

**WISCONSIN DEPARTMENT OF  
TRANSPORTATION  
BUREAU OF AERONAUTICS**

**AIRPORT LAYOUT PLAN  
DEVELOPMENT  
GUIDE/CHECKLIST**

February 2006

# Table of Contents

Page 1.....	Introduction, Transmittal Letter
Page 2-3.....	Narrative Report, Components
Page 4-23....	General Guide Lines for Airport Layout Plan Development
Page 24-27.....	Runway Approaches (Slope & Dimensions)
Page 28.....	Runway Safety Areas (Dimensions)
Page 29.....	Runway Object Free Areas (Dimensions)
Page 30.....	Threshold Location Planes Standards
Page 31.....	Appendix 2 Approach Slopes
Page 32.....	Approach Runway Protection Zones
Page 33.....	Departure Runway Protection Zones
Page 34.....	TERPS Departure Surfaces
Page 35.....	Light Plane Layout
Page 36.....	Ideal Rail Obstruction Clearance
Page 37-39....	Bureau of Aeronautics Level Names for V8 Mirco Station

## INTRODUCTION

This manual was developed by the Wisconsin Department of Transportation, Bureau of Aeronautics, to be used as a **GUIDE** and checklist for the development and preparation of airport layout plans, and to **ASSIST** the preparer in conforming with FAA Advisory Circular (AC) 150/5300-13, and changes. According to the AC, the components of an Airport Layout Plan (ALP) are as follows:

1. Narrative Report (Airport Layout Plan Report)
2. Airport Layout Drawing (you may need existing and ultimate depending on complexity)
3. Terminal Area Drawing
4. Inner Portion of the Approach Surface Drawing (Approach Sheets)
5. Airport Land Inventory Map (history of acquisition to current conditions)
6. Land Use Drawing
7. Airport Airspace Drawing - FAR Part 77 Surfaces

### I. **Transmittal Letter**

ALPs should be sent to FAA for airspace review using a standardized letter under the section chief's signature. See pages 21 & 22 for a sample transmittal letter. The letter should contain the following:

- A. Reference to its Airspace Case number, which is assigned by FAA by upon entry into the OE/AAA database. (Presently, only Safety, Operations Technical Services Section has access)
- B. A statement as to whether the submittal is a first time ALP or an update of a previous ALP. If an update, state what the update replaces, e.g., "it replaces an approved ALP dated \_\_\_\_\_."
- C. A page by page description of the changes made to the previous ALP. ( An extra copy of the ALP with the changes highlighted may be submitted to aid FAA in their review, but it is not required.)
- D. Any request for waivers or "determinations of no hazard" should be stated in the description of the page on which the items in question are shown. State the reason for the request.
- E. The end of the letter should summarize the requested waivers and "determinations of no hazard". If there are none, it should be so stated.
- F. There should be a statement that, " There are no obstructions to the Appendix 2 surfaces, or to the obstacle free zones." , if such is the case.

- G. The transmittal letter should be sent to the appropriate FAA Regional Offices as listed on the distribution list. The list is subject to change from time to time and can be found at w:\business\lists\FAAaddresses airspace coord.

## II. Narrative Report

- A. **Definition** - A condensed report explaining the reasoning behind, and the important features of the ALP. The report should accompany any new or significantly changed ALP for agency and sponsor review. When ALP preparation is being accomplished in conjunction with a Master Plan Study, the Master Plan Report will contain this information, and an ALP narrative report is not necessary. When periodically updating ALP's, a narrative report is not required unless major changes in airport function, classification or facilities are anticipated.
- B. **Components**
1. **Inventory** - Includes data on existing airport facilities, aviation activity (total operations, itinerant operations, instrument operations), based aircraft and critical aircraft. This element may also include the results of a need study or user survey where the planned improvements require documentation of need.
  2. **Forecasts** - Includes as a minimum, short (0-5 years), intermediate (6-10 years) and long range (11-20 years) forecasts for the following:
    - a) Total annual operations
    - b) Annual itinerant operations
    - c) Based aircraft
    - d) Annual instrument approaches
    - e) Existing and future annual operations by the critical design aircraft. For the critical design aircraft, identify the type of aircraft, (i.e.: design group, approach speed, and gross loading characteristics)
  3. **Demand/Capacity Analysis** - Includes a comparison of existing airport facilities and forecast needs to determine facility requirements, such as:
    - a) Length, strength and number of runways
    - b) Apron and tiedown requirements
    - c) Area requirements for terminal buildings, hangars, and auto parking
    - d) NAVAIDS and other airport aids
    - e) Taxiways

4. **Site Selection** - If a new airport or new runway is being considered, include a discussion of the factors which influenced its location, such as: airspace, environmental considerations, community needs, airport access, land availability, total costs, and engineering factors which may affect site development.
5. **Stage Development** - Indicate staging of improvements shown on the ALP, based on short, intermediate and long range (5, 10 and 20 years) forecasts of aviation activity.
6. **Economic Feasibility** - Show comparisons of annual costs needed to implement the phased development with annual revenues available or forecast to be available. Cost estimates for each stage of the proposed development should be included.
7. **Wind Data** - Discuss the wind data and coverage. Identify the source, period covered, and the number of observations. If applicable, determine the best alignment for the primary and/or the crosswind runway for optimum wind coverage.
8. **Alternative Analysis** - Briefly discuss and analyze the obvious alternatives. Explain why the selected alternative was chosen.
9. **Approaches** - Discuss the existing and future approaches. Determine if there are or will be any obstructions to FAR Part 77, Appendix 2, or TERPs surfaces. If there are obstructions, discuss their penetration and their proposed disposition. Identify any existing determinations of no hazard and the date granted. Determine if any additional determinations of no hazards are necessary. Describe the object and why a determination of no hazard is necessary.
10. **Waivers & Modifications to FAA Design Standards** - Identify any existing waiver and the date granted. Determine if any additional waivers are necessary. Identify the violations to all FAA standards including: approach surfaces, runway and taxiway separation distances, runway and taxiway object free areas, runway and taxiway safety areas, building restriction lines, runway obstacle free zone, controlled activity area, and the instrument landing system critical areas. Describe what is being waived and why a waiver is necessary, or the proposed disposition of each violation.
11. **Compatible Land Use** - Describe any local and/or regional planning efforts and zoning ordinances in effect or anticipated which would have an effect on or be affected by the airport development.

### III. Airport Layout Plan

#### General Guidelines

- Recommended plan size is either 22"x34" or 24" x 36" when plotted, depending on the size of the airport.
- Minimum Desirable Letter Size: based on scale to be plotted.

Example Scale of Drawing 1"=100'	Minimum Text = 15 feet
1"=200'	Text = 20 feet
1"=300'	Text = 30 feet
1"= 400'	Text = 40 feet
1"=1000'	Text = 100 feet

- Because of the number of imaginary surfaces required by FAA to be depicted on ALP's, it is necessary to separate ALP's into sections corresponding to Existing, Future (where appropriate), and Ultimate. This separation should apply to Layout Sheets and Approach Sheets.
- Each sheet should have a numerical and graphic scale. If the plans are reduced after plotting, numerical scale should be blocked out.
- All ALP elevations should be established using North American Vertical Datum 1988 (NAVD88), which is the official datum for mean sea level in the United States.
- All sheets will have a legend that explains all pertinent features that are not identified. Existing features should be shown with solid lines, and future and ultimate items shown with dashed lines.
- Identify runways by numerical designation in all references to a specific runway.
- Show True North to the top of each sheet or to the left as an alternative. When creating Plan & Profile sheets the north arrow will vary on these sheets and should be prominently displayed. Indicate both True North and Magnetic North and the year of the magnetic declination used.
- Each sheet should have a Title and Revision Block - see page 8 for example.

A. **Title Sheet** - See page 9 for a sample title sheet. Include the following features on the title sheet.

1. Outline of pavements, existing and ultimate, should appear in the middle of the sheet at an appropriate scale (usually 1"=800' or 1"=1,000'.)
2. Title and revision blocks, see page 8.

3. Consultant signature block.
4. Index to sheets, see page 8.
5. Wind Rose; all weather and IFR, where appropriate, with a minimum depiction of 10.5 knots, 13 knots, 16 knots and 20 knots delineated on the rose, as appropriate. Cite the data source and time period covered. See Appendix 1 AC 150/5300-13 for guidance in the development of wind rose data. If IFR wind rose is depicted, state % of time IFR conditions exist.
6. Approval Blocks - Airport owner, BOA and FAA - See page 8.
7. State outline with county boundaries shown. County in which airport is located should be blackened.
8. Location Map - location of the airport shown on a state highway base map.
9. Vicinity Map - location of the airport shown on a county map.
10. Airport Data Table - see page 10 for sample. Should contain the following:
  - a) Airport Classification (BU-A, BU-B, GU, T/C, AC/C). These represent Basic Utility A & B, General Utility, Transport/Corporate, and Air Carrier/Cargo, respectively.
  - b) Airport Reference Point - Lat/Long of center of ultimate development, to the nearest hundredth of a second.
  - c) Airport elevation - the highest point of the runways, to the nearest tenth of foot.
  - d) Mean maximum temperature of the hottest month.
  - e) Airport and Terminal Navigational Aids - (VOR, NDB, ILS, GPS, etc.)
  - f) Visual Aids - (VASI, PAPI, REIL, MALS, etc.)
  - g) Miscellaneous Facilities - (Rotating Beacon, segmented circle, taxiway lighting, etc.)
11. Design Critical Aircraft Data Table - see page 10 for sample. Identify the critical aircraft design groups and approach categories which regularly use each runway for existing data and which are anticipated for ultimate development.
  - a) Runway number.
  - b) Aircraft Weight - Maximum gross take-off weight of critical aircraft - **NOT PAVEMENT STRENGTH.**
  - c) Approach Speed - Maximum approach speed for category of the critical aircraft using the airport (Approach Category A<91 knots, B<121 knots, etc.)

- d) Wing Span - Maximum wing span for the design group of the critical aircraft using the airport (Design Group I <49', II <79', etc.)
- e) Tail height - Tail Height of critical aircraft.
- f) Airport Reference code (ARC) - Approach Category and Design Group.

Note: The data need not be all from the same specific aircraft. Approach speed can be for a Lear Jet, wingspan for a Citation, etc.

**B. Airport Layout Drawing (Scale: 1"=300' to 1"=800')**

1. All man-made and natural objects on the airport and in the approach areas must be shown. Airport facilities shown (existing, future, or ultimate, on their respective sheets) include runways, taxiways, aprons, blast pads, stabilized overruns and shoulders, runway safety areas, runway object free areas, buildings, nav aids, parking areas, roads, lighting, runway numbers, fences, segmented circle and lighted wind tee or cone, fueling facilities, beacon (elev. noted), tie downs, facilities associated with nav aids, and control tower (elevation noted.)
2. Prominent topographic features shown on and adjacent to the airport include trees, streams, ponds, rock outcropping, ditches, railroads, roads, power lines, towers, buildings, and contours when significant.
3. Runway Data Table: (Existing and Ultimate, unless there is a significant intermediate step) see page 10 for sample. This table should appear on all Airport Layout Sheets, with all the data included.
  - a) Runway Dimensions: length and width of runways.
  - b) Effective Gradient: expressed as a %: difference in end elevations divided by the total runway length.
  - c) Percent Wind Coverage: 10.5 and 13 knots minimum, 16 and 20 knots as appropriate.
  - d) Runway Visibility Minimums: visual, 1 mile,  $\frac{3}{4}$  mile,  $\frac{1}{2}$  mile, CAT II, CAT III.
  - e) Pavement Strength: gross weight - single, dual, dual tandem gear.
  - f) Approach Slope (design): for each runway end.
  - g) Approach Slope (actual): for each runway end (should match "clear for" data.)
  - h) Runway lighting: LIRL, MIRL, HIRL.

- i) Runway marking: basic, non-precision instrument, precision instrument.
  - j) Runway pavement type: turf, bituminous, PCC, other.
  - k) Visual & navigational aids: VASI, PAPI, REIL, MALSR, etc.
4. Existing or Ultimate Runway Protection Zones (RPZ) w/dimensions\*.
  5. Existing or Ultimate runway object free areas w/dimensions\*.
  6. Existing or Ultimate runway safety areas w/dimensions\*.
  7. Existing or Ultimate runway end coordinates (Lat., Long.)\*, to the nearest hundredth of a second.

\* Show dimensions for these features in tables and on drawing when dimensioning each feature would not clutter the drawing. Where these design features cannot be provided because of topographical or other constraints, a notation should be made. See page 13 for an example of tables. Where several substandard conditions exist, a table of modifications to Federal Standards should be included on the Layout Drawing. The table should include the substandard item, why it is substandard and FAA's action. See example, page 13.

8. Section lines and corners, township and range, benchmarks and monuments on the airport are shown. Existing property boundary line and easements are prominently shown and checked with latest Exhibit "A", certified survey maps, or deeds. The legend should identify the symbol for fee, clear zone easement, and aviation easement. Ultimate property interest line is also shown. Add the following note:

"When property interest is purchased, consideration will include the following:

- (1) Limits of land eligible for FAA participation;
- (2) Desires of property owner;
- (3) Existing property ownership boundaries;
- (4) Protection of the imaginary surfaces described in FAR Part 77.25;
- (5) Existing land use zoning controls.

Property interest may be acquired by fee or air easement rights."

9. True bearings of all runways and/or landing strips are shown to the nearest hundredth of a degree and noted as true. Magnetic declination should be shown at the north arrow.
10. Elevations to the nearest tenth of a foot, and stations are shown for all existing and proposed runway or landing strip ends and

# FOR NON BLOCK GRANT AIRPORTS

WISCONSIN DEPARTMENT OF TRANSPORTATION BUREAU OF AERONAUTICS			
TITLE & APPROVAL SHEET  SCHMAUS COUNTY AIRPORT SCHMAUSVILLE, WISCONSIN			
SCHMAUS & ASSOCIATES, INC. AIRPORT CITY, WISCONSIN			
SCALE:	DATE:	DWN BY:	SHEET OF

WISCONSIN DEPARTMENT OF TRANSPORTATION BUREAU OF AERONAUTICS	
REVIEWED BY: _____ P. E. AIRPORT DEVELOPMENT ENGINEER	
DATE: _____	
APPROVED BY: _____ P. E. CHIEF AIRPORT DEVELOPMENT ENGINEER	
DATE: _____	

FEDERAL AVIATION ADMINISTRATION

CITY OR COUNTY OF _____
APPROVED BY: _____
TITLE: _____
DATE: _____

INDEX TO SHEETS	
SHEET	TITLE
1	TITLE & APPROVAL
2	EXISTING AIRPORT LAYOUT DRAWING
3	ULTIMATE AIRPORT LAYOUT DRAWING
4	TERMINAL LAYOUT DRAWING
5	EXISTING RUNWAY 5 APPROACH
6	ULTIMATE RUNWAY 5 APPROACH
7	EXISTING RUNWAY 23 APPROACH
8	ULTIMATE RUNWAY 23 APPROACH
9	EXISTING RUNWAY 14 APPROACH
10	ULTIMATE RUNWAY 14 APPROACH
11	EXISTING RUNWAY 32 APPROACH
12	ULTIMATE RUNWAY 32 APPROACH
13	LAND INVENTORY MAP
14	LAND USE DRAWING
15	HEIGHT LIMITATION ZONE MAP
16	AIRPORT AIRSPACE DRAWING - FAR PART 77 SURFACES

SHEET 1 REVISIONS			
DESCRIPTION OF REVISIONS	DATE:	FIRM OR AGENCY NAME	DWN BY:



RUNWAY DATA				
	RUNWAY 13/31		RUNWAY 4/22	
	EXISTING	ULTIMATE	EXISTING	ULTIMATE
RUNWAY DIMENSIONS	60' X 2500'	75' X 4000'	75' X 5400'	100' X 6000'
EFFECTIVE GRADIENT (IN %)	.16	.38	.07	.31
% WIND COVERAGE	10.5 KNOTS 13 KNOTS	87.5 84.2	89.9 86.6	SAME
RUNWAY VISIBILITY MINIMUMS	V	1 MILE	3/4 MILE	1/2 MILE
PAVEMENT STRENGTH *	10 S, 30 D	30 S, 50 D	60 S, 80 D, 140 DT	SAME
APPROACH SLOPE (DESIGN)	20:1	13 34:1	31 20:1	34:1 4 50:1
APPROACH SLOPE (ACTUAL)	13 15:1	31 23:1	13 31	4 22 35:1
RUNWAY LIGHTING	LIRL	MIRL	MIRL	HIRL
RUNWAY MARKING	VISUAL	NON-PREC. INST.	NON-PREC. INST.	PREC. INST.
RUNWAY PAVEMENT TYPE	BITUM.	SAME	BITUM.	SAME
VISUAL & NAVIGATION AIDS		VASI, REIL	VASI	ILS, ALS, RVR

\* VALUES GIVEN ARE GROSS AIRCRAFT WEIGHT IN 1000\* SINGLE (S), DUAL (D) & DUAL TANDEM (DT) GEAR AIRCRAFT.

U-UTILITY T-TRANSPORT P-PRECISION V-VISUAL NP-NON PRECISION

AIRPORT DATA		
	EXISTING	ULTIMATE
AIRPORT CLASSIFICATION	GU-I	T/C
AIRPORT REFERENCE POINT COORDINATES	LAT. 44°50'49"N LONG. 91°29'29"W	
AIRPORT ELEVATION (MSL)	817.9	819.2
MEAN MAXIMUM TEMPERATURE OF HOTTEST MONTH	86.1 JULY	86.1 JULY
AIRPORT & TERMINAL NAVIGATION AIDS	VOR, NDB	VOR, NDB, ILS
VISUAL AIDS	VASI	VASI
MISCELLANEOUS FACILITIES:	TAXIWAY LIGHTING, LIGHTED WIND CONE, SEGMENTED CIRCLE, CEILOMETER, ROTATING BEACON	

DESIGN CRITICAL AIRCRAFT DATA				
	EXISTING		ULTIMATE	
	4-22	13-31	4-22	13-31
RUNWAY				
AIRCRAFT WEIGHT	< 12,500 LBS.	12,500 - 60,000 LBS.	< 12,500 LBS.	60,000 LBS.
APPROACH SPEED	< 121 KNOTS	< 141 KT	< 121 KT.	< 141 KT.
WING SPAN	< 49 FT.	< 79 FT.	< 49 FT.	< 118 FT.
TAIL HEIGHT	17 FT.	21 FT.	17 FT.	32 FT.
AIRPORT REFERENCE CODE	B-I	C-II	B-I	C-III

(Legend for land inventory map)

AREAS	ACRES	TYPE OF INTEREST	ACQUISITION PROGRAM
A	405.24	FEE	UNKNOWN
B	65.62	FEE	FAAP 1952
C	120.75	FEE	ADAP 1972
D	205.03	FEE	AIP 1983
E	24.99	CLEAR ZONE EASEMENT	STATE AID 1961
F	18.17	AVIGATION EASEMENT	COUNTY 1957
TOTAL FEE OWNED			796.64
TOTAL CLEAR ZONE EASEMENT			24.99
TOTAL AVIGATION EASEMENT			18.17

**FOR BLOCK GRANT AIRPORTS ONLY**

FEDERAL AVIATION ADMINISTRATION

THE WDOT, BUREAU OF AERONAUTICS CONDITIONALLY APPROVES  
THE AIRPORT LAYOUT PLAN IN ACCORDANCE WITH THE FEDERAL  
AVIATION ADMINISTRATION BLOCK GRANT AGREEMENT AND  
SUBJECT TO LETTER DATED \_\_\_\_\_ AND AIRSPACE CASE #  
\_\_\_\_\_

APPROVED: \_\_\_\_\_  
MARK D. ARNOLD, AIRPORT ENGINEERING CHIEF

DATE: \_\_\_\_\_

11. intersections (do not use negative stationing); high and low points of each paved runway; and displaced thresholds. For precision instrument runways grade changes within 3000' of threshold should be indicated.
12. Location of ultimate airport reference point shown on plan by station and offset.
13. Existing and proposed buildings and building areas shown. Roof elevations for existing buildings shown on layout sheet or other sheets when necessary.
14. Displaced thresholds are displaced in accordance with **FAA AC 150/5300-13, Appendix 2** or as previously approved by FAA. Stations and elevations of any displaced thresholds are shown.
15. Airport drainage direction and structures shown where appropriate.
16. Ground contours shown if unusual conditions exist (only if clarity is not lost.)
17. Facilities that are to be phased out, if any, are described. Any conversion of runways to taxiways, etc., is noted.
18. All objects affecting visibility zone between landing strips and/or runways are shown and disposition described.
19. Building restriction line is shown on both sides of runways and extended to airport property line or approach surfaces. This should include line-of-sight criteria between runways at non-control tower airport.
20. Depict threshold lights with symbols. Show type of lighting (LIRL, MIRL, etc.) in Runway Data Table. **DO NOT** depict runway edge lights on drawing.
21. Show any clearway or stopway associated with a runway.
22. Dimension runway and taxiway widths and lengths, separations from runway centerline to building restriction line, holdline, taxiway/taxilane centerline, parallel runway centerline, property line, and aircraft parking, and separations from taxiway centerline to building restriction line, parallel taxiway/taxilane centerline, and aircraft parking areas.
23. Areas reserved for future aviation development and services are outlined, e.g., general aviation, fixed base operations, heliports, cargo facilities.
24. The application of declared distances are shown in tabular form for each runway in both directions where those criteria are used.

APPROACH SURFACE DATA					
APPROACH SURFACE DIMENSIONS					
	RUNWAY	BASE	LENGTH	OUTER WIDTH	APPROACH SLOPE
EXISTING	4	1000'	3400'	2020'	34:1
	22	1000'	3400'	2020'	34:1
	13	250'	2000'	650'	20:1*
	31	250'	2000'	650'	20:1*
ULTIMATE	4	1000'	5000'	2500'	50:1
	22	1000'	5000'	2500'	50:1
	13	500'	2000'	1100'	20:1
	31	500'	2000'	1100'	20:1
RUNWAY SAFETY AREA (RSA)					
EXISTING RUNWAY SAFETY AREA DIMENSIONS					
RUNWAY	WIDTH	LENGTH BEYOND RUNWAY END			
4-22	500'	1000'			
13-31	120'*	240'*			
ULTIMATE					
4-22	500'	1000'			
13-31	150'	300'			
RUNWAY OBJECT FREE AREA (OFA)					
EXISTING RUNWAY OBJECT FREE AREA DIMENSIONS					
RUNWAY	WIDTH	LENGTH BEYOND RUNWAY END			
4-22	800'	300'			
13-31	250'	240'			
ULTIMATE					
4-22	800'	1000'			
13-31	400'	300'			
RUNWAY END COORDINATES (NAD 83)					
EXISTING					
RUNWAY	LAT.		LONG.		
4	43°12'45.32"N		90°11'15.01"W		
22	43°12'45.24"N		90°10'23.21"W		
13	43°12'48.12"N		90°11'07.41"W		
31	43°12'23.33"N		90°11'07.58"W		
RUNWAY END COORDINATES (NAD 83)					
ULTIMATE					
RUNWAY	LAT.		LONG.		
9	43°12'45.05"N		90°11'15.23"W		
27	43°12'45.23"N		90°10'10.03"W		
18	43°12'43.23"N		90°11'07.35"W		
36	43°12'08.31"N		90°11'07.37"W		
RUNWAY PROTECTION ZONE DATA (RPZ)					
DIMENSIONS					
	RUNWAY	INNER WIDTH	OUTER WIDTH	LENGTH	
EXISTING	4	1000'	1510'	1700'	
	22	1000'	1510'	1700'	
	13	250'	450'	1000'	
	31	250'	450'	1000'	
ULTIMATE	4	1000'	1750'	2500'	
	22	1000'	1750'	2500'	
	13	500'	700'	1000'	
	31	500'	700'	1000'	

\* NOT PRESENTLY PROVIDED.

PLEASE NOTE:

DATA FOR EXISTING CRITERIA TO BE SHOWN ON EXISTING SHEETS, AND FOR ULTIMATE CRITERIA TO BE SHOWN ON ULTIMATE SHEETS.

TABLE OF MODIFICATIONS TO FEDERAL STANDARDS		
ITEM	MODIFICATION	DATE OF FAA ACTION W/AIRSPACE CASE #
RUNWAY 11/29 SAFETY AREA	SUBSTANDARD SIZE	WAIVER GRANTED 6-28-92 92 AGL-1510-NRA
TAXIWAY "A"	TOO CLOSE TO RUNWAY	WAIVER GRANTED 7-5-90 89 AGL-1535-NRA
HANGAR	BLOCKS LINE OF SIGHT	WAIVER REQUESTED 12-25-91 88 AGL-1654-NRA
TREE (OBSTRUCTION #18-3)	PENETRATES 7:1	DETER. OF NO HAZARD 12-25-91 AGL-1701-NRA
ROAD (OBSTRUCTION #9-4)	PENETRATES 20:1	DISPLACED THRESHOLD 9-10-85 AGL-1488-NRA
T.V. ANTENNA (OBST. #27-7)	PENETRATES 7:1	DETER. OF NO HAZ. REQ. AGL-1685-NRA

C. **Terminal Area Drawing (Scale: 1"=50' or 1"=100')** Fueling facilities, existing and ultimate, including underground storage shown.

1. Air carrier gate positions shown, indicated by circles, existing and ultimate positions designated.
2. Existing and ultimate security fencing with gates shown.
3. Existing and ultimate buildings shown with critical elevations of highest buildings and buildings closest to the runway. Identify T-hangars and/or corporate hangars.
4. Existing or ultimate rotating beacon with elevation.
5. Building Restriction Lines (BRL).
6. Taxiway or taxilane centerlines designated, existing and ultimate.
7. Aprons, taxiways, clearances, etc. dimensioned.
8. Existing or ultimate lighted wind cone (with top elevation), wind tee, and segmented circle.
9. Location, ties, and elevations of any bench marks or monuments in terminal area.
10. Auto parking existing and ultimate shown.
11. Ground contours shown, if appropriate.
12. Drainage including any structures.
13. Control Tower with top elevation.
14. Entrance and access roads, existing and ultimate shown.
15. Various aircraft aprons, existing and ultimate, and their function shown (air carrier, cargo, transient, tie down area with tie downs shown, etc.)
16. Legend where necessary.
17. Index of buildings and facilities where necessary.
18. Line of sight, existing and ultimate.
19. Show aircraft parking limit line where appropriate.

D. **Approach Surface Drawings (Approach Sheets)**

Plan and profile view of existing or ultimate approach areas are required for all existing and ultimate runways in all airport layout plan packages.

1. Plan View

- a) Sufficient detail of runway to orient plan. Runway number indicated on the runway, and runway end elevations and stations, existing or ultimate, should be shown. Runway elevations and stations of any displaced or relocated threshold, existing or ultimate, should be shown.
- b) Scale will depend on the size of the approach surface. Usually a scale of 1"=100' or 1"=200' will be best. Prominent north arrow displayed. Generally a separate sheet for each approach will be needed. Where a large runway extension is proposed, it may be necessary to have two sheets for the approach. For Utility runways with visual approaches, both approach areas may fit on one sheet. Where obstructions occur along the entire length of a runway, it may be necessary to have additional sheets showing those objects and their disposition.
- c) All man-made and natural objects laterally from the runway centerline should be shown to a distance where **100'** above the adjacent runway elevation is obtained in the 7:1 transition surface, or to a distance to reasonably show all obstructions to Part 77, Appendix 2, or TERPS Departure Surface. This applies in the approach and for the entire runway length and includes trees, poles, antennas, hangars, buildings, rotating beacon, etc. Separate sheets may be necessary to show these items and their disposition. It may be necessary to show some object elevations on the layout plan sheet or terminal area sheet. Show tree removal limits necessary to provide clear surfaces.
- d) All man-made and natural objects must be shown in the approach area. Minimum coverage extends to the distance where the approach surface and transition surface clear **the runway end elevation by 100'**; it may be necessary to extend the coverage further because all objects which penetrate any existing or ultimate Part 77, Appendix 2, or TERPS Departure imaginary surfaces (i.e., primary, transition, or approach) or any object 5' below these surfaces must be shown on the plan and profile sheets.
- e) All roads, railroads, and waterways shown. The critical elevation of these items, and approach clearance over the roads, railroads, or waterways must be shown where the extended runway centerline and sides of the existing or ultimate approach surfaces intersect the road, railroad or waterway. The clearance is the **actual** difference between the approach surface and the traverse way elevation.
- f) Existing or ultimate approach surfaces, threshold location planes (with controlling obstruction or object labeled),

runway safety areas, and runway object free areas should be shown, labeled, and dimensioned. TERPS Departure Surfaces should only be shown if surveyed. On runways where these required criteria are not provided, a note should indicate same.

- g) The following should be shown only when declared distances are used: existing or ultimate clear ways, stopways and runway protection zones (RPZ). TORA, TODA, ASDA and LDA indicated for each runway end in each direction.
- h) Controlling objects and/or obstructions indicated. Each obstruction in the plan view should be numbered to coincide with the "Schedule of Obstructions" and be shown in the profile view. Elevations shown in the plan view to the extent possible without cluttering the drawing. Elevations can be shown in the schedule of obstructions, as an alternative. If there are no obstructions, state "There are no obstructions to this approach." Include the date of survey.
- i) Existing or ultimate property lines. Section corners indicated.
- j) Ground contours where available and when significant; an interval of **2'** is optimum; however, in some cases, 5' intervals will suffice.
- k) Navigational Aids and miscellaneous lighting aids (existing and ultimate) should be shown (Threshold lights, VASIs, REIL, MALS, etc.) Approach lighting systems should be shown in the plan and profile views. Elevation of each lighting unit in the profile view should be as existing or proposed.
- l) Above the line which divides the **Plan View** from the **Profile View**, list the design criteria upon which the subject runway is based: Approach Category, Design Group, Large or Small Aircraft, and Approach Minimums (day or night).

## 2. **Profile View**

- a) Profile view directly below plan view – stationing coincides vertically. Stationing agrees with the airport layout sheet.
- b) Preferred vertical scale – 1"=10' or 1"=20'.
- c) Existing runway centerline ground profile shown to limits of the plan view. If there is considerable difference between the centerline profile and the approach slope, a reduction in vertical scale may be appropriate. Runway end and displaced or relocated threshold stations and elevations should be shown in the plan and profile view.

- d) All roads and railroads should be shown and identified.
- e) Existing or ultimate approach and transition surfaces and **all** objects penetrating or within 5' below these imaginary surfaces shall be shown. If the threshold has been displaced in accordance with FAA AC 150/5300-13, Appendix 2, or previous FAA Orders or Advisory Circulars, the "threshold location plane" is shown.
- f) The date of FAA approval should be shown by note on the plan. Also show the controlling obstruction which determines the displaced threshold and its elevation.
- g) Objects which penetrate the 7:1 transition slope or come within five feet of it should be shown. The point where the existing and ultimate 7:1 surface, if different, passes through the object should be shown with symbol and defined in legend.
- h) Object heights need not be measured to closer than the nearest 0.5'.
- i) Depict as closely as possible the object being shown, e.g., show a house shape for a house, a tree shape for a tree.
- j) The highest point of a structure is shown. If only the antenna or chimney is an obstruction and not the structure, the elevation of the structure should still be shown on the plan view.
- k) The controlling object or obstruction with elevation shown and the actual "clear for" approach slope from the end of the primary surface indicated.
- l) If there are so many objects to be shown that the profile view would become cluttered and unreadable, then only vertical lines are shown to the correct height with their identifying number. Groups of trees should be shown by a line between tree symbols placed at the extremities of the trees.
- m) Legend included to identify lines and symbols.
- n) Each obstruction numbered in the profile view and in the plan view to coincide with the Schedule of Obstructions.
- o) Title block includes airport name, runway approach number, plan and profile scales, date, sheet number and consultant.

### 3. **Schedule of Obstructions**

- a) Every obstruction or group of obstructions (trees) to every imaginary surface as defined in Part 77, Appendix 2, or TERPS Departure criteria must be listed. This includes the entire primary, transition, and approach surfaces. Those items shown on the plan and profile that are not

obstructions, i.e. not within 5' of an imaginary surface, should not be listed in the schedule.

- b) Every obstruction must be shown on at least one sheet of the ALP. Objects along the entire length of the runway must be considered.
- c) A proposed disposition must be shown for every obstruction. If an FAA aeronautical study is requested for a determination of no hazard or if the FAA has made a determination of no hazard this should be noted. (See "Schedule of Obstructions", page 20.)

**E. Land Inventory Map**

- 1. Scale 1"=200' to 1"=600'.
- 2. The exterior boundary of all existing airport property interests must be shown. Division boundaries should be shown for land purchased under FAAP, ADAP, AIP, state aid project, airport owner only, and any other acquisition program.
- 3. Bearings and distances should be shown (when available) for the exterior airport boundary and each easement interest. Bearings shown and noted as true.
- 4. Show Existing and Ultimate Runway Protection Zones w/dimensions.
- 5. Show the station of the intersection of runway centerline extended with the property boundary line.
- 6. Show all permanent runway or airport reference monuments with distances and elevations.
- 7. Section corners, section lines, township and range, and/or government lot lines.
- 8. Property Table: (See legend for Land Inventory Map, page 10.)
  - Acreage for each division identified in 2 above.
  - Type of interest owned by airport (Fee, Avigation Easement, Clear Zone Easement.)
  - Identify the program and year land was acquired under, (e.g., FAAP, ADAP, AIP, State Aid Project, Sponsor Only.)
  - Total acreage in fee and easements.
- 9. Title block, legend, date, consultant, and revision block.
- 10. Show public road and railroad rights of way.

## F. Land Use Drawing

This drawing provides airport management with a plan for leasing revenue-producing areas on the airport. It also provides guidance for determining allowable proximity of farming operations to runways and taxiways. See page 23 for policy on crops.

The drawing should be sufficiently detailed to allow the airport management to determine which areas must be kept in mowed grass and which areas are restricted to low growing crops. The obstacle free zone, the runway object free areas, must be kept mowed and free of crops. Low crops are allowed outside these areas. High crops are allowed outside the primary surface, the runway object free areas, and the runway visibility zones.

Within the various parcels on and off the airport, standard drafting symbols (shading, cross hatching, etc.) should be used to identify recommended land use by general category (agricultural, industrial, recreational, etc.)

Identify the date and type of any zoning ordinance in effect. Depict boundaries of local government.

Depict the location of all public facilities (schools, hospitals, parks, etc.) in the vicinity of the airport.

## G. Airport Airspace Drawing - FAR Part 77 Surfaces

1. This drawing is only necessary as part of a master plan study or update.
2. Plan View - Scale: 1"=2000'
  - a) Show ultimate runway length with end numbers using current USGS 7 ½ minute quadrangle map as a base map.
  - b) Identify objects, and note their top elevations, which penetrate **any** of the surfaces, except those which are in inner approach surfaces. For the latter, add note, "See approach profiles for close in obstructions."
  - c) Show all FAR Part 77.25 surfaces, including the horizontal surface with elevation and conical surfaces above it.
3. Profile View - Scale: 1"=1000'
  - a) Detail ground profile along the runway centerline extended, and all significant objects with the approach surfaces regardless of whether they are obstructions.
  - b) Show existing and ultimate runway ends and FAR Part 77.25 approach slopes.

**PLAN AND PROFILE OF APPROACHES  
EXAMPLE SCHEDULE OF OBSTRUCTIONS  
RUNWAY 20**

**Date Surveyed**

**SCHEDULE OF OBSTRUCTIONS  
PENETRATION IN FEET**

Key Future No.	Description (with elevation)	Existing (or Ultimate)			Appendix 2 Surface	TERPS Departure Surface	Disposition
		Primary Surface	34:1	7:1			
20-1	Building (945.0)			14'			*
20-2	Power Pole (981.1)						*
20-3	Trees (991.2)			0-11'			Remove
20-5	Power Pole						*
20-6	Trees						Remove
20-7	Power Pole			6'			*
20-8	Power Pole			16'			*
20-9	Power Pole						*
20-10	Trees						Remove
20-11	Buildings						*
20-12	Trees			11'			Remove
20-13	Power Pole						Remove
20-15	Trees			0-22'			Remove
20-16	Trees			0-16'			Remove
20-17	Power Pole					27'	Remove
20-18	Tree				9'		Remove
20-19	CTH" TJ"		2'		0-4'		(1)
20-20	Trees			13'			Remove
20-21	Ground				0-31'	0-29'	Remove
20-22	Silo			8'			(2)

\*FAA Determination of No Hazard Requested

- (1) This road is marked and lighted and runway 20 threshold is displaced. See FAA ALP approval letter dated October 23, 1976.
- (2) The Silo is determined not to be a hazard. See FAA letter dated February 5, 1980.

May 1, 2002

Mr. Bob Huber  
FAA Airports District Office  
6020 28<sup>th</sup> Avenue South, Room 102  
Minneapolis, MN 55450

Eagle River Union Airport  
Airport Layout Plan  
Airspace Case #2002-AGL-347-NRA

Dear Nancy:

Enclosed for your review and approval is an Airport Layout Plan (ALP) for the Eagle River Union Airport. The ALP was developed in accordance with AC 150/5300-13, and changes. This ALP replaces the previously approved ALP dated November 21, 1995. The ALP changes consist of showing updates for the existing conditions and a revised length on the secondary Runway 13/31. The following is a page by page discussion of the changes to the ALP:

**Sheet 1** – Title sheet: The pavement configuration has been revised to show current conditions. The Airport Data box has been revised for existing and ultimate navigational and visual aids. The Design Critical Aircraft for Runway 4/22 is shown as B-II, Runway 13/31 is shown as B-I.

**Sheet 2** – Airport Layout Drawing: Runway 4/22 is shown as the primary runway with an ultimate length of 6,000. The runway will have NPI approaches with 34:1 approach slopes and a full length parallel taxiway on the west side to serve the hangar area. Adams Road will ultimately be closed to provide the necessary clearance. Runway 13/31 is the crosswind runway and is shown as paved and reduced in length from 3,850' on the previously approved ALP to 3,400'.

**Sheet 3** – Terminal Area Drawing: This drawing has been updated to show new hangars and the deer fence.

**Sheet 4** – Terminal Area Drawing: This is a new drawing showing hangars on the west side of Runway 4/22.

**Sheet 5** – Runway 4 Approach Drawing: A 1,004' extension to the southwest is shown for an ultimate runway length of 6,000. Lost River Road will be relocated outside the ultimate OFA and RSA. The ultimate property line is shown. Approximately 36 acres would need to be acquired.

The trees (4.1) are obstructions to the existing and ultimate 7:1. These trees provide a visual and nose buffer to the homes located along Lost River Road. For that reason, a "Determination of No Hazard" is requested.

**Sheet 6** – Runway 22 Approach Drawing: The existing 20:1 approach is shown with Adams Road closed to provide the appropriate clearance. The 1995 ALP used a threshold location plane to provide the clearance, but Appendix 2 criteria for night operations won't allow it. The City decided to close the road rather than displace the threshold. The ultimate approach

surface is shown as 34:1. The trees (22.9) are obstructions to the ultimate 7:1 are located in the front yards of adjacent homes. A "Determination of No Hazard" is requested.

**Sheet 7** – Runway 13 Approach Drawing: The existing turf crosswind runway is shown to be replaced with a 75' x 3,400' paved runway for visual use only. The length on the west end was reduced because of environmental concerns in the proximity of the river. 31 acres of fee or easement property will need to be acquired.

**Sheet 8** – Runway 31 Approach Drawing: The existing turf crosswind runway is shown to be replaced with a 75' x 3,400' paved runway for visual use only. The length on the east end was reduced to provide clearance over Adams Road, since the City will not be closing the road.

**Sheet 9** – Land Inventory Map: No changes.

### **Design Standard Waivers**

The ALP was completed utilizing the standards in AC 150/5300-13, and changes. No waivers are requested.

### **Summary of No Hazard Determinations Requests**

1. Sheet 5: The trees (4.1) are obstructions to the existing and ultimate 7:1. These trees proved a visual and noise buffer to the homes located along Lost River Road. A "Determination of No Hazard" is requested.
2. Sheet 6: The trees (22.9) are obstructions to the ultimate 7:1. These trees are located in the front yard of adjacent homes. A "Determination of No Hazard" is requested.
3. There are no obstructions to the Appendix 2 surfaces or the OFZs.

We believe public circularization is not necessary, since this is an updated ALP. Please conduct an aeronautical study of this plan and respond with your comments and those received from any other FAA branch shown copied below. If you have any questions, please contact me at (608) 267-5273 or at mark.arnold@dot.state.wi.us.

Sincerely,

Mark Arnold, P.E., Chief  
Airport Engineering Section

Enclosure

cc: Manager, Aviation Systems Standards Service, AVN-140B  
Manager, Resource and Planning Branch, AGL-470  
Manager, System Management Branch, AGL-520

Aircraft approach category and design group <sup>1</sup>	Distance in feet from runway centerline to crop		Distance in feet from runway end to crop		Distance in feet from centerline of taxiway to crop	Distance in feet from edge of apron to crop
	Visual & ≥ 3/4 miles	< 3/4 mile	Visual & ≥ 3/4 miles	< 3/4 mile		
<b>Category A &amp; B Aircraft</b>						
Group I	200 <sup>2</sup>	400	400 <sup>3</sup>	600	45	40
Group II	250	400	400 <sup>3</sup>	600	66	58
Group III	400	400	600	800	93	81
Group IV	400	400	1,000	1,000	130	113
<b>Category C, D &amp; E Aircraft</b>						
Group I	530 <sup>3</sup>	575 <sup>3</sup>	1,000	1,000	45	40
Group II	530 <sup>3</sup>	575 <sup>3</sup>	1,000	1,000	66	58
Group III	530 <sup>3</sup>	575 <sup>3</sup>	1,000	1,000	93	81
Group IV	530 <sup>3</sup>	575 <sup>3</sup>	1,000	1,000	130	113
Group V	530 <sup>3</sup>	575 <sup>3</sup>	1,000	1,000	160	138
Group VI	530 <sup>3</sup>	575 <sup>3</sup>	1,000	1,000	193	167

<sup>1</sup> Design groups are based on wing span and category depends on approach speed of the aircraft.

Group I - wing span up to 49 feet

Group II - wing span 49 feet up to 78 feet

Group III - wing span 79 feet up to 117 feet

Group IV - wing span 118 feet up to 170 feet

Group V - wing span 171 feet up to 213 feet

Group VI - wing span 214 feet up to 261 feet

Category A - approach speed less than 91 knots

Category B - approach speed 91 knots up to 120 knots

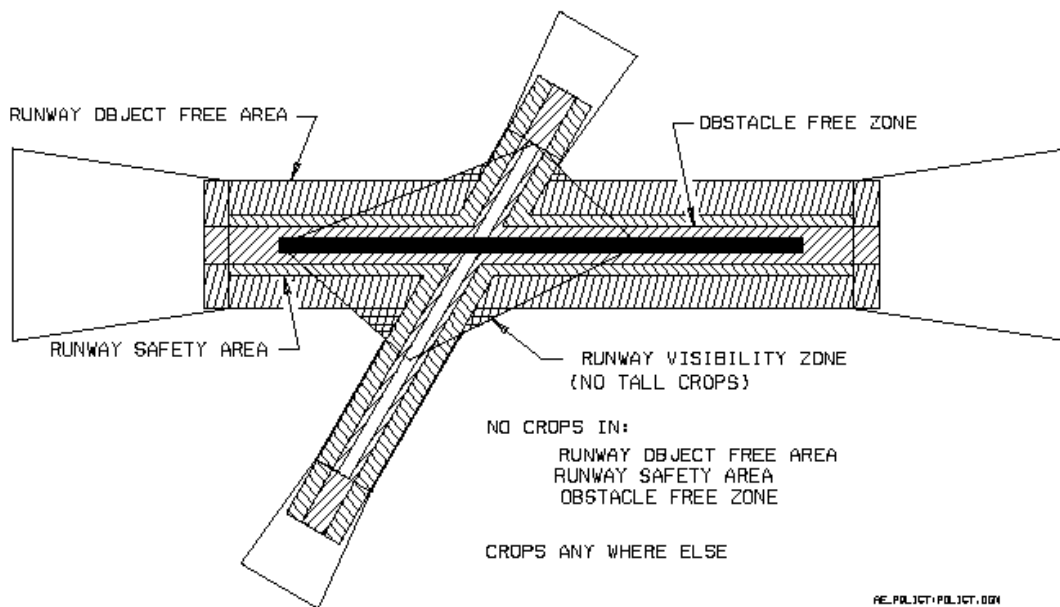
Category C - approach speed 121 knots up to 140 knots

Category D - approach speed 141 knots up to 165 knots

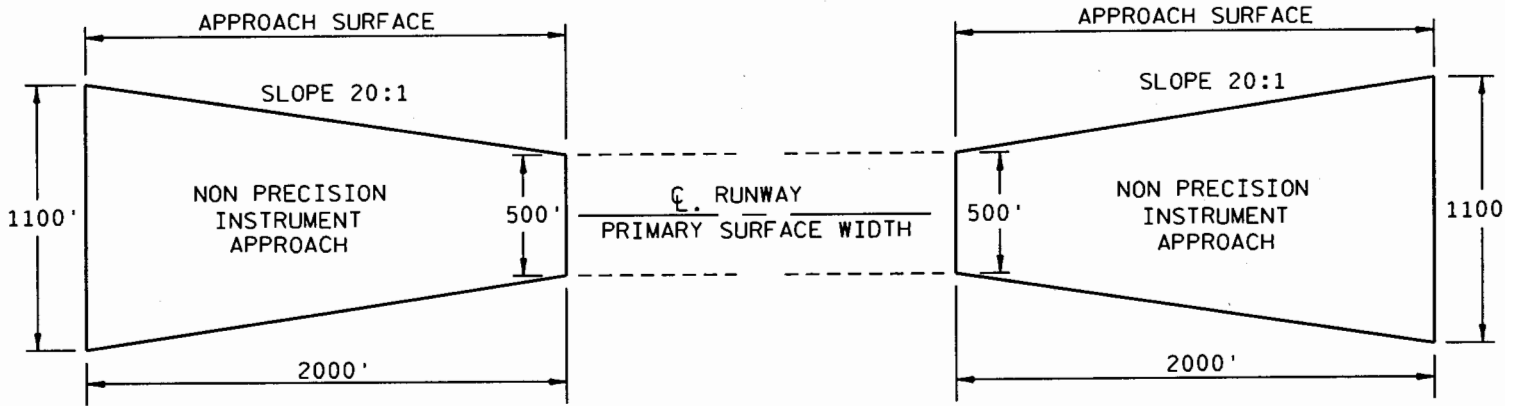
Category E - approach speed 166 knots or more

<sup>2</sup> If the runway will only serve small airplanes (12,500 lb. And under) in Design Group I, this dimension may be reduced to 125 feet. However, this dimension should be increased where necessary to accommodate visual navigational aids that may be installed. For example, farming operations should not be allowed within 25 feet of a Precision Approach Path Indicator (PAPI) light box.

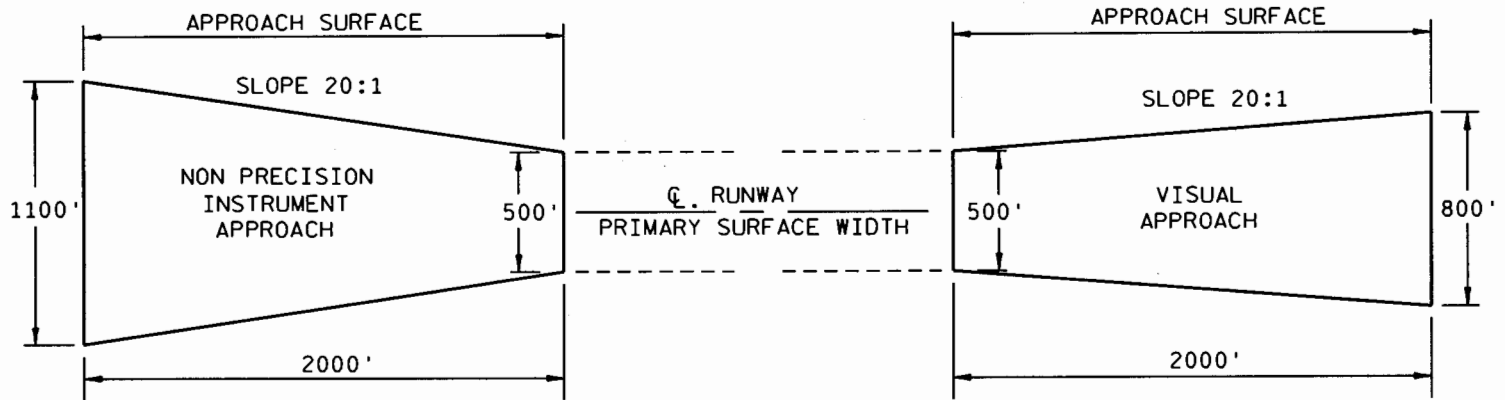
<sup>3</sup> These dimensions reflect the Threshold Siting Surface (TSS) as defined in AC 150/5300-13, Appendix 2. The TSS cannot be penetrated by any object. Under these conditions, the TSS is more restrictive than the OFA and the dimensions shown here are to prevent penetration of the TSS by crops and farm machinery.



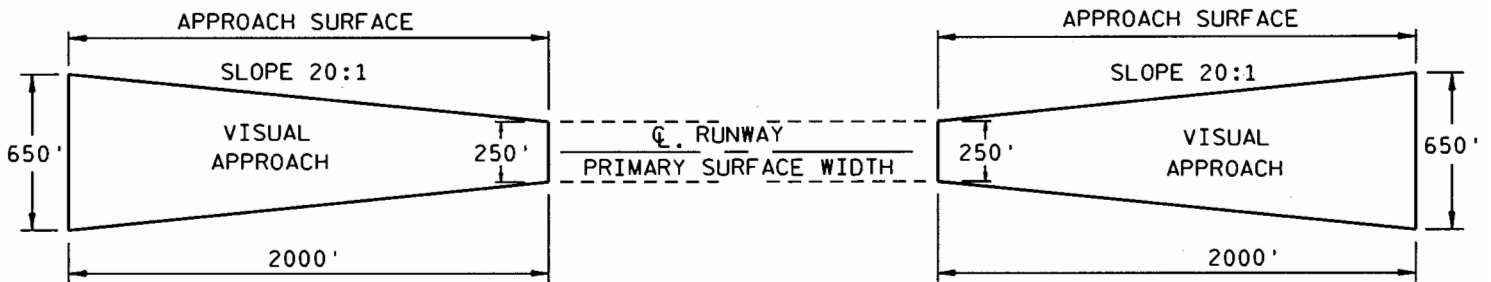
AE\_P01301.P01301.DGN



**A. NON PRECISION INSTRUMENT RUNWAY**

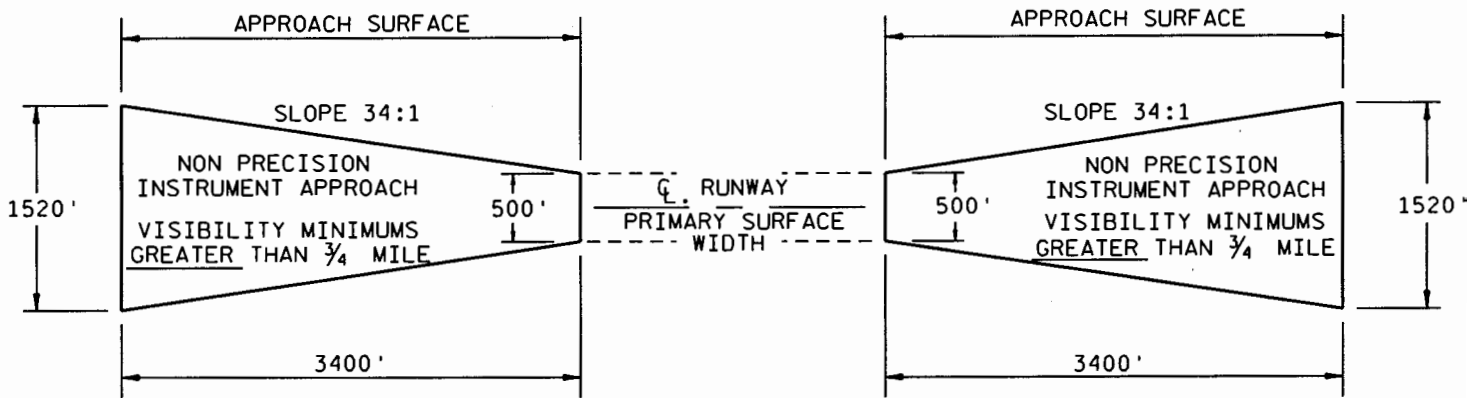


**B. NON PRECISION INSTRUMENT RUNWAY**

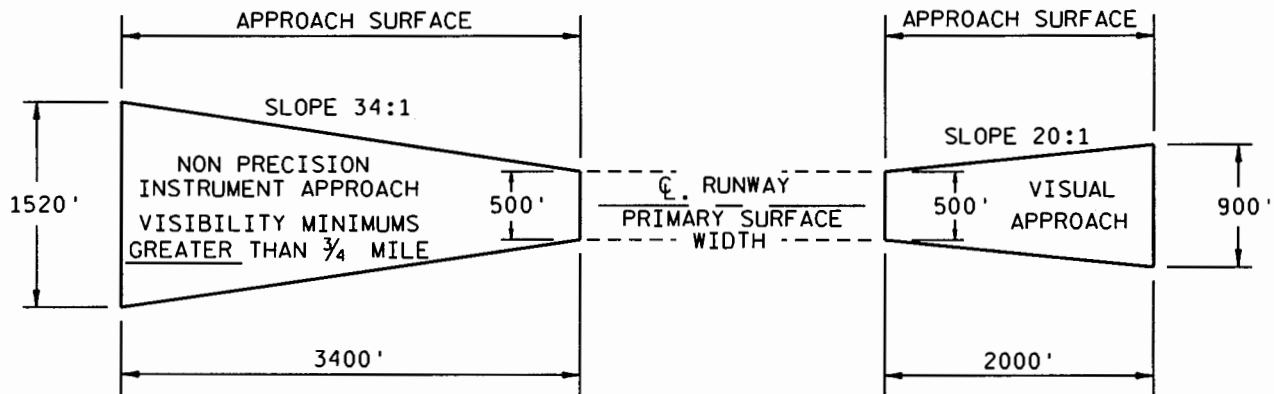


**C. VISUAL RUNWAY**

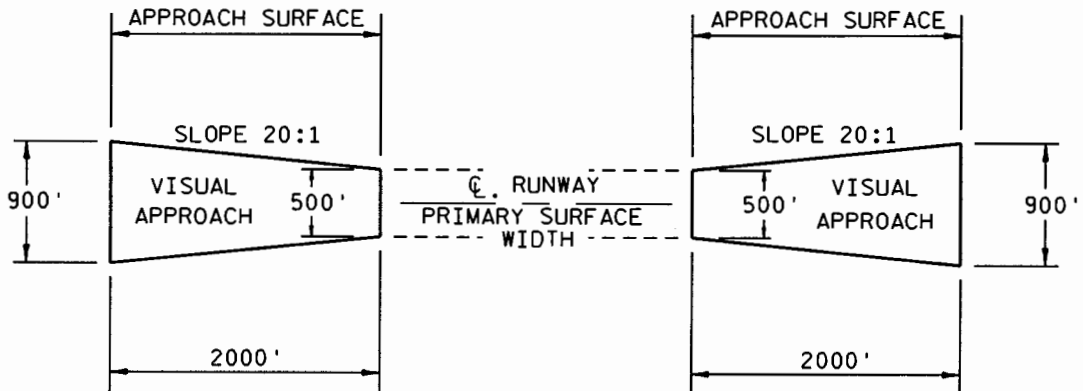
**FIGURE 1. PART 77 APPROACH SURFACE DIMENSIONS FOR UTILITY RUNWAYS**



**A. NON PRECISION INSTRUMENT RUNWAY WITH  
VISIBILITY MINIMUMS GREATER THAN  $\frac{3}{4}$  MILE**

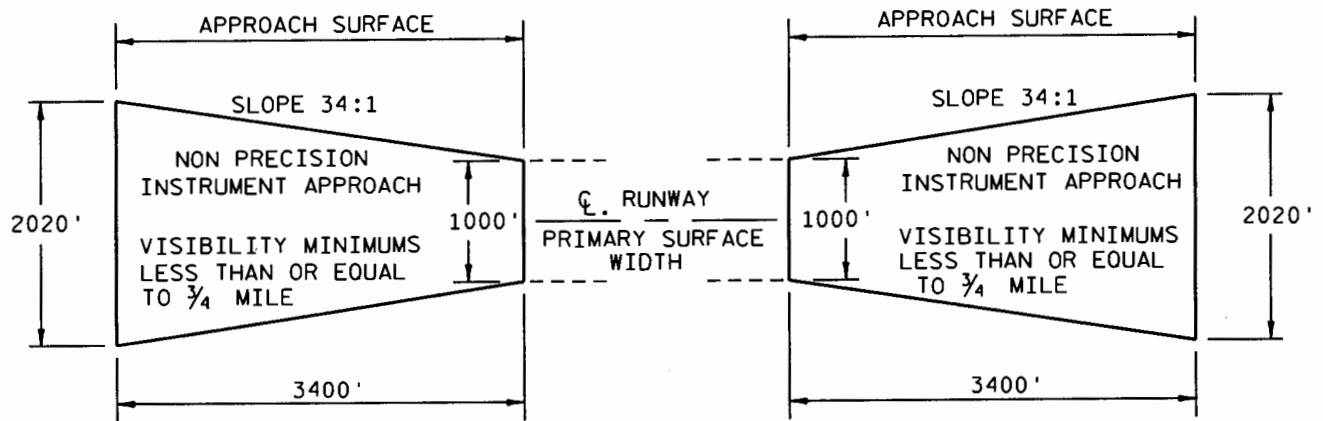


**B. NON PRECISION INSTRUMENT RUNWAY WITH  
VISIBILITY MINIMUMS GREATER THAN  $\frac{3}{4}$  MILE**

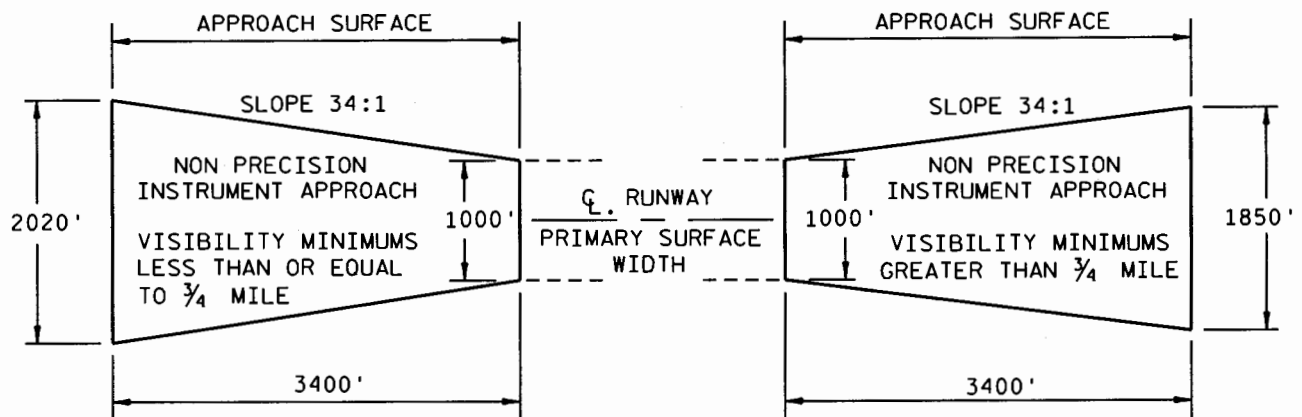


**C. VISUAL RUNWAY**

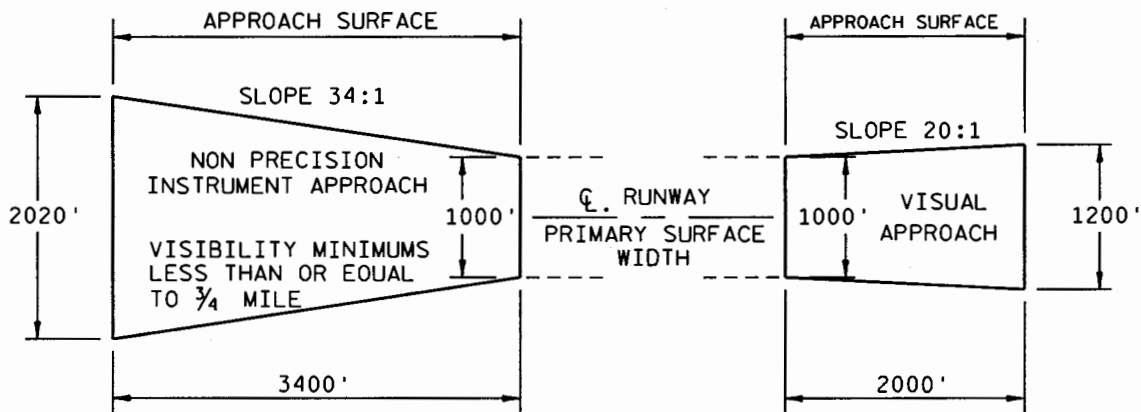
**FIGURE 2. PART 77 APPROACH SURFACE DIMENSIONS FOR RUNWAYS LARGER THAN UTILITY**



**A. NON PRECISION INSTRUMENT RUNWAY WITH  
VISIBILITY MINIMUMS AS LOW AS  $\frac{3}{4}$  MILE**

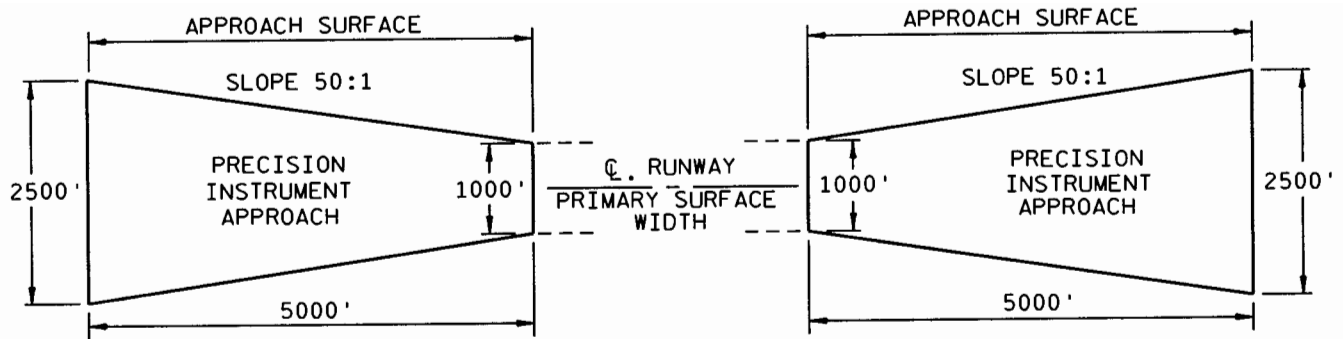


**B. NON PRECISION INSTRUMENT RUNWAY WITH  
VISIBILITY MINIMUMS AS LOW AS  $\frac{3}{4}$  MILE**

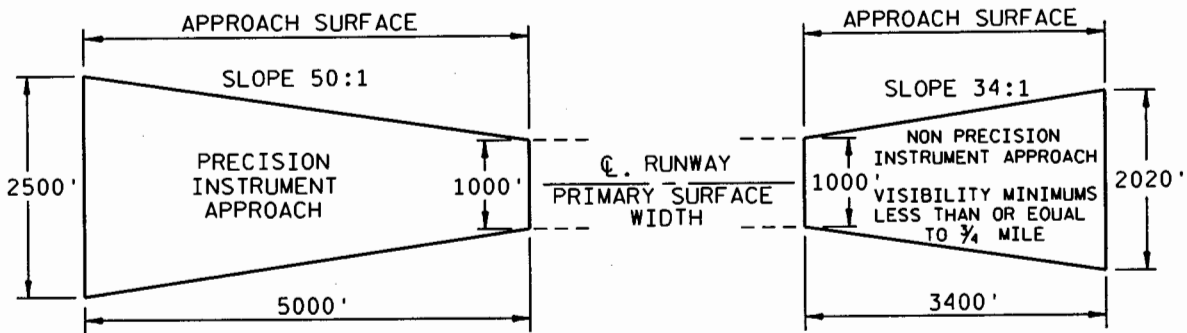


**C. NON PRECISION INSTRUMENT RUNWAY WITH  
VISIBILITY MINIMUMS LESS THAN OR EQUAL TO  $\frac{3}{4}$  MILE**

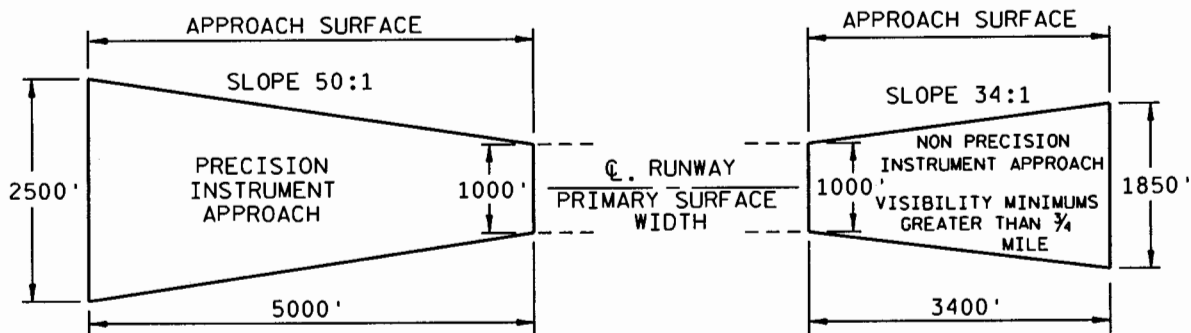
FIGURE 3. PART 77 APPROACH SURFACE DIMENSIONS FOR RUNWAYS LARGER THAN UTILITY



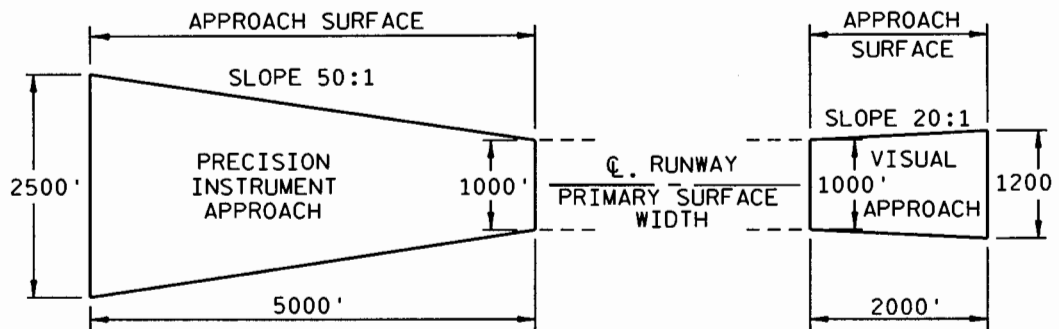
**A. PRECISION INSTRUMENT RUNWAY**



**B. PRECISION INSTRUMENT RUNWAY**



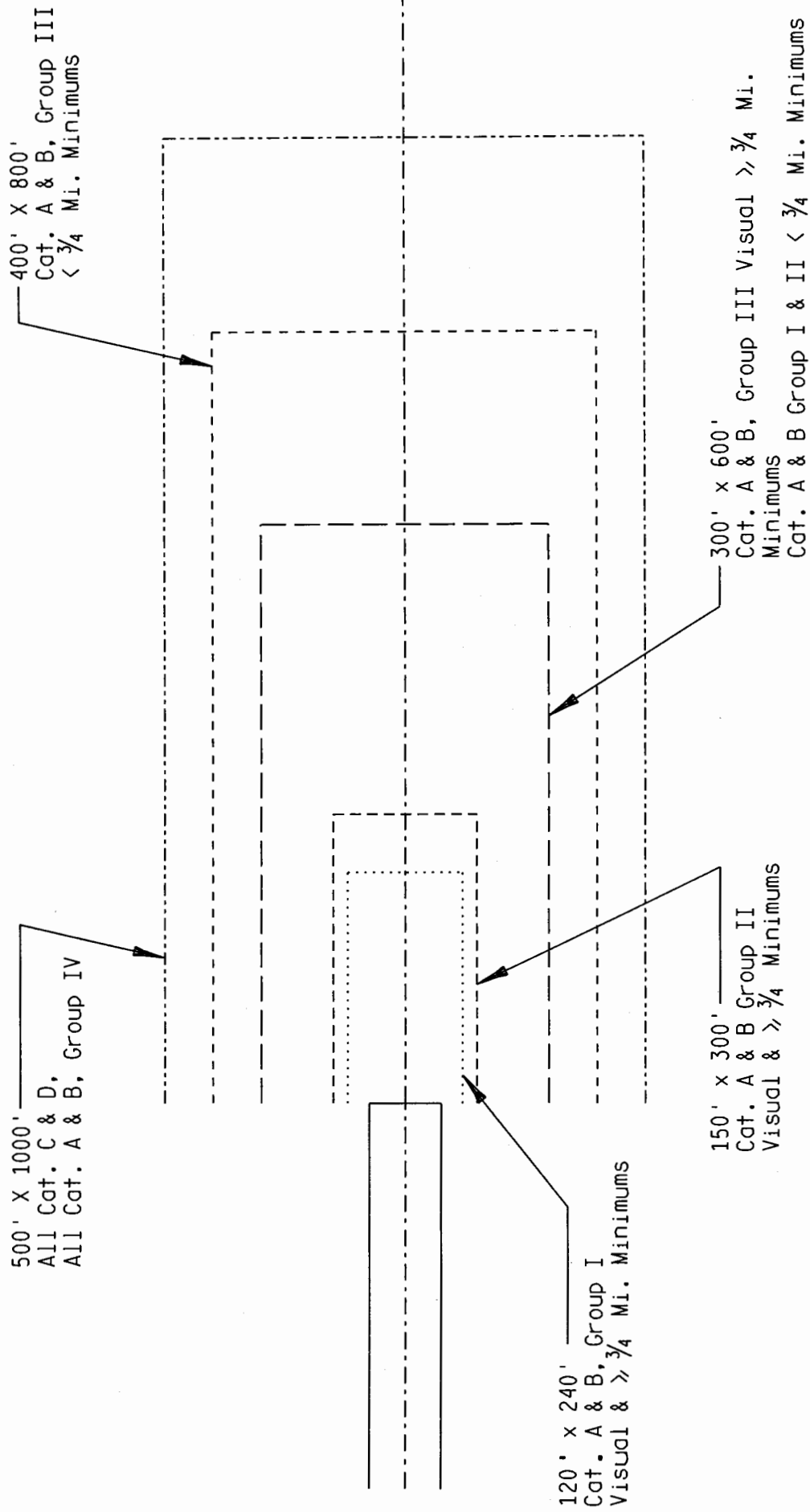
**C. PRECISION INSTRUMENT RUNWAY**



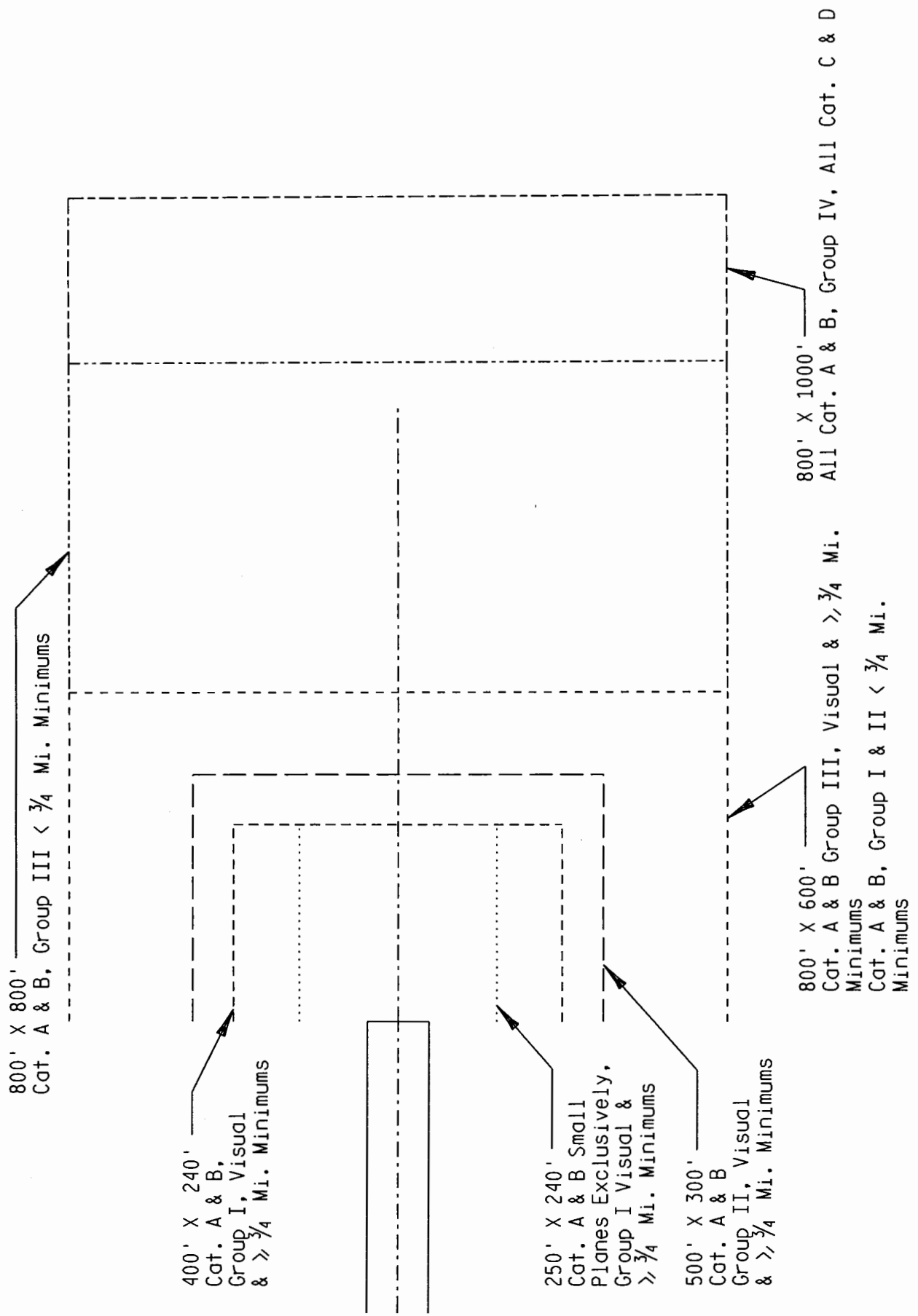
**D. PRECISION INSTRUMENT RUNWAY**

**FIGURE 4. PART 77 APPROACH SURFACE DIMENSIONS FOR RUNWAYS LARGER THAN UTILITY**

# RUNWAY SAFETY AREAS



# RUNWAY OBJECT FREE AREAS



# THRESHOLD LOCATION PLANE STANDARDS

9/26/2005

AC 150/5300-13 CHG 9

Appendix 2

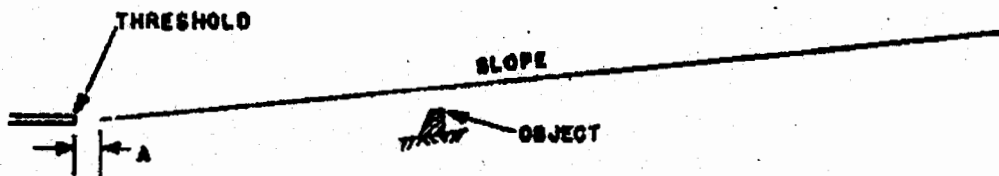
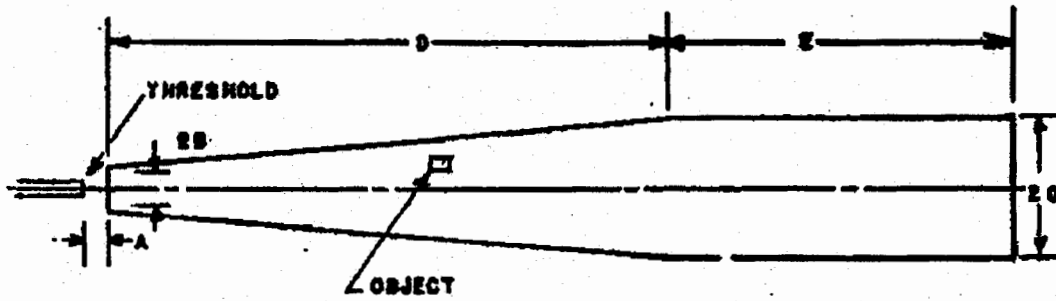
**Table A2-1. Approach/Departure Requirements Table**

	Runway Type	DIMENSIONAL STANDARDS*					Slope
		Feet					
		A	B	C	D	E	
1	Approach end of runways expected to serve small airplanes with approach speeds less than 50 knots. (Visual runways only, day/night)	0	60	150	500	2,500	15:1
2	Approach end of runways expected to serve small airplanes with approach speeds of 50 knots or more. (Visual runways only, day/night)	0	125	350	2,250	2,750	20:1
3	Approach end of runways expected to serve large airplanes (Visual day/night); or instrument minimums $\geq$ 1 statute mile (day only).	0	200	500	1,500	8,500	20:1
4	Approach end of runways expected to support instrument night circling. <sup>1</sup>	200	200	1,700	10,000	0	20:1
5	Approach end of runways expected to support instrument straight in night operations, serving approach category A and B aircraft only. <sup>1</sup>	200	200	1,900	10,000 <sup>2</sup>	0	20:1
6	Approach end of runways expected to support instrument straight in night operations serving greater than approach category B aircraft. <sup>1</sup>	200	400	1,900	10,000 <sup>2</sup>	0	20:1
7	Approach end of runways expected to accommodate instrument approaches having visibility minimums $\geq$ 3/4 but $<$ 1 statute mile, day or night.	200	400	1,900	10,000 <sup>2</sup>	0	20:1
8	Approach end of runways expected to accommodate instrument approaches having visibility minimums $<$ 3/4 statute mile or precision approach (ILS, GLS, or MLS), day or night.	200	400	1,900	10,000 <sup>2</sup>	0	34:1
9	Approach runway ends having Category II approach minimums or greater.	The criteria are set forth in TERPS, Order 8260.3.					
10	Departure runway ends for all instrument operations	0 <sup>5</sup>	See Figure A2-3				40:1 <sup>3</sup>
11	Departure runway ends supporting Air Carrier operations. <sup>4</sup>	0 <sup>5</sup>	See Figure A2-4				62.5:1

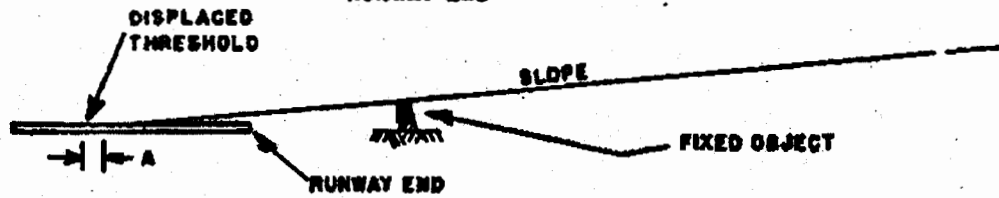
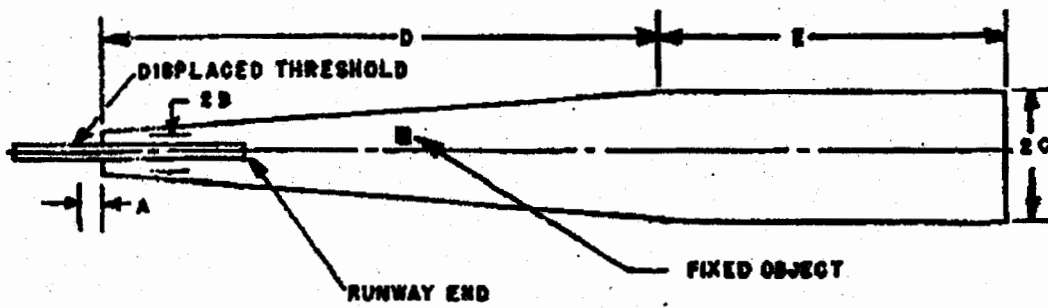
\* The letters are keyed to those shown in figure A2-1.

**Notes:**

1. Lighting of obstacle penetrations to this surface or the use of a VGSI, as defined by the TERPS order, may avoid displacing the threshold.
2. 10,000 feet is a nominal value for planning purposes. The actual length of these areas is dependent upon the visual descent point position of the instrument approach procedure.
3.  $\leq$  35-foot obstacles are permitted through the surface without requiring actions found in paragraph 4; however, they could have an impact on departure visibilities or departure procedures.
4. Information concerning penetrations to this surface is provided for information only and does not take effect until January 1, 2008.
5. Dimension A is measured from the departure end of the TODA as determined by the DER or clearway.



DISPLACEMENT NOT NECESSARY

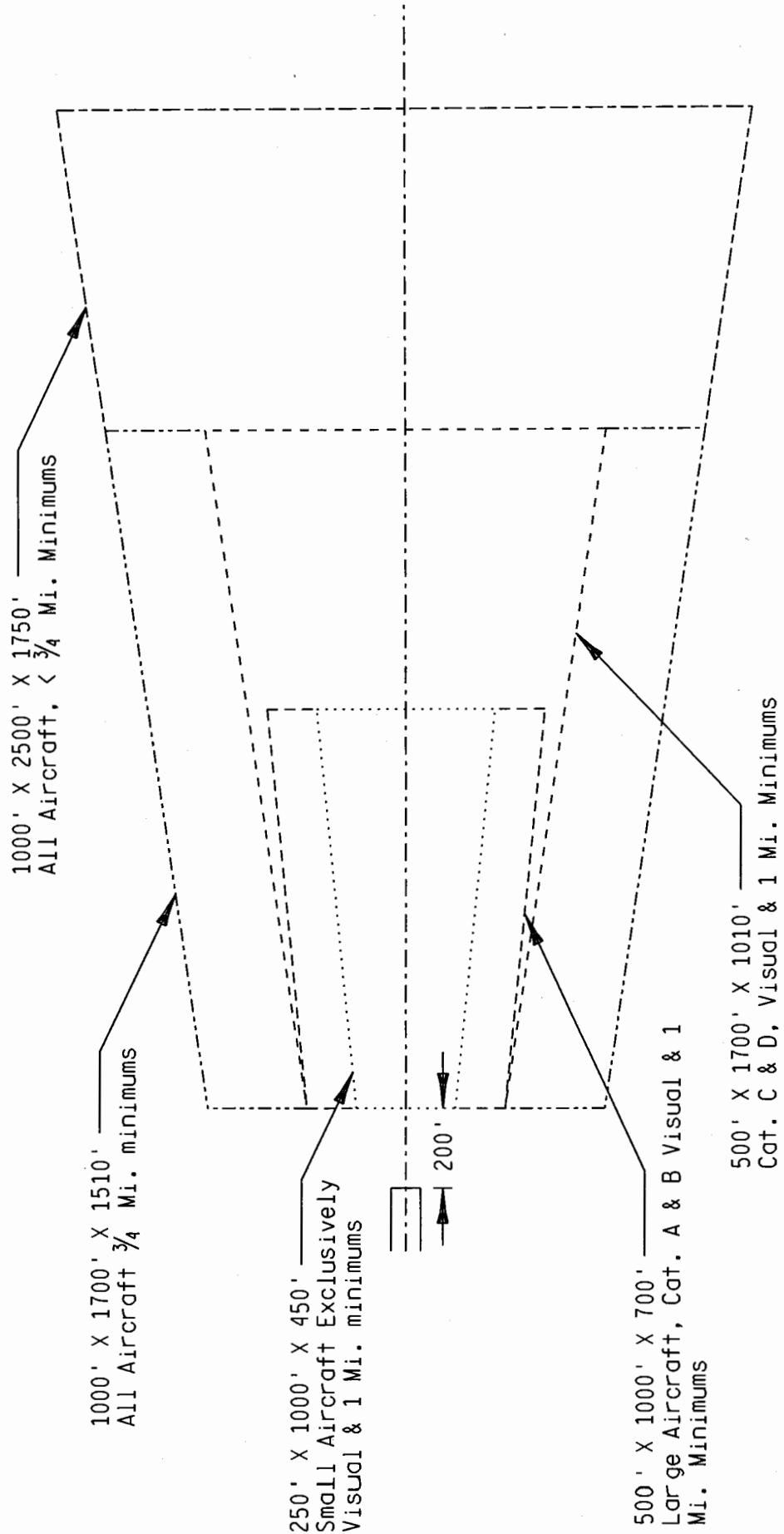


DISPLACEMENT NECESSARY

Figure A2-2. Approach slopes

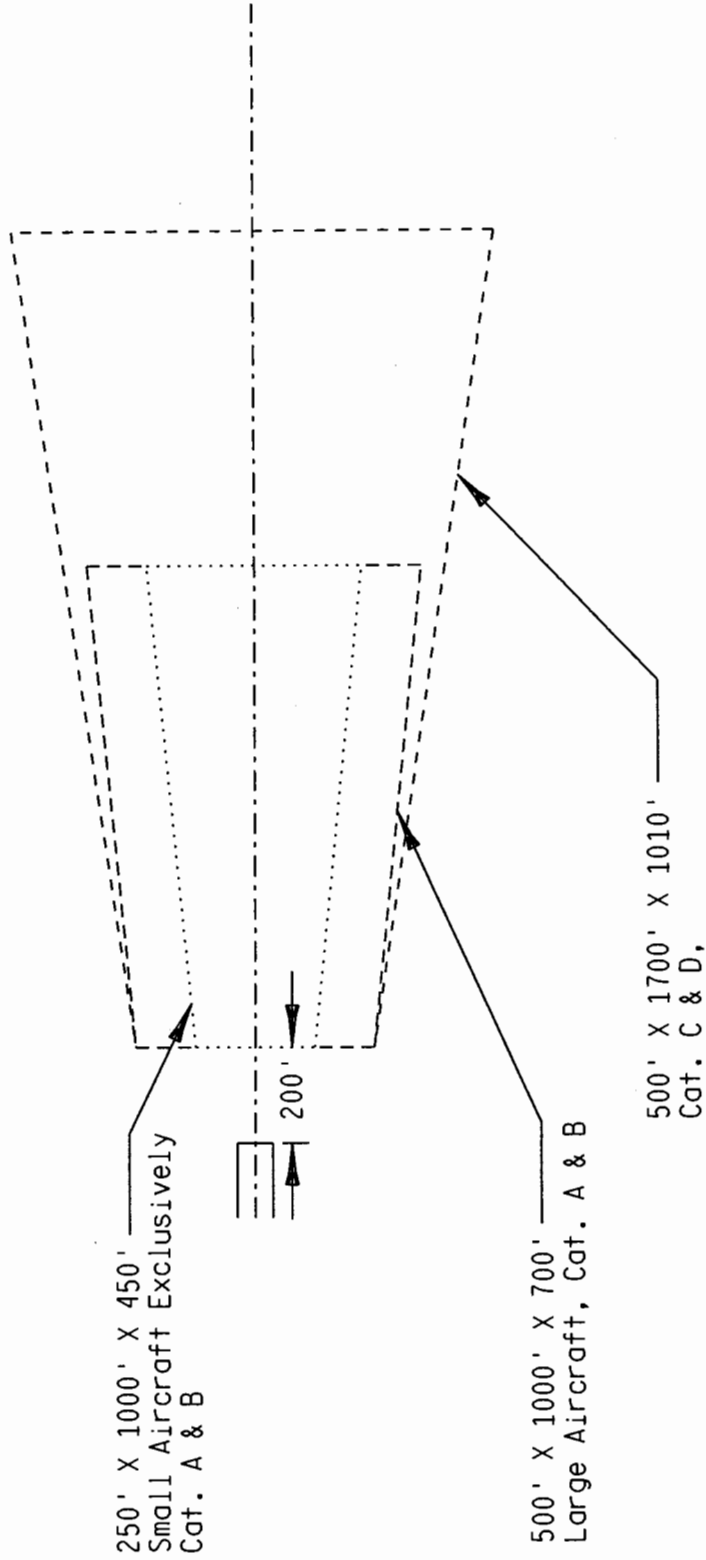
# APPROACH RUNWAY PROTECTION ZONES

(To Be Shown Only Where Declared Distances Are Used)



# DEPARTURE RUNWAY PROTECTION ZONES

(To Be Shown Only Where Declared Distances Are Used)

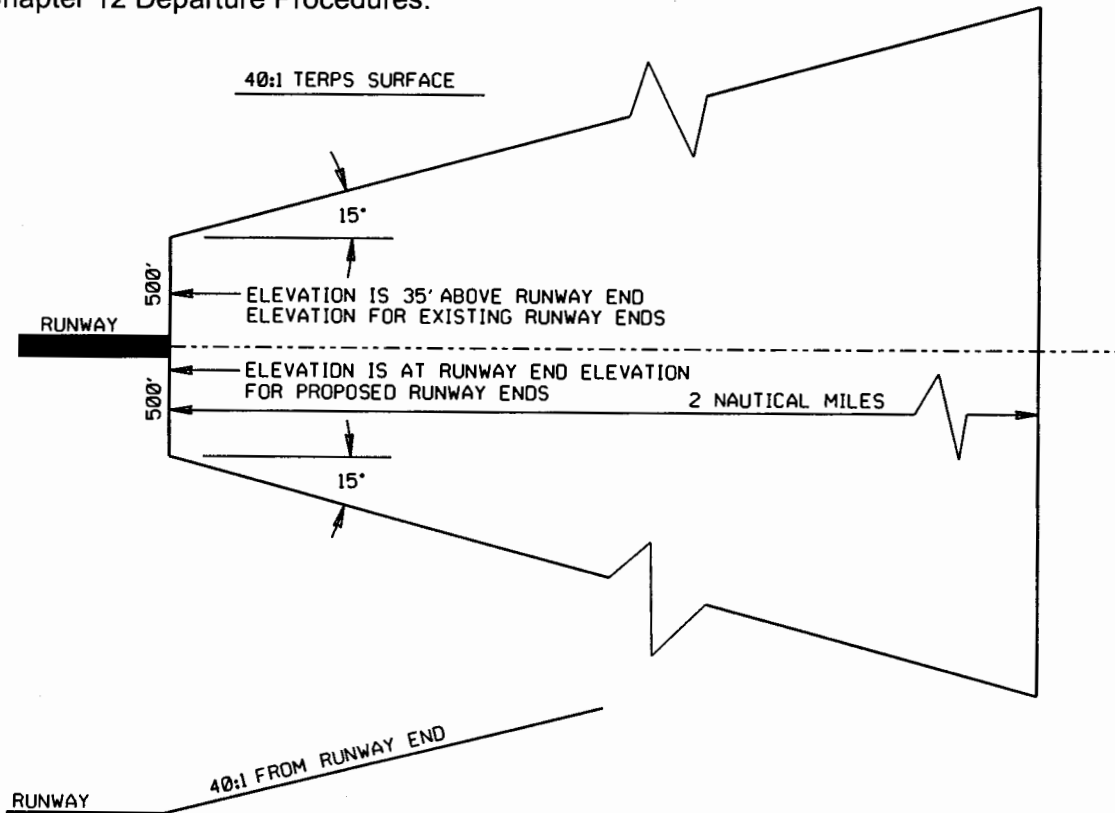


## TERPS Departure Surface (Only if surveyed)

The TERPS Departure Zone 1 obstacle identification surface is a 40:1 surface over an area that is 1000' wide (500' each side of the runway centerline) at the runway end and with sides that splay 15 degrees to line that is parallel to the extended runway centerline for a distance of 2 NM. It begins no higher than 35' above the runway end elevation and rises in the direction of departure. The following comments will assist in understanding how this surface is applied by the Chicago Flight Procedure Office (CHI FPO):

1. This surface only applies to IFR airports.
2. This surface is independent of approach minimums.
3. For proposed objects the 40:1 surface begins at the runway end elevation.
4. For objects that violate the surface departure minimums, climb rates may be required to permit a departure procedure. These departure minimums and climb rates will be provided in the airspace review of proposal and are included in the U.S. Terminal Procedures (Approach Plates) publication.
5. Lighting objects that violate the surface may be required to permit nighttime operations. The lighting requirements are not being implemented at this time. However the lighting requirement is being pointed out.
6. Proposed departure procedures over existing objects are raised 35' at the runway end then the impact of the existing object is assessed.

The zone 1 surface is not the only departure zone considered by the CHI FPO when departure procedures are studied. A complete explanation for all the surfaces considered is TERPS Order 8260.3B Chapter 12 Departure Procedures.



# LIGHT PLANE LAYOUT

1600' BEYOND LAST MALS LIGHT

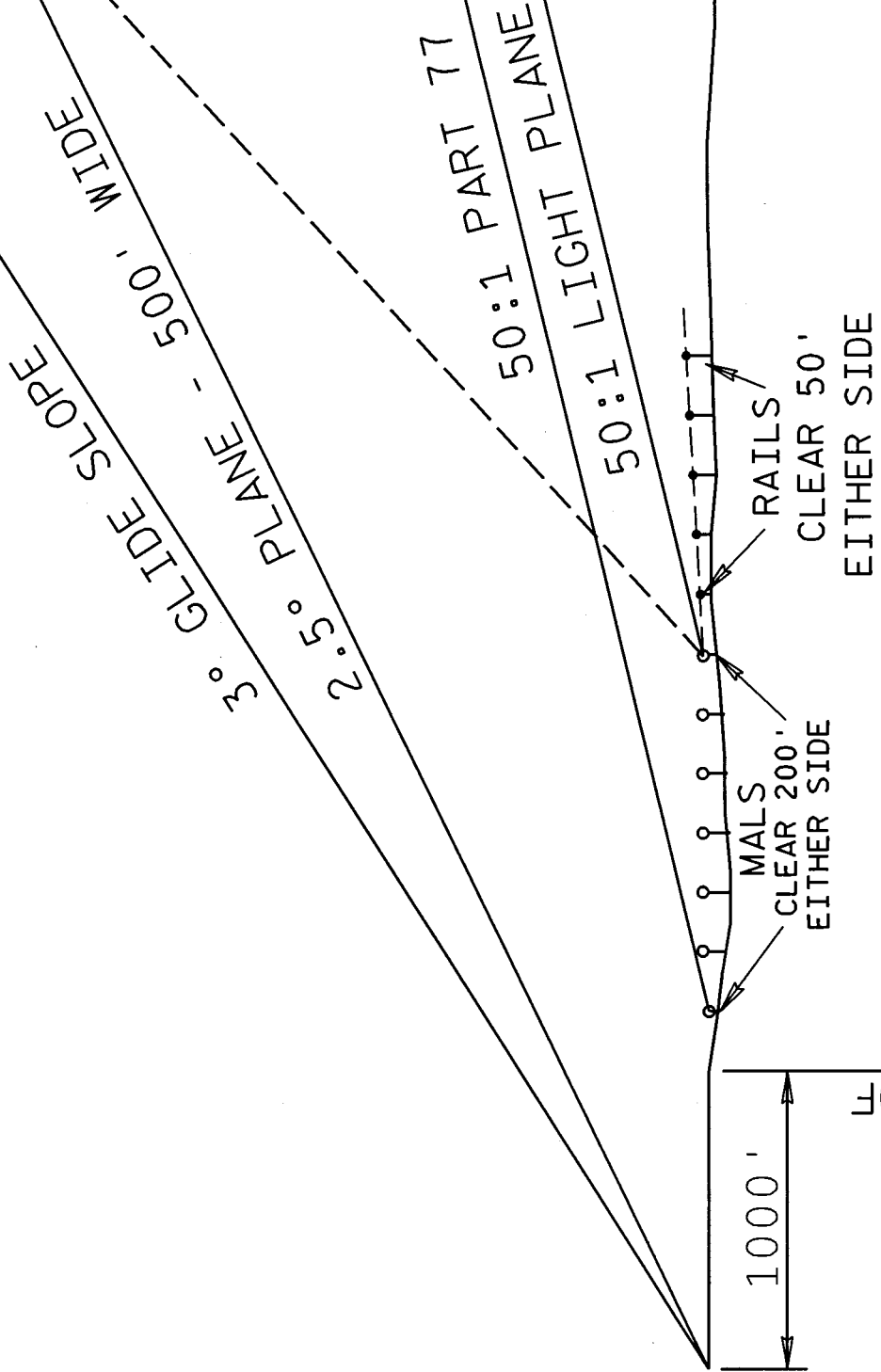


FIGURE 2-6. IDEAL RAIL OBSTRUCTION CLEARANCE

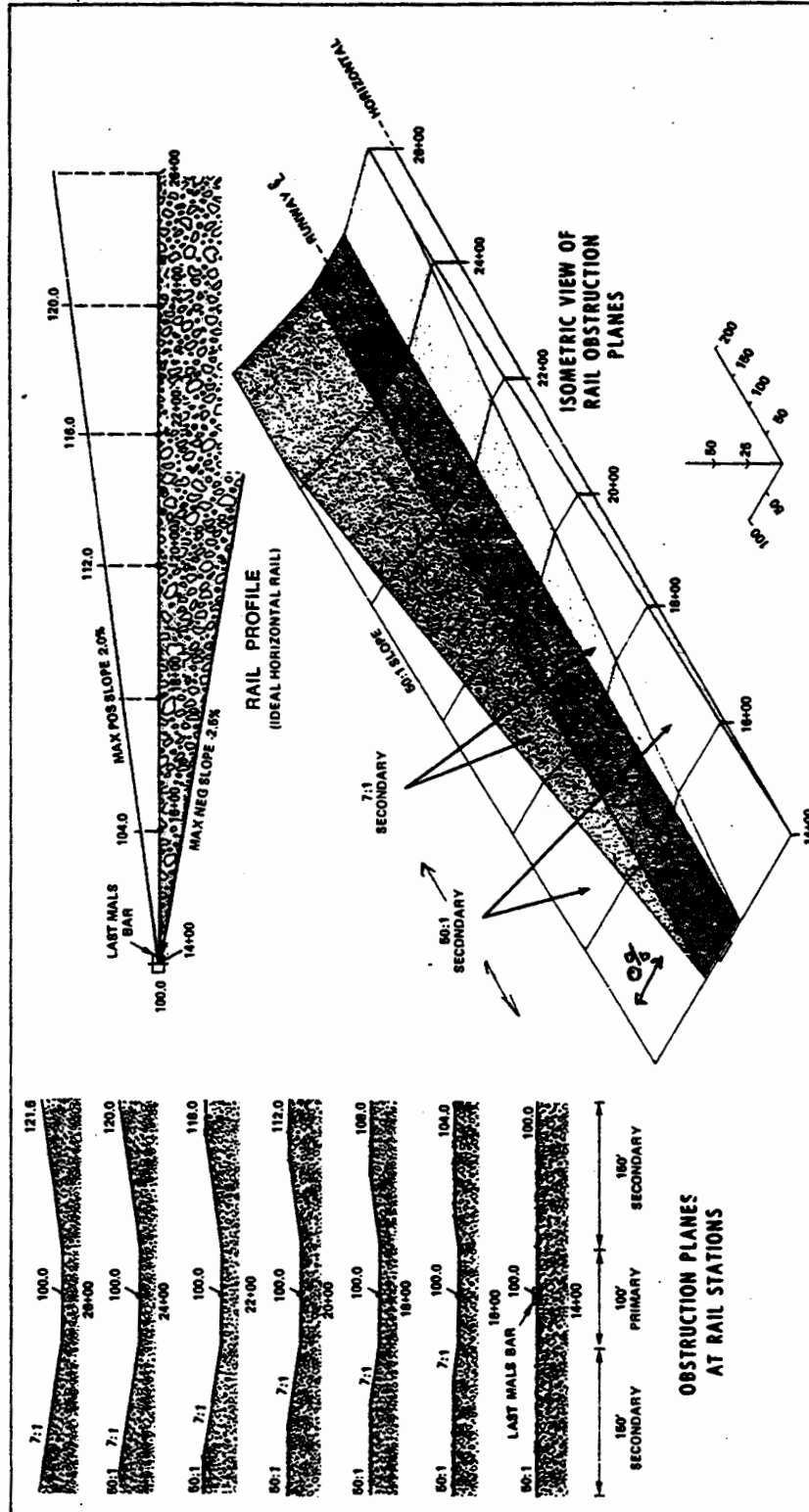


FIGURE 2 - 6. IDEAL RAIL OBSTRUCTION CLEARANCE

### Aeronautics

Item Description	Level Name	V8 Level	Color	Style	Weight	Symbol	J7.1 Level
EX. RWY CENTERLINE	AE E RWYCLINE	50010	0	0	0		
FUT. RWY CENTERLINE	AE F RWYCLINE	50012	0	0	0		
ULT. RWY CENTERLINE	AE U RWYCLINE	50014	0	0	0		
(ALL) RWY PAVEMENT	AE E RWYPAVEMENT	50020	0	0	2		
FUT. RWYS, TWYS, APRONS	AE F RWYPAVEMENT	50022	128	3	0		
EX. TURF RWYS, TWYS, APRONS	AE E TURFRWYS	50030	2	3	1		
FUT. TURF RWYS, TWYS, APRONS	AE F TURFRWYS	50032	2	2	0		
ULT. RWYS, TWYS, APRONS	AE U RWYPAVEMENT	50024	208	2	0		
EX. RWY SAFETY AREAS	AE E RSA	50040	105	6	1		
FUT. RWY SAFETY AREAS	AE F RSA	50042	136	6	0		
ULT. RWY SAFETY AREAS	AE U RSA	50044	151	6	0		
EX. RWY OBJECT FREE AREAS	AE E OFA	50050	110	7	1		
FUT. RWY OBJECT FREE AREA	AE F OFA	50052	112	7	0		
ULT. RWY OBJECT FREE AREAS	AE U OFA	50054	123	7	0		
EX. APPROACH SURFACE	AE E APP SURFACE	50060	30	0	2		
FUT. APPROACH SURFACE	AE F APP SURFACE	50062	31	0	0		
ULT. APPROACH SURFACE	AE U APP SURFACE	50064	32	0	3		
EX. RWY PROTECTION ZONES	AE E RPZ	50070	96	5	2		
FUT. RWY PROTECTION ZONES	AE F RPZ	50072	163	5	1		
ULT. RWY PROTECTION ZONES	AE U RPZ	50074	150	5	0		
EX. RWY VISIBILITY ZONE	AE E RVZ	50080	97	3	1		
FUT. RWY VISIBILITY ZONE	AE F RVZ	50082	103	3	0		
ULT. RWY VISIBILITY ZONE	AE U RVZ	50084	151	3	0		
EX. BUILDING RESTRICTION LINE	AE E BRL	50090	219	4	2		
FUT. BUILDING RESTRICTION LINE	AE F BRL	50092	221	4	1		
ULT. BUILDING RESTRICTION LINE	AE U BRL	50094	226	4	0		
EX. APPENDIX 2 SURFACES	AE E APP2SUF	50100	29	1	4		
FUT. APPENDIX 2 SURFACES	AE F APP2SUF	50102	77	1	2		
ULT. APPENDIX 2 SURFACES	AE U APP2SUF	50104	127	1	0		
EX. 40:1 DEPARTURE SURFACE	AE E TERPS	50110	214	20PM4R	3		
FUT. 40:1 DEPARTURE SURFACE	AE F TERPS	50112	215	20PM4R	1		
ULT. 40:1 DEPARTURE SURFACE	AE U TERPS	50114	216	20PM4R	0		
EX. AIRPORT PROPERTY LINE	AE E EAP	50120	23	0	4		
FUT. AIRPORT PROPERTY LINE	AE F FAP	50122	24	0	1		
ULT. AIRPORT PROPERTY LINE	AE U UAP	50124	23	0	0		
EX. CLEAR ZONE EASEMENT LINE	AE E CZE	50130	25	3	3		
FUT. CLEAR ZONE EASEMENT LINE	AE F CZE	50132	26	3	1		
ULT. CLEAR ZONE EASEMENT LINE	AE U CZE	50134	25	3	0		
EX. AVIGATION EASEMENT LINE	AE E AV	50140	27	6	3		
FUT. AVIGATION EASEMENT LINE	AE F AV	50142	28	6	1		
ULT. AVIGATION EASEMENT LINE	AE U AV	50144	27	6	0		
EX. GAS LINE EASE. SCALE 2	AE E GAS L EASE	50150	155	Egas	1	Line Style Scale = 2	
ULT. GAS LINE EASE. SCALE 3	AE U GAS L EASE	50154	155	Egas	0	Line Style Scale = 3	
EX. ELECTRICAL LINE EASE. SCALE 2	AE E ELEC L EASE	50160	180	Eelec	1	Line Style Scale = 2	
ULT. ELECTRICAL LINE EASE. SCALE 3	AE U ELEC L EASE	50164	180	Eelec	0	Line Style Scale = 3	
EX. WATER LINE EASEMENTS	AE E WATER L EASE	50170	124	Eshtplg	1	Line Style Scale = 1	
ULT. WATER LINE EASEMENTS	AE U WATER L EASE	50174	124	Eshtplg	0	Line Style Scale = 2	
EX. AGRICULTURE EASE SCALE 3	AE E ACCESS EASE	50180	93	Ematcl2	1	Line Style Scale = 3	
ULT. AGRICULTURE EASE SCALE 5	AE U ACCESS EASE	50184	94	Ematcl2	0	Line Style Scale = 5	
EX. LEASED LOT LINES	AE E LOT LINES	50190	12	6	1		
(FORMER) PARCEL LOT LINES	AE E PARCEL LOT LINES	50200	13	6	0		
EX. ROAD RIGHT OF WAY LINES	AE E ROAD R-O-W	50210	5	3	1		
ULT. ROAD RIGHT OF WAY LINES	AE U ROAD R-O-W	50214	6	3	0		
EX. RAIL ROAD R-O-W LINES	AE E RR R-O-W	50220	14	3	0		
ULT. RAIL ROAD R-O-W LINES	AE U RR R-O-W	50224	15	3	0		
EX. VOR	AE E_VOR	50230	45	0	0	cell library = aero cell = E_VOR	
EX. LOCALIZER	AE E LOCALIZER	50240	45	0	0	cell library = aero cell = E_LOC	
EX. GLIDE SLOPE	AE E_GLIDE_SLOPE	50250	0	0	0		
EX. NDB LOCATION	AE E_NDB	50260	0	0	0		
ULT. NDB LOCATION	AE U_NDB	50264	0	0	0		
EX. ODALS	AE E_ODALS	50270	45	0	0	cell library = aero cell = EODALS	
ULT. ODALS	AE U_ODALS	50274	45	0	0	cell library = aero cell = UODALS	
EX. MALSR	AE E_MALSR	50280	45	0	0	cell library = aero cell = MALSR	
ULT. MALSR	AE U_MALSR	50284	45	0	0	cell library = aero cell = UMALSR	
EX. MALSF	AE E_MALSF	50290	45	0	0	cell library = aero cell = MALSF	
ULT. MALSF	AE U_MALSF	50294	3	0	0	cell library = aero cell = UMALSF	
EX. AWOS	AE E_AWOS	50300	3	0	0	cell library = aero cell = E_AWOS	
ULT. AWOS	AE U_AWOS	50304	3	0	0	cell library = aero cell = U_AWOS	

Item Description	Level Name	V8 Level	Color	Style	Weight	Symbol	J7.1 Level
EX. AWOS PROTECTION AREA	AE_E_AWOS_P-A	50310	148	{ Batten }	0	Line Style Scale = 80	
ULT. AWOS PROTECTION AREA	AE_U_AWOS_P-A	50314	148	{ Batten }	0	Line Style Scale = 100	
EX. LOCALIZER CRITICAL AREA	AE_E_LOC_CRITICAL_AREA	50320	134	Ematcl2	1	Line Style Scale = 3	
ULT. LOCALIZER CRITICAL AREA	AE_U_LOC_CRITICAL_AREA	50324	135	Ematcl2	0	Line Style Scale = 5	
EX. GLIDE SLOPE CRITICAL AREA	AE_E_GSCRITICAL_AREA	50330	94	0	1		
ULT. GLIDE SLOPE CRITICAL AREA	AE_U_GSCRITICAL_AREA	50334	95	0	0		
EX. VOR CRITICAL AREA	AE_E_VORCRITICAL_AREA	50340	96	0	1		
ULT. VOR CRITICAL AREA	AE_U_VORCRITICAL_AREA	50344	97	0	0		
EX. 2 BOX PAPI LOCATION	AE_E_2BOXPAPI	50350	6	0	0	cell library = aero cell = 2BPAPI	
ULT. 2 BOX PAPI LOCATION	AE_U_2BOXPAPI	50354	6	0	0	cell library = aero cell = 2BPAPI	
EX. 4 BOX PAPI LOCATION	AE_E_4BOXPAPI	50360	6	0	0	cell library = aero cell = 4BPAPI	
ULT. 4 BOX PAPI LOCATION	AE_U_4BOXPAPI	50364	6	0	0	cell library = aero cell = 4BPAPI	
EX. VASI LOCATION	AE_E_VASI	50370	6	0	0	cell library = aero cell = VASI	
ULT. VASI LOCATION	AE_U_VASI	50374	6	0	0	cell library = aero cell = VASI	
EX. WINDCONE LOCATION	AE_E_WINDCONE	50380	106	0	0	cell library = aero cell = WCONE	
ULT. WINDCONE LOCATION	AE_U_WINDCONE	50384	106	0	0	cell library = aero cell = WCONE	
EX. WIND TEE LOCATION	AE_E_WINDTEE	50390	6	0	0	cell library = aero cell = WINDT	
ULT. WIND TEE LOCATION	AE_U_WINDTEE	50394	6	0	0	cell library = aero cell = WINDT	
EX. SEGMENTED CIRCLE	AE_E_SEG_CIR	50400	84	0	0	cell library = aero cell = SEGMET	
ULT. SEGMENTED CIRCLE	AE_U_SEG_CIR	50404	84	0	0	cell library = aero cell = SEGMET	
EX. RUNWAY END IDENTIFIER LIGHTS	AE_E_REILS	50410	9	0	0	cell library = aero cell = REILS	
FUT. RUNWAY END IDENTIFIER LIGHTS	AE_F_REILS	50412	0	0	0	cell library = aero cell = REILS	
ULT. RUNWAY END IDENTIFIER LIGHTS	AE_U_REILS	50414	9	0	0	cell library = aero cell = REILS	
EX. THRESHOLD LIGHT LOCATIONS	AE_E_THRES_LIGHTS	50420	0	0	0	cell library = aero cell = THLITE	
FUT. THRESHOLD LIGHT LOCATIONS	AE_F_THRES_LIGHTS	50422	0	0	0	cell library = aero cell = THLITE	
ULT. THRESHOLD LIGHT LOCATIONS	AE_U_THRES_LIGHTS	50424	0	0	0	cell library = aero cell = THLITE	
EX. RWY EDGE LIGHTS	AE_E_RWY_EDGE_L	50430	3	0	0	cell library = aero cell = EDGLTS	
ULT. RWY EDGE LIGHTS	AE_U_RWY_EDGE_L	50434	0	0	0	cell library = aero cell = EDGLTS	
EX. TAXIWAY EDGE LIGHTS	AE_E_TWY_EDGE_L	50440	0	0	0	cell library = aero cell = EDGLTS	
ULT. TAXIWAY EDGE LIGHTS	AE_U_TWY_EDGE_L	50444	0	0	0	cell library = aero cell = EDGLTS	
EX. GPS MONUMENT LOCATIONS	AE_E_GPSPM	50450	0	0	0	=	
EX. OBST. LGTS LOCATIONS-LABEL	AE_E_OBST_LITES	50460	249	0	1	cell library = aero cell = OBSTLT	
ULT. OBST. LGTS LOCATIONS-LABEL	AE_U_OBST_LITES	50464	249	0	0	cell library = aero cell = OBSTLT	
EX. FUEL FACILITIES LOCATION	AE_E_FUEL	50470	37	0	1	cell library = aero cell = E_FUEL	
ULT. FUEL FACILITIES LOCATION	AE_U_FUEL	50474	40	0	0	cell library = aero cell = U_FUEL	
EX. RWY END NUMBERS	AE_E_RWY_NUMBERS	50480	0	0	0		
FUT. RWY END NUMBERS	AE_F_RWY_NUMBERS	50482	0	0	0		
ULT. RWY END NUMBERS	AE_U_RWY_NUMBERS	50484	0	0	0		
EX. THRESHOLD BAR (10.5' WIDE)	AE_E_THRESHOLD_BAR	50490	0	0	0		
FUT. THRESHOLD BAR (10.5' WIDE)	AE_F_THRESHOLD_BAR	50492	0	0	0		
ULT. THRESHOLD BAR (10.5' WIDE)	AE_U_THRESHOLD_BAR	50494	0	0	0		
EX. THRESHOLD BARS (150' LONG)	AE_E_THRESHOLD_BARS	50500	0	0	0		
FUT. THRESHOLD BARS (150' LONG)	AE_F_THRESHOLD_BARS	50502	0	0	0		
ULT. THRESHOLD BARS (150' LONG)	AE_U_THRESHOLD_BARS	50504	0	0	0		
EX. CENTERLINE STRIPE (120' LONG)	AE_E_C_L_STRIPE	50510	0	0	0		
FUT. CENTERLINE STRIPE (120' LONG)	AE_F_C_L_STRIPE	50512	0	0	0		
ULT. CENTERLINE STRIPE (120' LONG)	AE_U_C_L_STRIPE	50514	0	0	0		
EX. FIXED DISTANCE MARKER	AE_E_FIXED_D_MARKER	50520	0	0	0		
FUT. FIXED DISTANCE MARKER	AE_F_FIXED_D_MARKER	50522	0	0	0		
ULT. FIXED DISTANCE MARKER	AE_U_FIXED_D_MARKER	50524	0	0	0		
EX. HOLDING LINES	AE_E_HOLDLINES	50530	4	0	0		

Item Description	Level Name	V8 Level	Color	Style	Weight	Symbol	J7.1 Level
FUT. HOLDING LINES	AE F_HOLDLINES	50532	4	0	0		
ULT. HOLDING LINES	AE U_HOLDLINES	50534	4	0	0		
EX. TWY CENTERLINES	AE E_TWY_C_L	50540	4	0	0		
FUT. TWY CENTERLINES	AE F_TWY_C_L	50542	4	0	0		
ULT. TWY CENTERLINES	AE U_TWY_C_L	50544	4	0	0		
EX. TIE-DOWNS (PAVED)	AE E_TIE-DOWNS	50550	4	0	0		
FUT. TIE-DOWNS (PAVED)	AE F_TIE-DOWNS	50552	4	0	0		
ULT. TIE-DOWNS (PAVED)	AE U_TIE-DOWNS	50554	4	0	0		
EX. WIND MEASURING DEVICE	AE E_ANEMOMETER	50560	0	0	0		
ULT. WIND MEASURING DEVICE	AE U_ANEMOMETER	50564	0	2	0		
EX. CHREVONS	AE E_CHREVONS	50570	4	0	0		
FUT. CHREVONS	AE F_CHREVONS	50572	4	0	0		
ULT. CHREVONS	AE U_CHREVONS	50574	4	0	0		
EX. ARROW WITH STRIPE	AE E_ARROW	50580	4	0	0		
FUT. ARROW WITH STRIPE	AE F_ARROW	50582	4	0	0		
ULT. ARROW WITH STRIPE	AE U_ARROW	50584	4	0	0		
EX. RWY EDGE STRIPE	AE E_EDGE STRIPE	50590	0	0	0		
FUT. RWY EDGE STRIPE	AE F_EDGE STRIPE	50592	0	0	0		
ULT. RWY EDGE STRIPE	AE U_EDGE STRIPE	50594	0	0	0		
EX. TOUCHDOWN STRIPES	AE E_TOUCHDOWNS	50600	0	0	0		
FUT. TOUCHDOWN STRIPES	AE F_TOUCHDOWNS	50602	0	0	0		
ULT. TOUCHDOWN STRIPES	AE U_TOUCHDOWNS	50604	0	0	0		
FUT. RAILROAD TRACKS	AE F_RAILROAD	50612	0	EMATCL1	0	Line Style Scale = 3	
EX. ELECTRICAL LINE ABOVE GROUND	AE E_ELEC_LINE	50620	3	EELEC	1	Line Style Scale = 3	
ULT. ELECTRICAL LINE ABOVE GROUND	AE U_ELEC_LINE	50624	0	EELEC	0	Line Style Scale = 2	
EX. UNDERGROUND DRAINAGE	AE E_UGDRAINAGE	50630	0	0	0		
ULT. UNDERGROUND DRAINAGE	AE U_UGDRAINAGE	50634	0	0	0		
OUTLINE OF PARCELS	AE FORMER_PARCEL_LINES	50640	243	7	0		
ULT. PROPERTY INTEREST LINE	AE U_PROP_INT_L	50654	23	0	1		
ULT. AIRPORT REFERENCE POINT	AE U_ARP	50664	185	0	1	cell library = aero cell = ARP	
EX. HELIPORT (OUTLINE ""H"")	AE E_HELIPORT	50670	119	0	1	cell library = aero cell = EHHELIP	
FUT. HELIPORT (OUTLINE ""H"")	AE F_HELIPORT	50672	119	0	0	cell library = aero cell = FHHELIP	
ULT. HELIPORT (OUTLINE ""H"")	AE U_HELIPORT	50674	119	0	0	cell library = aero cell = UHHELIP	
EX. HELIPAD APPROACH SURFACE	AE E_HELIP_APP	50780	30	0	2		
ULT. HELIPAD APPROACH SURFACE	AE U_HELIP_APP	50784	31	0	0		
EX. HANGAR LOT LINES	AE E_HANGAR_LOTS	50690	0	0	0		
FUT. HANGAR LOT LINES	AE F_HANGAR_LOTS	50692	0	0	0		
ULT. HANGAR LOT LINES	AE U_HANGAR_LOTS	50694	0	0	0		
FUT. HANGARS	AE F_HANGARS	50702	250	3	0		
EX. BEACON LOCATION	AE E_BEACON	50710	30	0	0	cell library = aero cell = STAR	
EX. APPROACH LITE SERVICE RD	AE E_APL_SERVICE_RD	50720	123	0	0		
FUT. APPROACH LITE SERVICE RD	AE F_APL_SERVICE_RD	50722	124	2	0		
ULT. APPROACH LITE SERVICE RD	AE U_APL_SERVICE_RD	50724	125	5	0		
EX. PERIMETER RD	AE E_PERIMETER_RD	50780	73	0	0		
FUT. PERIMETER RD	AE F_PERIMETER_RD	50782	73	5	0		
ULT. PERIMETER RD	AE U_PERIMETER_RD	50784	73	3	0		
EX. LOCALIZER SERVICE RD.	AE E_LOCSERVICE_RD	50790	74	0	0		
FUT. LOCALIZER SERVICE RD.	AE F_LOCSERVICE_RD	50792	74	2	0		
ULT. LOCALIZER SERVICE RD.	AE U_LOCSERVICE_RD	50794	74	3	0		
EX. GLIDE SLOPE SERVICE RD	AE E_GSSERVICE_RD	50800	76	0	0		
FUT. GLIDE SLOPE SERVICE RD	AE F_GSSERVICE_RD	50802	76	2	0		
ULT. GLIDE SLOPE SERVICE RD	AE U_GSSERVICE_RD	50804	76	3	0		
EX. TVOR SERVICE RD	AE E_TVORSERVICE_RD	50810	77	0	0		
FUT. TVOR SERVICE RD	AE F_TVORSERVICE_RD	50812	77	2	0		
ULT. TVOR SERVICE RD	AE U_TVORSERVICE_RD	50814	77	3	0		
ULT. ROAD RELOCATION	AE U_RDRELOCATION	50824	11	2	0		