Unalaska Airport

PUBLIC MEETING
UNALASKA AIRPORT RUNWAY EXTENSION
APRIL 8, 1980

MEETING SUMMARY

Mayor Huffman opened the discussion with a personal anecdote about the difficulties of flying to Unalaska in prior years. He noted that the aircraft have improved since then but that the runway has not.

Comments by Dick Reeve of Reeve Aleutian Airlines.

Mr. Reeve commented that in 1967 RAA made two trips a week into Unalaska utilizing DC-3 aircraft. Since then the shell fish industry has grown to the point that they have increased from two DC-3 flights a week to six YS-11 flights a week. The YS-11 aircraft have a capacity to accomadate 46 passagengers. This represents 2.25 times as much capacity per flight or 12 to 14 times the weekly capacity of the 1967 schedule. Air traffic into and out of Unalaska is highly seasonal with September and October the busy season. Thirty percent plus of the annual traffic occurs in these two months.

Mr. Reeve noted that an airline needs more than an improved runway. Also required is adequate airspace around the runway. The current runway is not ideal in this regard due to topographic features. Mr. Reeve then spoke about the geographic features of Unalaska, and the history of the airport which was built by the Navy in early 1940's.

He indicated that an instrument approach to the airport is from the northwest with the normal departing pattern to the southeast with an immediate left turn due to Mt. Newhall across Iliuliuk Bay. This mountain requires that the runway extension be constructed from the northwest end of the runway.

He noted that FAA parameters require certain airspace requirments as to operational flight patterns. While the Dames and Moore study addressed the construction feasibility of the runway extension it did not address certification critieria as required by FAA. Mr. Reeve indicated RAA has looked at possible aircraft that could utilize the extended runway and concluded that either the Boeing 737 or 727-100 could utilize a 1700-foot runway extension; these aircraft are certified for use on gravel runways thus if money is not availble for paving the lengthened runway could still be utilized.

Mr. Reeve noted that to provide for use by four engine jet aircraft such as a Boeing 707, a 7000-foot runway is necessary plus substantially better runway strength and paving due to the greater weight of these class of aircraft. As well, he indicated that these aircraft are not certified for use on gravel runways.

Mr. Reeve indicated that RAA has looked into the alternative runway locations noted in the report by Dames and Moore. The proposed spit location is unfavorably exposed to the dominant winds which are from the southeast or

northwest. The spit is perpendicular to these dominant winds. The average wind in Unalaska is 17 knots indicating there are many periods with winds at higher velocities than this. Use of the spit location would result in many days when the airport could not be used due to winds. There are social considerations in assessing this site also; the planes would fly right over the community which would be noisy. He commented that the other tentative location was across the bay near the existing airport running at approximately right angles to the existing runway. The geographic considerations of this alternative are even worse than the spit runway site. Cross winds are present and a mountain interfers with flight paths.

In conclusion Mr. Reeve indicated that RAA thinks that Unalaska needs a better airport to accomadate existing traffic loads to say nothing of future volumes. He stated that a 1700-extension will adequatly serve the community for serveral years to come.

Following the presentation by Mr. Reeve, Roger Allington, Meeting Moderator, indicated that the information packet contained estimates of future passagenger and frieght loads. He indicated that these predictions portend substantially increased loads over those now being carried.

Comments by Doug Jones of Dames and Moore.

Mr. Jones indicated that his firm prepared a report concerning the technical feasibility of extending the runway at the Unalaska. The report was prepared for the Alaska Department of Transportation and Public Facilities, Division of Aviation Design and Construction. The report considered only briefly the airspace geometry that the FAA requires. He indicated that they found no particularly difficult engineering problems concerning construction of the extension. One item of concern was locating an adequate material source for the fill and armor stone. The obvious location to consider was Mt. Ballyhoo in that part of the mountain must be removed to provide adequate side clearance for the runway. Mr. Jones indicated that the mountain contains generally poor material intermixed with some acceptable material. The cost of segregating the good material from the poor was considered prohibitive. Other sites investigated included Captains Bay and Arch Rock. Arch Rock on "Little South America" has good structural rock in ample quantities and is the recommended source.

Mr. Jones indicated that the design parameters used to prepare the cost estimate in the report were conservative. This resulted in a possibly high estimate and he felt that more detailed engineering based upon more concrete data could result in a 10% reduction in the estimated construction costs. He indicated the estimate of costs did not include administrative costs or engineering. The absence of wave data was the most critical unavailable data. In order to estimate this, he noted, they used pressure charts to calculate surface winds and from this they calculated probable wave heights. The prediction of winds from surface charts was the most difficult aspect of this calculation in Mr. Jones' view.

In response to a question about tsunamis Mr. Jones indicated that they were not found to be a critical design factor. Also the basic structural design was cited as being inherently capable of withstanding an earthquake.

Mr. Jones indicated the one unusal engineering aspect of the project is the depth

of water that is being proposed for fill. He indicated that there are only a few similiar type fills of this magnitude.

Due to the conservatism of the wave related design and the water depth Mr. Jones indicated that his firm is recommending that modeling be done to test the design concepts and to augment this with acquisition of wave data to firm up this design criterion.

He indicated that in his view a 1700-foot extension would cost about 24 million dollars as compared to the 35 million dollar cost for the full 2500-foot extension. This was a very quick calculation done only since Mr. Reeve had suggested the shorter length was adequate, he cautioned.

Mr. Richard Careaga, Planning Director for Unalaska queried Mr. Jones about the cost of an access road to other potential airport sites such as Broad Bay and what the cost of crossings over salmon streams would be. Mr. Jones indicated that he was not familiar enough with the locations to extend a guess.

In response to a question by the moderator, Mr. Jones indicated that the cost estimates reflect 1981 costs.

Mr. Allington noted that Doug didn't know he was scheduled to speak or that the shorter runway extension option would be discussed and thanked him for his perserverance.

In response to a question from the audience Mr. Jones indicated that the cost estimates did include paving.

Comments by Robie Strickland, Chief of Airport Division, Federal Aviation Administration.

Mr. Strickland indicated that there are a couple of comments already made that the FAA concurs with. First, that runway improvements are needed at Unalaska.

Second, they believe that runway lengthing of 1500 to 1700-feet could accomadate future needs.

He indicated that the FAA supports needed improvements at Unalaska. Mr. Strickland noted that his first flight to Unalaska required an overfly. He said he supports the need for development.

Mr. Strickland indicated the FAA does have some concerns that extending the runway might not solve the total problem. For an example he noted that it might not satisfy terrain clearance requirements or airspace. He indicated that if a YS-11 has a 6-mile visibility requirement a jet aircraft might require even longer visual sight distance due to higher approach speeds.

He noted that jet aircraft would place other demands on the airport that must be considered. The terminal, passagenger and freight handling systems and many other factors must be examined. This is usally done in an airport master plan. He indicated the FAA will participate in and fund such a study when we get a program; a study to look at these questions. Mr. Strickland noted the airport development aid program (ADAP) is before congress now but he indicated the outcome is uncertain. Unalaska is on the list of airports needing improvements.

He commented that preliminary indications are that the FAA could have a difficult time granting the necessary deviations to operate jet aircraft at Unalaska. A study is necessary to address these questions.

A member of the audience asked if the jet limitation applied if the aircraft came in from over the bay. Mr. Strickland noted that maneuving speed of the jets is higher. In addition the airline wants to be assured they can safely make a missed approach. Mt. Newhall at the southeast end is a potential hazard. Often the missed approach criterion is the most critical design factor.

Mr. Reeve reiterated his comment that RAA has looked at the airspace requirements and believes that the small jet aircraft can operate at the runway.

Mr. Careaga asked how fast the FAA responds to such studies in making their decisions. Mr. Strickland indicated the FAA would be would funding the study immediatly if they had the scope and funds. Approval to proceed would take only a matter of weeks. He indicated that Unalaska is high on the list of priorities.

Mr. Allington read letters from Flying Tiger Line and the North Pacific Fishing Vessels Owners Association into the record (See Appendix A).

Comments by Hal Schuyler from Sea-land Service, Inc.

Sealand is very interested in upgrading the current deficient runway. If 727 and 737 aircraft could serve the community the savings and safety considerations would enhance the present operating conditions of industry and assist in its growth. Air freight and mail could be delivered without backlogs; these being critical requirements for industry. Accident and medical patients could be evacuated more expeditiously.

Mr. Schuyler stated that benefits to his industry would be considerable with regard to the timely movement of marine pilots, custom and immigration officials, agricultural inspectors and ship's agents. Savings would occur to the fishing industry in the time-in-transit for employees, as well as emergency supplies, and spare parts.

This airport could positivily affect the outlying communities such as Nikolski, Chernofski, Akutan and Beaver Inlet through the availability of better transportation.

Comments by Phil Tutiakoff of Unalaska, chairman of the nonprofit regional corporation and officer in the Ounalashka Corporation.

He indicated his conversations with the ARCO people pointed out that any oil development would probably affect Unalaska. This will add to the problems of health and social services. Mr. Tutiakoff indicated that with all these experts here, all working on this one issue he was sure the runway could be acheived. He expressed his opinion that the runway improvement would be most beneficial. He noted the improved air service that would follow would allow the lifestyle to be improved. Particularly, he indicated, health and social services could be improved.

Comments by David Baumeister of ERA Helicopter and Jet Alaska.

Mr. Baumeister noted that Jet Alaska has operated a service to Unalska with their Lear until last August when the FAA caused them to cease operations due to a change in their certification of the adequacy of the runway length. He noted some statistics about their prior operation: in 1978 they made 76 flights to Unalaska; in 1978 140 flights; and in 1980 32 times. This yields monthly averages for the three years of 9.5, 11.8 and 12.8 times per month on an annual basis. Mr. Baumeister noted their medievac service is the major benefit to the community. He indicated that they flew 22 patients during the 18 months this service was in operation. With this service patients with major injuries and problems that need rapid medical evacuation can reach immediate medical care.

He indicated that to reinitiate the medievac service his company would require runway extension and surfacing. The gravel surface adds a penalty as to the length of runway needed. This penalty amounts to approximatly 15% on landing and 20% on takeoff. He indicated a short-term solution might be to pave the runway immediatly. Another problem with the gravel is the foreign object damage to the engines. He noted Jet Alaska has had three instances of this with the results being minor in two cases and requiring an engine replacement in the third case.

Mr. Reeve asked if paving only the two ends of the runway would help as this was one cost saving suggestion that he had heard of. Mr. Baumeister felt that the major problem is when the nose wheel touches down. This is some distance down the runway he indicated, thus the partial paving would probably not help that much.

Mr. Careaga asked if Jet Alaska still operates the medievac service utilizing a shuttle to Coldbay. Mr. Baumeister responeded positively, but cautioned that the reliability of this transfer is not as good as direct service and the unfavorable impact of the transfer on the patient can be great. He indicated that the shuttle aircraft does not have the life support systems the Jet Alaska can provide.

Mr. Jones of Dames and Moore commented that paving the runway should not take place until the runway is elevated because of probable wave damage. He indicated the runway is overrun by waves almost annually.

Comments by Commander Richard School of Search and Rescue, USCG.

Commander School indicated it is the policy of the Coast Guard to not interfer with commercial medievacs. He stated they would only come into "Dutch" when a commercial airline can not. He said he would like to see the runway improved so that the C-130's did not have to come in. He commented that the airspace question must be answered and noted that Coast Guard pilots are not as familiar with the runway and consequently nervous about it. He stated that when the nose wheel of the C-130 comes down it throws aggregate at the plane with about $2000 damage to the plane on each landing.

Ray Heeley, Vice President Marketing, Wien Air Alaska.

Mr. Heeley stated that Wien is always evaluating the route structure of the Alaska market. He noted that Wien currently flys into five gravel strips. Due to improvments of their Boeing 737 he stated that Wien carried more than 600 medievacs in 1980. He noted that they have filed for a route into Cold Bay but

reoognize that much of this traffic goes into Unalaska. Wien has five new aircraft, Boeing 727-100's. Consequently Wien is looking at new routes; Seattle to Dutch Harbor or Cold Bay. Many new route options are possible with these aircraft. All of this relates to renewable resource development. Attendant benefits of the new runway, would be competition which is best for community. Realization of these benefits requires that a improved runway be provided.

At this point the meeting adjourned for lunch with Kay Poland as the guest speaker.

Upon reconvening the meeting Moderator Roger allington read a letter by Pan Alaska fisheries into the record (See Appendix A).

A question from the audienoe oonoerning the requirement for an environmental impaot statement was responded to by Jess Burton, City Manager for Unalaska. He commented than one has not been prepared. His discussions with the Department of Transportation and Public Facilities have indicated that they would probably not begin one until funding is found.

Robie Strickland of the FAA commented that the master planning he spoke of earlier could include the environmental investigations.

Dick Reeve of Reeve Aleutian Airlines indicated a need to get on with the project. He noted that a normal process would take two to three years until construction but that the aotual construction would only take a year.

Following this the meeting was brokien up into three round table disoussions in ordar to document the problem and use the many types of expertise available to brainstorm a solution.

At approximately 2:45 the meeting reoonvened for the purpose of relating the finding of the three round table discussions.
:UNA #2 MS:

Summary of oup Discussions

Group Number One--Spokesman Dick Reeve of Reeve Aleutian Airlines.

The group was mostly airline people including at Alaska, USCG and RAA.

Mr. Reeve indioated his group reached six major statements of oonoern or observation:
1. An airport extension is required with 1700-feet probably the optimum length to serve the airline oommunity.

2. There are no practioal alternative sites for the airport and further investigation should be discontinued.

3. Paving is highly desirable and the oost of the paving is reasonable in terms of the benefits derived.

4. DOTPF should immediatly begin the airspaoe study inhouse or through the FAA. Quiok answers are neoessary so that the engineering oan begin.

5. Completion by mid-1983 is the fastest practical schedule. This is based upon a fast track schedule. The biggest hurdle is the planning and paper work, not the actual construction.

6. About 6 million dollars has been allocated to the project with 90% of the money from Federal sources. The Federal component is uncertain at this time. Regardless of the availability of Federal funds the need for this airport is so great that the state should be prepared to fund the project 100%.

Group Number Two--Spokesman Jess Burton, City Manager of Unalaska.

Mr. Burton commented that his group was closer to the social factors resulting from an inefficient airport including the problems of medical care and the costs of moving people in and out which are very high. He cited an example of flying a family from Unalaska to Anchorage for a vacation or shopping which would cost $2400 for a family of four. If a resident's employer does not provide this benefit the mental stress of not being able to leave is enormous. The availbility of perishibles was cited as a problem. Three dollars for a half gallon of milk, if it is available. Other effects of the air transportation problem is the cost to a plant or fishing boat when break down parts are unable to be sent. He noted that a small part, if not available, can shut down a million dollar boat while waiting for parts.

Mr. Burton noted that the airport is utilized by Akutan and other communities who rely upon Unalaska as a portal (See Appendix A). Travelers get as far as Unalaska then get stranded by weather and have to wait for days. In some cases there are no facilities available.

He indicated that his group determined that an appropiate stratregy would be to seek Legislative funding for the FAA study and engineering design in order to get the project underway. Based upon more detailed engineering the City would be in position to solicit construction funding next year.

Group Number Three--Spokesman Kenneth Cage, Pan Alaska Fisheries.

Mr. Cage noted that his group consisted mostly of seafood processors, the FAA, and state agencies including the Departments of Environmental Conservation and Community and Regional Affairs.

He commented that his group determined that it is essential this session to get airspace study underway in order to assess aircraft requrements so that the design can proceed.

The potential of expanded markets is high if an improved runway is in place. Fresh seafood markets direct from Dutch Harbor to New York, San Francisco or Japan are possible. This requires quick efficent transportation.

The environmental concerns must also be considered. The passage near the proposed extension is the desiginated dumping area for almost all the processors. The extension will require some investigation of the revised currents to see what the viability of the outfall area will be. This is not a major problem but it must be addressed.

Following the presentations by the three groups Moderator Roger Allington

provided a condensed summary of the points touched on by one or more of the three groups.

1. A 1700-foot runway extension is suffoient.
2. Paving is required.
3. Alternative airport sites are not available.
4. Completion in 1983 is the earliest practicable.
5. Studies and engineering shoud begin in 1981.
6. Seek construotion funding in 1982.
7. Target oompletion date is 1983 with jet usable airport available.
8. Medical, social and business requirments all speak to the need for an improved runway.
9. The six-million dollars is not really available.
10. Funds needed to get underway would be approximately $2 to $2.5 million.
11. Expanded markets a real potential for fisheries with improved runway.
12. Environmental problems need to be taken care in parallel with runway design and construction.
13. Fast action is necessary to get funding this year so that design may proceed.

Mr. Reeve again reiterated his obseravation that the projeot will take two years of paper work and one year oonsturotion. The obvious area to streamline is the paperwork.

He noted that the benefits of the runway improvement will extend to the whole state not just Unalaska. The promise of expanded fisheries particulary bottomfish, requires an improved air transportation system that works in concert with other required systems.

Mr. Allington commented that it might be appropiate to transfer the project to Unalaska for management purposes given the recent findings of Lieutenant Governor Miller that the Department of Transportation and Public Facilities is over-loaded with construction projects.

Mayor Huffman then closed the meeting. A transcript of the mayor's speech follows:

MAYOR'S CLOSING REMARKS

First and foremost I need to thank all of you for being here today. Those of you who know the situation have helped us provide a clearer picture of the deficiencies of the Unalaska Airport runway. Those of you who are in decision-making positions now have a better understanding of the problems at the Unalaska Airport and we thank you for your time and attention today.

As I am sure you now realize, the problems at the Unalaska Airport are not just local, municipal problems. There is a well defined need for a safe, efficient transportation system throughout the State of Alaska if we are to develop our fisheries for world food supplies, our oil and gas reserves for National well being and in doing so, enhance the economic well-being of the State of Alaska. That transportation system requires regional centers where commodities can be gathered and trans-shipped safely and economically. In the Southwestern part of our Great Land, only the community of Unalaska has the sea port,

community infrastructure, and airport potential to serve as the regional transportation center.

The existing State airport at Unalaska is presently being used as a regional air center. As the Aleution-Bering Sea economic conditions continue to rapidly increase, the use of this deficient facility will become more and more evident. There is no question in the minds of most of us familiar with the existing conditions that it is only a matter of time until we have another airport runway related accident with the resultant life and economic loss. In addition, there is a continuing economic loss to the citizens of the State due to the inadequate runway facilities. These losses to the people of the State of Alaska will grow even larger as the inadequate runway becomes more and more the single restraint to safe, efficient transportation in the Aleutian-Bering Sea Region.

A lot of work has been done to date. The Alaska Department of Transportation and Public Facilities has, through the Dames and Moore Study, established the engineering feasibility of extending the existing runway. The Unalaska Air Terminal report by Kramer Chin and Mayo as well as other studies has documented and quantified the need for substantially improved runway facilities to handle existing and projected operations. The meeting here today has reinforced all of these findings and further underscores the need to move on this proposed runway improvement now!

There is an old saying in management circles that when it comes to making major decisions you are always short of three things; information, money, and time. We, the people of the State fo Alaska need those in decision-making positions to make the decision now to proceed with runway improvements at Unalaska. We do not need to reinvent the wheel. We do need whatever actions are necessary to get "bricks and mortar" as soon as possible.

We urge the decision-makers to make positive decisions to proceed with the runway improvements now and all others to keep on top of the issue by keeping informed as to progress on the project.

We, the people of the City of Unalaska, speaking for the people of the "Great Land," need action now!

TELEGRAM

ALASCOM, INC.
PHONE: 586-6442
JUNEAU, AK 99802

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1981 APR 8 PM 7 22

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PMS REP ERIC SUTCLIFFE STATE HOUSE OF REPRESENTATIVES 465-4940
POUCH V 0691
JUNEAU AK 99802

I AM TAKING THIS MEANS TO ADD THE ALEUT CORPORATIONS STRONGEST ENDORSEMENT TO THE PROPOSAL TO EXPAND AND IMPROVE THE AIRPORT FACILITIES AT UNALASKA/DUTCH HARBOR. ALTHOUGH I WAS PERSONALLY UNABLE TO ACCOMPANY JESS BURTON AND THE MEMBERS OF THE UNALASKA CITY COUNCIL TO JUNEAU, I AM NEVERTHELESS ANXIOUS TO MAKE YOU AWARE OF OUR SUPPORT FOR THIS PROJECT. UNALASKA IS AN EXTREMELY VITAL ECONOMIC AND TRANSPORTATION CENTER IN THE ALEUTIAN ISLANDS AND SERVES THE RICHEST FISHERY IN THE NATION AS A SUPPORT BASE. IN ADDITION, IT WILL UNDOUBTEDLY BCOME A STRATEGIC OPERATION CENTER FOR OFFSHORE OIL AND GAS ACTIVITIES THROUGHOUT ALL OF THE OCEAN AREAS IN WESTERN ALASKA. I SPEAK ON BEHALF OF OUR 3200 SHAREHOLDERS, MANY OF WHOM LIVE IN THIS AREA, WHEN I SAY THAT IT IS URGENT THAT THIS FACILITY BE MODERNIZED AT THE EARLIEST POSSIBLE DATE.

AGAFON KRUKOFF, JR, PRESIDENT
THE ALEUT CORPORATION

KOMAE JNO

FLY TIGER LSA

LA CA 4/7/81

KRAMER CHIN AND MAYO INC JUNEAU ALASKA

NBR 46-304

ATTN: THE HONORABLE ERIC SUTCLIFFE

SUBJ: MTG CONCERNING RUNWAY IMPROVEMENTS AT UNALASKA, AK

DEAR MR. SUTCLIFFE:

REGRET UNABLE TO ATTEND MTG ON APRIL 8 AS SCHED COULD NOT BE CHANGED. AM THEREFORE SUPPLYING FWG INFO WITH REGARD TO MTG:

FT IS A SUBSTANTIAL PARTICIPANT IN THE ALASKA AVIATION COMMUNITY

FT PAYS THE STATE OF ALASKA MORE FUNDS IN THE FORM OF LANDING FEES AND FUEL FLOWAGE FEES THAN ANY OTHER U.S. CARRIER. OUR OPERATION IN PACD IS BOTH AIRLINE OPERATIONAL AS WELL AS COMMERCIAL. IN A LEASE PARTNERSHIP WITH THE STATE OF ALASKA, WE HAVE BEEN OPERATING A CONCESSION OPERATION ON THE PACD AIRPORT FOR THE LAST 14 YEARS.

IN 1980, FT INVESTED APPROX DOLLARS 200,000 IN UPGRADING ITS AIRLINE FACILITIES AND EQUIPMENT IN PACD. AS PART OF THESE IMPROVEMENTS WAS A COLD STORAGE BLDG CAPABLE OF HOLDING OVER 100,000 LBS OF FRESH SEAFOOD BUILT UP ON ACFT CARGO PALLETS PLUS AN ADDITIONAL 100,000 LBS OF BULK PRODUCT. THIS BLDG WAS BUILT IN RECOGNITION OF THE PHYSICAL LIMITATION OF THE PACD FISHERIES AND THE FACT THAT TO ACCUMULATE A FULL PLANELOAD OF SEAFOOD MAY TAKE IN EXCESS OF SEVERAL HRS. THE DESIGN AND CONFIGURATION OF OUR COLD STORAGE BLDG ENABLES FT TO COMPLETELY LOAD A 100,000 LB. DC-8 CHARTER IN LESS THAN ONE HR. THE COMBINATION OF HOLDING THE SEAFOOD UNDER REFRIGERATION AND THE EXPEDITIOUS LOADING OF THE ACFT ALLOWS FOR THE HIGHEST QUALITY CONTROL.

THE CHARTERS WE OPERATED FROM PACD LAST YR WERE QUITE SUCCESSFUL.

PACD AND DUTCH HARBOR AIRPORT POTENTIAL IN THE AIR TRANSPORT OF SEAFOOD

TO ACHIEVE THE LOWEST POSSIBLE RATE/LB. REQUIRES THE USE OF EFFICIENT, MODERN, STATE-OF-THE-ART JET ACFT. THIS, IN TURN, REQUIRES A FULL PAYLOAD OF 100,000 TO 200,000 LBS./LOAD (DC-8-63 OR 747).

HANDLING LARGE CARGO JET ACFT TO THEIR MAXIMUM PAYLOAD AND RANGE. BEFORE WE COMMITTED TO INVEST CAPITAL IN PACD LAST YR, WE STUDIED THE PROPOSED IMPROVEMENTS IN THE DUTCH HARBOR AIRPORT. OUR CONCLUSION WAS THAT, REGARDLESS OF THE LENGTH OF THE PRESENT RUNWAY IN DUTCH HARBOR, WE WOULD STILL BE RANGE- AND/OR TAKEOFF-LIMITED DUE TO THE SURROUNDING APPROACH AND DEPARTURE TERRAIN.

ON THE OTHER HAND, IF DUTCH HARBOR AIRPORT WERE IMPROVED TO ALLOW THE MAXIMUM LOAD ON A HERCULES-TYPE ACFT (APPROXIMATELY 50,000 LBS.), THEN A SHUTTLE OPERATION TO PACD MAY BE FEASIBLE, BECAUSE TWO HERC LOADS WOULD MAKE UP A DC-8 LOAD AND FOUR HERCS WOULD MAKE UP A 747 LOAD. A SHUTTLE OPERATION WOULD ALLOW THE SMALLER, LESS EFFICIENT, ACFT USE TO BE MINIMAL AND THE LARGER, MORE EFFICIENT ACFT COULD BE USED TO THEIR MAXIMUM. THE HERC IS CAPABLE OF HANDLING BUILT-UP DC-8 AND 747 PALLETS, AND THE FT COLD STORAGE BLDG CAN STORE THE SAME PALLETS ON AN INTERNAL, ROLLERIZED CONVEYOR SYSTEM. THIS MEANS THAT, ONCE THE SEAFOOD IS BUILT UP ON A PALLET IN DUTCH HARBOR, IT DOES NOT HAVE TO BE RE-HANDLED AGAIN UNTIL IT REACHES ITS FINAL DESTINATION.

FTS ANC OPERATION SERVES THE MAJOR CITIES OF ASIA, EUROPE AND THE UNITED STATES. CONSEQUENTLY, A HERC LOAD OF SEAFOOD FROM DUTCH HARBOR TO ANC CAN THEN BE TRANSSHIPPED ON FTS COMMON CARRIAGE SYSTEM OF 110 CITIES IN THE U.S. AND ALL OF THE MAJOR CAPITOL CITIES OF EUROPE AND ASIA.

CONCLUSION

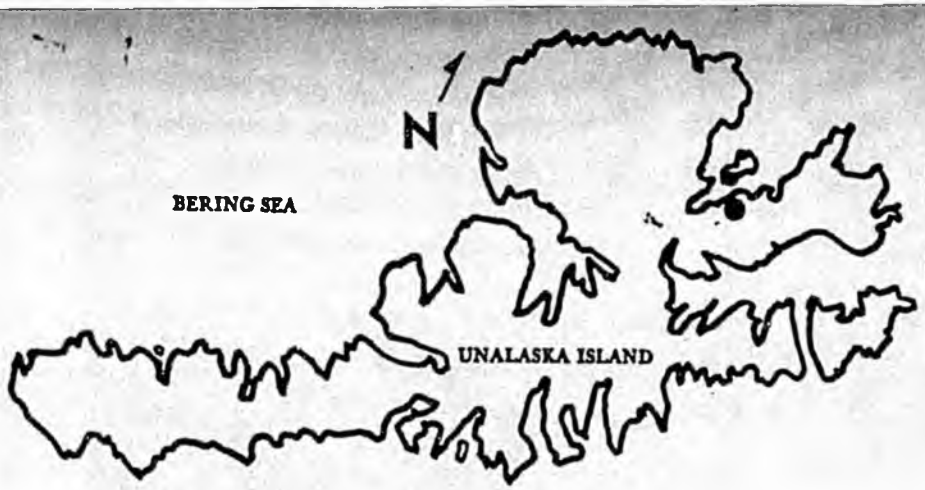
AN IMPROVED AIRPORT AT DUTCH HARBOR, WHICH WOULD ALLOW A FULLY LOADED HERC TO OPERATE TO PACD AND/OR ANC, WOULD INCREASE THE POTENTIAL OF AN ECONOMICALLY FEASIBLE AIR-TRANSPORTED SEAFOOD PROGRAM.

SINCERELY,

FLYING TIGERS
DOUGLAS R. SMITH
GENERAL MANAGER
CONTRACT AND GOVERNMENT PROGRAMS
TLX 674496

340PM
◆
KOMAE JNO

FLY TIGER LSA



OUNALASHKA CORPORATION

P. O. BOX 149
UNALASKA, ALASKA 99685
907-581-1276

AN ENVIRONMENTAL & SYSTEMATIC APPROACH
TO DEVELOPMENT

March 31, 1981

Eric Sutcliffe
15th District Representative
Pouch V
Juneau, Alaska 99811

Dear Eric,

It is my understanding that a Public Hearing will be held in Juneau on April 8th in the Baronof Hotel, with the main issue of the Unalaska Airport.

I would like you the read in the the record of the Ounalashka Corporation concerns and wishes regarding the Station here in Unalaska.

1. The present Runway is not sufficient to handle the traffic we receive in the Community.

2. The days of Aircraft cancellation, due to Runway condition, (ie. snow, rain, slush)is well into the past. If Unalaska is to continue as the center for Fishing Development.

3. The extension of the Unalaska Airport would have great Economic and Cultural change to the Community. Some examples of Economic change would be, more work for the local People year around because of the expanded arrival and departures of other Airlines besides Reeve Aleutian Airways, who have done an outstanding Job, as there record will ascertain. We feel with the interest of other main Airlines the possibility of a reduced Round Trip ticket to Juneau could make a big difference to the Policy maker of Alaska in the Aleutian Chain.

4. Interest in the development of the richiest fishing grounds in North America con be better controled by good Economical Transportation of our Public officials.

5. We of the Ounalashka Corporation feel that if we are to become Commercial Competitive with the foriegn Fisherman we should be given the tool of Transportation to all points needed to expand the sale of locally Produced and marketed Products.

In closing we would like to emphasize the importance of Air Transportation

in Unalaska, by inviting all Legislatives to travel to Unalaska and Experience a Westernly approach landing at Unalaska.

Sincerely

Vincent M. Tutiakoff, Sr.

Vincent M. Tutiakoff, Sr.
President

c.c. Jim Sourant

VMT/pbl

Resolution 81-5

A resolution supporting to expansion of air terminal facilities at Dutch Harbor.

WHEREAS, the people of the Aleutians are dependent upon air transportation for survival;

WHEREAS, air transportation in the Aleutians is excessively costly and difficult;

WHEREAS, these problems are brought about due to lack of adequate facilities;

WHEREAS, the weather in the Aleutians is among the worst in the world;

WHEREAS, the airport facilities at Dutch Harbor are completely inadequate;

WHEREAS, current facilities cannot accommodate large pay-load aircraft;

WHEREAS, Dutch Harbor is a vital link in the air transportation in the Aleutians; and

WHEREAS, the future economic development of the Aleutians is dependent on the expansion of air facilities;

NOW, THEREFORE,

BE IT RESOLVED BY THE CITY COUNCIL OF AKUTAN,
that the people of Akutan strongly support the improvement and expansion of airport facilities at Dutch Harbor and urge Governor Jay Hammond to support the expenditure of state funds for this purpose.

DATED: 4-7-81

CITY OF AKUTAN

By: _____
Mayor

ATTEST:

_____
City Clerk

Pan-Alaska Fisheries, Inc.
A SUBSIDIARY OF CASTLE & COOKE, INC.
CASTLE & COOKE BUILDING, FISHERMEN'S TERMINAL
P.O. BOX 17705 / SEATTLE, WASHINGTON 98107 / 206 284-0900
TELEX 32 9439 PAN AKFISH SEA

April 7, 1981

Mr. Jess Burton
City Manager
City of Unalaska
Unalaska, AK 99685

Dear Jess:

I was very pleased to learn from you last week that the City of Unalaska was going to sponsor a public hearing in Juneau on April 8, 1981 to solicit support for the project to extend the Unalaska airport runways.

We strongly support the effort to extend the runway so that larger capacity, larger range aircraft can be operated into Unalaska. The benefit of such an extension to us as a major Unalaska-based processor would come in the form of more timely and economic movement of personnel and material. At the present time, the shuttle service between Cold Bay and Dutch Harbor causes us problems of longer trips, greater possibilities of delays enroute, and greater possibilities of air freighted material being lost or delayed enroute.

We understand that the City of Unalaska has requested that the Alaska Department of Transportation, which is responsible for the airport facility, apply for adequate funds from the State Legislature to extend the runway. We support this request because we believe it is in the long term best interest of both the City of Unalaska and the local residents, both individual and corporate.

We have asked that our engineer, Mr. Ken Cage, attend the hearing in Juneau to represent us so that we can be fully aware of what specific plans for the runway extension the responsible City and State agencies are now recommending, and to provide our input.

Sincerely,

PAN-ALASKA FISHERIES, INC.

William P. Woods, Jr.
Vice President - Production

WPW:kew

cc: R. Jensen - B. Kinnear - G. Gerhardstein

NORTH PACIFIC FISHING VESSEL OWNERS ASSOCIATION
Building C-3, Room 218
Fishermen's Terminal
Seattle, Washington 98119
Phone: (206) 285-3383

April 7, 1981

Jeffery C. Ottesen
Project Coordinator
Kramer, Chi & Mayo, Inc.
124 West Fifth Street
Juneau, Alaska 99801

Dear Mr. Ottesen:

The North Pacific Fishing Vessel Owners' Association (NPFVOA) is unable to send a representative to the April 8 public meeting on the need for extending and improving the runway at the Unalaska Airport. NPFVOA's failure to send a spokesman, however, should not be taken as an indication that the Association feels this project is not important enough to warrant "personal" attention or the Association does not support the improvement of facilities at the airport. NPFVOA strongly urges that the airport be upgraded and this project be given priority attention and funding.

NPFVOA's members own the majority of large vessels which harvest king crab and tanner crab in the Bering Sea. During the seasons for these crab, Dutch Harbor becomes a focal point for member (and non-member) vessels' "non-fishing" activities: almost all of the 141 million pounds of king crab and 76 million pounds of tanner crab caught during the 1980 Bering Sea fisheries were delivered to processing plants in Dutch Harbor; "finished" crab products were shipped from there. Supplies and equipment were transferred to vessels at Dutch Harbor, and relief crews board at this port. Critical to these vital support activities is the Unalaska Airport. Unfortunately, the condition and length of its runway are woefully inadequate to handle the aircraft which land there. The runway and lack of support facilities also inhibit efficient air transportation of materiels and personnel into Dutch Harbor, and restrict the volume of fish cargo which can be flown from Unalaska.

Our first concern is for the safety of the air travelers and aircraft. NPFVOA believes that the present runway does not adequately ensure the safety of those who fly into and out of Unalaska. The runway should be improved if only to preserve the lives and property which pass through the airport facilities.

Because of the condition and length of the runway, large aircraft cannot land at Unalaska Airport. Travelers and cargo destined for Dutch Harbor must first fly to Cold Bay and then transfer to the smaller aircraft which can be handled at the Unalaska Airport. In addition to being an inconvenience, valuable time is lost and unnecessary expenses are incurred as a result of the inability to fly large planes directly from Seattle

to Dutch Harbor. Usually the king crab fishery is short and intense; time is of the essence. Delays in receiving equipment and parts for emergency repairs mean less fishing time and substantial drops in income for crews and vessel owners. By extending and improving the runway at Unalaska Airport, large aircraft could fly directly from Seattle, thereby eliminating untimely (and costly) transfers of men and supplies at Cold Bay, and lessening the economic impact on fishing vessels engendered by these transfers.

If larger planes were able to land at the Unalaska Airport, more processed crab would move via air freight than presently do. Larger aircraft could also expand markets throughout the world for live crab. There is no reason the market for live crab could not rival and even dwarf that of live Maine lobster. There is now a demand in Japan for live, U.S. - caught Korean hair crab. However, because of the poor facilities of Unalaska, the crab must be flown to Anchorage for transshipment to the Orient. The less handling which occurs, the more likely that the crab will reach its intended destination alive and in good condition.

Although the crab fisheries presently dominate operations at Dutch Harbor, one cannot ignore the fledgling bottomfish industry in the Bering Sea. Domestic fishermen are just now beginning to develop fisheries for such species as pollock, cod, and yellowfin sole.

Already U.S. harvesters are making inroads into fisheries once the exclusive province of foreign fleets. As the domestic fisheries expand, foreign vessels will be eliminated from U.S. waters, and foreign nations will have to rely wholly on the U.S. industry for continuity of supply of fish and fish products. The untapped bottomfish resources of the Bering Sea have potential annual yields of millions of tons. And Congress, in the Magnuson Fishery Conservation and Management Act of 1976, made the development of the Alaska bottomfish industry a priority for fisheries management. Since the Alaskan bottomfish fishery will be developed by fishermen who are now fishing for king crab in the Bering Sea, Dutch Harbor will be the recipient of this largess of fishing activities. The economic promise of this fishery is unlimited: millions of dollars could flow into the economy of Dutch Harbor, Unalaska, Alaska, and the United States. It must be emphasized that this financial infusion of fish dollars will not be a one-shot deal. Unlike oil and gas drilling, which leave ghost towns once the wells are dry, fish are renewable resources and can sustain an economy as long as the fish are rationally harvested.

To make this economic Eden a reality, better transportation facilities are going to have to be provided at Unalaska Airport. If the runway were improved and extended, larger aircraft could transport fresh bottomfish to the lower 48 states; also, large amounts of frozen fish and finished product could be flown to domestic and foreign markets. In addition, support facilities at the airport will have to be added so that expeditious handling ensures that a premium quality product remains so.

NPFVOA believes that the benefits which would accrue to the City of Unalaska and the State far outweigh the costs of upgrading the facilities at Unalaska Airport. However, any improvements or additions to the airport should not be made with a near-sighted perspective. What is

necessary is that the planners and developers have a vision of the long-term potential of the crab and bottomfish industries

NPFVOA appreciates this opportunity to coment on the extension and improvement of the facilities at Unalaska Airport.

Sincerely,

Richard J. Goldsmith
Executive Director

cc: The Honorable Don Young
Jesse Burton

ARCO Oil and Gas Company
Alaska Region
Post Office Box 360
Anchorage, Alaska 99510
Telephone 907 277 5637

April 2, 1981

Jeffery C. Ottesen
124 West Fifth Street
Juneau, Alaska 99801

Subject: Runway Dutch Harbor

Dear Mr. Ottesen:

Due to the poor runway and landing facilities they have now and the number of accidents they have had in the past, I would not think there would be any doubt in anyone's mind that they need a better runway and landing facilities.

At the present time we will not take our aircraft into Dutch Harbor and will not until we get a better runway. It is just to dangerous.

I would think there would be no doubt in the Legislature's mind that Dutch Habor needs a new runway. So, if I was the Legislature I would take a hard look at this one. I would think the money would be wisely spent.

Sincerely,

M E Meyer

Captain Marvin Meyer
In Charge of Alaska Air Operations

MEM:mak

cc: Dave Harbour
Dick Knowles

APPENDIX A

UNALASKA AIRPORT RUNWAY EXTENSION
LETTERS OF SUPPORT

PLEASE NOTE: THE FOLLOWING PAGES WERE TREATED AS A UNIT IN THE ORIGINAL DOCUMENT

CITY OF UNALASKA

RUNWAY EXTENSION AND IMPROVEMENT PUBLIC MEETING

BACKGROUND INFORMATION

Regional and Commercial Setting

Strategicially situated, the City of Unalaska and it's associated port at Dutch Harbor serves a broad area of the North Pacific, Bering Sea and Aleutian Chain in the capacity of a service center, staging area and communications/transportation hub. The geographic significance of Unalaska's location was first recognized in WW II when Unalaska served as a headquarters for the Aleutian Campaign. The rapid expansion and growth of the crab fishery in the late 1960's and 1970's resulted in Unalaska becoming one of the leading ports in the nation in terms of dollar value of product processed. Yet, the level of activity at Unalaska is destined to increase further. The emergence of the white fish industry as an American-based fishery, which is predominantly a Bering Sea resource, will amplify greatly the need for services and transportation at Unalaska. Finally, two of the scheduled Federal oil and gas lease sales in the Bering Sea, Navarin Basin and St. George Basin, will probably be served with a base of operations at Unalaska (See Appendix A).

The importance of Unalaska as a service center for the Aleutians and the prospective resource development in the region is accentuated in view of the very limited alternatives available. Unalaska is the only organized municipality

southwest of King Cove and Sandpoint with an administrative and fiscal capacity to provide the necessary community infastructure the new industries will require. Unalaska possesses the only deep water port with convienent access to both the Bering Sea and North Pacific as well as containerized vessel capabilities, as is evident by the large number of vessels, processors, and shipping lines which utilize Unalaska as a port. These facts portend a dramatic future for Unalaska in light of anticipated economic activities. This future was quantified in terms of probable airfrieght and passagenger loads in a recent report by Kramer Chin & Mayo, Inc. and TAP, Inc (See Appendix C).

Runway Deficiencies

Dampening the opportunity and reliability of Unalaska to service these existing, emerging and potential industries is the deficiencies of the state-operated airport that is grossly inadequate by modern air transportation standards. Because there are limited opportunites to locate a service center elsewhere given the sparse population and rugged topography of the Aleutians, the Unalaska airport continues to be utilized in spite of the deficient facility. This reliance is especially significant in view of the absence of marine-based passenger transportation service to Unalaska. The aircraft operational limitations of the airport include runway length, runway width and lack of certain navigation aids. The current runway is approximatly 4000 feet in length with a usable width of 100 feet. The runway is surfaced with crushed gravel. The runway is unlighted and navigational aids are limited to an NDB (Non-directional radio beacon) and DME (distance measuring equipment). The absence of runway lighting and more sophisticated navigation aids, in concert with the presence of abrupt mountainous terrain immediatly adjacant to the runway necessitate that all

aircraft operations be conducted under VFR (visual flight rules). Use of the runway is limited to daylight hours and visibility from a distance of six nautical miles when on approach. These restrictions are significant in consideration of limited winter daylight and the notorious weather in the Aleutians. In comparison, Juneau's International Airport requires only two miles visibility and a 1000-foot ceiling for either day or night operations.

Severe limitations exist on the type of aircraft that can use the facility due to the shortness of the runway, the restrictive side clearances and the absence of naviagational aids. Reeve Aleutian generally operates YS-11 aircraft (twin turbo-prop engines) into the facility. Larger aircraft only infrequently operate in and out of the airport due to the limitations. Neither the Boeing 727 or 737 aircraft can economically use the runway. These two aircraft are the primary models employed in the Alaska intrastate and interstate commercial air carrier industry.

Runway Improvement

In response to these noted deficiencies the Alaska Department of Transportation and Public Facilities, Division of Aviation Design and Construction sponsored an investigation to assess the feasibility of contructing a 2500-foot extension to the 4000-foot runway at Unalaska Airport. The report, prepared by Dames and Moore, Anchorage, identifies four alternative construction options, each with different design configurations, materials and resulting costs. All options are based upon a 2500-foot extension from the northwest end of the runway. The presence of an existing road and harbor facilities at the southeast end preclude extension in this direction. The findings of this report were published in a

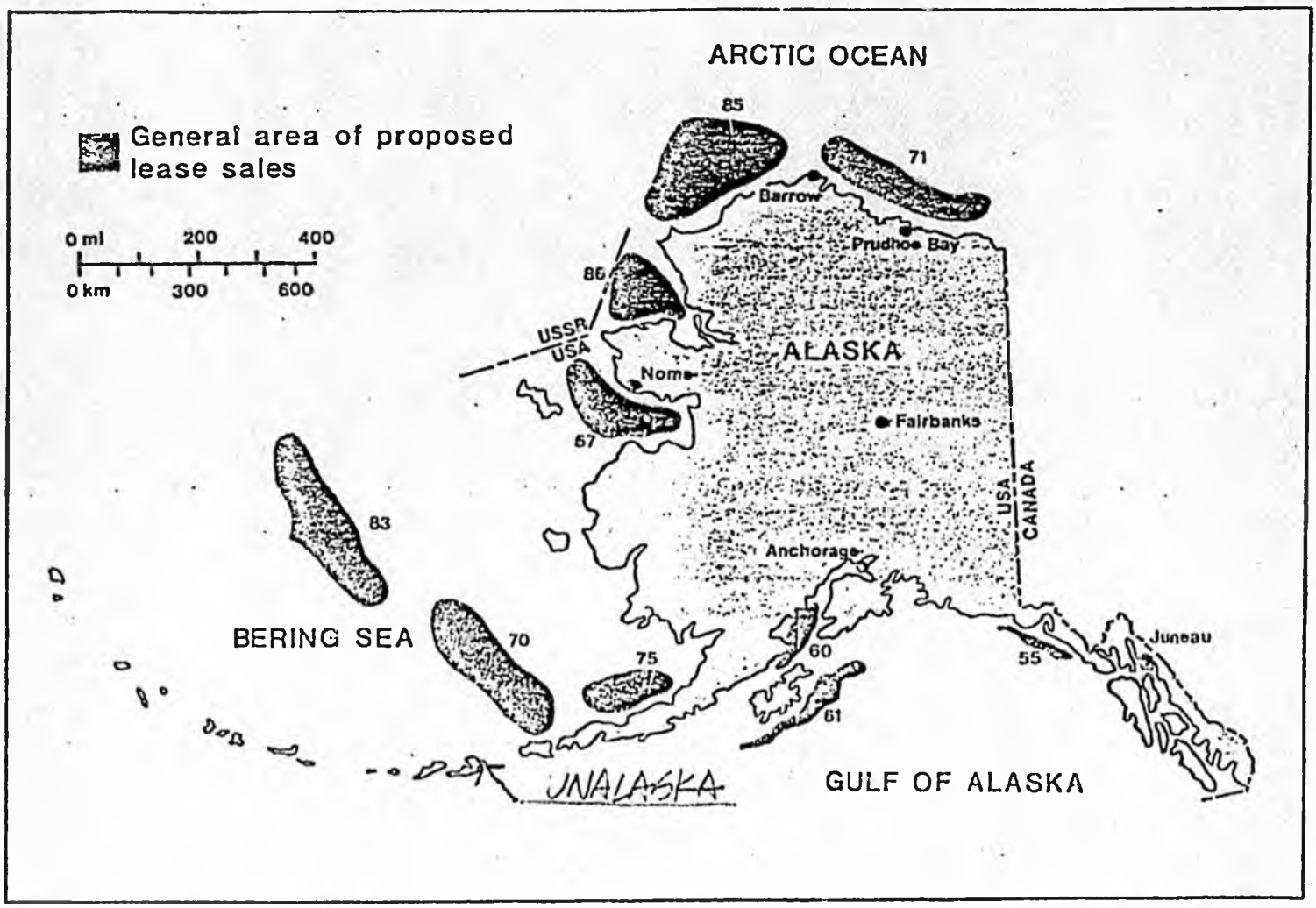
report titled "Offshore Runway Extension at Unalaska Airport, Alaska," September, 1980. Excerpts of this report are attached (See Appendix B).

Meeting Objectives

The purpose of this meeting is to further document the need for the runway extension and improvements. Business and Industry representatives from the air and marine transportation, commercial fishing, oil and gas and other private sector activities have been invited to speak to the need for, and potential benefits of improvements to the runway. Additionally, governmental representatives which would benefit from or have responibility for the improvement have been invited. It is hoped that individuals will take the opportunity to speak to the importance of this project from the standpoint of their company or governmental point-of-view. After lunch the meeting will break into a number of groups each focusing on a different aspect of the importance of the runway with the purpose of identifying a statement of support and benefits that pertain to the runway improvements from the particular industry or governmental activity. Following this, a general meeting will continue with the objective of summarizing the findings of the day including the findings of each group. A written summary of the meeting will be prepared and provided to the Legislature and appropiate government officials in support of funding requests.

APPENDIX A

OIL & GAS LEASE SALES - BERING SEA



-Areas proposed for lease in Alaska, 1980-1985 (adapted from Benton, McDowell, and Conner, 1979; BLM, 1980a; and U.S. Department of the Interior, 1980 by Rogers, Golden & Halpern, 1980).

ALASKA LEASING SCHEDULES

YEAR	STATE SALE No.	STATE DATE	STATE AREA	FEDERAL SALE No.	FEDERAL DATE	FEDERAL AREA
1981	33	2nd Qtr	Upper Cook Inlet (onshore & offshore, including the Susitna Valley)			
	32	3rd Qtr	Cook Inlet south of Kenai River (exempt acreage sale)	60	9/81	Lower Cook Inlet
					12/81	NPR-A
1982	35	1st Qtr	Lower Cook Inlet (offshore & onshore)			
	34*	2nd Qtr	Prudhoe Bay Uplands			
	36*	2nd Qtr	2nd Beaufort Sea (submerged lands)			
	37	3rd Qtr	Middle Tanana Basin and Copper River Basin	57	9/82	Norton Basin
				70	12/82	St. George Basin
1983	38	1st Qtr	Norton Basin	71	2/83	Beaufort Sea
	39	2nd Qtr	3rd Beaufort Sea	61	4/83	Kodiak Shelf
	40	3rd Qtr	2nd Upper Cook Inlet (offshore & onshore, including the Susitna Valley)	75	10/83	North Aleution Shelf
1984	41	1st Qtr	SW Bristol Bay Uplands			
	42	2nd Qtr	Minchumina Basin			
	43	3rd Qtr	4th Beaufort Sea	83	12/84	Navarin Basin
1985**	44	1st Qtr	Chukchi (nearshore & onshore)***	85	2/85	Chukchi Sea***
	45	2nd Qtr	Hope Basin	86	5/85	Hope Basin
	46	3rd Qtr	Holitna Basin			

---

* Same day Sales

** 1981 additions to the State 5-year lease schedule

*** The holding of the Chukchi Sales at this time is contingent upon a reasonable assumption that technology will be available for exploration and development in the lease sale area.

APPENDIX B

Exerpts of Report

by

Dames & Moore

"Off-shore Runway Extension at Unalaska Airport, Alaska"

EXECUTIVE SUMMARY

The Alaska Division of Aviation Design and Construction (ADA) is assessing the feasibility of constructing a 2500-foot runway extension to the 4000-foot runway at Unalaska Airport. Phase I results of a multidisciplinary study to investigate the site and ocean conditions, prepare preliminary designs, and estimate construction costs are contained in this report. If the project is determined to be feasible, Phase II studies will involve final design. Suggestions regarding important final design investigations are included in this report.

Results of this study incorporate underwater geological, geophysical, oceanographic, marine biological, and quarry investigations at the site, and engineering analyses incorporating laboratory rock testing, earthquake and tsunami studies, and computer analysis of slope stabilities. These investigations were integrated into an iterative design process, which considered the proposed structure's durability, construction methods, and estimated costs. Our design studies evaluated several alternative design concepts before selecting one for detailed cost estimates.

Throughout the design process we simultaneously considered the stability of the structure to waves and earthquakes, the construction conditions at this challenging site, and the associated costs. Although it was determined that the offshore site could experience severe wave attack, the existing data do not permit a very accurate refinement of the design wave criteria. Further, limitations on the locally available armor stone had to be considered. However, we believe that the selected design concept, a "benched-slope" embankment, represents both a cost-effective, and wave-resistent structure.

Our design and cost evaluation studies identified four construction options, each with different wave protection configurations, materials, and estimated costs. It will be necessary to conduct physical modelling tests to make an informed decision on stability/cost tradeoffs among these four cases.

INTRODUCTION

The Alaska Division of Aviation Design and Construction (ADA) desires to improve air service to the Unalaska area by upgrading the airport runway. The area is projected to become a major processing center for Alaska's developing bottomfish fishery. The geography of the airport facilities on Amaknak Island requires that any extension of the airstrip be towards the northwest into the ocean (Figure 1). Thus, major considerations are the design and cost to construct an offshore runway extension.

This study responds to ADA's Phase I feasibility evaluation and presents a set of preliminary designs, recommendations, and associated cost estimates. Phase II will involve detailed design of the facility.

In developing our conclusions, investigations were performed in the field and laboratory and by analytical methods. These included offshore and underwater surveys, quarry investigations, and evaluations of design events (waves, earthquakes, tsunamis), all in support of the actual design studies. Our results, conclusions, and recommendations are presented in the body of this report. Details of the investigations are included as appendices.

PURPOSE AND OBJECTIVE

The primary purpose of this study is to develop suitable and adequate information upon which to base preliminary engineering designs. These designs must withstand the considerable natural forces that impinge on this offshore site. Because the final design must consider the extent of risk of damage acceptable to ADA, our findings are presented in a format intended to assist ADA in their own evaluation and determination.

Based on the results of our investigations and preliminary design recommendations, our objective is to prepare a construction cost estimate. This estimate includes all major aspects of the proposed runway extension (quarrying, haul road, rockfill embankment, wave protection, and pavement)

We believe our estimated construction costs are suitable for assessing project feasibility; that is, these preliminary designs can be installed at this remote site for approximately the costs indicated (1981 base). The four cases and their associated costs are:

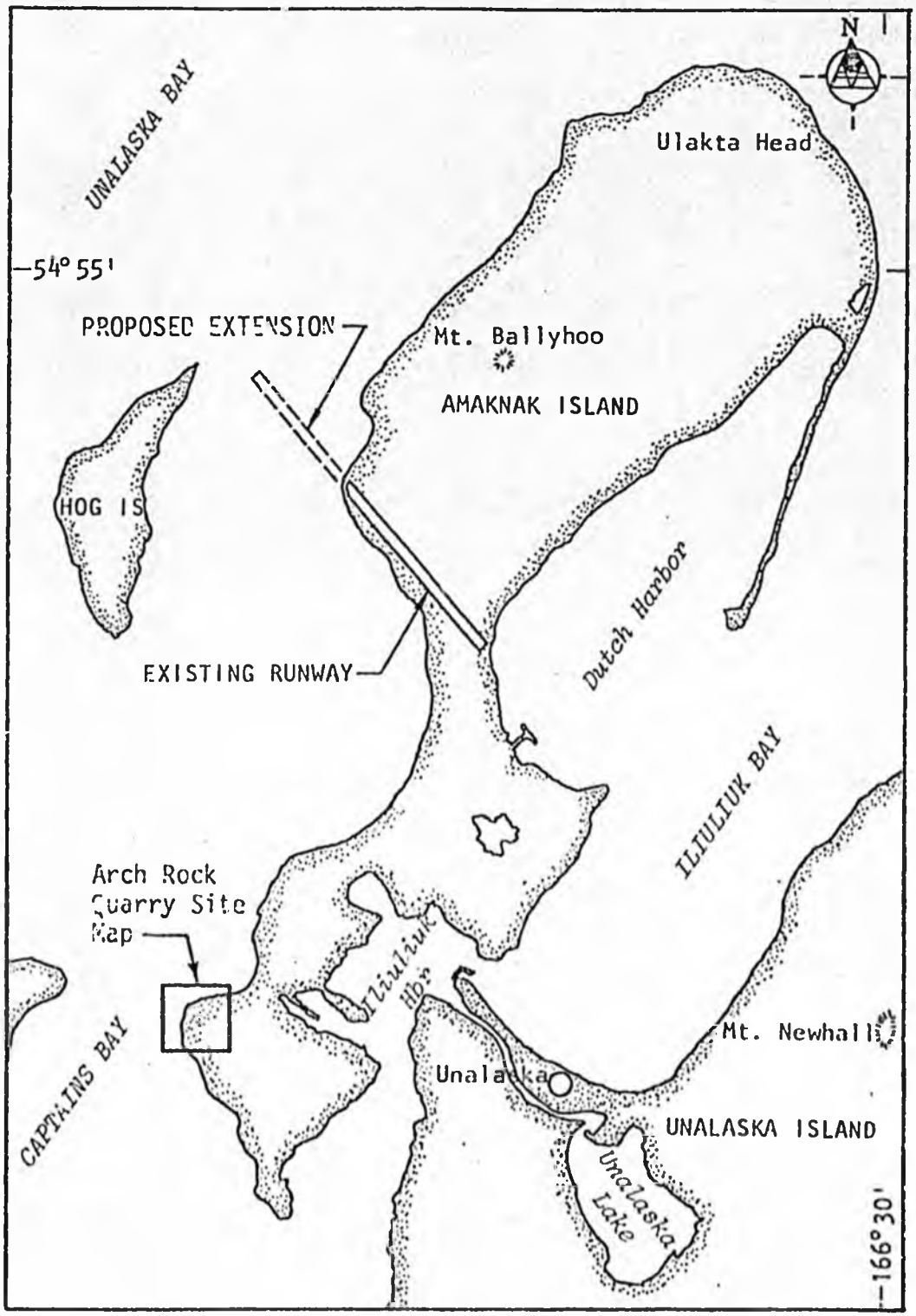
	Construction Options		
Case Designation	Marine Construction Techniques Needed	Add Concrete Wave Armor	Cost to Construct ($ Million)
Ar	Yes	No	33.7
Ac	Yes	Yes	37.6
Br	No	No	31.3
Bc	No	Yes	36.0

These costs are for construction activities only; contractual factors must be added to estimate total project cost. These highly variable factors include contractor's profit and bond, and any royalities to be paid to the quarry landowner. ADA's technical and administrative costs, also must be included. We estimate contractual costs for this project would be 20 - 25 percent of the construction cost.

Construction could be divided into smaller cost increments by building the extension in two or more length segments. The costs of the offshore extension may suggest that some variations, alternatives, or other refinements (alignments, orientations, lengths) be given further consideration.

Because the limited site wave data do not permit a refined evaluation of the design wave criterion, generally conservative (safer) assumptions have been incorporated into our design analysis. On-site wave measurements and physical modelling are recommended to assess this conservatism and to test the final design concept.

The actual results of such wave measurements and model tests cannot be predicted, but we anticipate that such investigations would reduce the above estimated costs by as much as several million dollars.



VICINITY MAP

0 3000

Scale in feet

nt Patterns

DAMES & MOORE

Figure 1

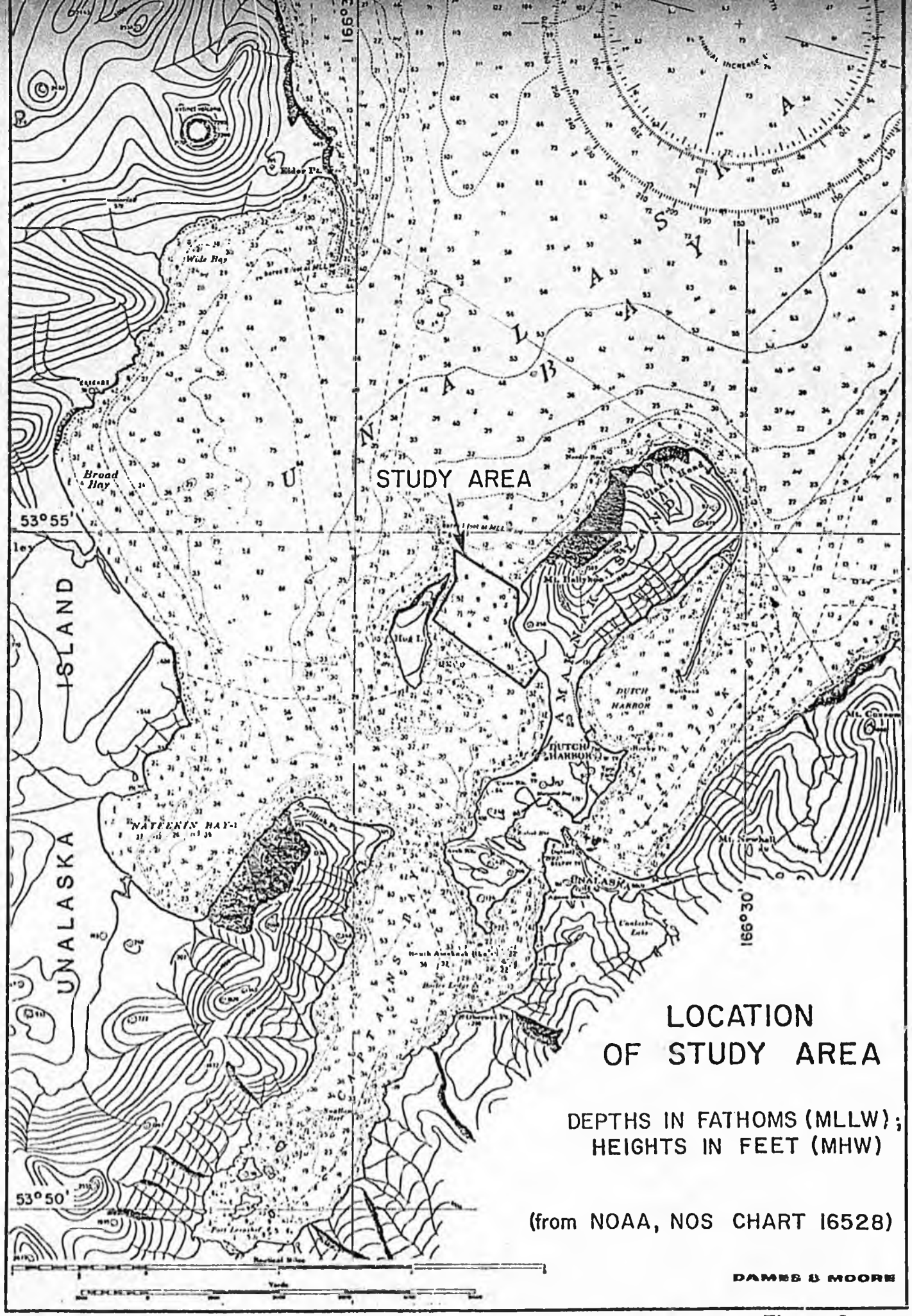
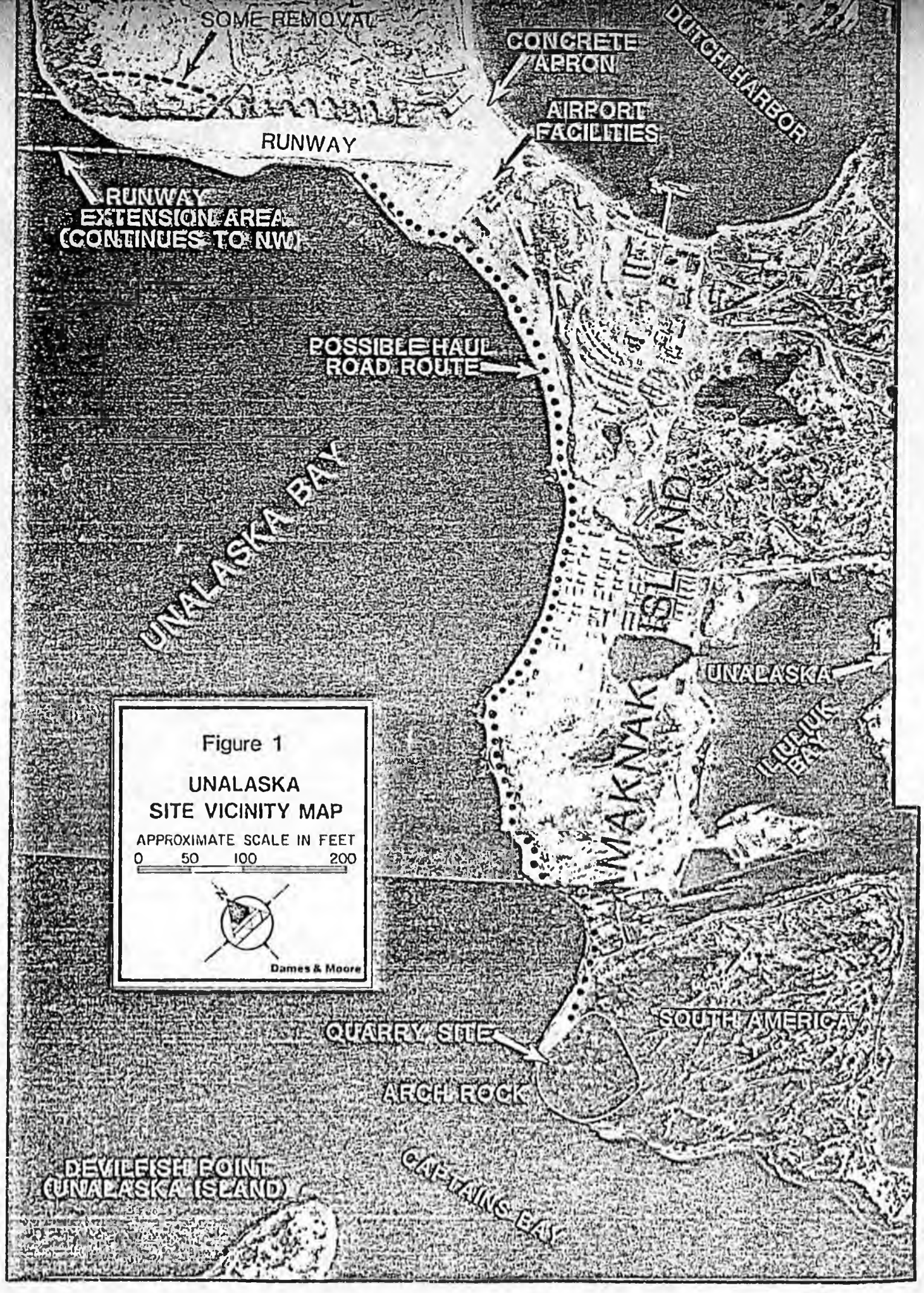

STUDY AREA
UNALASKA ISLAND
Broad Bay
Wide Bay
Eider Pt.
NATEEKIN BAY
DUTCH HARBOR
UNALASKA
Mt. Ballyhoo
Mt. Cannon
Mt. Newhall
53°55'
53°50'
166°30'
LOCATION
OF STUDY AREA
DEPTHS IN FATHOMS (MLLW);
HEIGHTS IN FEET (MHW)
(from NOAA, NOS CHART 16528)
DAMES & MOORE

Figure 2


SOME REMOVAL
CONCRETE APRON
DUTCH HARBOR
AIRPORT FACILITIES
RUNWAY
RUNWAY EXTENSION AREA (CONTINUES TO NW)
POSSIBLE HAUL ROAD ROUTE
UNALASKA BAY
MAKNAK
UNALASKA
QUARRY SITE
SOUTH AMERICA
ARCH ROCK
DEVILFISH POINT (UNALASKA ISLAND)
CAPTAINS BAY
Figure 1
UNALASKA
SITE VICINITY MAP
APPROXIMATE SCALE IN FEET
0 50 100 200
Dames & Moore

and reflects the construction considerations for this remote location. This cost estimate will assist ADA in assessing the feasibility of constructing the proposed runway extension at Unalaska.

ORGANIZATION OF STUDY

A multidisciplinary team of Dames & Moore technical specialists was organized to address the various issues required to meet the objective of this study. The work was identified as several tasks for field investigations, laboratory and analytical evaluations, and finally engineering and designing studies. The details of the study tasks and their results are reported by the principal investigators as appendices to this report.

During the course of this study, there was a shift to greater emphasis on the considerable design-related problems identified during the earlier stages. This resulted in an increased level of effort by the study team in an iterative designing process, and the addition of a Technical Review Board composed of prominent coastal engineers.

This study is the result of a team effort by the following Dames & Moore engineers and scientists:

- D. Clark - Quarry Investigations
- N. Donovan - Seismic Criteria
- W. Driskell - Marine Biology
- L. E. Fausak - Marine Geology/Oceanography
- D. F. Jones - Project Management/Coastal Engineering
- D. F. Laneiwicz - Marine Geophysics
- D. C. Lees - Marine Biology
- J. T. Moore - Coastal Engineering
- L. L. Morrison - Geology/Quarry Investigations/Geotechnical
- C. I. Rauw - Tsunamis
- K. W. Tsai - Geotechnical Analysis
- J. C. Wilson - Principal-in-Charge/Design Studies/Cost Estimating

and outside consultants:

- W. F. Baird – Coastal Engineering
- L. F. de Stwolinski – Construction Cost Estimating
- B. Edge – Coastal Engineering
- C. E. McHuron – Engineering and Quarry Geology
- C. K. Sollitt – Coastal Engineering

PROPOSED CONSTRUCTION

The proposed construction would lengthen and surface the Unalaska airstrip to accommodate larger jet aircraft. Three extension lengths were initially considered: 1000-foot, 2500-foot, and 4000-foot, the latter spanning the strait to Hog Island. This study focuses on the 2500-foot extension, although some conclusions regarding a 1000-foot extension also are presented. Brief consideration was also given to alternative 6500-foot runway alignments.

The proposed offshore extension is a rockfill structure protruding out to a depth of about 55 feet (MLLW). The paved runway surface is to be 100 feet wide, which will require a usable level strip 300 feet wide. The sides and head (offshore end) of the structure must be protected from wave attack by suitable armor stone or concrete shapes. Crest elevation will be about +30 feet contingent on tides, storm water levels, and wave runup (which depends on side slope and materials). Wave overtopping must be negligible or entirely prevented to protect the pavement. The improvements must provide acceptable airspace clearance for larger aircraft. Discussions with ADA emphasized that the structure also should require minimum maintenance because of the cost of providing such services in a remote location.

Rockfill material and armor stone are to be produced from local sources. Initially, the hill immediately north of the existing runway was proposed as a quarry source. Part of this hill must be removed to provide adequate airspace clearance associated with the runway improvement. (Cutting back a portion of this hill and wasting it north of the extension will not be a significant effort using the equipment available for the embankment construction.) However, our early site reconnaissance determined that the rock materials comprising this hill would not produce armor-quality stone or good fill material. Therefore, we conducted an exploration for potential quarry sites. Of several candidate sites, the one at Arch Rock on Amaknak Island was selected for detailed mapping and drilling and proved to offer some of the best rock in the area. Development of this quarry site, which is close to the airstrip, will permit overland transport of rock materials along a 2-mile haul road.

SITE CHARACTERISTICS AND DESIGN CONSIDERATIONS

GENERAL SETTING

The community of Unalaska is located on Unalaska Bay in the eastern Aleutian Islands (Figure 2). The town of Unalaska, industrial (mainly fisheries) improvements, and airport facilities surround Iliuliuk Bay. Dutch Harbor and the airport are on Amaknak Island (Figure 1).

The airstrip runs NW-SE across the island, immediately south of Mount Ballyhoo. Its length is 4000 feet and usable width about 100 feet. Crushed gravel is used as surface material except for a concrete apron approximately 1000 by 400 feet setting obliquely to the centerline on the southeast end. Several former military buildings, including the terminal used by Reeve Aleutian Airlines, sit along the apron. The northwest end of the runway fronts Unalaska Bay and is unprotected. According to the terminal manager for Reeves, that end of the airport is flooded by waves each year.

The north side of the airport has been partially excavated from the adjacent hillside. On the northwest end, a steep bluff lies immediately adjacent to the runway; toward the southeast, a series of scallops have been cut into the slope. These originally functioned as parking spaces, and some are still used for that reason. They also provide some protection from winds prevalent on Amaknak Island.

Because of the 1800-foot high mountains and existing harbor facilities to the southeast, the airport extension must run northwestward into the ocean. This seafloor area is shallow relative to the surrounding underwater area and forms a sill (underwater saddle ridge) connecting Amaknak and Hog Islands.

Weather conditions are a major consideration in selecting construction methods and equipment, and in planning construction schedules. Good weather is the exception in the Bering Sea and wind shifts are both frequent and

rapid. Storms are almost continuous during the winter. Major storm tracks follow a trajectory that roughly parallels the Aleutian Island chain with storm centers passing both north and south of the Unalaska area.

SEAFLOOR CONDITIONS

The seafloor is smooth over most of the outer extension area below about 35 feet deep and consists of sand and gravel sediments within a broad dish-shaped 10-foot depression enclosing a maximum depth of almost 60 feet (see bathymetric chart in pocket). Underwater geologic observations and marine geophysical surveys strongly suggest that the coarse sediments are thin deposits overlying bedrock material (however, drilling would be required to confirm this interpretation). Large boulders occur over the shallower narrow shelf of the nearshore portion (Appendix A).

Overall, the seafloor conditions, while somewhat deep, are favorable for the proposed construction. Slopes are slight and towards the structure, sediments are coarse and thin, and the seafloor is free of prominent irregularities.

OCEAN CONDITIONS

Tidal fluctuations are usually only 3 - 4 feet and do not appear to drive circulation at the site. Current measurements yielded generally low speeds, averaging about 1/4 knot, and their directions and speeds do not show any clear pattern (Appendix B). The low currents between Amaknak and Hog Islands and coarse seafloor sediments appear to preclude any scour problems caused by construction of the extension.

Large storm-generated waves can impinge on the proposed structure, especially from the northern octant. Our design wave studies included collection of the limited wave data (insufficient for engineering purposes), three independent wave hindcasts, and computer analysis of wave refraction from the deep sea shoreward to the site (Appendix G). These studies concluded that unattenuated deepwater waves of 24-30 feet could reach the

site with frequency of occurrence of 1-in-50 to 1-in-100 years. We found these storm-generated waves will be the controlling design criterion, overriding earthquakes and tsunamis.

EARTHQUAKES AND TSUNAMIS

Although our detailed study showed that the site could be susceptible to a catastrophic tsunami, the historical record suggests this possibility is too rare to include as a design condition (Appendix F). However, the potential for a large seismic event affecting the Unalaska site is great. Our study found that 17 earthquakes of magnitude 6 or greater have occurred within 60 miles (100 km) of the site during the 60-year period of record. A vertical acceleration of 25%g was selected as the seismic design criterion (Appendix E). The return period for this event is similar to the design wave, between 1-in-50 and 1-in-100 years. A 40%g safety criterion (about 1-in-400 years) was used to analyze the geotechnical stability of the embankment (Appendix I).

MARINE BIOLOGY

A marine biological investigation (Appendix C) was conducted to assess ecological or environmental conditions that would influence project design or costs. No sensitive, endangered, or unique commercial or threatened species were encountered in the site vicinity. The most direct environmental impact would be the habitat alterations caused by the offshore embankment and the coastal haul road. However, no unique or sensitive species or habitat will be lost. The main effect will be burial of some existing substrate with a net increase in rocky habitat. Organisms will become re-established in the new habitats after a few seasons.

Alterations in the local circulation caused by the proposed structure could impact a larger area. The extent of changes in current and wave patterns and resultant effects are not possible to forecast at this time. Of primary concern is the cannery effluent discharge area approximately 1-1/2

miles south of the site. Some change in the waste field or reduction in mixing could be experienced.

GEOLOGY AND QUARRY POTENTIAL

The Aleutian Islands are volcanic in origin, usually andesitic. Plutonic and intrusive rocks also occur throughout the site area. Rocks in the vicinity of the site tend to be altered and fractured with several volcanic or intrusive sequences.

The mountain and hills immediately north of the existing runway are comprised of moderately- to highly-altered volcanic rock. This area is unsuitable for armor stone sources and only marginal for rockfill material. Several other localities were inspected as potential quarry sites. Of these sites, Arch Rock was selected for detailed investigation by mapping and rock core drilling. This quarry site proved to provide the best armor stone potential within a reasonable proximity to the construction site. Located on Amaknak Island, it also offers overland transport to the construction site.

The Arch Rock quarry site is composed primarily of massive andesite and competent andesite breccia. Test results indicate this rock will provide good rockfill material. The massive andesite will be the primary producer of armor stone.

The maximum size classification of armor stone will be 20 tons (16 to about 24 tons). Production of this class of stone will control quarry operations and strongly influences both design and construction costs.

SELECTION OF DESIGN CRITERIA

The preceding discussions illustrate the relevant design parameters and their relative importance at the Unalaska site. Selection of magnitudes for these natural forces as the basis for design has significant impact upon the final construction and its costs. This section presents information upon which ADA can select the acceptable risk level to be incorporated into the final design.

In order to proceed to a specific construction cost estimate we have made a preliminary selection of design parameter values. Should ADA choose more or less conservative criteria, the cost estimate should be adjusted accordingly.

Calculation of all variations in tradeoffs between design criteria (accepted level of risk of damage) and costs would be inappropriate at this preliminary stage. Rather, we have attempted to provide the benefit of our judgement, gained from our detailed studies of the many unique site conditions, for ADA's consideration regarding the feasibility of this project. Although we have made relatively specific conclusions as a result of our study, there is in reality a broader range of possible solutions.

DESIGN PARAMETERS

All site-specific data available at the time of this study have been incorporated into our analyses. In addition, we have developed a considerable body of new data relevant to this site's design problems. These are summarized in the preceding section and presented in detail in the various appendices.

Of all the considerable natural forces to be considered in designing an offshore rockfill structure at this site, the potential storm wave attack clearly dominates. Even the formidable Aleutian earthquake climate, and its associated water wave, the tsunami, are of lesser design significance than

the possible Bering Sea waves from the north. Yet data on storm waves is limited for design purposes; in fact, wave data had to be supplemented using wave hindcasting techniques.

Other site design parameters (seafloor conditions, ocean currents, quarry sources, and environmental impacts) all appear to range from manageable to quite favorable. Of these, a source for larger armor stone or shallower site depths might mitigate the wave protection problem; but given the overall conditions found in our study, waves would remain the paramount consideration.

CONTROLLING NATURAL FORCE: WAVE CRITERIA

In the absence of adequate wave data, hindcast analyses were performed to select design waves. These analyses are presented in Appendix G, which also includes a discussion of the unknowns and accuracy of this technique. Based on interpretation of our hindcast studies, we have selected the following values for significant wave heights, H_S, and their associated return periods.

	H_S (feet)	
Return-Period	From Extremal Distribution Model	With Allowance for Accuracy of Data Base
50-Year	22.5	26
100-Year	24.5	28

As explained in the following section and in Appendix G, we have used the conservative 28-foot H_S in our design analysis. We further recommend that measurements of actual wave conditions at the site be made before design is finalized. This would reduce much uncertainty in the design wave criteria, and could reduce estimated costs significantly.

DESIGN CONCEPTS

APPROACH

At the outset of this study it was assumed that a conventional "rubble-mound" coastal structure would provide a sufficient runway extension. However, early results from our design wave studies, combined with the quarry investigation data, suggested that more challenging design issues must be faced. The problem became that of finding a resistant design concept that maximizes use of the local rock materials, can be constructed using fairly standard construction methods and equipment, and incorporates a prudent standard of safety. For instance, the Arch Rock quarry appears quite good, but potentially large waves dominate the available armor stone. Requirements for marine construction equipment and methods should be minimized or eliminated to reduce costs. In addition, despite the lack of specific wave data, indications of large waves call for some conservative design assumptions.

The design study, as described in detail in Appendix H, has as its major elements:

1. Selection of design wave criteria;

2. Development of several alternative design concepts;

3. Review of these alternatives by our study team, and an independent Technical Review Board(1); and

4. Development of a "hybrid" preliminary design based on the reviews.

---

(1) The Technical Review Board was comprised of three independent coastal engineering specialists prominent in their field: Dr. W.F. Baird of Hydrotechnology, Ltd., Ottawa, Ontario; Dr. B. Edge of Clemsen University, Clemson, S.C.; and Dr. C.K. Sollitt of Oregon State University, Corvallis, OR.

ALTERNATIVE CONCEPTS

Four alternative "rubble-mound" concepts were designed and cost-estimated for the review process. These were selected following initial assessments of: a) more conventional embankment structures, which were found to be unable to withstand site wave criteria; and b) other design concepts, such as pile- or cassion-supported runways or concrete structures, which were shown to be much more expensive alternatives.

The four rockfill embankment alternatives varied in wave protection measures, and overall configuration. Basically, their characteristics were:

1. Rubble-mound design based on the standard methods of the Shore Protection Manual (U.S. Army, 1977). This design requires very flat slopes for stability and demands extensive marine construction and extreme rock quantities.

2. Adding concrete shapes (45-ton dolosse) at the head of the structure to reduce required slope and quantities. The use of dolosse is questioned in the face of recent failures.

3. Further reducing quantities by adding "placed" armor stone along the trunk of the structure. The stone available from the Arch Rock quarry will not yield the shape required to provide the extra stability inherent in the "placed" stone technique (Sollitt and Debok, 1976).

4. A traditional rubble-mound design protected by a submerged breakwater offshore. This design showed promise, but there are substantial design unknowns associated with this untried concept.

Following evaluations of these four alternatives by the study team and technical review board, a "hybrid" concept was devised: a benched slope. This configuration has a shelf extending seaward that will cause large waves to break and dissipate prior to reaching the embankment slope below the runway.

PRELIMINARY DESIGN

The benched-slope concept is the preliminary design used for construction cost estimating. During the iterative design review process, the variations in configuration and construction of this concept were evaluated. The study team concluded that the concept could be constructed as:

Plan A: A basic design with standard wave protection components requiring some (minimized) marine construction, or

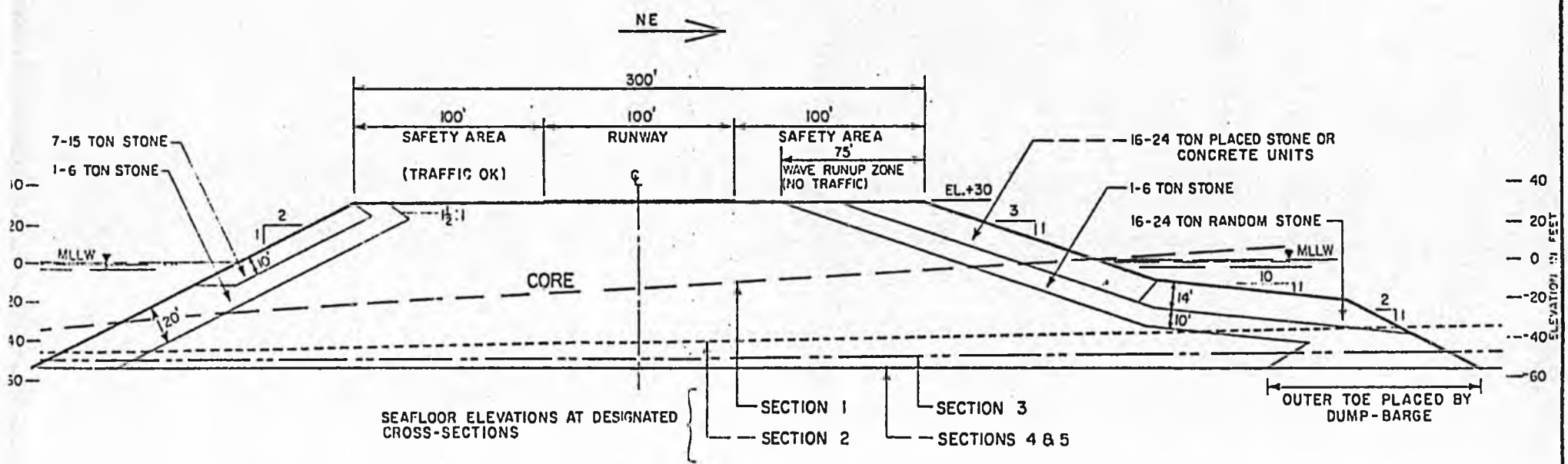
Plan B: A variation that could be constructed without marine equipment (at some cost savings) and especially mandates model testing of the adequacy of its wave protection characteristics.

Marine construction methods require more expensive equipment and operations than land-based construction. In addition, the greater risk and susceptibility to delays increase contingencies that must be incorporated into construction costs. Therefore, we sought to minimize or eliminate marine construction requirements.

CONFIGURATIONS AND WAVE PROTECTION

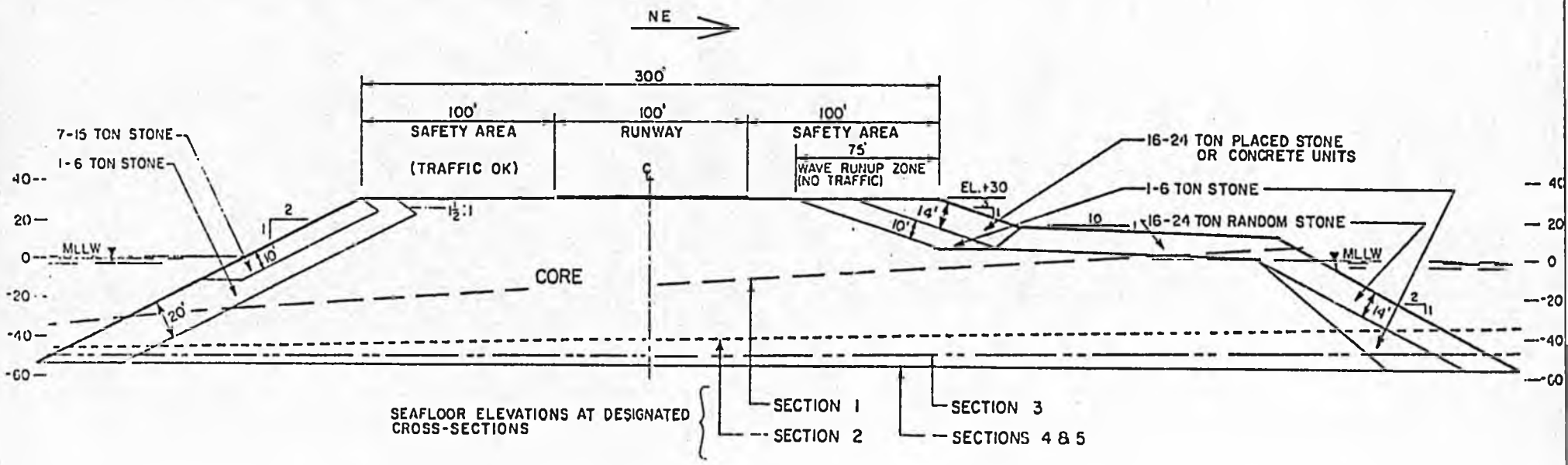
Plan A configuration (Figure 3), has a submerged bench extending about 100 feet seaward of the runway embankment from a depth of 10 - 20 feet. This bench would intercept larger waves and cause them to loose force by shoaling or breaking before reaching the runway embankment. Although the proposed configuration minimizes costly marine construction methods, some marine construction must be employed to build the outer bench and the slope.

Plan B (Figure 4) has a similar bench extended just above sea level to permit land-based construction equipment access to build the outer toe slope. The outer bench and slope in this plan must resist the full force of



PLAN A
TYPICAL CROSS SECTION - PROPOSED BENCHED-SLOPE DESIGN CONCEPT

NOTE:
PLAN A REQUIRES SOME MARINE CONSTRUCTION
PLAN B DOES NOT REQUIRE MARINE CONSTRUCTION



PLAN B

TYPICAL CROSS SECTION - PROPOSED BENCHED-SLOPE DESIGN CONCEPT

NOTE:

PLAN A REQUIRES SOME MARINE CONSTRUCTION

PLAN B DOES NOT REQUIRE MARINE CONSTRUCTION

DAMES & MOORE

Figure 4

all waves, and endure breaking and overtopping by the larger waves. However, minor failures and displacements at the outer bench would not affect the runway embankment. Runup from large waves would be dissipated over the elevated bench and embankment slope. This configuration, which might have to allow some level of sacrificial failure to protect the main facility under severe wave loading conditions, must be tested by physical modelling.

GEOTECHNICAL STABILITY

Geotechnical stability characteristics of this structure were analyzed (Appendix I) and it was concluded that the slope and settlement behavior during severe earthquake loadings was satisfactory.

CONSTRUCTION MATERIALS

The available local armor stone (maximum size 16 - 24 ton) could be augmented by installation of concrete armor units. Actual need for such units, their size, and coverage over the structure, would depend upon modelling results.

A 2500-foot extension using the preliminary design dimensions shown will require 3.0 - 3.2 million cubic yards of rockfill and armor stone.

AVIATION CONSIDERATIONS

A minimum width of 300 feet is needed to provide 100-foot "runway safety areas" on both sides of the 100-foot paved airstrip. Included within one safety area is a 75-foot "wave runup zone" over the upper edge of the armor stone layer along the northeast side. The surface of the wave runup zone would be composed of a smooth layer of rock and gravel covering the armor stone. This surface would not be suitable for aircraft or vehicle traffic and would require some routine maintenance, similar to that for a gravel runway. Should wave overtopping occur, extensive maintenance could be required. The alternative to this maintenance would be to widen the embankment.

Other aviation considerations, such as airspace, meteorological and aircraft operations factors, have not been assessed in detail because of the predominance of the offshore construction in determining project costs. In order to proceed to final design with the marine extension, these factors must be evaluated further. The cost of the offshore extension also suggests that a feasibility assessment of other airport alternatives may now be appropriate.

CONSTRUCTION COST ESTIMATE

Four construction options were identified as representing the range of estimated construction cost at this preliminary design stage. The principal variables in the four options are Plan A or Plan B construction configuration, and armor stone or concrete armor units. For cost estimating, four cases were defined (Appendix J):

Matrix Identifying Four Estimate Cases

	All Rock	With Concrete
Plan A - Some Marine Construction	Ar	Ac
Plan B - No Marine Construction	Br	Bc

Quantities of construction materials were taken based on the preliminary design description; these are summarized in Table 1.

Detailed estimates of specific construction components were made for such activities as mobilization/demobilization, quarry production, haul road, placement of rockfill, placement of armor stone, casting of concrete units, and runway surfacing. These various components were then combined using the lump sums, unit costs, and production rates (all based on 1981 projected prices) appropriate to each of the four cases (see attachments to Appendix J for details). This resulted in estimates of the total construction-related costs for a 2500-foot extension, summarized below:

Case	Estimated Total Cost to Construct (1981 $)	Approximate Unit Cost (per foot extension) (1981 $)
Ar	33,747,400	13,500
Ac	37,649,550	15,060
Br	31,252,800	12,500
Bc	35,964,650	14,385

TABLE 1

QUANTITY TAKE-OFFS

BENCHED-SLOPE DESIGN CONCEPT

	PLAN A (Some marine construction)		PLAN B (No marine construction)	
	All Rock (Ar)	With Concrete Shapes (Ac)	All Rock (Br)	With Concrete Shapes (Bc)
Concrete Shapes[1]	—	4,270	—	4,270
Armor Stone (tons)				
16 - 24 ton stone	516,000	287,000	516,000	287,000
7 - 15 ton stone	102,000	102,000	102,000	102,000
1 - 6 ton stone	818,000	818,000	818,000	818,000
Total Armor Stone	1,436,000	1,207,000	1,436,000	1,334,000
Quarry Volumes (cubic yards)				
Embankment Rockfill	2,343,000	2,343,000	2,523,000	2,523,000
Total Structure[2]	2,976,000	2,874,000	3,156,000	3,054,000
Waste[3]	1,521,000	—	1,341,000	—
Total Volume Quarried	4,497,000	2,874,000	4,497,000	3,054,000

Footnotes:

1 Assumed 40-ton units and complete coverage.

2 Embankment rockfill and armor.

3 Extra to produce required amount of 16 - 24 ton armor stone at 5% yield.

These costs are for construction activities only. Four principal contract-related factors must be added to the above costs; these are:

- Profit - This highly variable factor could range 10 - 15 percent or higher. We suggest 12 percent for purposes of an estimate.

- Bond - A contractor's bond usually ranges between 0.5 - 1.0 percent of the total contract (including profit). We suggest a figure of 0.75 percent.

- Royalty - Royalities may have to be paid for quarry production, and would be determined from negotiations with the landowning party. These costs might range widely ($0.10 - $0.70 per cubic yard of production).

- Administration, Engineering, Design and Inspection - Allowance for ADA's technical and administrative costs can be estimated using the ASCE Manual of Engineering Practice, No. 45 (1975). For projects of this size ($30 - $40 million), this recommends a range of 4-3/4 percent (average complexity) to 5-3/4 percent (more complex) of construction costs recommended. Five percent is suggested for this project.

A reasonable range for contractual factors for this project is 20 - 25 percent for estimating purposes. Therefore, the total costs associated with construction of a 2500-foot runway extension at Unalaska Airport could range about $35 - $45 million, depending upon the selected construction option and negotiated contracts.

For comparison, we also made a rough estimate for the least-cost extension having the same runway length, width and surfacing. This extension would be constructed by land-based methods using all rock without extra armor stone production and bench. This hypothetical structure's estimated total cost is about $28 - 30 million ($24 million plus contractual factors). Therefore, the

potential for cost reductions with new design information is on the order of several million dollars.

It may be desirable to construct the extension in phases in order to permit smaller funding increments over an extended period. We believe that the best approach to phased construction is to divide the work into increments of extension length. We suggest a 1500-foot interim extension for the first phase construction. Costs for phased construction were estimated using Case Br as an example assuming the phases are in two consecutive years and inflation is 9 percent:

Phase	Length Increment (feet)	Cost to Construct (1981 $ millions)
I	0 - 1500	14.9
II	1500 - 2500	19.6
TOTAL	2500	34.5

For this example, the increase in total cost of a 2500-foot extension, assuming one-year inflation and two mobilizations, is approximately 10 percent.

CONCLUSION

Cost estimates and construction methods have been analyzed throughout the design process, and have been important factors in design decisions. We feel we have identified the most economical approach to building a structure that can withstand the forces at this site. Considering the possible cost reductions that may become evident from further design information, we believe these preliminary costs are suitable for ADA's feasibility assessment.

APPENDIX C

Excerpts from Report

by

Kramer, Chin & Mayo, Inc.

and

TAP, Inc.

"Feasibility Study for a New Air Terminal - Dutch Harbor, Alaska"

AIR FREIGHT AND CARGO

Equally important as the transporting of persons is the transportation of mail, freight and cargo of all types into the Dutch Harbor Airport by air carrier. At present, Reeve Aleutian Airlines has a combination passenger/cargo flight each day six days a week and a separate cargo-only flight. This is being flown by a YS-11 aircraft which is a turbo-prop two-engine aircraft manufactured in Japan. The aircraft is unpressurized but has operated extremely well into Dutch Harbor, given the facility and operational restrictions at that airport. For the year 1980, Table 1 indicates that as much as 134 tons of freight could be delivered at the airport. An equally impressive number of 100 tons of air mail could develop. It is interesting to note that the freight enplaning and deplaning at most airports is fairly equal. This is especially true in a metropolitan area; the further one gets from the manufacturing centers, the more freight is delivered to that location. It is not surprising that the off-load freight and mail at Dutch Harbor should be some 6 times that of the on-loaded freight leaving Dutch Harbor. This situation could be expected to continue throughout the century regardless of the other influences of the airport or the town. It is this large volume of freight which dictates the necessity of a separate air freight building. At the present time one of the Native Corporation-owned buildings is being used for that purpose and this study suggests that it continue to be used for the purpose. The terminal building will have an area dedicated to the receipt and mailing of smaller air freight parcels.

Table 1.

HISTORIC & FORECAST COMPARISON OF
POPULATION/ENPLANEMENTS/AIR CARGO

	Area		Total Cargo			
			Freight–Tons		Air Mail–Tons	
	Population	Enplanements	On	Off	On	Off
HISTORIC						
1977	1,500 e	7,227 a	89.5	N.A.	39	N.A.
1978	2,250 e	8,565 a	65.7	N.A.	40.4	N.A.
1979	3,000 e	11,517 a	67	415	41	445
FORECAST						
1980	5,200	18,000	134	719	100	771
1985	12,000	37,000	310	1,660	230	1,780
1990	16,000	50,000	413	2,213	307	2,372
1995	18,000	60,000	464	2,489	345	2,670
2000	20,000	70,000	516	2,766	384	2966

a = actual

e = estimate

N.A. = not available

Source: TAP, Inc.

PASSENGER ENPLANEMENT

Table 2 of this study, Scheduled Flights Per Day, indicates the forecast enplanements by target years and the average passengers per day for those years. This indicates the number of seats needed per day which in turn either dictates the type of aircraft or the frequency of service each day.

The assumption has been made in this study that the runway will not be improved to the degree that it can accept any larger aircraft until 1985. Therefore, two flights per day with the YS-11 are programmed in this forecast section from 1980 to 1985 and one cargo-only flight per day. This is based on service of 6 days a week.

The passengers per day grow from 58 for the current year to as many as 192 at the end of the century. This number ofspersons leaving Dutch Harbor daily would have great difficulty being accommodated on an aircraft as small as the YS-11. However the use of a larger aircraft is dependent on extension and improvement of the runway.

Certainly there will be peak periods throughout the year based on such things as fishing seasons and other industrial demands as well as possible tourist peaks. Therefore, the airline will be adjusting flights and flight schedules accordingly but for the purpose of space planning, average enplanements only have been utilized.

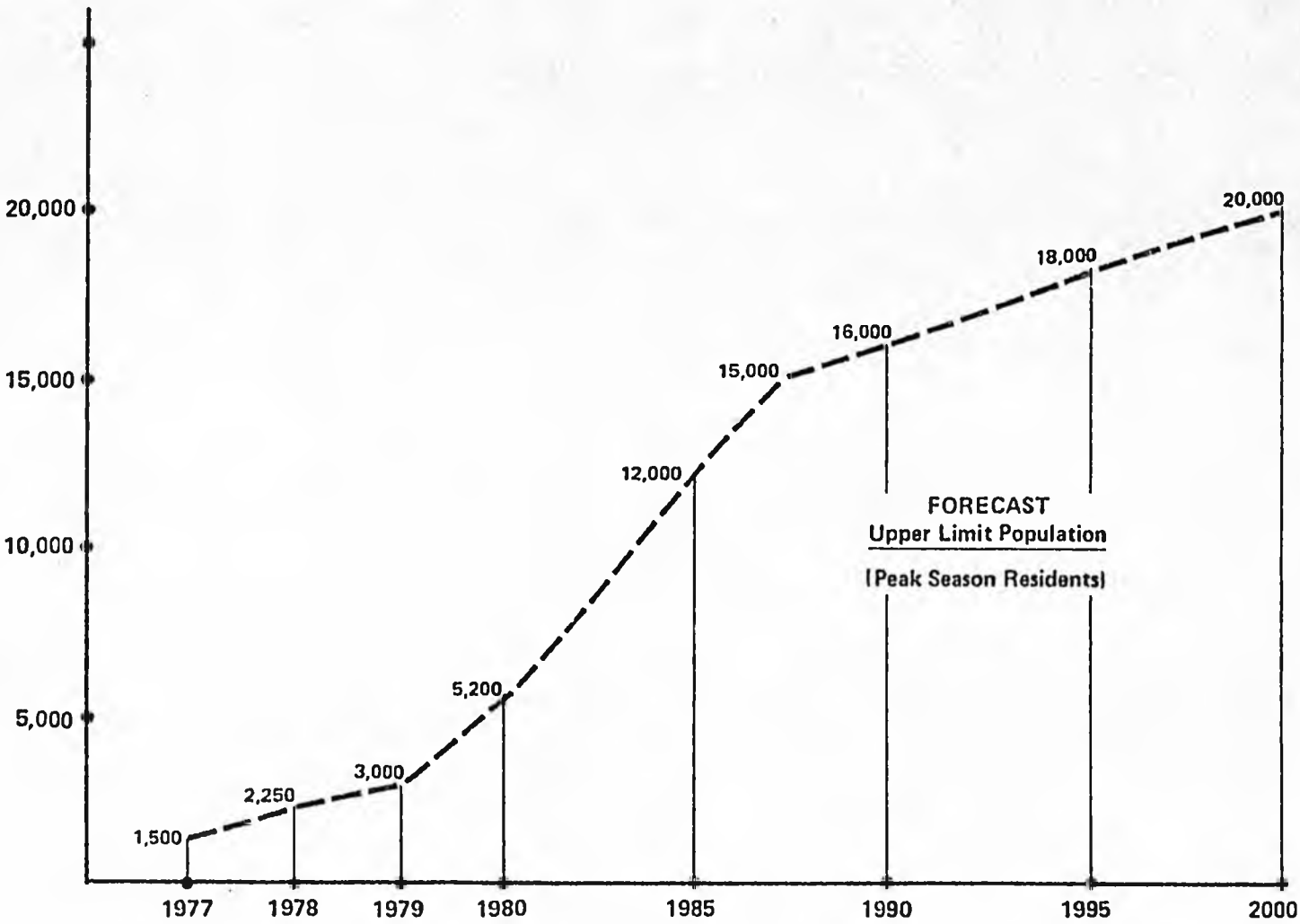


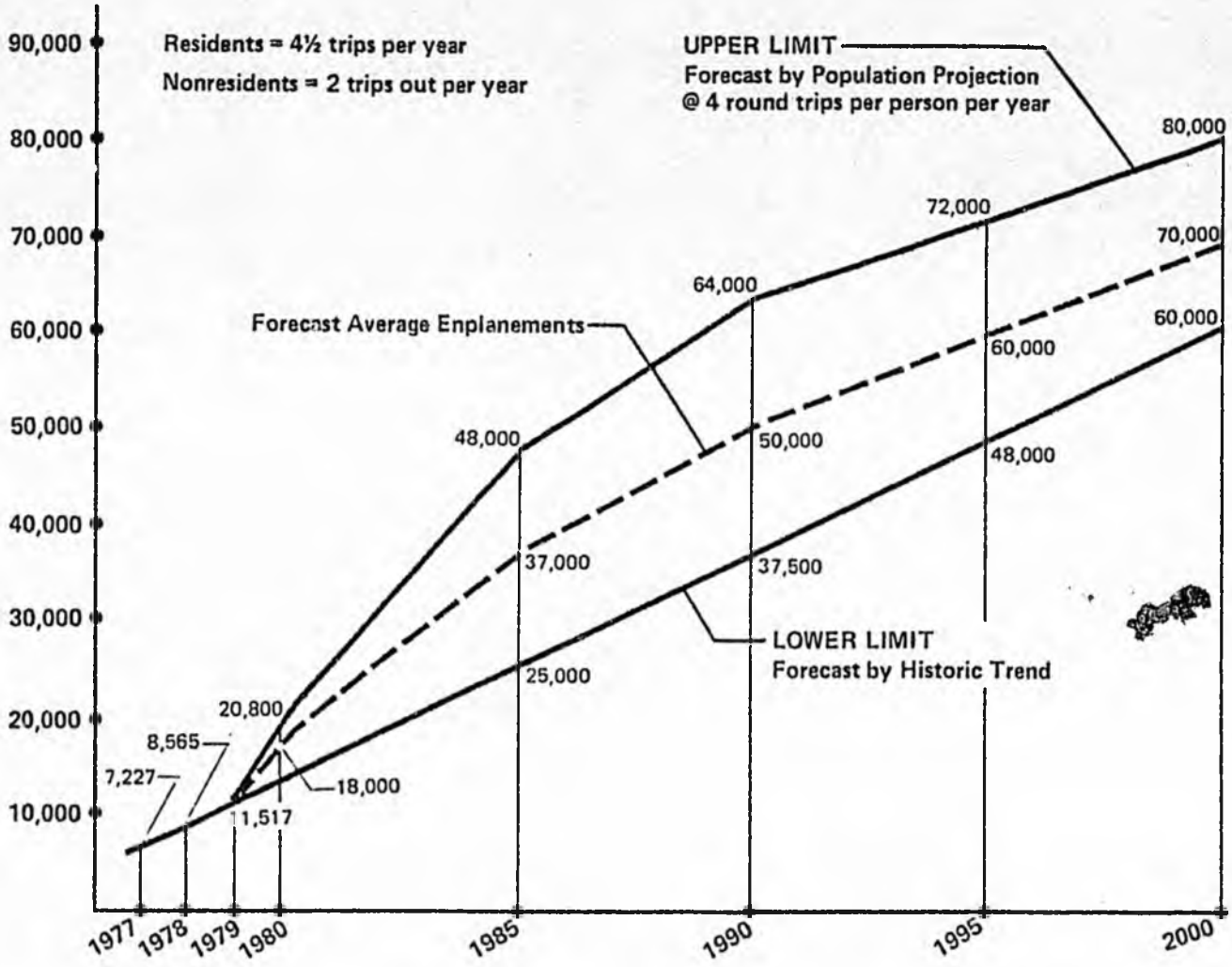
DIAGRAM 1

PEAK SEASON POPULATION FORECAST

(Based on Community Development Plan, November, 1977
by Tryck, Nyman & Hayes, Anchorage, Alaska)

Interpolations by T.A.P. Inc.

Kramer, Chin & Mayo, Inc.
Consulting Engineers, Architects, Applied Scientists
124 West Fifth Street, Juneau, Alaska 99801
Phone (907) 586-6400



Kramer, Chin & Mayo, Inc.
Consulting Engineers, Architects, Applied Scientists
124 West Fifth Street, Juneau, Alaska 99801
Phone (907) 586-6400

DIAGRAM 2

PASSENGER ENPLANEMENTS –
TOTAL SCHEDULED AND NONSCHEDULED

Table 1

HISTORIC & FORECAST COMPARISON OF POPULATION/ENPLANEMENTS/AIR CARGO

	Area		Total Cargo			
			Freight—Tons		Air Mail—Tons	
	Population	Enplanements	On	Off	On	Off
HISTORIC						
1977	1,500 e	7,227 a	89.5	N.A.	39	N.A.
1978	2,250 e	8,565 a	65.7	N.A.	40.4	N.A.
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FORECAST						
1980	5,200	18,000	134	719	100	771
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1990	16,000	50,000	413	2,213	307	2,372
1995	18,000	60,000	464	2,489	345	2,670
2000	20,000	70,000	516	2,766	384	2966

a = actual

e = estimate

N.A. = not available

Source: TAP, Inc.

Table 2

FORECAST SCHEDULED FLIGHTS PER DAY

Year	Enplanements	Passengers per day	Flights per day	Cargo flights per day
1980[1]	18,000	58	2 YS11	1 YS11
1985[2]	37,000	118	2 L-188	1 YS11
1990[3]	50,000	160	2 B-737	1 L-188
1995[4]	60,000	192	2 B-737	1 L-188
2000[5]	70,000	192	2 B-737	1 L-188

1. 1980 service six days/week with YS11 @ 30 seats available
2. In 1985 service with Electras @ 80 seats six days/week
3. In 1990 service with 116-seat jet six days/week
4. In 1995 116-seat jet two flights/day six days/week
5. In 2000 116-seat jet two flights/day seven days/week

All assuming scheduled service by only one carrier.

By the end of the planning period, 1980 to 1985, one Lockheed Electra per day will be required just for freight and mail.

17,700 lbs of freight
18,700 lbs of mail

36,400 lbs or 18 tons per day six days per week

Source: TAP, Inc.

AIRPORT REQUIREMENTS

Through interviews with Reeve Aleutian Airlines personnel and top management, it has been determined that the airlines are fully cognizant of the fact that the Dutch Harbor traffic is rapidly increasing. It is the desire of this airline to fly a larger aircraft into Dutch Harbor. However that is not operationally possible until the runway is improved. The present 4200-foot runway does not have a prepared all-weather surface and is not maintained to high standards. The airport itself has physical limitations because of poor approaches and a mountain in the transition zone, and this causes the runway problem to be magnified.

Reeve Aleutian Airlines has stated that as soon as the airport runway is lengthened it will fly an aircraft with more seats available and the first step would probably be to a Lockheed Electra. This study has assumed that the one cargo flight per day will continue with the YS-11 until 1990, at which time an additional Lockheed Electra will be used once a day for cargo-only flights. In the meantime, from 1985 until 1990 two Lockheed Electras will be necessary for the forecast passenger traffic. In 1990 there will be sufficient traffic to justify two Boeing 737 or similar aircraft with some 116 seats available per aircraft. By establishing the 737 as the ultimate aircraft, certain runway improvements can now be designed to this critical aircraft. Reeve has stated that they would desire to have a 5500-foot runway for a Lockheed Electra but could get by with 5000 feet. They further stated that they would desire to have a 6000-foot runway for the Boeing 737 but could get by with 5500 feet. The airport would still have a certain operational limitation, namely being a VFR airport, daytime only. Also, due to the faster heavier aircraft, even though there will be more runway, it will still require a highly specialized pilot skill to fly in the extraordinary weather conditions of the Aleutians coupled with a substandard airport. Airport improvements are so critical to the economic health of the area in Dutch Harbor that this study has assumed that the state and the FAA will act on the suggested improvements and provide a greater runway length with a paved surface just as soon as monies are appropriated.

Table 3

SUMMARY OF REQUIREMENTS OF
PASSENGER TERMINAL RELATED FACILITIES

	Needed for				
	1980	1985	1990	1995	2000
TERMINAL AREA					
Airline gates (GA)	2	2	3	3	3
Air taxi—charter gates (AC)	0	2	3	3	3
Total gate positions on apron	2	4	6	6	6
AUTO PARKING SPACES REQUIRED					
Public parking	10	50	100	150	200
Employee parking	2	5	10	20	25
Car rental spaces	0	5	7	10	15
Total spaces required	12	60	117	180	240
Curb load and unload linear feet required	80	120	140	170	200
ANNUAL TOTAL CARGO, TONS					
Airfreight, on and off	853	1,970	2,623	2,953	6,297
Air mail, tons, on and off	881	2,010	2,679	3,015	3,350
Total annual tonnage	1,734	3,980	5,302	5,968	9,647
Pounds handled per day six day/week	11,120	25,520	33,980	38,260	61,840
Tons handled per day six day/week	5.56	12.76	16.99	19.3	30.92

Source: TAP, Inc.

Table 4

FORECAST OF AIRCRAFT OPERATIONS AND ACTIVITY

	1980	1985	1990	1995	2000
Based aircraft, business, pleasure, government—peak season	4	6	8	9	10
Total annual aircraft operations	5,424	7,680	8,800	9,400	10,740
Air carrier—noncargo	624	1,240	1,240	1,240	1,460
Air taxi	N.A.	1,040	1,560	1,560	2,080
Military	100	100	100	100	100
Civilian— Local	200	300	400	500	600
Itinerant	4,500	5,000	5,500	6,000	6,500
Air Cargo	624	624	624	624	624
Annual Totals	11,472	15,984	18,224	19,424	22,104
Average daily aircraft operations	16	24	32	36	40
Average peak hour operations	6	8	10	12	14
Annual scheduled air carrier operations	1,248	1,248	1,248	1,248	1,460
Daily scheduled air carrier departures	2	2	2	2	2
Maximum air carrier stage length, mi.	180*	180*	180*	180*	800**

*Cold Bay **Anchorage

Source: TAP, Inc.

PLEASE NOTE: THE PRECEDING PAGES WERE TREATED AS A UNIT IN THE ORIGINAL DOCUMENT.