SECTION 1 INTRODUCTION

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1.01 - Introduction

The Seattle-Tacoma International Airport (SeaTac), operated by the Port of Seattle and located in the City of SeaTac, Washington, has proposed the development of a third north/south runway (8,500 feet) to expand the airport's capacity. In response to concerns regarding the potential for increased aviationrelated impacts upon neighboring communities, the State of Washington approved a grant in 1995 to assess the impacts of the proposed third runway. The grant, administered through the State's Department of Community, Trade, and Economic Development (CTED), funded this study to assess the impacts on, and develop mitigation strategies for, the following jurisdicstions:

- City of Burien, Washington
- City of Des Moines, Washington
- City of Federal Way, Washington
- City of Normandy Park, Washington
- City of Tukwila, Washington
- Highline School District
- Highline Community Hospital District

Figure 1.1 shows the area being studied.

The City of Burien, acting as the grant manager, led a cooperative effort to interview potential consultants in the fall of 1995. By December, the following team was selected to conduct this study:

- Hellmuth, Obata + Kassabaum, Inc. (Dallas, Texas), with Raytheon Infrastructure Services, Inc. (Phildelphia and Denver) as a subconsultant. The HOK/Raytheon team provided environmental, transportation, and community compatability analysis and mitigation.
- Thomas/Lane Associates, Inc. (Seattle, Washington), providing socio-economic analysis and mitigation measures.
- Michael J. McCormick, AICP (Olympia, Washington) providing inter-governmental affairs consulting.

		1FT	Figure 1.1 Study Area
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1.02 - Project Scope

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The provisions of the State grant which funds this study stipulate that the study not be used to oppose the proposed SeaTac runway. The specific grant language is:

"State appropriation is provided solely for distribution to the Cit yof Burien for analysis of the proposed Port of Seattle third runway, including preparation of a draft environmental impact statement and other technical studies. The amount provided in this subsection shall not be expended directly or indirectly for litigation, public realtions, or any for of consulting services for the purposes of opposing the construction of the proposed third runway."

The approach for this study contained the following:

- Conduct a case study analysis of other airport mitigation programs in the United States and summarize selected public project mitigation programs within Washington State.
- Review the Environmental Impact Statement (EIS) as prepared by the Port of Seattle's consultants and comment accordingly.
- Independently assess the potential environmental, transportation, and scoioeconomic impacts of the third runway upon the 5 communities, and school and hospital districts.
- Develop appropriate mitigation measures to address the potential impacts, along with projected mitigation costs, suggested funding mechanisms, and recommended implementation and oversight strategies.

In addition to this introductory section, this report also contains the following sections:

- Section 2 Airport Mitigation Case Studies
- Section 3 Washington State Mitigation Case Studies
- Section 4 Environmental Analysis of the SeaTac Environmental Impact Statement
- Section 5 Transportation Analysis of the SeaTac Environmental Impact Statement
- Section 6 Socio-Economic Analysis of the SeaTac Environmental Impact Statement
- Section 7 Proposed Mitigation Measres
- Section 8 Burien Neighborhood Impacts
- Section 9 Des Moines Neighborhood Impacts
- Section 10 Federal Way Neighborhood Impacts
- Section 11 Normandy Park Neighborhood Impacts
- Section 12 Tukwila Neighborhood Impacts
- Section 13 Institutional Impacts
- Section 14 Proposed Funding and Implementation Mechanisms
- Section 15 Overview
- Appendices Footnotes and Technical References

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SECTION 2 MITIGATION CASE STUDIES

2.01 - Airports within the United States

In Task 4 ("Mitigation State-of-the-Art") of the consultant scope of services, the experience of American airport mitigation programs for selected airports is summarized. The candidates for the case study were selected because of similarities with the proposed SeaTac project or as examples of the most recent mitigation programs.

Airports across the United States have, at one time or another, found it necessary to reduce or *mitigate* the impacts of their airport operations on surrounding residents and businesses.

Airport mitigation is generally accomplished under the requirements of Federal Aviation Regulations (FAR) Advisory Circular Part 150 (commonly referred to as Part 150).

The following airports were selected as case studies for their mitigation programs:

- Colorado Springs International Airport (Colorado Springs, Colorado)
- Dallas/Fort Worth International Airport (Dallas, Texas)
- Lambert Field/St. Louis International Airport (St. Louis, Missouri)
- Minneapolis/St. Paul International Airport (Minneapolis, Minnesota)
- San Diego International Airport (San Diego, California)
- San Francisco International Airport (San Francisco, California)

These selected case studies represent airports of varying size, location, and operations. All cases have developed (or are developing) mitigation and remediation programs as a result of airport expansion projects.



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2.02 - Colorado Springs International Airport

Colorado Springs has experienced rapid recent growth as a result of the new Denver International Airport (DIA). Growth has occurred at Colorado Springs to a degree because of the higher landing fees at DIA. Also, it is now a longer trip to DIA (north of Denver) than it was to Stapleton, so the Colo-

rado Springs airport (south of Denver) has become relatively more "geographically attractive". Colorado Springs is currently in the process of developing a mitigation plan in support of a new runway project to meet this increasing demand.



2.03 - Dallas/Fort Worth International Airport

One of the largest and busiest airports in the world, DFW was sited to minimize the need for off-airport mitigation. DFW is located on a large site between the cities of Dallas and Fort Worth which was purchased in the 1960s. At the time DFW was initially designed, it was presumed that this site would be large enough to contain the ultimate airport build-out plan and all the accompanying impacts. Over the

years, as DFW grew, so too did the area surrounding the airport property. Today, DFW is practically enveloped by development. In the late 1980s, DFW began the process of developing a plan to add two new runways. Due to the amount of surrounding development, DFW had to develop a mitigation program for it four neighboring communities.



Figure 2.2 Dallas/Fort Worth International Airport

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2.04 - Lambert Field/St. Louis International Airport

Lambert Field is an older urban airport which serves the St. Louis metropolitan area. It has an on-going mitigation and remediation program for its established neighboring communities, including Bridgeton (a low-income community).



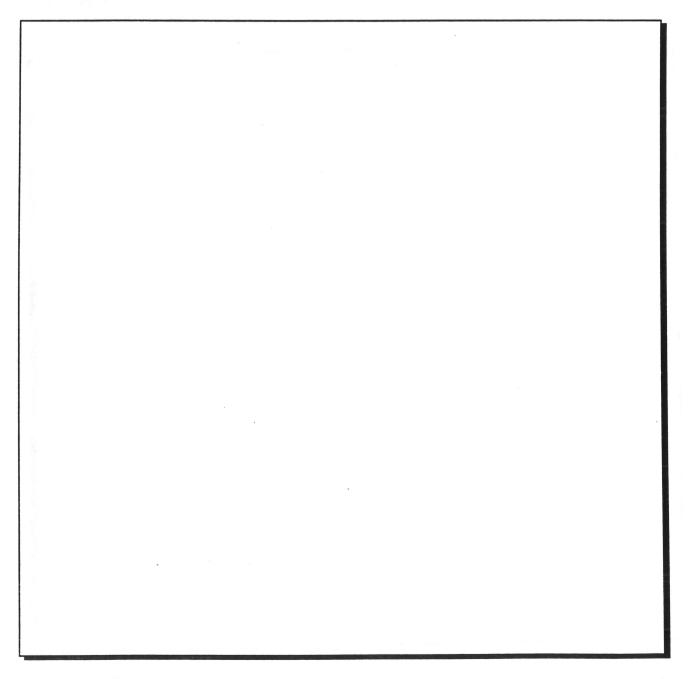
Figure No. 2.3 Lambert Field/St. Louis International Airport

2.05 - Minneapolis/St. Paul International Airport

Rather than build a new airport away from the city, Minneapolis/St. Paul Airport is currently planning for the expansion of its existing facility. The Airport is located between

the two cities (southeast of Minneapolis) and is also surrounded by established communities, such as Richfield and Bloomington.



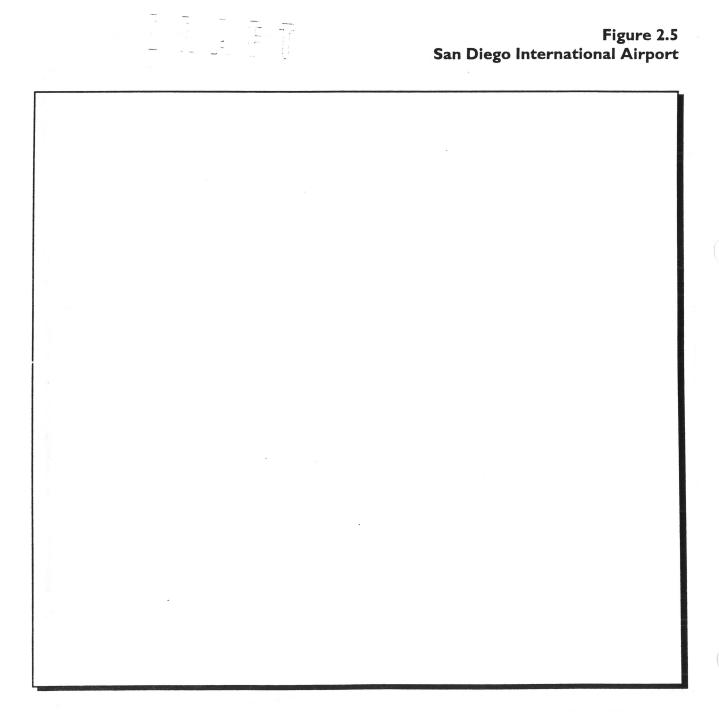


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2.06 - San Diego International Airport

San Diego Airport is located in downtown San Diego and along the shoreline of San Diego Bay. At 474 acres and with a single runway, it is the smallest airport studied. While the area surrounding the airport is mostly non-residential, the arrival and departure paths bring aircraft at low altitudes over downtown

and several residential areas. The cost of real estate and the expansion of the San Diego metropolitan area make siting a new airport impractical. The airport's best option is to acquire approximately 500 acres adjacent to the airport currently owned by the US Navy.



2.07 - San Francisco International Airport

San Francisco Airport is also an older facility, but it is located in San Francisco County and adjacent to San Francisco Bay. Consequently, much of the arrivals and departures are made over water. The area surrounding the airport has developed mostly with industrial uses, with some residential areas located to the north

and west. Because of the expense associated with a new airport and due to the fact that land in the San Francisco area is not available, improvements are being made to the existing facility. Other aspects of the six airports studies are summarized in Table No. 1.

Figure 2.6

Figure 2.6
San Francisco International Airport

2.08 - Airport/Aircraft Noise

Noise is the most obvious and pervasive impact associated with airports:

- Noise is generated by aircraft on both arrival and departure (with departures being much louder than arrivals).
- Noise is generated by aircraft on the ground when packing away from the gate under their own power ("power-backs").
- Noise is generated by aircraft on the ground when performing engine maintenance tests which require powering up the engines to almost full thrust ("maintenance run-ups").

Noise is the most common impact that is mitigated by US airports. However, how the noise impacts are measured and assessed are at the heart of an ongoing debate between airports and airport communities.

Noise is considered to be both an aviation and an environmental impact, so both the Federal Aviation Administration (FAA) and the United Environmental Protection Agency States (USEPA) define the means by which noise is The standard noise descriptor mandated by these Federal agencies is the Day-Night Average Sound Level (Ldn or DNL). It provides a numerical description of the weighted 24-hour cumulative noise energy level using the A-weighted decibel scale over 1 year, with nighttime aircraft operations being weighted heavier than daytime operations. The Ldn formula weighs aircraft operations during "daytime" operations (7:00 AM to 7:00 PM) at a 1-to-1 ratio.

"Nighttime" operations (7:00 PM to 7:00 AM) are weighted at a 10-to-1 ratio.

Because Ldn is often referred to as an "average" noise level, it is not an accurate representation of individual noise events for a specific location. The ongoing debate mentioned above involves the desire on the part of airport communities to use Single-Event Noise Levels (SELs) as the more accurate representation of noise intrusion. Typically, the loudest aircraft type in the current fleet mix at an airport is viewed as the worst noise violator. At present, neither FAA nor USEPA recognize SELs as the means to measure airport noise.

Aircraft are classified by "stages" which has a direct correlation to their noise output. Old Stage 1 aircraft are no longer allowed to operate in the United States. Stage 2 aircraft will be similarly prohibited by the year 2000.

The quieter Stage 3 aircraft will be allowed to operate after that time (Stage 2 aircraft that have been retrofitted with new engines - "hush kits" - that meet Stage 3 standards will also be allowed to operate). Establishment of a new Stage 4 standard is being considered, but it is anticipated that it will result in a minimal additional noise reduction (approximately 3 dBA).

US airports rely on FAR Part 150 to define how noise will be measured and mitigated. Part 150 is also the basis for FAA funding for noise mitigation programs. Airports that exceed the Part 150 requirements may be eligible for additional FAA funding (on a case-by-case basis) or may fund the mitigation programs from other sources.

2.09 - Noise Mitigation - Purchase/Relocation

Residential, business, school, church, and other properties that are identified to be within excessive noise areas are purchased outright by the airport. Residents and businesses are also eligible for relocation payments under the Uniform Relocation Assistance Act (US Department of Transportation). In these cases, the purchased area usually becomes part of the airport property and is restricted from future development/redevelopment.

A variation on the purchase/relocation program is some form of sales assistance. The airport will either act as a broker or as a third-party agent to foster the sale of a property where the airport will not take title. Assistance programs that maintain residential neighborhoods do not remove the area's incompatibility potential. In some cases, assistance programs can be used to assemble

land to replat and redevelop former residential areas as airport-oriented non-residential uses.

DFW International Airport has developed the most liberal airport purchase program. Not only are homes within the 65 Ldn contour are purchased, but the purchase area is extended to encompass neighborhood areas, sometimes extending as far as the 62 Ldn contour.

St. Louis has only purchased homes to the 70 Ldn contour. The Minneapolis/St. Paul program is currently being developed, but will also likely purchase only to the 70 Ldn contour.

The least liberal program is in San Francisco, where no homes are purchased. Residential areas are subjected to 70 and 75 Ldn contours.



2.10 - Noise Mitigation - Sound Insulation

Residential, business, school, church, and other properties that are identified - by the airport's interpretation - to be within noise areas that are not excessive enough to warrant purchase, are usually offered sound insulation programs.

These vary from region to region, but generally involve added attic insulation, triple-paned windows, and in some cases, central air conditioning. Sound insulation, however, does not adequately address mitigation of outdoor activities associated with homes and schools.

In some cases, sound insulation of older, deteriorating homes can exceed that structure's value. When air conditioning is added, some residents, businesses, schools, or churches cannot afford the additional electric utility costs associated with keeping the system running.

Sound insulation is offered by all airports studied, but with variations in each program. For instance, DFW offered sound insulation to homes outside the 65 "neighborhood" Ldn contour, in concert with an avigation easement.

St. Louis offers sound insulation as an option for homeowners in the 65 to 70 Ldn contour (the other options being sales assistance or an avigation easement). In the poorer neighborhoods that surround St. Louis airport, the value of sound insulation exceeds the value of the structure. The airport considers sound insulation to be adequate compensation for the homeowner in these cases. San Francisco and Minneapolis have similar insulation programs for homes, businesses, schools and churches.

Title 21 of the California Noise Standards requires areas 65 CNEL and higher to be mitigated. CNEL (Community Noise Equivalent Levels) contours are very similar to Ldn contours, except in the way aircraft operations are weighted (the Ldn weighting approach described previously). The CNEL approach weighs operations in the following manner:

- 7:00 AM to 7:00 PM 1-to-1 ratio.
- 7:00 PM to 10:00 PM 3-to-1 ratio.
- 10:00 PM to 7:00 AM 10-to-1 ratio.

The area surrounding San Diego's airport is mostly non-residential, but the airport has identified upwards of 750 homes that may require sound insulation under a Phase 1 mitigation program (still being developed). The airport has also almost completed an \$11 million sound insulation of 6 schools.

Minneapolis offered sound insulation to area schools, but also required that the facilities stay in service for a specific period of time (20 years), so that improvements would not be made to an obsolete facility.



2.11 - Noise Mitigation - Avigation Easements

Residential, business, school, church, and other properties that are identified - by the airport's interpretation - to be impacted by aircraft activity may also be offered an "avigation easement". This instrument is similar to other property easements, except that it is permits passage through a property's air space, not on the ground like a utility easement.

Avigation easements are usually offered to property owners in exchange for a one-time payment and become a permanent attachment to the property deed. Payment may be a portion of the value of the property (sometimes as high as 25%) or may be offered in combination with a sound insulation program.

DFW once again had the most liberal avigation easement program. Easements were offered to homeowners in the 60 Ldn contour at 25% of the fair market value of the home.

However, DFW also learned that homeowners perceived the 25% payment as a beginning point for negotiation. Many turned down the easement in the hopes that a higher price would be offered (which was not). DFW also acknowledged that the 25% payment was approximately equal to the reduction in property value as a result of aircraft activity. In theory, the avigation easement would give the owner of a \$100.000 home a one-time cash payment of \$25,000. The homeowner could then sell his/her home for as low as \$75,000 and walk away from the transaction with no The buyer would get a financial impact. \$100,000 home for a reasonable price and would be aware of the avigation easement at the time of purchase.

In other airports, the avigation easement was a requirement of accepting the sound insulation improvements. No cash payment was offered for the easement.

2.12 - Permanent Noise Monitoring

All the airports studied had some form of permanent noise monitoring program in place. San Francisco conducts quarterly noise monitoring tests, while others monitor it continuously. The number and location of the monitors varies with each airport. St. Louis, for instance, has 13 permanent and 10 temporary noise monitoring stations. Minneapolis has 24

permanent noise monitoring stations and integrates the data with their geographic information system (GIS) data. San Diego has been providing permanent noise monitoring since 1974, and now has 24 permanent monitoring stations, also integrated with their GIS system.

2.13 - Traffic/Transportation Mitigation

When an airport's capacity is enhanced, the number of enplanements and operations also increases. This has an associated increase in ground traffic headed to and from the airport. Most airports contacted do not offer any mitigation for off-site access and circulation. The only exceptions were DFW and San Diego.

DFW has been working with the Texas

Department of Transportation to construct and east/west connector highway which links two regional freeways (SH 161 and SH 360) with the airport's south entrance.

San Diego will be building a new \$28 million access roadway to improve airport access, but the new roadway will still connect with surface streets, rather than regional freeways.

2.13 - Construction Mitigation

None of the airports contacted offered a mitigation program during project construction.

DFW was able to utilize dirt removed for construction of an adjacent freeway (SH 161) to build the new east runway. The remaining construction spoils were contained totally on-Given the airport's size, construction traffic and staging was totally contained within airport property. The airport is also accessible from several major regional freeways, so there was no traffic impacts on the few local streets adjacent to the airport.

San Francisco, too, relies on regional free-

ways for its primary airport access. these freeways are also heavily traveled by non-airport traffic, there is no capacityenhancing project currently underway at the airport.

Minneapolis representatives stated that they had not yet assessed the potential construction impacts. They projected that most impacts would be traffic related (construction vehicles) and that the system of regional freeways and that the system of regional freeways accessing the airport would be satisfactory to handle the increase in traffic.

2.14 - Community Mitigation

Of the airports contacted, none offered any mitigation measures to reduce the impact on neighboring community facilities and services. Beyond sound insulation of structures, no

measures were developed to mitigate impacts to parks, public safety services, the tax base, or other community facilities and services.

2.15 - Noise Abatement Procedures

All of the airports contacted have in place some formal noise abatement program which regulates the operation of aircraft on the ground and aloft during certain hours. Airports near lakes, bays, or other bodies of water commonly require a "water approach" for arrivals and departures.

Others restrict the use of Stage 2 aircraft

during certain hours, or require those aircraft to follow arrival/departure corridors which fly over non-residential areas. The most restrictive nighttime procedures are at San Diego, which prohibits all departures, except for emergencies, between the hours of 11:30 PM and 6:30 AM. This includes cargo and passenger service.

2.16 - Maintenance Run-Ups

It is common to restrict or prohibit maintenance run-ups in the evening and early morning hours. St. Louis allows no more than a 2-minute run-up at 90% power. San Francisco minimizes, but does not prohibit run-ups. Minneapolis restricts aircraft operations between 11:00 PM and 6:00 AM to Stage 3

aircraft whenever possible, and prohibits maintenance run-up during these hours. San Diego will be phasing out Stage 2 aircraft by 1999 (one year earlier than required) and prohibits maintenance run-ups between the hours of 11:30 PM and 6:30 AM, with a restriction on departures also during that time.

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2.17 - Power Backs

The way aircraft back away from the gate also can create noise. Aircraft can either back away from the gate under their own power - called "power backs" - or be pushed back using an airplane tug ("push backs"). Most airports now use push backs as a standard procedure. St. Louis even designed their aprons to slope

lightly away from the gate to facilitate push backs.

San Diego and Minneapolis have no formal policy on power backs, but both say that push backs are more common.

2.18 - Summary

The airports contacted represent a cross-section of American airports in urbanized and urbanizing areas. They appear to "go by the book" when it comes to FAA-funded mitigation. Mitigation and remediation programs seem to be confined to noise abatement - through property acquisition, sales assistance, sound attenuation/insul-ation, avigation easements, and airport abatement procedures.

Most neighboring communities feel that the airports do not do enough to adequately compensate them for the "privilege" of having

the airport as their neighbor. They routinely cite the inadequacy of Ldn as a true measurement of noise impact, and promote the use of SEL contours instead. Airport communities also have to live with reductions in the tax base, diminishing residential property values, increased traffic, and other community impacts, without any compensation or assistance from airports, the states, the FAA, the USEPA, or any other agency.

In summary, aside from noise, no other impacts are routinely mitigated.

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SECTION 3 WASHINGTON STATE MITIGATION CASE STUDIES

3.01 - Washington State Experience

The State of Washington has demonstrated its desire to go beyond "traditional" mitigation measures as defined by Federally-funded programs. Several members of the consulting team, as well as staff from the City of Burien, have been involved in some of these projects.

For the purposes of comparison, the following case studies have been summarized:

- Puyallup Indian Tribe Land Claim
- Boeing/Everett Facility Expansion
- Satsop Power Plant Site Mitigation Plan
- IH-90 Freeway Improvement Project

Each case study exhibits mitigation that exceeds traditional physical remediation to include socio-economic and cultural mitigation.

3.02 - Puyallup Indian Tribe Land Claim

The Federal Government, the State of Washington, and various Pierce County local governments reached an agreement with the Puyallup Indian Tribe in August 1988 to relinquish tribal claims to land, tidelands, mineral claims, submerged lands, non-fisheries, and water rights. In return, the Tribe received 899 acres of land valued at \$37.46 million, given on an "on-reservation" status.

The Tribe was also paid \$24 million which was placed in an annuity fund. Each enrolled Tribe member 21 years old and older received a \$20,000 cash payment. For remaining Tribe members under 21, a similar cash payment will be made upon their twenty-first birthday (by August 2009). Mitigation measures also included a \$22 million trust fund to be used for housing, education and cultural preservation, supplemental health care, elderly care and day care centers, substance abuse, burial and cemetery maintenance. This trust fund would exist in perpetuity along with the Tribe.



The State and the Port of Tacoma jointly agreed to fund a \$9.235 million fisheries enhancement program. The mitigation agreement required that the Tribe agree to specific projects to reduce conflicts between tribal fishing and commercial shipping. Job training was offered to 265 Tribe members, with 115 jobs offered in the private sector (valued at \$2.5 million).

The agreement also granted \$9.5 million to the Tribe for economic development of existing tribal lands, \$2.0 million in business development funds for enterprises by Tribe members, and \$2.5 million (the latter to be paid over a 20-year period) for the Tribe's participation in the Blair waterway project (widening and deepening of the channel to open it to foreign trade). In exchange, the Tribe agreed not to assert their taxation power for "non-trust" lands and to not exercise their authority over these lands and over "non-Indians" to protect the fisheries.

3.03 - Boeing/Everett Facility Expansion

This agreement involved the City of Everett, Washington and the Boeing Company which allows Boeing to expand their airplane manufacturing facility. The agreement was reached in September 1991, pursuant to the Washington State Environmental Protection Agency (SEPA) review and approval of the project.

The agreement lists specific Federal, State, and local requirements which Boeing must meet in order to mitigate identified impacts, including air, earth, surface water, plants, animals, wetlands, hazardous materials, and transportation. The Boeing expansion project would be denied if these conditions are not met. The agreement identified both on-site and off-site mitigation requirements.

On-site, Boeing must submit a revised site plan to the City of Everett which reflects the SEPA "decision document" and specifies construction requirements. Boeing must manage on-site environmentally-sensitive areas, landscaping, surface water, and transportation. The expansion project site was divided into five

areas, with specific impacts and mitigation measures identified for each area.

Off-site, Boeing would provide \$46.1 million for transportation mitigation, including purchasing 10 buses and 80 vans for ridesharing purposes, and funding transportation system improvements and demand management strategies. Boeing would also fund a program (\$3.9 million) to address company-related traffic through residential neighborhoods.

The project EIS projected that the expanded facility would attract 54,000 new workers to the area. Boeing agreed to invest \$2.0 million in the "Local Initiative Support Coalition", seek new employees from the local impact area, and coordinate with local community colleges to develop vocational training in skills areas needed by Boeing. Boeing would also fund the necessary additions to the City's public safety personnel. At 1.9 firefighters and 1.4 security officers per 1,000 employees, that resulted in 102 new firefighters and 76 new security officers.

3.04 - Satsop Power Plant Site Mitigation Plan

This agreement involved the Washington Public Power Supply System (WPPSS) and the Washington State Department of Wildlife. involving proposed additions to the nuclear power plants operated by WPPSS. In return for project approval, WPPSS would replace and/or compensate for any fish and wildlife damage or loss resulting from the project. WPPSS also agreed to the State's measures to protect wildlife.

The agreement first required a habitat evaluation preservation analysis of the Satsop site, which determined the need for mitigation. The agreement ensured compliance, along with a site certification process.

Different areas on or near the construction site were identified which would require mitigation. In some cases, mitigation only consisted of preservation of the existing habitat.

In other areas, mitigation involved limits to vehicular access, limits to thinning and tree removal, eliminating root rot, enhancing brush areas, maintenance of foraging fields, and preservation of ponds. The agreement also identified preservation zones in which no land management or wildlife enhancement activities would be conducted.

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3.05 - IH-90 Freeway Improvement Project

An agreement between the Washington State Highway Commission ("Commission"), Metro, King County, and the cities of Seattle, Mercer Island and Bellevue was reached regarding proposed IH-90 improvements (between IH-405 and IH-5).

The Commission's design for IH-90 would incorporate all of the provisions for community amenities and for the reduction of adverse environmental impacts. The Commission agreed to participate with the City of Seattle in a planning study which addressed redevelopment of areas adjacent to the project. Additionally, the Commission would transfer fee title of all State-purchased lands (outside the project right-of-way) to the local

jurisdictions at the lowest cost possible. IH-90 would be operated in a manner that encourages growth and development in King County's urban areas, but not in undeveloped areas. A review team was established to monitor the project and advise the Commission on the development of IH-90. The Commission would also become responsible for the design and construction of the portion of IH-90 that can be funded with Federal interstate funds, as well as the other parties responsible for the design and construction of the remaining facilities.

This agreement ended more than 20 years of dispute between the local cities and the Commission.

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