Oakland representative directly, please call Robert Bernardo at (510) 627-1401 or e-mail at: rbernard@portoakland.com
COMMUNITY AGENDA FOR NEW MASTER PLAN

1. What specific plans will be included in the new master plan to AVOID NEW AIRPLANE NOISE problems resulting from the new airport extensions?

2. What specific noise mitigation plans will be included in the new master plan to ADDRESS NEW AIRPLANE NOISE problems resulting from the new airport extensions?

3. What specific plans will be included in the new master plan to encourage a REDUCTION IN THE USE OF NOISIER AIRCRAFT — especially AT NIGHT?

4. Why can't some type of NOISE BARRIER be erected to, at least partially, reduce new noise impacts — especially at night — to residents living close to the SOUTH FIELD?

5. What specific mitigation plans will be included in the new master plan to ADDRESS NEW STREET TRAFFIC PROBLEMS resulting from the new airport extensions?

Compiled by San Leandro Community Representatives

PORT OF OAKLAND

December 29, 2005

City of San Leandro Representatives to the Master Plan Stakeholder Advisory Committee:

Ms. Kathy Ornelas  Ms. Debbie Pollart  Ms. Carmen Fewless
City of San Leandro  City of San Leandro  2518 Galloone Place
835 E. 14th Street  835 E. 14th Street  San Leandro, CA 94577
San Leandro, CA  94577

Mr. James Reynolds  Mr. Dennis Roucci
1055 Adason Drive  13111 Neptune Drive
San Leandro, CA 94578  San Leandro, CA 94577

Subject: Response to San Leandro Comments
          Master Plan, Oakland International Airport (OAK)

Dear San Leandro Stakeholder Advisory Committee Members:

Thank you for the comments in your letter dated September 12, 2005, and the five questions in your list entitled “Community Agenda for New Master Plan” (handed out at the June 30, 2005, Stakeholder Advisory Committee meeting). The following paragraphs outline our response to your comments.

September 12, 2005, Letter

We agree that the City of San Leandro should have opportunity to review and comment on projects as they are proposed after the master plan. As you know, the master plan only suggests projects for further study, such as conceptual engineering, financial feasibility, and environmental review. The Port is committed to working with the San Leandro representatives to address potential effects of Airport growth on neighboring jurisdictions. As outlined in Section 8.3 of the master plan, we suggest establishing a committee so that the Port’s Planning and Development staff can continue to meet, annually or semi-annually, as needed, with community and Airport users to provide updates on various projects and Airport activity, and receive input. The City of San Leandro would also be able to provide input on projects as part of environmental reviews required in accordance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

First, as a general rule, airlines prefer the longer runway length at South Field (compared to North Field). The Port also agrees that as a general rule, air traffic should not be diverted from South Field to North Field, except as required for safety, maintenance/construction, emergencies, or other reasons requiring Runway 11-29 at South Field to be closed. We believe that any terminal concept in planning Area 2 (see Figure 4.1 in the master plan) would not cause the airlines to use North Field any more than they do today due to the circuitous taxi route from North Field to South Field. If an airline lands on Runway 27L, for example, it must exit at Taxiway J, cross Runway 27R, taxi back along Taxiway C, cross Runway 27R again, cross Runway 27L, and then proceed southbound along Taxiway B to the existing terminals or a new terminal in Area 2. It is more convenient (with no runway crossings) and about the same taxi distance to land at South Field (Runway 29), taxi on Taxiway W, and then northbound on Taxiway B to a
new terminal in Area 2. The master plan studies, but does NOT recommend, a new taxiway at North Field, south of Runway 9R-27L (see Figure 5.5).

The draft land-use map for 2010 to 2012 (see Figure 8.3) does not show any fill of wetlands. The draft land-use map for 2025 does show possible land uses that might require fill of wetlands. However, it is important to note that the master plan does not discuss any projects in the 2025 timeframe to accommodate unconstrained aviation demand because the master plan is not recommending a new South Field runway (which would likely be required to accommodate the unconstrained demand in 2025). Therefore, it is not reasonable to plan projects that far into the future (see Section 3.1.3 of the master plan), and the 2025 land-use map shows potential land-uses if ever required.

**Question 1: Specific Plans to Avoid New Airplane Noise**

The Port of Oakland does not (and cannot) control the number or type of aircraft that the airlines (or other aircraft operators) fly in and out of OAK. In fact, under federal grant assurances, airports must make facilities available for public use on reasonable terms and without unjust discrimination to any person, firm, or corporation to conduct or engage in any aeronautical activity. The FAA has determined that some arrangements for accommodation must be made if reasonably possible, and that an airline may not be denied access to an airport solely based on the non-availability of facilities (FAA Order 5190.6A, Airport Compliance Handbook, Section 4-15). Further, the number of airline passengers will likely continue to grow even without new facilities, such as a new terminal building, and the airlines will likely continue to add flights, but existing facilities will operate at poorer and poorer levels of service (e.g., dirty restrooms, cramped hold rooms, long lines at the security checkpoint, etc.). For example, as discussed at the August 19 and September 30, 2004, Stakeholder Advisory Committee meetings, the 18 million annual passengers (MAP) forecast in 2010 might be able to be accommodated at the existing airport gates at the Airport, plus those that are currently under construction, albeit at a greatly reduced level of service if new gates at a new terminal were available. The forecast increase in the number of passenger airline flights/operations (2010 compared to existing conditions in 2004) translates to single-event aircraft noise; however, until additional analyses are performed, it is unclear whether this new aircraft noise results from new projects or the normal growth that would occur even without those projects, as described above. Also, depending on the aircraft types, there may not be a corresponding increase in "airplane noise."

For air cargo operations, the Port does have some control because air cargo is more dependent on the availability of facilities. As described in Section 3.3 of the master plan, we are recommending that the Port not aggressively pursue new air cargo development at OAK. This recommendation results in a low air cargo growth forecast (3.59% annual air cargo weight increase) focused on existing air cargo airlines at OAK as they grow in response to the economic growth in the San Francisco Bay Area. In terms of air cargo airline operations (and therefore, flights and single-event aircraft noise), these assumptions result in no new flights at South Field (2010 compared to existing conditions in 2003) and a 2% annual average growth in the small air cargo operations at North Field (e.g., Ameriflight). Therefore, we have listened to the input from the Stakeholder Advisory Committee about aircraft noise, and the master plan is recommending not to pursue an aggressive air cargo marketing campaign, resulting in fewer flights and less single-event aircraft noise.

The master plan compares aircraft noise anticipated in 2010 (based on the forecasts) to existing aircraft noise in 2004 (see Sections 6.3.8 through 6.3.10 in the master plan), both in terms of nighttime single event noise contours and community noise equivalent level (CNEL) contours, a time-weighted average measurement of noise. Although there will be "new" aircraft operations resulting in more flights and noise resulting from those flights (see Figures 6.3-1 and 6.3-2), it is anticipated that there will be less overall CNEL noise footprint in 2010 (compared to existing conditions in 2004) because it is anticipated that FedEx (the largest air cargo airline at OAK) will phase-out most of their noisiest nighttime aircraft operations (Boeing 727s) by 2010.

Finally, the Port remains open to exploring new ideas to avoid and mitigate aircraft noise, and will keep these community concerns in mind if and when future projects are studied and proposed.

**Question 2: Specific Plans to Mitigate New Airplane Noise**

The Port is committed to mitigating the effects of aircraft noise on neighboring communities. Section 6.3.7 of the master plan summarizes the Port’s existing noise control programs, including voluntary noise abatement flight procedures, community outreach and participation, and residential and school sound insulation programs. It is important to note that none of the projects or land uses discussed in the master plan are anticipated to change or reduce the effectiveness of the Port’s existing, voluntary noise abatement flight procedures.

Further, the San Leandro representatives on the Stakeholder Advisory Committee requested that the master plan investigate the effectiveness of a noise barrier to block take-off roll noise emanating from aircraft departing on Runway 29. The preliminary results are contained in Section 6.6 of the master plan, and a public meeting with the Neptune Drive neighbors is scheduled on January 5, 2006. The master plan recommends that the Port and San Leandro continue to work together to investigate the feasibility of constructing a noise barrier, either on the Airport or along the rear yards of the homes on the west side of Neptune Drive. As projects or groups of related projects undergo environmental review pursuant to CEQA and/or NEPA, it is important to note that because there may not be any significant aircraft noise effects, a potential noise barrier may not be formal mitigation under CEQA / NEPA. Therefore, the Port would be pursuing a noise barrier in response to community interest.

**Question 3: Specific Plans to Reduce Use of Noisier Aircraft**

As described in the response to Question 1, the Port does not (and cannot) control the number or type of aircraft that the airlines (or other aircraft operators) fly in and out of OAK. With that said, the master plan forecasts assume that FedEx will phase-out all but one nighttime Boeing 727 operation. Although the Port cannot require this phase-out under the Airport Noise and Capacity Act of 1990, we believe that FedEx will eventually retire this aircraft due to its age and high operating costs. Further, as air cargo weight is anticipated to grow at OAK (low growth scenario, focused on existing air cargo airlines), it is anticipated that FedEx (and other air cargo airlines) will start using larger aircraft, retiring the older and smaller Boeing 727s.

**Question 4: Noise Barrier**

See response to Question 2.

**Question 5: New Traffic Problems**

The master plan suggests that the Port, City of San Leandro, and City of Alameda jointly undertake a traffic monitoring study (Section 8.3). As was the case in the Airport Development Program (ADP) environmental documents, the Port would expect to commit to paying its pro rata share of intersection improvements in the City of San Leandro as a result of significant traffic effects identified in future environmental documents. As you know, intersections within the City of San Leandro are within the City’s jurisdiction, and therefore only the City can effect any intersection improvements.
The Port is also committed to public transportation and high-occupancy vehicle access to OAK. For example, the Port has already invested $2.5 million in planning and preliminary engineering and is planning to commit over $25 million to the construction of the on-Airport portions of the BART Connector, which is a BART project that would construct a people mover to link the Coliseum BART station and the terminals at OAK. We have shown the BART Connector on the 2025 land-use map. Further, OAK has convenient curb side access to public transportation and high-occupancy vehicle modes, such as AC Transit, other scheduled buses, and door-to-door vans. The Port is spending over $90 million to reconstruct the loop roadway and curbsides to keep OAK convenient for all ground access modes.

Thank you for taking the time to provide detailed input on the draft land-use maps discussed at the August 11, 2005, Stakeholder Advisory Committee meeting. Your input has been valuable and had a true impact on the conclusions and recommendations in the master plan. We look forward to bringing the master plan process to a close and continuing to work with the City of San Leandro and other communities as projects are further evaluated and potentially implemented.

Sincerely,

Kristi McKenney
Aviation Planning and Development Manager

cc: Douglas Mansel
San Leandro Unified School District (USD) Representatives to the Master Plan Stakeholder Advisory Committee:

Mr. Leon Glaister
San Leandro USD
14735 Juniper Street
San Leandro, CA 94579

Mr. Mike Murphy
San Leandro USD
262 Davis Street
San Leandro, CA 94577

Mr. Heidi Finberg
San Leandro USD
San Leandro, CA 94579

Mr. Francois Gallo
979 Woodland Avenue
San Leandro, CA 94577

City of Alameda • California

October 26, 2005

To: Kristi McKenney, Aviation Planning Manager
    Douglas Mansel, Aviation Planner

From: Alameda Representatives to Airport Master Plan Stakeholders Committee

Subject: Comments on Near Term Land Use Map (2010-12) and Long Term Land Use Map (2025)

At the August 11, 2005 Stakeholder Committee meeting, Port staff requested comments on material presented to date and specifically requested comments and recommendations on the Near-Term Land Use Map (2010-2012) and the Long Term Land Use Map (2025). The Alameda representatives to the Airport Master Plan Stakeholder Committee met to discuss our recommendations with a larger group of concerned Alameda residents. As a result of our discussion, we have prepared the following comments and recommendations for your consideration. We reserve the right to provide more detailed and extensive comments on the Airport Master Plan once we have had the opportunity to review the written document. Our comments provided below are intended to assist you in the preparation of the Airport Master Plan.

Environmental Impacts: According to the information provided by the Port at the Stakeholder meetings, Oakland Airport is currently operating at approximately 13.5 million passengers per year. The 2010-12 Land Use Plan is designed to accommodate 18 million passengers per year and the 2025 Land Use Plan may accommodate as many as 30 million passengers per year.

The Alameda representatives continue to be very concerned about the potential impacts of airport expansion on neighboring communities. Residents are already burdened with noise from aircraft overflights, aircraft generated air pollution, and airport related vehicular traffic and the threat of aircraft accidents on residential communities. The substantial increase in passengers and corresponding increases in aircraft operations will significantly impact Alameda residents. We request that the Master Plan clearly acknowledge the effect of the airport’s operations on Alameda residents and establish an ongoing commitment to work with the Alameda representatives to address the impacts of Airport growth on neighboring jurisdictions. Moreover, while we understand that this Master Plan itself will not be undergoing environmental review and that environmental review will instead accompany individual projects, we remain concerned about the cumulative environmental effects of the projects contemplated by the Master Plan. We therefore recommend that the Master Plan...
recognize that environmental review for the first project under the Master Plan must comprehensively evaluate the environmental impacts associated with accommodating 30 million passengers per year.

**Demand Management:** We reiterate the request in our October 28, 2004 letter that the Master Plan comprehensively evaluate demand management strategies to accommodate forecasted passenger levels. For example, by strategically spreading flight times throughout the day, existing gates, which are being underutilized at certain times, might be used to accommodate additional flights, thus reducing the demand for new gates and terminal expansion. As part of the Master Plan planning process, Port staff should evaluate demand management strategies that have been implemented at other airports.

**Airfield Planning – Alternative Taxiways:** The Master Plan is proposing alternative taxiways presumably to improve access to Runway 29 and generally improve the connection between the North and South Fields. The Alameda representatives strongly support improving circulation access between the North and South Fields in an effort to encourage North Field-based aircraft to use Runway 29 for departure (consistent with the 1976 Settlement Agreement). To that end we believe that Taxiway T3 may provide an attractive alternative, provided it is coupled with continuous two-way flow to Taxiway W. We also believe that the recommended improvements to Runway 29, coupled with this facilitated flow might be an incentive for increased use of Runway 29 by North Field aircraft. We therefore recommend detailed consideration of Taxiway T3, together with, not as an alternative to, a new taxiway parallel to and east of Taxiway B. We also request that the Port consider further the feasibility of Taxiway T0 (zero), which would allow planes not blocked by departures on Runway 27. Finally, we request that the Port run simulations that describe the airfield circulation performance of the various taxiway layout alternatives. It is important to evaluate the numerical simulation results describing the performance of the different alternatives, but the only information currently available to us is the text on the layout plans. A detailed review of these airfield simulations will enable the Alameda representatives to more fully understand North and South Field circulation and to further evaluate the merits of Taxiways T3 and T0 (zero).

**Cargo Operations:** The Master Plan projects cargo operations to increase from 0.9 million annual tons (MAT) in 2010 to 1.5 MAT in 2020. Cargo operations continue to be a strong concern for Alameda residents because of the substantial number of nighttime operations associated with cargo activity. While the Master Plan includes fairly extensive treatment of passenger facilities, it does not contain similar detail for proposed cargo facilities. In order to assess the proposed growth in air cargo facilities and the alternatives for their location, we would like to see more detailed analysis of the basis for the space requirements. Specifically, we would like to see how the activity forecasts are translated into cargo gate positions and overall terminal acreage.

Moreover, while we understand that Oakland will continue to play a strong role in Bay Area air cargo operations, the Master Plan is the appropriate forum for evaluation of other facilities accommodating some of the increase in cargo demand. In particular, the Alameda representatives recommend that the Master Plan evaluate the potential for Mather Air Force Base to accommodate some portion of increased Bay Area cargo operations. Finally, as we stated above in regards to environmental review for passenger operations, environmental review for the first project under the Master Plan must comprehensively evaluate the environmental impacts associated with accommodating 1.5 MAT of cargo operations.

**Parking and Passenger Facility Locations:** The 2010 and 2025 Land Use Plans identify a large new parking area on Ron Cowan Parkway adjacent to the City of Alameda. The plans also show continued use of the area on Doolittle Drive for rental cars or other passenger facilities. The Alameda representatives are concerned with the number of cars that cut through Alameda to access the Airport. Locating long term parking and rental car facilities adjacent to Alameda on Doolittle Drive and Ron Cowan Parkway will increase the number of future passengers who will choose to cut through Alameda, park or drop off their car, and then proceed to the Airport. We recommend that the Master Plan evaluate the feasibility of locating all parking and rental car facilities serving passengers along the airport’s primary access routes of 98th Avenue and Hegemierger Road, and Airport Drive. Additionally, for parking and rental car facilities that might remain or be constructed on Doolittle Drive or Ron Cowan Parkway, we recommend that the Master Plan evaluate traffic control strategies and design features that would guide the vehicles to/from 98th Avenue rather than Alameda roads.

**Traffic Monitoring:** Given the potential increase in vehicular traffic accessing the airport via Alameda roads, we request that the Master Plan contain a program for on-going monitoring of air-port generated traffic using Alameda bridges. Monitoring results would then be used to calculate the Port’s pro rata share of necessary improvements to Alameda roads.

**Transit Mitigation:** Passenger growth over the next 20 years will impact the I-880 freeway and the interchanges providing access to the airport. Moreover, regional growth over this same period will also contribute to worsening traffic congestion. The Master Plan should include considerations for costs and funding additional transit service in Oakland, Alameda, and San Leandro to mitigate the regional traffic impacts that will be caused by increasing passenger and cargo activity.

**Airport BART Connector:** Given the traffic impacts of airport expansion, we recommend that the Master Plan make a strong commitment to the Airport BART connector and that the final 2010 and 2025 Land Use Plans graphically depict the Airport BART Connector.

**Noise Reduction:** We recommend that the Master Plan prioritize improvements that will facilitate the use of Runway 29 by North Field pilots. To this end, Alameda representatives strongly encourage the Master Plan to consider airfield circulation when recommendations are set forth regarding passenger terminal areas. Specifically, while it is possible to meet terminal planning objectives with a variety of configurations that can fit in Area 2, an
important criterion for selection should be the impact on airfield circulation. As discussed above, the provision of effective circulation from the North to the South Field is an important incentive to reduce departures on Runway 27.

Air Quality Mitigation and Monitoring: We recommend that the Master Plan include a clear commitment to continue the implementation of best management practices for fuel management and continue to support the use of non-fossil fuel vehicles in use at the Airport and environs. In addition we recommend that the Master Plan include air quality monitoring stations capable of detecting toxic air contaminants within the residential communities adjacent to the airport and make the monitoring results publicly available.

Prioritized Improvement Schedule: The 2010 and 2025 Land Use Plans include a large number of recommended improvements. We recommend that the Master Plan include a prioritization or schedule for improvements. The purpose of the prioritization or schedule would be to clarify which improvements the Port believes to be the highest priority and which improvements may be dependent on completion of other improvements. This information will give all participants and interested parties a better understanding of the timing and sequence of activities.

Stakeholder Committee Materials and Presentation: Doug Mansel and Kristi McKenney have done an excellent job of preparing and presenting data and reports to the Stakeholder members. We appreciate their willingness to entertain questions and provide thorough, well-reasoned responses. The Alameda representatives now have a greater appreciation for and understanding of the complexities associated with airport planning. More importantly, we continue to believe that the Alameda representatives' participation in the Master Plan process has greatly improved the relationship between neighborhood representatives and the Port.

Citizens' League for Airport Safety and Serenity
a corporation of homeowner associations formed to protect the safety, health & welfare of people living in communities near the Oakland Airport

November 23, 2005

To: Kristi McKenney, Aviation Planning Manager
    Douglas Mansel, Aviation Planner

From: CLASS

Subject: Addendum to Alameda Representatives Comments on Near Term Land Use Map (2010-12) and Long Term Land Use Map (2025)

Along with other Alameda Representatives, members of CLASS prepared comments and recommendations (dated 12 October 2005, from Alameda Representatives to Airport Master Plan Stakeholders Committee) on the Near-Term and Long-Term Land Use Maps. That letter contains a request for detailed airfield circulation simulations to help evaluate the merit of the suggested taxiway alternatives.

In view of the data from the Port’s taxiway timing analysis that shows a non-significant average improvement of taxi-time, and the CLASS investigation into the case-by-case occurrences of jets departing North Field indicating a significant quantity of taxiway blockage and queue delay events, we are requesting that the Master Plan include a case-by-case analysis of a significant number of the North Field jet departures.

This analysis should include all available data such as taxiway conditions, South Field runway conditions and runway congestion. And since the events are often the result of pilot-ATC conversations, the audio recordings of those conversations should also be part of the investigation data. Additionally, the investigation should include meetings with the pilots, Air Traffic Controllers, and airfield operators regarding both their actions and their views of these and other taxiway alternatives.

The goal of this investigation is to determine the merits of the suggested taxiway alternatives in the reduction of North Field jet departures.

Thank you

Gary Hofer
President, CLASS

PMB #151, 875-A Island Drive • Alameda, CA 94502 • (510) 433-7949
PORT OF OAKLAND

December 14, 2005

City of Alameda Representatives to the Master Plan Stakeholder Advisory Committee:

Mr. Andrew Thomas  Ms. Marge McLean  Mr. David Needle
City of Alameda  City of Alameda  2981 Northwood
2263 Santa Clara Avenue  2263 Santa Clara Avenue  Alameda, CA 94501
Alameda, CA 94501

Mr. Red Wetherill  Mr. Walt Jacobs
28 Cove Road  28 Balley Bay
Alameda, CA 94502

CLASS Representatives to the Master Plan Stakeholder Advisory Committee:

Ms. Barbara Tuleja  Ms. Eileen Bitten  Ms. Laurel Impert
22 Purcell Drive  115 Purcell Drive  CLASS Staff Representative
Alameda, CA 94502  Alameda, CA 94502  396 Hayes Street

Mr. Gary Hoffer
President, CLASS
PMB #151, 875-A Island Drive
Alameda, CA 94502

Subject: Response to Alameda Comments on the Draft Land-Use Maps

Master Plan, Oakland International Airport (OAK)

Dear Alameda Stakeholder Advisory Committee Members:

Thank you for your letter dated October 26, 2005, and the Citizens' League for Airport Safety and Serenity (CLASS) addendum dated November 23, 2005, providing us with your comments on the draft land-use maps. The following paragraphs outline our response to your comments using the same headings from your October 26, 2005, letter, as we discussed at our informal meeting on December 1, 2005.

Environmental Impacts

It is important to note that the 2025 land use map will likely not accommodate 30 million annual passengers (MAP) because a new South Field runway is not proposed (i.e., the existing South Field Runway 11-29 would likely not be able to accommodate the aircraft operations required to serve 30 MAP, given the forecast aircraft fleet mix). The 30 MAP forecast for 2022 is unconstrained (i.e., it is a forecast of how many people would naturally want to use the Airport assuming that there were no facility limitations). When 30 MAP is discussed in the master plan, we have tried to make it clear that 30 MAP will likely not be realized.

The Port is committed to work with Alameda representatives to address potential effects of Airport growth on neighboring jurisdictions. As outlined in Section 8.3 of the master plan, we suggest establishing a committee so that the Port’s Planning and Development staff can continue to meet, annually or semi-annually, as needed, with community and Airport users to provide updates on various projects and Airport activity, and receive input. We also recommend conducting an Airport ground traffic study in association with the cities of Alameda and San Leandro.

Future environmental documents will look at cumulative environmental effects in accordance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). These environmental documents may or may not include all of the master plan projects, but only those that are reasonably anticipated to be in place in the selected “out year” in accordance with CEQA and NEPA requirements. It is unlikely that any documents will analyze the effects of 30 MAP because the master plan is not proposing a new runway, as described above. Further, the master plan does not recommend any projects to accommodate aviation demand in 2025. It is not reasonable to plan projects that far into the future (see Section 3.1.3 of the master plan). The 2025 land-use map shows potential land-uses if ever required.

As a point of clarification, the number of airline passengers that used OAK in calendar year 2004 was 14.1 million (14.1 MAP). For the last 12 months ending October 2005, OAK served over 14.4 MAP.

Demand Management

The Port does not control when the airlines fly airplanes in and out of OAK, as explained at the Stakeholder Advisory Committee meeting on September 30, 2004. No U.S. airport has implemented demand management strategies to avoid constructing terminal facilities or minimize potential environmental effects. In fact, under Federal grant assurances, airports must make facilities available for public use on reasonable terms and without unjust discrimination to any person, firm, or corporation to conduct or engage in any aeronautical activity. The FAA has determined that some arrangements for accommodation must be made if reasonably possible, and that an airline may not be denied access to an airport solely based on the non-availability of facilities (FAA Order 5190.6A, Airport Compliance Handbook, Section 4-15).

The FAA has implemented a form of demand management called "slot controls" at a few U.S. airports with excessive air traffic control delay (e.g., 15 to 20 minutes of delay per aircraft on average throughout the entire day), such as LaGuardia Airport. Slots are essentially take-off or landing reservations, and the FAA issues only so many each hour of the day (similar to a popular, busy restaurant). The airlines can buy and sell slots and there are "use it or lose it" provisions. In general, the FAA is trying to phase-out slot controls and is researching other demand management strategies to address air traffic control delay, such as congestion or peak-hour pricing and slot auctions. However, these are only at airports with significantly more activity and congestion than OAK, and therefore, demand management strategies are not a tool that is available at OAK, at least through the near-term (2010 to 2012) planning horizon.

Airfield Planning – Alternate Taxiways

The Port is committed to its existing voluntary noise abatement procedures, which requires jets and large turboprops to take-off on Runway 29 (in west plan), as opposed to the runways at North Field. As such, the Port recognizes the need for an efficient taxiway system linking North Field (where corporate jets and large turboprops park) and South Field (where Runway 29 is located).
As a point of clarification, the master plan is not proposing alternative taxeways; however, the master plan does study alternative taxeways. The master plan studied five potential new taxeways linking North Field and South Field (T0 through T4), as shown on Figure 5.6. As described in your letter, Figure 5.6 does indeed outline planning considerations associated with each potential alternative. The master plan also contains Table 5.1 (presented at the March 31, 2005, Stakeholder Advisory Committee meeting), which computes the distance and time increase or decrease associated with aircraft using each of the potential alternative taxeways. As summarized on the table, the best potential alternative taxeway (T3) only provides a 1% or 1 minute taxi time saving on an otherwise 9-minute taxi time from North Field to South Field. As such, the master plan concludes that none of the alternative North Field-South Field taxiway connectors provide any meaningful benefits.

However, based on the airfield simulation model (see Section 5.2), the Port did discover that there was indeed a significant amount of taxi delay on the South Field portion of Taxiway B (the existing North Field-South Field taxiway connector), generally between Taxiway T and Taxiway B2. This delay was being caused by corporate jets (or large turboprops) taxiing from North Field to South Field (southbound on Taxiway B) while other aircraft, such as FedEx airplanes going to the Metroplex apron, were taxiing northbound on Taxiway B. As part of the master plan, the Port is proposing (for further study and evaluation) a new taxiway parallel and east of existing Taxiway B, generally between Taxiways T and B2, to alleviate this head-to-head taxiway congestion, as well as provide efficient access to a potential new terminal in this area. This taxiway is shown conceptually on Figures 5.2 and 5.3 in the master plan. This taxiway will keep South Field as a convenient as possible for use by corporate jets and large turboprops, in accordance with the Port’s voluntary noise abatement procedures.

Taxiway T0 provides limited benefits in reducing delay crossing Runways 27L and 27R (for an aircraft taxiing from North Field to South Field). In order to provide any significant benefit, it would need to be constructed as a “perimeter taxiway.” A perimeter taxiway takes aircraft far enough around the end of the runways that they do not have to stop and wait from clearance to cross from the air traffic control tower. However, Taxiway T0 would need to be constructed well into the Metropolitain Golf Links golf course and possibly into the City of San Leandro in order to be considered a perimeter taxiway. Therefore, this taxiway alternative has not been recommended for further consideration in the master plan.

Your letter dated October 26, 2005, suggests using a computer simulation to further study the North Field-South Field taxiway connectors. Computer simulation may not be a useful tool in this instance because the programmer has to tell the simulation model how assign aircraft to the various taxeways. However, we do agree that the Port and CLASS and/or City of Alameda could jointly undertake a study to better understand why some flight crews choose not to comply with the Port’s voluntary noise abatement procedures, as suggested in the CLASS addendum dated November 23, 2005. This type of study will be recommended in the master plan. It should be noted, however, that almost 98% of corporate jets and turboprops comply with the voluntary noise abatement procedures and that the top three reasons for refusal are wear and tear on the aircraft (due to the long taxi distance), the cost of fuel (due to the long taxi distance), and taxi time (due to the long taxi distance).

Cargo Operations

There is not a strong link between cargo weight, number of air cargo operations, and planning areas, unlike passenger airlines. More judgment and less calculation is involved. For example, the master plan is suggesting that the Port not pursue an aggressive air cargo growth program (due to community concerns over potential environmental effects of aggressive air cargo growth), which results in the lowest reasonable air cargo growth projections for OAK. As a result, air cargo growth is anticipated to occur only at existing air cargo tenants, as outlined in the master plan (Sections 3.3 and 4.3). As a result of this choice, any unmet demand would either not happen or occur at another airport (such as Mather Airport, as suggested in your letter).

As described above, future environmental documents will look at cumulative environmental effects in accordance with CEQA and NEPA. These environmental documents may or may not include all of the master plan projects, but only those that are reasonably anticipated to be in place in the selected “out year.” Further, the master plan does not recommend any projects (for further study) to accommodate aviation demand in 2025. It is not reasonable to plan projects that far into the future (see Section 3.1.3 of the master plan). The 2025 land-use map shows potential land-uses if ever required.

Parking and Passenger Facility Locations

The Port prefers that parking and rental cars be located as close as possible to the terminals. This arrangement is more convenient for airline passengers and employees and more cost effective for the Port (there would be less busing costs). However, as the terminal area becomes more congested, it might not be possible to keep all parking and rental car activity at South Field.

The master plan suggests that the Port, Alameda, and San Leandro jointly undertake a traffic monitoring study (Section 8.3).

Traffic Monitoring

The master plan suggests that the Port, Alameda, and San Leandro jointly undertake a traffic monitoring study (Section 8.3). As was the case in the Airport Development Program (ADP) environmental documents, the Port would expect to commit to paying its pro rata share of intersection improvements in the City of Alameda as a result of significant traffic impacts identified in future environmental documents. As you know, intersections within the City of Alameda are within the City’s jurisdiction, and therefore only the City can effect any intersection improvements.

Transit Mitigation

This suggestion is generally beyond the scope of the master plan and may not be possible because of PAA revenue diversion rules (see Section 7.2.3, Other Important Regulations and Requirements, for more discussion of revenue diversion). However, it is important to note that the Port is committed to public transportation and high-occupancy vehicle access to OAK. For example, the Port has already invested $2.5 million in planning and is planning to commit over $25 million to the construction of the on-Airport portions of the BART Connector, which is a BART project that would construct a people mover to link the Coliseum BART station and the terminals at OAK. Further, OAK has convenient curbside access to public transportation and high-occupancy vehicles modes, such as AC Transit, other scheduled buses, and door-to-door vans. The Port is spending over $90 million to reconstruct the loop roadway and curbsides to keep OAK convenient for all ground access modes.

Airport BART Connector

We have shown the AirBART Connector on the 2025 land-use map (it will likely not be constructed in the 2010 to 2012 timeframe).

Noise Reduction

We agree with the recommendation to give high priority to airfield circulation when considering a terminal in Area 2. In fact, we are proposing to construct a new taxiway, parallel to Taxiway B to
improve airfield circulation and keep South Field as convenient as possible for North Field aircraft, as described above.

Air Quality Mitigation and Monitoring

The Port is committed to minimizing the potential effects of Airport operations and improving air quality. The master plan highlights specific programs that the Port does to accomplish this commitment (see Section 6.4.1). However, it is not appropriate for the Port to commit to installing air monitoring stations in the master plan at this time. The Port can continue research into the usefulness of air monitoring stations and potential costs. The Port is also committed to continue assisting the FAA in its research on aircraft emissions (see Section 6.4.1, Aircraft Emissions).

Prioritized Improvement Schedule

A list of potential near-term (2010 to 2012) projects for further study is included in the master plan (Section 8.3).

Thank you for taking the time to provide a detailed comment letter on the draft land-use maps discussed at the August 11, 2005, Stakeholder Advisory Committee meeting. Your input has been valuable and had a true impact on the conclusions and recommendations in the master plan. We look forward to bringing the master plan process to a close and continuing to work with the City of Alameda, CLASS, and other communities as projects are further evaluated and potentially implemented.

Sincerely,

Kristi McKenney
Aviation Planning and Development Manager

cc: Douglas Mansel

January 11, 2006

Ms. Kristi McKenney, Aviation Planning and Development Manager
Mr. Doug Mansel, Aviation Planner
Port of Oakland
530 Water Street
Oakland, CA 94604-2064

Subject: Comments to the Draft Master Plan for the Oakland International Airport

Dear Ms. McKenney and Mr. Mansel:

The following are comments to the Draft Master Plan submitted by the San Leandro City and community representatives to the Master Plan Stakeholder Advisory Committee. Permit me to preface these comments by thanking you and your staff, on behalf of the San Leandro committee members, for your assistance and guidance through this lengthy process. We have appreciated the amount of time, energy, expertise, and patience you have demonstrated throughout. We have all enjoyed and been enlightened by this opportunity.

Comments:

1. It would be appropriate to include a glossary with all of the acronyms. More than one of us has noticed it is difficult to recall technical references or titles made in early chapters.

2. Page E-1 – Don’t split tables between 2 pages, or if you must, include table headings on the second page.

3. Page E-2 shows the first reference to the term "unconstrained". There needs to be an explanation of this term early on, since it is used in a number of references.

4. Page E-2 – Under Potential Airline Passenger Development, in the first paragraph, we ask that there be a rewording of paragraph so that it is clear that Port doesn’t actually need additional gates. You just want them so that passengers may get through gates in less time.
5. Page E-3 – The first paragraph under Potential Air Cargo Development should include the same statement that is made in other sections of MP that cargo forecasting was based on growth of existing cargo carriers and that the Port will not aggressively market new carriers.

6. Page E-3 – In the last sentence under Potential GA Development we request you change the statement to read “The Stakeholder Advisory Committee had comments, but did not recommend any changes on the potential general aviation development.”

7. Page E-3 – Under Potential Airfield Development, the section needs to state very clearly that no specific use is being proposed for long-term forecast. Is it a valid assumption that, assuming the fleet remains similar to today, the airport cannot accommodate 30 million passengers?

8. Page E-4 – The second sentence of the second full paragraph should be changed to read “Most members preferred not to discuss….” rather than “Some members preferred not to discuss…”

9. Page E-4 – In the third paragraph in discussing RON, of the estimated 23-46 acres of RON required in 2010-2012 timeframe, how much acreage already exists? Also, how realistic a number is this “unconstrained” analysis?

10. Page E-4 – In the first paragraph under Airline-Related Support Facilities, are the parking areas referred to public and/or employee? That should be clarified.

11. Page E-4 – In the last sentence under Airport Ground Access, change “… should be considered for future airline…” to “… could be considered for future airline…”.

12. Page E-4 – Under Environmental Considerations, please give an explanation for the term “screening-level”. Also, indicate that this preliminary screening was done by Port staff and not technical specialists.

13. Page E-5 – In the first full paragraph please change “One environmental consideration…” to “The environmental consideration…” It should also be noted that it is not just the CNEL level of noise, but the duration over a 24-hour period that impacts residents. For example, the old, noisy fleet may be replaced with quieter planes, but now traffic is going 23-hours a day instead of 20. Is there really any improvement to quality of life for residents? We would argue that the answer is “no”.

14. Page E-5 – Shouldn’t the last sentence of the first full paragraph indicate “the forecast contours to the northwest of the airport…”?

15. Page E-5 – A reference should be made to the truck traffic study requested by the Stakeholder Committee members, since this issue was voiced as a concern during the MP process but never addressed.

16. Page E-5 – At the end of the first paragraph, Davis Street (SR 61) should be added as another major roadway serving OAK.

17. Pages 3-9 and 3-10 – The references to jets should be clarified to be business jets or general aviation jets. While the stakeholders recognize the reference is for general aviation operations during the Southeast Plan, some may misunderstand and think that commercial jets have the ability to depart from North Field during those weather conditions.

18. Page 4-7 – In the discussion regarding the disadvantages to mixing lighter aircraft with larger aircraft, it would be helpful to add a sentence to the end of the first full paragraph that indicates that the same reasoning (delays in flights, bad to mix larger and smaller planes) supports the position that air carriers and other South Field traffic would not be encouraged to use the North Field, regardless of the proximity of terminal facility expansions. Or this comment could be added to the end of the first paragraph on page 4-5, addressing San Leandro concerns about transferring South Field traffic to North Field.

19. Page 6-10 – In the discussion regarding noise analysis methodology, there should be some explanation of the difference between A-weighted and C-weighted noise (shown in Fig. 6-2) and how there are no regulatory standards for measuring or mitigating impacts from C-weighted noise.

20. Page 6-12 – In the reference to “Noise Insulation Program”, San Leandro’s Airport Noise Insulation Program, which is underway, was not mentioned.

21. Page 6-15 – 6-4.4 says “As described in Section 6.3, the Port has worked with surrounding communities to develop…” but we did not see a reference to the working groups in that section. Also, the working groups should be mentioned by name (North Field Study Group, South Field Study Group, Noise Forum). Many of the noise abatement measures have come about as a result of settlement agreements between the Port and the Cities of San Leandro and Alameda.

22. Page 6-20 or subsequent pages – There should be a comment that any proposed noise barrier could only reduce A-weighted noise; C-weighted noise would not be affected by any such barrier.

23. Page 6-21 – This section could be re-worked in light of the meeting held with residents of Neptune Drive on January 5, 2006. Reference could be made to the strong preference of the Neptune Drive residents that the noise barrier be built on airport property and not on Neptune Drive properties.
24. Page 6-22 – The last sentence of the first paragraph should explain why the noise barrier would be effective only for the first row of homes on the Bay. Also, a question regarding the noise barrier. The last sentence of the second full paragraph in the second column (For an on-Airport barrier ...) comments on a constant noise reduction until the aircraft climbs high enough to be seen above the barrier. Will there be a sudden noise increase once the aircraft climbs above the level of the barrier or would the noise grow gradually? That could have a dramatic effect.

25. Page 6-23 – Again, reference should be made to the meeting with Neptune Drive residents and property owners on January 5 and their strong preference for the barrier to be studied on airport property. Mention should also be made regarding the suggestion that was made at that meeting that the Port re-visit the concept of a cross-wind runway as a noise mitigation measure, accompanied by noise barrier walls at the east end of such a runway.

26. Page 7-2 – Compensatory Cost Centers – Can the concept of charging cargo companies for tonnage be considered, equivalent to the fees airlines pay for enplaned passengers?

27. Page 8-2 – In the second column, first bullet of “In addition to these projects,” strike “either on Airport or along Neptune Drive”.

28. Page 8-3 – The sixth bullet refers to seismic strengthening to the perimeter of Runway 11-29. Would this need to be taken into consideration before a noise barrier could be designed on the southeast side of that levee?

In the Summary of Near-Term Master Plan Projects Recommended for Further Study, the final bullet on Page 8-2 recommends the establishment of a committee to continue meetings with the Port’s Planning and Development staff and community stakeholders to provide updates on projects and receive input from the community. We ask that the Port Board of Directors endorse this recommendation. We agree that the continued communication between the Port and the community is invaluable as the Port considers development projects at OAK.

Finally, regarding environmental concerns, we feel that stronger commitments should have been made in the Draft Master Plan by the Port regarding mitigating noise impacts to surrounding communities. Assumptions are being made regarding a significant increase to the number of commercial airline flights anticipated by 2010. While noise contour forecasts may indicate CNEL levels remaining similar to today or shrinking, it is logical to conclude that single event noise incidents will increase. While Federal and State regulatory standards rely on DNL and CNEL measurements, all parties, including the Port, have acknowledged that single events are disruptive and intrusive, particularly during nighttime hours. Therefore, the Port should take a more proactive stance in addressing noise impacts from the airport’s operations as it considers the need to expand airport facilities.

Comments to Draft Master Plan 5 January 11, 2006

Thank you, again, for the opportunity to participate in this process and for consideration of these comments.

Sincerely,

Kathy Ornelas
Community Relations Representative

C: City Council Airport Committee
San Leandro Stakeholder Committee Members
5. Under “Potential Air Cargo Development,” the Executive Summary states that the “master plan recommends accommodating the lowest forecast of air cargo activity, rather than an aggressive forecast that would require a significant amount of new development.” It goes on to say that “only a modest amount of additional on-Airport area would be needed to accommodate future air cargo growth, and this area would likely be needed adjacent to existing air cargo facilities.” Further, under “Background and Overview,” the Executive Summary states that “air cargo growth is focused on existing air cargo tenants; a low-growth air cargo forecast is recommended as the Port intends to de-emphasize marketing new air cargo airlines and service.”

6. We have included this comment in the Executive Summary as suggested.

7. Under “Potential Airfield Development,” the Executive Summary states that “it is recommended that the Port not pursue a new South Field runway at this time due to environmental and financial constraints.” Further, under “Background and Overview,” the Executive Summary states that “projects are not proposed to accommodate long-term (2025) forecasts, which are speculative and not reasonably foreseeable at this time. Further, the long-term, unconstrained airline passenger forecasts are not likely to be realized due to limitations on South Field (air carrier) runway capacity (i.e., a new runway is not proposed in this master plan.”

In general, it is a reasonable assumption that, assuming the aircraft fleet using the Airport remains similar to today, the Airport cannot likely accommodate 30 million annual passengers (MAP). We have added a discussion to the Executive Summary (under “Summary of Aviation Activity Forecasts”) that describes the difficulty associated with estimating constrained demand for 2025 (i.e., given the capacity limitation of Runway 11-29 at South Field). Constrained airline passenger forecasts are dependent on many future variables including fleet mix, aircraft seating configurations, load factors, assumed taxiway and other airfield improvements, amount of delay that the airlines and airline passengers are willing to tolerate, air travel market considerations, air traffic control rules and procedures, required aircraft-to-aircraft separations due to wake vortices, all of which are likely to change between now and 2025.

8. We have included your suggested change in the Executive Summary (under “Potential Airfield Development”).

9. In the Executive Summary under “Potential Airfield Development,” we have included an estimate of the area (in acres) of remote (on-Airport, off-gate) remain overnight (RON) aircraft parking available in February 2005, as well as the amount that is planned to be available after the Terminal 2 renovation/extension is complete. The estimated range in the future remote RON aircraft parking represents our “best guess” on the area that might be required for this activity. We anticipate that the Airport will continue to have a high demand for RON aircraft parking, whether at aircraft gates or remote aprons (off-gate). The detailed calculations and explanation, which were reviewed with the Stakeholder Advisory Committee, are contained in Chapter 5, Section 5.6 of the final master plan.

10. The parking areas referred to here are for ground service equipment (GSE), not the public or employees. All GSE must have a safe place to park so that it does not interfere with the safe movement of aircraft and vehicles operating on the airfield and aprons. We have clarified this section
by adding "GSE" in front of "parking areas" under "Airline-Related Support Facilities" in the Executive Summary.

11. In the Executive Summary under "Airport Ground Access," we have changed "should" to "could," as you suggest. We have also added that this area could be considered because "of this location's good roadway access to/from the terminal complex and the availability of a large, upland area."

12. In the Executive Summary under "Environmental Considerations," we have clarified that "Port staff considered environmental issues as a screening-level (identifying key environmental benefits and constraints)." We have included similar clarifications in Chapter 6, Section 6.5 of the final master plan.

13. In the Executive Summary under "Environmental Considerations," we have changed "One environmental consideration . . . " to "The environmental consideration . . . " as you suggest. We also added to the single event noise discussion stating that the increase in flights "translates to more single aircraft overflight noise events." The tradeoff between the number of flights (which is anticipated to increase) and the noise that each of these flights generates (which is anticipated to decrease due to the slow phase-out of the cargo Boeing 727 and, in general, new aircraft and engine technologies) is why the master plan and future environmental documents look at not only time-weighted, cumulative noise contours, but also single aircraft overflight noise contours.

14. We have added the word "forecast" as you suggest (in the Executive Summary, under "Environmental Considerations").

15. We have added a brief discussion of (1) the Airport ground traffic study, (2) the Neptune Drive noise barrier study, and (3) the North Field general aviation jet "deviations" study to the Executive Summary under "Environmental Considerations."

16. We have added Davis Street (State Route 61) to the list of major roadways serving the Airport. We have also added Davis Street (State Route 61) to the list of access roadways on Figure 2.2.

17. We have added "general aviation" in front of "jets" in Section 3.4.2 summarizing noise abatement procedures, as you suggest.

18. In Section 4.2.5, under the discussion of San Leandro representatives comments, we have added that "from a runway capacity perspective, it would not be desirable to mix lighter general aviation aircraft that operate at North Field with larger aircraft flown by the passenger airlines."

19. We have expanded the discussion of A-weighted versus C-weighted scales and described some of the issues associated with using C-weighted scales in Section 6.3.1 under "Characteristics of Sound, Sound Level and Frequency" of the final master plan (in the paragraph that references Figure 6.3).

20. This section on "Noise Insulation Program" has been deleted from Section 6.4 (Other Environmental Programs and Policies) because it is already addressed in Section 6.3.7 and Figure 6.12, including the City of San Leandro Sound Insulation Program. Similarly, Section 6.4.4 (Noise Abatement) in the draft master plan has been deleted.

21. As described in our response to Comment #20 (above), we have deleted Section 6.4.4 from the draft master plan because noise abatement is already addressed in Section 6.3.7 and Figure 6.12.

22. This contention is not true. A noise barrier would affect higher frequency sounds. Both the A and C scale measure high frequency sound so both would be affected. The A scale may be affected more, but the significance of the difference cannot be known without knowing the frequency of the sound.

23. The input received at the January 5, 2006, Neptune Drive neighborhood meeting is contained at the end of Section 6.6.5 in the final master plan. We state that "all homeowners along the west side of Neptune Drive that expressed an opinion indicated that they did not want a noise barrier constructed in their rear yards despite the potential noise reduction benefit. . . . Instead, they requested that the Port continue to study the costs and benefits of constructing on-Airport noise barriers."

24. We have added a brief discussion on why a potential noise barrier is only effective for the first row of homes along Neptune Drive (along San Francisco Bay) to the end of Section 6.6.2 (The Noise Barrier Effect) in the final master plan: "This limited benefit if because the homes along the west side of Neptune Drive already serve as a noise barrier and block much of the high-frequency taxi and Runway 29 take-off roll noise from the rest of the neighborhood."

In Section 6.6.5 of the final master plan, we have added the following discussion: "When the aircraft rises above the noise barrier, the noise increase will be sudden. However, since the noise barrier reduction at this point is about 5 dBA, the increase would not be considered dramatic."

25. See response to Comment #23 (above). We have indicated that the neighbors expressed an interest in further studying on-Airport noise barriers (which can include those associated with other runways).

26. We have added discussion in "Airline Cost Per Enplaned Passenger" under Section 7.2.3 in the final master plan to indicate that the passenger airlines do not pay the Port on a "per passenger" basis. The passenger airlines pay for the amount of terminal space and gates that they use, and they pay landing fees based on weight. One can take the amount they pay and divide by the number of airline passengers to calculate an average airline cost per enplaned passenger. Airline cost per enplaned passenger is a calculated number that is useful for various analyses, comparisons, etc., but it is not the average passenger airlines pay the Port. It should also be noted that the cargo airlines pay the Port for the facilities that they use (through lease agreements) and for landing fees based on weight, similar to the passenger airlines.

The Port does collect Passenger Facility Charges (PFCs) on a "per enplaned passenger" basis, as described in Section 7.2.4 in the final master plan. PFCs are collected by the airlines when passengers purchase tickets, and forwarded to the Port, less a handling charge. PFCs are used to fund capital projects. A similar charge could be considered for the users of air cargo airlines, but would require federal legislation to implement. These charges would also likely only be able to fund capital projects.

27. In Section 8.3.1 of the final master plan (Section 8.3 of the draft master plan), we have modified this recommendation to read as follows: "Continue to study a potential Runway 29 aircraft noise barrier,
on Airport, which would provide some aircraft noise reduction for the homes on the west side of Neprue Drive in the City of San Leandro under certain, limited conditions, or other methods to reduce the effects of aircraft noise in the community (including the City of Alameda), and continue to work with the City of San Leandro on their residential sound insulation program, which is currently underway.”

28. We do not know for certain if the dike would need to be seismically strengthened prior to construction of a noise barrier, but it is quite possible.

As described in our response to Comment #27, we are recommending that the Port and City of San Leandro (and other affected communities as well) continue to work together to identify and implement methods to reduce the effects of aircraft noise in the community, including residential sound insulation programs.

Thank you for taking the time to provide detailed input on the draft master plan discussed at the December 8, 2005, Stakeholder Advisory Committee meeting. Your input has been valuable and had a true impact on the conclusions and recommendations in the master plan. We look forward to bringing the master plan process to a close and continuing to work with the City of San Leandro and other communities as projects are further evaluated and potentially implemented.

Sincerely,

Kristi McKenney
Manager, Aviation Planning and Development

cc: Douglas Mansel

San Leandro Unified School District (USD) Representatives to the Master Plan Stakeholder Advisory Committee:

Mr. Leon Glaster
San Leandro USD
14735 Juniper Street
San Leandro, CA 94579

Mr. Mike Murphy
San Leandro USD
14735 Juniper Street
San Leandro, CA 94579

Ms. Heidi Finberg
262 Davis Street
San Leandro, CA 94577

Mr. Francois Gallo
979 Woodland Avenue
San Leandro, CA 94577

City of Alameda • California

Date: January 12, 2006

To: Kristi McKenney, Aviation Planning Manager
Douglas Mansel, Aviation Planner

From: City of Alameda Representatives to Airport Master Plan Stakeholders Committee:
David Needle, Walt Jacobs, Red Wetherill, Marge McLean, and Andrew Thomas

CLASS Representatives to Airport Master Plan Stakeholders Committee:
Barbara Tuleja, Eileen Bitten, Gary Hoffer, and Laurel Impett

Subject: November 29, 2005 Draft Oakland International Airport Master Plan

At the December 2005 Stakeholder Committee meeting, Port staff requested comments on the November 29, 2005 Draft Oakland International Airport Master Plan. The Alameda representatives to the Airport Master Plan Stakeholder Committee prepared the following comments and recommendations to assist you in the preparation of the next draft Airport Master Plan.

The Alameda Representatives commend the Port staff, in particular Doug Mansel and Kristi McKenney, who have done an excellent job of preparing and presenting data and reports to the Stakeholder members. We appreciate their willingness to entertain questions and provide thorough, well-reasoned responses. The Alameda Representatives now have a greater appreciation for and understanding of the complexities associated with airport planning. We appreciate the opportunity to comment on the draft Master Plan.

Master Plan Executive Summary – Requested Revisions. The Alameda Representatives continue to be very concerned about the potential environmental and safety impacts of airport expansion on Alameda. Alameda residents are already burdened with noise from aircraft overflights, aircraft generated air pollution, airport related vehicular traffic and the threat of aircraft accidents on residential communities. Substantial increases in passengers and corresponding increases in aircraft operations from the existing 14 million annual passengers to 18 or 22 million passengers will result in significant impacts to Alameda residents.
To adequately evaluate the environmental impacts of the proposed improvements at OAK, we request that the Executive Summary be revised to include a clear statement of the total number of passengers that might be realistically expected to be served by the improvements proposed in the Master Plan.

Currently the second bullet of the Overview Section of the Executive Summary, page E-1 states that the Master Plan is designed to accommodate the 2010/2012 forecast passenger activity of 18 MAP. Near the very end of the document, on page 7-8, the draft plan states that the maximum number of airline passengers that will ever use OAK on an annual basis is just over 22 MAP “due to capacity limitations of the OAK’s main air carrier runway (Runway 11-29).”

We request that the Master Plan Executive Summary Overview section be revised to include a clear statement about the maximum number of airline passengers (MAP) and million annual tons (MAT) of cargo that can be reasonably anticipated by 2025 given the improvements proposed in the Master Plan.

On page E-2 of the Executive Summary (under Potential Airline Passenger Development), please add a statement such as the following: “Alameda Representatives stated that any recommendations made by the Alameda Representatives regarding the location of terminal projects should not be taken as an implicit endorsement of a plan to expand the airport.” Please see the Alameda Representatives October 28, 2004 letter.

On page E-3 of the Executive Summary, under General Aviation, please include some information on and discussion of the current and projected increase in helicopter activity at OAK and the related noise implications. Also please include a description of the types of training schools that are anticipated and the types of aircraft that are anticipated to be used in these schools.

On page E-3, in the airfield development section queue delay, please add a statement showing the current queue delays and perhaps the national average.

On page E-5, in the aircraft noise paragraph, please include a reference to the study of noise mitigation and specifically the study of the additional northfield-southfield taxiways.

Chapter 6: Environmental Considerations – Requested Revisions

Noise: While the Plan states that aircraft noise was studied “in some detail,” (page E-5) and indeed the Plan authors model single aircraft overflight noise, the Plan never correlates the actual impact (even at a screening level) that increased overflights would have on nearby residents. The Plan contains a generic description of the effect of noise on humans; mentioning communication interference, sleep interference, physiological responses and annoyance. What is missing, however, is an analysis of the impact on nearby residents of the single noise events associated with total operations in the Plan’s forecast year (i.e., 2010-2012). It is critically important for the public to understand, for example, how many additional nighttime flights to expect in 2010-2012 and the impact of these flights on their lives. To this end, the Plan should be able to describe, at a screening level, the frequency of increased awakenings that Alameda residents would likely experience in 2012 compared to current conditions.

The Alameda Representatives support the proposed additional studies recommended in the Master Plan to determine whether any additional taxiways or other improvements might further reduce the number of pilots who choose to not comply with the voluntary noise abatement procedure.

Transportation and Traffic: Each of the previous letters from the Alameda Stakeholders expressed our concerns about noise and traffic impacts of OAK expansion on Alameda. We appreciate the extensive work done in the Master Plan to describe and measure the potential noise impacts of OAK expansion. However, we are disappointed that the Environmental Considerations Chapter does not include a similar discussion or quantification of the potential traffic implications of expanding passenger services from 14 MAP to 18 to 22 MAP. The Master Plan should include a discussion of how the expanding Airport will accommodate the additional automobile and transit needs of 18 to 22 MAP, while minimizing the impacts of the additional traffic on neighboring jurisdictions and the region. Specifically, as described below, we recommend that the Master Plan address the feasibility of increased transit access to OAK.

The Alameda Representatives are concerned that with increasing congestion on I-880, increasing amounts of airport related traffic will choose to cut through Alameda to access the OAK. The 2010 and 2025 Land Use Plans identify a large new parking area on Ron Cowan Parkway adjacent to the City of Alameda. Locating long term parking and rental car facilities adjacent to Alameda on Doolittle Drive and Ron Cowan Parkway will increase the number of future passengers who will choose to cut through Alameda, park or drop off their car, and then proceed to the Airport.

We continue to recommend that the Master Plan prioritize locations along the Airport’s primary access routes of 98th Avenue, Hegenberger Road, and Airport Drive for automobile parking and rental car facilities. Additionally, for parking and rental car

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facilities that might remain or be constructed on Doolittle Drive or Ron Cowan Parkway, we recommend that the Master Plan include recommendations for traffic control strategies and design features that would guide the vehicles to/from 98th Avenue rather than Alameda roadways.

We support the recommendation on page 8-2 that the Port conduct a ground traffic study to determine how much airport related traffic is using local Alameda streets. However, we request that the following revisions be made to this section:

1. The recommended traffic study should be conducted by the Port prior to the first environmental document prepared for any improvements recommended in the Master Plan so that the information from the study is available for the environmental review.

2. The recommended traffic study should include tasks to complete traffic studies and intersection improvements identified in the original settlement agreement that have not yet been completed.

3. The recommended traffic study should include a commitment to ongoing or periodic monitoring, which can be used to calculate the Port’s pro rata share of necessary improvements to Alameda roadways.

Transit Improvements: Passenger growth over the next 20 years will impact the I-880 freeway and the interchanges providing access to the Airport. Moreover, regional growth over this same period will also contribute to worsening traffic congestion. We continue to request that the Master Plan include recommendations for transit improvements to accommodate increases in MAP and mitigate the regional traffic impacts that will be caused by increasing passenger and cargo activity. As a planning and feasibility study, the Master Plan should address the feasibility of providing automobile access and transit access to OAK. The Master Plan should include a discussion of the existing AirBART bus line, current capacity of that line, and the additional capacity and transit facilities that would need to be provided to accommodate 18 or 22 MAP. We appreciate that the Maps were modified to include the proposed BART connector, but we would request that the Master Plan include a discussion of the proposed BART connector, the progress that has been made to implement the connector and the remaining obstacles to project completion.

Health Risk: The Draft Plan should include a section on health risk from aircraft emissions. Aircraft are sources of toxic air contaminants that may have acute and chronic health impacts on nearby residents. The FAA/University of Missouri-Rolla/NASA/CARB study on aircraft emissions should be published within the next year. We recommend that the Master Plan add the following bullet in section 8.3 (Summary of Near-Term Master Plan Projects Recommend for Further Study). “Upon completion of the FAA/University of Missouri-Rolla/NASA/CARB study on aircraft emissions, undertake a health risk assessment to determine the health risk to nearby residents resulting from 2010-2012 aircraft operations.”

Alameda Stakeholders
Comments on Draft Master Plan
February 7, 2006

City of Alameda Representatives to the Master Plan Stakeholder Advisory Committee:

Mr. Andrew Thomas  
City of Alameda  
2263 Santa Clara Avenue  
Alameda, CA  94501

Ms. Marge McLean  
City of Alameda  
2263 Santa Clara Avenue  
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Mr. David Needle  
2981 Northwood  
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Mr. Red Wetherill  
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Mr. Walt Jacobs  
28 Balley Bay  
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CLASS Representatives to the Master Plan Stakeholder Advisory Committee:

Ms. Barbara Tuleja  
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Ms. Eileen Bitten  
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Ms. Laurel Impett  
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San Francisco, CA  94102

Mr. Gary Hoffer  
President, CLASS  
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Alameda, CA  94502

Subject: Response to Alameda Comments  
Master Plan, Oakland International Airport (OAK)

Dear Alameda Stakeholder Advisory Committee Members:

Thank you for your letter dated January 12, 2006, providing us with your comments on the draft master plan. The following paragraphs outline our response to your comments using the same headings and paragraph structure in your letter to us.

Master Plan Executive Summary – Requested Revisions

We have added a discussion to the Executive Summary (under “Summary of Aviation Activity Forecasts”) that describes the difficulty associated with estimating constrained demand for 2025 (i.e., given the capacity limitation of Runway 11-29 at South Field). Constrained airline passenger forecasts are dependent on many future variables including fleet mix, aircraft seating configurations, load factors, assumed taxiway and other airfield improvements, amount of delay that the airlines and airline passengers are willing to tolerate, air travel market considerations, air traffic control rules and procedures, and required aircraft-to-aircraft separations due to wake vortices, all of which are likely to change between now and 2025. Therefore, we cannot predict with accuracy or reliability what the constrained airline passenger forecasts might be in 2025, at least not to a level that could be included in the final master plan. However, if the aircraft fleet remains similar to today (which we believe is likely, but not certain) and assuming all of the other variables described above remain similar to today and assuming that the airlines and airline passengers are willing to tolerate an increase in delay (e.g., 4 to 5 minutes average delay per aircraft throughout the day), then Runway 11-29 might be able to accommodate between 20 and 22 million annual passengers (MAP). However, it is important to note that even upon reaching between 20 and 22 MAP, it is unlikely that the number of airline passengers using the Airport will simply stop growing. Growth will likely continue, but at a slower (trickle) rate. Further, as any of the variables described above change, the “maximum” number of passengers (as described above) would also change.

The unconstrained and constrained forecast for air cargo weight in 2025 is 1.5 million annual tons (MAT). That is, we anticipate that the existing air cargo airlines could probably grow to accommodate 1.5 MAT at their existing facilities, plus those that have not yet been constructed but previously reviewed and approved in the Airport Development Program (ADP) environmental documents. The constrained and unconstrained air cargo weight forecasts are the same. We have shown a modest expansion of the FedEx metropolis (to the north, towards Reno-Cowen Parkway) on the 2025 land-use map, which would allow FedEx to operate more efficiently and might be required to accommodate ramp area for larger (and quieter) aircraft.

In the Executive Summary under “Potential Airline Passenger Development” and other areas in the final master plan, as appropriate, we have added the following statement: “Input and recommendations provided by members of the Stakeholder Advisory Committee on potential future terminal development should not necessarily be considered implicit endorsement of future terminal expansion.”

In the Executive Summary under “Potential General Aviation Development” and in Chapter 4, Section 4.4.1 and in a footnote to Table E.1 (Summary of Unconstrained Aviation Activity Forecasts), we have expanded the discussion of existing and future helicopter operations anticipated at the Airport. In the Executive Summary under “Potential General Aviation Development,” we have added the following: “The area anticipated to be needed to base additional piston airplanes and helicopters is for hangars to park private airplanes, not aircraft associated with flight schools. Today, there is one flight school at North Field that trains students to fly helicopters. There are also two smaller flying clubs/businesses that offer flight instruction in small, piston airplanes.” To Table E.1, we have added a footnote explaining that in 2004, a new helicopter flight training school opened at North Field. The school is ramping up training classes and flight operations through 2006. During this period, the number of helicopter operations is anticipated to grow from between 2,000 to 4,000 to just over 34,000 annual operations. After this ramp-up period, it is anticipated that helicopter operations would grow 1% annually (no additional helicopter flight training schools are anticipated at North Field). Most of the helicopter training flights are conducted over Airport property.

In the Executive Summary under “Potential Airfield Development” and in Chapter 5, Sections 5.2.1 and 5.2.3, we have added the following statement (or similar): “In August 2005, the average queue delay per
aircraft was less than 10 minutes during the morning departures peak, with only occasional queue delays averaging less than a few minutes each for the remainder of the day. There is no published “national average” for queue delay. Typically, national average delays that are quoted are for total delay, including delay associated with air traffic control, mechanical delays, weather, queue delay, etc.

In the Executive Summary under “Potential Airfield Development,” we have added a discussion about potential North Field - South Field taxiway connections. We conclude that “based on measured taxi distances and estimated taxi times, as well as the airfield simulation . . . it was demonstrated that a taxiway parallel to Taxiway B on South Field (e.g., between Taxiways T and B2) would resolve most of the Taxiway B congestion and head-to-head taxi issues.”

Chapter 1: Introduction and Background – Requested Revisions

We have included the following statement in Section 1.1.3: “Some members of the Stakeholder Advisory Committee performed independent technical work to verify master plan analyses and draw their own conclusions, including preparation of simulations, spreadsheet analyses, and use of outside consultants for peer review.” We have also added a similar statement in the Executive Summary under a new subheading “Stakeholder Advisory Committee Process.”

We have included the following statement in Section 1.2: “The Port committed to prepare this master plan with community participation as a result of various agreements settling litigation over the ADP environmental review documents.”

Chapter 6: Environmental Considerations – Requested Revisions

Noise:

The potential effects of aircraft noise on humans (e.g., communication interference, sleep interference, etc.) are discussed generally in Sections 6.3.3 and 6.3.4 of the final master plan, as you note. However, the level of analysis requested is too detailed compared to the level of detail contained in the final master plan. The master plan focuses on land-use designations and areas for potential development, not specific projects. As projects undergo more detailed planning, preliminary engineering, financial feasibility review, and environmental review, only then will enough information be known to proceed with these important analyses on the effects of aircraft noise on residents in the City of Alameda. In fact, these types of analyses would be conducted on projects that come out of the master plan (when they are ripe for consideration) as part of the environmental review process that is required pursuant to the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

Even though the requested analyses are generally beyond the scope of the master plan, one can get a more detailed sense of the effects of aircraft noise on City of Alameda residents from a review of the environment documents prepared for the ADP, including the most recent (second) Supplemental Environmental Impact Report (SEIR) on the ADP (certified by the Board of Port Commissioners in November 2003). These documents analyze the effects of aircraft noise in considerable detail. Generally, we anticipate that the effects resulting from projects implemented out of the master plan to be less than those analyzed in these prior environmental documents. For example, the prior environmental documents analyzed the noise effects of aircraft operations associated with 22.4 MAP and 2.1 MAT. As described above, it is unclear whether the existing air carrier runway at South Field could accommodate more than about 22 MAP, and the 2025 forecast for air cargo weight is only 1.5 MAT. That is, the aircraft noise effects associated with projects that might come out of the master plan might be less than those described in the prior environmental documents, although more detailed work would be required to determine the effects. Therefore, the prior environmental documents are a good resource for estimating potential environmental effects on City of Alameda residents.

Transportation and Traffic:

The master plan recommends conducting a baseline traffic study to determine the number and types of vehicles (cars, trucks) accessing the Airport through the cities of Alameda, San Leandro, and Oakland. However, the level of analysis requested is generally too detailed compared to the level of detail contained in the final master plan. The master plan focuses on land-use designations and areas for potential development, and in general, not specific projects. As projects undergo more detailed planning, preliminary engineering, financial feasibility, and environmental review, only then will enough information be known to proceed with more detailed traffic studies (the baseline traffic study described above is an important first step). In fact, these types of analyses would be conducted on projects that come out of the master plan (when they are ripe for consideration) as part environmental review that is required pursuant to the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

Even though the requested analyses are generally beyond the scope of the master plan, one can get a more detailed sense of the effects of Airport traffic on Alameda residents from a review of the environment documents prepared for the ADP, including the most second SEIR. These documents analyze the effects of traffic in considerable detail. Generally, we anticipate that the effects resulting from projects implemented out of the master plan to be less than those analyzed in these prior environmental documents. That is, the traffic effects associated with projects that might come out of the master plan might be less than those described in the prior environmental documents, although more detailed work would be required to determine the effects.

We agree that locating a long-term/economy passenger and/or employee parking lot in the upland area of the Central Basin (south of Ron Cowan Parkway, adjacent to the City of Alameda) might increase traffic through the City of Alameda, especially as I-880 becomes more congested in the future. However, this potential project, as well as any other potential near-term project discussed in the final master plan, would not proceed without detailed environmental review required under CEQA and NEPA, including traffic and transportation effects. We believe that an important first step in determining potential future traffic effects is conducting the baseline traffic study described above.

It is important to note that the consolidated rental car facilities at North Field (along Doolittle Drive) are existing facilities (not proposed in the final master plan). There are currently several large signs that direct rental car customers to I-880 via 98th Avenue (not through the City of Alameda). The Port has also worked with each rental car company to show the preferred route to/from I-880 on the maps that they give to their customers (again via 98th Avenue, not through the City of Alameda). However, rental car customers that live or have business in the City of Alameda must be allowed access between the consolidated rental car facilities at North Field and the City of Alameda (along Doolittle Drive/State Route 61). The Port agrees that parking and rental car facilities should generally be located as close to the terminals as possible. This strategy provides a good level of service for airline passenger and employees, and minimizes the Port’s busing costs.
However, as the terminal area becomes more and more congested, the Port may need to explore remote (but on-Airport) parking locations for long-term/economy passenger and/or employee parking.

Regarding the proposed baseline traffic study, the three suggested additions in your letter are too detailed to include in the final master plan. On your first suggestion, we believe the baseline traffic study will provide important information that can be used in subsequent environmental review documents. However, the suggested baseline traffic study could be done before an environmental review process gets underway, as one of the first tasks (e.g., a technical study) in an environmental review process, or it could overlap with an environmental review process. On the second suggestion, all of the traffic studies associated with the ADP have been completed. The Port committed to paying its pro rata share of intersection improvements in the City of Alameda as a result of significant traffic impacts identified in the ADP environmental documents. As you know, however, intersections within the City of Alameda are within the City’s jurisdiction, and therefore, only the City can effect intersection improvements. It is worth noting that the Port would expect to commit to pay its pro rata share of intersection improvements as a result of significant traffic impacts identified in future environmental documents (and the suggested baseline traffic study might form the basis for such analyses conducted in future environmental documents). On the third suggestion, the Port is committed to conducting a baseline traffic study in the final master plan document. Future commitments (e.g., ongoing or periodic monitoring) would need to be negotiated between the Port and City of Alameda based on the results of the baseline traffic study and mitigations required in future environmental documents, if any.

**Transit Improvements:**

The Port is committed to public transportation and high-occupancy vehicle access to the Airport. For example, the Port has already invested $2.5 million in planning and is planning to commit over $25 million to the construction of on-Airport portions of the BART Connector. Further, the Airport has convenient curbside access for public transportation (AirBART and AC Transit) and high-occupancy vehicle modes (e.g., door-to-door vans). The Port is spending over $90 million to reconstruct the loop roadway and curbsides to keep the Airport convenient for all modes. These improvements should be able to accommodate the anticipated near-term traffic accessing the Airport (18 to 20 MAP in the 2010 to 2012 timeframe). Of course, any new terminal (e.g., in Area 2) would require its own curbside roadways that would be implemented with such a project (see Section 4.6.3 in the final master plan).

We have included a brief discussion of AirBART bus capacity in the final master plan (see Section 6.4.1). Essentially, as ridership grows, the Port can add additional buses to the system to increase capacity, as is done today during peak periods. A discussion of the status of the BART Connector project is contained in Section 4.6.4 of the final master plan.

**Health Risk:**

The requested analyses are generally beyond the scope of the master plan. However, one can get a more detailed sense of the effects of toxic air contaminants on Alameda residents from a review of the environment documents prepared for the ADP, including the second SEIR. These documents analyze the effects of toxic air contaminants in considerable detail. Generally, we anticipate that the effects resulting from projects implemented out of the master plan to be less than those analyzed in these prior environmental documents. That is, the health risks associated with projects that might come out of the master plan might be less than those described in the prior environmental documents, although more detailed work would be required to determine the effects. Also, we hope that health risk assessments in future environmental documents might be able to rely on more accurate aircraft engine emissions data that was collected by the Federal Aviation Administration, University of Missouri-Rolla, National Aeronautics and Space Administration, and the California Air Resources Board, and is now being analyzed.

**Air Quality Mitigation and Monitoring:**

The Port is committed to on-going air quality improvement, as outlined in Section 6.4.1 of the final master plan.

**General Document Format:**

We will include a clearer reference system for drawings, graphics, and tables in the final master plan.

Thank you for taking the time to provide detailed input on the draft master plan discussed at the December 8, 2005, Stakeholder Advisory Committee meeting. Your input has been valuable and had a true impact on the conclusions and recommendations in the master plan. We look forward to bringing the master plan process to a close and continuing to work with the City of Alameda and other communities as projects are further evaluated and potentially implemented.

Sincerely,

Kristi McKenney
Manager, Aviation Planning and Development

cc: Douglas Mansel
RE: Comments on Oakland International Airport 20-year Master Plan Stakeholder Process

Dear Mr. Grossman,

As the Oakland City Councilmember representing both the Oakland International Airport and many residents impacted by its operations, I appreciate the opportunity to comment on the ongoing Master Plan Stakeholder Process that has been coordinated by the Port of Oakland.

I would first like to offer my appreciation for the sincere commitment and effort that the Port has demonstrated in soliciting input and developing recommendations on the future land use configurations and terminal development options in the airport area. I have been apprised of the ongoing discussions from City of Oakland and Port of Oakland staff, as well as from the City of Oakland community representatives to the committee. I would like to recognize the Port for its engagement with the community stakeholders from the surrounding areas. The outstanding work of Ms. Kristi McKenney and Mr. Doug Mansel, in particular, should be commended.

It is my hope that this process will lead to a terminal development concept and land use configuration that can be supported by all parties involved. The airport is important both to my district and to the City of Oakland as a whole, and serves as a catalyst for economic development throughout the region. Ensuring that the airport is equipped to handle the projected growth in passengers and cargo activity in its terminal development concepts, land use configurations, ground transportation access, and through support services and facilities in the Airport area is important to me and my constituents.

Further, I would like to concur with the staff recommendations contained within the draft Master Plan that limits additional on-airport parking sites sponsored by the Port of Oakland to one of the nine areas identified in Figure 4.19 in the immediate airport area. I am concerned with advice given by some stakeholders to locate airport parking along Hegenberger Road and 98th Avenue off of the airport, given both the current revitalization of these corridors and the opportunity for separate economic development opportunities that might exist in these areas.

Again, I appreciate the opportunity to respond to your ongoing deliberations.

Sincerely,

Laurence E. Reid
President Pro Tempore of the City Council
Councilmember, District 7

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Oakland International Airport
Master Plan Open House / Public Meeting
Hilton Oakland Airport
January 31, 2006

Name: Harold Perez

Do you wish to be placed on our mailing list for community updates? Y/N

If so, do you prefer e-mail or US Postal mail? [ ] Y [ ] N

Question or comment:

[Editorial note: Text not legible]

In the airport going to put in better security on cargo freight because they check the passengers and luggage very well.
REPORTER'S TRANSCRIPT OF PROCEEDINGS

ON BEHALF OF THE PORT OF OAKLAND:
ANTHONY BATARSE, Port Commissioner
STEVE GROSSMAN, Director of Aviation
KRISTI MCKENNEY, Manager, Aviation Planning and Development
DOUG MANSEL, Senior Aviation Project Manager

Reported by: VALERIE E. JENSEN, CSR 4401
the master plan, Mr. Doug Mansel.

The master plan really allows us to share
with the community potential future development at the
airport. It allows us to look at what kind of demand
might be out there for our services and what kind of
projects we might need to consider to meet that demand
or what the consequences might be if we don’t meet that
demand.

The master plan, for those of you who don’t
know, really was originated by the community through
the settlement agreement process we went through a
number of years ago. This process was specifically
requested by the community. And I think we’re grateful
they did that, because it’s been a truly fruitful
effort, I know, at least on the part of the Port.
And I hope the stakeholders would say the same.

To give you a little bit of context of what
this master plan means in terms of other activities
and developments going on at the airport. Some of
you may be familiar with the current development going
on at the airport known as the ADP, the Airport
Development Program, and specific projects, such as
the terminal expansion program, E2, our roadway project.
If you’ve been to the airport recently, you’re very
familiar with these projects. They’re well underway.

It’s very exciting to see it going on.

A number of projects over the years have
been built under that program. The airport roadway
project was another collaborative effort with the
City of Alameda. Also, Gateway projects. That was
spurred, in fact, by Larry Reid and Sheila Young
and those folks from Alameda and San Leandro and
Oakland that worked together on that process.

Those projects are underway. They’re not
part of the master plan. That’s the last effort.
This is really what’s to come. So, this is sort of
delving into the future and looking forward.
None of these projects have specifically
been cleared — or will be — through the master plan
adoption process. They’re really the future. There
will be a lot more to look at in detail and study and
go over and share with the community as specific
projects come out of the master plan and go forward.

I’m going to give you a brief overview on
some of the key outcomes. And Doug will talk in more
detail about those.

Realistically, the land use maps are the key
projects to come out of this process, looking in broad
terms at what kind of land uses and where those might go
to meet some of the demand we forecast for the future.
Our primary focus, as Steve Grossman, indicated is on the near term. While it may have been appropriate some decades back to plan and pay for projects 20 years hence that might be needed, that's not appropriate for this industry anymore. So, we can look 20 years out together, we can think about it, we can forecast for it, but specific projects are really more appropriate for the near term where we know we'll need those facilities and we know we can afford them and they make sense to proceed with.

The long-term forecast you'll hear more about tonight. You'll find really that can be accommodated without any runway, which is not recommended in this master plan at this time. We'll discuss more about that in the presentation.

And I think one of the most important things you'll find is that the stakeholders, throughout the process, had a great impact on the process, but this is -- a good example of a significant area was in our cargo growth forecast. Unlike passenger demand, cargo demand can be considerably varied. We looked at a number of high-, medium- and low-growth scenarios. We're recommending the lower-growth scenario largely through a lot of input with our community groups. So, again, you'll hear more

The master plan will identify near-term projects and provide long-term on-airport general land use guidance. Again, as we get further and further into the future, it gets more and more speculative and more general and really, in the end, focuses on land use.

The master plan is providing a vehicle for community participation in the airport planning process, as Kristi and the other speakers mentioned. And, importantly, we agreed to do this -- the community requested we do that, and we're doing it under various settlement agreements that we have with the surrounding communities.

It's also important to note what the master plan will not do. It's not focusing on detailed plans for individual projects. That will come later on as projects are ripe for consideration.

It might not include every project the Port might propose in the 20-year planning horizon. As we get further and further out, the future becomes inherently uncertain. We do the best we can now, but we might miss something, especially the further out we go.

As Kristi mentioned, this master plan is not intended to approve specific projects. So, we might talk about some terminal buildings and things like that in future slides, but when our Board eventually approves this master plan, it's not approving any sort of specific projects in that master plan. Therefore, it won't undergo detailed environmental review under CEQA and NEPA, the California Environmental Quality Act.

It's important to note we did do sort of commemorative environmental screening level review in the master plan, with particular focus on aircraft noise. We did do some environmental screening -- again, with a particular emphasis on aircraft noise -- but we didn't do the detailed work that's required under CEQA and NEPA. That will be later on as projects come out of the master plan and move forward.

We'll cut right to the chase here: The key outcomes and recommendations of the master plan. Kristi hit on this a little bit. But a master plan at Oakland -- first of all, we're following the FAA guidance on preparing a master plan. They give us some guidance on how to do that. We're following that guidance.

The master plan will identify near-term
and likely isn't achievable without a new air carrier runway.

You'll see that we have not shown a new air carrier runway in the long-term. In the 2025 planning, we're not showing an air carrier runway.

It's not recommended in the master plan at this time.

What we are recommending -- I guess I should say we have identified the need for that runway. It's clear, based on demand, that a runway would be needed. We're not recommending, at this point, the Port pursue that, but we are recommending that sort of be a regional discussion.

There's a couple reasons why we don't think the Port can undertake this on its own. First of all, the environmental considerations and issues associated with building a runway likely in San Francisco Bay or through wetlands. And, second of all, the cost associated with building that runway is probably billions of dollars. It's unlikely the Port would be able to afford something like that.

So, because of those two reasons, we're recommending that the Bay Area, as a whole, look at runway capacity and tackle this issue. It really is a regional decision. Should a runway go at Oakland or should it go at San Francisco?

Well, there's certainly projected demand for it, but how that gets accommodated in the Bay Area is something the region as a whole needs to discuss.

So, that's sort of our recommendation. So, because of that, we're not likely to achieve our long-term forecasts you'll see on the next slide.

We're also -- as Kristi mentioned, we're recommending a low-growth air cargo forecast. We're going to recommend we de-emphasize our marketing of air cargo -- new air cargo airlines. This is again based on input from the Stakeholder Advisory Committee.

With that said, it's important to note we do anticipate the existing air cargo airlines at Oakland -- FedEx, UPS and others -- we do think they will continue to grow as the Bay Area grows.

It's just not going to be a super-high growth that might be expected if we went out and marketed, for example, a new cargo hub or something like that. We do expect growth in cargo focused on our existing air cargo airlines and around existing facilities, but not a huge growth that one could achieve if you went out and marketed that.

Okay. So, a summary of forecasts.

In 2004 the Port served 14.1 million annual passengers that flew in and out of Oakland. By 2005, we expect that to go to 18 million annual passengers. By 2021, up to 30 million.

Again, what's important to note about the 30 million is that's an unconstrained number. It's likely we'll not achieve 30 million because of the air carrier runway capacity at the airport.

You put all those passengers onto airplanes, and this is how it translates in terms of operations, which are takeoffs and landing. In 2004 we had 430 daily air passenger airline operations. We expect that to go to 542 by 2010.

We didn't get into the level of detail of forecasting daily airline operations for 2025. Again, you know, we probably won't get there. It's just too detailed a level of work for this sort of higher-level master planning we're doing here, land use planning.

In terms of cargo, in 2004 we had point 7 million annual tons. That's 700 thousand million tons of cargo coming in and out of the airport. We project that going to point 9 by 2010 and up to 1.5 by 2025.

And this is our low-growth air cargo forecast we talked about a few minutes ago.

When you put this cargo on the airplanes, in 2004 we had 156 daily air cargo airline operations. We're projecting that to go to 164.

It's interesting to note that growth from 156 to 164 -- we're actually expecting that to be mostly the smaller feeder air cargo planes that come in and out of the airport.

In terms of the large air cargo airplanes that FedEx, UPS and the heavy cargo airlines fly, we're actually projecting that to stay the same as it is today or what it was in 2004. The way they do that, they -- the way they accommodate more weight from point 7 to point 9 is they change their airplanes out. They fly larger airplanes to accommodate the increasing weight.

That's good news, because FedEx, in particular, flies some of the noisiest airplanes. They depart in the middle of the night -- the Boeing 727's, if you're familiar with that. So, the good news is, when the cargo grows to point 9, they'll need bigger airplanes to fly that cargo. And the good news is the bigger airplanes are substantially quieter than the current fleet.

We'll talk about that in a minute when we
look at the noise figures.

Daily general aviation operations will go from 352 to 434. We actually broke this down by type of general aviation activity in terms of helicopters, piston, turboprops, and corporate jets. Those numbers were outside on the board for anyone interested in seeing how each of those subcategories of general aviation are growing, in some cases, shrinking.

We also forecast a number of based general aviation aircraft, those aircraft that call their home Oakland and have their airplane in a hangar or on a ramp. These forecasts were prepared -- in some cases, we have wait lists for airplanes waiting to get a hangar -- and, also, based on industry trend in terms of corporate jets that are entering and exiting the fleet. So, we do forecast a bit of an increase in the number of aircraft that want to call Oakland home.

We spent a lot of time with the Stakeholder Advisory Committee talking about the relationship or a lack of a relationship between the number of operations and the number of based aircraft. In many master plans, there's actually a relationship: the more based aircraft you have, the more operations you have.

For Oakland, it's not quite as strong just looked at the earlier slide and there's more operations, more takeoffs and landings.

That is true. There will be more takeoffs and landings. However, as we talked about, we think some of those takeoffs and landings -- particularly the cargo airlines -- will be -- instead of using noisy aircraft, they will use quieter aircraft.

Even though there will be more operations, there will be quieter aircraft. So, we're predicting the noise footprint will shrink a little bit, especially up here in the northwest adjacent to Alameda.

Again, the reason for that is largely that FedEx is starting to retire their Boeing 727's. We can't affect when that happens, but we think it'll probably happen, at least in part, by 2010, given the cost of jet fuel and other considerations and the increase in cargo volume.

Okay. We have three more slides -- they're the land use maps -- and then the next steps. So, we're getting near the end here.

This first map shows Oakland Airport and the land uses that exist today. I'll point out -- highlight a few things to sort of familiarise you with that for those of you that aren't terribly familiar with the airport.

The two largest land uses on the airport are air fields, which includes the runways and taxiways.
We have, basically, two air fields -- North Field, with three runways at North Field and supporting taxiways or structures. Then, at South Field, we have one main air carrier runway -- 11/29 -- and the supporting taxiway system.

The second largest land use on the airport is actually undesignated. We have a significant amount of our land that is not designated for any aviation use currently. A lot of that is jurisdictional wetlands.
It's sort of challenging development. That is our second largest land use, undesignated.

Just to do orientation, this taxiway running from North Field to South Field is the main taxiway connector between those two air fields. It's called Taxiway Bravo, if I use that term.

I'll point out the existing Terminal 1, Terminal 2 complex in this area.
And then Kristi mentioned Terminal 2 renovation and extension work currently under construction. That's in this area right here.
Just to the west of Taxiway Bravo is the Federal Express metropolis. This is their West Coast hub.
flow of traffic to and from the -- the air traffic of the airplanes to and from the terminal.

The second thing it does is it minimizes the number of head-to-head taxi operations on Taxiway Bravo.

I'll give you an example of that.

After a FedEx airplane, for example, lands and pulls off the runway, it needs to taxi northbound on Bravo to get to the terminal, to the FedEx hub.

Meanwhile, an aircraft that parks up at the general aviation -- a corporate jet that parks at North Field may need to taxi southbound to get to runway 29 and depart. They do that for noise abatement.

So, there's the head-to-head taxi issue.

In some cases, it creates delay.

This taxiway helps alleviate that problem.

The second taxiway improvement is right here. It's a new high-speed exit off of runway 29.

After an aircraft lands on runway 29, we found, through simulation studies, that most of them actually cannot pull off on the first taxiway exit right here. They go a little too fast to do that. By the time they get to the second one right here, they're going too slow. Then we take them further away from the terminal, and they have to taxi back.

would have to tell us that, yes, it makes sense to do this development. Some of it's quite challenging, due to the aging infrastructure.

The North Field goes back to 1920. A lot of the infrastructure up there is aged.

A couple other things.

We are showing a surface parking lot at the corner of Ron Cowan Parkway. We'd like to try to keep the passenger parking in the terminal area. That's the most convenient for the airline passengers, and it is less expensive for us to operate because we don't have to operate buses all over the place. But as this area becomes more congested with replacement facilities and a new terminal, it may -- we may need to expand our surface parking.

In this case, it would probably be long-term.

Airline passenger parking or potential parking for employees. We have a lot of employees that work at the airport that need to park.

The last thing I'll point out on the 2010 to 2012 land use map is air field improvements. We are showing -- kind of dashed in here -- a taxiway parallel to Taxiway Bravo. That serves two purposes.

The first purpose is, if we do build a terminal in this area, it supports that terminal. It helps the
Another study that was recommended by the
that aren't here, but these are just examples.

Another study -- there are a couple others
coming to and from the airport.

detailed traffic study to figure out how people are
were sort of a baseline traffic study, really doing a

Leandro and the cities of Alameda and Oakland requested

One of the things that both the City of San

We think they're a good idea.

our full Board and, hopefully, they would approve it
February 27.  If it is recommended, it would go to
the Board of Port Commissioners at their meeting on

February 14. That will be reviewed and,

the Board of Port Commissioners at their meeting on
February 27. If it is recommended, it would go to
our full Board and, hopefully, they would approve it
on March 7.

It's important to mention that there are
some follow-up studies that are recommended out of this
master plan, largely, again, requested by the community.
We think they're a good idea.

One of the things that both the City of San
Leandro and the cities of Alameda and Oakland requested

was sort of a baseline traffic study, really doing a
detailed traffic study to figure out how people are
coming to and from the airport.

Another study -- there are a couple others
that aren't here, but these are just examples.

Another study that was recommended by the
...
MR. GROSSMAN: Just don’t mention it to anybody in the bar.

Okay. Now is the unique time when we will try to answer your questions. If we can’t, we’re going to note them down and get you the answer to the question, or we’ll try and answer it afterwards, depending on the question.

So, we have a line up here. We want to make sure everybody can hear the question. So, please -- I’ll be the ringmaster and direct it, probably, all to Doug, but that’s okay.

MR. MANSEL: If you do come up to speak, we’d like to get your name and -- at least your name, so we know how to spell it. So, if you wouldn’t mind filling out a speaker card, if you come up, so we have your name, that would be great.

MR. GROSSMAN: That would be wonderful.

So, who’s got a question?

Please.

MR. CLIFFORD: I’m Ethan Clifford.

What is the capacity of air ops for that single runway?

MR. GROSSMAN: That is 18 to 20 million is probably a reasonable number of people to plan for that runway. 30 million is not.

MR. CLIFFORD: Thank you.

Now, the other thing. You have entered into settlement agreements. And knowing what we know about eminent domain and things like that, do these settlement agreements also limit the various small villages at either end of the runway from changing zoning?

Are they controlled from growth by these agreements?

MR. GROSSMAN: Not to my knowledge. I don’t think the settlement agreements specifically constrain either community from that. There are agreements we reached in the ’70s and early ’80s with Alameda that do have some constraints in them, but not the most recent ones that were reached.

MR. MCNERRIE: I’ll let Doug chime in as well.

Again, if you want to be purely mathematical and you want to multiply about 50 ops an hour times 24 hours a day, you can come up with a pretty big number.

But that’s not necessarily a business realistic number because you’re not going to have that level of activity between 1:00 or 2:00 or 3:00 in the morning when you -- you do have ramp operations, but they’re not that frequent. So that’s sort of our peak hour time period.

And then there’s big dips during the day. If you came out at 2 o’clock, there’s fewer demand for flights, et cetera.

It’s very hard to say with great certainty what the capacity might be in terms of passengers -- which is a very common request, but the people want to know. That’s because it’s so dependent on such detailed factors.

For example, if Southwest changed from 737 700s to 800s and carried 20 more passengers, all of a sudden, how many people we could carry on the same runway on the same weather and same conditions changes. So, we’ve discussed it in terms of broad terms.

MR. GROSSMAN: I’m assuming those are then.

They are probably more annoying than the jets.

I’m wondering, why is it voluntary rather than mandatory?

MR. GROSSMAN: Well, I think they know the answer.

I’ll let you answer.

MR. MCNERRIE: The two percent wouldn’t be commuter in the sense of, like, commuter passenger aircraft, because none of the commercial passengers -- even the smaller commuters are taking off at North Field. But they would be general aviation, business jets. They could be carrying packages or doing other things like that, or whatever business they might be on.

And that’s exactly the purpose of that follow-up study. Let’s really understand who those two percent are and why they’re doing that.

What was the second part?

MR. MANSEL: Voluntary.

MR. MCNERRIE: Voluntary.

That goes back to Federal regulations which we operate under. Under procedures and rules that were in place prior to certain laws being passed -- specifically, ANCA in the late ’80s --
The greatest impact would be -- if a wall is going to be made, if you live in one of those homes, that's a very undesirable solution. We heard that loud and clear.

That's fine. This is purely investigation.

We're working cooperatively with the city on it. We have committed to continue to look at the specifics of a wall on the airport.

I can promise you, even if all issues were resolved and it was determined to be a worthy project to show a cost-benefit tomorrow, it would still be a very substantial project from an engineering perspective and a cost perspective and from -- not the least of which, a BCDC-building-on-and-in-the-bay perspective.

That's by no means a quick-fix project. We've got more work to do with the community to figure out what you could continue to operate. They were grandfathered in. If you didn't have those rules in place, you cannot bring new restrictions on air traffic.

It's, basically, regulated by the Federal government. To try and bring new restrictions is an extremely-onerous process. Some folks here are familiar with the Part 161 type of process. And you have to show very extreme benefit to the cost. And something like that would never qualify for even beginning the study, really.

Mr. Grossman: Okay. Another question?

Harold?

Mr. Perez: Yeah. My name is Harold Perez from the Davis West Neighborhood Group.

What I'm asking about is, first of all, on the cargo.

You say there's not going to be much more, but it shows it's going to be more. The thing is -- what I'm complaining about is they make you take your shoes off. They make you strip down, almost, to get on an airplane, yet I can go probably put up a hundred-pound bomb and stick it in the belly of the airplane, and nobody checks. There's nothing being checked at the airport on this freight cargo.

I'd like to see something better, especially after what you've seen on TV the last couple of nights.

This guy is not just kidding. Somebody is going to do something stupid. One of us -- a lot of us are going to suffer. And I would love to see something done on the freight cargo.

The other question I'd like to know is, when are they going to start that wall down the South Field?

Vince knows about it.

We showed what we would like to have. I'd like to see that wall go up.

They keep trying to push on the insulation, but, my God, I'm going to be dead before we ever get the wall up. So, if I can get the wall in, I got a little bit of a chance.

I'm hoping you can give me some kind of an answer of when you'll start the wall, because I think you guys will probably have the wall up before we will get the insulation.

And I thank you.
MR. MANSEL: I think, to add to that, it's important to note that one of the things that did come out of the study was the sound wall and noise barrier really only helped the homes that are on the west side of Neptune Drive. So, there's probably 15 homes, or something like that, on the west side of Neptune Drive right on the bay. After you get beyond those homes, the homes that are on that side of Neptune Drive actually blocked the noise from the homes further east.

So, there wouldn't be a huge benefit. There would be actually no benefit to any homes further — anywhere else in San Leandro. The only homes that benefit are those right on the water.

MR. MANSEL: While he does that, I'll answer your second question.

MR. MANSEL: Okay.

Next question?

SPEAKER: My name is William (last name unintelligible). I'm an Alameda resident.

I have two questions.

Can somebody comment on one of these?

They're saying that the helicopter traffic is supposed to decrease from around nine to seven? I think I saw that correctly. I only glanced at it, but I thought it was interesting.

MR. MANSEL: Okay.

SPEAKER: Thank you.

My second question was about the noise footprint, one of the slides you've shown.

Did I understand correctly that that footprint pretty much takes into account the average takeoff and landing of a single aircraft? In other words, if the number of takeoffs and landings double at Oakland International, that footprint potentially would stay the same if aircraft in general, don't get noisier?

MR. MANSEL: I think I would like to see if Vince — Vince Mestre is the noise consultant that helped us prepare those charts, I want to see if he could explain that.

SPEAKER: Maybe you can go back to it on the slide show.

MR. MANSEL: While he does that, I'll answer the question.

If the number of operations doubled and the aircraft were identical, they didn't change the noise level, then the noise footprint would get larger.

What happens in this case is the number of operations increases, but the number of the loudest aircraft — in particular, the hushkitted 727 aircraft that operate at night — those numbers decrease in the fleet. There's sort of an offsetting effect. The net effect is the contours get a little bit smaller because the effect of the retirement of the noisier aircraft has a greater effect than the increase in the number of operations.

SPEAKER: In other words, it is sort of like a compound effect of noise? It's not as simple as just taking the noise effect of the single takeoff?

MR. MANSEL: No.

There are three factors that are included in the contours — the number of operations, how loud the operation is and the time of day that the operation occurs. So, an operation that occurs between 7:00 and 10:00 in the evening is the same as three aircraft during the day. It's a penalty of operations.
three aircraft.

An aircraft that operates between 10 p.m.
at night and 7 a.m. in the morning goes into this
computation as though it were 10 airplanes during
the day. So, there's a factor of 10 penalty for
any aircraft that operates at night.

Those are the three main factors that go
into these footprints.

SPEAKER: Thank you. That explains it.

Mr. GROSSMAN: Okay. Yes, sir. Thank you.

MR. WOZNIAK: Gordon Wozniak, City Council
of Berkeley.

Could you put up the graph that shows the
master plan forecast, the numbers? I have a summary
sheet, but I think you had most of the information.
I wanted to ask a question about it.

The question relates to this. You were
saying, on the transportation tonnage, even the
tonnage was going to go up projected from 2004 to
2025. It roughly doubles from point 7 million tons, or
whatever, to 1.5. The number of flights were staying
about the same. You said they'll be using larger planes
because you're going to constrain the number of flights.

But in a more detailed figure which -- in the summary,
when you show the passengers -- daily passengers --
the number of passengers per flight seems to be a little
over 100. So, as you scale up your projected numbers,
basically, the numbers grow linearly.

Since you're saying now you're constrained
by one runway, why wouldn't the airlines put in bigger
planes so you might actually get substantially higher
than 207? The passenger facilities can't handle it?

Seems to me you could have a lot more passengers than
you projected.

The numbers you had here -- in 2004, there
are 44 thousand passengers per day, 430 flights. 2012
is 42 thousand and 600. That's, roughly, 100 passengers
per plane. But there are a lot bigger planes out there.

MR. MESTRE: The description of existing
noise contours, those aren't preliminary. Those are
very well established.

The airport operates a permanent noise
monitoring system that has monitors that operate 24/7
around the airport. Those contours are updated every
three months.

The airport publishes a new set of contours
every quarter. Then there's an annual report that has
a new annual contour.

So, these are not something that the
airport looks at irregularly. Every three months,
a new contour is generated. This is tracked. The
trend -- the number of people inside the contours are
reported on a quarterly basis. So, it's something
that's not exactly realtime, but three months after
the effect, the noise footprints are known.

MR. GROSSMAN: Nor will we do future noise
studies.

MR. MESTRE: Certainly, if there was some
place of information that caused us to change any major
assumption that was used in the study, either in terms
of fleet mix or number of operations or the runways
they use or the flight tracks, then the airport would
essentially generate a new future contour that would be
used for all the airport planning, community planning
and work with the community. So, there is an ongoing
program to keep track of what is happening and what
might happen in the future.

MR. WOZNIAK: You're making those projections
on the cargo.

MR. GROSSMAN: Right. Because we have
information both -- historically -- and cargo airline
plans to buy larger aircraft.

FedEx, for example, over the last 10 years,
has continually increased the size of their airplanes,
particularly here at Oakland. So, they're handling
a lot more volume, as far as packages, with not a
much greater number of airplane operations. And
they continue to buy bigger airplanes.

In the routes that are flown by passenger
carriers, today they are primarily narrow-body routes,
737's and Airbus A320s. Nothing suggests that's going
to change. Those are the most economical aircraft to
fly today.

Might they increase in size gradually?
1. Yeah, they right.
2. Again, as I think Doug mentioned, if
3. Southwest decided to buy 737 800s -- which is a
4. slightly bigger aircraft than the 700 -- we could
5. carry -- or they could carry more passengers.
6. They haven't made that decision. Nothing
7. suggests they're going to make that decision. But
8. they might.
9. So, this is our best guess right now.
10. I0 years from now we'd have to re-evaluate all this.
11. You're right. We may handle more
12. airplanes -- or not more airplanes but more
13. passengers -- because the system has changed.
14. Again, we're basing our projections on
15. what we know today.
16. MR. GROSSMAN: Hi. My name is Hannah
17. Forsythe. I'm an Alameda resident.
18. As part of your noise survey, the next one
19. you're going to be doing, are you going to be testing
20. noise levels in various parts of the county, the area?
21. I ask specifically because I've lived here only about a
22. year and a half.
23. I'd never heard an airplane until November 30.
24. I don't know what happened on November 30, but since
25. then I hear planes all the time. I can't hear Dave

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1. I'm wondering why last year, when I was
2. living here at the same time, I never heard an airplane.
3. Something is different. Something is different.
4. MR. GROSSMAN: Well, if I had to pick on
5. somebody from the FAA here, I would, but I don't see
6. them.
7. That's a great question. We'll continue
8. working to try and get you answers on that.
9. MS. FORSYTHE: Could the FAA -- I tried
10. calling them. I talked to about four people.
11. I want to do something. So, that's why I'm
12. here.
13. MR. GROSSMAN: Okay.
14. MR. GROSSMAN: I don't know where to go.
15. MR. GROSSMAN: That's a good point.
16. UNIDENTIFIED WOMAN SPEAKER: This is not a
17. question for you; it's actually an add-on to what my
18. neighbor just said.
19. I live in the same area. I went out to the
20. beach and watched flight patterns. And the planes that
21. are going over our neighborhood are headed to SFO.
22. That's what I'm discovering.
23. MR. GROSSMAN: That could be part of it.
24. Why it didn't happen last year is a whole other aspect
25. of it to consider.

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1. That is something fairly common. As you all
2. know, when the weather changes, airplanes coming into
3. SFO fly right over the Berkeley, Oakland, San Leandro
4. hills, to an extent. It's a very different operation.
5. But, again, we can check on last year and see
6. what's different, if anything. We'll keep working on
7. that.
8. Thank you.
10. If California were to build high-speed rail
11. between Northern and Southern California, would that
12. have any material impact on your projections, the use
13. of the airport?
14. MR. GROSSMAN: I'll try that one.
15. MS. MCKENNEY: Okay.
16. MR. GROSSMAN: They like to delegate up to
17. ME, so...
18. In the next 20 years, probably not, because
19. I don't know if it can be built in the next 20 years.
20. Long term? Very well may be. If there were
21. high-speed rail, it would certainly draw traffic from
22. all three Bay Area airports in the Los Angeles market
23. without a doubt.
24. So, you know, again, that's a very long-term
25. investment to be made.

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MR. GROSSMAN: All in favor? All opposed?

SPEAKER: Any comment on that?

MR. GROSSMAN: That’s a good rumour. Okay.

I can’t remember if Doug or Kristi talked about it.

This whole issue of new airports and airfield capacity is now becoming more important. We have actually started a dialogue with the Metropolitan Transportation Commission about a process to decide what is to be done in the Bay Area.

Do we put runways at our existing airports?

Do we build up some of the satellite airports that are already out there? Do we build a fourth air carrier airport somewhere in the Central Valley?

So, that’s all that is. Nobody has plans to do it. Nobody is pushing to do it.

And you can imagine the difficulty of building a new airport in somebody’s backyard. And so that’s why, as Doug mentioned, this is a regional decision.

And neither Oakland nor my friends at Millbrae International can do it on their own. And so — I mean, they proved it by spending eight million dollars and getting nowhere. So, I don’t have eight million, but... So, I think that’s going to be a very interesting political debate that goes on with high-speed rail.

Mr. Jacobs: Do we build up some of the satellite airports that are already out there? Do we build a fourth air carrier airport somewhere in the Central Valley?

Mr. Grossman: Yeah. Yeah.

About 21 years ago, when I was working at San Jose, one of the first things I did as a planning manager down there was to look at that issue.

I mentioned it in those instances in a report and got my head handed to me by Mountain View and Sunnyvale.

So, again, it comes into this regional question. Nobody wants it, but can the region force some decisions?

Moffitt has always been a logical place to look at.

Mr. Jacobs: My name is Walt Jacobs. I’m a co-chairman of the Port of Oakland Noise Forum, and I’m also the chairman of the Alameda-Airport Operations Committee.

Our Noise Forum actually came up with a couple of interesting points at our last meeting that...
I would like to mention to everybody. One of them is that there is pressure at every airport in the country to not expand, on the part of citizens, until they do two things -- quiet the airplanes and engage in some kind of dialogue and solution to pollution.

So, it's coming from a reverse direction. Now the airlines are, all of a sudden, waking up to the fact that there is a problem out there, and they've not going to get anywhere until they deal with these things, which has brought pressure on from an entirely different direction than we've seen up to now at the Noise Forum.

The other thing is that new aircraft are still being developed. There hasn't been any real discussion about that tonight, but what was that new aircraft that Boeing is building, 30 percent quieter than the quietest airliner out there?

MR. GROSSMAN: 787. Was that mentioned?

MR. JACOBS: Yeah. We could also be the beneficiary of that at some point, too.

MR. GROSSMAN: The technology is changing. The 787, of course, is essentially, I understand, designed as an intercontinental airplane -- of which we don't have a whole lot at Oakland. But that technology, as it gets applied to smaller airplanes, can certainly benefit us, as it gets applied to large cargo airplanes, can certainly benefit us.

Good point, Walt. Thank you.

Yes. Come on up.

MS. BLAND: Hi. My name is Mercedes Bland, and I'm in Alameda.

With all the growth that you projected regarding to where you'll be in 2025 with Oakland Airport, is there anything, like, planned in conjunction with the three cities that are here tonight and how all their plans have growth that will be combined and affected on 880 once everybody gets to grow?

Everybody else can grow everywhere else, but I don't see how 880 between Emeryville and the end of San Leandro has room to expand to accommodate a whole lot more, much less double.

MR. GROSSMAN: Good question. Boy, we could start a whole lot of rumors about that.

Once we get into our detailed environmental work, one of the things we have to do is coordinate with the cities around us and their plans for development and then analyze, essentially, kind of what they all look like together. It is a concern.

I mean, one of the reasons the Port has been so vocal in its support of the air-BART connector project is for that project and for BART to take a greater share of our passengers. We're hopeful, working with BART, that that will become a reality as well.

We handle about a million passengers on the buses we run to the Coliseum. With a light-rail connection, we think we could potentially double that. But that's one way to, hopefully, take traffic off the roads.

But, yes, we do have to look at that as we get into the detailed environmental assessments before the projects are approved. So, you'll see some of that as we move forward with whatever the Board decides we'll move forward with.

Good points.

Yes?

MR. WAGNER: My name is Richard Wagner. I live in Alameda.

I didn't know there was a Noise Forum. If I had known there was, I probably would have shown up a long time ago.

My comment is about the cargo planes in the middle of the night.

It seems to me -- I've never taken -- I've never recorded the exact times I hear noise, but my best recollection is around 3 o'clock when these are the first takeoffs, and then there's a period of about a half hour or so, and then it seems like there are more planes that take off.

I have two comments. One is, why can't they just take off at about the same time -- 1:00, 2:00, 3:00? I mean, there's no other traffic.

There's no -- it's not a traffic problem. Why can't they all take off within 15 minutes?

The other thing -- it seems like they're doing a lot of taxing out there. I mean, you hear the low hum of a jet aircraft.

I mean, when I fly, you get on the plane. Everybody is on. They fire it up. You back out and taxi a little bit and take off.

There's no other traffic out there, and yet I hear planes just buzzing or a plane buzzing as if they are waiting for the weather to clear or something.

I don't understand. Why can't they -- there can't be more than about five planes from FedEx and UPS that take off at that time of night. Why can't they all take off in five or 10 minutes?

MR. GROSSMAN: Good question. Well, FedEx and UPS could provide you with a detailed answer to the question.
My assumption is it's related — obviously, it's related to their business and how fast they can load, unload and get planes out of them.

Again, cargo planes operate a bit the same as passenger planes. They push back from their gates at the cargo buildings and taxi out to the runway.

I guess what I would suggest is if — one, I'm sure Walt would be willing to talk to you about the Noise Forum. You're certainly invited to attend.

Two, I don't know if you're fully aware of our Noise Abatement Office that we have, because we could tell you exactly what time that's happening, where those airplanes are flying and what the noise levels are. And so if you would afterwards — actually, Wayne has his hand raised back there.

Get a card from Wayne. If you can make the time, come in and talk to Wayne and the staff.

You'll be amazed at the information they can provide you. We can also do some work with you on some of the business reasons why things happen.

MR. PEREZ: You were talking about newer, smaller aircraft.

MR. GROSSMAN: Oh, you can.

MR. PEREZ: I'd like to ask another question.

MR. GROSSMAN: You can.

MR. PEREZ: You were talking about newer, smaller aircraft.

MR. GROSSMAN: Actually, Wayne has his hand raised back there.

MR. PEREZ: You were talking about newer, smaller aircraft.

MR. GROSSMAN: And cajole FedEx into phasing out their noisy aircraft.

MR. PEREZ: How come?

MR. GROSSMAN: How come?

MR. KROLL: Hi. Jim Kroll again.

MR. GROSSMAN: How come?

MR. PEREZ: How come?

MR. KROLL: Hi. Jim Kroll again.

MR. GROSSMAN: Actually, Harold, we're talking about new, quieter, larger aircraft that will come into South Field. And we have no plans to change our current runway program. So, our expectation is that all scheduled air carrier aircraft, be they passenger or cargo, will operate out of South Field.

MR. GROSSMAN: In the master plan as such.

UNIDENTIFIED WOMAN SPEAKER: We live in Alameda. I would like to speak on behalf of my in-laws here, Patrick and Fran Reyes.

Their concern is that — geographically, they did a study for the noise levels. Surprisingly enough, one side of the street were all given the opportunity to have double-paned windows, double-paned doors, and then, 10 steps away across the street, they did not.

They're wondering, since the fact that — the Oakland Airport is expanding, and you're talking about quieter planes and all that. However, it'll take time before these quieter planes come aboard.

Is there any other further studies they can do? Because they're really hearing these planes every day louder and louder.

MR. GROSSMAN: Sure.

That's always a challenge for an airport...
insulation program, we were as liberal as we could be,
under the Federal guidelines, to draw that line. So,
in some cases, people are getting insulation who would
not normally receive it but, because we didn’t want to
break up blocks, again, the line was drawn where it is.
We routinely look at the issue of the
insulation program.
It may well be that, as part of our
environmental studies, we’ll look at are there any
other homes that need to be insulated. But I don’t
want to mislead you. Generally speaking, as the
airport environment gets a bit quieter, there is
less justification for us, in working with the Federal
government, to approve additional homes to be insulated.
That’s just kind of the facts.
So, while we’ll look at it, I don’t hold
out a lot of hope we’re going to expand the insulation
program beyond the boundaries today.
Ready to go home?
Sounds like it.
Great.
Thank you all for coming out tonight. We
will be here if you have any questions.
Ms. McKENNEY: We want to let folks know.
If you picked up a handout, all this information is
on the Oakland Airport web site, www.oaklandairport.com,
and more.

JENSEN REPORTING SERVICE (510)886-6868 62

STATE OF CALIFORNIA

I do hereby certify that the hearing
was held at the time and place therein stated; that
the statements made were reported by me, a certified
shorthand reporter and disinterested person, and were,
under my supervision, thereafter transcribed into
typewriting.
And I further certify that I am
not of counsel or attorney for either or any of the
participants in said hearing nor in any way personally
interested or involved in the matters therein discussed.
IN WITNESS WHEREOF, I have hereunto set
my hand and affixed my seal of office this 2nd day of
February 2006.

---------------------------------
VALERIE E. JENSEN
Certified Shorthand Reporter
### Appendix D  
**Glossary of Acronyms**

#### Land-Use Designation Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Airfield</td>
</tr>
<tr>
<td>ARB</td>
<td>Aviation-Related Business</td>
</tr>
<tr>
<td>ARS</td>
<td>Airline-Related Support</td>
</tr>
<tr>
<td>C</td>
<td>Cargo</td>
</tr>
<tr>
<td>GA</td>
<td>General Aviation</td>
</tr>
<tr>
<td>PF</td>
<td>Passenger Facilities</td>
</tr>
<tr>
<td>R</td>
<td>Recreation</td>
</tr>
<tr>
<td>U</td>
<td>Undesignated</td>
</tr>
</tbody>
</table>

#### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3xx</td>
<td>Airbus aircraft type (fill in xx with appropriate model numbers)</td>
</tr>
<tr>
<td>AAD</td>
<td>Average Annual Day</td>
</tr>
<tr>
<td>AAIA</td>
<td>Airport and Airway Improvement Act</td>
</tr>
<tr>
<td>AC</td>
<td>Advisory Circular</td>
</tr>
<tr>
<td>ACIP</td>
<td>Airport Capital Improvement Program</td>
</tr>
<tr>
<td>Acre</td>
<td>Area comprised of 43,560 square feet</td>
</tr>
<tr>
<td>ACTIA</td>
<td>Alameda County Transportation Improvement Authority</td>
</tr>
<tr>
<td>ADP</td>
<td>Airport Development Program</td>
</tr>
<tr>
<td>ADPM</td>
<td>Average Day, Peak Month</td>
</tr>
<tr>
<td>AIMP</td>
<td>Airport Improvement Program</td>
</tr>
<tr>
<td>ANCA</td>
<td>Airport Noise and Capacity Act of 1990</td>
</tr>
<tr>
<td>ANOMS</td>
<td>Airport Noise and Operations Monitoring System</td>
</tr>
<tr>
<td>APU</td>
<td>Auxiliary Power Unit</td>
</tr>
<tr>
<td>ARFF</td>
<td>Airport Rescue and Firefighting</td>
</tr>
<tr>
<td>ARP</td>
<td>Airport Roadway Project</td>
</tr>
<tr>
<td>B7x7</td>
<td>Boeing aircraft type (fill in x with appropriate model number)</td>
</tr>
<tr>
<td>BART</td>
<td>(San Francisco) Bay Area Rapid Transit District</td>
</tr>
<tr>
<td>BCDC</td>
<td>(San Francisco) Bay Conservation and Development Commission</td>
</tr>
<tr>
<td>CFC</td>
<td>Customer Facility Charge</td>
</tr>
<tr>
<td>CIP</td>
<td>Capital Improvement Program</td>
</tr>
<tr>
<td>CLASS</td>
<td>Citizens’ League for Airport Safety and Serenity</td>
</tr>
<tr>
<td>CMA</td>
<td>Congestion Management Agency</td>
</tr>
<tr>
<td>CNEL</td>
<td>Community Noise Equivalent Level</td>
</tr>
<tr>
<td>CNG</td>
<td>Compressed Natural Gas</td>
</tr>
<tr>
<td>CUTE</td>
<td>Common Use Terminal Equipment</td>
</tr>
<tr>
<td>dB</td>
<td>Decibel</td>
</tr>
<tr>
<td>dBA</td>
<td>A-weighted decibel</td>
</tr>
<tr>
<td>Acronym</td>
<td>Definition</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
</tr>
<tr>
<td>DNL</td>
<td>Day Night Noise Level</td>
</tr>
<tr>
<td>EIR</td>
<td>Environmental Impact Report</td>
</tr>
<tr>
<td>FAA</td>
<td>Federal Aviation Administration</td>
</tr>
<tr>
<td>FAR</td>
<td>Federal Aviation Regulations</td>
</tr>
<tr>
<td>FBO</td>
<td>Fixed Base Operator</td>
</tr>
<tr>
<td>FICAN</td>
<td>Federal Interagency Committee on Airport Noise</td>
</tr>
<tr>
<td>FICON</td>
<td>Federal Interagency Committee on Noise</td>
</tr>
<tr>
<td>GA</td>
<td>General Aviation</td>
</tr>
<tr>
<td>GAAP</td>
<td>Generally Accepted Accounting Principals</td>
</tr>
<tr>
<td>GAMA</td>
<td>General Aviation Manufacturers Association</td>
</tr>
<tr>
<td>GASB</td>
<td>Government Accounting Standards Board</td>
</tr>
<tr>
<td>GGE</td>
<td>Gasoline Gallon Equivalents (a measure of CNG usage)</td>
</tr>
<tr>
<td>GRE</td>
<td>Ground Run-up Enclosure</td>
</tr>
<tr>
<td>GSE</td>
<td>Ground Service Equipment</td>
</tr>
<tr>
<td>HNL</td>
<td>Hourly Noise Level</td>
</tr>
<tr>
<td>Hz</td>
<td>Hertz</td>
</tr>
<tr>
<td>IAB</td>
<td>International Arrivals Building</td>
</tr>
<tr>
<td>IFR</td>
<td>Instrument Flight Rules</td>
</tr>
<tr>
<td>KJOB</td>
<td>Berkeley Keep Jets Over the Bay Committee</td>
</tr>
<tr>
<td>LEED</td>
<td>Leadership in Energy and Environmental Design</td>
</tr>
<tr>
<td>Leq</td>
<td>Equivalent Noise Level</td>
</tr>
<tr>
<td>Lmax</td>
<td>Maximum Noise Level</td>
</tr>
<tr>
<td>LOI</td>
<td>Letter of Intent</td>
</tr>
<tr>
<td>MAP</td>
<td>Million Annual Passengers</td>
</tr>
<tr>
<td>MAT</td>
<td>Million Annual Tons</td>
</tr>
<tr>
<td>MD</td>
<td>McDonnell Douglas (now Boeing)</td>
</tr>
<tr>
<td>MMP</td>
<td>Materials Management Program</td>
</tr>
<tr>
<td>MSL</td>
<td>(above) Mean Sea Level</td>
</tr>
<tr>
<td>MTC</td>
<td>Metropolitan Transportation Commission</td>
</tr>
<tr>
<td>NASA</td>
<td>National Aeronautics and Space Administration</td>
</tr>
<tr>
<td>OAK</td>
<td>Oakland International Airport</td>
</tr>
<tr>
<td>OFA</td>
<td>Object Free Area</td>
</tr>
<tr>
<td>OMC</td>
<td>Oakland Maintenance Center</td>
</tr>
<tr>
<td>PAL</td>
<td>Planning Activity Level</td>
</tr>
<tr>
<td>PFC</td>
<td>Passenger Facility Charge</td>
</tr>
<tr>
<td>RAPC</td>
<td>Regional Airport Planning Committee</td>
</tr>
<tr>
<td>RASP</td>
<td>Regional Airport System Plan</td>
</tr>
<tr>
<td>RON</td>
<td>Remain Overnight</td>
</tr>
<tr>
<td>RSA</td>
<td>Runway Safety Area</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>SEL</td>
<td>Sound Exposure Level</td>
</tr>
<tr>
<td>SENEL</td>
<td>Single Event Noise Exposure Level</td>
</tr>
<tr>
<td>SID</td>
<td>Standard Instrument Departure</td>
</tr>
<tr>
<td>SIP</td>
<td>Sound Insulation Program</td>
</tr>
<tr>
<td>SIMMOD</td>
<td>Airport and Airspace Simulation Model</td>
</tr>
<tr>
<td>SPL</td>
<td>Sound Pressure Level</td>
</tr>
<tr>
<td>Sq. ft.</td>
<td>Square Feet</td>
</tr>
<tr>
<td>STIP</td>
<td>State Transportation Improvement Program</td>
</tr>
<tr>
<td>TAF</td>
<td>Terminal Area Forecast</td>
</tr>
<tr>
<td>TEA-21</td>
<td>Transportation Equity Act for the Twenty-First Century</td>
</tr>
<tr>
<td>UPS</td>
<td>United Parcel Service</td>
</tr>
<tr>
<td>USPS</td>
<td>United States Postal Service</td>
</tr>
<tr>
<td>VFR</td>
<td>Visual Flight Rules</td>
</tr>
</tbody>
</table>
AVIATION COMMITTEE  
BOARD OF PORT COMMISSIONERS  
OF THE CITY OF OAKLAND

Kenneth Katzoff, Chair  
Darlene Ayers-Johnson  
Frank King

Subject: Master Plan Progress Report

Dear Committee Members:

The purpose of this letter is to update the Aviation Committee on the progress of the master plan for Oakland International Airport (OAK). This letter has three main sections: (1) Background, (2) Summary of Technical Work, and (3) Master Plan Administration (Budget and Schedule Update).

Background

The Port of Oakland executed Phase One and Phase Two settlement agreements with the City of Alameda, Citizens League for Airport Safety and Serenity (CLASS), and Berkeley Keep Jets Over the Bay Committee (collectively, the Petitioners) on November 14, 2001, and October 8, 2002, respectively, in which the Port agreed to prepare a 20-year master plan for Oakland International Airport. The Port aviation planning staff is preparing the master plan, with assistance from specialized consultants for graphics, airfield simulation, aircraft noise analysis, and administration (see summary table in the administration section of this letter).

The central process for conducting the master plan is a series of meetings with a Stakeholder Advisory Committee. The role of the Stakeholder Advisory Committee is to (1) advise Port staff on long-range, high-level planning issues at OAK, (2) provide input on master plan technical issues, and (3) identify potential impacts early on in the planning process. The Stakeholder Advisory Committee consists of representatives (community members and/or staff) from the cities of Alameda, San Leandro, and Oakland, and Oakland Unified School District, Alameda County, Berkeley Keep Jets Over the Bay Committee, and Airport users, including fixed base operators, passenger and cargo airlines, the Port's Airline Liaison Office, and flight training light general aviation aircraft operators. Committee meetings are scheduled every one to two months and are structured around master plan technical elements and topics. The following table outlines the meetings to date and schedule for remaining meetings.

The next section of this letter provides an overview of the technical work completed and presented to the Stakeholder Advisory Committee in meetings one through five.

As with most airport master plans, clear, quality graphics are one of the most important aspects for communicating master plan concepts and land-use plans with stakeholders and decision makers. We have included 12 graphics with this letter (collated at the end) that summarize technical work to date. These 12 graphics are representative samples of the over 40 graphics that have been prepared to date for this master plan. Most of these graphics will be used in the final master plan documentation (land-use plan). The title of each graphic is in the upper right corner of the title block below “Oakland International Airport Master Plan” (vertically). All graphs, which show years along the horizontal axis, are titled “Forecast,” with a more detailed graph description along the top, including a graph number (e.g., Graph 1P).

Summary of Technical Work

This section of the letter provides a summary of the technical work completed and presented to the Stakeholder Advisory Committee in meetings one through five. Essentially, forecasts of future aviation activity at OAK have been completed for each of the three primary types of Airport users: (1) airline passengers, (2) air cargo, and (3) general aviation (including corporate jets and turboprops, helicopters, and piston aircraft). Potential areas on the Airport have been identified for future development, along with appropriate planning considerations. The forecasts inform the amount of area required for possible future development, and will be used for master planning tasks, including the airfield simulation work, which will assist Port staff in evaluating runway and taxiway capacity and delay issues. The forecasts will also be forwarded to the Federal Aviation Administration (FAA) for their approval.

Existing Conditions

At the first Stakeholder Advisory Committee, Port staff presented a summary of existing conditions at OAK. Existing conditions are summarized on the first two graphics, “Existing Land-Use Map” and “Existing Conditions.” The “Existing Land-Use Map” shades areas on the Airport by primary land use, including airfield, passenger facilities, cargo, general aviation, and other
ues. "Existing Conditions" provides relevant Airport statistics, including the amount of area (acres) related to each of the primary land uses shown on the land-use map.

**Planning Horizon and Inherent Uncertainties in Forecasting**

One of the most important master plan tasks is to forecast near-term and long-term activity at the Airport (e.g., airline passengers, air cargo tonnage, flights, etc.). However, it is important to note that forecasts of aviation activity are almost always wrong (in other words, the actual number of passengers realized in any particular year rarely ever matches the forecast number of passengers for that year, for example). This difference occurs because of trend-breakers. Example trend-breakers include airline deregulation, the Gulf War, September 11, jet fuel availability and prices, SARS, economic downturns, low-cost carrier competition, etc. Because of this reality, airport planners must focus on plans, programs, and projects that are flexible and workable for a range of possible future conditions. Moreover, actual development should be tied to activity levels, not specific years, because the specific level of activity warranting new development may occur sooner or later than the projected years. However, forecasting the approximate years or range of years that a certain amount of activity is anticipated to occur is a necessary master plan task to relate potential development to its surroundings (e.g., other activities and programs) and for general discussion purposes.

For the purposes of this master plan, Port staff and the Stakeholder Advisory Committee agreed that the near-term planning horizon (5-years out) will be 2010, and the long-term horizon will be 2025 (20-years out). More detailed forecasts have been prepared for the 2010 timeframe (when the future is somewhat more predictable), and more general forecasts have been prepared for 2025 (when the future is substantially more uncertain).

The graphic titled "Forecasting Process" outlines the detailed forecasting process for each of the three primary types of Airport users: (1) airline passengers, (2) air cargo, and (3) general aviation (including corporate jets and turboprops, helicopters, and light piston aircraft).

**Airline Passengers and Flights**

The first "Forecast" graph (Million Annual Passengers, Historic and Forecast. Graph 1P) shows the historic and forecast number of airline passengers at OAK. The historic data is based on Port and FAA data. The forecasts are from the FAA’s Terminal Area Forecast for OAK and the Regional Airport Planning Committee’s Regional Airport System Plan (RASP). Based on recent trends at OAK and these forecasts prepared by others, Port staff and the Stakeholder Advisory Committee agreed to plan for 16 million annual passengers (MAP) in 2010 and 30 MAP in 2025. Port staff and the Committee also discussed that the next round of terminal development may be more appropriately planned, designed, and constructed for slightly more than 16 MAP and slightly beyond the 2010 timeframe. 18 to 20 MAP (which would occur approximately in the 2010 to 2012 timeframe) provides a good range to consider for the next round of passenger facility planning, design, and construction at the Airport.

The following table summarizes the master plan forecasts for airline passengers and airline passenger flights:

<table>
<thead>
<tr>
<th>Existing Master Plan Passenger Forecasts</th>
<th>2010</th>
<th>2012</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Million Annual Passengers (MAP)</td>
<td>14.1</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>Planning Day Passengers (Average Day, Peak Month)</td>
<td>43,745</td>
<td>56,047</td>
<td>63,158</td>
</tr>
<tr>
<td>Daily Flight Operations</td>
<td>430</td>
<td>542</td>
<td>983</td>
</tr>
</tbody>
</table>

(1) A flight or operation is one take-off or landing. In other words, if there are 430 flights, there are 215 take-offs (departures) and 215 landings (arrivals).

Based on simulation analyses that count the number of aircraft by airline on the ground throughout the day, and more traditional master plan calculation techniques, it was estimated that the Airport will need between 46 and 50 total aircraft gates (between 17 and 21 gates more than the current gates plus those under construction) to accommodate passenger demand in the 2010 to 2012 timeframe. From a level of service perspective, 46 to 50 total aircraft gates results in between 6 to 6.5 departures per gate per day, and 37,000 to 42,000 passengers per gate in the peak month (August). This compares to 8.9 daily departures per gate per day in August 2004 (from 24 gates), and 56,500 passengers per gate in August 2004. The national average is about 5.5 departures per gate per day, with Mineta San José International Airport having approximately 6.3 departures per gate per day from 31 gates (based on June 2004 data).

Although runway capacity/delay/congestion will be the topic of a future Aviation Stakeholder Advisory Committee meeting (in March and April 2005), it appears, based on preliminary analyses, that the number of aircraft operations required to serve 18 to 20 MAP can be accommodated on the existing South Field runway (Runway 11-29), with some reasonable increase in delay (there is almost no delay today).

Port staff and the Stakeholder Advisory Committee reviewed three possible areas for future terminal development that could accommodate 17 to 21 additional gates (i.e., beyond existing gates plus those currently under construction). The three areas are shown on a graphic titled "Potential Terminal Development Areas." Port staff prepared 13 potential terminal development concepts (2 concepts in Area 1, 9 concepts in Area 2, and 2 concepts in Area 3). For each concept, the following planning considerations were discussed:

- Runway access/taxiways
- Terminal aircraft parking area
- Landside access roads, wayfinding, curbside length, parking (area and revenue)
- Walking distances
- Environmental constraints
- Constructability (existing facilities must remain operational)
- Total project cost (including environmental mitigations, replacement facilities, etc.)
- Other considerations specific to a particular concept
Three sample concept graphics are provided with this letter, one in each of the three potential terminal development areas: "Potential Terminal Development Concept 1B / 2C / 3B." Port staff received official comment letters from the Stakeholder Advisory Committee representatives of cities of Alameda and Oakland. Based on comments in these letters and comments from the members of the Stakeholder Advisory Committee during the meetings, there appears to be general consensus that Area 2 is the best location for potential terminal development at OAK. Area 2 is less challenging environmentally and is more financially feasible. Port staff generally concurs that Area 2 is the best area for potential terminal development, although it would require relocation of the UPS and belly cargo buildings, Buildings M-105 and M-112 (shown on the graphics as "Cargo Building"). As outlined in the letter from the City of Alameda, some of the Stakeholder Advisory Committee representatives are concerned about any future development at OAK. Other representatives indicated that mitigation measures need to be explored to offset potential environmental impacts associated with future development (some environmental issues have been identified in each potential terminal development concept and will be discussed in more detail at a Stakeholder Advisory Committee meeting in June 2005).

Air Cargo and Flights

The next "Forecast" graph (Million Annual Tons of Cargo (Rolling) – Bay Area Airports. Graph 1D) shows the historic and forecast weight of air cargo (including air mail) at OAK, as well as at San Francisco and Mineta San José International airports. The high growth forecast for OAK, 5.14% annual growth in air cargo weight, was developed to show the growth rate required to reach the weight level projected for 2010 in the Supplemental Environmental Impact Report for the Airport Development Program (i.e., 2.1 million annual tons, or MAT) by 2025. The medium growth forecast reflects the RASP growth rate (4.52% annual growth in air cargo weight) starting from the current weight level. The low growth forecast, 3.59% annual growth in air cargo weight, reflects the historical average annual growth for air cargo in the Bay Area from 1990 through present. Using the low growth forecast (3.59% annual growth rate), Port staff believes that OAK will handle approximately 0.9 MAT, or 900,000 tons, in 2010 and 1.5 MAT in 2025. The majority of this air cargo weight (over 75%) is expected to be carried on FedEx (in larger aircraft, such as Airbus A-300s and A-310s, DC-10s and MD-11s). By 2010, Port staff expects FedEx to have phased out all but one of their nighttime Boeing 727 operations (the oldest and noisiest aircraft in their fleet).

Although they do not carry a significant amount of air cargo weight (less than 2%), a significant number of air cargo operations (almost 58%) occur with smaller single-engine and multi-engine piston and turboprop aircraft operating from North Field. These flights operate to smaller airports carrying bank checks and feeding FedEx and other large air cargo airlines, among other tasks.

The following table summarizes the master plan forecasts for air cargo weight and total cargo airline flights:

<table>
<thead>
<tr>
<th>Master Plan Cargo Forecasts</th>
<th>2010</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Million Annual Tons (MAT) (12 months ending Nov., 2004)</td>
<td>0.72</td>
<td>1.5</td>
</tr>
<tr>
<td>Daily Flight Operations (2003 annual average day)</td>
<td>195</td>
<td>194</td>
</tr>
</tbody>
</table>

(1) One ton is equal to 2,000 pounds (also called a short ton), which is equal to approx. 0.9 metric tons.
(2) A flight or operation is one take-off or landing.
Ins not available

Port staff and Stakeholder Advisory Committee representatives discussed possible areas on the Airport for potential air cargo development areas, as shown in a graphic titled "Potential Air Cargo Development Areas." Appropriate planning considerations are listed for each area. Areas 1 and 2 provide significant area for future air cargo development and are generally not needed to support the forecast level air cargo activity. However, if the Port chose to aggressively market new air cargo development, these areas might be needed and the forecasts would likely need to be increased. Area 3 provides for a modest expansion of the existing FedEx complex. Area 4 (also known as Area 2 from the terminal graphics) could accommodate new and/or relocated air cargo facilities, in conjunction with potential terminal development.

Port staff received an official comment letter from the Stakeholder Advisory Committee representatives from the City of Oakland. Based on comments in this letter and comments from the members of the Stakeholder Advisory Committee during the meetings, there appears to be general consensus that Areas 3 and 4 provide the best location for potential air cargo development at OAK. Port staff generally concurs that Areas 3 and 4 are the best areas for potential air cargo development (as informed by the forecasts, assuming an non-aggressive marketing/strategic to attract new air cargo development to OAK).

General Aviation Operations and Based Aircraft

The final "Forecast" graph (Annual General Aviation and Military Operations. Graph 1D) shows the historic and forecast number of general aviation and military aircraft operations at OAK. Since 2000, the total number of general aviation aircraft operations has plummeted from over 250,000 annual operations (take-offs and landings) to less than 150,000 today (over a 40% decrease).

General aviation operations are divided into four categories for the purposes of forecasting: (1) helicopters, (2) jets (including corpora5e jets), (3) turboprops (turbine engines that spin propellers), and piston (including fixed and gliding flights).

For helicopters, Port staff assumed a 1% annual growth rate in addition to a significant jump in the middle of 2005 when a new helicopter flight training school starts operations at North Field (Silver State helicopters). For jets, a 3% annual growth rate was assumed, based on industry trends and forecasts (e.g., forecasts prepared by others, including National Business Aviation Association, Rolls-Royce, and Honeywell). For piston, Port staff forecast a continued decrease
in the number of operations over the 20-year master planning horizon at 1% annually. It is anticipated that turboprop operations will remain constant over the planning horizon.

Port staff also prepared an inventory of aircraft currently based at the airport by type of aircraft (helicopter, jet, piston, turboprop). Forecasts of based general aviation aircraft were based on current waiting lists for hangar space at OAK and industry trends and forecasts (e.g., forecasts prepared by others, including National Business Aviation Association, General Aviation Manufacturers Association, Rolf-Reyoe, and Honeywell). It is important to note that there is no direct correlation between the existing or projected number of general aviation operations and the number of based aircraft at OAK. For example, basing a corporate jet at OAK may actually decrease operations because the corporate jet operator no longer needs to fly into and out of OAK just to pick-up and drop-off passengers (i.e., the aircraft is already parked at OAK ready to go). However, some based aircraft, such as those at flight schools, generate disproportionately high number of operations due to training activity (such as touch and go flights, which is a series of take-offs and landings in a rectangular pattern). It should also be noted that most of the anticipated new based aircraft demand is for hangars, not tie-down space on a ramp.

The following table summarizes the master plan forecasts for general aviation operations and based aircraft by type of aircraft (helicopter, jet, piston, turboprop):

<table>
<thead>
<tr>
<th>Type of Aircraft</th>
<th>Existing</th>
<th>Master Plan General Aviation Forecasts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2010</td>
</tr>
<tr>
<td>Helicopter</td>
<td>2,704</td>
<td>35,607</td>
</tr>
<tr>
<td>Jet</td>
<td>16,873</td>
<td>19,887</td>
</tr>
<tr>
<td>Piston</td>
<td>103,542</td>
<td>97,902</td>
</tr>
<tr>
<td>Turboprop</td>
<td>5,822</td>
<td>5,855</td>
</tr>
<tr>
<td>Total</td>
<td>126,071</td>
<td>133,462</td>
</tr>
<tr>
<td>Helicopter</td>
<td>7</td>
<td>977</td>
</tr>
<tr>
<td>Jet</td>
<td>45</td>
<td>55</td>
</tr>
<tr>
<td>Piston</td>
<td>284</td>
<td>296</td>
</tr>
<tr>
<td>Turboprop</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>350</td>
<td>434</td>
</tr>
<tr>
<td>Based Aircraft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helicopter</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>Jet</td>
<td>29</td>
<td>30</td>
</tr>
<tr>
<td>Piston</td>
<td>228</td>
<td>300</td>
</tr>
<tr>
<td>Turboprop</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>277</td>
<td>384</td>
</tr>
</tbody>
</table>

(1) An operation is one take-off or landing.
(2) Includes anticipated increases in operations due to the new helicopter training school (Blair State Helicopters) based at North Field.
(3) The planning day is the annual average day for general aviation.

Port staff and Stakeholder Advisory Committee representatives discussed possible areas on the Airport for potential general aviation development areas, as shown in a graphic titled "Potential General Aviation Development Areas." Areas 1 through 3 provide new areas for general aviation development, such as corporate jet hangars or consolidation of light general aviation hangars.

Area 4 is the redevelopment of existing general aviation facilities. Appropriate planning considerations are listed for each area.

Port staff and the Stakeholder Advisory Committee representatives discussed the various development areas at the December 2004 meeting. Several Committee members suggested some additional planning considerations, which were added to the graphic. However, the Committee did not discuss a preferred alternative land-use area for general aviation activity.

This topic will be agendized for discussion at a future Stakeholder Advisory Committee meeting.

Next Steps

Port staff plans to use the forecast number of operations for future master plan tasks, such as selecting airfield operations to determine runway and taxiway capacity, delay, and congestion. The potential development areas and planning considerations will be used to formulate land-use plans and master plan documentation.

Master Plan Administration

The master plan project is part of the Port’s Capital Improvement Program (CIP), and all work has been and will be charged to appropriate CIP element and work order numbers. The following table presents a snapshot of the budget for the master plan:

<table>
<thead>
<tr>
<th>Resource</th>
<th>Original Budget</th>
<th>Brief Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphics/Report Production</td>
<td>$75,000</td>
<td>Board approved contract for $75,000 with Finger Design Associates (Resolution No. 04117); Board approved supplemental contract with Finger Design Associates (Resolution No. 04904) to add $7,005 to the original contract, for a total of $81,500. approx. $1,500 spent</td>
</tr>
<tr>
<td>CAD Services/Engineering</td>
<td>$30,000</td>
<td>Approx. $14,700 spent (in-house/Engineering Division staff costs)</td>
</tr>
<tr>
<td>Division Support</td>
<td>$20,000</td>
<td>Contract with Outside Consulting Services, Inc.; approx. $4,300 spent</td>
</tr>
<tr>
<td>Administrative Support</td>
<td>$35,000</td>
<td>Port staff is doing most of the printing in-house (e.g., mailing handouts); approx. $4,000 spent</td>
</tr>
<tr>
<td>Printing</td>
<td>$30,000</td>
<td>Approx. $10,000 spent</td>
</tr>
<tr>
<td>Legal Services</td>
<td>$150,000</td>
<td>Board approved contract for $150,000 with Mastre Grove Associates (Resolution No. 04306); approx. $10,000 spent</td>
</tr>
<tr>
<td>Aircraft Noise Consulting</td>
<td>$100,000</td>
<td>Board approved contract for $100,000 with ATAC Corporation (Resolution No. 04118); approx. $11,000 spent, plus an additional $85,000 committed (work-in-progress in preparation for March 3, 2005, Stakeholder Advisory Committee meeting)</td>
</tr>
</tbody>
</table>

As shown in the status for each resource, the overall master plan is still well under the proposed budget (approximately 48% spent, compared to the originally authorized budget for the master plan, excluding the recent Board authorization for additional graphics services), whereas Port
staff estimate that the master plan is approximately 50% complete, including the airfield simulation work currently underway. Port staff will continue to update the Board on the overall progress of the master plan and related budgets.

As shown on the first table in this letter, Port staff will continue the technical work and meetings with the Stakeholder Advisory Committee, and estimates that the main master plan work will be complete approximately in fall 2005. Also, Port staff plans to host a public workshop to present the work on the master plan so far. This public workshop will be scheduled in the early spring 2005.

If you have any questions on the technical or administrative aspects of the master plan, please call or e-mail me.

Sincerely,

Steven Grossman
Director of Aviation

Attachment

cc: Board of Port Commissioners
    Jerry Bridges
    Joe Wong
    David Alexander
    Steve Grossman
South Field

- Runway 33L (aligned 033°/303°) is a major east-west runway.
- Runway 9R (aligned 090°/270°) is a primary north-south runway.
- Runway 27R (aligned 270°/090°) is used for takeoffs and landings.
- Runway 29L (aligned 290°/010°) is a secondary north-south runway.
- Runway 11R (aligned 110°/290°) is a minor east-west runway.

General Aviation

- South Field is the primary general aviation airport in Oakland.
- It serves a variety of general aviation aircraft, including business jets, propeller planes, and helicopters.
- The airport has a range of services and facilities for general aviation, including hangars, fueling, and maintenance services.

Aircraft Operations

- The airport handles a significant number of general aviation operations each year.
- The operations are critical for various industries, including business, research, and transportation.

Air Cargo

- Oakland International Airport is a major hub for air cargo operations.
- The airport has a dedicated cargo terminal and is served by numerous air cargo carriers.
- The airport is a critical link in the global supply chain, handling a large volume of air cargo.

Airport Planning

- The airport is undergoing significant planning and development to accommodate future growth.
- The Master Plan includes updates to the terminal, runway, and other infrastructure to ensure the airport remains a leader in the industry.

Existing Conditions

- The airport is located in a populated area with a high degree of development.
- The airport is facing challenges related to noise, congestion, and capacity.
- The airport is working to address these challenges through innovative solutions and planning efforts.

Conclusion

- Oakland International Airport is a vital asset to the Bay Area and the nation.
- The airport is committed to providing world-class service while addressing the challenges of growth and development.
- The airport is working proactively to ensure it remains a leader in the aviation industry.

References

- FAA Terminal Area Forecast (actual data), January 2004
- City of Oakland, Oakland International Airport Master Plan, July 2004
- Airport Development Program (ADP)
- Regional Airport System Plan, Oakland International Airport, Oakland, CA, (2003)
Million Annual Passengers (MAP), Historic and Forecast

Graph 1P

Note: This graphic is a work-in-progress and was prepared by the Port as part of a master plan for Oakland International Airport. The information presented is preliminary and must be interpreted in the context of other master plan graphics, documents, and meeting discussions.
Planning Considerations

- New unit terminal northwest of Terminal 1 (near Terminal 1)
- Relatively short walking distances
- Relatively inexpensive site preparation and terminal development
- Must relocate existing facilities (e.g., cargo building)
- May need to demolish Oakland Maintenance Center hangar
- Impact to international arrivals aircraft parking
- Minimal/no environmental site impacts
- Good airfield access (gates near runway)/likely requires new taxiway parallel to Taxiway B
- Difficult curbside operations (short weave distance between new unit terminal and Terminal 1)
- May require new pedestrian connection from proposed BART Connector station to new unit terminal

Note: This graphic is a work-in-progress and was prepared by the Port as part of a master plan for Oakland International Airport and must be interpreted in the context of other master plan graphics, documents, and meeting discussions.
### Planning Considerations

- Expansion of current Terminal 2 renovation and extension project
- Expensive site preparation, including 30+ acres of Bay fill (likely not affordable)
- Environmentally constrained site (i.e., Bay fill, wetlands, wildlife, etc.)
- Good airfield access (gates near runway) / site can accommodate remote aircraft parking
- Difficult curbside development (the Terminal 2 curbside is already congested)
- Adds terminal closer to residential areas

### Oakland International Airport Master Plan

**Potential Terminal Development Concept**

**October 2004**

**Legends**

- Bay Area Actual
- Bay Area Regional Airport System Plan (RASP) 4.98%
- Bay Area Historical Growth 3.59%
- OAK Actual
- OAK High Growth 5.14%
- OAK Medium Growth 4.52%
- OAK Low Growth 3.59%
- SFO Actual
- SJC Actual

**Note:**
This graphic is a work-in-progress and was prepared by the Port as part of a master plan for Oakland International Airport. The information and analysis are preliminary and must be interpreted in the context of other master plan graphics, documents, and meeting discussions.

---

**Million Annual Tons of Cargo (Rolling) — Bay Area Airports**

**Graph 1C**

- Million Annual Tons of Cargo (MAT) — Air Freight and Air Mail
- 1986-2025

**Forecasts**

**Legend**

- Bay Area Actual
- Bay Area Regional Airport System Plan (RASP) 4.52%
- OAK Medium Growth 4.52%
- OAK Low Growth 3.59%
- SFO Actual
- SJC Actual
- OAK (RASP) 4.52%
- OAK (High Growth) 5.14%
- OAK (Medium Growth) 4.52%
- OAK (Low Growth) 3.59%

**Note:**
This graphic is a work-in-progress and was prepared by the Port as part of a master plan for Oakland International Airport. The information and analysis are preliminary and must be interpreted in the context of other master plan graphics, documents, and meeting discussions.
Planning Considerations

Area 1

- Requires significant amount of area for core cargo facilities (± 100 acres)
- Potential for long-term use by terminal operators (± 25 acres)
- Significant amount of airport cargo aircraft and lighter aircraft demand in the area
- Would require new roadway connections to Cloverfield Blvd and Doolittle Dr.
- Requires significant swapping of airport space and current flight patterns
- Significant mixing of larger air cargo aircraft and lighter general aviation aircraft

Area 2

- Requires a significant upgrade to North Field infrastructure
- Provides a significant amount of area for new air cargo facilities (± 180 acres)
- Provides for modest expansion and/or relocation of existing cargo facilities in this area (± 40 to 90 acres)
- Some environmental constraints (i.e., wetlands)

Area 3

- Possible good site access via Ron Cowan Parkway
- Good airfield access (site near South Field runways for noise abatement procedures)
- Provides for modest expansion of FedEx's existing terminal
- Possible conflicts with potential terminal development
- Environmentally constrained site (i.e., wetlands, wildlife, etc.)

Area 4

- Requires closure of Runway 15/33 (for full site development)
- Provides for modest expansion and/or relocation of existing cargo facilities in this area (± 330 acres)
- Some environmental constraints (i.e., wetlands)

Note: This graphic is a work-in-progress and was prepared by the Port as part of a master plan for Oakland International Airport. It is preliminary and must be interpreted in the context of other master plan graphics, documents, and meeting discussions.

Annual General Aviation and Military Operations

Graph 1G

Legend:

- [Legend items for General Aviation and Military Operations]

Note: This graph shows the forecasted annual general aviation and military operations from 1998 to 2022. The data includes trends in usage and predictions for future years.
Planning Considerations

Area 1
- Provides 20 acres ± for new general aviation (e.g., hangar) development
- Access would likely need to be from Harbor Bay Parkway
- Good site to consolidate smaller general aviation hangars (e.g., replacement facilities for older hangars, such as the new “T” hangars and Port-A-Ports)
- Somewhat longer taxi distances to Runways 27L/R and 33 (than from existing new “T” hangars and Port-A-Ports)
- Extensive use of the site would require relocating the City of Oakland soccer fields
- Unknown site preparation requirements and utility upgrades (possibly extensive and expensive)
- Moves general aviation development closer to residential areas (compared to existing Area 4)

Area 2
- Provides 65 acres ± for new general aviation (e.g., hangar) development
- Access would likely need to be from Harbor Bay Parkway
- Possible site for new corporate jet facilities (i.e., hangars and related offices)
- Taxiway infrastructure may need to be upgraded
- Extensive use of the site would require some taxiway realignment/reconstruction
- Short taxi distances for landing aircraft (Runways 27L/R), but long taxi distances for departing aircraft (Runway 29 for noise abatement)
- Possible conflicts with potential air cargo development area (still being considered by Stakeholder Advisory Committee)
- Unknown site preparation requirements and utility upgrades (possibly extensive and expensive)
- Moves general aviation development closer to residential areas (compared to existing Area 4)

Area 3
- Provides 15 acres ± for new general aviation (e.g., hangar) development
- Hangar development in this area would likely require a new landside roadway with a connection to Earhart Rd. and/or Doolittle Dr. (Ste. Rte. 61)
- Possible site for new corporate jet facilities (i.e., hangars and related offices)
- Short taxi distances for landing aircraft (Runways 27L/R), but long taxi distances for departing aircraft (Runway 29 for noise abatement)
- Possible conflicts with potential air cargo development area (still being considered by Stakeholder Advisory Committee)
- Unknown site preparation requirements and utility upgrades (possibly extensive and expensive)

Area 4 (Redevelopment)
- Upgrades and/or redevelops existing (but aging) general aviation (or other aviation) facilities at North Field
- Relatively good landside access on existing roadways at North Field
- Taxi distances the same as existing
- Less site preparation and utility upgrades likely required
- Possible asbestos and lead paint issues
- Requires mixing of various types of aircraft (piston, jet, cargo, etc.)

Aviation Committee
Board of Port Commissioners
Of the City of Oakland

Kenneth Katzloff, Chair
Darlene Ayers-Johnson
Frank Kiang

Subject: Master Plan Progress Report

Dear Committee Members:

The purpose of this letter is to update the Aviation Committee on the progress of the master plan for Oakland International Airport (OAK). This letter summarizes an attached Technical Memorandum and has five main sections: (1) Summary of Forecasts, (2) Arial Simulations, (3) New South Field Runways, (4) Runway Safety Area Studies, and (5) Master Plan Administration (budget and schedule update).

Summary of Forecasts
The following table summarizes the master plan forecasts:

<table>
<thead>
<tr>
<th></th>
<th>Existing**</th>
<th>2010</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airline Passengers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Million Annual Passengers (MAP)</td>
<td>14.1</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>Daily Operations*</td>
<td>430</td>
<td>542</td>
<td>n/a</td>
</tr>
<tr>
<td>Air Cargo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Million Annual Tons (MAT)</td>
<td>0.74</td>
<td>0.9</td>
<td>1.5</td>
</tr>
<tr>
<td>Daily Operations*</td>
<td>156</td>
<td>164</td>
<td>n/a</td>
</tr>
<tr>
<td>General Aviation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily Operations*</td>
<td>7</td>
<td>97</td>
<td>n/a</td>
</tr>
<tr>
<td>Helicopter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jet</td>
<td>45</td>
<td>55</td>
<td>n/a</td>
</tr>
<tr>
<td>Proton</td>
<td>284</td>
<td>266</td>
<td>n/a</td>
</tr>
<tr>
<td>Turboprop</td>
<td>16</td>
<td>16</td>
<td>n/a</td>
</tr>
<tr>
<td>Subtotal</td>
<td>352</td>
<td>434</td>
<td>n/a</td>
</tr>
<tr>
<td>Total Daily Operations*</td>
<td>938</td>
<td>1,140</td>
<td>n/a</td>
</tr>
</tbody>
</table>

* An operation is a take-off or landing.
** For more detail, please refer to the full Technical Memorandum.

n/a = not available

STEVEN J. GROSSMAN
Director of Aviation

Phone: (510) 627-1032
Fax: (510) 627-1797
E-mail: agrossma@portoakland.com

PORT OF OAKLAND

April 12, 2005

Note:
This graphic is a work-in-progress and was prepared by the Port as part of a master plan for Oakland International Airport (OAK). This letter summarizes an attached Technical Memorandum and has five main sections: (1) Summary of Forecasts, (2) Arial Simulations, (3) New South Field Runways, (4) Runway Safety Area Studies, and (5) Master Plan Administration (budget and schedule update).

Item A
530 Water Street  ■  Jack London Square  ■  P.O. Box 2064  ■  Oakland, California 94604-2064
Telephone: (510) 627-1100  ■  Facsimile: (510) 627-1806  ■  Web Page: www.portoakland.com
Airfield Simulations

The airfield (taxiways and runways) were simulated using the 2010 operations forecasts above. The airfield simulation model assumes:

- A new 21-gate unit terminal (for 50 total gates) would be constructed parallel to Taxiway B
- The cargo building (now housing UPS and belly cargo) would be relocated to the northern part of the Oakland Maintenance Center (OMC) site
- A new taxiway parallel to Taxiway B would be constructed

The simulation showed that in 2010, there would be about 20 minutes of queue delay per aircraft, on average, accessing Runway 29 during the morning departure peak from about 7 AM to 9 AM. The average queue delay per aircraft was less than 10 minutes for the remainder of the day. Twenty minutes of delay per aircraft in the morning departure peak is not desirable, so two airfield improvements were tested using the simulation model:

- Taxiway access improvements to Runway 29
- A new high-speed taxiway exit off Runway 29

The taxiway access improvements would provide additional queuing space and allow Air Traffic Control to sequence departures more efficiently. The new high-speed taxiway exit would allow landing aircraft to exit the runway sooner, allowing departing aircraft to take-off sooner. For additional details and graphics, please refer to the full Technical Memorandum. With these two improvements, there would be about 10 minutes of queue delay per aircraft, on average, accessing Runway 29 during the morning departure peak.

Although these airfield improvements would not be required in 2010 (with a new 21-gate unit terminal), they would allow the airfield to operate more efficiently, reducing delay during the morning departure peak and continuing to provide benefits beyond 2010.

New South Field Runways

Beyond 2010, Runway 11-29 will continue to experience increases in delay (although less if the two improvements above are implemented), as the morning departure peak continues longer into the morning and at other peak activity periods. Detailed simulation analyses were not performed beyond 2010; however, Port staff anticipates that delay on Runway 11-29 will increase so as to warrant additional runway capacity at South Field between 2015 and 2025. Port staff prepared a graphic and evaluation of five potential new runways at South Field, one inbound (north) of existing Runway 11-29 and four outbound (south) of existing Runway 11-29 at varying distances. A runway inboard of Runway 11-29 would be closer to the surrounding communities, but could be slightly cheaper to construct than outbound options. Any runway outbound of Runway 11-29 would be farther away from the surrounding communities, but would have considerable environmental issues associated with filing San Francisco Bay, as well as financial issues (outbound options are expected to cost several billion dollars). The farther south runways are constructed in the Bay, the more all-weather take-off and landing capabilities would be provided.

Although the master plan is not anticipated to recommend a future South Field runway configuration, it must acknowledge that a new South Field runway might be required if the Airport continues to grow beyond 2015 and a new 21-gate unit terminal. (Beyond the 2015-timeframe, the activity forecasts, and therefore the need for future development and runways, are much less certain and subject to external trend-breakers, such as September 11, jet fuel availability and prices, SARS, economic downturns, low-cost carrier competition. The master plan will therefore contain more detail on near-term projects in the 2010 timeframe and less detail on long-term projects, such as new South Field runways.)

Runway Safety Area Studies

Runway Safety Areas (RSAs) are areas to the side and beyond the ends of runways that, according to Federal Aviation Administration (FAA) regulations, must be:

- Cleared and graded and have no potentially hazardous ruts, humps, depressions or other surface variations,
- Drained by grading and storm sewers to prevent water accumulation,
- Capable of supporting equipment and occasional passage of aircraft without causing structural damage to the aircraft,
- Free of objects, except for objects that need to be located there because of their function

RSAs are provided to:

- Protect an aircraft on take-off or landing that departs the main runway surface (e.g., due to an engine failure or blown tire)
- Provide an area suitable for access by emergency equipment

Several RSAs at OAK do not currently meet FAA standards. The Port and its consultants are developing a range of possible solutions to bring sub-standard RSAs into compliance with FAA standards, or at least improve them to the extent practicable. Possible solutions will be screened for practicability, further study, and/or possible preliminary design and/or more detailed environmental review. The FAA, in consultation with the Port, will make the final determination as to the practicability of possible solutions for correcting and/or improving sub-standard RSAs.

Master Plan Administration

The originally authorized master plan budget is approximately 49% spent (excluding the recent Board authorization for additional graphics services). The master plan is approximately 60% complete.

Sincerely,

[Signature]
Slavich Grossman
Director of Aviation

Attachment (Technical Memorandum)

cc: Board of Port Commissioners
    David Alexander
    Joe Wong
    Jerry Bridges
The purpose of this technical memorandum is to update you on the progress of the master plan for Oakland International Airport (OAK). This letter has three main sections: (1) Background, (2) Summary of Technical Work, and (3) Master Plan Administration (Budget and Schedule Update).

Background

The Port of Oakland executed Phase One and Phase Two settlement agreements with the City of Alameda, Citizens League for Airport Safety and Serenity (CLASS), and Berkeley Keep Jets Over the Bay Committee (collectively, the Petitioners) on November 14, 2001, and October 8, 2002, respectively, in which the Port agreed to prepare a 20-year master plan for Oakland International Airport. The Port aviation planning staff is preparing the master plan, with assistance from specialized consultants for graphics, airfield simulation, aircraft noise analysis, and administration (see summary table in the administration section of this letter).

The central process for conducting the master plan is a series of meetings with a Stakeholder Advisory Committee. The role of the Stakeholder Advisory Committee is to (1) advise Port staff on long-range, high-level planning issues at OAK, (2) provide input on master plan technical issues, and (3) identify potential impacts early-on in the planning process. The Stakeholder Advisory Committee consists of representatives (community members and/or staff) from the cities of Alameda, San Leandro, and Oakland, San Leandro Unified School District, Alameda County, and Airport users, including fixed base operators, passenger and cargo airlines, the Port’s Airline Liaison Office, and flight training/light general aviation aircraft operators. Committee meetings are scheduled every one to two months and are structured around master plan technical elements and topics. The following table outlines the meetings to date and schedule for remaining meetings:

### Meeting Table

<table>
<thead>
<tr>
<th>Meeting Date</th>
<th>Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 10, 2004</td>
<td>Master Plan Goals and Process, Existing Land-Use Map and Conditions</td>
</tr>
<tr>
<td>August 19, 2004</td>
<td>Airline Passenger Forecasts</td>
</tr>
<tr>
<td>September 30, 2004</td>
<td>Potential Terminal Development Areas and Concepts</td>
</tr>
<tr>
<td>October 28, 2004</td>
<td>Air Cargo Forecasts and Potential Development Areas</td>
</tr>
<tr>
<td>December 9, 2004</td>
<td>General Aviation Forecasts and Potential Development Areas</td>
</tr>
<tr>
<td>March 3, 2005</td>
<td>Airfield Simulation, Issuance, and Potential Solutions</td>
</tr>
<tr>
<td>March 31, 2005</td>
<td>Airfield Issuance and Potential Solutions (continued, to include a briefing on runway safety area studies)</td>
</tr>
<tr>
<td>April 21, 2005</td>
<td>Airport Access and Airline Support Issues</td>
</tr>
<tr>
<td>June 30, 2005</td>
<td>Environmental and Financial Challenges and Constraints</td>
</tr>
<tr>
<td>August 10, 2005</td>
<td>Alternative Land-Use Plans (based on previous meetings)</td>
</tr>
<tr>
<td>October 10, 2005</td>
<td>Recommended Land-Use Plans</td>
</tr>
</tbody>
</table>

The next section of this letter provides an overview of technical work completed and presented to the Stakeholder Advisory Committee in meetings six and seven on airfield (runway and taxiway) issues and potential solutions. The Aviation Committee was briefed on meetings one through five in January 2005.

As with most master plans, clear, quality graphics are one of the most important aspects for communicating master plan concepts and land-use plans with stakeholders and decision makers. We have included 14 graphics (including one table) with this letter that summarizes technical work to date. These graphics are a representative sample of the over 50 graphics that have been prepared to date for this master plan. Most of these graphics will be used in the final master plan documentation (land-use plan). The title of each graphic (with the exception of the one table) is in the upper right corner of the title block below "Oakland International Airport Master Plan" (vertically).

Summary of Technical Work

This section of the letter provides a summary of the technical work completed and presented to the Stakeholder Advisory Committee in meetings six and seven on airfield issues and potential solutions.

**Airfield Simulation and Key Findings**

Runway 11R-29R Capacity/Delay. A detailed airfield simulation model was prepared using the 2010 aircraft operations forecasts presented in the last Aviation Committee master plan update and summarized in a table at the end of this letter (see Summary of Master Plan Forecasts table). ATAC Corporation prepared the simulation using Simmod PRO®, which is an ATAC Corporation derivative of the Federal Aviation Administration’s (FAA’s) Airport and Airspace Simulation Model or SIMMOD™. The airfield simulation model assumed (1) a new 21-gate unit terminal (for 50 total gates) would be constructed parallel to Taxiway B (generally between Taxiway B2 and Taxiway S), (2) the cargo building (now housing UPS and belly cargo) would be relocated to the northern part of the Oakland Maintenance Center (OMC) site, and (3) a new taxiway parallel to Taxiway B between Taxiway B2 and Taxiway T would be constructed. These assumptions are represented in blue on two graphics showing potential taxiway improvements.
### Summary of Master Plan Forecasts

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2012</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Airline Passengers</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Million Annual Passengers</td>
<td>14.1</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>Planning Day Passengers</td>
<td>43,745</td>
<td>56,047</td>
<td>63,158</td>
</tr>
<tr>
<td>Daily Operations (A)</td>
<td>430</td>
<td>542</td>
<td>598</td>
</tr>
<tr>
<td>Percent of Total Daily Operations</td>
<td>43.8%</td>
<td>47.3%</td>
<td>44.4%</td>
</tr>
<tr>
<td><strong>Air Cargo</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Million Annual Tons</td>
<td>0.74</td>
<td>0.9</td>
<td>1.5</td>
</tr>
<tr>
<td>Daily Operations (B)</td>
<td>156</td>
<td>164</td>
<td>93,412</td>
</tr>
<tr>
<td>Percent of Total Daily Operations</td>
<td>16.6%</td>
<td>14.4%</td>
<td></td>
</tr>
<tr>
<td><strong>General Aviation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Operations (C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helicopter</td>
<td>166</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>Jet</td>
<td>15,519</td>
<td>16,066</td>
<td></td>
</tr>
<tr>
<td>Piston</td>
<td>5,822</td>
<td>6,562</td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td>17,407</td>
<td>19,294</td>
<td></td>
</tr>
<tr>
<td>Daily Operations (C)</td>
<td>204</td>
<td>246</td>
<td></td>
</tr>
<tr>
<td>Percent of Total Daily Operations</td>
<td>22.2%</td>
<td>21.4%</td>
<td></td>
</tr>
<tr>
<td><strong>Summary</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composite Planning Day Operations (A+B+D)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helicopter</td>
<td>2,204</td>
<td>2,507</td>
<td></td>
</tr>
<tr>
<td>Jet</td>
<td>16,574</td>
<td>19,937</td>
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</tr>
<tr>
<td>Piston</td>
<td>203,542</td>
<td>203,542</td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td>227,260</td>
<td>227,260</td>
<td></td>
</tr>
<tr>
<td>Airfield Simulation Operations (A+B+D-C)</td>
<td>996</td>
<td>1,140</td>
<td></td>
</tr>
</tbody>
</table>

(1) An operation is a take-off or landing.
(2) One ton is equal to 2,000 pounds (also called a short ton), which is equal to approx. 0.9 metric tons.
(3) In 2005, a new helicopter flight training school is anticipated to start operations at Oakland field.
(4) The planning day is the annual average day for general aviation.
(5) Calendar year 2004
(6) August 2004
(7) 12 months ending September 30, 2004
(8) Inventory as of December 2004
(9) a = not available

**Summary**

At South Field, which are discussed in detail below (see Potential Runway 29 Access Improvements and Potential New High-Speed Exit Taxway – Runway 29). Although the entire airfield was simulated (including North Field), all congestion points in 2010 occurred at South Field (Runway 11-29 and associated taxways). Runway 11-29 accommodated the 2010 aircraft operations with an increase in delay, particularly in the morning departure peak between 7 AM and 9 AM. In the morning departure peak, the average queue delay per aircraft exceeded 20 minutes. For the remainder of the day, the average queue delay per aircraft was less than 10 minutes. Queue delay is the delay experienced while waiting in line to depart Runway 29. The queue extended from Runway 29, back along Taxway W, up Taxway U, almost to the east apron near the Terminal 2 extension. The average queue delay per aircraft in 2010 on the existing airfield (i.e., with no airfield improvements) is plotted by time of day in Graph 2AF in purple (see Airfield Queue Delay Comparison). Port staff and airfield consultants (ATAC Corporation and HNTB Corporation) examined two potential improvements to minimize the queue delay accessing Runway 29 in the morning departure peak. The first potential improvement would be a new taxiway parallel to Taxiway W between Runway 29 and Taxiway U and parallel to Taxiway U between Taxiway T and Taxiway W (see Potential Runway 29 Access Improvements). These new taxiways would allow for additional aircraft queuing distance and minimize the possibility that the morning departure queue would extend to the east apron. More importantly, dual taxiways feeding Runway 29 would allow Air Traffic Control (ATC) to optimize departure sequencing to take full advantage of existing runway capacity. Generally, aircraft turning in the same direction after take-off require more spacing between consecutive departures than aircraft turning in different directions. Therefore, these taxiways would allow ATC to queue aircraft with different departure turns in two distinct queues and allow them to depart alternately, minimizing delay. Today, the only opportunity for "jump" the queue to achieve improved sequencing is for an aircraft to access Runway 29 from Taxiway U (resulting in a shorter runway length). Based on testing this potential taxiway improvement in the airfield simulation model, it is estimated that the departure queue delay per aircraft would be reduced by up to 23%. The average queue delay per aircraft in 2010 with improved taxiway access to Runway 29 is plotted by time of day in Graph 2AF in blue (see Airfield Queue Delay Comparison). The second potential improvement would be a new high-speed exit from Runway 29, between existing high-speed exits at Taxiways V and Y (see Potential New High-Speed Exit Taxway – Runway 29). Based on aircraft breaking performance estimates, only about 13% of the 2010 aircraft fleet mix would be able to exit Runway 29 at Taxiway V (the aircraft, after landing, is going too fast to exit here). Meanwhile, the high-speed exit at Taxiway Y is too far down the runway (i.e., aircraft are going quite slow by the time they arrive at Taxiway Y and then because of its geometry, it takes aircraft farther away from the terminal area). Port staff and airfield consultants simulated a new high-speed exit between Taxiways V and Y, about 700 feet east of Taxiway V. Approximately 79% of the 2010 aircraft fleet mix would be able to exit here, reducing runway occupancy time upon landing by about 15% (because aircraft do not have to taxi all the way to Taxiway Y to exit Runway 29). Taxi time and distance is reduced by approximately 9%, saving the airlines fuel and providing a potential air quality benefit. Moreover, because landing aircraft would be able to exit the runway sooner, aircraft queued for departure can depart sooner. It is estimated that the average departure queue delay per aircraft column.
**Planning Considerations**

- Reduces Runway Occupancy Time (ROT) (approximately 15%)
- Impacts wetlands (approximately 1.2 Acres)
- Decreases taxi distances and time (approximately 9%)
- Reduces airfield congestion
- Reduces Runway 29 queue delay by 21% (39% with new Runway 29 access)

**Note:**

This graphic is a work-in-progress and was prepared by the Port as part of a master plan for Oakland International Airport. It is preliminary and must be interpreted in the context of other master plan graphics, documents, and meeting discussions.
would be reduced by up to 21%. The average queue delay per aircraft in 2010 with a new high-speed exit from Runway 29 is plotted by time of day in Graph 2AF in green (see Airfield Queue Delay Comparison).

Taken together, these two potential taxiway improvements allow Runway 11-29 to operate more efficiently, taking advantage of its full potential capacity. The average queue delay per aircraft in 2010 with both improvements is plotted by time of day in Graph 2AF in red (see Airfield Queue Delay Comparison). The average queue delay per aircraft during the morning departure peak drops to about 10 minutes (from about 20 minutes with no improvements).

These potential improvements were discussed with the Stakeholder Advisory Committee. Although there were no strong objections to either potential improvement, the Committee did ask several questions about whether these potential improvements increase the capacity of Runway 11-29. These types of improvements reduce delay and allow the runway to operate more efficiently, closer to its maximum potential capacity (i.e., capacity limited by required FAA aircraft separation standards). Delay costs the airlines money and is inconvenient for airline passengers. The capacity of a single runway is fixed, given a fleet mix, arrival/departure schedule, and weather. In other words, in 2010, it is unlikely that the airlines would choose to add or cancel a flight or even change their flight schedule due to these potential improvements. Runway 11-29 can accommodate the anticipated 2010 flight schedule (with the associated assumptions, such as 21 additional aircraft gates) with some increase in delay (less than the two airfield improvements described above).

Beyond 2010, Runway 11-29 will continue to experience increases in delay (although less if the two improvements above are implemented), as the morning departure peak continues longer into the morning and at other peak activity periods. Detailed simulation analyses were not performed beyond 2010; however, Port staff anticipates that delay on Runway 11-29 will increase so as to warrant additional runway capacity at South Field between 2015 and 2025. A graphic was prepared (see Potential New South Field Runways) to show potential new runways at South Field, one inboard (north) of existing Runway 11-29 (Runway 11) and four outboard (south) of existing Runway 11-29 (Runways 01, 02, 03, and 04). The graphic presents several Planning Considerations, outlining the benefits and issues associated with each runway. Any runway outboard of existing Runway 11-29 has considerable environmental issues associated with filling San Francisco Bay, as well as financial issues (the outboard options are expected to cost several billion dollars).

Although the master plan is not anticipated to recommend a future South Field runway configuration, it must acknowledge that a new South Field runway might be required if the Airport continues to grow beyond 2015 and a new 21-gate unit terminal. The Stakeholder Advisory Committee reaction was mixed. Some members preferred not to discuss the need for new runway capacity in the long-term; others saw some potential aircraft noise benefits with the outboard runway options.

Miscellaneous Potential Taxiway Improvements. Port staff analyzed the need for a new North Field-South Field taxiway connection (the only connection today is Taxiway B, which crosses Ron Cowen Parkway on a bridge) initially to reduce taxi delays. See Potential North Field-South Field Taxiways. Several members of the Stakeholder Advisory Committee are
Taxiway B is constructed south of the Oakland Maintenance
soil preparation, environmental/wetlands mitigation
• Provides taxiway access to Central Basin
• Improves airfield flow and minimizes head-to-head aircraft
and South Field
• Provides additional taxiway connection between North Field
Taxiway 4
operations on Taxiway B
and South Field, connecting to Taxiway B and a new taxiway
Center site (to Taxiway T)
• Provides taxiway access to Central Basin
• Improves airfield flow and minimizes head-to-head aircraft
• Moves taxiing aircraft closer to the City of Alameda
taxiing from North Field to depart South Field on Runway 29
to wetlands (13 acres ± of wetlands impact)
• Of Central Basin options (T1, T2, and T4), minimizes impact
• Provides taxiway access to Central Basin
and South Field
• Provides additional taxiway connection between North Field
Taxiway B is constructed south of the Oakland Maintenance
• May not be required if a new taxiway parallel to and east of
existing Taxiway A)
• Provides a more standard airfield layout (compared to
• Does not impact wetlands
taxiway bridge over Ron Cowan Parkway, negating the need to construct a new (second)
queue for Runways 27R and 27L (improves airfield flow)

Planning Considerations
• Moves aircraft arriving or departing Runway
runway to be used for departing aircraft, eliminating the need to
do not need to turn in the same direction
• Does not require Bay fill
(formerly temporary Runway 12-30)
• Slightly easier/less expensive construction over existing Taxiway W
• Possible wake turbulence concerns (may limit simultaneous
• Requires demolition or relocation of the Ground Run-up Enclosure
area and Runway 29, further congesting the terminal area
• Minimizes aircraft queuing distance available between terminal
1 (700 ft.
15
Runway O2 (2,500 ft. Outboard of Runway 11-29)
• Impacts Bay waters (over 150 acres in total impacted footprint)
• Minimizes aircraft queuing distance available between terminal
runway capacity (e.g., allowing for paired, simultaneous arrivals)
• May be able to use new GPS-based technologies to further improve
• Provides a moderate to substantial increase in runway capacity in
conditions (IMC)
• Allows independent (paired, simultaneous) operations (take-offs
Runway O1 (800 ft. Outboard of Runway 11-29)
• Expensive/difficult construction
• Impacts wetlands (over 4 acres for taxiway connections)
• Impacts Bay waters (over 550 acres in total impacted footprint)
• Expensive/difficult construction
• Impacts wetlands (over 4 acres for taxiway connections)
• Operates similar to Runway O3, without special radar equipment
• Expensive/difficult construction
• Impacts wetlands (over 4 acres for taxiway connections)
• Impacts wetlands (over 4 acres for taxiway connections)
• Costs
Interested in these taxiways to encourage compliance with voluntary noise abatement procedures, which require corporate jets and large turboprops, which land and park at North Field, to depart from Runway 29 (taxing from North Field to South Field on southbound on Taxiway B). Some Committee members are interested in minimizing head-to-head taxi events on Taxiway B, which require one aircraft to hold so another one can safely bypass it, which could discourage the use of Runway 29 if excessive delay is incurred due to this holding/bypassing. Further, some Committee members are interested in studying if any of these taxiways shorten the taxi distance and time between North Field and South Field (Runway 29).

Using the airfield simulation for 2010 described above, Port staff and consultants determined that most head-to-head taxi events on Taxiway B occur south of Taxiway B1 (south of Ron Cowan Parkway) on South Field. These occur, for example, when a FedEx aircraft is traveling northbound on Taxiway B (after landing) to the FedEx complex, while a corporate jet is taxiing from North Field to South Field for departure. The potential new taxiway parallel to Taxiway B between Taxiway B2 and Taxiway T, which is required to support a new terminal in this vicinity (as simulated), solves these head-to-head taxi issues on Taxiway B, without the need for a new connection between North Field and South Field (and crossing Ron Cowan Parkway).

Port staff also studied whether any of the potential North Field-South Field taxiway alternatives significantly shorten the taxi distance and time from North Field to South Field (to encourage compliance with the voluntary noise abatement procedures). Depending on exact aircraft parking locations at North Field, Taxiway 3 (T3) has some potential to shorten taxi distance and time, up to one minute on an otherwise 10 minute taxi (over almost 3 miles), or about a 10% reduction in taxi distance and time. Although this taxiway alignment would provide a slightly shorter taxi distance and time, it is unlikely that a time savings of just one minute over an otherwise 10 minute taxi would encourage additional compliance with noise abatement procedures. It was pointed out to the Stakeholder Advisory Committee that almost 98% of the corporate jets and turboprops comply with the voluntary noise abatement procedures already, and those that do not are typically daytime flights.

In summary, a new taxiway parallel to Taxiway B between Taxiway B2 (i.e., south of Ron Cowan Parkway) and Taxiway T would reduce most head-to-head taxi events on Taxiway B, minimizing delay for aircraft taxiing between North Field and South Field. This taxiway would also be required to support a new terminal in this vicinity. However, a full new connection between North Field and South Field, as shown on Potential North Field-South Field Taxiways, does not appear to be warranted, at least in the near-term, as it does not significantly shorten taxi distance or time, and the head-to-head taxi events are solved with a new taxiway parallel to Taxiway B, as described above.

Port staff also evaluated a potential new taxiway at North Field, parallel to Runway 9R-27L (see Potential New Taxiway Parallel to Runway 9R-27L). This taxiway would improve safety by minimizing the number of runway crossings required for an aircraft that lands on Runway 27L that needs to taxi to South Field (e.g., passenger airlines that land at North Field when Runway 11-29 is closed). It also provides a shorter taxi route for these aircraft. Although this taxiway does provide some benefits, it is not required and its benefits may not outweigh its costs.
(construction costs may be substantial due to poor soil conditions and drainage issues in this area).

**Remain Overnight (RON) Aircraft Parking.** Port staff evaluated the need for future remote (off-gate) RON aircraft parking apron. Today, there are 26 acres of apron dedicated to RON aircraft parking, of which 21 acres is required on any given night. As new aircraft gates are constructed, RON aircraft parking will continue to be required. However, less apron area per gate may need to be dedicated to RON, as more aircraft will be able to park overnight at aircraft gates (rather than on remote RON aprons). It is anticipated that additional gate construction would allow the gate-use intensity to decrease such that it will not be required to push an aircraft off a gate for a subsequent arrival (i.e., it can remain parked on the gate until its morning departure and the later arrival can use its own gate and also remain there until morning). Based on area per gate factors derived from data at OAK and other airports, it is estimated that between 23 and 46 acres of RON aircraft parking apron would be required in 2015, depending on the actual number of gates constructed, and between 33 and 68 acres of remote RON aircraft parking apron would be required in 2025, depending on the actual number of gates constructed.

Providing the desired amount of RON aircraft parking will be challenging. **(see Potential Remain Overnight (RON) Airport Parking Areas).** All areas except Area 1 require wetlands to be filled/impacted. Providing RON aircraft parking in Area 1 will be challenging, because potential future terminal concepts in this area likely eliminate existing RON aircraft parking aprons. Other considerations are shown on the graphic under Planning Considerations.

**Runway Safety Area Studies**

Port staff and consultants (URS Corporation) are conducting Runway Safety Area (RSA) studies. Although these studies are separate from the master plan, Port staff has briefed the Stakeholder Advisory Committee on the progress on these studies because it is an airfield issue that may need to be addressed within the master plan timeframe and some of the airfield issues and improvements described above are related to potential RSA improvements.

**Background.** The FAA has established the Runway Safety Area Program, which requires RSAs at all airports certified under 14 Code of Federal Regulations (CFR) Part 139, including OAK, to meet current FAA dimensional, grading, drainage, and other engineering standards for RSAs. Improvement of sub-standard RSAs is a national, high-priority goal for FAA. The FAA has set an internal deadline in 2007 to identify practicable solutions and start the process to improve sub-standard RSAs throughout the United States. Therefore, the FAA has requested the Port of Oakland conduct RSA studies to identify and investigate practicable solutions to bring sub-standard RSAs at OAK into compliance with current FAA RSA standards.

RSAs are an integral part of the runway environment, which must be (1) cleared and graded and have no potentially hazardous ruts, humps, depressions or other surface variations, (2) drained by grading and storm sewers to prevent water accumulation, (3) capable of supporting equipment and occasional passage of aircraft without causing structural damage to the aircraft, and (4) free of objects, except for objects that need to be located in the RSA because of their function (and then they must be tangible). RSAs are provided to (1) protect an aircraft on take-
off or landing that depletes the main runway surface (e.g., due to an engine failure or blown tire), and (2) provide an area suitable for access by emergency equipment (so that it can quickly reach an aircraft that has depeled the main runway surface).

RSA dimensions are established in FAA Advisory Circular (AC) 150/5300-13, Airport Design. According to this AC, Runways 11-29, 9R-27L, and 9L-27R at Oakland International Airport require RSAs that are 500 ft. wide (centered on the runway centerline) and extend 1,000 ft. beyond the ends of each of the runways. Runway 15-33 requires an RSA that is 150 ft. wide (centered on the runway centerline) and extends 300 ft. beyond each end of the runway.

At the FAA's request, the Port has initiated the RSA studies. Port staff recommended and the Board selected URS Corporation to conduct these studies. The studies will result in a determination of the practicability of improving sub-standard RSAs to meet current AC standards.

RSA Field Survey Findings: The following is a brief summary of findings from a field survey of all RSAs at OAK conducted in January 2005.

- Runway 11-29 (South Field): The localizer antenna (an electronic landing aid providing lateral guidance for aircraft on final approach) is located approximately 450 feet from the Runway 29 threshold and does not appear to have tangible mountings. East of the localizer antenna, the ground rises steeply towards the perimeter dike and airfield roadway on top of the dike. San Francisco Bay is on the other side of the dike. Consequently, the required 1,000 feet of RSA is not provided beyond the Runway 29 threshold. There are also wetlands located within the RSA on approach to Runways 29 and 11 that do not meet FAA RSA standards.

- Runway 9R-27L (North Field): There is an airfield roadway that traverses the RSA on approach to Runway 27L (and Runway 27R). The grades on both sides of the roadway do not meet FAA RSA standards. There are also wetlands located in the RSA on approach to Runways 9R and 27L. Harbor Bay Parkway (and the associated Airport perimeter fence) is located approximately 114 feet inside of the west limit of the RSA for Runway 9R, and consequently, the required 1,000 feet of RSA is not provided beyond the Runway 9R threshold. On the sides of Runway 9R-27L (within the RSA), there are several areas where the soil (mostly clay) is too soft to support equipment or the occasional passage of aircraft. Numerous animal (squirrel) burrows were also observed (which do not meet FAA grading requirements for RSAs).

- Runway 9L-27R (North Field): There is an airfield roadway that traverses the RSA on approach to Runway 27R (and Runway 27L). The grades on both sides of the roadway do not meet FAA RSA standards. The Airport perimeter fence is located within the RSA on approach to Runway 27R. There are also wetlands located in the RSA on approach to Runway 27R. Although there were some areas of standing water and soft soils, Runway 9L-27R appeared to have better overall drainage and soil stability (compared to Runway 9R-27L). Numerous animal (squirrel) burrows were observed (which do not meet FAA grading requirements for RSAs).

- Runway 15-33 (North Field): There is an uncontrolled airfield roadway approximately 238 feet from the threshold of Runway 15. This roadway violates the requirement for positive control of all vehicle and aircraft movements within the RSA. Numerous animal (squirrel) burrows were also observed (which do not meet FAA grading requirements for RSAs).

Development of Possible RSA Solutions: A variety of possible solutions must be considered for RSAs that do not comply with FAA RSA standards, including the following:

- Shifting runways
- Relocating runways
- Realigning runways
- Reducing runway lengths
- Relocating, removing or otherwise addressing non-standard objects or conditions
- Combinations of the above actions
- Installing Engineered Materials Arresting System (EMAS)
- Displacing runway thresholds and implementing declared distances

In addition to the items listed above, there are other types of improvements that may be needed to bring RSAs into compliance with FAA standards, including grading, drainage, soil improvements, repairing ruts and rips, relocating items not fixed-by-function, and replacing items that do not have tangible mountings.

FAA Order 5200.8 requires that "the first alternative to be considered in every case is constructing the traditional graded area surrounding the runway." FAA Order 5200.9, which was published five years after FAA Order 5200.8, indicates that "a standard EMAS installation provides a level of safety that is generally equivalent to a full RSA constructed to the standards of Advisory Circular 150/5300-13 for runways. It also provides an acceptable level for safety for runways. Therefore, at sites where a standard RSA is not practicable, the installation of a standard EMAS is the best alternative. At sites where neither a standard RSA nor a standard EMAS installation is possible, a range of alternatives including maximizing the existing
RSA, use of non-standard EMAS installations, implementation of declared distances, or some combination of actions should be considered.

Attached graphics show possible RSA solutions at OAK using the hierarchy described above. The title of each graphic is in the upper right corner of the title block below “Oakland International Airport Runway Safety Area Studies” (vertically). The limits of the RSA for each runway are shown with dashed red lines on all RSA graphics.

The first RSA graphic (see Create Standard RSAs) shows possible solutions that create standard RSAs by relocating roads, constructing an earth platform (on approach to Runway 29), filling wetlands, and stabilizing soils and improving drainage (at North Field).

The second RSA graphic (see Create Standard RSAs: Shift Runways) shows a solution that creates standard RSAs by shifting runways, displacing thresholds, and filling wetlands, as required.

The third RSA graphic (see Install Standard EMAS) shows standard EMAS installations, which, according to the FAA, provide an equivalent level of safety as full-length RSAs. Installation of standard EMAS would require filling wetlands (on approach to Runway 9R at North Field) and displacing the Runway 29 threshold, which would require the approach lighting system to be relocated.

The fourth RSA graphic (see Install Non-Standard EMAS) shows non-standard EMAS installations. These installations would likely be considered acceptable to the FAA, but do not meet standard EMAS criteria because the EMAS would not stop the design aircraft leaving the end of the runway at 70 knots and the suggested 600 ft. installation cannot be provided. At North Field, the wetlands on approach to Runway 9R may not have to be impacted and at South Field, a displaced threshold would not be required (and therefore the approach lighting system would not need to be relocated).

The fifth RSA graphic (see Displace Thresholds/Declared Distances) shows the distances required to displace thresholds to create standard RSAs. The table shows the effective take-off and landing lengths. In all cases, the runways would be effectively shortened, which could impact flight operations. Port staff and consultants are coordinating with relevant airline representatives (e.g., aircraft performance engineers) to determine and document potential impacts to the airlines. This documentation is important in order to determine if this potential solution is practicable.

The sixth RSA graphic (see Maximize Existing RSAs) shows possible solutions to improve, but not fully correct, sub-standard RSAs. The resulting sub-standard RSA length is shown.

These graphics illustrate families of potential solutions to correct or improve sub-standard RSAs at OAK. Any actual solution may be a combination of those presented on the various graphics. For example, the FAA might determine that it is practicable to shift Runway 15-33 along its centerline, while standard EMAS is most appropriate for the approach to Runway 27L/R, while non-standard EMAS is the best solution in the approach in Runway 29.

The Port and its consultants are screening the possible solutions for practicability, further study, and/or possible preliminary design and more detailed environmental review. The FAA will make the final determination as to the practicability of possible solutions for correcting and/or
Note: This graphic is a work-in-progress and was prepared by the Port as part of Runway Safety Area Studies for Oakland International Airport. The graphic is preliminary and must be interpreted in the context of other graphics, documents, and meeting discussions.

Install Standard EMAS

This EMAS does not provide the minimum runway exit speed performance for the design aircraft (i.e., B-747-400).
Note: This graphic is a work-in-progress and was prepared by the Port as part of Runway Safety Area Studies for Oakland International Airport. The graphic is preliminary and must be interpreted in the context of other graphics, documents, and meeting discussions.
improving sub-standard RSAs. The Runway Safety Area studies started in January 2005 and are anticipated to be completed in August 2005. Port staff will continue to brief the Aviation Committee and the Stakeholder Advisory Committee on the RSA studies.

**Next Steps**

Port staff are currently preparing for a meeting with the Stakeholder Advisory Committee on April 21, 2005, which will focus on ground transportation and airline support facilities, such as belly cargo, in-flight provisioning/steering, fueling, ground service equipment maintenance facilities, etc. The next meeting will focus on environmental issues (including aircraft noise) and financial issues and constraints. The next series of meetings will focus on a land-use plan and master plan documentation.

**Master Plan Administration**

The master plan project is part of the Port’s Capital Improvement Program (CIP), and all work has been and will be charged to appropriate CIP element and work order numbers. The following table presents a snapshot of the budget for the master plan:

<table>
<thead>
<tr>
<th>Resource</th>
<th>Original Budget</th>
<th>Brief Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphics/Report Production</td>
<td>$75,000</td>
<td>Board approved contract for $75,000 with Finger Design Associates (Resolution No. 04117); Board approved supplemental contract with Finger Design Associates (Resolution No. 04054) to add $70,000 to the original contract, for a total of $145,000; approx. $76,000 spent</td>
</tr>
<tr>
<td>CAD Services/Engineering Division Support</td>
<td>$30,000</td>
<td>Approx. $15,800 spent (in-house/Engineering Division staff costs)</td>
</tr>
<tr>
<td>Administrative Support Printing</td>
<td>$30,000</td>
<td>Contract with Outsourcing Consulting Services, Inc.; approx. $5,500 spent</td>
</tr>
<tr>
<td>Legal Services</td>
<td>$30,000</td>
<td>Port staff is doing most of the printing in-house (e.g., meeting handouts); approx. $6,000 spent</td>
</tr>
<tr>
<td>Aircraft Noise Consulting</td>
<td>$150,000</td>
<td>Approx. $14,500 spent</td>
</tr>
<tr>
<td>Airfield Simulation Consulting</td>
<td>$100,000</td>
<td>Board approved contract for $100,000 with ATAC Corporation (Resolution No. 04118); approx. $91,000 spent</td>
</tr>
</tbody>
</table>

As shown in the status for each resource, the overall master plan is still well under the proposed budget (approximately 49% spent), compared to the originally authorized budget for the master plan, excluding the recent Board authorization for additional graphics services, whereas Port staff estimate that the master plan is approximately 60% complete. Port staff will continue to update the Board on the overall progress of the master plan and related budgets.

As shown on the first table in this letter, Port staff will continue the technical work and meetings with the Stakeholder Advisory Committee, and estimates that the main master plan work will be complete approximately in fall 2005.
Environmental Issues

Port staff evaluated potential environmental opportunities and constraints associated with future growth at the Airport, both in terms of footprint or site environmental considerations associated with new facilities (such as a potential new terminal building), and operational environmental considerations associated with increased aviation activity (i.e., more airline passengers, more air cargo weight, more flights, etc.). It is important to note that throughout the master planning process, environmental issues have been considered at a screening level. Because this master plan is a concept-level planning and feasibility study, it does not provide details on development plans, engineering feasibility, or environmental constraints that would be needed before the Port could decide whether to proceed with any particular project.

One environmental consideration that was studied in some detail in the master plan is aircraft noise. The aircraft noise analysis looks at both single aircraft overflight noise contours called Single Event Noise Exposure Level (SEINEL) and time-weighted cumulative noise contours called the California Noise Equivalent Level (CNEL). Overall, there will be more aircraft operations in 2010 than 2004, going from approximately 586 daily air carrier (passenger and cargo) airline operations in 2004 to approximately 706 daily air carrier operations anticipated in 2010. However, the Port anticipates a decrease in the number of operations of the noisiest aircraft, the Boeing 727, going from 16 daily operations in 2004 to an anticipated 6 daily operations in 2010, with only 2 departures at night (compared to 4 in 2004). This anticipated decrease is due to Federal Express’ (FedEx’s) slow phase-out of its older and noisier Boeing 727 aircraft. Because of the reduction in Boeing 727 operations, especially at night, the CNEL contours to the northeast of the Airport (adjacent to the City of Alameda) are smaller than the existing CNEL contours.

Potential Financial Plan

Port staff prepared a preliminary (hypothetical) plan to fund the projects likely to be recommended in the master plan, including a potential third terminal (east of Taxiway B, north of existing Terminal 1, and south of Ron Cowan Parkway), a new high-speed exit taxiway (off Runway 29), and Runway 29 taxiway access improvements. The analysis assumes that Passenger Facility Charges (PFCs) and Airport Improvement Program (AIP) grants are used to fund most of the costs associated with implementing these projects. PFCs would be bonded for 20 years, and there would be a small incremental increase in airline rates and charges. The basic idea is to keep the costs that the airlines pay at a reasonable level to keep the Airport attractive to low-cost and other airlines. The analysis assumes that other capital projects, such as renovation of existing facilities and major maintenance projects, could be funded using Port cash or revenue from coverage on the PFC-backed bonds. The preliminary financial plan suggests that these master plan projects are affordable, given certain assumptions in the analysis, which are subject to change in the future. Further, the preliminary financial plan does not consider Port-wide financial issues; it is focused solely on Airport capital projects and potential revenues. After the master plan is complete, the Port will need to conduct more thorough analyses on the financial feasibility of these and other Port projects from a Port-wide capital and funding perspective.
Land-Use Plans

Port staff prepared three graphics: (1) existing on-Airport land uses (e.g., airfield, passenger facilities, cargo, airline-related support, general aviation, aviation-related business, recreation, and undesignated uses), (2) near-term on-Airport land uses (2010 to 2012 timeframe), and (3) long-term on-Airport land uses (2025). These three graphics are the heart of the master plan. The primary new land use in the 2010 to 2012 timeframe is a new terminal in the area east of Taxiway B, north of existing Terminal 1, and south of Ron Cowan Parkway. The Oakland Maintenance Center (OMC) hangar site would be redeveloped to support the new terminal land use area to the south including replacement air cargo facilities, potential airline provisioning and GSE maintenance facilities, and remain overnight (RON) aircraft parking and/or airline passenger/employee vehicle parking. At North Field, the new land uses are for general aviation aircraft parking ramps and/or hangars.

The primary new land use in the 2025 timeframe is additional passenger facility uses at South Field, mostly for additional airline passenger/employee vehicle parking and RON aircraft parking, and more general aviation land use at North Field. A new runway at South Field (parallel to Runway 11-29) is not shown on the long-term land-use map (2025). Although one would likely be required before 2025 to meet anticipated demand at OAK, Port staff is recommending that the master plan document not include a new runway, but indicate that additional runway capacity in the Bay Area is a regional issue that the Port cannot solve on its own, but because of the anticipated cost to construct a new runway ($3 billion+) and the likely controversy over filling San Francisco Bay to do it.

Master Plan Administration

The originally authorized master plan budget is approximately 72% spent (excluding the recent Board authorization for additional graphics services). The master plan is approximately 80% complete.

Finally, for your information and background, I have attached the two previous master plan updates for your information. If you have any questions on the master plan, please call or e-mail me.

Sincerely,

Steven Grossman
Director of Aviation

Attachment (Technical Memorandum)

cc: Board of Port Commissioners
Jerry Bridges
Joe Wong
David Alexander

The purpose of this technical memorandum is to update you on the progress of the master plan for Oakland International Airport (OAK). This letter has three main sections: (1) Background, (2) Summary of Technical Work, and (3) Master Plan Administration (budget and schedule Update).

Background

The Port of Oakland executed Phase One and Phase Two settlement agreements with the City of Alameda, Citizens League for Airport Safety and Serenity (CLASS), and Berkeley Keep Jets Over the Bay Committee (collectively, the Petitioners) on November 14, 2001, and October 8, 2002, respectively, in which the Port agreed to prepare a 20-year master plan for Oakland International Airport. The Port’s Aviation Planning and Development staff is preparing the master plan, with assistance from specialized consultants for graphics, airfield simulation, aircraft noise analysis, and administration (see summary table in the administration section of this letter).

The central process for conducting the master plan is a series of meetings with a Stakeholder Advisory Committee. The role of the Stakeholder Advisory Committee is to (1) advise Port staff on long-range, high-level planning issues at OAK, (2) provide input on master plan technical issues, and (3) identify potential impacts early on in the planning process. The Stakeholder Advisory Committee consists of representatives (community members and/or staff) from the cities of Alameda, San Leandro, and Oakland, San Leandro Unified School District, Alameda County, and Airport users, including fixed base operators, passenger and cargo airlines, the Port’s Airline Liaison Office, and flight training/light general aviation aircraft operators. Committee meetings are scheduled every one to two months and are structured around master plan technical elements and topics. The following table outlines the meetings to date and schedule for the remaining meeting in November 2005:
This section concludes with a brief discussion of next steps.

Technical work includes: (1) airport ground access issues (Meeting eight), (2) airline-related support facilities (Meeting nine), (3) environmental issues (Meeting nine), (4) a financial plan (Meeting nine), and (5) draft land-use plans for OAK in 2010 to 2012 and 2025 (Meeting ten). These master plan concepts and land-use plans were discussed with the Stakeholder Advisory Committee, the cargo ferry landing areas are not ideally located, and there are currently no cargo companies requiring such a facility at OAK. The graphic entitled "Potential Ground Access Development Areas" focuses mostly on areas to accommodate future vehicle parking demand (Areas 1 through 9), which may require minor support and/or access roadways. Port staff recommend that Areas 1 through 5 be considered to meet future parking requirements in the terminal area (some of these areas are currently used for parking today). It is also recommended that Area 7 (the upland area of the Central Basin) be considered for future parking (in the 2010 to 2012 timeframe) for economy/remote airline passenger parking and/or employee parking.

The graphic examines the potential need for two new access roadways to/from the terminal area (Areas 10 and 11), which may be required in the 2025 (20-year) planning horizon. Both potential roadways would require filling of wetlands. The San Leandro representatives on the Stakeholder Advisory Committee recommended against considering a roadway in Area 11, even if it were limited to vehicles serving the terminal area (i.e., not a primary public access route).

Finally, this graphic depicts the future BART Connector alignment (assuming a full funding plan can be achieved) and two areas (Areas 12 and 13) for potential cargo ferry landings. As discussed with the Stakeholder Advisory Committee, the cargo ferry landing areas are not ideally located, and there are currently no cargo companies requiring such a facility at OAK.

### Airline-Related Support Facilities

The graphic entitled "Potential Airline Support Facility Development Areas" highlights areas on the Airport that might be suitable for various airline support facilities, including belly cargo, provisioning and catering, fuel load rack, ground service equipment (GSE) maintenance facility, GSE storage and parking areas, ground runup enclosure (GRE), airport rescue and firefighting (ARFF) station, turbulants, and fuel storage. The graphic contains a matrix that identifies which airline-related support facilities would be suitable in each of the 12 potential on-Airport development areas.

Many of the airline-related support facilities should be located as close to the terminal complex as possible, making Area 1 (and some of the surrounding areas) attractive. However, the terminal area is already quite congested and will likely be more so in the future as a new terminal is recommended in this area. The need for airline-related support facilities in Area 1 will need to be balanced with other uses competing to be located in Area 1.

Finally, some airline-related support facilities are currently located on the Airport, and new facilities would only be required if the existing facilities are displaced by another (possibly higher and better) use. Examples include belly cargo, provisioning and catering, fuel load rack, GRE, and the ARFF station. Because a future terminal was identified in Area 1 (east of Neil Armstrong Way) and the recent kick-off of construction on the new terminal loop roadway and curb-side project, the Airport’s primary roadway system is well situated to accommodate forecast airline passenger, air cargo, and general aviation ground access needs. The graphic entitled "Potential Ground Access Development Areas" focuses mostly on areas to accommodate future vehicle parking demand (Areas 1 through 9), which may require minor support and/or access roadways. Port staff recommend that Areas 1 through 5 be considered to meet future parking requirements in the terminal area (some of these areas are currently used for parking today). It is also recommended that Area 7 (the upland area of the Central Basin) be considered for future parking (in the 2010 to 2012 timeframe) for economy/remote airline passenger parking and/or employee parking.

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### Summary of Technical Work

This section of the letter provides an overview of the technical work completed and presented to the Stakeholder Advisory Committee in meetings eight through ten. The Aviation Committee was briefed on meetings one through five in January 2005 and meetings six and seven in April 2005 (the staff reports for prior Committee briefings are posted on the Airport web site: www.oaklandairport.com, click on "Development" and then "Master Plan").

Clear, quality graphics are one of the most important aspects for communicating master plan concepts and land-use plans with stakeholders and decision makers. We have included eight graphics and two tables with this letter that summarize technical work to date. These graphics are a representative sample of the over 60 graphics that have been prepared to date for this master plan. Most of these graphics will be used in the final master plan document. The title of each graphic with the exception of the two tables is in the upper right corner of the title block below "Oakland International Airport Master Plan" (vertically).

#### Airplane Ground Access

Port staff analyzed the need for future airport ground access improvements. Essentially, with the completion of the Airport Roadway Project, which rebuilt 88th Avenue and Airport Drive (up to Neil Armstrong Way) and the recent kick-off of construction on the new terminal loop roadway and curb-side project, the Airport’s primary roadway system is well situated to accommodate forecast airline passenger, air cargo, and general aviation ground access needs. The graphic entitled "Potential Ground Access Development Areas" focuses mostly on areas to accommodate future vehicle parking demand (Areas 1 through 9), which may require minor support and/or access roadways. Port staff recommend that Areas 1 through 5 be considered to meet future parking requirements in the terminal area (some of these areas are currently used for parking today). It is also recommended that Area 7 (the upland area of the Central Basin) be considered for future parking (in the 2010 to 2012 timeframe) for economy/remote airline passenger parking and/or employee parking.

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April 2005

This graphic is a work-in-progress and was prepared by the Port as part of a master plan for Oakland International Airport. The master plan is preliminary and must be interpreted in the context of other master plan graphics, documents, and meetings.

**Potential Airline Support Facility Development Areas**

- landside only access required
- can occur via pipelines and hydrants, fuel trucks, waste
- Triturator
- Ground Runup Enclosure (GRE)
- Provisioning/catering
- Provisioning/catering
- Requires landside access for deliveries and up and drop-off cargo (small boxes, packages)
- Requires public landside access
- Planning Considerations
- In some instances, it is possible for provisioning/catering facilities to only require landside access.

**Parking Areas**

- Provides a location for airlines to conduct fuel trucks, ground service equipment (GSE) and fill aircraft
- Provides a location and facilities to refuel aircraft and building (without airside access)
- Requires landside access for deliveries and up and drop-off cargo (small boxes, packages)
- Requires public landside access

**Planning Considerations**

- Would increase traffic through City of San Leandro
- Close to jet fuel storage facility to Airport
- May require significant landfill of drainage basin
- Would impact wetlands

**Site Confined by Proximity to Taxiway B**

- Currently used for employee parking

**Currently Used for Public Parking**

- Central location, convenient access to existing terminals

**Adjacent to Terminal Access Corridor**

- Limited to informed users
- Poor access to terminals at South Field

**Site Confined by Proximity to Taxiway B**

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**Currently Used for Public Parking**

- Central location, convenient access to existing terminals

**Adjacent to Terminal Access Corridor**

- Limited to informed users
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Taxiway B, north of existing Terminal 1, and south of Ron Cowan Parkway), some airline-related support facilities in this area, such as belly cargo and some airline provisioning facilities, may need to be relocated to other areas. This graphic will guide the planning for relocating these airline-related support facilities, as required.

Environmental Issues

Port staff and the Stakeholder Advisory Committee discussed potential environmental opportunities and constraints associated with future growth at the Airport, both in terms of footprint or site environmental considerations associated with new facilities (such as a potential new terminal building), and operational environmental considerations associated with increased aviation activity (i.e., more airline passengers, more air cargo weight, more flights, etc.). An example footprint/site environmental consideration would be taking or impacting wetlands and/or wildlife on the Airport. Example operational environmental considerations include aircraft noise, air quality, and traffic/transportation effects.

It is important to note that throughout the master planning process, environmental issues have been considered at a screening-level. For example, Port staff and the Stakeholder Advisory Committee looked at three possible areas on the Airport for a future passenger terminal. Each area had its own benefits, as well as operational, economic, and environmental constraints. Port staff and the Stakeholder Advisory Committee eliminated two out of the three possible areas for future terminal land use due to environmental and economic feasibility. The recommended area for future terminal development is east of Taxiway B, north of existing Terminal 1, and south of Ron Cowan Parkway.

It is also important to note that because this master plan is a concept-level planning and feasibility study, it does not provide details on development plans, engineering feasibility, or environmental constraints that would be needed before the Port could decide whether to proceed with any particular project. For example, the Port would need to complete additional planning and engineering on a potential terminal concept before it could know whether it was going to be affordable and what the environmental effects might be, if any. As such, the board of Port Commissioners will not be deciding to propose or approve any specific project or groups of projects when it considers approval of the master plan. Rather, any project identified in the master plan would need to undergo more detailed planning, engineering and environmental review before it could proceed, including understanding how much it might cost, how it is going to be funded, and importantly, its environmental effects (in accordance with the California Environmental Quality Act and National Environmental Policy Act). Only then could a project or groups of related projects be approved by the Board and proceed into construction.

One environmental consideration that was studied in some detail in the master plan is aircraft noise. Specifically, Port staff and the Stakeholder Advisory Committee looked at potential aircraft noise associated with aircraft operations forecasts for the near-term planning horizon (2010). A series of graphics entitled Aircraft Noise (8 pages) provides (1) general background information on aircraft noise (e.g., what is noise, how it is measured, how it affects sleep, and federal laws regulating aircraft noise), (2) a summary of existing noise abatement management programs at OAK, and (3) single aircraft overflight noise contours (called Single Event Noise Exposure Level or SENEL) and time-weighted cumulative noise contours (called the California Noise Equivalent Level or CNEL). The aircraft noise analyses were prepared by Mestre Greve Associates, in association with Brown Buntin Associates.
Factors That Affect Annoyance
- Frequency and duration of noise
- Distance from the noise source
- Environmental conditions (e.g., weather, temperature)
- The individual's sensitivity to noise

FAA PART 150 Noise and Land Use Guidelines for New Development

- Land use compatibility
- Aircraft noise impact
- Land use restrictions

FAA PART 150 Noise and Land Use Guidelines for New Development

- Land use compatibility
- Aircraft noise impact
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Oakland International Airport

- Runway 29 Silent 7 Departure Procedure:
  - Turbojet aircraft practicing instrument approaches south of OAK are to turn over San Leandro Bay, continue to the I-880 freeway.
  - Land on Runway 10L/28R for departures.

North Field Noise Abatement Procedures (continued)

DAYTIME 6 AM TO 10 PM

- Aircraft terminated to local control at year-end, except in the case of emergency.
- Aircraft terminated to local control at year-end, except in the case of emergency.

South Field Program

DAY AND NIGHT

- No runway 7L/25R departures. No departures and arrivals of both private and small corporate bubble aircraft.
- No runway 7L/25R departures. No departures and arrivals of both private and small corporate bubble aircraft.

Sleep Interference

- Noise levels measured with sound level meters.
- Noise levels measured with sound level meters.

Sleep Interference

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Oakland International Airport

- Master Plan
- Master Plan

North Field Noise Abatement Procedures (continued)

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Note: This graphic is a work in progress and was prepared by the Port as part of a master plan for Oakland International Airport. The data is preliminary and must be interpreted in the context of other master plan graphics, documents, and meeting discussions.

**Table:**

<table>
<thead>
<tr>
<th>Year</th>
<th>Departures</th>
<th>Arrivals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>5,165</td>
<td>5,165</td>
</tr>
<tr>
<td>2010</td>
<td>5,186</td>
<td>5,176</td>
</tr>
</tbody>
</table>

*These aircraft do not have identical noise contour footprints, but are very similar and are grouped here for display purposes.

**Noise Contours (Sound Exposure Level):**
- 80 dB SEL
- 85 dB SEL
- 90 dB SEL

**Time Periods:**
- Day 7am-7pm
- Evening 7pm-10pm
- Night 10pm-7am

**2004 CNEL Contours (Community Noise Equivalent Level):**
- 60 dB SEL
- 65 dB SEL
- 70 dB SEL
Note: This graphic is a work-in-progress and was prepared by the Port as part of a master plan for Oakland International ... preliminary and must be interpreted in the context of other master plan graphics, documents, and meeting discussions.
The SENEL contours (Aircraft Noise graphics, Pages 5 and 6) present the noise footprint of the most common types of air carrier (passenger airline and air cargo) aircraft anticipated to operate at OAK in 2010. The number of aircraft operations (take-offs and landings) in 2004 and anticipated in 2010 is also presented. Overall, there will be more aircraft operations in 2010 than 2004, going from approximately 586 daily air carrier operations in 2004 to approximately 706 daily air carrier operations anticipated in 2010 (note that not all types of air carrier aircraft are shown on the graphic). However, the Port anticipates a decrease in the number of operations of the noisiest aircraft, the Boeing 727 (HK, for hushkit), going from 16 daily operations in 2004 to an anticipated 6 daily operations in 2010, with only 2 departures at night (compared to 4 in 2004). This anticipated decrease is due to Federal Express' (FedEx's) slow phase-out of the older and noisier Boeing 727. It is anticipated that FedEx will replace these aircraft with newer, larger, and quieter aircraft.

The last set of Aircraft Noise graphics present CNEL contours for existing conditions (2004), 2010 future conditions, and a comparison of 2004 and 2010 conditions (Pages 7 through 9). On the southeast side of the Airport (the normal direction from which aircraft approach the Airport for landing), the noise contours are relatively unchanged (2010 compared to 2004). On the northwest side of the Airport (the normal direction which aircraft depart the Airport after take-off), the noise contours in 2010 are anticipated to be slightly smaller than those in 2004. Even with more operations, the CNEL noise contours in 2010 are generally smaller for departing aircraft because of the anticipated reduction in the number of B727 operations described above.

In addition to aircraft noise, Port staff and the Stakeholder Advisory Committee examined other environmental opportunities and constraints, but at a higher, screening-level. The graphic entitled Other Environmental Programs (2 pages) summarizes the Airport’s existing air and water quality programs, wetlands management program, burrowing owl mitigation program, recycling programs (including the Airport Materials Management Program), as well as public access. A table entitled Master Plan Preliminary Environmental Screening Matrix (and associated graphics) evaluates potential development areas (e.g., for future terminal facilities, air cargo facilities, airfield improvements, etc.) against a series of environmental site planning considerations, such as aesthetics, wetland/wildlife, historic values, etc. In all cases, the evaluation compares existing conditions to the potential future condition. The evaluation could result in an opportunity for environmental benefit (+), a potential environmental constraint (-), no potential environmental benefit or constraint (0), or an unknown benefit/constraint (?) (e.g., when additional study is required). The table also addresses potential operational planning considerations that are not necessarily associated with a particular site. For example, airline passengers and passenger airline operations will likely continue to increase, even if a new terminal is not constructed (albeit at a lower level of service). Therefore, the potential operational planning considerations cannot be directly linked to potential future development areas or facilities (e.g., a new terminal). Additional discussion on this table will be contained in the master plan document.

Finally, Port staff asked the Stakeholder Advisory Committee to recommend environmental projects that should be considered in the master plan. The Stakeholder Advisory Committee requested that Port staff consider construction of a sound wall to block aircraft noise emanating from aircraft departures on Runway 29 towards certain areas in the City of San Leandro. Mestre Greve Associates prepared a preliminary analysis that is summarized on the graphic.
Recycling Programs

The Port has implemented a program to manage materials from ongoing construction projects and other airport operations. In 2004, the airlines diverted over 101 tons of material from the landfill. Airlines recycle magazines, newspapers, cardboard, and aluminum cans and bottles. The airport worked with airlines to consolidate both waste and recycling into one coordinated program. Prior to 2003, each airline contracted separately with a waste company and recycled items over-the-counter.

Food Waste Program

Food waste recovery was added in 2004. The program collects pre-consumer waste such as vegetable trimmings, coffee grounds, and filters, milk cartons, cheesy pizza boxes, and used paper towels. Material is then used as high nutrient fertilizer in the production of organic food. In 2004, the program diverted over 298 tons of material from the landfill.

Terminal Two Extension - LEED Certified

Terminal Two will have 51 tons diverted from the landfill in 2004. The terminal’s design includes dedicated recycling areas to encourage recycling. The new terminal will include a high-quality LEED-certified building. LEED = Leadership in Energy and Environmental Design.

Environmental Programs Info On Website

The Airport’s website is currently being updated to provide basic information on the airport’s environmental programs. Grade separated pedestrian/bike trail completed along southeast side of Airport Parkway (providing connection between the airport and Alameda). Emphasizes water savings, energy efficiency, material selection and indoor environmental quality. LEED provides a complete framework for assessing building performance. LEED = Leadership in Energy and Environmental Design. Terminal 2 extension has been designed using green building criteria.

Master Plan Preliminary Environmental Screening Matrix

This is a preliminary screening-level evaluation matrix for master planning purposes only and subject to change. Preliminary evaluations in this matrix may change as projects are defined in these areas and upon further environmental review.
This graphic is a work-in-progress and was prepared by the Port as part of a master plan for Oakland International Airport. It is preliminary and must be interpreted in the context of other master plan graphics, documents, and meeting discussions.

**Airport Planning & Management**

City of Alameda


**Legend**

- Potential Air Cargo Development Areas
- Development Areas
- Water
- Taxiways
- Runways
- Future Buildings
- Roadways
- Future Air Cargo Roadways

**Source:**

- Significant mixing of larger air cargo aircraft and lighter cargo truck traffic and airline passenger vehicle traffic
- Adequate airfield access (site near South Field runways)
- Committee
- Possible conflicts with potential terminal development
- Existing cargo facilities in this area (± 40 to 90 acres)
- Provides for modest expansion and/or relocation of site/facilities (± 29 acres)
- Would allow for modest expansion of FedEx's existing area (± 330 acres)
- Provides a significant amount of area for new air cargo

**Area 1**

- Environmentally constrained site (i.e., wetlands, wildlife, etc.)
- Expensive site preparation (i.e., large amount of fill, grading, soil preparation, environmental/wetlands mitigation)

**Area 2**

- Good airfield access (site near South Field runways for noise abatement procedures)
- Area (still being considered by Stakeholder Advisory Committee)
- Possible conflicts with potential terminal development
- Existing cargo facilities in this area (± 40 to 90 acres)
- Provides for modest expansion and/or relocation of site/facilities (± 29 acres)
- Would allow for modest expansion of FedEx's existing area (± 330 acres)
- Provides a significant amount of area for new air cargo

**Area 3**

- Some environmental constraints (i.e., wetlands)
- Expensive site preparation (i.e., large amount of fill, grading, soil preparation, environmental/wetlands mitigation)
- Area (still being considered by Stakeholder Advisory Committee)
- Possible conflicts with potential terminal development
- Existing cargo facilities in this area (± 40 to 90 acres)
- Provides for modest expansion and/or relocation of site/facilities (± 29 acres)
- Would allow for modest expansion of FedEx's existing area (± 330 acres)
- Provides a significant amount of area for new air cargo

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Planning Considerations

- Moves general aviation development closer to residential upgrades (possibly extensive and expensive)
- Unknown site preparation requirements and utility
- City of Oakland soccer fields
- Extensive use of the site would require relocating the new "T" hangars and Port-A-Ports
- Good site to consolidate smaller general aviation hangars
- Access would likely need to be from Harbor Bay Parkway
- Provides 20 acres ± for new general aviation (e.g., hangar)

Central Basin

- Reduces Runway 29 queue delay by 23% (39% with
- Impacts wetlands (approximately 1.6 Acres)
- Negates the need for midfield take-offs
- Provides greater aircraft sequencing capabilities
- Provides additional aircraft queuing area for

City of Alameda

- Moves general aviation development closer to residential upgrades (possibly extensive and expensive)
- Unknown site preparation requirements and utility (still being considered by Stakeholder Advisory Committee)
- Possible conflicts with potential air cargo development area (Runway 29 for noise abatement)
- But long taxi distances for departing aircraft
- Short taxi distances for landing aircraft (Runways 27L/R), realignment/reconstruction
- Possible site for new corporate jet facilities
- Access would likely need to be from Harbor Bay Parkway
development
- Provides 65 acres ± for new general aviation (e.g., hangar)

Area 2

- Possible site for new corporate jet facilities
- Access would likely need to be from Harbor Bay Parkway
development
- Provides 15 acres ± for new general aviation (e.g., hangar)

Area 4 (Redevelopment)

- Requires mixing of various types of aircraft
- Possible asbestos and lead paint issues
- Less site preparation and utility upgrades likely required
- Taxi distances the same as existing
- Relatively good landside access on existing roadways at

Area 3

- Potential General Aviation Development Areas
- Potential Runway 29 Access Improvements

Legend:
- Potential General Aviation Development Areas
- Potential Runway 29 Access Improvements
- Future Roadways
- Roadways
- Taxiways
- Runways
- Wetlands
- Redevelopment Areas
- Future Landfill/Ramp
- Future Roads
- Future Runway 29 Access
- Future Taxiways
- Future Buildings
- Future Aircraft Gate

Potential General Aviation Development Areas

Potential Runway 29 Access Improvements

Future Roadways

Roadways

Taxiways

Runways

Wetlands

Redevelopment Areas

Future Landfill/Ramp

Future Roads

Future Runway 29 Access

Future Taxiways

Future Buildings

Future Aircraft Gate

Oakland International Airport

= 1 Acre
May lead to excessive delay on Taxiway B and gates (inefficient for airline operations). Long reposition distances on taxiways between North Field and North Field (not shown) Development Areas. Express (Area 3 from graphic showing Potential Air Cargo
May impact/limit possible future expansion of Federal
Must use/cross active taxiways when repositioning aircraft
Possible impacts to wetlands (depending on the exact size
Provides approximately 9 acres for RON aircraft parking to Runway 29
May be affected by need for new taxiways to improve access sitioning aircraft between RON parking positions and gates
Must use/cross active taxiways when repo-
Imacts a major storm water drainage basin
Imacts wetlands
Provides approximately 20 acres for RON aircraft parking
Imacts wetlands
Provides approximately 11 acres for RON aircraft parking
Area available for RON aircraft parking depends on future
Automobile parking
taxiway crossings
Provides RON aircraft parking in proximity to gates, with no
to Runway 29
Reduces Runway Occupancy Time (ROT)
Reduces airfield congestion
Decreases taxi distances and time
Impacts wetlands (approximately 1.2 Acres)
(approximately 15%)

Planning Considerations
9R

Taxiway Y would be able to exit 82% of 2010 Fleet Mix is
Taxiway Z able to exit

Ron Cowan Par

Oakland VOR

Central Basin

Control Tower

Air Cargo Way

Southwest

Building

Provisioning

Southwest

Building

U

P

South

To

w

Oakland

North Air Traffic Control Tower

Air Traffic Control Tower

South

A

South

Paris

ShepardWay

Terminal 1

Maintenance

Center Hangar

Maintenance

Center Hangar

Maintenance

Center Hangar

Center Hangar

Center Hangar

Center Hangar

H

J

Oakland VOR

North Air Traffic Control Tower
Note: This graphic is a work-in-progress and was prepared by the Port as part of a master plan for Oakland International... is preliminary and must be interpreted in the context of other master plan graphics, documents, and meeting discussions.

- Would increase traffic through City of San Leandro
- Close to jet fuel storage facility
- Could provide non-public (e.g., service vehicle) access
- Would require significant land acquisition
- Would impact wetlands
  (could be constructed on viaduct)
- May require significant landfill of drainage basin
- Would impact wetlands

Area 10

Area 9

Area 7

Area 6

Area 5

Area 4

Area 1

Parking Areas

Planing Considerations

Potential Airline Support Facility Development Areas

Fuel Storage  •• •  •
Triturator •
Ground Runup Enclosure (GRE)    ••    ••
GSE Storage/Parking ••• •
Maintenance •• ••••• •
Fuel Load Rack •••••

AREA 13

• Should be located in proximity to aircraft gates
• Requires public landside access
• Provides a location to store fuel (jet fuel, 100 LL,
 Fuel Storage
• Should be located in proximity to aircraft gates

Triturator

Ground Runup Enclosure (GRE)

GSE Storage/Parking

Maintenance

Fuel Load Rack

AREA 13

• Provides a location to store fuel (jet fuel, 100 LL,

Fuel Storage

Triturator

Ground Runup Enclosure (GRE)

GSE Storage/Parking

Maintenance

Fuel Load Rack

Harbor Bay Parkway

San Leandro Bay

Old Earhart Rd.

• May require landside access through City of Alameda
• May be able to be located off-Airport
• Inconvenient landside access
• Direct access to Bay
• Would impact wetlands

Area 8

Area 10

San Francisco Bay

San Francisco Bay

Old Earhart Rd.

Harbor Bay Parkway

CONTROL TOWER

AIR TRAFFIC CONTROL TOWER

AIR TRAFFIC CONTROL TOWER

CARGO BUILDING

CENTER HANGAR

CENTER HANGAR

PROVISIONING SOUTHWEST

PROVISIONING NORTHEAST

CATERING

CATERING

BAY TRAIL

WATER

LAND

FUTURE ROADWAYS

BUILDINGS

AIRPORT LAND

DEVELOPMENT AREAS

POTENTIAL GROUND ACCESS

POTENTIAL AIRLINE SUPPORT FACILITY DEVELOPMENT AREAS

LEGEND
entitled Potential Takeoff Noise Barrier. A takeoff noise barrier located on the Airport would provide virtually no noise relief due to limitations on where the wall can be constructed in order to provide for safe takeoffs and landings at the end of Runway 11-29 (i.e., a wall cannot be constructed inside the Object Free Area). However, a takeoff noise barrier constructed in San Leandro along San Francisco Bay (in the back yards of the homes along Neptune Drive) would provide some small noise reduction benefit (on the order of 5 dBA), but would not reduce low frequency (rumbling) noise. As described on the graphic, the barrier would need to be continuous behind all of the homes and would likely require a permit from the San Francisco Bay Conservation and Development Commission (BCDC), which might be difficult to obtain. Other issues include maintenance (for glass or Lexan alternatives) and constructability (which might need to occur from the waterside). The City of San Leandro and the San Leandro representatives on the Stakeholder Advisory Committee are considering whether to recommend this project to the Port for inclusion in the master plan.

Potential Financial Plan

Port staff provided the Stakeholder Advisory Committee with an overview of airport finances, including the Airport’s operating budget and capital improvement program. Port staff presented a preliminary (hypothetical) plan to fund the projects likely to be recommended in the master plan, including a potential third terminal (east of Taxiway B, north of existing Terminal 1, and south of Rom Cowan Parkway), a new high-speed exit taxiway (off Runway 29), and Runway 29 taxiway access improvements. The analysis assumes that Passenger Facility Charges (PFCs) and Airport Improvement Program (AIP) grants are used to fund most of the costs associated with implementing these projects. PFCs would be bonded for 30 years, and there would be a small incremental increase in airline rates and charges. The basic idea is to keep the costs that the airlines pay at a reasonable level to keep the Airport attractive to low-cost and other airlines. The analysis assumes that other capital projects, such as renovation of existing facilities and major maintenance projects, could be funded using Port cash or revenue from coverage on the PFC-backed bonds.

The preliminary financial plan suggests that these master plan projects are affordable, given certain assumptions in the analysis, which are subject to change in the future. For example, the cost of construction continues to escalate. Further, the preliminary financial plan does not consider Port-wide financial issues; it is focused solely on Airport capital projects and potential revenues.

In summary, the preliminary financial plan presents a rough analysis to check that it is reasonable to be considering these projects at all. It appears that it is indeed reasonable for the Port to be considering these projects from a rough affordability perspective. After the master plan is complete, the Port will need to conduct more thorough analyses on the financial feasibility of these and other Port projects from a Port-wide capital and funding perspective.

Land-Use Plans

The graphic entitled Existing Land-Use Map presents the existing aviation land-uses on the Airport. It is essentially the same graphic that was presented at the beginning of the master plan process, updated as necessary. The graphic now displays wetlands on the Airport.
The graphic entitled **Near-Term Land-Use Map (2010 – 2012)** presents the forecast land uses in 2010 to 2012. The land use abbreviations highlight areas of significant change from the prior land use map (in this case, changes from the Existing Land-Use Map). As shown on the graphic, the primary new land uses include a new terminal (Passenger Facilities or PF) in the area east of Taxiway B, north of existing Terminal 1, and south of Ron Cowan Parkway, as recommended by Port staff and the Stakeholder Advisory Committee. The old Oakland Maintenance Center (OMC) hangar site would be redeveloped to support the new terminal land use area to the south including replacement air cargo facilities, such as the belly cargo and United Parcel Service building (C land use), potential airline provisioning and GSE maintenance facilities (AR5 land use), and remain overnight (RON) aircraft parking and/or passenger/employee vehicle parking (PF land use).

Other new land uses anticipated in 2010 to 2012 timeframe include Airfield (or A) land uses for new taxiways parallel to Taxiway B, a new high-speed taxiway off Runway 29 (shown as Taxiway Z), and new Runway 29 taxiway access improvements. The PF land use on the west side of Taxiway B, just south of Ron Cowan Parkway would be for RON aircraft parking, and the PF land use in the Central Basin, just south of Ron Cowan Parkway would be for long-term/remote airline passenger vehicle parking and/or employee parking.

At North Field, the new land uses are for general aviation aircraft parking ramps and/or hangars (GA land use). The area just north of Runway 15-33 would likely be used for larger corporate jet parking, while the area adjacent to Harbor Bay Parkway would likely be used for hangars for small (e.g., single-engine or light multi-engine) aircraft hangars. It is anticipated that these areas would be developed as market conditions warrant using a third party developer model.

The graphic entitled **Long-Term Land-Use Map (2025)** presents the forecast land uses in 2025. The land use abbreviations highlight areas of significant change from the prior land use map (in this case, changes from the Near-Term Land-Use Map (2010 – 2012)). The graphic shows an expansion of the PF land uses in and around the existing terminal area, mostly to support additional RON aircraft parking and some airline passenger and/or employee vehicle parking. The graphic also shows additional expansion of GA land use at North Field, mostly for additional small aircraft or corporate jet hangars.

A new runway at South Field (parallel to Runway 11-29) is not shown on the Long-Term Land-Use Map (2025). Although one would likely be required before 2025 to meet anticipated demand at OAK, Port staff is recommending that the master plan document not include a new runway, but indicate that additional runway capacity in the Bay Area is a regional issue that the Port cannot solve on its own, both because of the anticipated cost to construct a new runway ($3 billion+) and the likely controversy over filling San Francisco Bay to do it.

**Next Steps**

Port staff is currently writing the master plan document based on the graphics and discussion at the Stakeholder Advisory Committee meetings. The document will be reviewed with the Stakeholder Advisory Committee at the November 10, 2005, meeting. Port staff plans to hold a public meeting on the master plan in the fall 2005. Also, Port staff plans to brief the elected officials in the cities of San Leandro (on September 12, 2005), Alameda, and Oakland (as...
Note:

This graphic is a work-in-progress and was prepared by the Port as part of a master plan for Oakland International ... is preliminary and must be interpreted in the context of other master plan graphics, documents, and meeting discussions.

Important Note:

This graphic depicts potential airport land uses in the 2025 timeframe at Oakland International Airport. Each individual land use depicted may be independent of or may be related to other uses. Whether any land use will be proposed is subject to a number of factors, including market conditions, availability of funding, environmental constraints, etc. Each land use depicted may be independent of or may be related to other uses. Whether any land use will be proposed is subject to a number of factors, including market conditions, availability of funding, environmental constraints, etc. Each individual land use depicted may be independent of or may be related to other uses.
desired by the respective city staff and councils). Finally, the master plan document will be presented to the Aviation Committee for review and recommendation to the Board of Port Commissioners for adoption (estimated in January 2006).

Master Plan Administration

The master plan project is part of the Port’s Capital Improvement Program (CIP), and all work has been and will be charged to appropriate CIP element and work order numbers. The following table presents a snapshot of the budget for the master plan:

<table>
<thead>
<tr>
<th>Resource</th>
<th>Original Budget</th>
<th>Brief Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphics/Report Production</td>
<td>$75,000</td>
<td>Board approved contract for $75,000 with Finger Design Associates (Resolution No. 04117); Board approved supplemental contract with Finger Design Associates (Resolution No. 04304) to add $70,000 to the original contract, for a total of $145,000; approx. $105,500 spent</td>
</tr>
<tr>
<td>CAD Services/Engineering Division Support</td>
<td>$30,000</td>
<td>Approx. $16,500 spent (in-house/Engineering Division staff costs)</td>
</tr>
<tr>
<td>Administrative Support</td>
<td>$30,000</td>
<td>Contract with Outsource Consulting Services, Inc.; approx. $6,000 spent</td>
</tr>
<tr>
<td>Printing</td>
<td>$35,000</td>
<td>Port staff is doing most of the printing in-house (e.g., meeting handouts); approx. $10,000 spent</td>
</tr>
<tr>
<td>Legal Services</td>
<td>$30,000</td>
<td>Approx. $18,000 spent</td>
</tr>
<tr>
<td>Aircraft Noise Consulting</td>
<td>$150,000</td>
<td>Board approved contract for $150,000 with Mestre Greve Associates (Resolution No. 04076); approx. $70,000 spent</td>
</tr>
<tr>
<td>Airfield Simulation Consulting</td>
<td>$100,000</td>
<td>Board approved contract for $100,000 with ATAC Corporation (Resolution No. 04118); approx. $97,000 spent</td>
</tr>
</tbody>
</table>

As shown in the status for each resource, the overall master plan is still under the proposed budget (approximately 72% spent, compared to the originally authorized budget for the master plan, excluding the Board authorization for additional graphics services), and Port staff estimate that the master plan is approximately 80% complete.

As shown on the first table in this letter, Port staff has one more scheduled meeting with the Stakeholder Advisory Committee, and estimate that the master plan will be complete in early 2006 (concluding with adoption by the Board of Port Commissioners).

If you have any questions on the technical or administrative aspects of the master plan, please call or e-mail me.
Market Share

At the September 30, 2004, meeting, the Stakeholder Advisory Committee requested that the Port provide data on airline passenger market share. Table A describes the potential market share for Oakland International Airport (OAK), based on population by Bay Area county. The primary catchment area share is estimated by the Port's Aviation Marketing and Communications Department. For example, in Alameda County, approximately 90% of the estimated population (or 1,314,927 people) is closest to OAK and would naturally use OAK assuming competitive air service is available (i.e., with the right airlines, destinations, schedules, air fares, etc.). The potential catchment area for Sacramento International Airport, which likely has some influence in the northern Bay Area counties (e.g., Solano County), has been excluded from this analysis. As shown in Table A, we estimate that approximately 48.6% of the total Bay Area population would naturally want to use OAK, again assuming competitive air service is available (i.e., with the right airlines, destinations, schedules, air fares, etc.).

Table B shows the Airport’s actual market penetration. Of all passengers bound to and from specific destinations, Table B shows what percent is served at OAK. For markets (cities) where competitive air service is available at OAK, OAK captures approximately 48.5% of the market, which is close to the estimated potential described above. For well-served markets, OAK captures between 30% (e.g., Houston and Boise) and 60% (e.g., L.A. basin and Albuquerque) of the market. For those markets that are under-served from OAK, only about 18.9% of passengers traveling to/from those markets choose OAK (vs. the other two Bay Area airports). Looking at both well-served and under-served markets, the total actual market share for OAK is estimated to be 34.2%. That is, of all the domestic passengers beginning or ending their journey in the Bay Area, approximately 34.2% choose OAK.

The passenger forecasts presented at the Stakeholder Advisory Committee meeting in August 2004 suggested that OAK would serve approximately 18 million annual passengers (MAP) in 2010 (give or take) and 20 MAP in 2012 (give or take). OAK currently serves 14 MAP (data for the 12 months ending August 2004). The anticipated growth from 14 MAP to 18 to 20 MAP will occur as airlines add flights in existing markets (capturing an increase in market share at OAK) or add flights to new markets.

International Market

Similar market share data is not readily available for international airline service, and therefore a similar analysis on international market share is not possible. Currently, the only international flights to/from OAK are to/from Mexico on Mexicana Airlines (on Airbus A320) and SunTrips charters (on Boeing 757). North American Airlines will soon start scheduled service to various destinations in Mexico (on Boeing 757). We anticipate that OAK will continue to be dominated by domestic airline service, largely because the airlines at OAK primarily serve origin and destination (O&D) airline passengers (passengers starting or ending their trips in the Bay Area). The largest airline at OAK, Southwest Airlines, does not (and has not given any indication that they plan to) have interline agreements with other domestic or international airlines, making transfers to international flights difficult or impossible. San Francisco International Airport, on the other hand, serves both O&D airline passengers as well as a connecting hub for several airlines, most notably, United Airlines. Unlike Southwest Airlines, United Airlines has numerous interline agreements, making transfers to other international airlines or even international flights on United Airlines possible. That is, in order to be a significant international hub, the Airport must have a large O&D market, as well as serve as an airline hub for connecting passengers. Examples of large hub airports include San Francisco, Chicago O’Hare, Atlanta, Miami, John F. Kennedy, and Los Angeles international airports. All of these airports serve as hubs for multiple airlines that have interline agreements (also note that of these airports, Southwest Airlines only operates out of Los Angeles International Airport).

Based on this market share analysis and historic trends, we anticipate that passenger airline service at OAK will continue to grow, expanding in existing and new domestic markets. As discussed at the Stakeholder Advisory Committee meeting, we do not anticipate significant growth in international air service at OAK. We will likely continue to have and may see some modest growth in airline service to/from Mexico and possibly destinations in Canada. However, these international flights would continue to serve primarily O&D traffic and represent a small portion of overall passenger traffic at OAK and an even smaller portion of the Bay Area international passenger traffic. This analysis is consistent with the findings in the Regional Airport System Plan, Update 2000, Volume II, Aviation Forecasts (Feb. 2001).
### Table A

**Oakland International Airport Estimated Airport Service Area**

<table>
<thead>
<tr>
<th>Bay Area County</th>
<th>Population (1)</th>
<th>Primary Catchment Area Share (2)</th>
<th>OAK Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda</td>
<td>1,461,030</td>
<td>90%</td>
<td>1,314,927</td>
</tr>
<tr>
<td>Contra Costa</td>
<td>1,001,136</td>
<td>100%</td>
<td>1,001,136</td>
</tr>
<tr>
<td>San Francisco</td>
<td>751,682</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>San Mateo</td>
<td>697,456</td>
<td>100%</td>
<td>697,456</td>
</tr>
<tr>
<td>Marin</td>
<td>246,073</td>
<td>50%</td>
<td>123,037</td>
</tr>
<tr>
<td>Sonoma</td>
<td>466,725</td>
<td>100%</td>
<td>466,725</td>
</tr>
<tr>
<td>Napa</td>
<td>131,607</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>Solano</td>
<td>412,336</td>
<td>100%</td>
<td>412,336</td>
</tr>
<tr>
<td>Santa Clara</td>
<td>1,679,421</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>Santa Cruz</td>
<td>251,984</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>7,098,050</td>
<td></td>
<td>3,449,768</td>
</tr>
</tbody>
</table>

**OAK Share of Bay Area Market:** 48.6% 

Source:
2. Port of Oakland, Aviation Marketing and Communications Department.

### Table B

**Oakland International Airport Actual Market Share**

<table>
<thead>
<tr>
<th>Market</th>
<th>Daily Average Passengers (Inbound and Outbound) (1)</th>
<th>Percent Served</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bay Area Total</td>
<td>OAK at OAK</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25,307</td>
<td>12,284</td>
</tr>
</tbody>
</table>

#### Well-Served Domestic Markets
- Albuquerque: 350 passengers, 59.1% served
- Boise: 208 passengers, 32.2% served
- Boston: 1,203 passengers, 5.2% served
- Chicago: 1,963 passengers, 18.7% served
- Dallas/Ft. Worth: 899 passengers, 21.6% served
- Denver: 1,226 passengers, 15.3% served
- New York/Newark: 3,425 passengers, 26.3% served
- Orlando: 475 passengers, 23.4% served
- Phoenix: 1,743 passengers, 44.5% served
- Portland: 1,486 passengers, 38.4% served
- Salt Lake City: 752 passengers, 53.5% served
- Seattle/Tacoma: 2,321 passengers, 38.7% served
- St. Louis: 317 passengers, 17.0% served
- Washington/Dulles: 226 passengers, 37.6% served
- Washington/Baltimore: 1,870 passengers, 38.9% served

#### Under-Served Domestic Markets
- Atlanta: 821 passengers, 29.6% served
- Austin: 425 passengers, 15.1% served
- Boston: 1,203 passengers, 5.2% served
- Chicago: 1,963 passengers, 18.7% served
- Cincinnati/N. Kentucky: 119 passengers, 5.9% served
- Dallas/Ft. Worth: 899 passengers, 21.6% served
- Denver: 1,226 passengers, 15.3% served
- Detroit: 459 passengers, 15.7% served
- Hawaii: 2,021 passengers, 13.5% served
- Miami/Ft. Lauderdale: 653 passengers, 19.8% served
- Minneapolis/St. Paul: 623 passengers, 3.9% served
- New York/Newark: 3,425 passengers, 26.3% served
- Orlando: 475 passengers, 23.4% served
- Palm Springs: 152 passengers, 1.6% served
- Philadelphia: 654 passengers, 4.9% served
- Pittsburgh: 296 passengers, 3.7% served
- St. Louis: 317 passengers, 17.0% served
- Other: 7,801 passengers, 22.5% served

#### All Domestic Markets
- Total: 49,099 passengers, 34.3% served

Source:
1. U.S. DOT O&D Passenger Survey 4 Quarters Ending 1st Quarter '04
### Summary of 17.2 MAP flight schedule (with Southwest Airlines 17.2 MAP data changed to 18.0 MAP)

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Airline A</th>
<th>Airline B</th>
<th>Airline C</th>
<th>Airline D</th>
<th>Airline E</th>
<th>Airline F</th>
<th>Airline G</th>
<th>Airline H</th>
<th>Airline I</th>
<th>Southwest Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>B757-Series</td>
<td>293</td>
<td>3.69</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>737.75</td>
</tr>
<tr>
<td>B737-Series</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>A319/320</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table A: Seats Added/Goals

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Airline A</th>
<th>Airline B</th>
<th>Airline C</th>
<th>Airline D</th>
<th>Airline E</th>
<th>Airline F</th>
<th>Airline G</th>
<th>Airline H</th>
<th>Airline I</th>
<th>Southwest Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total seats added</td>
<td>0</td>
<td>1,412</td>
<td>624</td>
<td>0</td>
<td>200</td>
<td>268</td>
<td>0</td>
<td>0</td>
<td>616</td>
<td>6,302</td>
</tr>
<tr>
<td>Regional Jets</td>
<td>0</td>
<td>140</td>
<td>0</td>
<td>0</td>
<td>200</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>100</td>
<td>440</td>
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<tr>
<td>B747-Series</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B757-Series</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B737-Series</td>
<td>0</td>
<td>1,272</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>268</td>
<td>0</td>
<td>0</td>
<td>240</td>
<td>8,082</td>
</tr>
<tr>
<td>A319/320</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7,780</td>
</tr>
</tbody>
</table>

### Table B: Average number of seats per aircraft (17.2 MAP flight schedule)

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Airline A</th>
<th>Airline B</th>
<th>Airline C</th>
<th>Airline D</th>
<th>Airline E</th>
<th>Airline F</th>
<th>Airline G</th>
<th>Airline H</th>
<th>Airline I</th>
<th>Southwest Total</th>
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</thead>
<tbody>
<tr>
<td>Total seats added</td>
<td>0</td>
<td>1,412</td>
<td>624</td>
<td>0</td>
<td>200</td>
<td>268</td>
<td>0</td>
<td>0</td>
<td>616</td>
<td>6,302</td>
</tr>
<tr>
<td>Regional Jets</td>
<td>0</td>
<td>140</td>
<td>0</td>
<td>0</td>
<td>200</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>100</td>
<td>440</td>
</tr>
<tr>
<td>B747-Series</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B757-Series</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B737-Series</td>
<td>0</td>
<td>1,272</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>268</td>
<td>0</td>
<td>0</td>
<td>240</td>
<td>8,082</td>
</tr>
<tr>
<td>A319/320</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7,780</td>
</tr>
</tbody>
</table>

### Table C: Summary (Table A + Table F)

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Airline A</th>
<th>Airline B</th>
<th>Airline C</th>
<th>Airline D</th>
<th>Airline E</th>
<th>Airline F</th>
<th>Airline G</th>
<th>Airline H</th>
<th>Airline I</th>
<th>Southwest Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total seats added</td>
<td>0</td>
<td>1,412</td>
<td>624</td>
<td>0</td>
<td>200</td>
<td>268</td>
<td>0</td>
<td>0</td>
<td>616</td>
<td>6,302</td>
</tr>
<tr>
<td>Regional Jets</td>
<td>0</td>
<td>140</td>
<td>0</td>
<td>0</td>
<td>200</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>100</td>
<td>440</td>
</tr>
<tr>
<td>B747-Series</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B757-Series</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B737-Series</td>
<td>0</td>
<td>1,272</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>268</td>
<td>0</td>
<td>0</td>
<td>240</td>
<td>8,082</td>
</tr>
<tr>
<td>A319/320</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7,780</td>
</tr>
</tbody>
</table>

### Table D: Market Share

<table>
<thead>
<tr>
<th>Airline</th>
<th>Southwest Airlines</th>
<th>Airline I</th>
<th>Airline H</th>
<th>Airline G</th>
<th>Airline F</th>
<th>Airline E</th>
<th>Airline D</th>
<th>Airline C</th>
<th>Airline B</th>
<th>Airline A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load Factor</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

### Table E: Through Market Share

<table>
<thead>
<tr>
<th>Airline</th>
<th>Southwest Airlines</th>
<th>Airline I</th>
<th>Airline H</th>
<th>Airline G</th>
<th>Airline F</th>
<th>Airline E</th>
<th>Airline D</th>
<th>Airline C</th>
<th>Airline B</th>
<th>Airline A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load Factor</td>
<td>61.4%</td>
<td>77.0%</td>
<td>6.6%</td>
<td>2.0%</td>
<td>0.5%</td>
<td>5.1%</td>
<td>2.6%</td>
<td>5.9%</td>
<td>12.8%</td>
<td>23.0%</td>
</tr>
</tbody>
</table>

### Table F: New seats added (required to go from 17.2 MAP to 18.0 MAP for Southwest Airlines)

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Airline A</th>
<th>Airline B</th>
<th>Airline C</th>
<th>Airline D</th>
<th>Airline E</th>
<th>Airline F</th>
<th>Airline G</th>
<th>Airline H</th>
<th>Airline I</th>
<th>Southwest Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>New seats added</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table G: New seats added (over 17.2 MAP flight schedule)

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Airline A</th>
<th>Airline B</th>
<th>Airline C</th>
<th>Airline D</th>
<th>Airline E</th>
<th>Airline F</th>
<th>Airline G</th>
<th>Airline H</th>
<th>Airline I</th>
<th>Southwest Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>New seats added</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table H: Estimated recent average Load Factor

<table>
<thead>
<tr>
<th>Airline</th>
<th>Southwest Airlines</th>
<th>Airline I</th>
<th>Airline H</th>
<th>Airline G</th>
<th>Airline F</th>
<th>Airline E</th>
<th>Airline D</th>
<th>Airline C</th>
<th>Airline B</th>
<th>Airline A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load Factor</td>
<td>80.02%</td>
<td>80.02%</td>
<td>80.02%</td>
<td>80.02%</td>
<td>80.02%</td>
<td>80.02%</td>
<td>80.02%</td>
<td>80.02%</td>
<td>80.02%</td>
<td>80.02%</td>
</tr>
</tbody>
</table>

### Calculations

1. **New seats required**: For the additional 1.8 MAP AAD passengers (80% Load Factor)

   - Total seats required for through passengers (17.2 MAP flight schedule) = 560
   - New seats required (over 17.2 MAP flight schedule) = 1,360

2. **New seats required**: For the additional 1.8 MAP ADPM passengers (80% Load Factor)

   - Total seats required for through passengers (17.2 MAP flight schedule) = 400
   - New seats required (over 17.2 MAP flight schedule) = 1,360

3. **New seats required**: Market share by airline

   - Southwest Airlines = 61.4%
   - Airline I = 77.0%
   - Airline H = 6.6%
   - Airline G = 2.0%
   - Airline F = 0.5%
   - Airline E = 5.1%
   - Airline D = 2.6%
   - Airline C = 5.9%
   - Airline B = 12.8%
   - Airline A = 23.0%

### Additional Notes

- **Table A**: Seats (18 MAP)
- **Table B**: Average number of seats per aircraft (17.2 MAP flight schedule)
- **Table C**: Summary (Table A + Table F)
- **Table D**: Market Share (Estimated)
- **Table E**: Through Market Share
- **Table F**: New seats added (required to go from 17.2 MAP to 18.0 MAP for Southwest Airlines)
- **Table G**: New seats added (over 17.2 MAP flight schedule)
- **Table H**: Estimated recent average Load Factor

---

*Note: All calculations are based on Southwest Airlines B737-800s changed to B737-700s.*
### Summary 2000 (0.9 MAT) air cargo AAD flight schedule

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>South Field</th>
<th>North Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>A300 Series</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>A300 Series</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>B767 Series</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>B747 Series</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>B727 Series</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>DC-10</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>MD-11</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Large Turbo Prop</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Small Single Engine</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Small Turbo Prop</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

### Summary 2000 (0.8 MAT) air cargo AAD flight schedule

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>South Field</th>
<th>North Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>A300 Series</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>A300 Series</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>B767 Series</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>B747 Series</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>B727 Series</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>DC-10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>MD-11</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Large Turbo Prop</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Small Single Engine</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Small Turbo Prop</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

### Summary 2000 (1.4 MAT) air cargo AAD flight schedule

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>South Field</th>
<th>North Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>A300 Series</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>A300 Series</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>B767 Series</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>B747 Series</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>B727 Series</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>DC-10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>MD-11</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Large Turbo Prop</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Small Single Engine</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Small Turbo Prop</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

### Summary 2000 (1.4 MAT) air cargo AAD flight schedule

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>South Field</th>
<th>North Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>A300 Series</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>A300 Series</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>B767 Series</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>B747 Series</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>B727 Series</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>DC-10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>MD-11</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Large Turbo Prop</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Small Single Engine</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Small Turbo Prop</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

**Notes:**
- See 2003 Supplemental Environmental Impact Report (SEIR) for Airport Development Program (ADP). 0.8 MAT was used as the current MAT, 0.9 MAT cargo activity used for the SEIR.
- See 2002 Supplemental Environmental Impact Report (SEIR) for Airport Development Program (ADP).
1) Summarize historic annual general aviation operations data (North and South Fields)

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>2000*</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>Sept. 2004 (X)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helicopter</td>
<td>15,173</td>
<td>2,300</td>
<td>3,032</td>
<td>3,802</td>
<td>2,704</td>
</tr>
<tr>
<td>Jet</td>
<td>20,214</td>
<td>13,827</td>
<td>14,709</td>
<td>16,185</td>
<td>16,574</td>
</tr>
<tr>
<td>Piston**</td>
<td>216,594</td>
<td>122,170</td>
<td>118,937</td>
<td>111,975</td>
<td>103,542</td>
</tr>
<tr>
<td>Turboprop</td>
<td>6,348</td>
<td>6,290</td>
<td>6,510</td>
<td>6,894</td>
<td>5,822</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>258,329</td>
<td>144,587</td>
<td>143,188</td>
<td>138,856</td>
<td>128,642</td>
</tr>
</tbody>
</table>

*From 2003 Supplemental Environmental Impact Report (SEIR) for Airport Development Program (ADP).
**Includes touch and go’s (50% ±), blimps, and gliders.

2) Estimate annual growth rate and general aviation operations in 2010

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Proposed Rate* (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helicopter**</td>
<td>1%</td>
</tr>
<tr>
<td>Jet</td>
<td>3%</td>
</tr>
<tr>
<td>Piston</td>
<td>-1%</td>
</tr>
<tr>
<td>Turboprop</td>
<td>0%</td>
</tr>
</tbody>
</table>

*Estimated based on recent trends at OAK and industrywide projections.
**Proposed rate of annual growth after Silver State Helicopters starts operation in mid-2005.

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helicopter*</td>
<td>35,507</td>
</tr>
<tr>
<td>Jet</td>
<td>19,937</td>
</tr>
<tr>
<td>Piston</td>
<td>97,238</td>
</tr>
<tr>
<td>Turboprop</td>
<td>5,822</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>158,504</td>
</tr>
</tbody>
</table>

*Adjusted for Silver State Helicopters new operations scheduled to start in mid-2005.

3) Compute average annual day (AAD) operations

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helicopter</td>
<td>97</td>
</tr>
<tr>
<td>Jet</td>
<td>55</td>
</tr>
<tr>
<td>Piston*</td>
<td>266</td>
</tr>
<tr>
<td>Turboprop</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>434</td>
</tr>
</tbody>
</table>

*50% ± touch and go's.

4) Adjust SEIR 2000 flight schedule to achieve 2010 master plan general aviation flight schedule

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>2000 SEIR</th>
<th>2010</th>
<th>Required SEIR</th>
<th>Required MP</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helicopter</td>
<td>42</td>
<td>97</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jet</td>
<td>52</td>
<td>55</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston**</td>
<td>594</td>
<td>266</td>
<td>(326)</td>
<td>(326)</td>
<td></td>
</tr>
<tr>
<td>Turboprop</td>
<td>16</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>704</td>
<td>434</td>
<td>(270)</td>
<td>(270)</td>
<td></td>
</tr>
</tbody>
</table>

*MP = master plan (from Table D).
**50% ± touch and go's.
Master Plan Forecast - Oakland International Airport

1) Summarize gate requirements from August 19, 2004, meeting.

<table>
<thead>
<tr>
<th>MAP</th>
<th>18</th>
<th>20</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approx. Year</td>
<td>2010</td>
<td>2012</td>
<td>2025</td>
</tr>
<tr>
<td>Aug. (Pk. Month) Passengers</td>
<td>1,737,457</td>
<td>1,957,903</td>
<td>2,895,761</td>
</tr>
<tr>
<td>Daily Departures (Total Flights/2)</td>
<td>271</td>
<td>299</td>
<td>n/a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Avg. Daily Departures per Gate</th>
<th>Total Gate Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td>46</td>
</tr>
<tr>
<td>6.5</td>
<td>42</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Avg. Daily Departures per Gate</th>
<th>Aug Passengers per Gate</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td>37,771</td>
</tr>
<tr>
<td>6.5</td>
<td>41,368</td>
</tr>
</tbody>
</table>

2) Determine approximate gate requirements for 30 MAP (range).

Assumed August Passengers per Gate: 40,000
Approx. Total Gate Requirements: 72
Total Gate Requirements (planning range): 65 to 75
Increase from 2010/2012 Gate Requirements: 15 to 25

3) How much area per gate is required for planning?

<table>
<thead>
<tr>
<th>Airport</th>
<th>Gates in Acres/43</th>
<th>Acres per Gate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(X)</td>
<td>(43+15)/X</td>
</tr>
<tr>
<td>Oakland International</td>
<td>28</td>
<td>2.1</td>
</tr>
<tr>
<td>Reagan Washington National</td>
<td>23</td>
<td>2.5</td>
</tr>
<tr>
<td>General Mitchell International</td>
<td>35</td>
<td>1.7</td>
</tr>
<tr>
<td>McCarran International</td>
<td>22</td>
<td>2.6</td>
</tr>
<tr>
<td>Chicago Midway</td>
<td>34</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Factors influencing acres per gate calculation:
- Aircraft fleet mix (gate "size")
- Aircraft movement area requirements (e.g., taxiways)
- Terminal configuration
- Access roadway requirements and alignment
- Remote aircraft parking requirements

Use 2.2 acres per gate for master planning (LINE C)

3) Calculate approximate area required for 15 to 25 additional gates (30 MAP).

Approx. area required (planning range): 33 to 55 acres

(1) Source: Site Re-Use Study, United Airlines Maintenance Center, Ricondo & Associates, June 2003
(2) Includes 15-acre allowance for landside facilities (including curbside and parking garage)

OAK Forecasts.xls Port of Oakland
Master Plan Forecast - Oakland International Airport

1) Summarize existing inventory of based general aviation aircraft

<p>| TABLE A: Inventory of based general aviation aircraft (Dec. 2004) |</p>
<table>
<thead>
<tr>
<th>Hangar</th>
<th>Tie-Down</th>
<th>Total (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helicopter</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Jet</td>
<td>28</td>
<td>1</td>
</tr>
<tr>
<td>Piston</td>
<td>139</td>
<td>89</td>
</tr>
<tr>
<td>Turboprop</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>102</td>
</tr>
</tbody>
</table>

2) Estimate based general aviation aircraft demand in 2010 and 2025

<p>| TABLE B1: 2010 based general aviation aircraft demand |</p>
<table>
<thead>
<tr>
<th>Hangar</th>
<th>Tie-Down</th>
<th>Total (B)</th>
<th>Net New* (X)</th>
<th>% Growth*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helicopter</td>
<td>3</td>
<td>11</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Jet</td>
<td>36</td>
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<td>7</td>
</tr>
<tr>
<td>Piston</td>
<td>256</td>
<td>64</td>
<td>320</td>
<td>92</td>
</tr>
<tr>
<td>Turboprop</td>
<td>14</td>
<td>0</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>309</td>
<td>75</td>
<td>384</td>
<td>107</td>
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</tbody>
</table>

<p>| TABLE B2: 2025 based general aviation aircraft demand |</p>
<table>
<thead>
<tr>
<th>Hangar</th>
<th>Tie-Down</th>
<th>Total (C)</th>
<th>Net New* (Y)</th>
<th>% Growth*</th>
</tr>
</thead>
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<td>Helicopter</td>
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<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Jet</td>
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<td>58</td>
<td>29</td>
</tr>
<tr>
<td>Piston</td>
<td>256</td>
<td>64</td>
<td>320</td>
<td>92</td>
</tr>
<tr>
<td>Turboprop</td>
<td>14</td>
<td>0</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>331</td>
<td>75</td>
<td>406</td>
<td>129</td>
</tr>
</tbody>
</table>

*Compared to existing (Dec. 2004) based aircraft inventory (Table A).

3) Estimate based general aviation aircraft area requirements in 2010 and 2025

<p>| TABLE C: Estimated area requirements (acres/aircraft) |</p>
<table>
<thead>
<tr>
<th>Hangar</th>
<th>Tie-Down</th>
<th>Total (L)</th>
<th>High (H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jet/Turboprop*</td>
<td>0.47</td>
<td>1.00</td>
<td>Source: Based on existing area per aircraft calculations for OAK</td>
</tr>
<tr>
<td>Piston/Helicopter*</td>
<td>0.09</td>
<td>0.15</td>
<td></td>
</tr>
</tbody>
</table>

*Jet and turboprop aircraft are similar in size and therefore have similar area per aircraft requirements. Piston and helicopter aircraft are similar in size and therefore have similar area per aircraft requirements.

| TABLE D: Estimated area requirements for based general aviation aircraft (acres) |
|---------|----------|----------------|----------------|----------------|----------------|----------------|
| Jet/Turboprop* | 44 | 3 | 7 | 14 | 29 | 51 | 58 | 73 |
| Piston/Helicopter* | 21 | 9 | 15 | 9 | 30 | 36 | 30 | 36 |
| Total | 65 | 12 | 22 | 23 | 44 | 77 | 87 | 109 |

*Jet and turboprop aircraft are similar in size and therefore have similar area per aircraft requirements. Piston and helicopter aircraft are similar in size and therefore have similar area per aircraft requirements.
Potential New North Field - South Field Taxiways  
Master Plan Analysis - Oakland International Airport

1) **Determine taxi distances (assume existing transient aircraft parking locations)**

<table>
<thead>
<tr>
<th>Taxi Route to Runway 29(2)</th>
<th>Distance (feet)(1) from Taxi Route to Runway 29</th>
<th>Business Jet Center</th>
<th>Weighted Avg. Location(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing (Taxiway B or O)</td>
<td>15,860</td>
<td>13,489</td>
<td>15,267</td>
</tr>
<tr>
<td>Taxiway 1 (T1)</td>
<td>17,590</td>
<td>20,147</td>
<td>18,229</td>
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<tr>
<td>Taxiway 2 (T2)</td>
<td>14,337</td>
<td>16,621</td>
<td>14,908</td>
</tr>
<tr>
<td>Taxiway 3 (T3)</td>
<td>13,927</td>
<td>13,274</td>
<td>13,764</td>
</tr>
<tr>
<td>Taxiway 4 (T4)</td>
<td>15,854</td>
<td>18,321</td>
<td>18,471</td>
</tr>
</tbody>
</table>

(1) Source: Measured from aerial basemaps in AutoCAD  
(2) Assumes West Plan departures and existing noise abatement procedures  
(3) Assumes 75% of transient jet traffic will use KaiserAir and 25% will use Business Jet Center

<table>
<thead>
<tr>
<th>Taxi Route to Runway 29 (statute miles)</th>
<th>Distance (statute miles) from Taxi Route to Runway 29</th>
<th>KaiserAir</th>
<th>Business Jet Center</th>
<th>Weighted Avg. Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing (Taxiway B or O)</td>
<td>3.0</td>
<td>2.5</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>Taxiway 1 (T1)</td>
<td>3.3</td>
<td>3.8</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Taxiway 2 (T2)</td>
<td>2.7</td>
<td>3.1</td>
<td>2.8</td>
<td></td>
</tr>
<tr>
<td>Taxiway 3 (T3)</td>
<td>2.6</td>
<td>2.5</td>
<td>2.6</td>
<td></td>
</tr>
<tr>
<td>Taxiway 4 (T4)</td>
<td>3.0</td>
<td>3.5</td>
<td>3.1</td>
<td></td>
</tr>
</tbody>
</table>

2) **Convert distances to time**

Assumed taxi speed (from simulation model):  
- 16 knots (nautical miles per hour)  
- 0.3 statute miles per minute [X]

<table>
<thead>
<tr>
<th>Taxi Route to Runway 29</th>
<th>Approx. time (min. sec.)* from Taxi Route to Runway 29</th>
<th>KaiserAir</th>
<th>Business Jet Center</th>
<th>Weighted Avg. Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing (Taxiway B or O)</td>
<td>09:47</td>
<td>09:25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taxiway 1 (T1)</td>
<td>10:51</td>
<td>11:15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taxiway 2 (T2)</td>
<td>08:51</td>
<td>09:12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taxiway 3 (T3)</td>
<td>08:36</td>
<td>08:30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taxiway 4 (T4)</td>
<td>09:45</td>
<td>10:10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Excludes delay crossing runways and holding for bypass traffic

3) **Compare taxiway alternatives**

<table>
<thead>
<tr>
<th>Taxi Route to Runway 29</th>
<th>Change in time from existing (sec.)* from Taxi Route to Runway 29</th>
<th>KaiserAir</th>
<th>Business Jet Center</th>
<th>Weighted Avg. Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing (Taxiway B or O)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Taxiway 1 (T1)</td>
<td>64</td>
<td>247</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>Taxiway 2 (T2)</td>
<td>-96</td>
<td>116</td>
<td>-13</td>
<td></td>
</tr>
<tr>
<td>Taxiway 3 (T3)</td>
<td>-77</td>
<td>-77</td>
<td>-55</td>
<td></td>
</tr>
<tr>
<td>Taxiway 4 (T4)</td>
<td>0</td>
<td>179</td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

*A positive number represents an increase in taxi time compared to existing, and a negative number represents a decrease in taxi time compared to existing

<table>
<thead>
<tr>
<th>Taxi Route to Runway 29</th>
<th>Percent change in taxi times compared to existing</th>
<th>KaiserAir</th>
<th>Business Jet Center</th>
<th>Weighted Avg. Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing (Taxiway B or O)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Taxiway 1 (T1)</td>
<td>10.9%</td>
<td>49.5%</td>
<td>19.5%</td>
<td></td>
</tr>
<tr>
<td>Taxiway 2 (T2)</td>
<td>-9.5%</td>
<td>23.2%</td>
<td>-2.3%</td>
<td></td>
</tr>
<tr>
<td>Taxiway 3 (T3)</td>
<td>-12.1%</td>
<td>-1.4%</td>
<td>-9.7%</td>
<td></td>
</tr>
<tr>
<td>Taxiway 4 (T4)</td>
<td>0.0%</td>
<td>35.9%</td>
<td>8.0%</td>
<td></td>
</tr>
</tbody>
</table>

*A positive percentage represents an increase in taxi time compared to existing, and a negative percentage represents a decrease in taxi time compared to existing

4) **Discussion of analysis**

1) The analysis focuses on transient jets because they are the least familiar with noise abatement procedures  
2) Taxiway 3 (T3) provides the most taxi time savings for jets from both KaiserAir and Business Jet Center  
3) With Taxiway 3 (T3), jets would save about approx. 10% on taxi time or just under 1 min. on average  
4) Any new North Field-South Field taxiway unlikely to reduce taxi times enough to preclude North Field jet departures*

*A new taxiway parallel to Taxiway B is likely required south of Taxiway B2 if a new terminal is constructed in this vicinity. This taxiway minimizes head-to-head taxi events on existing Taxiway B.

---

*Source: [www.portoakland.com](www.portoakland.com)  
Taxi times.xls  
Port of Oakland
1) Summarize existing and near-term future RON aircraft parking conditions and planning factors:

As of February 2005:

- 23 aircraft gates \(X\)
- Available remote RON aircraft parking: 26.0 acres (measured from aerial basemaps in AutoCAD) \(Y\)
  - 1.1 acres per gate (approx.) \(Y / X\)
- Required remote RON aircraft parking with 70% of aircraft gates used for RON aircraft parking (30% of aircraft gates vacant late at night)
  - 21.0 acres (in use on a typical night) \(Z\)
  - 0.9 acres per gate (approx.) \(Z / X = E1\)
- Required remote RON aircraft parking with 90% of aircraft gates used for RON aircraft parking (10% of aircraft gates vacant late at night)
  - 18.1 acres \(W\)
  - 0.8 acres per gate (approx.) \(W / X = E2\)

After Terminal 2 extension is complete:

- 29 aircraft gates \(A\)
- Available remote RON aircraft parking: 33.4 acres \(B\)
  - 1.2 acres per gate (approx.) \(B / A\)
- Required remote RON aircraft parking with 70% of aircraft gates used for RON aircraft parking (30% of aircraft gates vacant late at night)
  - 26.4 acres* \(A x E1\)
- Required remote RON aircraft parking with 90% of aircraft gates used for RON aircraft parking (10% of aircraft gates vacant late at night)
  - 22.8 acres* \(A x E2\)

*Assumes existing gate to remote RON aircraft parking area ratio remains constant (given percent of gates used for RON aircraft parking)

Future required remote RON aircraft parking*:

- 0.5 acres per gate** \(F\)

*Based on a planning factor for McCarran (Las Vegas) International Airport (a large hub, west coast airport with a large number of Southwest Airlines operations)

**Assumes gate to remote RON aircraft parking area ratio will decrease in the future as OAK airline passenger operations and gate availability increase (and departures per gate per day decrease)

2) Compute range of future remote RON aircraft parking requirements, 2010 to 2021

<table>
<thead>
<tr>
<th>Total Gate</th>
<th>Low**</th>
<th>Medium**</th>
<th>High**</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>23.3</td>
<td>36.1</td>
<td>41.9</td>
</tr>
<tr>
<td>50</td>
<td>25.3</td>
<td>39.3</td>
<td>45.6</td>
</tr>
</tbody>
</table>

(1) Range in number of gates (46 to 50) from previous master plan analyses
(2) Assumes the gate to remote RON aircraft parking area ratio will decrease in the future
(3) Assumes existing gate to remote RON aircraft parking area ratio with 10% of gates not used for RON aircraft parking
(4) Assumes existing gate to remote RON aircraft parking area ratio with 30% of gates not used for RON aircraft parking

3) Compute range of future remote RON aircraft parking requirements, 2021

<table>
<thead>
<tr>
<th>Total Gate</th>
<th>Low**</th>
<th>Medium**</th>
<th>High**</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>32.9</td>
<td>51.1</td>
<td>59.2</td>
</tr>
<tr>
<td>75</td>
<td>37.1</td>
<td>58.0</td>
<td>68.3</td>
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</tbody>
</table>

(1) Range in number of gates (65 to 75) from previous master plan analyses
(2) Assumes the gate to remote RON aircraft parking area ratio will decrease in the future
(3) Assumes existing gate to remote RON aircraft parking area ratio with 10% of gates not used for RON aircraft parking
(4) Assumes existing gate to remote RON aircraft parking area ratio with 30% of gates not used for RON aircraft parking

*RON.xls Port of Oakland
<table>
<thead>
<tr>
<th>A/D TIME</th>
<th>AIRLINE</th>
<th>A/C TYPE</th>
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</tr>
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SIMMOD Simulation
Airfield and Airspace Simulation Report
Oakland International Airport Master Plan Preparation Report

Revised:
January 6, 2006

Produced For:
Port of Oakland
530 Water Street
Oakland, CA  94607

Contract Number 04118

By:
ATAC Corporation
755 N. Mathilda Avenue, Suite 200
Sunnyvale, CA 94085

In Association With:
HNTB Corporation
6151 West Century Blvd.
Los Angeles, CA 90045

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1. Simmod PRO! Description

Developed by ATAC, Simmod PRO! is a PC-based (Windows Operating System) enhanced derivative of the widely used airport and airspace simulation model (SIMMOD). It represents a suite of software tools including the latest version of the FAA-validated SIMMOD simulation engine, a user-friendly graphical interface for preparing simulation inputs, a versatile traffic animator for replaying the simulated aircraft movement, and a flexible output analysis and reporting module. Simmod PRO! extends the capabilities of the simulation engine by allowing the implementation of rule-based logic as part of the simulation inputs. This offers the ability to specify rules that query the state of the simulation for dynamic decision-making.

There is no conceptual limit to the number of airports, size of terminal airspace and/or en route airspace, or number of flights that can be simulated by Simmod PRO!. The model properly captures the interactions between airport and airspace operations, including interactions among multiple neighboring airports. The model is capable of simulating current or potential airport facilities, runway configurations, dynamic gate use alternatives, runway and taxiway closings, dynamic runway switching, dynamic weather effects at an airport or in the airspace, airspace route structures, airspace sectorization, separation standards, traffic management techniques, and air traffic control procedures and policies.

In order to provide the flexibility of Simmod PRO! to simulate current, as well as a wide range of potential alternatives, many air traffic parameters are controlled by user input. The inputs are organized into three major categories: airfield-related input, airspace-related input, and simulation event input. The airfield-related input allows the user to specify the physical layouts of airports and operational parameters such as gate, taxiway, and runway structure, gate utilization by airlines, taxiway routings between gates and runways, departure lineup strategies, and aircraft landing and takeoff strategies. The airspace-related input allows the user to specify airspace routings, airspace sectorization, airspace separation standards including wake turbulence, arrival and departure procedures, metering and flow constraints, and strategies for resolving potential conflicts. Simulation event inputs provide the user with the capability to specify the departure and arrival demand schedules and desired changes in operating conditions including runway use configurations, terminal routing plans, and flow and metering constraints.

Because Simmod PRO! simulates the movement of each individual aircraft on the airfield and in the airspace, the model is capable of producing a wide variety of results at a detailed or aggregate level. Examples of output from Simmod PRO! include delay time, undelayed travel time, taxi-in time, taxi-out time, gate hold use, congestion, runway or airport capacity, and runway or airport traffic flows. The output data can be further refined by individual routes, taxi paths, airlines, sectors, gates, time periods, or individual aircraft. The output is often formatted for use in other software packages such as the Integrated Noise Model (INM), Noise Impact Routing System (NIRS), spreadsheet programs, and animation packages.

2. General Modeling Assumptions

This section describes the general modeling assumptions that apply to all simulation runs.

2.1 Scope of Simulation Study

This section presents a brief summary of the scope of the simulation work being performed in support of the Oakland International Airport (OAK) Master Plan Preparation. Part of this document contains the assumptions used to develop the airfield and airspace simulation models; specifically, a proposed improvement to access Runway 29, an additional high-speed runway exit, and the addition of a new taxiway parallel to Taxiway B. The proposed scenarios are being simulated for year 2010 with 18 million annual passengers and 0.9 million annual tons of cargo demands provided in conjunction with the Port of Oakland. The West Plan with Visual Flight Rules (VFR) runway configuration is the predominant plan and weather combination at OAK. In this configuration aircraft arrive and depart to the west. The West Plan VFR configuration, which excludes West Plan with Instrument Flight Rules (IFR) and Southeast Plan operations, occurs approximately 87% annually at OAK. The West Plan VFR configuration is used for all of the simulation runs for this study.

2.2 Airspace

To simulate the movements of aircraft in the model, Simmod PRO! utilizes node and link structures to create paths traversed by aircraft in the simulations. Ground links, which represent the ground tracks of the aircraft on the airfield, can be accurately modeled since the paths of these aircraft are constrained to existing taxiways and aprons at the airport. Thus, duplicating these paths as links would result in a fairly accurate representation of the ground route structures. However, unlike the ground routes, air routes are more difficult to model since no two aircraft trajectories are identical. Consequently, the simulation airspace is designed to capture an approximate air traffic flow of these aircraft.

The focus of this simulation study is to accurately capture ground airfield inefficiency at Oakland International Airport. The airspace necessary to capture these times are contained within approximately 15 nautical miles from OAK as shown below in Figure 1.
2.3 Aircraft

Standard radar separations applied in this modeling effort conform to the criteria contained in the handbook “U.S. Department of Transportation, Federal Aviation Administration, 7110.65P, Air Traffic Control, February 19, 2004.”

FAA ATC place aircraft into one of four possible categories as defined below:

- Heavy: Gross weight greater than 255,000 lbs
- B757: Boeing 757
- Large: Gross weight greater than 41,000 lbs but less than 255,000 lbs
- Small: Gross weight less than 41,000 lbs

Based on the aircraft’s category, minimum general airspace wake turbulence separations in nautical miles would apply as presented below:

- Heavy behind heavy – 4 miles
- Large/heavy behind B757 – 4 miles
- Small behind B757 – 5 miles
- Small/large behind heavy – 5 miles

Based on the aircraft’s category, minimum final approach wake turbulence separations in nautical miles that exist when the lead aircraft is over the landing threshold are shown below:

- Heavy behind heavy – 4 miles
- Large/heavy behind B757 – 4 miles
- Large behind heavy – 5 miles
- Small behind large – 4 miles
- Small behind B757 – 5 miles
- Small behind heavy – 6 miles

During periods when visual separations are allowed at OAK, the “U.S. Department of Transportation, Federal Aviation Administration, 7110.65P, Air Traffic Control, February 19, 2004,” handbook allows the use of as little as 2.5 Nautical Mile (nm) separation between aircraft established on the final approach within 10 nm of the landing runway. Table 1 presents the minimum separations allowed based on aircraft category.

**Table 1: Minimum Oakland International Airport Final Approach Visual Separations**

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<tr>
<th>Lead Aircraft</th>
<th>B757</th>
<th>Heavy</th>
<th>Large</th>
<th>Small</th>
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<td>2.9 nm</td>
<td>2.9 nm</td>
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<td>2.5 nm</td>
<td>3.5 nm</td>
</tr>
</tbody>
</table>

2.4 Simulation Schedule

The simulation event files are a representative day at OAK for the projected demand year of 2010. Aircraft in this demand schedule are grouped into one of eight groups. They are defined as:
- B757 – Boeing 757, all models
- Heavy Jet – Jet aircraft with a maximum gross takeoff weight limit greater than 255,000 pounds (e.g., A310, B763)
- Large Jet – Jet aircraft with a maximum gross takeoff weight limit greater than 41,000 pounds and less than 255,000 pounds (e.g., B733, B737, A320)
- Large Turboprop – Large turbine-propeller and piston-propeller powered aircraft with a maximum gross takeoff weight limit greater than 41,000 pounds (e.g., F27)
- Small Jet – Jet aircraft with a maximum gross takeoff weight limit less than 41,000 pounds (e.g., L335)
- Small Single Piston – Small single piston-propeller powered aircraft with a maximum gross takeoff weight limit less than 12,000 pounds (e.g., C152, C172)
- Small Turboprop – Small turbine-propeller and piston-propeller driven aircraft with a maximum gross takeoff weight limit between 12,000 and 41,000 pounds (e.g., C208, BE99)
- Small Twin Piston – Small twin piston-propeller powered aircraft with a maximum gross takeoff weight limit less than 12,000 pounds (e.g., BE58, PA31)

Table 2 presents operational counts for OAK by the above defined aircraft groups in the demand schedule year of 2010.

Table 2: Daily Operational Total by Aircraft Type at Oakland International Airport

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<td>43</td>
<td>0</td>
<td>86</td>
</tr>
<tr>
<td>Total</td>
<td>456</td>
<td>455</td>
<td>132</td>
<td>1,043</td>
</tr>
</tbody>
</table>

Figure 2 below presents hourly airport runway demands for all aircraft in the 2010 demand schedule year. The demand is solely based on the event schedules and is different from simulated runway flow. The differences arise from the air and ground delays and other factors that delay aircraft from using the runways at scheduled times.

2.4.1 Methodology for Flight Matching Departures with Arrivals (Turnaround Flights)

Airline, flight number, origination, destination, and aircraft type information are all contained in the event files which are used as the basis for building the simulation model schedule. The Simmod PRO! simulation model has the ability to keep track of the various effects arrival delays have on departing flights as well as keep track of gate availability if the information can be obtained from the event files. The event file is composed of individual flight segments. For example, if a flight lands at OAK, occupies a gate, and disembarks with the exact same flight number, the event file will have two unique flight segments for this flight. This is a turnaround event, and the gate occupied during the time on the ground is easy to determine. However, if the flight number changes, it is much harder to tie an arrival flight segment to a departure flight segment and the associated gate occupied unless that information is part of the model input.

To match arrival and departure segments into a turnaround event involves several steps. The first step involves finding arrival flights with the same characteristics as departing flights. On a first pass through the schedule a match is attempted for each departing flight based on airline, flight number, origination, destination, and aircraft type. In
addition, an arriving flight must also be at a gate within a minimum of 15 minutes and maximum of 4 hours of the departing flight in order to be considered a match. Departing and arriving flights that are not matched up the first time through the schedule are then processed again taking only airline, origination, destination, and aircraft type into account. Specific flight numbers are not considered on this second pass. In addition, an arriving flight must also be at a gate within a minimum of 20 minutes and maximum of 3 hours of the departing flight in order to be considered a match.

During the simulation, Simmod PRO! will use the turnaround flight information in order to determine how much scheduled departure times are offset due to delays that arrival segment incurs. If a departing flight has a matching arrival flight, the departing flight will not be allowed to “push back” from its gate until the departing flight’s matched arrival flight pulls up to the gate and the appropriate gate service time has been satisfied. In the case that the arriving aircraft is late to the gate and prevents the departing segment from proceeding, delay is assigned to the arrival segment and only the scheduled departure time is changed for the departure flight segment. The arriving aircraft waits at the gate and will not allow another arrival to use its gate until the departing segment pushes back from the gate.

2.5 Runways

OAK operations were modeled for both the South Field (Runway 29/11, 10,000 feet) and North Field (Runway 27R/09L, 5,454 feet, 27L/09R, 6,122 feet, and 33/15, 3,372 feet). For West Plan VFR, all jet departures must use Runway 29. Within the simulation model, the majority of jet arrivals occur at the South Field, however, small jets that can utilize Runway 27R or 27L may land there.

Due to the surrounding airports, most notably SFO and SJC, Northern California TRACON (NCT) requires departures to have a minimum separation of 10 nm if the two aircraft are flying the same route from the same airport. For example, if there are two north-bound departures at OAK, they are required to have a minimum separation of 10 nm; but individual north-bound departures from OAK and SJC will not require such restriction. Currently OAK will use an intersection departure procedure from Taxiway U to stage aircraft in order to reduce the occurrence of same route departures. This is only done for those aircraft that can depart using the shorter runway length from Taxiway U. For example, if two north-bound flights are ready to depart, and a south-bound flight is taxing towards Runway 29, the ground controller can hold the second north-bound departure flight and clear the south-bound departure to take-off from the intersection of Taxiway U on Runway 29.

Detailed North Field runway usage for OAK was calculated using approximately 4 years of ANOMS data provided by the Port of Oakland. ANOMS data includes detailed flight information such as aircraft type, runway used, and departure or arrival information. From the ANOMS data it was determined that there are few jet operations on the North Field. As Table 3 illustrates, out of 68,299 total North Field operations per year, only 11.9% were jet operations with the majority of those operations being arrivals.

### Table 3: North Field Jet Operations

<table>
<thead>
<tr>
<th>Type of Ops</th>
<th>Number of Ops</th>
<th>Percent of Ops</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Ops</td>
<td>68,299</td>
<td>100.0%</td>
</tr>
<tr>
<td>Jet Ops</td>
<td>8,146</td>
<td>11.9%</td>
</tr>
<tr>
<td>Jet Arrival</td>
<td>6,881</td>
<td>10.1%</td>
</tr>
<tr>
<td>Jet Departure</td>
<td>1,266</td>
<td>1.9%</td>
</tr>
</tbody>
</table>

Ops = operations (take-offs and landings)

Under VFR weather conditions, approximately 14%-15% of North Field arrivals “side step” to Runway 27L. Touch and Go operations were modeled using Runway 27L. A small number of jet departures from Runway 33 were modeled based on the ANOMS data (approximately 1 aircraft per day). Figure 3 presents a depiction of the runway use for OAK under West Plan VFR conditions that was used in the simulation model.

Figure 3: Airfield Layout of Oakland International Airport West Plan Flow – VFR

14-15% of North Field Arrivals Offload to 27L Based on ANOMS Historical data
2.6 Gates

As requested by the Port of Oakland, all airlines were made anonymous except for Southwest Airlines and Federal Express. The anonymous airlines were coded with "P" for passenger and "C" for cargo followed by another alphabet designating a unique airline ("PA" designates "Passenger Airline A" and "PB" designates "Passenger Airline B").

On the South Field, in addition to the current gate configuration at OAK, a new 20 gate passenger terminal was modeled near Taxiway B. The new passenger terminal was modeled to be used by Southwest Airlines, and the previous gates used by Southwest Airlines were modeled to be available for all other passenger airlines.

On the North Field, several parking locations were used to reflect an accurate representation of OAK. Cargo aircraft and all general aviation aircraft park at the North Field. The gate assignment for each airline and their locations are depicted in Figure 4. The percentages for the GA operations indicate what percentage of GA jet, turbo-propeller, and propeller driven aircraft park at the given locations.

2.7 Taxiway Assumptions

Taxi speeds vary throughout the airport depending on the various conditions encountered by the aircraft. Average taxi speeds used in the simulation are based on observed operations at OAK provided by the Port of Oakland which gathered data by observing and timing actual aircraft operations.

Although there is significant variation of observed taxi speeds based on the congestion encountered by the aircraft, for the purposes of the simulation, taxi speeds within the terminal area were determined to be 3 knots for departures and 7 knots for arrivals. The specific simulation ground links that these speeds apply to are depicted in the shaded area in Figure 5.

![Figure 5: Terminal Area Taxi Speeds](image)
The taxi speed, after exiting the Runway 29, along taxiway W for arrivals was defined as 20 knots, and everywhere else on the airfield as 16 knots as depicted in Figure 6.

Figure 6: West Plan Taxi Speeds

To optimize the aircraft flow at OAK, all of the scenarios included the new parallel taxiway adjacent to Taxiway B as shown in Figure 7 below.

Figure 7: West Plan Taxi Flow
3. Scenario Specific Modeling Assumptions

Each of the scenarios has the same airspace structure integrated in the simulation model, with variations in ground structure and procedures. This section will explain the differences. One baseline scenario and three alternatives have been simulated to capture travel time and delay impacts to assess the impacts of each change. The three alternatives are the 1) Runway 29 access improvement, 2) the addition of a high-speed runway exit, and 3) the combination of Runway 29 access and high-speed runway exit. A fourth analysis was conducted to quantify the impact of the addition of a parallel taxiway near the proposed new terminal. All of these alternatives are compared to the baseline scenario, which incorporated a new terminal and a new dual taxiway.

3.1 Baseline Scenario

The baseline scenario is the basis for all the alternatives and the results of the alternatives will be compared against it. The baseline scenario consists of the proposed new terminal and parallel taxiway with all of the assumptions made in Section 2 including the Taxiway U intersection departure to minimize the 10 nm same route departure restriction. Figure 7 from the previous section represents the ground structure of the Baseline scenario.

3.2 Runway 29 Access Improvement Scenario

The first of the three proposed alternative scenarios at OAK is the Runway 29 access improvements to provide flexibility for departure queuing. The enhancement includes creating a parallel taxiway, adjacent to Taxiway W for queuing aircraft. Figure 8 shows the ground layout of the proposed enhancement over the original drawing.

Several drawings of the proposed airfield and terminal structures, provided by the Port of Oakland, were referenced to develop the link-node structure required by the simulation to model aircraft movement on the ground. As mentioned in Section 2.5, due to air traffic from surrounding airports, such as SFO and SJC, departures are required to have a minimum separation of 10 nm between two aircraft flying the same route from the same airport. The baseline scenario uses the Taxiway U intersection for departure to allow ATC to inject an aircraft on a different departure route between same route sequences. This requires precise timing in the sequencing of aircraft. During times of high departure demand this presents a problem because once aircraft reach Taxiway W, only a few can be switched within the queuing area.

By improving the queuing stage at Runway 29, aircraft can be sequenced more efficiently to minimize the 10 nm restriction, thus decreasing delay at OAK. East-bound departures make up the majority of the flights in the 2010 demand schedule; therefore all east-bound aircraft taxi using the upper taxiway and north-bound and south-bound aircraft taxi using the lower taxiway as depicted in Figure 8. This made it possible to pull the aircraft out of the two taxiways and sequence them in such order that the 10 nm restriction is avoided as much as possible.

3.3 Addition of a High Speed Runway Exit Scenario

The second proposed enhancement at OAK involves creating a high-speed runway exit between Taxiway V and Taxiway Y. The proposed high-speed runway exit will allow aircraft to clear the runway more efficiently, thus reducing runway occupancy times. This creates a greater opportunity for a departure from Runway 29 to be able to depart between arrivals. To minimize the 10 nm restriction on same route departures, the Taxiway U intersection departure procedure will be used in this alternative. Figure 9 shows the proposed high-speed exit ground structure over the existing drawing.
Figure 9: Proposed High-Speed Runway Exit at Oakland International Airport

Table 4 and 5 depicts the runway exit percentages by aircraft type for the existing and proposed high-speed runway exit scenario using the Runway Exit Interactive Design Model (REDIM) software. The percentages indicate how often each aircraft will be able to utilize a particular exit. For example, Table 4 shows that a B727-200 (e.g. B722, B72Q) will exit on Taxiway V 14.8% of the time and on Taxiway Y 85.2% of the time. By comparing Tables 4 and 5 for the simulation runway exit distributions without or with the proposed high-speed exit respectively.

With the proposed new high-speed taxiway, Table 5 shows the same B727-200 will exit Taxiway V 14.4% of the time, proposed new taxiway 83.2% of the time, and Taxiway Y 2.4% of the time. By comparing Tables 4 and 5, it can be concluded that more arrival aircraft will be able to clear the runway earlier and decrease runway occupancy time. In addition to the added benefit of reduced runway occupancy times, aircraft that can exit the runway prior to Taxiway Y by using the proposed exit instead will have a shorter distance to taxi because of the geometry of the airfield. This shorter distance will reduce the average taxi time needed for arrival aircraft to reach their gates at OAK.
Table 6 shows the correlation between the aircraft used to calculate the runway exit distribution by REDIM and the 2010 aircraft models used in SIMMOD.

### Table 6: Correlation of Aircraft between REDIM and SIMMOD

<table>
<thead>
<tr>
<th>REDIM Aircraft</th>
<th>SIMMOD Aircraft</th>
<th>% of Aircraft</th>
</tr>
</thead>
<tbody>
<tr>
<td>A300-600</td>
<td>A306</td>
<td>3.6%</td>
</tr>
<tr>
<td>A310-300</td>
<td>A310</td>
<td>1.5%</td>
</tr>
<tr>
<td>A320-200</td>
<td>A319</td>
<td>1.6%</td>
</tr>
<tr>
<td>B727-200</td>
<td>B720</td>
<td>0.9%</td>
</tr>
<tr>
<td>B737-300</td>
<td>B733</td>
<td>13.0%</td>
</tr>
<tr>
<td>B737-400</td>
<td>B734</td>
<td>3.6%</td>
</tr>
<tr>
<td>B737-500</td>
<td>B735</td>
<td>3.2%</td>
</tr>
<tr>
<td>B737-600</td>
<td>B737</td>
<td>39.3%</td>
</tr>
<tr>
<td>B738-700</td>
<td>B738</td>
<td>6.9%</td>
</tr>
<tr>
<td>B747-200</td>
<td>B744</td>
<td>0.9%</td>
</tr>
<tr>
<td>B757-200</td>
<td>B752</td>
<td>1.2%</td>
</tr>
<tr>
<td>B763-700</td>
<td>B763</td>
<td>1.8%</td>
</tr>
<tr>
<td>DC-10</td>
<td>DC10</td>
<td>1.2%</td>
</tr>
<tr>
<td>Learjet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC10</td>
<td>DC10</td>
<td>1.2%</td>
</tr>
<tr>
<td>C208</td>
<td></td>
<td>1.3%</td>
</tr>
<tr>
<td>C550</td>
<td></td>
<td>0.1%</td>
</tr>
<tr>
<td>C560</td>
<td></td>
<td>0.1%</td>
</tr>
<tr>
<td>CARJ</td>
<td></td>
<td>3.0%</td>
</tr>
<tr>
<td>CL60</td>
<td></td>
<td>1.6%</td>
</tr>
<tr>
<td>F27</td>
<td></td>
<td>0.3%</td>
</tr>
<tr>
<td>GLF3</td>
<td></td>
<td>0.3%</td>
</tr>
<tr>
<td>H25A</td>
<td></td>
<td>0.3%</td>
</tr>
<tr>
<td>H25B</td>
<td></td>
<td>0.3%</td>
</tr>
<tr>
<td>L295</td>
<td></td>
<td>0.3%</td>
</tr>
<tr>
<td>L360</td>
<td></td>
<td>0.3%</td>
</tr>
<tr>
<td>PA461</td>
<td></td>
<td>0.3%</td>
</tr>
<tr>
<td>PA32</td>
<td></td>
<td>0.3%</td>
</tr>
<tr>
<td>MD-11</td>
<td>MD11</td>
<td>3.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.4 Combination of Runway 29 Access Improvement and the Addition of a High Speed Runway Exit Scenario

The third alternative proposed is the combination of the improved Runway 29 access and a new high-speed runway exit. This would clear an arrival aircraft off from the runway as soon as possible and allow for better departure aircraft sequencing to avoid the 10 nm restriction. The assumptions discussed in Section 3.2 and 3.3 were both used in this alternative.

3.5 New Dual Taxiway Parallel to Taxiway B

To quantify the impact of the proposed parallel taxiway, an additional simulation alternative was created. The alternative scenario is identical to the baseline scenario except for the removal of the proposed parallel taxiway. Figures 10 and 11 show the ground structure for the alternative and the baseline scenario. Refer to section 2.7 "Taxiway Assumptions" and Figure 7 for more information on the taxiway structure for the baseline scenario.

Figure 10: Terminal ground structure without Proposed Parallel Taxiway
4. Results

The first section of the results describes the various output statistics of the Simmod PRO! models under three alternative scenarios. The first alternative is the Runway 29 access improvement, the second alternative is the addition of a high-speed runway exit, and the last alternative scenario is the combination of a high-speed runway exit and Runway 29 access improvement. The second section of the results will show the impact of a new dual taxiway, parallel to Taxiway B.

4.1 Runway 29 Access Enhancement, New High-Speed Exit, and the Combined Alternative

Figure 12 shows the effect of each airfield improvement on departure queue delay on Runway 29. Queue delay represents any delay incurred by an aircraft waiting in line to depart as well as the delay of an aircraft ready to depart but not yet cleared to depart because of air traffic control procedures. For example, an aircraft waiting for an arrival aircraft to land and clear the runway and an aircraft waiting in line behind that aircraft to depart will both be accounted as queue delay. The data points that define the line in Figure 12 represent the average queue delay per aircraft for the previous hour. For example, the average delay shown at 7 a.m. will be an average of all the delay that occurred between 6 a.m. and 7 a.m.

The queue delay is highest in the baseline scenario with a delay of 20.2 minutes per aircraft at 8 a.m. (i.e. average delay between 7 a.m. and 8 a.m.). The delay is highest during this time period because of the high departure demand level.

Implementation of the proposed Runway 29 access improvement reduces the peak delay down to 11.8 minutes per aircraft. The high-speed runway exit reduces the peak departure queue delay down to 16.4 minutes per aircraft. Implementation of both the high-speed runway exit with the Runway 29 access improvement produces the largest benefit by further reducing the departure queue delay down to 9.5 minutes per aircraft during the peak hour.

Figure 13 shows the Runway 29 departure flow for each scenario. It shows the total number of aircraft departing Runway 29 during the previous hour. The flow of departures is highest with the combined high-speed exit and Runway 29 access scenario with a peak departure flow of 35 aircraft. This increase in departure flow as shown in Figure 13 has a direct correlation to lower queue delay as shown in Figure 12. As departure flow increases, departure queue delay generally decreases as shown in Figures 12 and 13.
Figure 12: Average Departure Queue Delay for Runway 29 at Oakland International Airport

Figure 13: Runway 29 Departure Flow at Oakland International Airport
Figure 14 below represents the number of Runway 29 departure aircraft delayed versus the minutes of queue delay experienced by those aircraft during peak hours. The baseline scenario and the Runway 29 access improvement have aircraft that experience queue delay of up to 28 minutes. With the proposed high-speed runway exit, the aircraft experiencing departure queue delay is reduced to a maximum of 22 minutes. The number of aircraft delayed for up to 22 minutes is further reduced with the combination of high-speed exit and Runway 29 access improvements.

In addition to having fewer aircraft delayed as shown in Figure 14, Table 7 below shows that the total cumulative delay for Runway 29 is lower during the same period of time. While the departure flow from the runway remains the same over this period of time, the amount of delay experienced by these aircraft is reduced significantly due to the airfield improvements.

Table 7: Total Queue Delay Between 7AM ~ 10AM on Runway 29

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Aircraft Flow</th>
<th>Total Queue Delay (Hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>96</td>
<td>12.0</td>
</tr>
<tr>
<td>High-Speed Runway Exit</td>
<td>96</td>
<td>9.6</td>
</tr>
<tr>
<td>Runway 29 Access Improvement</td>
<td>96</td>
<td>9.6</td>
</tr>
<tr>
<td>Combined</td>
<td>96</td>
<td>8.0</td>
</tr>
</tbody>
</table>

When the aircraft exits the runway sooner as is the case in the scenarios with the additional high-speed runway exit, it not only decreases the average arrival travel time to the gate, but frees the runway for either another arrival operation or a departure operation. Table 8 presents average Runway 29 queue delay, Runway 29 arrival travel time, and the airport-wide queue delay per aircraft. The arrival travel times represent the average ground travel time between runway exit points and gates. The first two columns of Table 8 represents the results obtained only on Runway 29, but column three, Airport-wide queue delay, includes average queue delay from both North and South fields. The combination of the Runway 29 access improvement and the high-speed runway exit results in the most savings in queue delay and arrival travel time.

Table 8: Average Daily Queue Delay and Arrival Travel Time

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Runway 29 Queue Delay</th>
<th>Runway 29 Arrival Travel Time</th>
<th>Airport-Wide Queue Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>3.7</td>
<td>5.4</td>
<td>3.0</td>
</tr>
<tr>
<td>High-Speed Runway Exit</td>
<td>3.7</td>
<td>4.9</td>
<td>3.0</td>
</tr>
<tr>
<td>Runway 29 Access Improvement</td>
<td>3.6</td>
<td>5.4</td>
<td>2.9</td>
</tr>
<tr>
<td>Combined</td>
<td>3.0</td>
<td>4.9</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Table 9 presents the data in Table 8 as a percentage improvement compared to the Baseline scenario.

Table 9: Percent Improvement from Baseline Scenario

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Runway 29 Queue Delay</th>
<th>Runway 29 Arrival Travel Time</th>
<th>Airport Queue Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-Speed Runway Exit</td>
<td>21%</td>
<td>9%</td>
<td>19%</td>
</tr>
<tr>
<td>Runway 29 Access Improvement</td>
<td>23%</td>
<td>0%</td>
<td>22%</td>
</tr>
<tr>
<td>Combined</td>
<td>36%</td>
<td>9%</td>
<td>35%</td>
</tr>
</tbody>
</table>

In each of these 3 simulation alternatives, the capacity of the airport is not changed as a result of the alternative airfield enhancements. These enhancements to the airfield allow the airport to handle the projected demand during those periods of peak demand with much lower delay levels than without the proposed improvements. In effect the airfield improvements allow more aircraft to land and depart within the hours they are scheduled to operate within.

4.2 New Parallel Taxiway

This section reports the findings of the proposed parallel taxiway adjacent to Taxiway B. This analysis was done to quantify the impact of not constructing a new dual taxiway next to the proposed new terminal. The "Number of Aircraft" field in Table 10 represents the total number of aircraft using either Taxiway B (Single Taxiway) or the
proposed parallel taxiway (Dual Taxiway). Table 9 shows that with the Dual Taxiway, fewer aircraft are delayed and the total minutes of delay is lower compared to the Single Taxiway scenario.

<table>
<thead>
<tr>
<th>Table 10: Comparison between Single and Dual Taxiway</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Number of Aircraft</td>
</tr>
<tr>
<td>Delayed Aircraft</td>
</tr>
<tr>
<td>Minutes Delayed</td>
</tr>
</tbody>
</table>

Table 11 presents a more detailed comparison of the data presented in Table 10 by including airline and gate location. A total of four more North Field based aircraft (ten minus six) and 25 more Southwest airlines flights (49 minus 24) are delayed in the single versus dual taxiway scenarios. Furthermore, the total minutes of delay is reduced from 38.3 to 8.7 with the addition of the dual taxiway.

<table>
<thead>
<tr>
<th>Table 11: Detailed Comparison between Single and Dual Taxiway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Dual Taxiway</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>South Field</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Single Taxiway</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>South Field</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

The total number of aircraft delayed is reduced from 59 to 30 aircraft as shown in Tables 10 and 11. Furthermore the cumulative delay for aircraft that are delayed is reduced from 38.3 down to 8.7 minutes of total delay.

The other three alternatives, including the baseline model, all incorporated this dual taxiway due the assumption that they all would include a new terminal with the dual taxiway. In order to efficiently utilize the gates at a new terminal, a dual taxiway parallel with Taxiway B would be required. The dual taxiway would also relieve congestion already present on Taxiway B for south-bound corporate jet departures that originate on the North Field and must taxi across the airport to Runway 29.
This memorandum documents the methodology used in the development of proposed exit taxiways improvements for Runway 11-29 at Oakland International Airport (OAK). This analysis is being conducted in support of the OAK Master Plan.

HNTB is under contract with ATAC, who is performing airfield modeling and simulation on proposed improvements to the airfield. The primary goal of these improvements is to enhance the efficiency of aircraft operations by reducing runway occupancy time, and by providing additional aircraft queuing and sequencing. These improvements would reduce congested airfield areas (hot-spots).

**Background and Setting**

Runway 11-29 is located in the South Field of OAK. This runway serves all air carrier operations and all jet departure traffic as a result of noise abatement measures.

Runway 11-29 is 10,000 feet long and it currently has two acute-angle taxiways (V and Y) and a right-angle (W) to serve arrivals to the west, and one acute-angle (U) and one right-angle taxiway (W) for arrivals to the east.

Based on observations of runway operations and discussions with the Port, the location of the exit taxiways is an area that might not be optimal for the current and projected fleet mix.

Another area that has been identified as a potentially being congested is the taxiway system that connects to Runway 29. The current taxiway configuration of Runway 29 includes a "holding bay" along Taxiway W. This area is used to sequence aircraft for departure, however is limited in space for aircraft queuing.

**Airfield Planning Criteria – Exit Taxiways**

There are two important considerations of exit taxiway design. The first is the location of the exit taxiway with respect to the distance from the runway landing threshold and the second is the configuration of the exit taxiway. Exit taxiway designs are provided for both airplane design groups used in the geometric analysis.

Exit taxiways should be located at intervals along the runway corresponding to the average turnoff points of the airplane design groups using the runway. The objective is to provide free flow of aircraft between the runway and parallel taxiway. Runway efficiency is affected by exit taxiway locations because the runway occupancy time (ROT) of aircraft is determined by the location and design of exit taxiways.

**Types of Exit Taxiways**

1 Taxiway W is a full parallel taxiway and connects both ends of Runway 11-29.
Aircraft Traffic
Activity levels and aircraft fleet mix used in the analysis were developed by the Port of Oakland for the year 2010. From the data generated, which consisted on a daily flight schedule with runway assignments, a simplified list of aircraft operating on Runway 11-29 was generated. The following table summarizes the types of aircraft and daily operations used for this analysis.

<table>
<thead>
<tr>
<th>Aircraft Category</th>
<th>% of the Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A300-600</td>
<td>3.6%</td>
</tr>
<tr>
<td>A310-300</td>
<td>1.5%</td>
</tr>
<tr>
<td>A320-200</td>
<td>9.1%</td>
</tr>
<tr>
<td>B767-300</td>
<td>2.1%</td>
</tr>
<tr>
<td>B727-200</td>
<td>0.9%</td>
</tr>
<tr>
<td>B737-300</td>
<td>13.8%</td>
</tr>
<tr>
<td>B737-400</td>
<td>53.4%</td>
</tr>
<tr>
<td>B757-200</td>
<td>1.2%</td>
</tr>
<tr>
<td>Learjet</td>
<td>10.3%</td>
</tr>
<tr>
<td>B747-200</td>
<td>0.6%</td>
</tr>
<tr>
<td>DC-10</td>
<td>1.2%</td>
</tr>
<tr>
<td>MD-11</td>
<td>3.8%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Methodology
The assessment of the efficiency and effectiveness of additional exit taxiways was modeled by using the Runway Exit Design Interactive Model (REDIM 2.1). This model relies on the following input specific to the conditions of the runway and fleet mix. Specifically, model input includes:

- Aircraft Fleet Mix
- Airport Operational Data
- Free Roll and Breaking
- Airport Environmental Data
- Wind Speed
- Wind Direction
- Airport Elevation
- Airport Temperature
- Runway Orientation
- Runway Gradient
- Weather (Dry/Wet Split)

The model can be used in an evaluation or design mode. In the evaluation mode, the model determines the effectiveness of the exit taxiway system – in terms of Runway Occupancy Time (ROT) and the distribution of the fleet mix by exit. In the design mode, the model, based on the parameters listed above, finds an optimal taxiway distribution for the fleet mix.

As noted in Table 2, an acute-angle taxiway would greatly improve the aircraft distribution and would therefore reduce the time aircraft occupy the runway. This taxiway should be located approximately 5,000 feet from Runway 29 threshold. The layout of this taxiway should follow the FAA recommendations for a 30 degree exit taxiway with a long spiral.

Guidance regarding the preferred geometric layout for this new taxiway is found in the FAA Advisory Circular 150-5300-13 “Airport Design.”

This taxiway will likely impact current field conditions, including existing wetlands. The treatment and mitigation of this potential impact is outside of the scope of this study.

---

The analysis performed for OAK relied on the model’s evaluation mode using several proposed new exit locations. Since the predominant operations are to the west, improvements to reduce ROT during this condition were run.

Results and Recommendations
The following tables summarize the results of the modeling.

### Table 1
Runway 11-29 Aircraft Mix

<table>
<thead>
<tr>
<th>Aircraft Category</th>
<th>% of the Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A300-600</td>
<td>3.6%</td>
</tr>
<tr>
<td>A310-300</td>
<td>1.5%</td>
</tr>
<tr>
<td>A320-200</td>
<td>9.1%</td>
</tr>
<tr>
<td>B767-300</td>
<td>2.1%</td>
</tr>
<tr>
<td>B727-200</td>
<td>0.9%</td>
</tr>
<tr>
<td>B737-300</td>
<td>13.8%</td>
</tr>
<tr>
<td>B737-400</td>
<td>53.4%</td>
</tr>
<tr>
<td>B757-200</td>
<td>1.2%</td>
</tr>
<tr>
<td>Learjet</td>
<td>10.3%</td>
</tr>
<tr>
<td>B747-200</td>
<td>0.6%</td>
</tr>
<tr>
<td>DC-10</td>
<td>1.2%</td>
</tr>
<tr>
<td>MD-11</td>
<td>3.8%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Table 2
Runway 11-29 Exit Taxiway Distribution

<table>
<thead>
<tr>
<th>Aircraft Category</th>
<th>Exit Type</th>
<th>Condition</th>
<th>30 Deg</th>
<th>30 Deg</th>
<th>30 Deg</th>
<th>90 Deg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A300-600</td>
<td>Dry</td>
<td>0.0%</td>
<td>91.2%</td>
<td>8.8%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>A310-300</td>
<td>Dry</td>
<td>0.0%</td>
<td>98.8%</td>
<td>1.2%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>A320-200</td>
<td>Dry</td>
<td>0.0%</td>
<td>95.6%</td>
<td>4.4%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>B767-300</td>
<td>Dry</td>
<td>0.0%</td>
<td>63.2%</td>
<td>36.8%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>B727-200</td>
<td>Dry</td>
<td>14.4%</td>
<td>85.2%</td>
<td>3.4%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>B737-300</td>
<td>Dry</td>
<td>7.6%</td>
<td>90.8%</td>
<td>1.6%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>B737-400</td>
<td>Dry</td>
<td>3.6%</td>
<td>94.4%</td>
<td>2.0%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>B757-200</td>
<td>Dry</td>
<td>0.0%</td>
<td>90.0%</td>
<td>10.0%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Learjet</td>
<td>Dry</td>
<td>100.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>B747-200</td>
<td>Dry</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>91.6%</td>
<td></td>
</tr>
<tr>
<td>DC-10</td>
<td>Dry</td>
<td>0.0%</td>
<td>72.8%</td>
<td>27.2%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>MD-11</td>
<td>Dry</td>
<td>0.0%</td>
<td>0.0%</td>
<td>2.4%</td>
<td>97.6%</td>
<td></td>
</tr>
</tbody>
</table>

As noted in Table 2, an acute-angle taxiway would greatly improve the aircraft distribution and would therefore reduce the time aircraft occupy the runway. This taxiway should be located approximately 5,000 feet from Runway 29 threshold. The layout of this taxiway should follow the FAA recommendations for a 30 degree exit taxiway with a long spiral.

Guidance regarding the preferred geometric layout for this new taxiway is found in the FAA Advisory Circular 150-5300-13 “Airport Design.”

This taxiway will likely impact current field conditions, including existing wetlands. The treatment and mitigation of this potential impact is outside of the scope of this study.
Runway 11-29 is the main air carrier runway at Oakland International Airport (OAK). Today, it operates at about 80% of its capacity, and during peak periods, aircraft experience only a minor amount of delay (1.5 minutes of delay per aircraft on average). In 2010, it is estimated that Runway 11-29 will operate at about 98% of its capacity, and during peak periods, such as the morning departures peak, aircraft will experience an increase in delay (over 3 minutes of delay per aircraft on average). The estimates assume the aircraft operations forecasts for 2010 from the master plan.

**Important Note**: These estimates of runway capacity and delay are rough approximations, contain numerous simplifications, and are derived using the Annual Service Volume (ASV) methodology for long-range airfield planning outlined in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5060-5, Airport Capacity and Delay. They provide only a rough indication of runway usage compared to its capacity, and would not be sufficient for detailed planning or decision making. These calculations were requested by the master plan Stakeholder Advisory Committee and may not accurately reflect actual runway capacity or delay. Although a rough adjustment was made to account for nighttime airline operations (see Methodology below), ASV methodology described in FAA AC 150/5060-5 does not anticipate 24-hour airline operations and is therefore not an appropriate tool for detailed planning or decision making at OAK.

**Methodology**

The ASV methodology is described in FAA AC 150/5060-5, Airport Capacity and Delay, Chapter 2 (Capacity and Delay Calculations for Long Range Planning). According to the AC, ASV is an estimate of an airport’s annual capacity, accounting for some differences in runway use, aircraft mix, weather conditions, etc. The ASV methodology uses simplifications that limit its accuracy. For example, it assumes there are no airspace constraints and operations occur over a less than 24-hour day (i.e., there are no late night take-offs or landings).

The first step is to estimate annual demand (in terms of operations, or take-offs and landings) in 2010. The table on Page 3 summarizes the results. Today, there are approximately 191,625 annual operations. Based on the master plan operations forecasts, there will be approximately 234,330 operations in 2010. These operations are only those that occur on Runway 11-29 at South Field (and exclude operations at North Field). They include all passenger airline operations, large cargo airline operations, and general aviation (corporate) jet departures (arrivals are assumed to occur at North Field). These assumptions are consistent with the Port of Oakland’s existing, voluntary noise abatement procedures. Annual demand is then adjusted to remove late night cargo airline operations, as they are not accounted for in ASV calculations.

The second step is to compute ASV using FAA AC 150/5060-5, Airport Capacity and Delay. From Figure 2-1, runway configuration No. 1 is selected to approximate Runway 11-29, excluding North Field. The Mix Index is then computed. Both today and in 2010, it is estimated that 86% of the aircraft fleet mix using Runway 11-29 will be Class C, with a maximum take-off weight of between 12,500 lb. and 300,000 lbs., and that 12% of the aircraft fleet mix using Runway 11-29 will be Class D, with a maximum take-off weight over 300,000 lbs. (based on the master plan fleet mix forecasts). See Table 1-1 in FAA AC 150/5060-5, Airport Capacity and Delay. The Mix Index is then computed:

\[
\text{Mix Index} = 9\% \text{ Class C} + (3 \times 9\% \text{ Class D}) = 86 + (3 \times 12) = 122
\]

Figure 2-1 shows an ASV of 240,000 operations per year, using runway configuration No. 1 and a Mix Index of 122. Dividing annual demand by ASV provides an estimate of runway capacity utilization (in terms of a ratio or percentage of runway capacity used on an annual basis). Figure 2-1 can be used to estimate average delay per aircraft.

The ASV methodology provides a rough approximation of how runway demand compares to capacity on an annual basis. It should be noted that the annual demand to ASV ratio (or percentage) can exceed 1 (or 100%), as outlined in the Figure 2-1 of the FAA AC 150/5060-5, Airport Capacity and Delay. That is, ASV is not an absolute capacity limit, and it is possible for a runway to exceed the calculated ASV. When this happens, the average delay per aircraft increases. More precise tools, such as airfield simulation (see Chapter 5 of FAA AC 150/5060-5, Airport Capacity and Delay), can be used to refine runway capacity and delay estimates, identify airfield congestion, and study potential solutions in detail.

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## Demand to Annual Service Volume Comparison

### Runway 11-29

#### Master Plan 2010 Operations Forecasts
Oakland International Airport

<table>
<thead>
<tr>
<th></th>
<th>Existing 2010</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passenger Airlines</td>
<td>430</td>
<td>156,950</td>
</tr>
<tr>
<td>Cargo Airlines</td>
<td>102</td>
<td>37,230</td>
</tr>
<tr>
<td>General Aviation - Jet(1)</td>
<td>23</td>
<td>8,365</td>
</tr>
<tr>
<td>Subtotal</td>
<td>555</td>
<td>202,575</td>
</tr>
<tr>
<td>Nighttime Cargo Adjustment(2)</td>
<td>(30)</td>
<td>(10,950)</td>
</tr>
<tr>
<td>Total Demand</td>
<td>525</td>
<td>191,625</td>
</tr>
<tr>
<td>Annual Service Volume <a href="3">ASV</a></td>
<td>240,000</td>
<td>240,000</td>
</tr>
<tr>
<td>Demand / Annual Service Volume [D / ASV]</td>
<td>0.80</td>
<td>0.98</td>
</tr>
</tbody>
</table>

(1) Includes departures on Runway 11-29 only (assumes arrivals occur at North Field).
(2) ASV assumes less than a 24-hour/day operation; late-night operations must be excluded from demand.
(3) From FAA AC 11505060-5, Airport Capacity and Delay, Chapter 2, Figures 2-1, No. 1 (Mix Index = 122).

Annual Service Volume (ASV) is a simplified estimate of annual runway capacity.
Environmental Considerations in the Master Plan
Oakland International Airport

July 2005

This paper provides an overview of environmental planning efforts the Port is undertaking as part of the master plan process for Oakland International Airport (OAK). It describes the environmental considerations currently ongoing in consultation with the Stakeholder Advisory Committee and the appropriate level and type of the environmental review. Finally, this paper explains the required procedures and timing of environmental review pursuant to the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA).

The Master Plan and Environmental Assessment

The OAK master plan is being prepared in accordance with the process described in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6A (Airport Master Plans). In conceiving the master plan, the Port and stakeholders agreed that “it is in their mutual interest to communicate with one another and . . . to focus their mutual attention on ‘big picture’ needs and solutions, rather than detailed planning of individual Airport facilities.”

Stakeholder Communication

In keeping with the stated master planning goal, Port staff has been preparing the master plan through regular and constant dialogue with the Stakeholder Advisory Committee. The focus has been on concept-level planning and feasibility study that will identify the need for possible near-term projects (through about 2010 to 2012) and long-term land uses (through 2025). As Port staff and the Stakeholder Advisory Committee have been considering potential developments for various areas on the Airport (e.g., future passenger facilities, cargo, general aviation, airline-related support, etc.), we have also discussed planning considerations associated with the potential land uses, including environmental considerations.

For example, Port staff and the Stakeholder Advisory Committee looked at three possible areas on the Airport for a future passenger terminal. Each area had its own benefits, as well as operational, economic, and environmental constraints. Port staff and the Stakeholder Advisory Committee eliminated two out of the three possible areas for future terminal land use due to environmental and economic feasibility. Port staff also prepared a preliminary environmental screening matrix, which examined site planning considerations (e.g., aesthetics, wetlands and wildlife, geology and soils, etc.) and operational planning considerations (e.g., aircraft noise, air quality, traffic, etc.).

Further, Port staff and the Stakeholder Advisory Committee have looked at potential aircraft noise associated with aircraft operations forecasts for the near-term planning horizon (2010). Aircraft noise was examined using a time-weighted cumulative noise metric (called the California Noise Equivalent Level or CNEL), as well as a single aircraft overflight noise metric (called Single Event Noise Exposure Level or SENEL) along with the numbers of operations by type of aircraft from the 2010 master plan forecast.

Finally, Port staff asked the Stakeholder Advisory Committee to recommend environmental projects that should be considered in the master plan. The Stakeholder Advisory Committee requested that Port staff consider construction of a sound wall to block aircraft noise emanating from aircraft departures on Runway 29 towards certain areas in the City of San Leandro. Port staff agreed to study this potential environmental project and present results to the Stakeholder Advisory Committee for their input and recommendations.

Concept Level Planning

Because the OAK master plan is a concept-level planning and feasibility study, it does not provide the details on development plans, engineering feasibility or environmental constraints that would be needed before the Port could decide whether to proceed with any particular project. For example, the Port would need to complete additional planning and engineering on a potential terminal concept before it could know whether it was going to be affordable and what the environmental effects might be, if any.

As such, when it considers approval of the OAK master plan, the Board of Port Commissioners will not be deciding to propose or approve any specific project or groups of projects. Rather, any project identified in the OAK master plan would need to undergo more detailed planning, engineering and environmental review before it could proceed, including understanding how much it might cost, how it is going to be funded, and importantly, its environmental effects (through a CEQA and NEPA process). Only then could a project or groups of related projects be approved by the Board and proceed into construction.

FAA AC 150/5070-6A and Environmental Analysis

Environmental analysis in the OAK master plan process has been conducted in accordance with the FAA AC 150/5070-6A. The AC recommends that the two essential components of environmental feasibility planning are public acceptance and regulatory compliance. The general principle is that the master planner:

“. . . must recognize both of these factors and design a program through which the public is completely and truthfully informed. A creative approach to environmental considerations, results in a better overall design, and a greater possibility of public support, rather than just meeting the statutory requirements.”

To this end, a major element of the OAK master plan process has been and continues to be extensive outreach to and consultation with the Stakeholder Advisory Committee and elected officials of the neighboring cities. The process has included candid presentations on airport use and capacity forecasts, possible noise effects, current and possible future environmental enhancement measures, and initial environmental assessment of the various possible future projects.

In determining the appropriate level and type of environmental analysis in the OAK master plan, Port staff followed the principle outlined in the AC that:

“The information presented in this AC covers the planning requirements for all airports, regardless of size, complexity or role. However, the scope of study must be tailored to the individual airport, with the level of effort limited to its specific needs and problems. Based on an airport’s specific needs, certain master planning elements may be emphasized while others will not be considered at all.”

1 FAA AC 150/5070-6A, Chapter 8 (Environmental Procedures and Analysis)
2 FAA AC 150/5070-6A, Chapter 9, Section 1.a (page 48)
3 FAA AC 150/5070-6A, Chapter 1 (Introduction), Section 4.a (page 2)

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1 Phase Two Agreement dated October 8, 2002 between the Port of Oakland and the City of Alameda, Citizens League for the City of Alameda, July 2005.
2 Phase Two Agreement dated October 8, 2002 between the Port of Oakland and the City of Alameda, Citizens League for the City of Alameda, July 2005.
3 FAA AC 150/5070-6A, Chapter 8 (Environmental Procedures and Analysis)
4 FAA AC 150/5070-6A, Chapter 8, Section 1.a (page 48)
5 FAA AC 150/5070-6A, Chapter 1 (Introduction), Section 4.a (page 2)
As a concept-level planning and feasibility study, the OAK master plan focuses on short-term planning strategies and long-term planning principles, not specific airport projects or facilities. If and when any possible development contemplated in the OAK master plan should ripen into a project that the Port may wish to pursue and approve, the Port will follow all environmental regulations and permit requirements required of specific project-level planning, including the conduct of environmental review under NEPA and/or CEQA.

Federal Action and NEPA

Prior to the Port’s proposal for any specific project, neither the AC nor the FAA’s environmental procedures require the review of the OAK master plan pursuant to NEPA. In fact, absent any federal action, there is no basis for the FAA to undertake any environmental assessment under NEPA.

NEPA applies only when a federal government agency proposes “legislation and other major Federal actions significantly affecting the quality of the human environment.” The AC refers to FAA Order 5050.4A, Airport Environmental Handbook, for the specific procedure applicable to airport actions. FAA Order 5050.4A defines “federal action” as (a) approval of an airport location, (b) approval of an airport layout plan or revisions to an airport layout plan, (c) approval for funding for airport development, (d) requests for the conveyance of government land under the Airport and Airway Improvement Act, and (e) approval of release of airport land.

The master plan AC clearly states that the “FAA does not approve a master plan”; therefore, a master plan does not constitute federal action. Also, the OAK master plan does not involve any one of the triggering federal actions defined in FAA Order 5050.4A.

The AC does contemplate that a master plan includes “the master plan report and a set of drawings.” Drawings may include an airport layout plan. The FAA must conduct an environmental assessment under NEPA should the Port seek FAA approval of a new or revised airport layout plan.

During the OAK master plan process, the Port has produced and presented numerous drawings and land-use plans, some of which will be adopted as part of the OAK master plan. However, the Port does not contemplate seeking FAA approval of any of the drawings or any revision of its airport layout plan at this time. The Port has an FAA-approved airport layout plan consistent with it’s Airport Development Program (ADP) currently under implementation. Should the Port pursue any development considered in the OAK master plan that is not in its current airport layout plan, the Port will seek a revision of the airport layout plan, and the FAA will conduct the necessary environmental review under NEPA.

CEQA

It is anticipated that the Board of Port Commissioners will approve the OAK master plan document as a planning and feasibility study. Discretionary actions by the Port (through its Board), such as approving the OAK master plan, are required to comply with CEQA. However, because the OAK master plan will be a planning guidance document only (i.e., the Board has not approved, adopted, or funded any possible future actions considered in the OAK master plan), it is anticipated that this Board action will be exempt from CEQA under Section 15262 (Feasibility and Planning Studies) of the CEQA Guidelines.

This approach of exempting the OAK master plan from CEQA review is consistent with the provisions of the ADP settlement agreements between the Port, City of Alameda, Citizens League for Airport Safety and Serenity (CLASS), City of San Leandro, and others. The Phase Two Agreement, entered into by various parties on October 8, 2002, specifically defines the “Master Plan” as “guidelines for future airport development, ” the approval of which “will be exempt from the requirements of the California Environmental Quality Act . . . .” The Addendum to Settlement Agreement between the Port and the City of San Leandro provided that the City of San Leandro “shall have formal representation in the formulation of the Master Plan (as defined in subparagraph 2.14 of the Phase Two Agreement).” The City of San Leandro also agreed “not to bring any challenge to Port’s approval of the Master Plan pursuant to the provisions of the California Environmental Quality Act or the National Environmental Policy Act, so long as that approval is limited to approval of the Master Plan as a planning study, and does not constitute a decision by Port to approve, adopt, or fund any project or group of projects described in the Master Plan, or have a legally binding effect on later Port activities.”

For additional information, please contact:

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5 NEPA, Section 102(2)(C)
6 FAA AC 150/5070-6A, Chapter 8, Section 2.a (page 48)
7 FAA AC 150/5070-6A, Chapter 8, Section 3.a (page 49)
8 FAA AC 150/5070-6A, Chapter 2 (The Planning Process), Section 4 (page 11)
9 Phase Two Agreement, Section 2.14
10 Addendum to Settlement Agreement, dated July 22, 2003, between the City of San Leandro and the Port of Oakland, paragraph 3
11 Addendum to Settlement Agreement, dated July 22, 2003, between the City of San Leandro and the Port of Oakland, paragraph 10(vi).