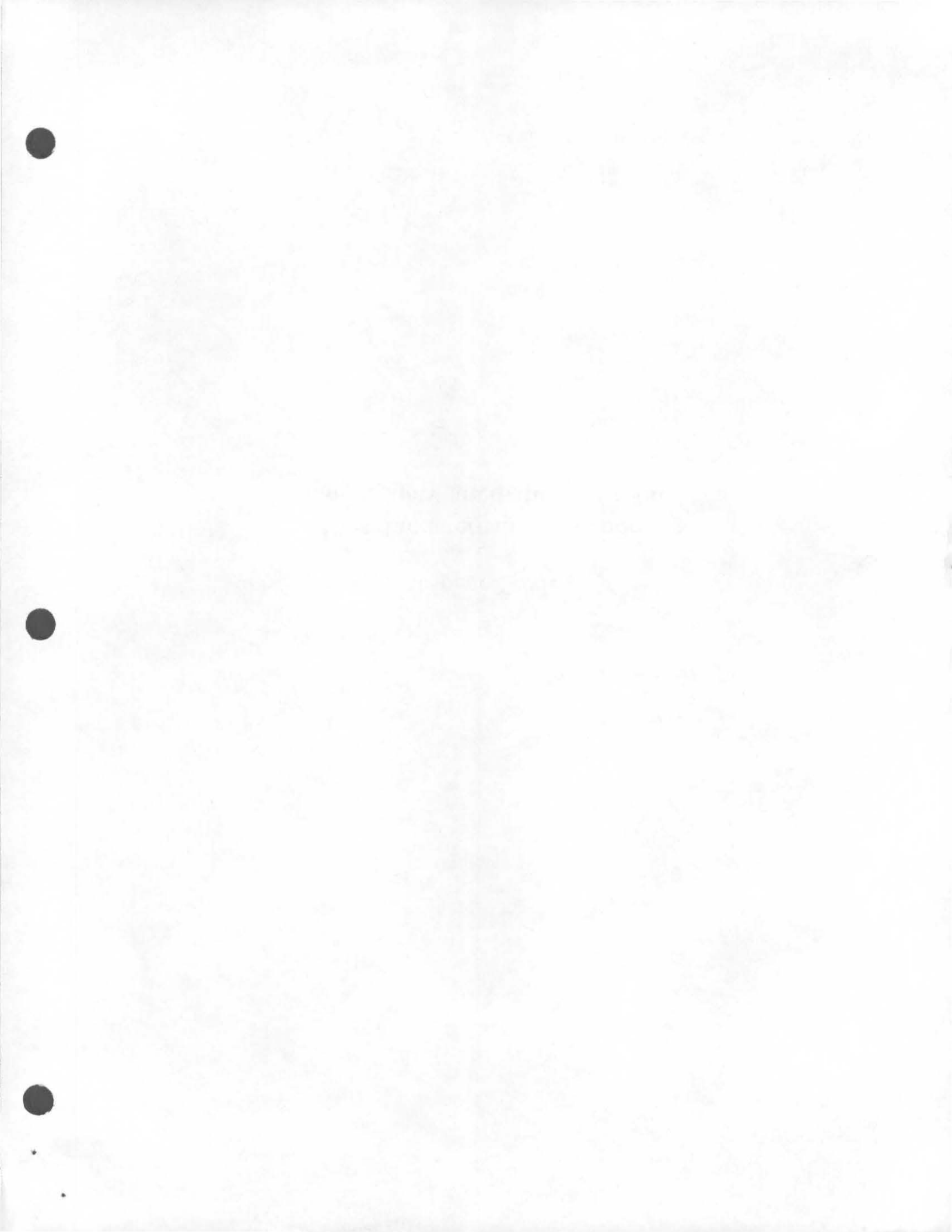


Airspace Study

Sea-Tac International Airport
King County International Airport



Attachment A

WORK PROGRAM: PHASE AND TASK DESCRIPTIONS

The objective of this study is to provide operational and policy-oriented alternatives that will protect the airport capacities of Sea-Tac International Airport (Sea-Tac) and King County International Airport (Boeing Field). The study will address the impacts on airport capacity of the common use of airspace between Sea-Tac and Boeing Field, estimate the levels of congestion and delay resulting from projected demand and airport capacity, and evaluate operational and policy-oriented alternatives to relieve levels of congestion and delay.

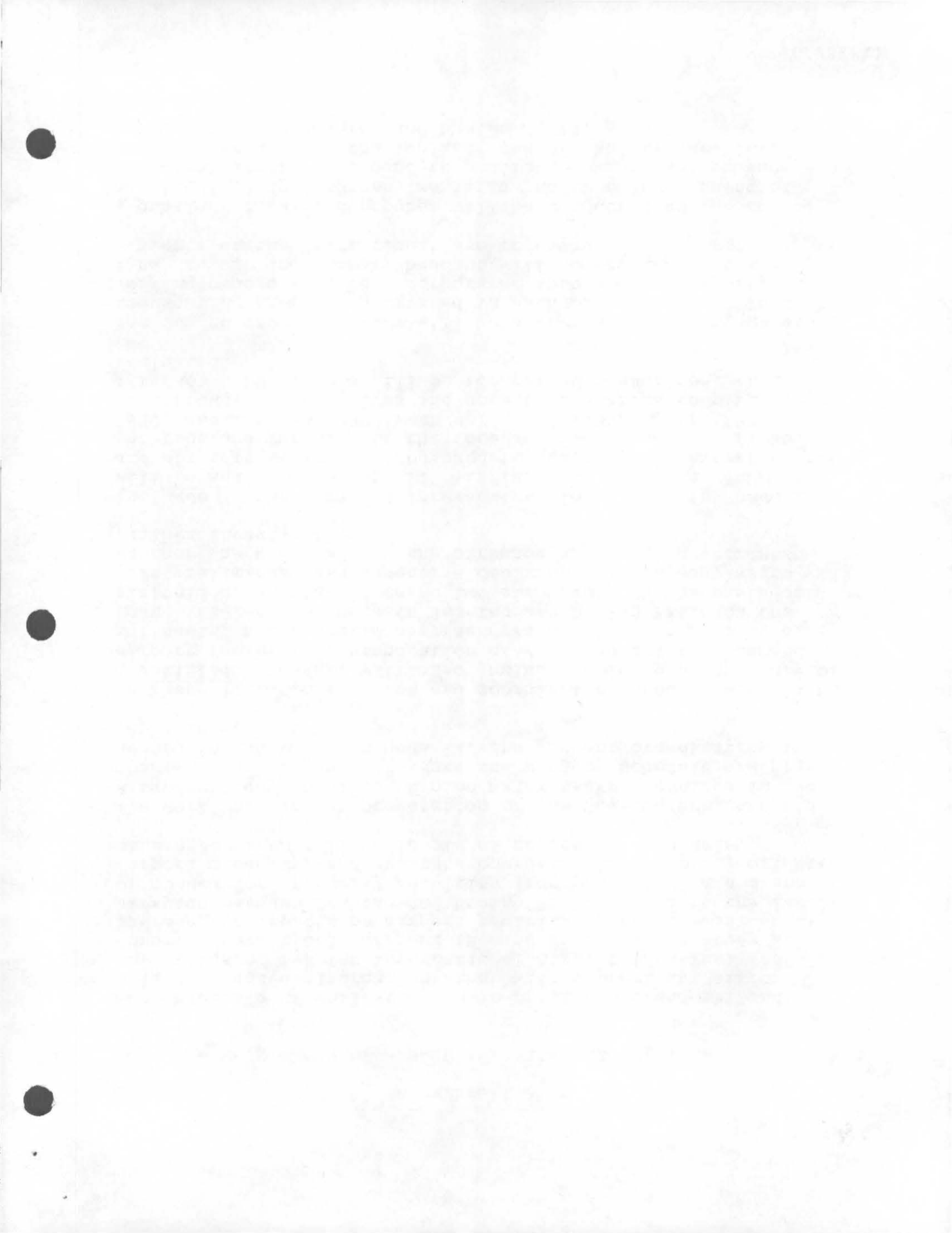
The work program for preparation of the Sea-Tac/Boeing Field Airspace Study consists of nine major tasks organized in two phases. The sequence of tasks and project schedule are presented in Exhibit 1 on page 14, and project organization is shown in Exhibit 2 on page 15.

In Phase 1, administration and coordination procedures will be identified. Phase 1 will also include an indepth inventory of airport facilities, preparation of detailed aviation demand forecasts, and a preliminary assessment of the impact of airspace interactions between Sea-Tac and Boeing Field on the airfield capacities of these two airports. On the basis of this preliminary assessment, a decision will be made as to whether the magnitude of the airspace interaction warrants further investigation.

In Phase 2, the airspace interactions identified in Phase 1 will be analyzed in detail. Airfield and airspace capacities and aircraft delays will be used to quantify the extent of the interactions for each of the forecast demand periods (1985, 1990, and the year 2000), as well as for base year (1980) conditions. Alternatives and potential actions to mitigate airspace interactions will be identified, described, and evaluated.

The output from the study will be a series of working papers documenting the work performed in each of the tasks. These working papers will be incorporated into a draft report. A final report and summary handout will be prepared after comments on the draft report are received.

A public information program will be conducted to inform the public of study progress, maximize public understanding of technical studies, respond to public concerns, and enhance public awareness of the implications of the airspace interactions between Sea-Tac and Boeing Field.



The study will be conducted by the Port of Seattle (the Port), King County (the County), and Peat, Marwick, Mitchell & Co. (PMM&Co.), in coordination with the Washington State Department of Transportation (WSDOT), and the Federal Aviation Administration (FAA). The technical tasks, associated responsibilities and study products are described in the following pages.

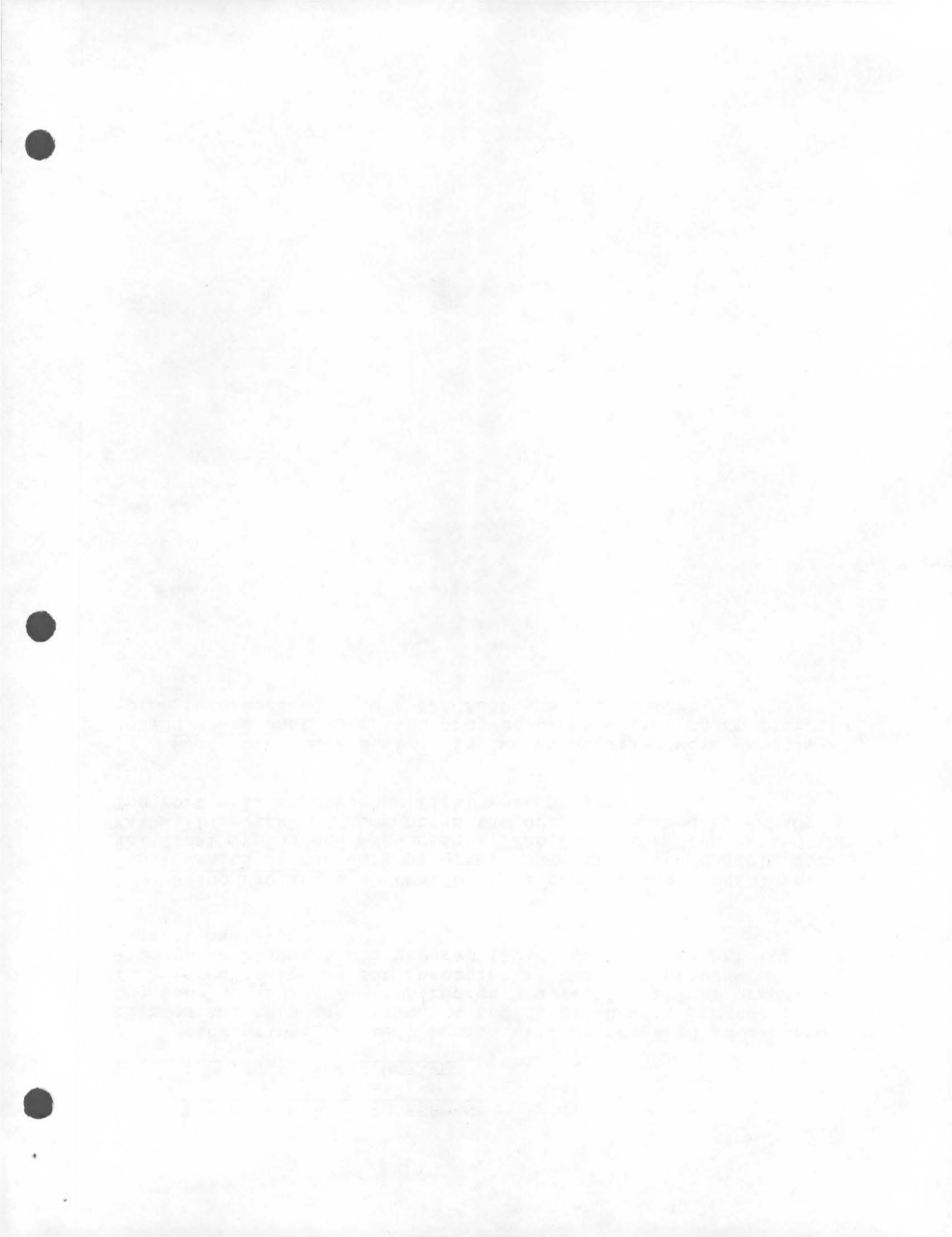
PHASE 1 - PRELIMINARY ASSESSMENT

Task 1: Prepare Study Design

Description: A study design will be prepared in a manner that establishes the framework and detailed work program for the Sea-Tac/Boeing Field Airspace Study. It will be prepared in a format suitable for insertion as the work program of an Airport Development Aid Program (ADAP) grant agreement for federal assistance.

Responsibilities: PMM&Co. will prepare the initial and final drafts of the work program, and will be responsible for the final typing and production. The Port, the County, and the FAA will review and comment on the drafts prepared by PMM&Co. The Port will approve the final work program.

Product: Study design, including detailed work program, schedule and cost data, and project organization chart designed to be incorporated into a FAA ADAP grant agreement.



Task 2: Document Study Background

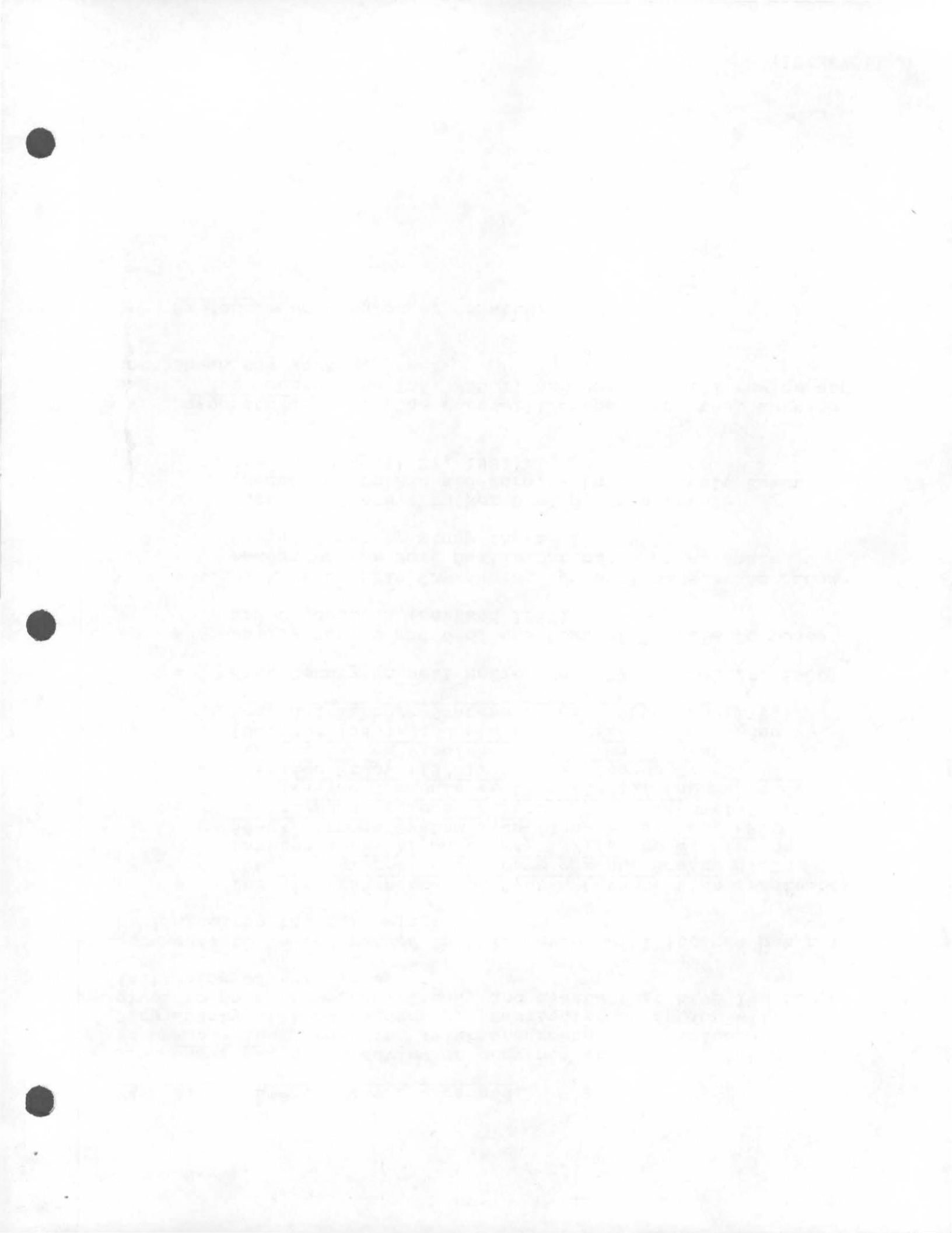
Description: A review of previous studies and their recommendations regarding aviation growth and development in King County will be conducted. Particular attention will be given to policies, resolutions, and events that have led to the initiation of this study.

Documents to be referenced in this review will include but not be limited to the following:

- The Air Transportation System Advance Plan (September 1969); Master Plan for Development, Boeing Field International Airport (May 1971); the Washington State Airport System Plan (June 1973); the PSCOG Recommended Regional Airport System Plan (1975); the Sea-Tac Communities Plan (1976); the Eastside Aviation Study (1978); the Washington State Airport System Plan/Part III: Implementation (October 1980); and the PSCOG Draft Recommended Regional Airport Systems Plan: 1980-2000 (1981).
- King County Council Motion No. 4779 (March 24, 1980).
- Policy Nos. 5 and 6 of the Port of Seattle Purposes and Objectives (revised 1980).
- Port of Seattle Commission approval of a staff recommendation for Port participation in an Airspace Demand/Capacity study (April 14, 1981).
- Correspondence from Ron Dunlap, King County Executive, to Richard Ford, Port of Seattle Executive Director (April 27, 1981).

Responsibilities: The Port will prepare the task working paper. The County, the FAA, WSDOT, and PMM&Co. will review and comment on the working paper.

Product: Working paper on study background.



Task 3: Conduct Inventory

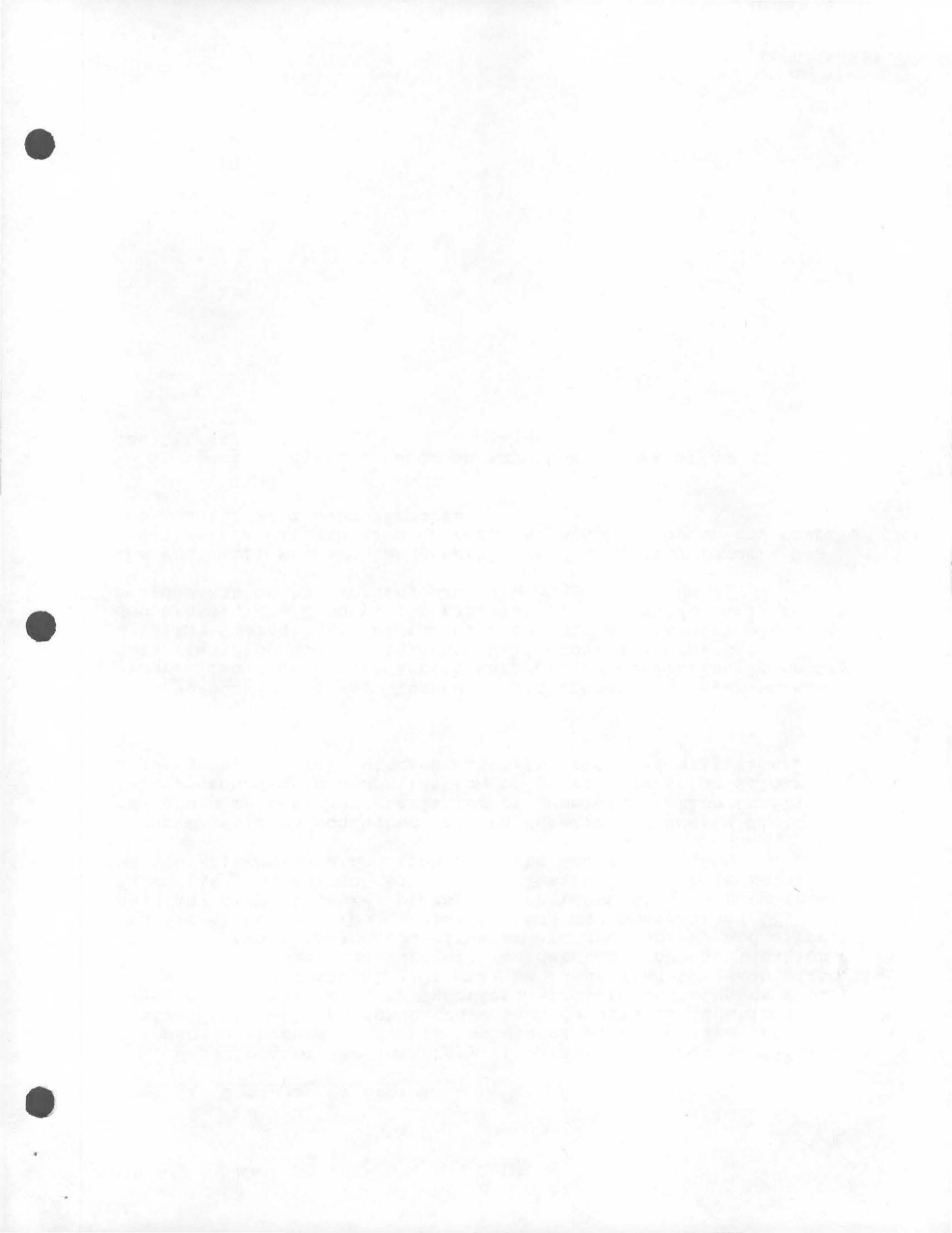
Description: An inventory of existing airport facilities, airspace structure, and existing master plans for Sea-Tac and Boeing Field will be conducted. Such details as location, ownership, size, category function, airfield and support facilities, and navigational aids will be identified for each airport. Existing airspace structure will be described by the location of controlled airspace and airways, ATC procedures, and airport traffic patterns. The conclusions and recommendations of existing airport master plans will be identified as they relate to facility expansion and capacity limitations. This information will be obtained from existing documents.

A survey will be conducted at both Sea-Tac and Boeing Field to determine the characteristics of general aviation traffic (e.g., ground origin-destination of general aviation pilots and passengers; general aviation aircraft origins-destinations, etc.).

Responsibilities: The Port will prepare the task working paper. The County will assist the Port in collecting inventory data regarding Boeing Field and will provide a copy of the existing Boeing Field master plan and other pertinent planning documents. The County, the FAA, WSDOT, and PMM&Co. will review and comment on the working paper.

The Port will prepare the general aviation survey forms, organize the distribution of forms at both airports, and compile the results from both airports.

Product: Working paper on inventory of existing facilities.



Task 4: Prepare Forecasts

Description: Forecasts of aircraft operations at Sea-Tac and Boeing Field will be prepared for 1985, 1990, and the year 2000. These forecasts will be based on projections included in the Sea-Tac Noise Exposure Forecast Update (1981), the FAA Seattle Hub Forecast (1980), and the PSCOG Draft Recommended Regional Airport Systems Plan: 1980-2000 (1981), and will be unconstrained by airside and landside facilities. The forecasts will identify (a) annual levels of aircraft operations and (b) peak hour operations for the average day of the peak month for 1985, 1990 and the year 2000. Local general aviation operations will be distinguished from itinerant operations. Differing aircraft demand levels in VFR and IFR conditions will also be determined. Exhibit 3 on page 16 illustrates the elements of the forecasts needed for input to airfield and airspace capacity calculations. Aircraft operations will be identified by aircraft type as shown in Exhibit 4 on page 17.

Responsibilities: The Port will prepare the task working paper and will be responsible for preparing the demand forecast for Sea-Tac International Airport. The County will prepare the demand forecast for Boeing Field and the Port will assist in performing any necessary statistical analysis of data. PMM&Co., the FAA, and WSDOT will review and comment on the working paper.

Product: Working paper on forecasts of aircraft operations.

Task 5: Conduct Preliminary Analysis of Airspace Interactions

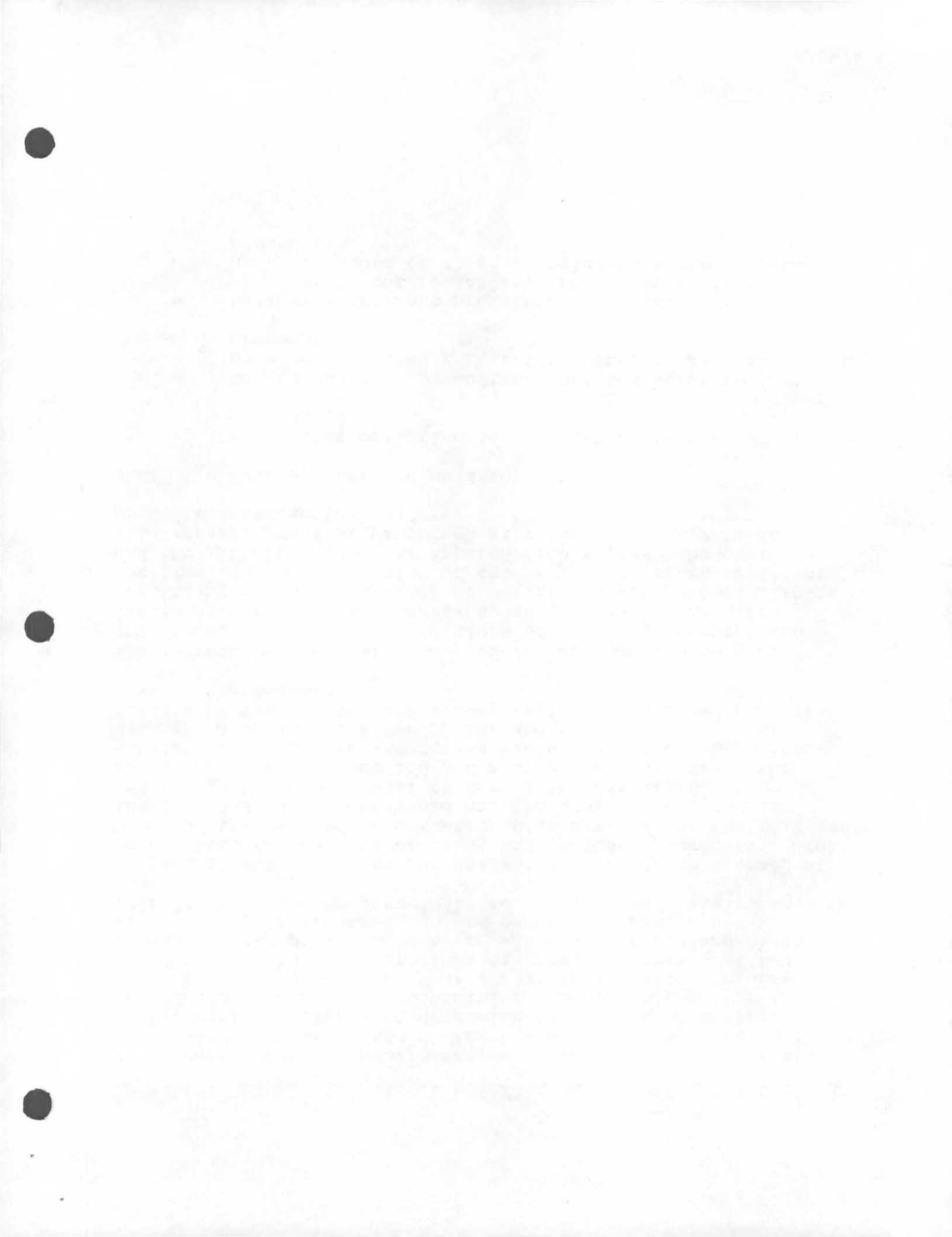
Description: A preliminary analysis of airspace interactions between Sea-Tac and Boeing Field will be made using a configuration analysis to determine the impact of airspace interactions on airfield capacities and aircraft delays in 1980, 1985, 1990, and the year 2000. In addition, an assessment will be made of operations at other airports that may affect the capacities of Sea-Tac and Boeing Field and/or the airspace capacity. Existing and proposed airspace and air traffic control procedures will be reviewed and summarized.

As part of the configuration analysis, an airspace basemap will be prepared to show the existing and proposed procedures. This basemap will be used to communicate information on the airspace interactions to airport users and the general public. In addition, the basemap will be useful in identifying those aspects of the airspace and ATC procedures that affect the capacities of Sea-Tac and Boeing Field. Airspace operations data--such as actual flight paths and the distribution of traffic by fix, route, and runway--will be displayed on overlays to the basemap.

Transparent overlays will be prepared so they can be used on topographic maps and graphic plots of existing and proposed instrument-procedures geometry to quickly assess existing conditions and the potential of new procedures. To facilitate the simultaneous evaluation of the various segments of flight and the infinite number of intersection angles, the overlays will contain areas of protected airspace shown in relation to possible interception angles.

Thus, the overlays will be used to:

- Plot lines of influence of existing instrument procedures.
- Locate controlling obstructions and airspace that must be protected for traffic patterns and instrument procedures.
- Analyze instrument procedures from the en route phase of flight to landing and from takeoff to the en route phase of flight, including missed approach procedures.



Using analytical techniques, estimates of airfield capacities and aircraft delays will be prepared for Sea-Tac and Boeing Field under existing ATC conditions for 1980, 1985, 1990, and the year 2000. Aircraft delays caused by the airspace interactions between the airports will also be estimated. The frequency of occurrence of the interactions will be determined from available weather records. Thus, the preliminary assessment will (a) determine where, why, and with what frequency existing airspace interactions occur, and (b) estimate how these interactions may change in the future with changes in ATC procedures, new navigational aids, and increased traffic demands. The assessment will form a basis for establishing a network and air traffic flow patterns that can be analyzed by analytical and simulation models as appropriate in Task 6. A working paper documenting the results of the preliminary assessment will be prepared.

Based on the findings of the preliminary assessment of airspace interactions, a decision will be made regarding whether or not to proceed with Phase 2 of the study. A "go decision" will be followed by a written proposal describing the selection of the models/methods to be used in Phase 2. A "no go decision" will terminate the study and will be followed by preparation and production of a draft and final report.

Responsibilities: PMM&Co. will prepare the base map and the task working paper. The Port and the County will provide PMM&Co. with airport and airspace operational data from existing data bases. The Port, the County, the FAA, and WSDOT will review and comment on the working paper.

The Port and the County will determine the need to proceed with Phase 2. If a "go decision" is made, PMM&Co. will prepare the method/model proposal for Port and County review and approval. If a "no go decision" is made, a draft and final report will be prepared with responsibilities as defined in Task 9.

Products: Working paper on preliminary airspace analysis and base map; a written model/method proposal with a go decision; a draft and final report with a no-go decision.

PHASE 2 - ALTERNATIVE IDENTIFICATION AND EVALUATIONTask 6: Conduct Detailed Analysis of Airspace Interactions

Description: The airspace interactions identified during the performance of Task 5 will be quantified using appropriate models/methods. Hourly capacity estimates will be developed for Sea-Tac and Boeing Field under visual flight rules (VFR) and instrument flight rules (IFR) conditions. Capacity constraints imposed on both airfields by the common use of the airspace between Sea-Tac and Boeing Field will be identified and quantified for both VFR and IFR conditions for north, south, and opposing traffic flows. Operations at any other airports that may affect the capacities of Sea-Tac and Boeing Field and/or the capacity constraints imposed on both airfields by the common use of airspace between Sea-Tac and Boeing Field will also be identified and quantified to the extent necessary for both VFR and IFR conditions for north, south, and opposing traffic flows. Existing ATC procedures and the continued use of the existing runway systems will be assumed. However, the effect of proposed changes in airspace and air traffic control procedures on Sea-Tac and Boeing Field capacities will be estimated.

Aircraft delay estimates for the peak hour in VFR and IFR weather conditions will be estimated and used as a basis for computing annual aircraft delay values. Delay costs will be estimated for existing and forecast levels of aircraft operations at Sea-Tac and Boeing Field using the most current estimates of aircraft operating costs. A working paper documenting the results of the detailed assessment will be prepared.

Responsibilities: PMM&Co. will prepare the task working paper. The Port and the County will provide PMM&Co. with airport and airspace operational data from existing data bases. The Port, the County, the FAA, and WSDOT will review and comment on the working paper.

Product: Working paper on detailed airspace assessment.



Task 7: Evaluate Alternatives

Description: Operational and policy-oriented alternatives, as well as other potential actions to mitigate airspace interactions, will be identified and described. Evaluation criteria will be developed to screen the alternatives and permit the selection of a group of alternatives that merit further analysis. Evaluation criteria will include but not be limited to the following:

- Impact on airfield capacities
- Aircraft delays and associated costs
- Feasibility of implementation
- Cost of implementation

It is anticipated that the selected alternatives will include at a minimum (1) status quo, i.e., unconstrained future demand, (2) restrictions on the use of the existing facilities, and (3) diversion of aviation demand to other airports. The selected alternatives will be evaluated in terms of criteria used in the initial alternatives screening process described above. The results of the evaluation will be documented in a working paper.

Responsibilities: PMM&Co. will prepare the task working paper. The Port and the County will assist PMM&Co. in developing and ranking alternatives. The Port, the County, the FAA, and WSDOT will review and comment on the working paper.

Product: Working paper on evaluation of alternatives.



[The text on this page is extremely faint and illegible. It appears to be a multi-paragraph document, possibly a letter or a report, but the specific words and sentences cannot be discerned.]

Task 8: Project Coordination and Public Participation Program

Description: Formal project coordination procedures will be established for the project, including (1) preparation of a schedule of regular progress and coordination meetings, (2) identification of key contacts in all participating agencies and organizations, and (3) development of a public participation program.

The purpose of the public participation program is to inform the public of study progress, maximize public understanding of technical studies, respond to public concerns, and enhance public awareness of the implications of the airspace interactions between Sea-Tac and Boeing Field. The program will consist of an Advisory Committee, public meetings, briefings of Port and County chief executive officers and elected officials, and newsletters.

The Advisory Committee will consist of representatives of government, business, airport operators, and local communities, and is scheduled to meet eight times during the course of the study. Three public meetings are scheduled to present study findings and receive public comment. Status reports will be presented to the staffs of the Port and the King County chief executive officers and elected officials during the study. Newsletters will present study progress and announce meeting dates and locations. Advisory Committee meetings, briefings of Port and County chief executive officers and elected officials, and public meetings will be scheduled to permit the efficient use of project resources.

Responsibilities: The Port, the County, and PMM&Co. will organize the public participation program. PMM&Co. will prepare and present material for the Advisory Committee meetings, Port and County review briefings, and the public meetings, and will also prepare a synopsis of the public participation program for inclusion in the study final report. The Port and the County will review and comment on the meeting materials prepared by PMM&Co., and will chair Advisory Committee meetings, Port and County review briefings, and public meetings. The Port will arrange meeting locations and will record the proceedings of the Advisory Committee meetings and public meetings. The Port will maintain a mailing list for newsletter distribution and will prepare the newsletters. The Port will document acceptance of the findings of the study. PMM&Co. will present material for Advisory Committee meetings, Port and County executive staffs and elected officers, and public meetings during three two-day trips and five one-day trips. PMM&Co. will be represented by the Project Manager or an alternate approved by the Port.

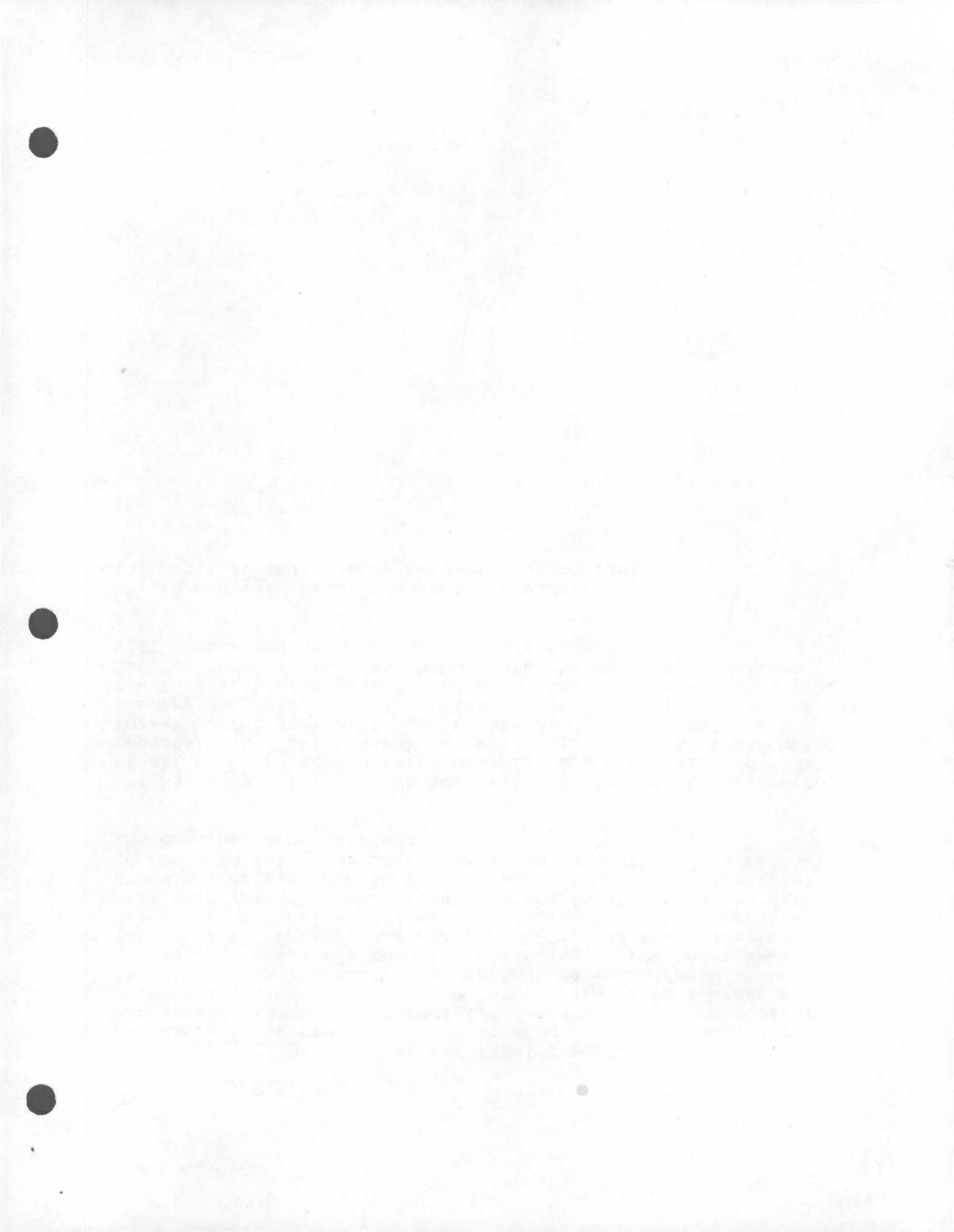
Products: Formal coordination procedures, a schedule of regular progress meetings, a public participation program synopsis, newsletters, and meeting presentation materials.

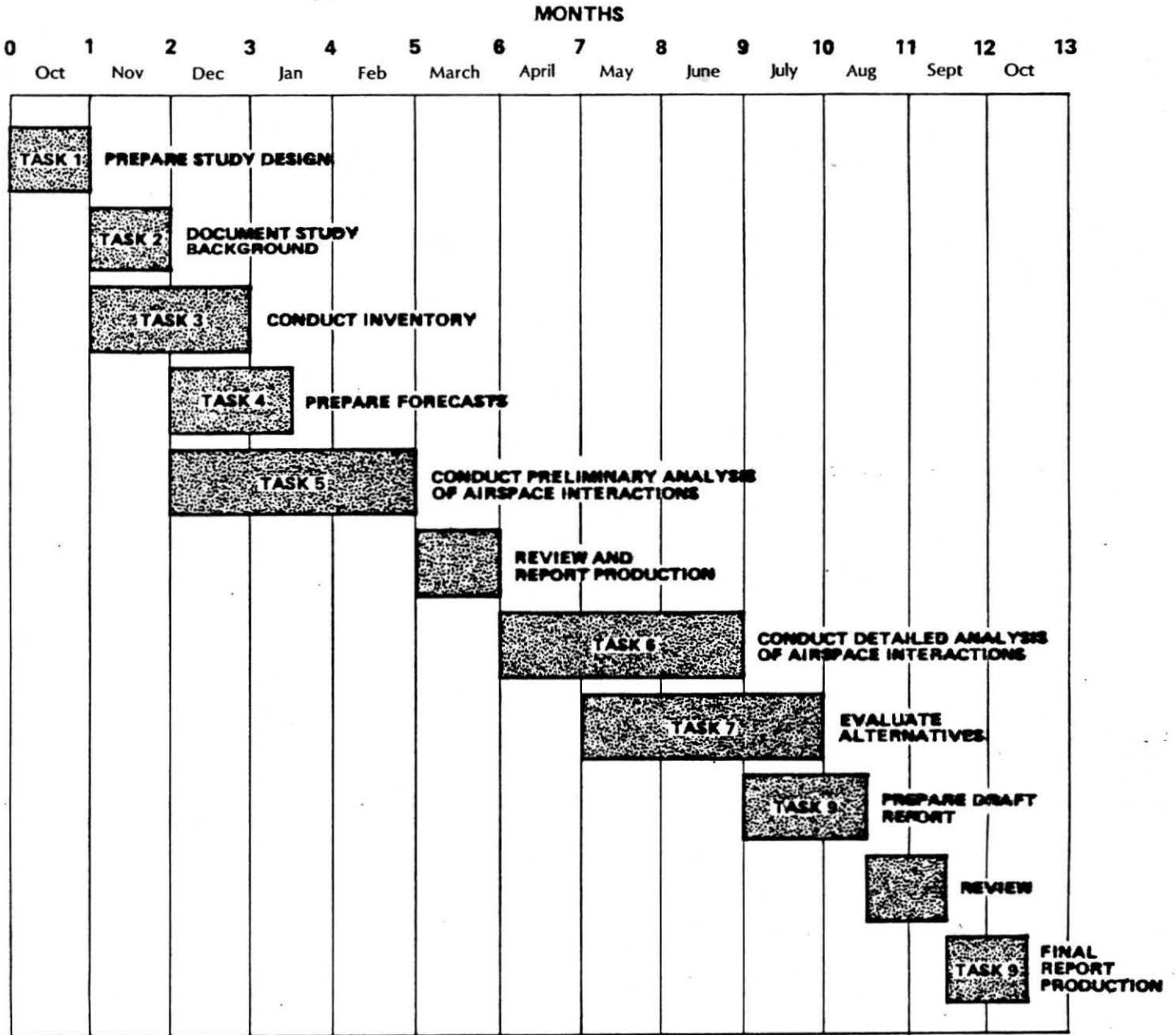
Task 9: Report Production

Description: A draft and final report and a summary handout will be prepared. The working papers prepared for the background, inventory, forecast, airspace analysis and alternatives evaluation tasks will be incorporated into a draft report. An introduction, summary, and appendices as needed will be included in the draft report. Following review and comment by the Port, the County, the FAA and WSDOT, and the Advisory Committee, a final report will be published. A summary handout will be prepared concurrently with the final report and will be produced for wide public distribution. (The final report will be produced following Task 5 if a "no go decision" is made at the conclusion of that task).

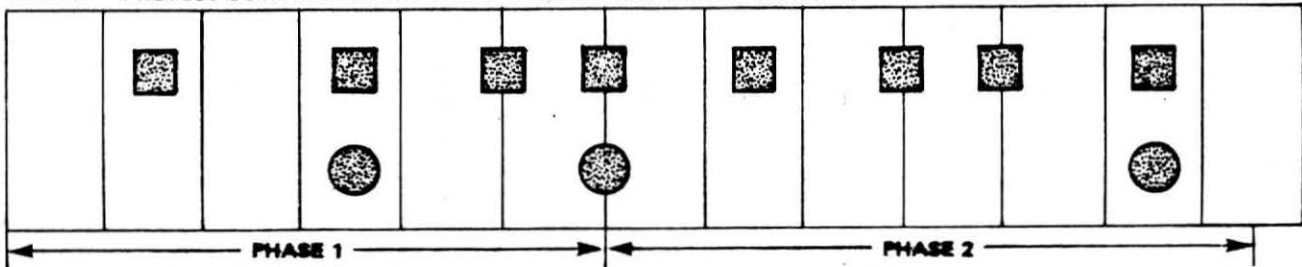
Responsibilities: PMM&Co. will provide camera-ready copy of all text and accompanying graphics for the draft and final reports. The Port and PMM&Co. will establish report and graphic formats. The Port will prepare the study introduction and summary chapters, and will print the draft and final reports. The Port will also prepare and print the summary handout. The County, PMM&Co., the FAA, WSDOT, and the Advisory Committee will review and comment on the draft report.

Products: Draft report (20 copies), final report (50 copies), and summary handout (200 copies).





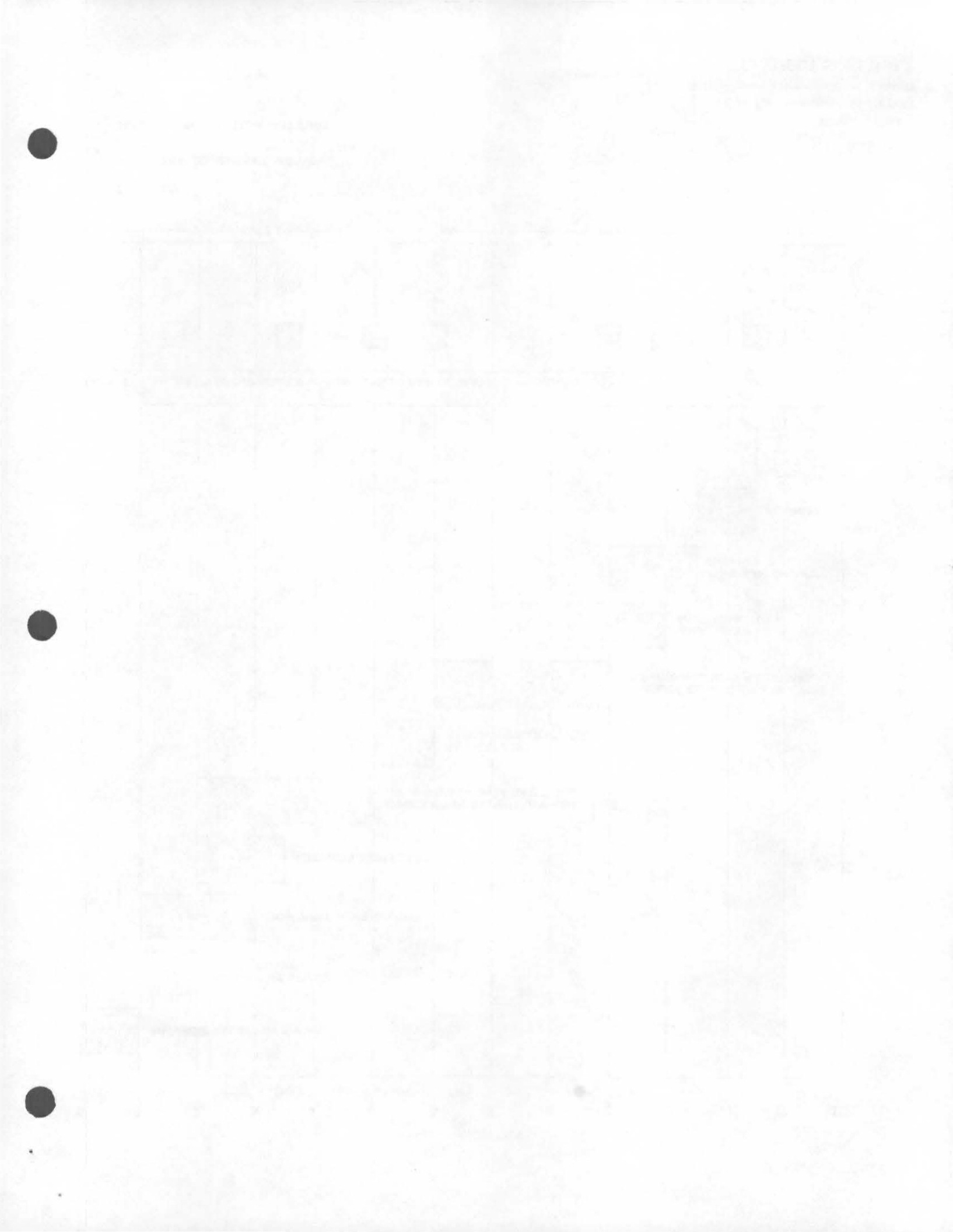
TASK 8 PROJECT COORDINATION AND PUBLIC PARTICIPATION PROGRAM



LEGEND

-  ADVISORY COMMITTEE MEETING
-  PUBLIC INFORMATION MEETING

Exhibit 1
 Airspace Study
 Sea-Tac International Airport
 King County International Airport
PROJECT SCHEDULE



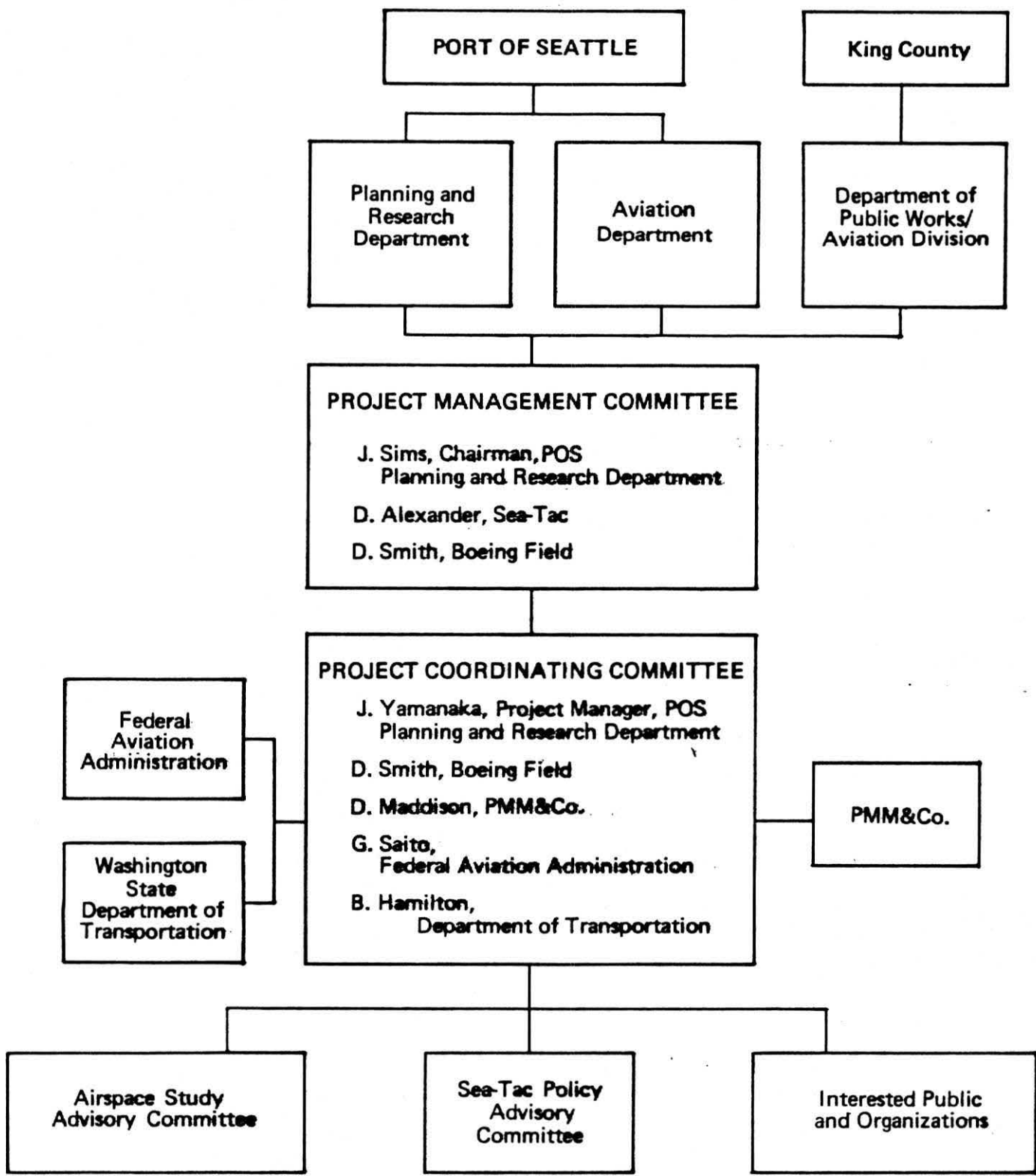


Exhibit 2
 Airspace Study
 Sea-Tac International Airport
 King County International Airport
PROJECT ORGANIZATION



Exhibit 3

FORECASTS OF AIRCRAFT OPERATIONS
Sea-Tac International Airport/
King County International Airport
Airspace Study

	Annual operations				Peak hour, average day, peak month							
					VFR conditions				IFR conditions			
	1980	1985	1990	2000	1980	1985	1990	2000	1980	1985	1990	2000
<u>Air carrier and commuters</u>												
Class* A												
B												
C												
D												
<u>General aviation-itinerant</u>												
Class* A												
B												
C												
D												
<u>General aviation-local</u>												
Class* A												
B												
C												
D												
<u>Military</u>												
Class* A												
B												
C												
D												

*See attached page for description of classes.

Aircraft Classi- fication	Types of Aircraft ^a
Class A	Small single-engine aircraft weighing 12,500 lb ^b or less (e.g., PA18, PA23, C180, C207)
Class B	Small twin-engine aircraft weighing 12,500 lb ^b or less and Lear jets (e.g., PA31, BE55, BE80, B99, C310, C402, LR25)
Class C	Large aircraft weighing more than 12,500 lb ^b and up to 300,000 lb ^b (e.g., CV34; CV58; CV88; CV99; DC4; DC6; DC7; L188; L49; DC8-10, 20 series; DC9; B737; B727; B720; B707-120; BA11; S210)
Class D	Heavy aircraft ^c weighing more than 300,000 lb (e.g., L1011; DC8-30, 40, 50, 60 series; DC10; B707-300 series; B747; VC10; A300; Concorde; IL62)

- a. For aircraft type designators, see FAA Handbook No. 7340.1E with changes.
- b. Weights refer to maximum certificated takeoff weight.
- c. Heavy aircraft are capable of takeoff weights of 300,000 lb or more whether or not they are operating at this weight during a particular phase of flight. (Reference FAA Handbook 7110.65 with changes.)

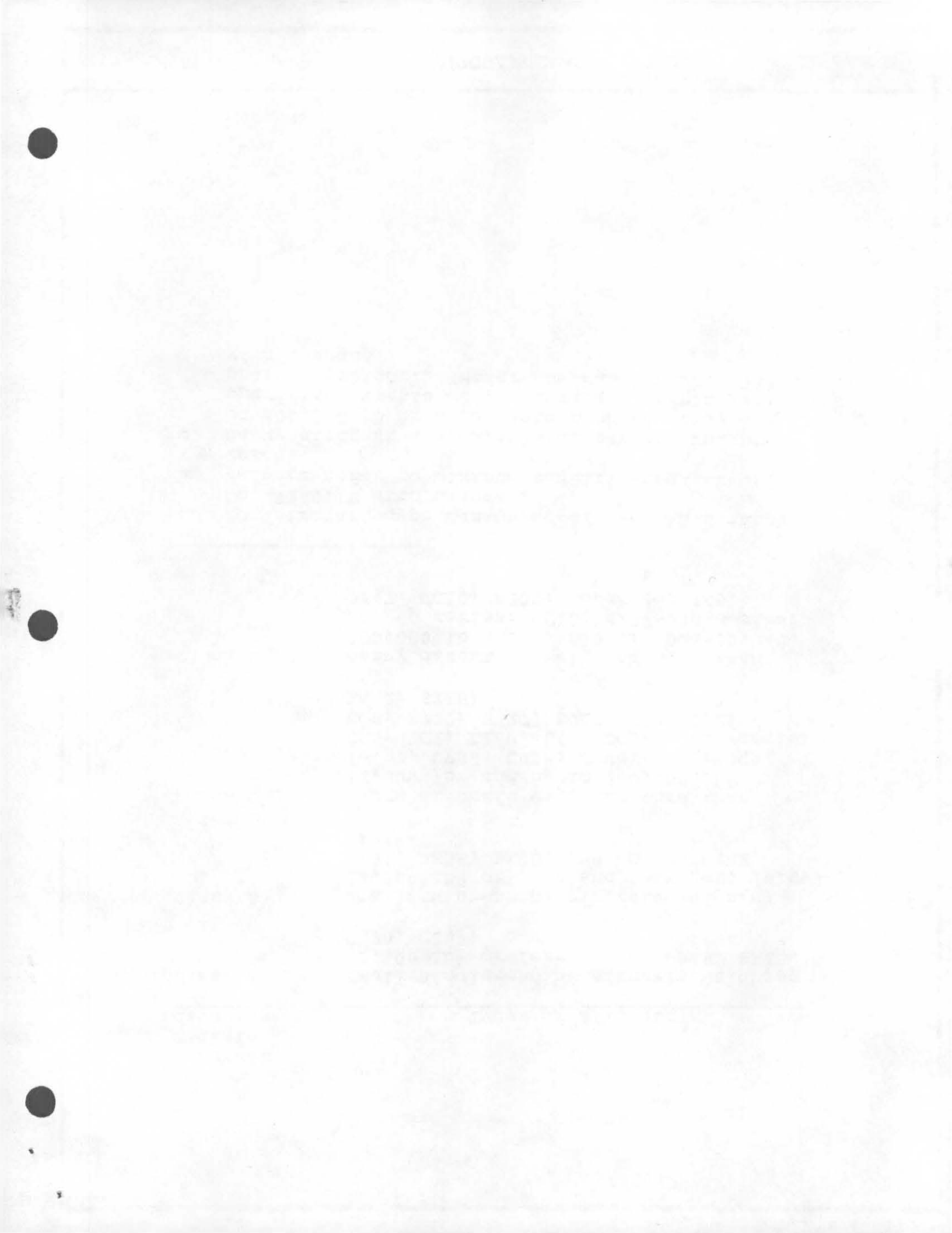


Exhibit 5

CONSULTANT BUDGET ESTIMATE
Sea-Tac International Airport/
King County International Airport
Airspace Study

<u>Task Number/Description</u>	<u>Manhours</u>	<u>Amount</u>
<u>Phase 1:</u>		
1. Study design	56	\$ 3,892
2. Study background	4	278
3. Inventory	56	4,170
4. Forecasts	32	2,224
5. Preliminary airspace analysis	148	10,286
8. Public participation program	96	6,672
9. Report production	16	1,112
Direct expenses	<u>--</u>	<u>3,518</u>
Total--Phase 1	408	\$32,152
<u>Phase 2:</u>		
6. Detailed airspace analysis	188	\$13,066
7. Alternatives analysis	216	15,012
8. Public participation program	72	5,004
9. Report production	16	1,112
Direct expenses	<u>--</u>	<u>3,654</u>
Total--Phase 2	<u>492</u>	<u>\$37,848</u>
Total	900	\$70,000

Exhibit 6

PROJECT TEAM RESPONSIBILITIES
**Sea-Tac International Airport/
 King County International Airport
 Airspace Study**

<u>Task No./Description</u>	<u>Port of Seattle</u>	<u>King County</u>	<u>FAA</u>	<u>WSDOT</u>	<u>PMM&Co.</u>
1. Prepare study design	○	○	○	○	●
2. Document study background	●	○	○	○	○
3. Conduct inventory	●	⊖	○	○	⊖
4. Prepare forecasts	●	⊖	○	○	⊖
5. Conduct preliminary analysis of airspace interactions	⊖	⊖	⊖	○	●
6. Conduct detailed analysis of airspace interactions	⊖	⊖	⊖	○	●
7. Evaluate alternatives	⊖	⊖	○	○	●
8. Project coordination and public participation program	●	⊖	○	○	⊖
9. Report production	⊖	○	○	○	●

Legend: ● Primary responsibility
 ⊖ Support responsibility
 ○ Review responsibility

