6

AIRFIELD DESIGN

DESIGN ISSUES

For the role which it serves, Orland Haigh Field has an extensive amount of land and more than adequate runway length. Various components of the runway and taxiway system nevertheless do not meet Federal Aviation Administration design standards. Also, many areas are in a deteriorating condition.

Figure 6 graphically summarizes the airfield's most notable problems and also points out the substantial opportunities for improvement which are available. The remainder of this chapter addresses these airfield design issues.

AIRPORT DESIGN STANDARDS

Appendix B discusses the relationship between specific characteristics of an airport's "critical" aircraft and the design standards most applicable to the airport.

Development of a long-range plan for Orland Haigh Field's runway and taxiway system requires first that the appropriate runway classification and associated design standards for the Airport be determined. Table 7 compares the design standards potentially applicable at the Airport with the existing layout dimensions. As can be seen, there is no close correlation between the existing dimensions and any one set of standards. The closest similarity is with the former General Utility standards, however the runway length is much longer than required and the runway width is substandard.

The primary determinants of the appropriate future classification are the type of aircraft which will use the Airport and the type of instrument approach available.

- **Aircraft Types** – The current use of the Airport almost exclusively by small, single-engine airplanes best fits the criteria for a Basic Utility Stage II or General Utility Stage I facility. The anticipated usage of the Airport also fits into these classifications.

- **Instrument Approach** – For runway classification purposes, the Airport's present circling, non-precision instrument approach is treated the same as a visual approach. As discussed later in this chapter, upgrading of this approach is not anticipated.

Under most circumstances, an airport should be designed to the highest set of standards needed to accommodate the critical aircraft likely to use the facility on a regular basis in the future. This objective must be balanced against the costs – both in dollars and in the

loss of opportunity to better utilize available land – of implementing a higher set of standards.

Given these factors, it is recommended that the Orland Haigh Field runway be considered a General Utility Stage I facility. However, where General Utility Stage II standards can be attained with no significant additional cost, these dimensions should be used. Specific implications of these recommendations are discussed later in this chapter.

RUNWAY LONGITUDINAL DESIGN REQUIREMENTS

The longitudinal requirements of a runway design involve more than just the runway length. Other components include the runway safety area, approach surfaces, landing threshold location, and clear zones.

Runway Length Standards

Classification		Required Length
Basic Utility Stage II		3,200 feet
General Utility Stage I		3,800 feet
General Utility Stage II		4,400 feet
Transport (Business Jets)		
% of Fleet	% of Useful Load	
75%	60%	4,750 feet
100%	60%	5,750 feet

Runway Length

The existing runway length exceeds the requirements for all aircraft now operating at the Airport or anticipated to regularly operate there in the future. The runway could in fact be shortened by several hundred feet without seriously affecting the operating capabilities of any of these aircraft. At a minimum, the General Utility Stage I standard should be met. However, in keeping with the design philosophy recommended above, the General Utility Stage II standard is recommended as the minimum length.

Runway Safety Area

A *runway safety area* is a cleared, drained, graded, and preferably turfed area symmetrically located about the runway which, under normal conditions, is capable of supporting snow removal, fire fighting, and rescue equipment and of accommodating the occasional passage of aircraft without causing major damage to the aircraft.

Neither end of the runway has a safety area which fully satisfies FAA standards. The runway safety area should extend a minimum of 240 feet beyond the runway end for a General Utility Stage I runway or 300 feet for a General Utility Stage II facility.

At the approach end of Runway 15, the runway pavement comes within 50 feet of County Road 200. To the south, there is no physical barrier at the end of the runway; however, the runway stops at the airport property line and the ground beyond does not conform to the grading standards for a safety area.

Approach Surfaces

The existing circling non-precision approach at Orland Haigh Field is treated as a visual (20:1 slope) approach for the purposes of Federal Aviation Regulations Part 77 approach surface requirements. County Road 200 at the runway's north end lies within the primary surface which extends 200 feet beyond the runway end. There are no more distant obstacles. Power lines 30-feet high along County Road 24 are the critical obstacles within the Runway 33 approach, but are some 30 feet below the approach surface.

Table 7

AIRFIELD DESIGN STANDARDS

	Existing Standards			*Former Standards*		*Existing*
	Basic Utility Stage II[a,d]	General Utility Stage I[a,d]	General Utility Stage II Nonprecision and Visual[a,e]	Basic Utility Stage I[b]	General Utility[b]	Runway 15-33
Pavement Strength	12,500 lbs.	12,500 lbs.	12,500+ lbs.	12,500 lbs.	12,500 lbs	8,000 lbs.
Runway						
Length[c]	3,200 ft.	3,800 ft.	4,400 ft.	3,200 ft.	3,800 ft.	5,160 ft.
Width	60 ft.	60 ft.	75 ft.	60 ft.	75 ft.	50 ft.
Taxiway						
Width	25 ft.	25 ft.	35 ft.	30 ft.	40 ft.	40 ft.
Runway Safety Area						
Width	120 ft.	120 ft.	150 ft.	120 ft.	150 ft.	120± ft.[g]
Length (beyond runway end)	240 ft.	240 ft.	300 ft.	200 ft.	200 ft.	Rwy 15 – 20 ft. Rwy 33 – 20 ft.
Runway Obstacle Free Zone						
Width	250 ft.	250 ft.	250 ft.	–	–	–
Runway Centerline to:						
Taxiway Centerline	150 ft.	225 ft.	240 ft.	150 ft.	200 ft.	200 ft.
Aircraft Parking Area	125 ft.	200 ft.	250 ft.	200 ft.	250 ft.	350 ft.
Building Restriction or Property Line						
Non-Taxiway Side	125 ft.	200 ft.	250 ft.	200 ft.	250 ft.	350 ft.
Taxiway Side	194 ft.[f]	269 ft.[f]	307 ft.[f]	200 ft.	250 ft.	480 ft.
Taxiway Centerline to:						
Fixed or Movable Obstacle	44 ft.	44 ft.	67 ft.	50 ft.	50 ft.	–
Taxiway Centerline	69 ft.	69 ft.	103 ft.	–	–	–

[a] Source: FAA Advisory Circular 150/5300-4B, Change 8, "Utility Airports – Air Access to National Transportation" (1985).

[b] Source: FAA Advisory Circular 150/5300-4B, Change 3 (1978).

[c] Standards relative to Orland Haigh Field's 96° F. mean maximum, hottest month temperature and 215 feet MSL elevation.

[d] For aircraft with wingspans up to 49 feet.

[e] For aircraft with wingspans up to 79 feet.

[f] Assuming taxiway to fixed or movable obstacle distance below.

[g] At north and south ends. Asphalt mat provides wider safety area in center section.

Landing Threshold Location

When structures, trees, vehicles, or other objects in the approach area penetrate the approach surface and cannot be eliminated, displacement of the runway landing threshold may be necessary. The amount of displacement is determined by a threshold location plane which, for a visual runway approach, begins at the runway end and slopes upward at 20:1 as shown on the left. Objects thus can penetrate the approach surface, but not require a displaced threshold. A minimum of 15 feet threshold location plane clearance is required over public roads.

As a rule, establishment of displaced thresholds is discouraged. The preferred solution is to remove the offending obstruction. Where shortening of the runway would not significantly affect aircraft operations, relocation of the runway end to eliminate the displaced threshold is another option to be considered.

At Orland Haigh Field, the Runway 15 landing threshold is displaced by 345 feet because of County Road 200 (actually, the edge of the threshold location plane clears the road by slightly less than the required 15 feet). There are no obstructions which necessitate the existing 350-foot displacement of the Runway 33 threshold. The displacement is apparently to permit farm equipment to work on the adjacent property without being hazards to landing aircraft. It could be eliminated if the County obtained control over the approach area land.

Clear Zones

The FAA defines a *runway clear zone* as a trapezoidal area at ground level, under the control of the airport authorities, for the purpose of protecting the safety of approaches and keeping the area clear of the congregation of people. The runway clear zone begins at the end of each primary surface and is centered upon the extended runway centerline.

The FAA requires that an airport operator have sufficient control over property lying within runway clear zones to assure the safety of aircraft approaches and to keep the area clear of congregations of people. Clear zones are located relative to the runway ends and do not take into account any threshold displacements.

No part of either Orland Haigh Field runway clear zone is located on airport property.

RUNWAY LONGITUDINAL DESIGN ALTERNATIVES

When physical barriers, particularly ones which cannot readily be eliminated, occur a short distance beyond the runway ends, tradeoffs often must be made in the design of the above components. Such is the case at Orland Haigh Field. At the north end of the Airport, County Road 200 must for all practical purposes be regarded as a fixed barrier – relocation of the road would only make sense if other feasible airfield design options were not available. The property line at the runway's south end, on the other hand, represents much less of a constraint. County acquisition of the property is a realistic alternative; availability of funding is the principal impediment.

For each runway end, five basic designs can be defined:

- Leave runway end in existing location.
- Move runway end to provide threshold location plane clearance over road/property line.
- Move runway end to provide FAR Part 77 approach surface clearance over road/property line.
- Locate runway end coincident with extent of parallel taxiway.
- Shorten runway to bring clear zone onto existing airport property.

Table 8 describes the advantages and disadvantages of the options common to both runway ends. To fully evaluate the alternative designs, however, the differences between the two runway ends must be recognized and the combined effects of changes at each end considered simultaneously.

The runway length which would result from each of the 25 combinations is indicated below. Combinations which provide at least the General Utility Stage II length of 4,400 feet are best. General Utility Stage I lengths of 3,800 to 4,400 feet may also be acceptable if warranted by other factors. Any length less than 3,800 feet is not acceptable.

Runway Length Analysis

Length Reduction (feet)

	North	*South*
A – Leave as Is	0	0
B – Threshold Location Plane Clearance	360	350
C – Approach Surface Clearance	560	550
D – Equal to Taxiway	550	600
E – Clear Zone on Property	1,350	1,250

Resulting Overall Length (feet)

South \ *North*	**A**	**B**	**C**	**D**	**E**
A	5,160	4,800	4,600	4,610	3,810
B	4,810	4,450	4,250	4,260	3,460
C	4,610	4,250	4,050	4,060	3,260
D	4,560	4,200	4,000	4,010	3,210
E	3,910	3,550	3,350	3,360	2,560

Among other significant considerations and tradeoffs between the two ends are:

- A displaced threshold cannot be avoided at the north end of the runway unless the runway is shortened or County Road 200 is moved. The latter is not deemed practical. There are no fixed obstructions requiring a threshold displacement on the south even with the runway end in its existing position (the existing displacement allows farm equipment to move freely on the adjacent property).

- Relocating the north end of the runway so as only to provide threshold location plane clearance over the road (a 400-foot length reduction) is the minimum acceptable solution for that end. Much more preferable is for the road also not to penetrate the runway approach surface. This requires an additional 200 feet of length reduction as shown on the left.

- Land acquisition at the south end of the runway would be contiguous to existing airport property, whereas additional property on the north would be separated from the Airport by County Road 200.

- The parcels immediately beyond both ends of the runway are devoted to agricultural use, although neither is in active production at the moment.

- There are no dwellings in either clear zone although many more are located near the north end of the runway than the south end.

Given the design requirements and objectives outlined above, the optimum design configuration is judged to be to relocate the north end of the runway to provide approach surface clearance over County Road 200 and to leave the south end in its present location. This design results in a runway length of 4,500 feet, 100 feet longer than the General Utility Stage II standard. Specific changes at each end include:

- The approach end of Runway 15 should be relocated by approximately 560 feet. No displaced threshold is required. The remaining pavement beyond the new end should be marked with chevrons and maintained as an overrun.

- The displaced threshold at the south end of the runway should also be eliminated. To do so requires that the county obtain control over the clear zone property adequate to protect the runway approach surface. The subject of land acquisition is addressed Chapter 8.

RUNWAY LATERAL DESIGN REQUIREMENTS

Table 7 noted most of the standards for distances to objects laterally from the runway. In general, these standards pose no problems at Orland Haigh Field, particularly for the portion of the runway located on the asphalt mat. Certain items require some discussion, however.

Runway Width

The existing 50-foot runway width is 10 feet less than the General Utility Stage I standard and 25 feet narrower than the General Utility Stage II criterion. The runway should be widened. Given the anticipated usage of the Airport and the low cost-effectiveness of a wider than necessary runway, the 60-foot General Utility Stage I width is regarded as the appropriate design. A greater width sometimes can be justified at airports having strong crosswinds and no crosswind runway. Such winds are not very common at Orland Haigh Field, however.

Runway Safety Area

The width standards for a runway safety area are 120 feet for General Utility Stage I and 150 feet for General Utility Stage II. Orland

Table 8

RUNWAY ENDS ANALYSIS

A – Leave in Existing Location

Leave runway end at the existing physical end of the pavement. Runway 15 displaced threshold must remain. Runway 33 displaced threshold can be eliminated if adequate control of clear zone is obtained.

Advantages	*Disadvantages*
• Provides maximum runway length.	• Clear zones are completely off of existing airport property. • No taxiway access to runway ends unless taxiway is extended. • Substandard safety area length on existing property.

B – Provide Threshold Location Plane Clearance

Relocate runway ends to approximately where displaced thresholds are now located.

Advantages	*Disadvantages*
• Preserves most of runway length. • Allows displaced thresholds to be eliminated.	• Only minimally meets obstacle clearance criteria – objects would continue to be FAR Part 77 approach surface obstructions. • No taxiway access to runway ends unless taxiway is extended. • Most of clear zone off property.

C – Provide FAR Part 77 Approach Surface Clearance

Relocate runway ends an additional 200 feet farther in from above alternative.

Advantages	*Disadvantages*
• Provides full 15 feet of approach surface clearance at road/property line. • Displaced thresholds not required.	• Majority of clear zones remain beyond existing property line. • Eliminates use of at least 500 feet of runway at each end.

D – Equal to Taxiway Limits

Locate runway ends at limits of taxiway access to runway.

Advantages	*Disadvantages*
• Existing taxiway provides access to runway ends. • Displaced threshold not required.	• Marginal quality of pavement requires taxiways to be reconstructed; existing taxiway location as basis for runway ends thus eliminated.

E – Clear Zone on Property

Relocate runway ends sufficiently to get clear zones on existing property.

Advantages	*Disadvantages*
• Clear zone protection provided without additional land acquisition.	• Requires substantial reduction of runway length.

Haigh Field has more than adequate safety area width on the portion of the runway which overlays the asphalt mat. On the runway extensions, reasonably good shoulders appear to be about 25 feet wide, resulting in a total safety area width of only 100 feet. Minor additional grading and shoulder stabilization would bring the remainder of the runway safety area up to standard.

Runway-to-Taxiway Distance

For General Utility Stage I and Stage II runways, the required separation distances between a runway and a parallel taxiway are 225 and 240 feet, respectively. Either standard exceeds the Airport's existing 200-foot separation. The 200-foot distance was the former standard for General Utility runways. Because the taxiway was built prior to the change in standards, it is not essential that the separation be increased. Unless a precision approach is planned, the cost of such a change substantially exceeds the benefits for most airports. At Orland Haigh Field, however, several circumstances warrant repositioning the parallel taxiway at a distance of 240 feet from the runway.

- Most of the parallel taxiway lies on the asphalt mat and is defined only by a painted (barely visible) centerline stripe. A pavement seal coat or overlay is required along the taxiway alignment regardless of the setback distance chosen. Because the mat is in relatively uniform condition, the cost of changing the taxiway location is negligible.

- Much of the north portion of the taxiway is in poor condition and would require essentially complete reconstruction to repair.

- If the taxiway is to be moved, the choice is between the 225 and 240-foot distances. As discussed in the next chapter, the 15-foot difference would not significantly affect the utilization or capacity of the area remaining for buildings and aircraft parking.

- The 240-foot separation would allow the existing taxiway to stay in use while the new taxiway is constructed. With the 225-foot distance, this might be difficult, especially at the north end.

Building Restriction Line

The established 500-foot building setback distance is substantially greater than required even by General Utility Stage II standards. Allowing for aircraft with wingspans of up to 79 feet, buildings could be placed as close as 67 feet from the parallel taxiway (clearance for 49-foot wingspans requires a setback of only 44 feet). Where there is no parallel taxiway (e.g., beyond the runway ends), the minimum is 250 feet from the runway. Nevertheless, for reasons addressed in the Building Area Development chapter, it is usually desirable to keep buildings farther from the runway than required for operational safety.

Aircraft Parking Limit

As with the building restriction line, the controlling distance for the aircraft parking limit line is the setback from the parallel taxiway. For

Orland Haigh Field, a distance of 50 feet is recommended. This setback meets the lateral clearance standards for aircraft with wingspans up to 57 feet (slightly longer than a Beech Super King Air, one of the largest aircraft which might use the Airport on a regular basis).

TAXIWAYS

Consistent with the recommended width of the runway, taxiways should be 25 feet wide. The parallel taxiway should be extended to serve both proposed ends of the runway. Holding bays (run-up pads) large enough to accommodate two or three small aircraft should be provided at each end.

Aircraft currently can exit the runway at any location on the asphalt mat. For increased safety as well as reduced pavement maintenance, specific exit locations should be defined. For a runway with the proposed length of 4,500 feet, the ideal runway exit locations would divide the runway length into fourths. The precise exit locations should be slightly adjusted as necessary to align them with principal building area taxilanes.

PAVEMENT EVALUATION

Existing Conditions

Asphalt Mat

The asphalt mat on which lies all of the airfield except the runway ends and the north end of the parallel taxiway is now approximately 45 years old. It consists of approximately two inches of road mix material spread with a blade on compacted native soil. The native soil appears to be of sufficient quality to qualify as base material.

It has held up remarkably well considering its age and limited maintenance. Deterioration is occurring, however. Alligator cracking is apparent throughout the mat, breaking the pavement into 6- to 8-inch rectangular sections. The cracks appear to be due to thermal conditions rather than load induced. Another problem, one which results from the manner in which the pavement was laid, is pavement rutting. This condition causes extensive ponding after a rainfall. In some places, as much as 2 inches of water can accumulate.

See Appendix C for pavement evaluation details.

The general direction of drainage of the mat is toward the southeast. The existing runway overlay tends to act as a dam, channeling runoff from the west side of the mat to the point where the runway intersects the mat's south edge. Water then drains along the runway's west edge or sometimes across the pavement. The building area generally sheet drains toward the east edge of the mat, although several predictable flow lines have developed. Water tends to flow through many of the hangar buildings.

Runway and Taxiway

The portion of the runway on the original asphalt mat has a 2-inch asphalt overlay constructed in 1969. The extensions are comprised of 2 inches of asphaltic concrete on top of native soil. Both segments are estimated by the FAA as having a strength of 8,000 pounds for single-wheel landing gear aircraft.

Generally, the runway pavement is in good condition. Minor block cracking has occurred as is normal for pavement of this age. Also, there are areas of ponding on the portion which overlays the asphalt mat. These depressions probably have reflected up from the underlying surface.

The north extension of the parallel taxiway consists of a similar pavement section as that of the runway extensions. The pavement has been deeply rutted by passage of a very large transport aircraft. Otherwise it is in very good condition. No special treatment has been given to the remainder of the parallel taxiway to differentiate it from the asphalt mat.

Maintenance and Rehabilitation Program

Asphalt Mat

The ideal remedial action for the asphalt mat would be either to overlay the existing pavement or to remove and replace it with new pavement (possibly using the old material for base rock). As an overall program, however, the current and anticipated intensity of airport use does not warrant the cost which such measures would entail. Pavement replacement or overlay should limited to selected high-traffic areas and places where the pavement deteriorates to the point that other maintenance actions become ineffective.

The recommended alternative is to skin patch isolated low areas and failed pavement followed by application of three coats of cold tar slurry seal. This would create a very serviceable pavement for much less cost.

A slurry seal, though, would not cure the overall drainage problem on the mat. Such a large and flat area cannot be adequately drained by surface flow. The cost of most remedial actions, however, undoubtedly exceeds the benefits to be gained. Some improvement may be worthwhile in the runway/taxiway area as noted below. Also, future buildings should be designed to keep water from flowing through them.

The western three-quarters of the mat and other portions not needed for aircraft movement should be allowed to deteriorate unless specific uses for it exist. Periodic sweeping is recommended to keep loose gravel from being tracked or blown onto aircraft operating areas.

Runway and Taxiway

The recommended rehabilitation for the runway is placement of a two-inch asphalt overlay. This will effectively strengthen and prolong

the pavement life as well as provide improved drainage.

The only efficient means of repairing the damage northern segment of the taxiway is to remove the pavement and replace it with 2 inches of new asphaltic concrete. An overlay of the remainder of the parallel taxiway is recommended both as a way of maintaining the pavement and to help define aircraft circulation routes.

A further recommendation is to remove the pavement between the runway and proposed parallel taxiway. This would serve three purposes: eliminate the need to maintain the pavement; define runway exit locations; and improve drainage. It is anticipated that the pavement can easily be removed by standard construction equipment.

OTHER AIRFIELD DESIGN ELEMENTS

Marking

Runway

The existing runway marking scheme consists of basic markings with displaced thresholds indicated at each end. The runway number "33" at the south end is incorrectly located at the end of the pavement rather than at the displaced threshold line.

When the runway is overlaid, new standard basic markings should be painted. In accordance with the recommendations above, the approach end of Runway 15 should be marked as a relocated runway end rather than as a displaced threshold. If adequate land use control can be obtained over the clear zone property south of the runway before the overlay project is accomplished, then the Runway 33 displaced threshold marking can be eliminated. Otherwise, the displaced threshold will need to continue to be shown.

Taxiways

A barely visible centerline stripe marks the parallel taxiway and several runway exits. Most pilots pay little attention to the taxiway lines since the asphalt mat allows taxiing in virtually any direction.

Standard taxiway markings should be established when the taxiway is reconstructed as noted above. Hold lines should be placed 150 feet from the runway centerline.

Other

The name "Orland" appears in large block letters on the taxiway side of the runway, facing east. This lettering would be eliminated if the pavement between the runway and taxiway is removed as proposed. A suitable new location is near mid-field on the parallel taxiway or adjacent apron. While such marking is desirable from a user perspective, it is not required by the FAA.

A segmented circle is painted on the asphalt mat west of the runway. The position is satisfactory, but the size should be increased to a standard 100-foot diameter.

Lighting

The existing runway lights are a nonstandard, low-intensity type which are barely functional. Replacement with a standard, medium-intensity system is recommended for the immediate future. Pilot-controlled switching to turn on the lights only when needed is recommended as a means of saving electricity.

Installation of edge reflectors is recommended for the runway exits, parallel taxiway, and major building area taxilanes. These are much less expensive than taxiway lights and work well for general aviation airports with limited nighttime activity.

Instrument Approach

Existing

The established instrument approach into Orland is a nonprecision approach (VOR-A) utilizing the Chico VOR. It brings aircraft to the Airport from the east, roughly perpendicular to the runway, and requires circling to land from either the north or south. The minimums allowed are as low as 760 feet MSL (540 feet AGL) cloud ceiling and one mile visibility. Aircraft are handled by the Oakland Air Route Traffic Control Center and can be picked up on radar down to an altitude of about 1,000 feet MSL. Coordination with aircraft in the Chico Municipal Airport traffic area is sometimes required, particularly when aircraft are holding for the Orland approach.

Pilots and FAA air traffic controllers report that the approach works well. It enables aircraft to get below the typical stratus cloud layer or low, broken clouds. When dense ground fog occurs, all operations cease. Nearby Chico Municipal Airport, 14 n.m. east, can be used as an alternate when weather conditions do not permit landings at Orland Haigh Field. Chico has both a precision and a nonprecision approach with minimums below those of Orland.

Future

Although the existing approach is adequate for the anticipated needs of Orland Haigh Field, of potential interest to the Airport's users are the significant advances being realized nationwide in LORAN C air navigation and instrument approach capability. LORAN C is a ground-based electronic navigational aid which, in addition to providing accurate en route navigational guidance, offers the promise of enhanced nonprecision instrument approach capability for airports. As a nonprecision approach navigational aid, it has the advantage of not requiring additional on-airport navigational aids.

The FAA is presently establishing LORAN C instrument approach procedure operational criteria through an interim performance standards testing program. It is not yet certain what approach surface

dimensions will be required or what operational minimums can be attained. The first FAA-approved LORAN C instrument approach procedures are expected to be commissioned in late 1989.

Widespread establishment of LORAN C approaches is not likely to occur quickly. The low activity volumes of Orland Haigh Field and the availability of an existing nonprecision approach will probably place it rather low on the priority list. Nonetheless, the County may wish to pursue this possibility with the FAA. If a straight-in LORAN C approach could be established to Runway 33, it could potentially offer lower minimums and less rigorous operational requirements as well as instrument approach redundancy.

Because of the unknown standards and low likelihood of establishment, no specific provisions for a LORAN C approach can be included on the Orland Haigh Field Airport Layout Plan at this time. Protection of the runway approaches from tall structures and other incompatible development should satisfactorily preserve the option for future establishment of a LORAN C approach.

Approach and Landing Aids

Airport Beacon

The existing rotating beacon at the Airport is an old airway beacon which puts out a strong beam, but is expensive to operate and maintain. As discussed in the next chapter, removal of the T-hangar building on which the unit is mounted is proposed to occur at some point during the planning period. Replacement of the beacon will be necessary at that time or perhaps earlier if maintenance becomes impractical.

Visual Glide Slope Indicators

Visual Glide Slope Indicator (VGSI) is the generic term for the group of airport visual landing aids which includes Visual Approach Slope Indicators (VASI), Precision Approach Path Indicators (PAPI), and Pulsed Light Approach Slope Indicators (PLASI). When FAA funding pays for this equipment, whichever type receives the lowest bid price will be installed unless the airport owner wishes to pay the difference for a more expensive unit.

Installation of Visual Glide Slope Indicators is recommended for both ends of the Orland Haigh Field runway. The need for this landing aid arises not because of obstacles along the approach corridor, but to give visual reference during nighttime or low-visibility conditions. The lack of street lights and nighttime visual clues in the surrounding area makes height and distance perception more difficult – in effect, the Airport seems to sit in a large black hole.

Wind Indicators

The existing wind indicators at the Airport include a wind cone and a wind tee, both lighted and located in the segmented circle near the runway mid-point.

Installation of supplemental wind cones near each end of the runway is also recommended.

Sailplane and Ultralight Aircraft Facility Requirements

The operational characteristics and facility requirements of these unique aircraft differ in many respects from those of conventional fixed-wing airplanes. At airports with high activity volumes by these

aircraft, special facilities are sometimes established to accommodate them. Special facilities are not deemed necessary at Orland Haigh Field, however – existing facilities are adequate for the limited sailplane and ultralight activity which the Airport experiences. Establishment of special operating rules may nonetheless be warranted.