



Chapter 5: Development Alternatives

The objective of this chapter is to identify and evaluate alternative plans for the implementation and development of the facility requirements identified in the previous chapter. These facilities are required to satisfy aviation demand levels for the Yakima Air Terminal throughout the 20 year planning period. A three step process is used to accomplish this task:

- Identify alternative concepts that will meet the requirements for airport facilities imposed by future demand levels
- Evaluate each alternative, using a variety of criteria, to determine relative efficiency levels and the costs required for implementation
- Select a preferred alternative that maximizes the return on investment within the context of community/airport objectives

Overall, the objective is to produce a balanced airside and landside complex to serve forecast aviation demand. The selection of a preferred development alternative is the culmination of the Master Plan; and the work completed prior to this action has been input into this effort. Beyond this phase, all work consists of refining and developing the selected recommendations. The following five areas are examined in this chapter:

- Airfield Alternatives
- Terminal Area Alternatives
- General Aviation Area Alternatives
- Cargo Area Alternatives
- Industrial/Commercial Development Alternatives

Prior to developing this alternative analysis, a public meeting was held to inform the community of the study's purpose, progress, and findings, and to provide a forum for open public discussion. Presented and discussed at the meeting was an explanation of the airport master planning process, the concept of accommodating air cargo and increased passenger operations at the airport, and the resulting facility requirements (i.e., increased runway length) needed to support increased cargo and passenger operations.

While some in attendance expressed support for the concept of expanded air service at Yakima Air Terminal, a number of residents who lived in the vicinity of the airport expressed concern over any airport expansion plans. It was suggested by many that along with on-site runway development alternatives, consideration be given to developing a new airport elsewhere in the Valley.

In order to consider a new airport, it must be decided that the existing airport facility cannot be expanded to accommodate current or future demand. To arrive at this decision a detailed investigation comparing potential new sites to the existing airport operations must be conducted. Prior to initiating a detailed site selection study, there should be sufficient evidence of the need for a new airport and its viability in terms of potential community and user support as well as the legal, organizational, and financial capacity to build and operate it.

Since the purpose of this master plan is to produce a long range plan for the development of the Yakima Air Terminal, the amount of emphasis on the feasibility of developing cargo facilities at an alternative airport, or at a new airport, will be limited. Rather, the focus of this analysis will be on identifying and evaluating on-site alternatives. The resulting recommended alternative can then be used for comparison in determining the feasibility of developing a new facility. This can be discussed in the next step of the

process, an [environmental study](#). An [environmental study](#) would be required by the FAA should a runway extension at the airport be recommended.

An [environmental study](#) is a document, required by law, that evaluates significant environmental impacts of a proposed project that involves Federal funding. Its basic purpose is to assure that Federal development actions which may have significant environmental impacts are clearly defined and assessed, and that those who might be directly or indirectly impacted by those actions have a chance to review and respond to the assessment.

5.1 Airfield Alternatives

The identified improvements to the airfield at Yakima Air Terminal include a 2,557 foot extension of Runway 9-27 and its parallel taxiway from a current 7,603 feet to an ultimate length of 10,160 feet; the strengthening of the existing runway and taxiway pavement from 175,000pounds dual tandem (DT) to 250,000 pounds DT; and a 585 foot extension of crosswind Runway 4-22 from 3,835 feet to 4,420 feet.

In identifying alternative ways of meeting the defined requirements, the following parameters were used as guidelines:

- Maximize the use of existing facilities
- Provide sufficient airfield flexibility to meet the long range demand that is forecasted to occur
- Provide facilities in a manner that minimizes impacts on the community
- Plan future airfield alternatives that maintain an emphasis on airfield safety and efficiency

With this background, a range of possible alternative airport development scenarios were identified and submitted to a preliminary examination to determine their feasibility for ultimate development. These were then evaluated to determine whether any situations existed that would cause the automatic exclusion of the concept of further runway development at Yakima Air Terminal.

5.1.1 Airport Development Alternatives

This section examines three alternatives to the development of a runway extension at Yakima Air Terminal to accommodate future air cargo demand: (1) the No Development Alternative; (2) Transfer Demand to Another Airport; and (3) Develop an Airport at a New Site.

No Development Alternative

In analyzing and comparing the costs and benefits of various development alternatives, it is important to consider the consequences of no future runway development at the airport. This alternative essentially involves maintaining the airport in its present condition and not allowing for improvements to existing airport facilities. There are also landside building deficiencies that will delay, if not prohibit, future growth unless steps are taken to improve the situation. A more significant impact of the no development alternative will be the inability of the airport to serve existing markets and attract new users, especially potential businesses and industries who are seeking new locations that are related to the development of the Port of Entry and the Foreign trade Zone.

In the short term, if the development of the Foreign Trade Zone, International Port of Entry, and industrial/commercial areas on and around the airport are to be realized, the ability to attract air cargo carriers and potential revenue sources must be developed. In the long term, the airport's inability to accommodate larger type aircraft will hinder the community's ability to diversify its economy, service the air cargo needs of local growers, producers, and manufacturers, and encourage more direct passenger flights. Future air cargo

demand in the Yakima Valley will necessitate additional facilities at Sea-Tac, as well as at new sites.

A decision to adopt a no development alternative is inconsistent with the goals and objectives of the Master Plan. Throughout this study effort there has been strong evidence of the desire to diversify the local economy as well as indications of steady growth in aviation demands in the airport service area. To propose no further development at Yakima Air Terminal would be a decision that would adversely affect the long term viability of the airport, the regional airport system, and the community. Therefore, the no development alternative is not recommended.

Transfer Service to Another Airport

This alternative addresses the potential for accommodating air cargo demand at other airports. Alternative airports to be considered are Sea-Tac and Grant County (Moses Lake), and to a lesser extent Tri-Cities (Pasco), Yakima Training Center (Yakima Firing Center), and Bowers Field (Ellensburg).

Landside and airside congestion, community resistance to further airport development, noise problems, and unreliable weather conditions at Sea-Tac are well documented. These reasons, along with the desire to diversify the local economy, with the longest being 13,501 feet by 300 feet. The airport was developed in a relatively isolated area to support its original mission of military activity.

Brant County Airport, in Moses Lake, 100 miles northeast of Yakima, is the only other airport in the region with the airfield infrastructure needed to accommodate air cargo operations. The airport, a former military base, has four runways, with the longest being 13,501 feet by 300 feet. The airport was developed in a relatively isolated area to support its original mission of military activity.

Based on its existing facilities alone, the airport is clearly capable of accommodating international cargo aircraft, and until a few years ago, air transport of livestock was common. However, air cargo service has never fully developed out of Moses Lake for the same reasons that make it a questionable alternative to development at Yakima Air Terminal.

Grant County Airport does not have the same supporting economic and governmental infrastructure that makes cargo operations feasible at Yakima. This includes a local agricultural, manufacturing, and industrial base; a potential labor force; the ability to attract, process, and distribute backhaul; ties with the Puget Sound economy; and potential international port of entry and foreign trade zone status.

Development of air cargo facilities at Tri-Cities Airport, Yakima Training Center, or Bowers Field in Ellensburg would provide no advantage to development at Yakima Air Terminal in terms of utilization of existing facilities. Not only would runway extensions and stronger pavement be required for each airport to accommodate all-cargo aircraft, but infrastructure in terms of access roadways, sewer, water, electricity, aircraft navigation aids, buildings, taxiways, aircraft parking aprons, and aircraft fueling facilities would have to be built. In addition, no community support or political commitment evident in Yakima has been identified that would warrant development at these airports.

The Yakima Training Center (YTC) also presents the problem of the feasibility of being able to build and utilize civilian facilities on an active military base. According to a letter from the Office of the Installation Commander, it is not feasible to locate a public use airport at the YTC because of the incompatibility of civilian and YTC military operations. YTC operations can and do run around the clock seven days a week and typically consist of nap-of-the-earth helicopter flights (with and without night vision devices), close air support operations, high and low level bombing, large scale live fire and maneuver operations and parachute operations. While safely confined to YTC, according to army officials, any encroachment by commercial aircraft could end in disaster. Additionally, the YTC is studying the impact of increased training at the Center,

and are currently purchasing an additional 61,000 acres to enhance their training capability.

To develop air cargo facilities at an alternative airport is not considered a realistic alternative.

Develop An Airport At A New Site

A third alternative to development at Yakima Air Terminal is to build a new airport. In investigating potential sites within the Yakima Air Terminal's service area, several prohibitive factors were encountered. A new airport site to the south and southeast must contend with the topographical constraints of Ahtanum Ridge and the Rattlesnake Hills. To the north is Yakima Ridge and Saddle Mountains. A site to the west would produce final approach problems over the foothills of the Cascade Mountains. An area east of Moxee has been identified by some as having the most potential.

The development of a new public airport requires a tremendous financial commitment of public funds for land acquisition, site preparation, and the construction of airport facilities such as runways, taxiways, aircraft apron, terminal facilities, general aviation facilities, utility infrastructure, etc. In addition, the community would have to reimburse to the Federal government millions of dollars that the FAA has invested in the existing site over the last twenty years. Development of a new facility comparable to Yakima Air Terminal would probably cost over \$150 million to achieve very little additional benefit.

The environmental impact of a new airport can generally be assumed to be more significant than development at an existing facility. Approximately 2,000 -3,000 acres of land would have to be acquired in a region of high value agricultural farmland. Rigid environmental requirements and public sentiment against new airport development have made it extremely difficult to build new airports, and the process can be expected to last as long as ten years.

Summary

The evaluation of these factors indicate that the existing airport is the most prudent location in the area for development and maximizes the use of existing facilities. With a prudent expansion program, Yakima Air Terminal is fully capable of accommodating the long term aviation demands of the area and should be developed in response to these demands identified in the Master Plan.

5.1.2 Airfield Development Alternatives

Continuing the evaluation process, an examination of site specific alternatives were identified and evaluated. A total of four runway development alternatives were identified for comparison. These represent a reasonable range of options available at Yakima Air Terminal and, when compared with the maintenance of the status quo, will determine the most advantageous course of action to be followed. Exhibit 5-1 shows these alternatives, which are generalized and are sufficient to identify the limitations and constraints that occur within most probable scenarios, and are described as follows.

Do-Nothing Conditions

The existing condition's alternative represents a continuation of the status quo in order to define baseline conditions against which the true differences represented by the alternatives can be measured.

Alternative 1

In this alternative, the 2,557 foot runway extension to 9-27 is constructed on the west end of the existing runway towards South 48th Avenue. Runway 4-22 is extended 585 feet to the southwest for a total length of

4,420 feet.

Alternative 2

In this alternative, the 2,557 foot runway extension to 9-27 is constructed on the east end of the existing runway towards South 10th Avenue. Runway 4-22 is extended 585 feet to the southwest for a total length of 4,420 feet.

Alternative 3

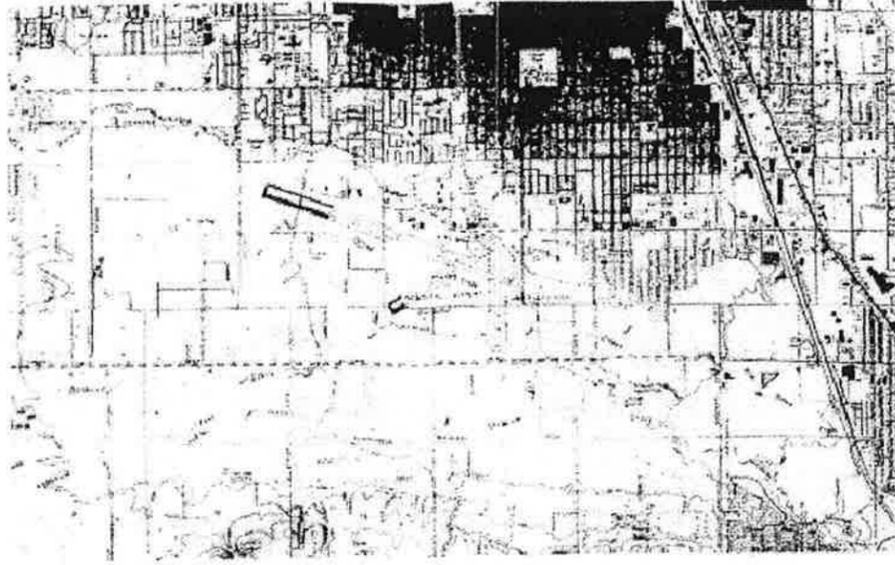
In this alternative, the 2,557 foot runway extension to Runway 9-27 is constructed by extending the west end of the existing runway 1,279 feet and the east end of the existing runway by 1,278 feet. Runway 4-22 is extended 585 feet to the southwest for a total length of 4,420 feet.

Alternative 4

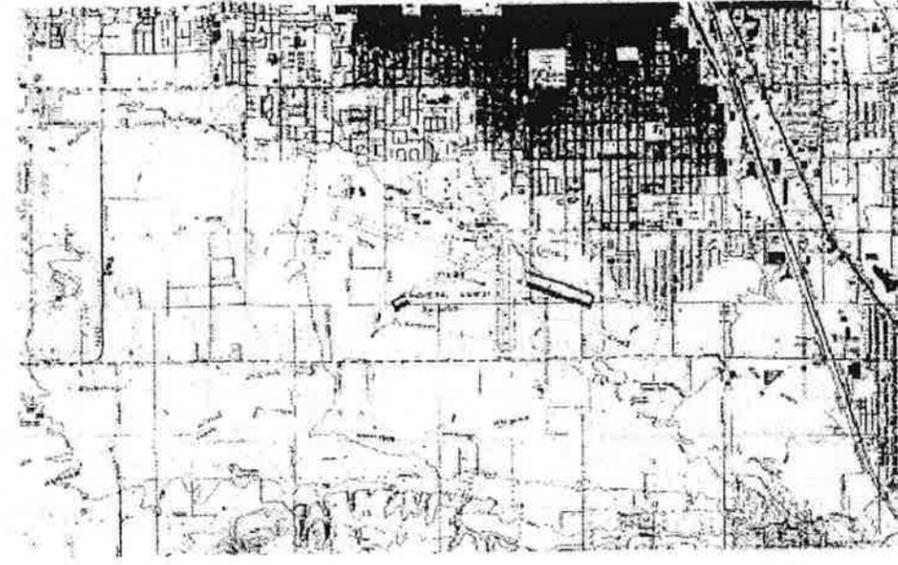
A fourth alternative action would be not to extend the existing Runway 9-27, but construct a 10,160 foot parallel runway 2,500 feet south of the existing 7,603 Runway 9-27. Runway 4-22 is extended 585 feet to the southwest for a total length of 4,420 feet.



EXISTING CONDITIONS

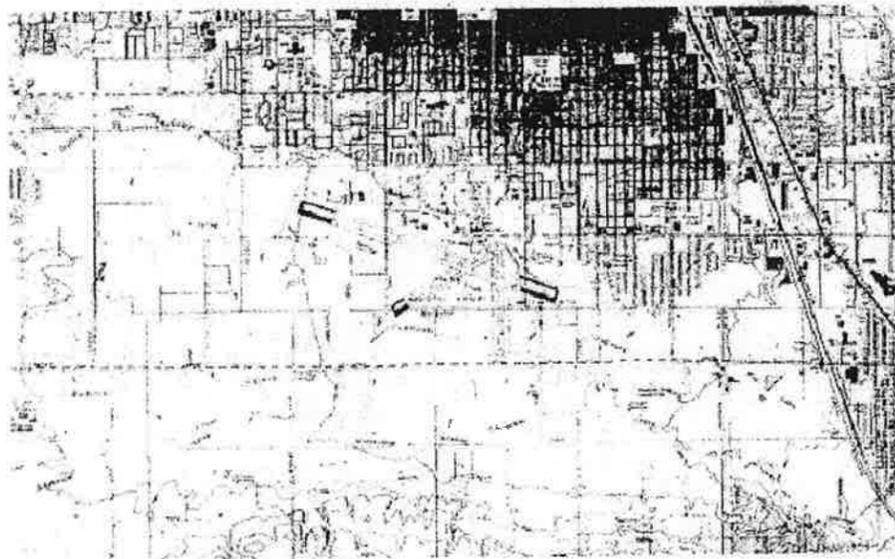


ALTERNATIVE 1

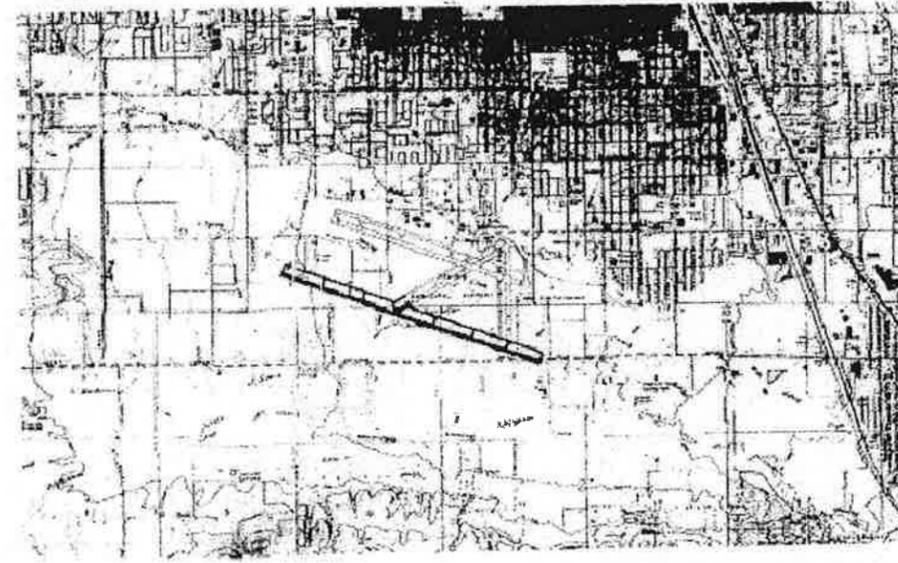


ALTERNATIVE 2

- ◆ ALTERNATIVE 1: A 2,557 foot Runway Extension to the West
- ◆ ALTERNATIVE 2: A 2,557 foot Runway Extension to the East
- ◆ ALTERNATIVE 3: A 1,279 foot Runway Extension to the West and a 1,278 foot Extension to the East
- ◆ ALTERNATIVE 4: A 10,160 foot Parallel Runway to the South of Runway 9-27



ALTERNATIVE 3



ALTERNATIVE 4

5.1.3 Runway Development Alternatives Evaluation

The purpose of this section is to evaluate the effects of the alternatives and, thus provide the technical basis necessary for selecting a preferred runway development plan for the airport. The alternatives will be subjected to an evaluation that will permit a comparison of the merits and deficiencies of all options under consideration. An evaluation matrix will be prepared to array the composite rankings of each alternative. Factors to be considered in the evaluation include:

- **Airspace Compatibility:** Using the forecasts of aviation activity, a determination will be made of the future airspace use and traffic patterns for the airport.
- **Operational Efficiency:** This category examines the efficiency of each alternative relative to its ability to accommodate the critical aircraft identified in the facility requirements, and efficiency and safety of ground movements.
- **Impact on Surface Transportation System:** Utilizing information developed previously, an evaluation will be performed to determine the adequacy of existing and planned surface transportation systems and ground access facilities to serve the airport, and the various impacts that may occur to local roadways due to runway development.
- **Environmental Compatibility:** This portion of the analysis will examine the environmental compatibility of the alternatives relative to each other in terms of the effects of noise, wetlands, land use, water, and the effects on parks, recreational areas, and historic sites on the area surrounding the airport.
- **Development Costs:** Estimates of the development costs required to expand the existing airport under each alternative will be prepared on the basis of planning cost estimates applied to the facility requirements. These capital cost estimates will provide a general indication of the cost of developing the facilities and also will provide a basis for comparing cost-effectiveness among the various alternatives.

Airspace Compatibility

The evaluation of compatibility with area airspace will result in a determination of which alternative offers the ability for aircraft use at or exceeding obstacle clearance standards established by the FAA.

TERPS Analysis: The United States Terminal Instrument Procedures (TERPS) standards for approach and departures have been applied to each runway alternative to determine if the configuration is feasible. For a basic understanding, the TERPS segments are described below.

- **Approach Criteria:** The Initial Approach Segment begins at the Initial Approach Fix (IAF) and, although not standard in length, does not exceed 50 nautical miles (NM). A descent ratio of 250 feet per nautical (NM) is used in determining obstructions. Two areas, a primary area extending 4 nm. on either side of the course fix, and a secondary area extending 2 nm. on either side of the primary area, make up the initial approach segment.

The Intermediate Approach Segment begins at the end of the initial approach segment and descends at 150 feet per nm. The segment also has a primary and secondary area, but the widths vary due to its tapered nature.

The Final Approach Segment commences at the terminus of the intermediate segment and is defined by the FAR Part 77 Approach Surface.

The Missed Approach Segment is 15 nm. long, comprised of two sections, and includes a primary and secondary area. The purpose of this segment is to provide a safe escape route to aircraft that cannot complete their landing.

- **Departure Criteria:** A single departure area is specified in the TERPS consisting of a 40:1 departure slope beginning at runway end and extending out for 10 nautical miles.
- **Missed Approach Criteria:** TERPS procedures also include provisions for a missed approach segment to provide safety margins to aircraft on approach should they reach their decision height and be unable to complete the landing. The missed approach should be a continuation of the final approach course and can be either straight or turning. In a straight missed approach, the surface begins at a height determined by subtracting the required final approach clearance from the minimum descent altitude. It ascends uniformly at a rate of 1 foot vertically for each 40 feet horizontally (40:1). Where this surface reaches a height 1,000 feet below the missed approach altitude, no further application is needed. In the secondary area, no obstacle can penetrate a 12:1 slope extending outward from the 40:1 surface.
- A turning missed approach area is designated if a turn of more than 15 degrees is required to safely execute the procedure. The dimensions and shape of this area are affected by three variables:
 - The width of the final approach area at the decision height;
 - The categories of aircraft authorized to use the procedure; and
 - The angle of the turn required

Secondary obstacle clearance areas re permitted when positive course guidance is required.

Using these criteria and elevations from topographic maps, obstruction surveys conducted by the National Ocean Service (NOS) and map interpretation techniques, obstructions were identified for the alternatives. Exhibit 5-2 presents the results of the TERPS analysis in narrative form.

**EXHIBIT 5-2
TERPS ANALYSIS RESULTS**

Runway Alternative	TERPS Conformity	Comments
Do-Nothing Conditions	Yes	—
Alternative 1: An extension 2,557 feet to the west	No	Terrain obstructions penetrate primary approach surface to the west.
Alternative 2: An extension 2,557 feet to the east	Yes	Requires elimination of existing straight-in nonprecision approach to Rwy 27.
Alternative 3: An extension 1,279 feet to the west and 1,278 feet to the east	Yes	—
Alternative 4: A 10,160 foot parallel Rwy south of 9-27	No	On approaches from both the east and west, terrain penetrates the primary area of the final approach segment. Terrain to the south penetrates horizontal surface and 20:1 conical surface of FAR Part 77 Approach Surface.

Summary: Airspace in the Yakima area is very constrained due to terrain features and military restricted areas. Of the four alternatives, only Alternatives 2 and 3 are feasible from an airspace perspective. Implementation of Alternative 2, a 2,557 foot extension of Runway 27 to the east, would require the elimination of the existing straight in nonprecision approach to Runway 27. This approach procedure is the only backup instrument approach to the airport should there be a failure of the ILS approach to Runway 27.

Alternatives 1 and 4 are not workable because of existing terrain penetrations of the Intermediate and Final Approach Segments to the airport.

Operational Efficiency

The primary measure of operational efficiency in the context of this analysis is the capability of an alternative to accommodate the forecast critical aircraft in terms of runway length.

Each of the alternatives, with the exception of the do-nothing condition, achieves the result of providing the required length needed to accommodate the forecast critical aircraft.

Shown in Exhibit 5-3 is the capability of each runway alternative to accommodate various types of cargo aircraft relative to potential payloads from Yakima to Anchorage. Anchorage is a refueling and reprovisioning stop for approximately 75 percent of all inbound and outbound cargo between Asia and the United States, and Asia and Europe.

Included in this exhibit for comparison is a variation of the no-development alternative. This no-development variation is the inclusion of a clearway to the end of Runway 9. A clearway is a clearly defined area connected to and extending beyond the runway end available for completion of the takeoff operation of turbine-powered airplanes. A clearway increases the allowable airplane operating takeoff weight without increasing runway length.

**EXHIBIT 5-3
 POTENTIAL TAKEOFF LOAD FACTORS**

	USEFUL LOAD		
	B-727	B-757	DC-8
Do-Nothing	53%	47%	31%
Do-Nothing (Clearway)	77%	78%	58%
Alternative 2	100%	100%	100%
Alternative 3	100%	100%	100%

The clearway must be at least 500 feet wide centered on the runway centerline. The practical limit for clearway length is 1,000 feet. The clearway plane slopes upward with a slope not greater than 1.25 percent. Except for threshold lights no higher than 26 inches and located off the runway sides, no object or terrain may protrude through the clearway plane. The area over which the clearway lies need not be suitable for stopping aircraft in the event of an aborted takeoff. The clearway must be under the control of the airport to ensure that no fixed or movable object penetrates the clearway plane during a takeoff operation.

The disadvantage of a clearway is that it requires a significant investment for the airport to clear, grade, and control the clearway. It does not increase any other runway operating parameters except for takeoffs in one direction.

The exhibit demonstrates that with the existing 7,603 foot runway, a Boeing 757 cargo aircraft flying approximately 1,500 miles to Anchorage with pilot, crew, and fuel, is limited to taking off with less than half of its design cargo lift potential. This is due to the runway takeoff distance needed for the aircraft to become airborne based upon airport elevation and average maximum temperature. With a runway length of 10,160 feet, the same plane can takeoff fully loaded.

The extension of Runway 4-22, 585 feet, is common to Alternatives 2 and 3. The 1987 Master Plan recommended that Runway 4-22 be extended from 4,292 feet to 4,820 feet to accommodate forecasted aircraft. Since that time, Runway 4-22 has actually been reduced in length to 3,835 feet because of safety hazards in the Runway End 22 safety area.

As discussed in Section 4.1.1 of the facility requirements, a minimum length of 4,420 feet is recommended for Runway 4-22 based upon new forecasts and fleet mix assumptions, and recent FAA Advisory Circulars. This length is needed for the airport to safely land small airplanes with ten or more passengers when there is a crosswind greater than 10.5 knots affecting Runway 9-27.

In terms of airfield capacity maximization, neither Alternative 2 or 3 will increase the number of aircraft operations the airport can accommodate, only the type of aircraft. A demand/capacity analysis performed earlier in the report, indicates that the airport's existing capacity of 160,000 to 181,000 annual operations will be sufficient over the 20 year planning period.

An analysis of ground movement efficiency determined that neither of the alternatives provide any significant advantages over another in terms of increased taxiing distances, traffic flow, or the ability of the air traffic control tower to monitor airport traffic patterns.

Summary: Without an extension to Runway 9-27, medium to long haul cargo aircraft cannot economically operate out of the Yakima Air Terminal. Not providing an extension to Runway 4-22 would hinder the use of small commuter aircraft at the airport. There are no operational advantages between Alternatives 2 and 3 given the existing and planned facilities on the airport.

Impact on Surface Transportation

Each alternative presents unique impacts to the existing and future roadway network. The review of these impacts is based on the assumption that a proposed major arterial, Valley Mall Boulevard, will provide direct access from I-82 to the vicinity of the airport. The preliminary alignment proposed for the extension of Valley Mall Boulevard is on the east side of the airport along the existing Pioneer Street location. This alignment provides a northwesterly extension of the roadway to South 15th Avenue.

In addition to this extension, a realignment of South 16th Avenue to intersect the new Valley Mall Boulevard will be provided to avoid clearance requirements of the existing runway. Regardless of the preferred runway alternative, a traffic analysis performed for the proposed Valley Mall Boulevard indicates that the travel demand on the roadway network will require a north-south connection to replace South 16th Avenue.

The implementation of Alternative 2, a 2,557 foot extension to the east, will result in the removal of the South 16th Avenue temporary alignment and require a new north-south connection implemented in the vicinity of South 10th Avenue. Due to clearance requirements in the approach path, the new roadway would need to be constructed approximately 2-4 feet below the existing grade. The proposed realignment and extension of Pioneer Street (Valley Mall Boulevard) will also be impacted by the approach path requirements. The new roadway would either need to be lowered an estimated 4-6 feet or realigned north of the approach path zone. The latter option would result in additional condemnation of existing

structures and right-of-way acquisition.

Alternative 3, a 1,279 foot extension to the west and a 1,278 foot extension to the east, would not impact the realignment of South 16th Avenue as would Alternative 2. Alternative 3's greatest impact will be on West Washington Avenue, an important east-west arterial on the western end of the runway. West Washington Avenue is projected to carry approximately 17,000 vehicles per day (VPD) for the year 2010 growth projection.

West Washington Avenue would either need to be realigned and extended to the west of this proposed runway alternative to achieve approach path requirements or constructed under the runway extension. The realignment and extension of West Washington Avenue would present significant right-of-way acquisition and construction costs. The undercrossing of the runway would result in significant construction costs but could be built within the existing right-of-way.

Based on the review of Alternatives 2 and 3, Alternative 2, a 2,557 foot extension to the east, has the potential for producing less impacts to the existing and future roadway network than Alternative 3. This conclusion is based primarily on the impacts resulting to West Washington Avenue that Alternative 3 would induce.

Environmental Compatibility

This portion of the analysis of runway extension alternatives examines the relative impact of each option from an environmental standpoint. The factors examined, and the methodologies employed are as follows.

- Relative noise impacts to be experienced under each alternative were examined to determine which alternative represents the least compatible situation. Residential impacts were the basis for this determination.
- The compatibility of each runway extension alternative with surrounding land uses, both on and off site, was studied. Criteria used to measure compatibility included impacts to existing land use patterns and the number of potential residential relocations.
- Relative impacts to natural areas were determined by measuring the amount of land designated as floodplain that would be needed for runway construction.

The results of the environmental factors evaluation process are summarized in Exhibit 5-4, and discussed below.

EXHIBIT 5-4

ENVIRONMENTAL COMPATIBILITY

Descriptor	Do-Nothing	Alternative 2*	Alternative 3*
Potential number of residential relocations	None	28	13
Potential number of residences within 65 DNL noise contour	4	7	5
Compatibility with existing uses	NA	Good	Fair
Acres of Prime Farmland needed to be acquired	None	None	None
Acres of additional floodplain encroachment	None	5.1	5.1

* Alternative 2: A 2,557 foot Runway Extension to the East

Alternative 3: A 1,279 foot Runway Extension to the West and a 1,278 foot Extension to the East

Land Use Compatibility: As identified in the Inventory Chapter, land use to the immediate west of the airport is primarily vacant or agricultural; land use to the east is a mixture of vacant, agricultural, and low density residential. Zoning around the immediate airport vicinity, and within most of the airport overlay district, is zoned for light industrial uses; further outside the overlay district, the zoning designation turns to residential.

The area needed to construct a runway extension in Alternative 2 falls primarily within an area zoned light industrial, with the runway's Runway Protection Zone (RPZ) encompassing approximately 46 acres of zoned residential area. For Alternative 3 the RPZ would only extend approximately 10 acres into zoned residential area, resulting in minimum impact. As defined earlier, the RPZ is a trapezoidal area representing the ground level at the innermost portion of the runway approach. The RPZ begins 200 feet beyond the runway threshold at the end of the area usable for takeoff and landings, and is centered along the extended runway centerline. The RPZ function is to enhance the protection of people and property on the ground.

Where practical, the airport should own the property under the runway approach and departure areas to at least the limits of the RPZ. It is desirable to clear the entire RPZ of all above ground objects. Where this is impractical, airport owners, as a minimum, should maintain the RPZ clear of all facilities supporting incompatible activities. Incompatible activities include, but are not limited to, those which lead to an assembly of people.

As indicated in Exhibits 5-5 and 5-6, implementation of Alternative 2 will require the probable relocation of 28 residences to the east of the airport, and 13 residences for Alternative 3. Each of these residential relocations are related to the Runway Protection Zone and would need to be evaluated on a case by case basis. Some of these residences are the same that may be impacted by the Valley Mall Boulevard extension. Although no residential relocations have been identified in the exhibit for the no development alternative, the fish hatchery and two associated residences are recommended to be relocated to meet FAA runway safety area criteria.

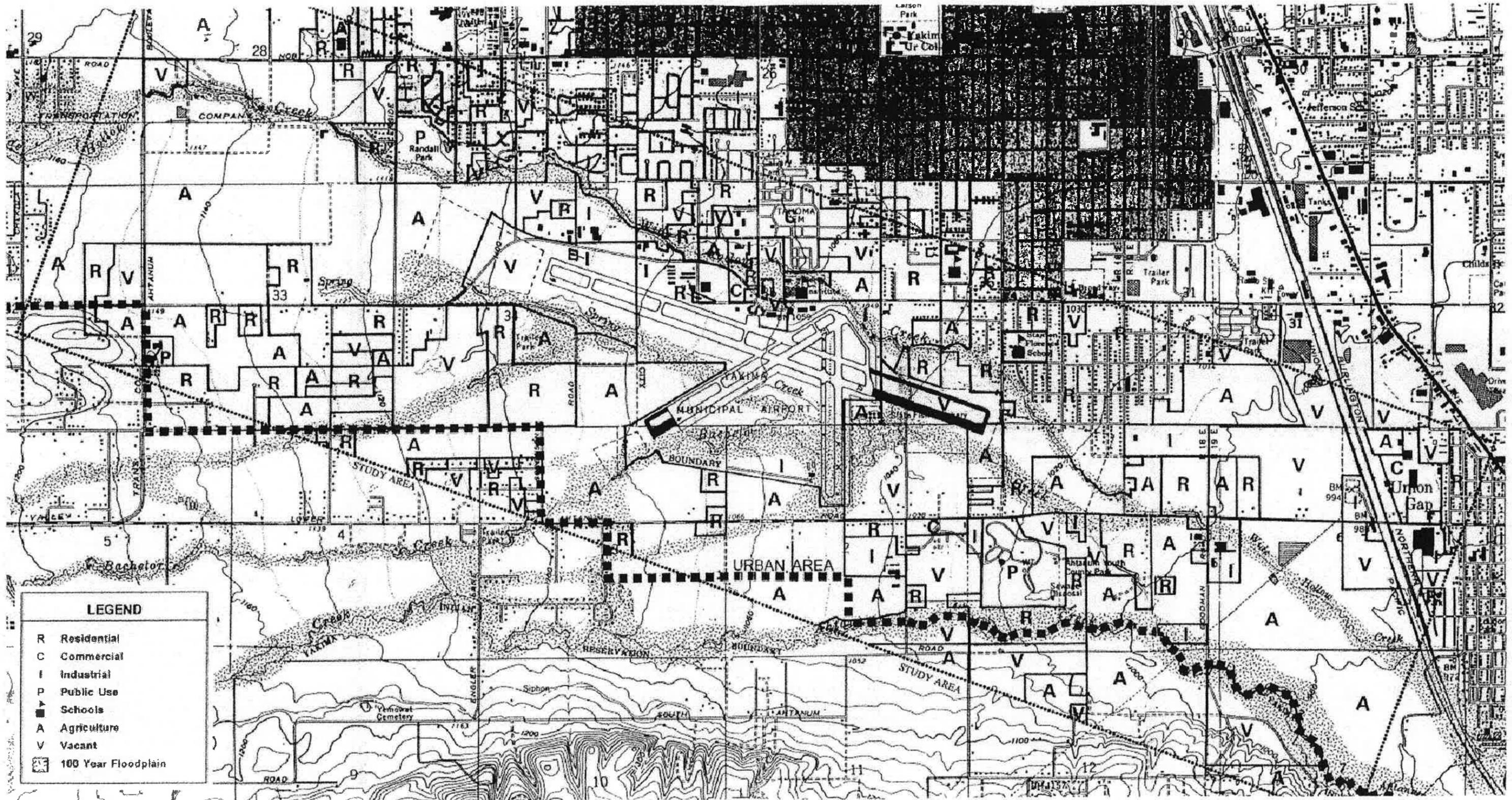
Noise Impacts: The relative noise impacts of the various alternatives were examined by using the FAA's Integrated Noise Model (INM). The model was used to simulate year 2012 potential aircraft noise conditions based upon the forecast of demand and the runway configuration described for each alternative. No cargo activity was included for the do-nothing alternative.

Potential aircraft noise was analyzed by generating noise contour lines of equal value representing a day-night average sound level (DNL). The DNL noise metric is based on a yearly average of the A-weighted sound level integrated over a 24 hour period for the aircraft expected to use the airport in year 2012. Residences falling within the 65 DNL contour were considered as being impacted by aircraft noise. All land uses are considered compatible with noise levels less than 65 DNL.

This analysis was performed only to compare the various alternatives. A more detailed explanation and analysis of noise impacts for years 1992, 1997, and 2012 will be conducted on the recommended alternative in the Environmental Review section.

Depicted in Exhibits 5-7, 5-8, and 5-9, the overlay of noise contours shows that while there was some incremental increase in noise generation between the no development alternative and the two development alternatives, there was very little difference in the level of noise that would be generated off of airport property. This same result carried over when evaluating the number of residences impacted by noise. Four homes were identified within the year 2012 65 DNL contour for the no development alternative, seven homes for Alternative 2, and five homes were predicted to be impacted for Alternative 3.

The reason for the low level of off-airport impact between the alternatives is that for Alternatives 2 and 3 to be implemented, the airport must acquire additional property. The additional property acquisition and associated residential relocations will remove most incompatible development and create conditions similar to those that currently exist.



AIRPORT MASTER PLAN UPDATE

BUR YAKIMA AIR TERMINAL
Yakima, Washington

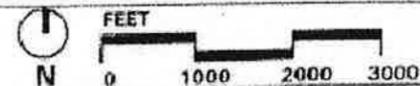
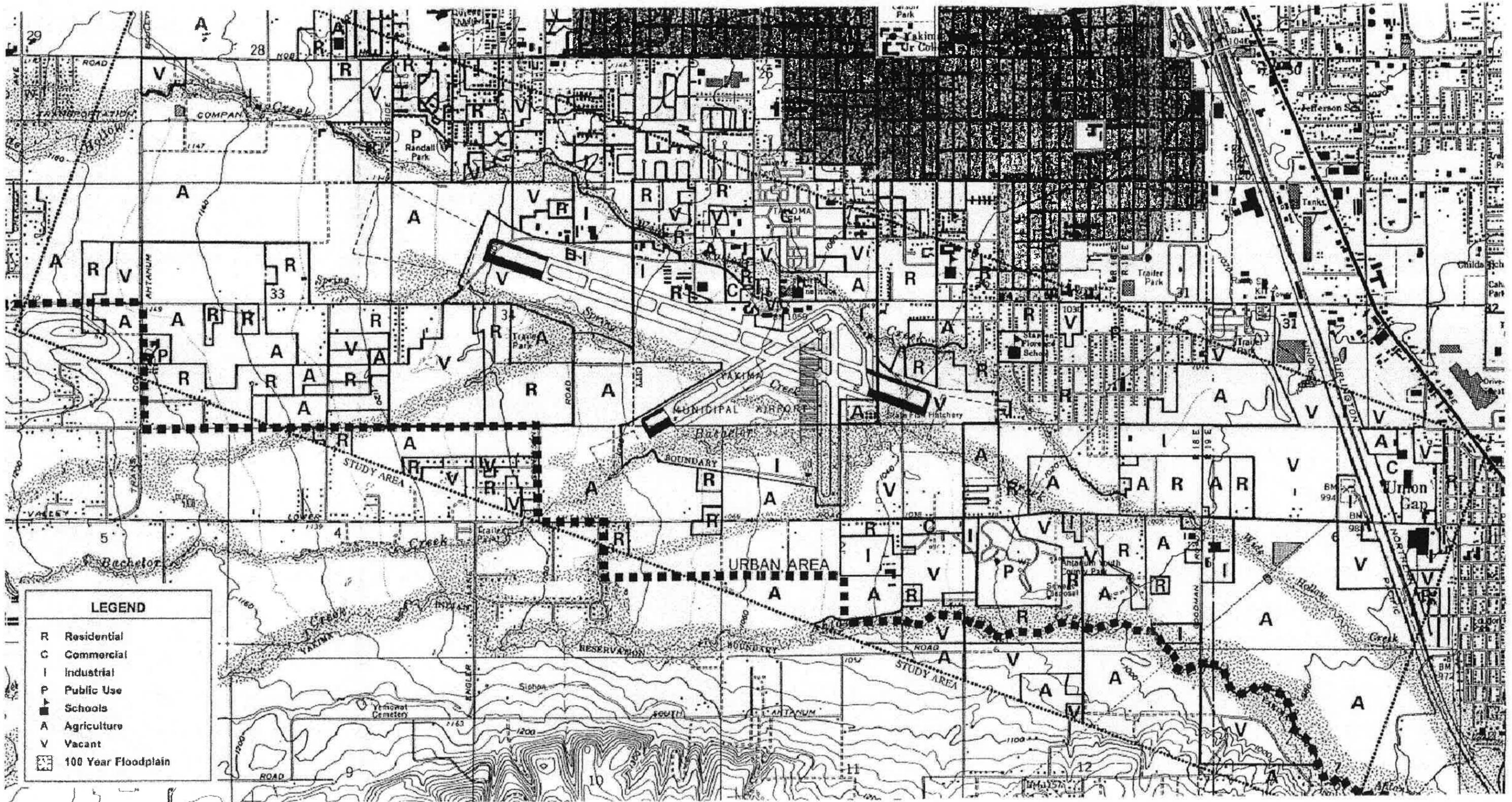


EXHIBIT 5-5

EXISTING LAND USE
RUNWAY ALTERNATIVE 2



AIRPORT MASTER PLAN UPDATE

DWP YAKIMA AIR TERMINAL
 Yakima, Washington

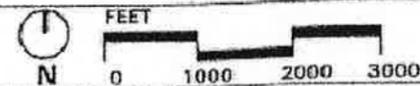
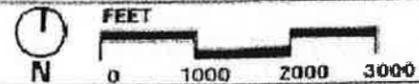
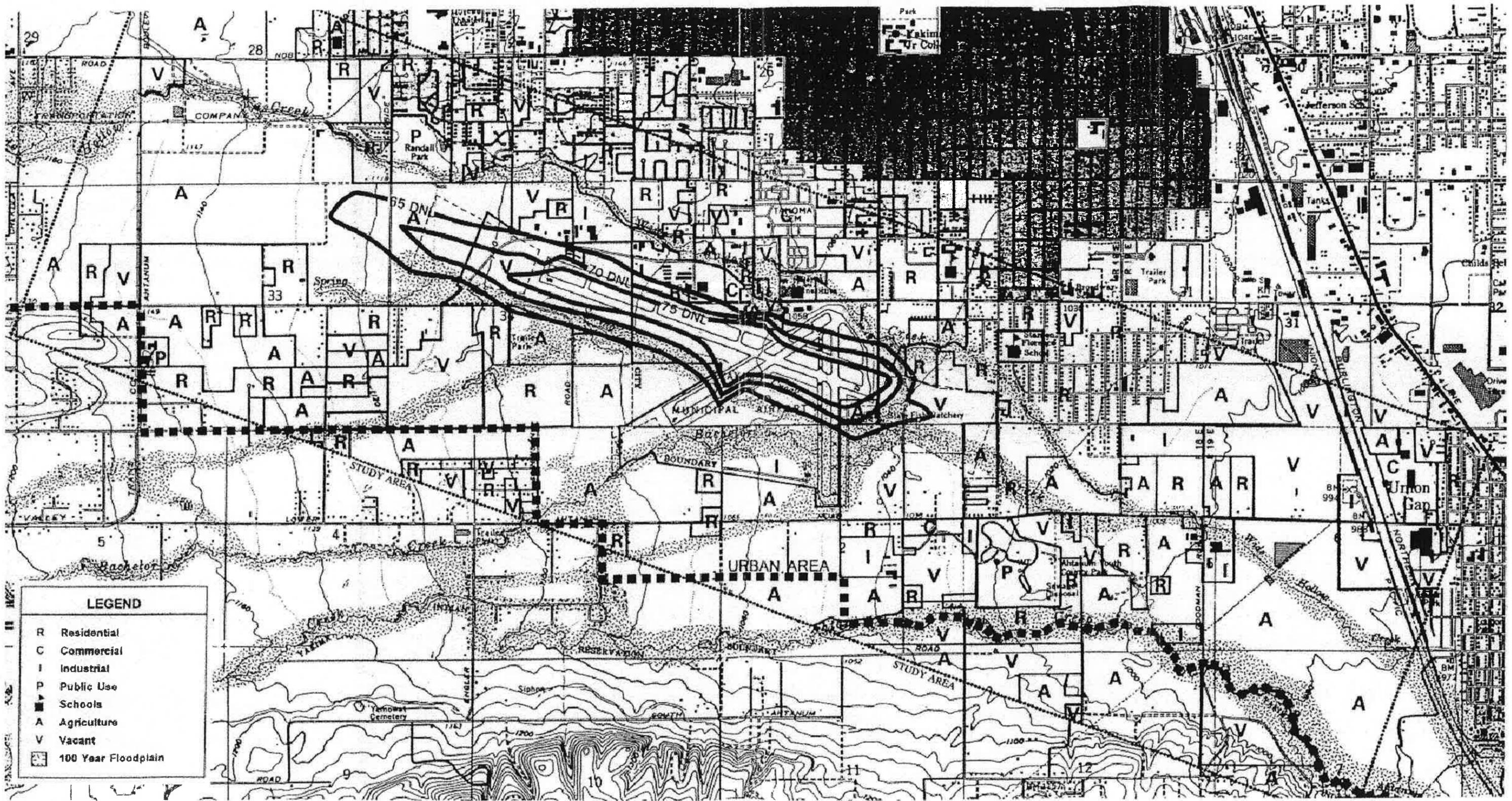
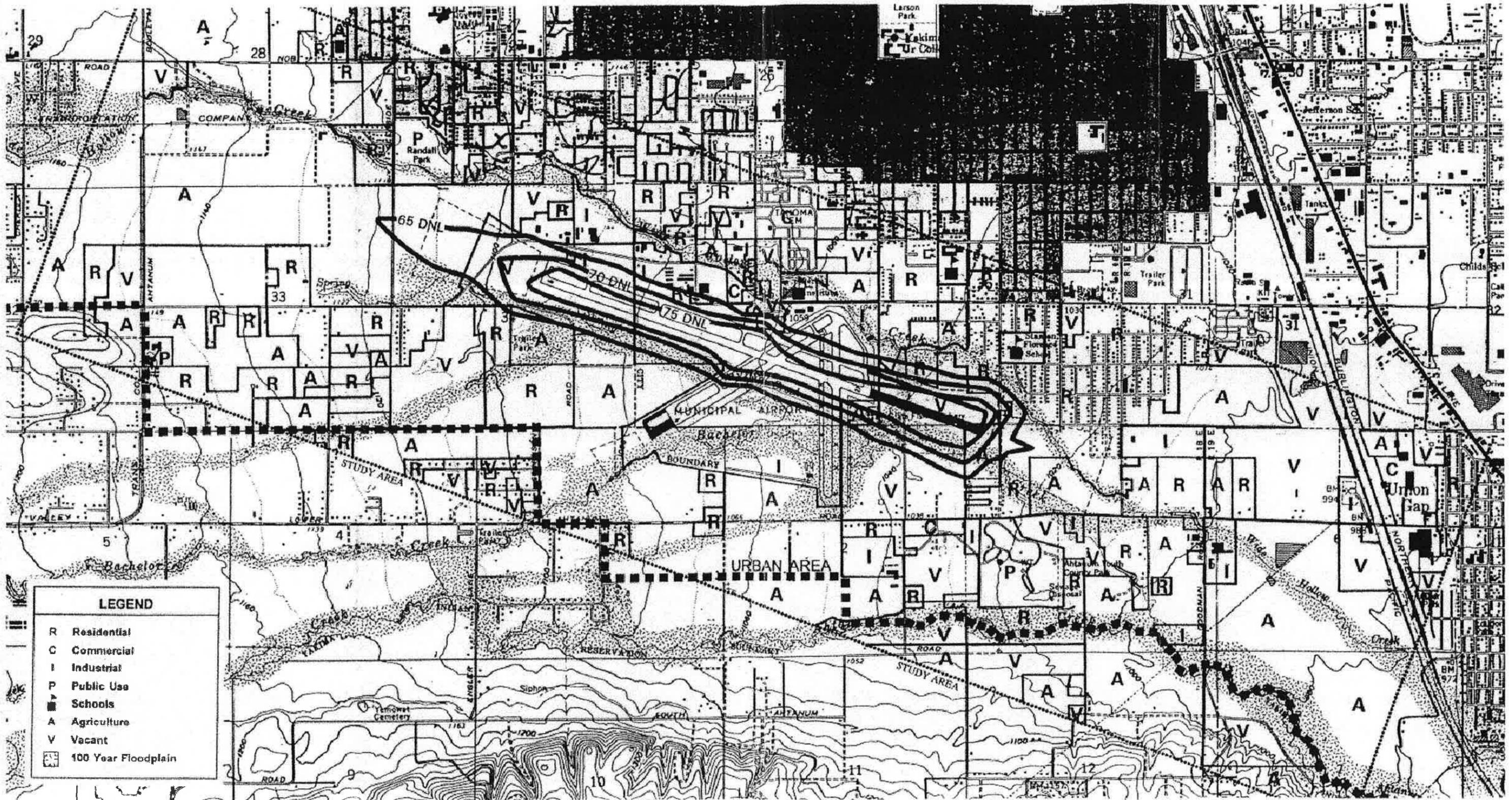


EXHIBIT 5-6
 EXISTING LAND USE
 RUNWAY ALTERNATIVE 3





AIRPORT MASTER PLAN UPDATE

DBR YAKIMA AIR TERMINAL
Yakima, Washington

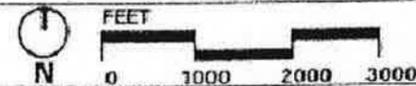
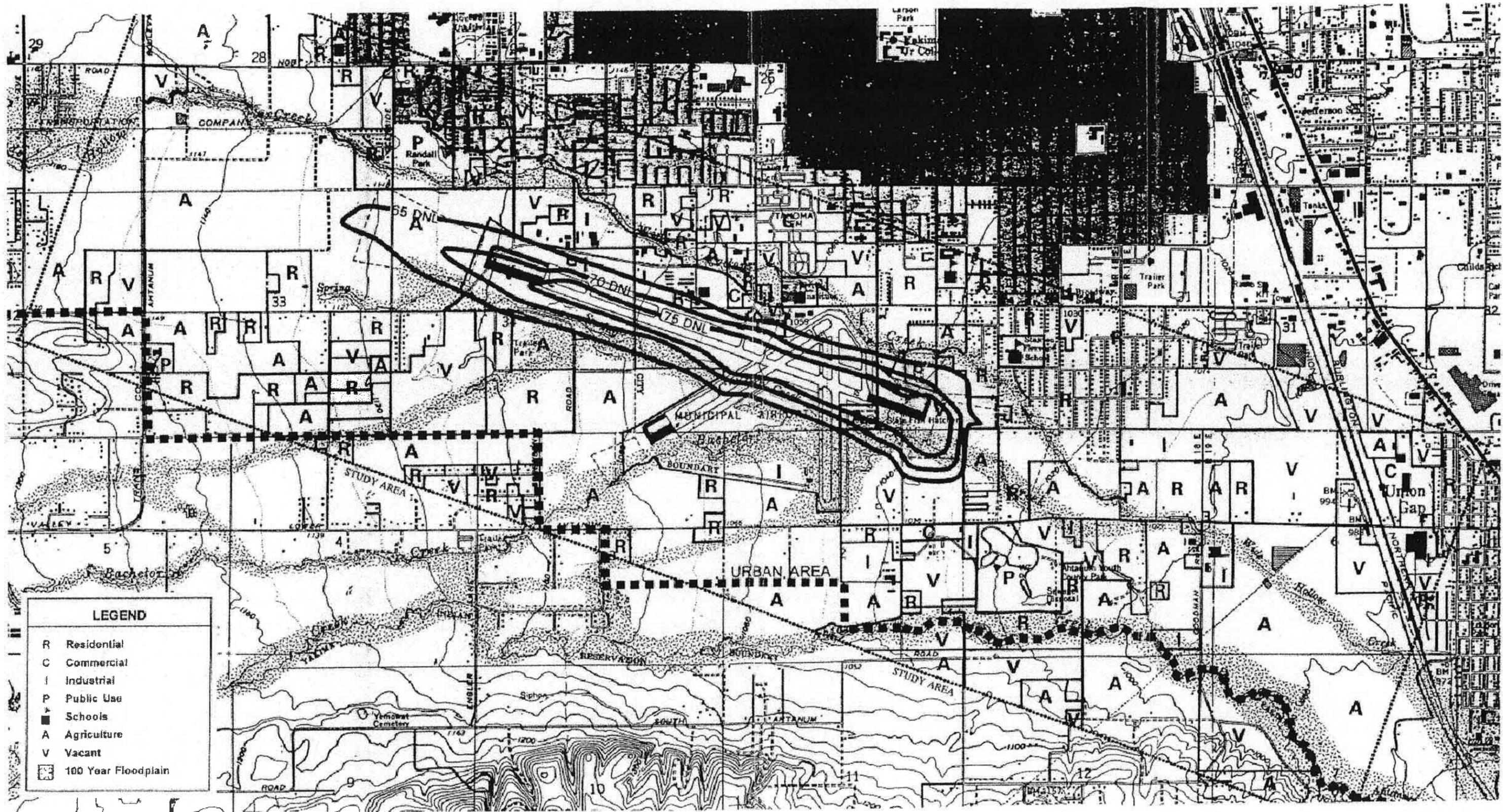


EXHIBIT 5-8

2012 NOISE CONTOURS
RUNWAY ALTERNATIVE 2



AIRPORT MASTER PLAN UPDATE

DDP YAKIMA AIR TERMINAL
DDP Yakima, Washington

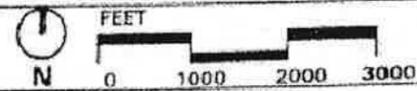


EXHIBIT 5-9

2012 NOISE CONTOURS
 RUNWAY ALTERNATIVE 3

Prime Farmland: Prime farmland, as defined by the U.S. Department of Agriculture (USDA), is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops without intolerable soil erosion, and land that is not already committed to urban development or water storage. Evaluation of the *Soil Survey of Yakima County Area Washington* and conversations with the Soil Conservation Service, have indicated that no land designated as prime farmland will need to be acquired to implement either Alternative 2 or Alternative 3.

Natural Areas: Natural areas in the vicinity of the airport were identified as those related to the streams and stream corridors of Bachelor Creek, Spring Creek, and Wide Hollow Creek.

Because floodplains are directly related to stream corridors and are identifiable on Federal and City land use maps, the relative impacts to natural areas was determined by measuring the amount of land designated as floodplain that would be needed for runway construction.

Floodplains are considered those areas with a one percent chance of flooding in any given year, or once in every 100 years. Examination of U.S. Geological Survey (USGS) maps and Federal Flood Insurance Maps have indicated that implementation of either Alternative 2 or 3 would require construction on approximately 5.1 acres of floodplain.

Development Costs

An estimate of the cost of constructing the facilities required under each alternative was made. Geometric and other pertinent information used in calculating these costs are as follows:

- Unit costs are based upon 1993 construction costs derived from reviewing data from past projects within the Yakima area;
- Site preparation includes the cost of preparing the land to accommodate the recommended runway extension plus a runway safety area, 500 feet wide extending 1,000 feet beyond the runway end;
- Runway 9-27 development costs were calculated based on the assumption that the existing runway and taxiway pavement will be upgraded or strengthened to meet the load bearing characteristics of Boeing 757 aircraft;
- Runway 4-22 development costs were calculated based on the assumption that the new extension will meet existing runway and taxiway load bearing characteristics;
- High Intensity Runway Lights (HIRL) will be installed on the Runway 9-27 extension, and Medium Intensity Runway Lights (MIRL) will be installed on the Runway 4-22 extension.

The results of the cost estimating process are shown in Exhibit 5-10. As indicated in this Exhibit, the estimated costs for each alternative are similar. The greatest difference is related to potential residential relocations, property acquisition, and roadway relocation costs. It should be kept in mind that these costs are for comparison purposes only, and the actual cost of implementing either alternative could vary substantially.

**EXHIBIT 5-10
 RUNWAY DEVELOPMENT COST ESTIMATES**

Descriptor	Alternative 2*	Alternative 3*
Land Acquisition Costs:		
• Fee Simple Property	\$88,000	\$83,000
• Avigation Easements	\$39,000	\$62,000
• Residential Relocations	\$2,590,000	\$1,200,000
• Fish Hatchery Relocations	\$1,600,000	\$1,600,000
Site Preparation:		
• Clearing and Grubbing	\$140,000	\$130,000
• Earthwork	\$1,070,000	\$1,370,000
• Roadway relocation	\$1,490,000	\$1,625,000
Strengthen Existing Runway 9-27 and Parallel Taxiway Pavement:	\$2,950,000	\$2,950,000
Runway and Taxiway Pavement Costs:	\$3,560,000	\$3,710,000
Runway and Taxiway Lighting Costs:	\$112,000	\$125,000
Runway and Taxiway Instrumentation Costs:	\$180,000	\$240,000
Subtotal	\$13,819,000	\$13,095,000
Runway 4-22 Extension Cost:	\$815,000	\$815,000
15 Percent Contingency	\$2,195,100	\$2,086,500
Total	\$16,829,100	\$15,996,500

* Alternative 2: A 2,557 foot Runway Extension to the East
 Alternative 3: A 1,279 foot Runway Extension to the West and a 1,278 foot Extension to the East

5.1.4 Runway Development Alternatives Evaluation

The purpose of this section is to evaluate the alternatives to provide the technical basis necessary for selecting a preferred runway development plan for the airport. Five alternatives, including the no-development option, were subjected to an evaluation that compared the merits and deficiencies of each option for development. Exhibit 5-11 presents a summary of the results.

**EXHIBIT 5-11
 EVALUATION SUMMARY**

Evaluation Factor	Do Nothing	Alt 1	Alt 2	Alt 3	Alt 4
Air Space Compatibility					
TERPS Conformity	Yes	No	Yes	Yes	No
Approach Flow	Good	Eliminated	Fair	Good	Eliminated

Operational Efficiency

Accommodation of Critical Aircraft	No	---	Yes	Yes	---
Ground Movement Efficiency	Good	---	Good	Good	---
Impact on Surface Transportation	Good	---	Good	Fair	---

Environmental Compatibility

Relative Noise Impacts	Good	---	Good	Good	---
Potential Relocations	0	---	28	13	---
Land Use Compatibility	Good	---	Fair	Good	---

Development Costs	\$1,600,000**	---	\$16,829,100	\$15,996,500	---
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- * Alternative 1: A 2,557 foot Runway Extension to the West
 Alternative 2: A 2,557 foot Runway Extension to the East
 Alternative 3: A 1,279 foot Runway Extension to the West and a 1,278 foot Extension to the East
 Alternative 4: A 10,160 foot Parallel Runway to the South of Runway 9-27
- ** Cost associated with relocation of fish hatchery

Alternative 1, a 2,557 foot extension of Runway 9-27 to the west and Alternative 4, the development of a 10,160 foot parallel runway to the south, were determined to be not feasible due to airspace and terrain constraints, and were excluded from further consideration. Both Alternative 2, a 2,557 foot extension to the east, and Alternative 3, a 1,279 foot extension to the west and a 1,278 foot extension to the east, were considered feasible from an airspace perspective. Although, implementation of Alternative 2 to the east, would require the elimination of the existing straight in nonprecision approach to Runway 27. This approach procedure is the only backup instrument approach to the airport should there be a failure of the ILS approach to Runway 27.

In evaluating the operational efficiency of the remaining three options, it was determined that only by implementing either of the two development alternatives, could the Yakima Air Terminal accommodate the critical aircraft identified in the facility requirements section. No advantage was found between the two alternatives in terms of taxiing distance, efficiency of ground movements, or visibility from the air traffic control tower.

In evaluating the impacts the alternatives would have on the existing and future roadways of the area, it was determined that the implementation of Alternative 2 would result in the removal of the South 16th Avenue temporary alignment and require a new north-south connection implemented in the vicinity of South 10th Avenue. Alternative 3 would impact West Washington Avenue, an important east-west arterial to the west of the airport. This important arterial would either need to be realigned and extended to the west of the proposed runway extension to achieve approach path requirements or constructed under the runway extension. The realignment and extension of West Washington Avenue would present significant right-of-way acquisition and construction costs. The undercrossing of the runway would result in significant construction costs but could be built within the existing right-of-way.

A comparison of the relative environmental impacts indicates that a runway extension completely to the

east will impact over twice as many residences as one that goes half to the east and half to the west. Implementation of Alternative 2 has the potential of requiring up to 28 residences to be relocated, compared with Alternative 3, which would require approximately 13 residential relocations. Noise impacts would be relatively equal, with an extension fully to the east creating more noise in that direction.

Costs associated with each alternative were found to be similar, with Alternative 3 estimated costs approximately \$833,000 less than Alternative 2. This difference is primarily related to the potential number of residential relocations associated with each alternative.

5.1.5 Recommended Airfield Alternative

Selection of a recommended airfield alternative was based upon both the quantitative factors presented the previous sections and subjective judgment based on previous experience. Review of the quantification factors indicates that while both Alternative 2 and 3 have yielded, in many cases, similar results, Alternative 3 consistently presented more advantages and flexibility.

Maintaining existing conditions, included in the analysis to provide a basis by which the other alternatives could be measured, clearly is not an acceptable plan if the airport is to achieve its goal of attracting charter air cargo operators. It does not allow the airport to maximize its potential as a Port of Entry, Foreign Trade Zone, or regional air service hub.

Alternatives 1 and 4 were not included in the analysis beyond the air space determination. Both were found to violate airspace safety criteria and were consequently eliminated from further consideration.

Alternative 2, a 2,557 foot extension of Runway 9-27 to the east, was determined to be feasible from an airspace perspective, but would require the elimination of an important instrument approach to the airport. This alternative also produced significantly more land use impacts than Alternative 3 in terms of residential relocations and changes in existing aircraft noise patterns. A 2,577 foot runway extension fully to the east would also significantly constrain roadway corridor options for the Valley Mall Boulevard Extension Study.

For the reasons outlined above, Alternative 3, a 1,279 foot extension to the west and a 1,278 foot extension to the east of Runway 9-27, combined with a 585 foot extension to Runway 4, is the recommended future development plan for the Yakima Air Terminal.

5.2 Terminal Area Development Alternatives

The need for an improved terminal building at the Yakima Air Terminal had been evident for sometime. Its interior organization caused several functional and operational problems for ticketing, enplaning and deplaning passenger flows, baggage claim, and customer queuing. It was also deficient in compliance for local building codes and the Americans with Disabilities Act (ADA) requirements. This led to recommendations that it ultimately be replaced.

Recognizing the need to improve and expand the facility, the Airport Board commissioned a terminal area study in 1988. This study provided an evaluation of the existing terminal building, its deficiencies, and the impact of retaining it for another 20 years. It also evaluated the future needs of the terminal as expressed in the 1987 Master Plan; developed and evaluated three alternative conceptual site plans; and examined costs. The study concluded that a new terminal south of Runway 4-22 offered the highest possible return in the long term.

5.2.1 Evaluation of 1988 Terminal Area Plan

A review and confirmation of the recommendation of the Plan for a new terminal location south of Runway 4-22 was conducted within the context of the 1996 Master Plan Update. Terminal building area requirements in gross square feet recommended in the 1988 Plan were [revised](#) and evaluated. [The following presents the evaluation and conclusions of the 1996 Master Plan Update:](#)

Terminal Siting Evaluation Criteria

There are a number of basic factors that must be considered in the siting of a passenger terminal. These factors revolve around the relationship of the terminal to the airfield, the relationship of the terminal to other airport facilities, and physical siting considerations. Criteria used to evaluate the recommended terminal site in the 1988 Plan included the following.

Runway Configuration: The runway configuration at an airport has a significant impact on the location of the apron-terminal complex. The terminal site should be located to minimize aircraft taxiing distances and times and the number of active runway crossings required between parking aprons and runways. At an airport, such as the Yakima Air Terminal, with a simple runway configuration, this may dictate locating the passenger terminal centrally with respect to the primary runway. At airports with more complex runway configurations, siting may require detailed analyses to determine runway use, predominant landing and takeoff directions, location and configuration of existing taxiways, and the most efficient taxiway routings. The runway configuration may also restrict ground access to certain areas of the airport and thus limit alternative terminal sites.

Access to Highway Network: The motor vehicle is and will continue to be the major mode of ground transportation to and from the Yakima Air Terminal. From a cost and efficiency standpoint, the passenger terminal should be located, when possible, to provide the most direct and shortest routing to the access roadway system serving the population center generating the major source of passengers and freight. Adequate area/distance should be provided between the public highway and the primary terminal building to accommodate the ultimate terminal development and necessary future highway interchanges and roadway alignment improvements.

Expansion Potential: To assure the long-term success of an airport terminal facility, potential expansion beyond forecast requirements should always be taken into consideration. In the planning stage, the terminal should be conceived in its ultimate form with reasonable allowance for growth and changes in operation beyond forecasted needs. Use of this principal in selecting a terminal site or expansion scheme will promote the provision of adequate space around the terminal (both on the airside and landside) for orderly construction of succeeding stages.

FAA Geometric Design Standards: Terminal facilities require a location that will assure adequate distances from present and future aircraft operational areas in order to satisfy FAA airport geometric design standards. These standards include such minimum separation distances as those between a runway centerline and aircraft parking aprons, buildings, and airport property lines; and those between a taxiway centerline and fixed/movable objects and other taxiways.

Existing and Planned Facilities: Existing and planned structures and utilities should be carefully inventoried and taken into account when planning new or expanded terminal facilities. In some cases, existing facilities or utilities, which are not related to and are restrictive to terminal development, can be demolished, abandoned, or relocated to a more suitable area. In other instances, existing conditions may limit the number of possible alternative terminal sites. In all cases, existing or planned locations of a FAA control tower, navigational aids, weather equipment, etc., should be analyzed to assure that terminal

development will not interfere with line-of-sight or other operational restrictions associated with these facilities.

Terrain: Topographical conditions should be considered in the selection of a terminal building site. For instance, potential drainage problems can be reduced if the terrain lends itself to naturally carrying water away from the building. Developing the terminal site on relatively flat land can prove economically advantageous by reducing grading or quantities of fill. An existing terrain feature, such as a grade differential between the landside of the terminal and an aircraft parking apron, can be minimized by use of multi-level terminal concept.

Environmental Impacts: The location of a terminal facility or major expansion of an existing one may result in significant environmental impacts that must be analyzed and weighed in considering alternative terminal sites.

Evaluation

According to the 1988 Plan, the advantage of a new terminal site south of Runway 4-22 is the site's potential for unlimited growth with no restrictions whatsoever through 2008 and beyond. The plan goes on to say that while this concept is by far the most expensive initially, the benefits afforded by having utilities, access roads, and aprons available to future industrial development along the abandoned north-south runway make this concept viable in terms of land acquisition and development return over the long term.

Along with the site evaluation criteria presented earlier, there are a number of other factors and events that were examined in evaluating the 1988 Plan recommendation. These included: (1) the new Valley Mall Boulevard roadway corridor; (2) the development of cargo activity at the airport and the need for a cargo operations area; and (3) the existence of an abandoned landfill on the proposed terminal location south of Runway 4-22.

Reliance on the widening of 16th Avenue from Washington Avenue to Ahtanum for terminal access from downtown was a major assumption in the 1988 site analysis. If runway 9-27 is extended, this will no longer be a possibility. Nevertheless, the new Valley Mall Boulevard will provide both direct access from I-82, and improved access from points north to the south side of the airport.

The same advantages cited in the 1988 Plan for a site south of Runway 4-22, (i.e., the benefits afforded by having utilities, access roads, and aprons available to future industrial development along the abandoned north-south runway), apply also to the development of a cargo center in this area. This has both positive and negative implications; location of passenger and freight facilities in proximity to each other facilitates the efficient servicing of aircraft carrying both passengers and cargo; however, the site may not be large enough for both facilities to expand.

The existence of a former landfill south of Runway 4-22 between Spring Creek and Bachelor Creek makes this area undesirable for development until the content and stability of the former landfill have been documented.

It is not always possible to locate a terminal so that ideal relationships are achieved between present and future airside and landside facilities. In making a trade-off between building a terminal close to the runways thereby limiting future aircraft parking, or not leaving adequate space for automobile parking and roadway expansion on the landside, a decision must be made as to which compromise creates the least impact to the airport with respect to safety, efficient operation, costs, and future expansion.

The existing terminal building site is adequate for the short term, but its expansion potential may be limited. Adequate terminal access roadways and parking is constrained by West Washington Avenue and associated development. The existing air carrier apron is also constrained by aircraft tail height restrictions that limit the number and size of aircraft that can park on the terminal ramp at one time.

The advantage of the recommended site on the south side of the airport is its potential for unlimited growth and a reorientation of development to the underdeveloped south side of the airport. This would open up the southwest portion of the airport along Spring Creek Road and South 36th Avenue to airport related development maximizing the airport's revenue potential. The disadvantage is the initial cost of development; construction of a passenger terminal at this location would require new surface access roadways and utilities, as well as the addition of a parallel taxiway south of Runway 9-27 to serve the new terminal area. Environmental impacts could also be significant due to the presence of Spring and Bachelor Creeks and the former landfill site.

The costs associated with a south side location could also be influenced by whether or not the runway improvements recommended in this plan are implemented and a strong air cargo market develops. Reversing the logic that utilities and access roads built to support a new south side passenger terminal would encourage industrial development, privately funded infrastructure improvements built to support cargo activities such as a Foreign Trade Zone and airport industrial park, could be used to support a new passenger terminal site.

Based on examination of a variety of factors, it was recommended that the terminal remain at its present location for the time being, since the facility requirements analysis indicated that based on demand, a new or relocated terminal was not needed immediately. Therefore, in the late 1990's, the airport implemented a three-phase project to improve the existing terminal building deficiencies, meet current code requirements, and provide expanded concourse area. Along with additional terminal area improvements recommended as part of the 2003 ALP update, the existing terminal area facilities are expected to meet the projected demand through the current 20 year planning horizon.

5.3 General Aviation Area Alternatives

As detailed in Section 4.4 of the Facility Requirements, additional general aviation related development will be needed at the Yakima Air Terminal over the next 20 years. The primary focus of general aviation growth will be in the development of corporate aircraft and air taxi services and facilities.

Developing the proper areas for general aviation hangars, apron, FBO/maintenance, air taxi, auto parking, and kindred facilities was approached using several considerations. In this analysis the following factors were examined:

- Compatibility with other airport facilities;
- Adequacy of land envelope;
- Compatibility with surrounding airport land use;
- Access to runway system; and
- Access from roadways.

The existing general aviation areas north of Runway 9-27 will provide limited space for expansion or redevelopment in the future. To accommodate future general aviation growth and to provide for an orderly progression of this development, an area in the southeasterly portion of the airport has been identified. With new vehicular and aircraft access, and capitalizing on newly installed utilities in the area, additional facilities for aircraft storage and parking can be accommodated. This type of user has generated inquiries in the past, but adequate space along with the needed utilities has not been available.

The southeasterly area was previously identified for location of the air cargo complex. This was further reviewed and found to conflict with existing general aviation in the area, and is somewhat remote from the runway which would lead to extended taxiing movements of cargo aircraft. This area has been re-defined for general aviation.

GENERAL AVIATION AREA

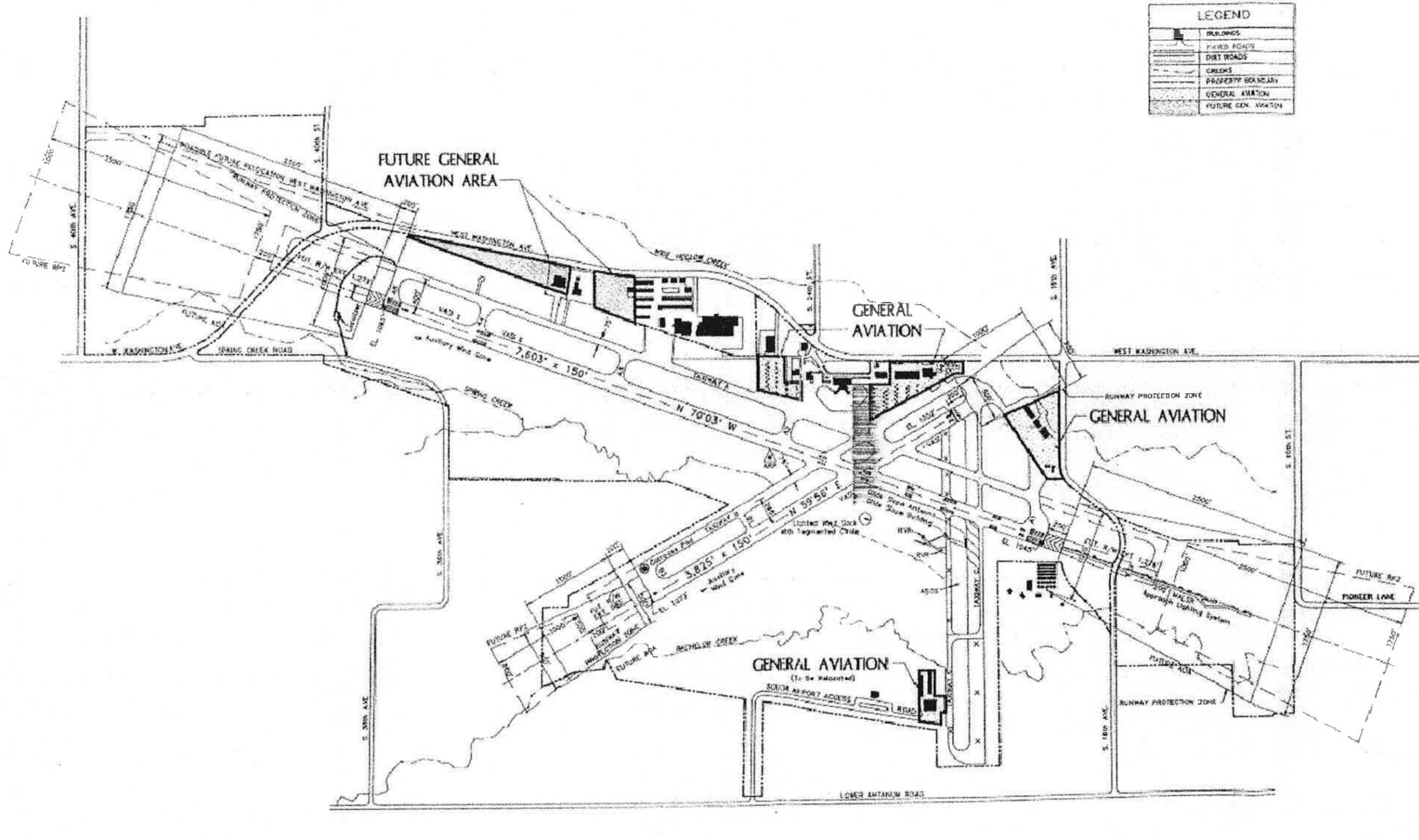


EXHIBIT 5-12
YAKIMA AIR TERMINAL MASTER PLAN
GENERAL AVIATION AREA

DATE	7-19-63	REVISIONS
DESIGNED BY	ETP	
CHECKED BY	KWC	
DATE	7-19-63	
SCALE AS SHOWN		
DRAWN BY	ETP	
BY	BUR BUCHER, WILIS & RATLIFF	
	ENGINEERING ARCHITECTS	

5.4 Air Cargo Development

Three primary considerations dictate the selection of a site on the airport for a cargo center. These include logistics, both airside and landside, land use efficiency, and site capacity. The logistical evaluation considers surface vehicle driving distances, arrival and departure taxiing distances, and the interaction of the cargo area with the passenger activity.

Land use efficiency considers how well the land is used from a planning perspective with the highest and best use being the objective. Also considered in this category are potential land use densities and compatibility with existing and planned land uses. The capacity of the site is also related to the land use density; however, each site should contain adequate capacity to meet the projected increase in demand for air cargo facilities as developed earlier in this report.

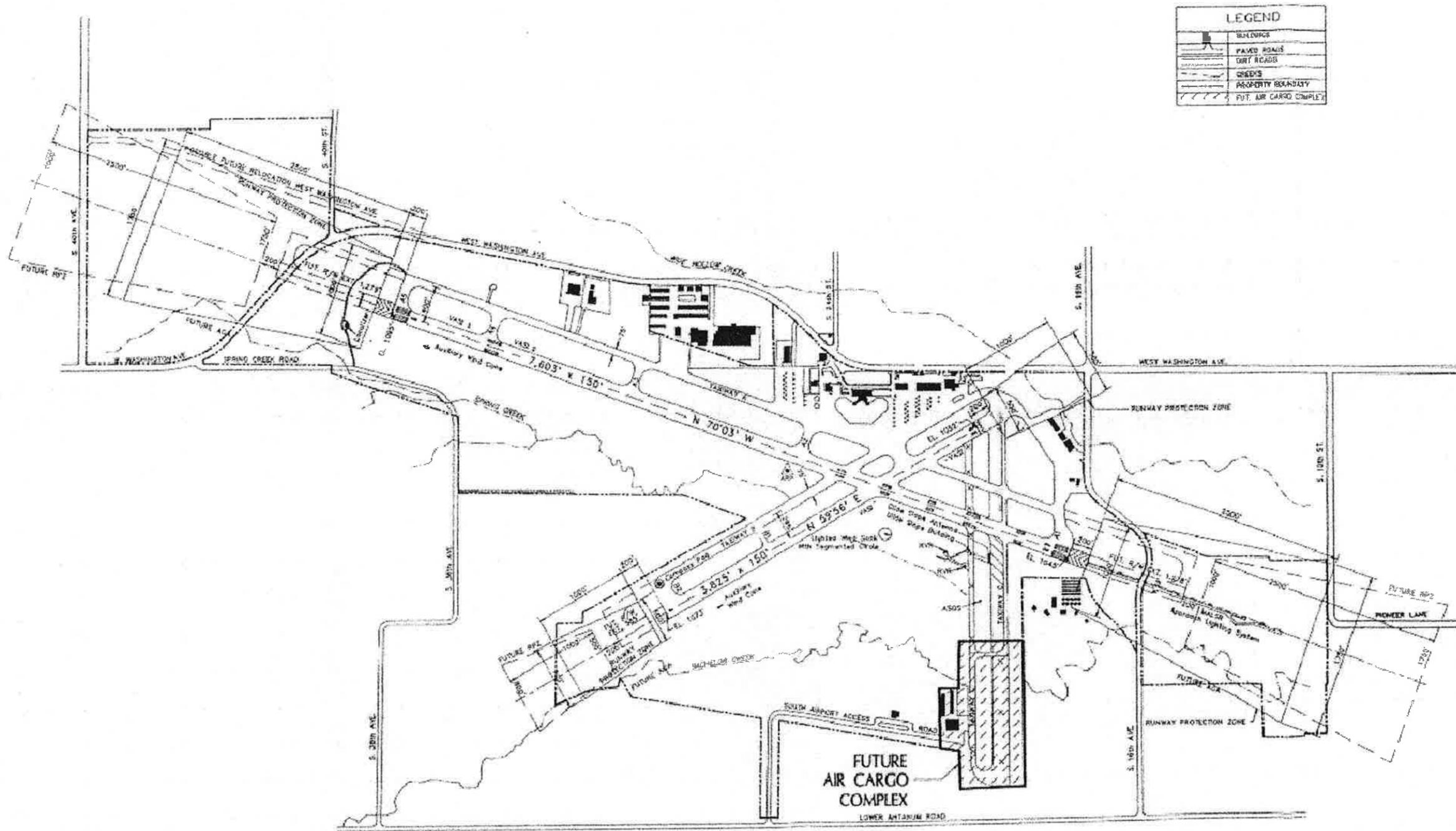
The 1996 Master Plan Update evaluated these factors and recommended the site at the south end of Taxiway C. However, considering the availability of additional industrial land for acquisition and re-evaluating the criteria, it is recommended that the future air cargo complex be located south of Runway 9-27 in a central location adjacent to South 36th Avenue. This location provides ample area for development; superior taxiway and runway access; the ability to support additional complementary aviation-related industrial/commercial operations; and does not create conflicts with existing general aviation facilities due to size, jet blast, or taxi routes.

5.5 Industrial Development Alternatives

The primary function of the Yakima Air Terminal is to provide the Yakima Valley and both the City and County of Yakima with a safe, efficient link to the nation's air transportation system. In order to accomplish this function, the use of available airport land must be subject to a set of priorities that assure that it is used for its best purpose. This priority list is summarized as follows:

- **Airport Operations Area:** Includes that land required for runways, taxiways, approaches, and related aviation facilities. The amount of land required herein is largely dependent upon the airport designation, safety areas, and FAA criteria.
- **Aviation Support Facilities:** Includes passenger terminal services, surface access, and general aviation facilities. Demand levels, required (or desired) auxiliary uses, and airfield layout are some of the factors that influence the amount of land required in this category.
- **Aviation Related Development:** This category includes land uses that are reliant, in some manner, upon the airport for their businesses. Examples include a cargo activities, aircraft manufacturing, remodeling, sales, and repair. Demand levels determine the amount of land specified for this use.
- **Industrial/Commercial Development:** This includes any businesses and/or industries that can locate on the airport but do not have any requirements to access the airfield. These concerns are compatible with airport operations, and space requirements are determined by demand.

AIR CARGO COMPLEX



LEGEND	
[Symbol]	BUILDINGS
[Symbol]	PAVED ROADS
[Symbol]	DIRT ROADS
[Symbol]	CREEKS
[Symbol]	PROPERTY BOUNDARY
[Symbol]	FUT. AIR CARGO COMPLEX

EXHIBIT 5-13 YAKIMA AIR TERMINAL MASTER PLAN AIR CARGO COMPLEX

DATE: 91-170	DESIGNED BY: TEP	DATE: 7-18-91	REVISION:
DRAWN BY: KWC	CHECKED BY: KWC	DATE: 7-19-91	
SCALE AS SHOWN	CHECKED BY: BOW	DATE:	
BY:	BUR BOYER, WILLS & RATLIFF		
	DESIGNERS PLANNERS ARCHITECTS		

- **Vacant or Buffer Areas:** Areas that, for any reason, cannot be used for any of the preceding broad uses should be set aside as buffer areas to complement surrounding, possible non-compatible, and community land uses.

Areas of existing land that could be classified as available for industrial development but without access to the airfield are the northwest portion and the south-central portion of existing airport property. Following the proposed relocation of West Washington Avenue from the 40th Avenue to the 48th Avenue corridor, two developable parcels will exist to the north and to the south of the future RPZ. These parcels will not have access to airport operational areas but are well suited to aviation compatible industrial development. Existing property adjacent to the south airport access road is also well suited to industrial development but lacks the access to operational areas.

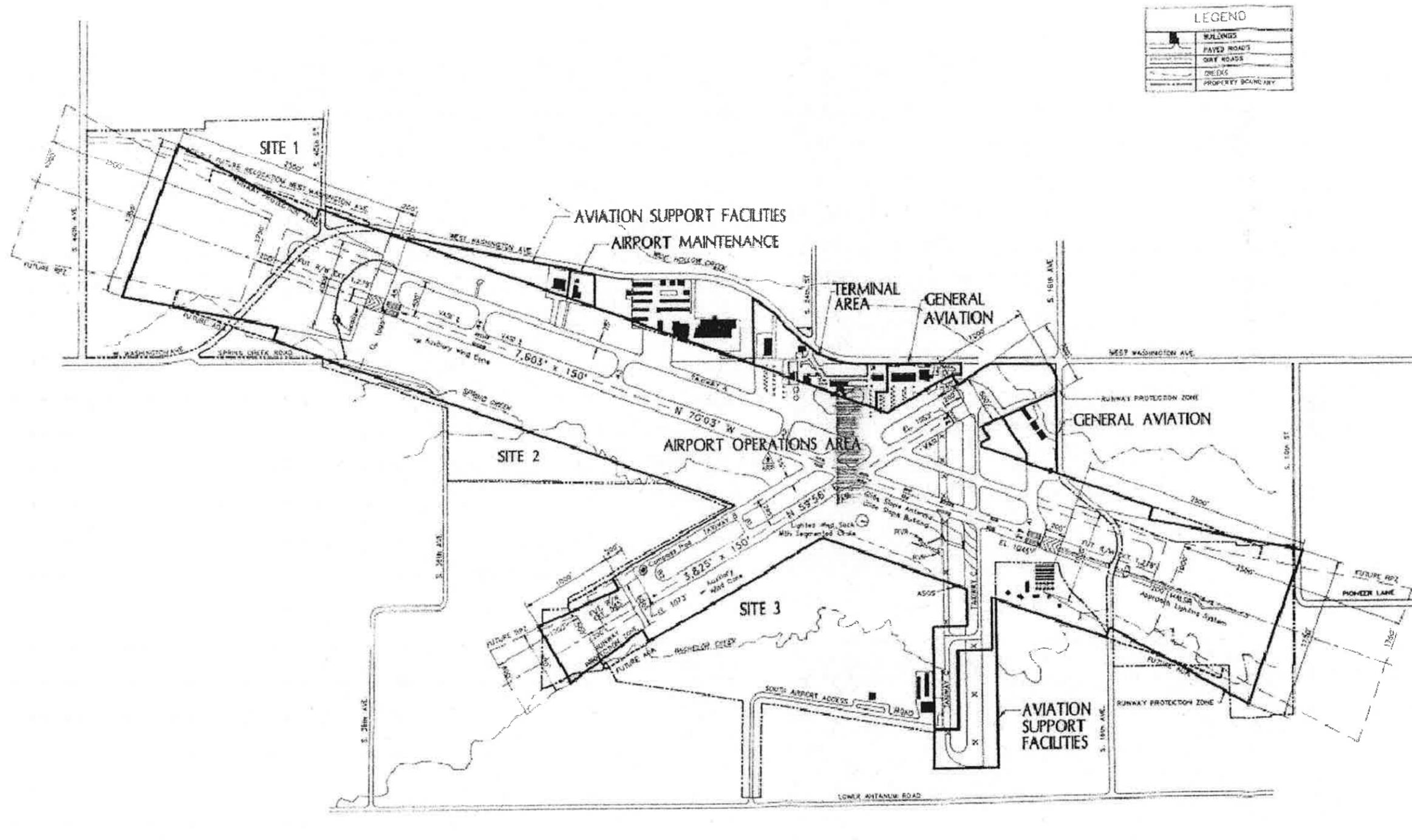
5.5.1 Identification of Potential Sites

Exhibit 5-14 delineates two distinct areas that could be classified as available land not needed for aeronautical purposes. Each of these sites will be evaluated in terms of their ability to accommodate some type of alternative development. The sites to be studied are described below.

Site 1: This site, located on the northwest corner of the airport property, is one that will be created as a result of the runway extension and realignment of West Washington Avenue. It is divided in two by the runway and RPZ. Parcel A and Parcel B both contain approximately 26 acres.

Site 2: This site is located off of South 36th Avenue, in the area south of Runway 9 and west of Runway 4.

AVAILABLE DEVELOPMENT SITES



LEGEND	
[Symbol]	BUILDINGS
[Symbol]	PAVED ROADS
[Symbol]	GRAVEL ROADS
[Symbol]	DRENCH
[Symbol]	PROPERTY BOUNDARY

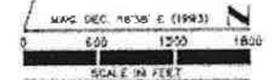


EXHIBIT 5-14
 YAKIMA AIR TERMINAL MASTER PLAN
 AVAILABLE DEVELOPMENT SITES

DATE: 8-1-93	DESIGNED BY: TTP	DATE: 7-19-93	CHECKED BY:
DRAWN BY: KRC	DATE: 7-19-93		
SCALE: AS SHOWN	DESIGNED BY: BCW	DATE:	
DRAWN BY:	BUR BUEHLER, WELLS & RATLIFF		
BY:	ENGINEERS ARCHITECTS		

5.5.2 Site Evaluation

The following paragraphs examine each of these sites to determine their suitability for development for other uses. This examination will be limited to issues such as topography, accessibility, tract size, available utility infrastructure, and other site conditions. It is not intended to include such factors as market demand for industrial/commercial sites, manufacturing types that could be attracted, or other market conditions. The discussion will focus on those broad types of development that could be accommodated, and will make recommendations as to which, if any, would be best suited.

Site 1

Site 1 can be evaluated as two distinct parcels. Parcel A is a strip of developable land that will be created with the extension of Runway 9. It is located north of the Runway 9 airport operations area and south of a potential corridor for the relocation of West Washington Avenue. The site has direct access to two arterial roadways and utilities can be available.

Some industrial development such as warehousing, light manufacturing, or commercial development could be suitable. Because portions of the site have direct access to the runway and taxiway system, aviation related industrial/commercial would be an appropriate use of this site. Should this parcel be developed, the development should be subject to a stringent set of performance standards that limit building heights, smoke emissions, electronic interference, and noise generation or toleration.

Parcel B contains 26 acres immediately south of the Runway Protection Zone for Runway 9. Because Spring Creek meanders throughout this location development potential may be limited. The area could be used for agriculture or low intensity recreation activity.

Site 2

Site 2 is a parcel located off of South 36th Avenue (Sorenson Road) south of Runway 9 and west of Runway 4. Because of the presence of Spring Creek, which meanders through the area, development may be limited to low intensity area.

Summary

Exhibit 5-15 shows the proposed uses for all airport property at the Yakima Air Terminal. The recommendations shown on this exhibit represent a determination of possible uses for land that is presently under utilized. As previously stated, no assessment of market demand for developments has been included, so the timing of the conversion of these sites has not been determined.

5.5.3 Off Airport Land Acquisition

To promote compatible land use in the vicinity of the airport, to provide adequate land for approach protection, and to provide adequate land for aeronautical purposes, acquisition of several land areas is recommended. For approach protection, acquisition is recommended for the future RPZ and approach areas beyond Runways 9, 27, and 4, and the property between the proposed Valley Mall Boulevard and existing airport property. To meet future development needs, land acquisition is recommended adjacent to the South airport property. To meet future development needs, land acquisition is recommended adjacent to the South 39th/36th Avenue corridor, between existing airport property and Ahtanum Road, and between existing airport property and South 16th Avenue. Acquisition of these properties would provide definitive control of the land and ensure its compatibility with future airport operations.

SITE DEVELOPMENT

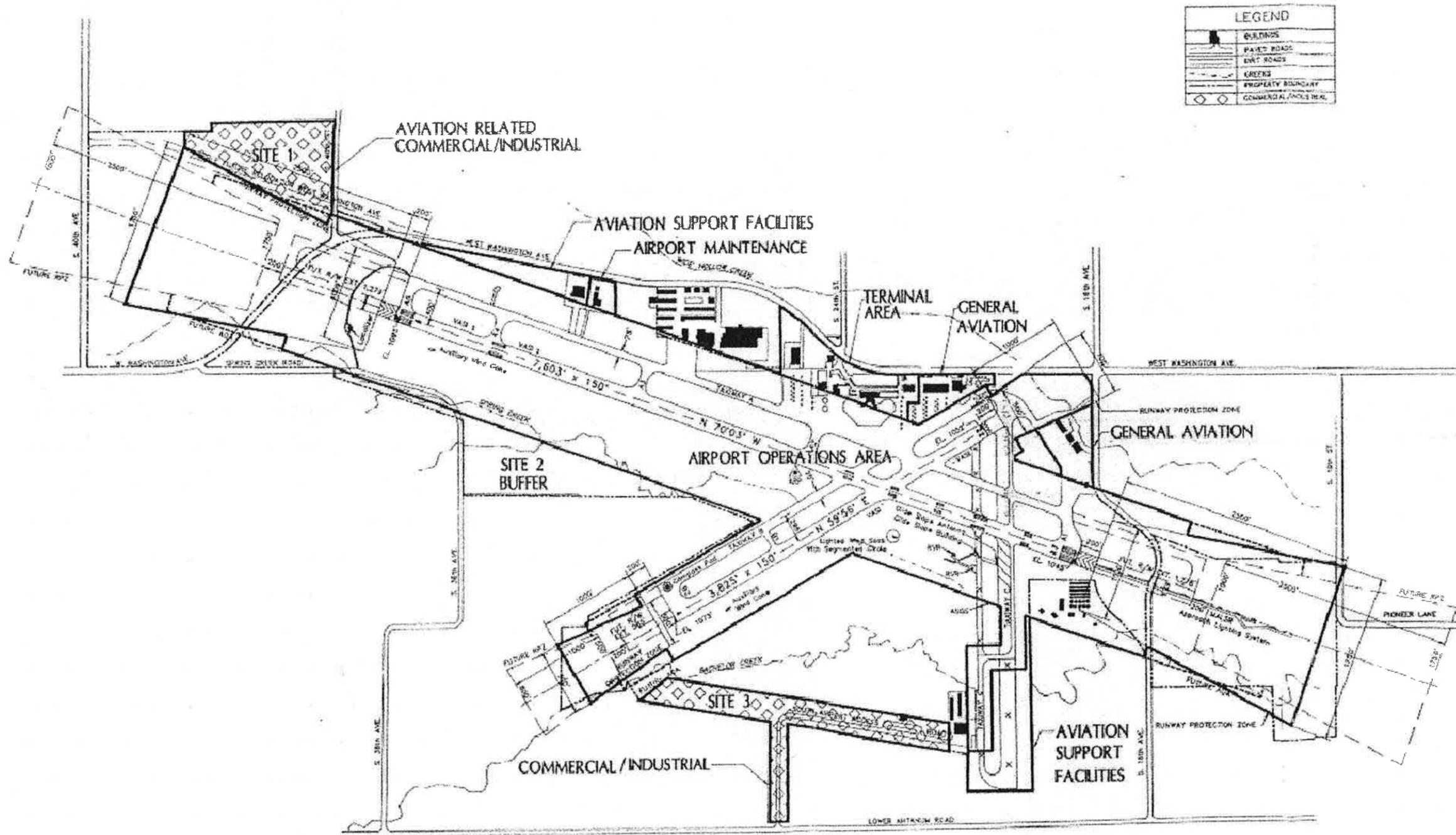


EXHIBIT 5-15
YAKIMA AIR TERMINAL MASTER PLAN
SITE DEVELOPMENT

DATE: 7-17-93	DESIGNED BY: JED	DATE: 7-19-93	REVISIONS:
DRAWN BY: JED	CHECKED BY: KMS	DATE: 7-19-93	
SCALE AS SHOWN	APPROVED BY: ROW	DATE:	
BUR BUCKER, WELLS & RATLIFF ENGINEERS ARCHITECTS			