CONNECTING GLOBALLY

North Central Texas Regional General Aviation and Heliport System Plan

Lancaster

DEMONSTRATION ENCROACHMENT ANALYSIS SURROUNDING LANCASTER MUNICIPAL AIRPORT

January 2008

Prepared By:

CLOUGH HARBOUR & ASSOCIATES LLP

gcr

for

NCTCOG North Central Texas Council of Governments

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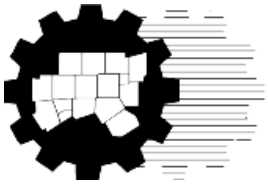

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Prepared in cooperation with the Federal Aviation Administration.

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CONNECTING GLOBALLY
North Central Texas General Aviation and Heliport System Plan

Abstract

TITLE: Demonstration Encroachment Analysis Surrounding Lancaster Municipal Airport

AUTHORS: CHA Aviation Development Team

DATE: January 2008

SUBJECT: The Demonstration Encroachment Analysis for Lancaster Airport is part of the North Central Texas Regional General Aviation and Heliport System Plan. The project team consists of the CHA Aviation Development Team and the North Central Texas Council of Governments. The goal of the Demonstration Encroachment Analysis is to demonstrate how aggressive compatible land use planning and compatible development surrounding a sample general aviation airport can maximize the long-term functionality and economic development of the airport and adjacent property for the benefit of both the community and region.

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ABSTRACT: As part of the Regional General Aviation and Heliport System Plan facilitated by the North Central Texas Council of Governments (NCTCOG), a Demonstration Encroachment Analysis was requested, using Lancaster Airport as the demonstration model. The purpose of the Encroachment Analysis is to identify potential development and zoning patterns that may be incompatible with future airport operations, as well as provide guidance and recommendations for action by impacted local municipalities and the airport sponsor. This analysis will serve as a model for other airports concerned with future airport operations and compatible development.

Acknowledgements

This Demonstration Encroachment Analysis Surrounding Lancaster Airport was developed in cooperation with the Air Transportation Technical Advisory Committee (ATTAC) and NCTCOG staff.

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Executive Summary

As part of the Regional General Aviation and Heliport System Plan facilitated by the North Central Texas Council of Governments (NCTCOG), a Demonstration Encroachment Analysis was requested, using Lancaster Airport as the demonstration model. The purpose of the Encroachment Analysis is to identify potential development and zoning patterns that may be incompatible with future airport operations, as well as provide guidance and recommendations for action by impacted local municipalities and the airport sponsor. This analysis will serve as a model for other airports concerned with future airport operations and compatible development. As such, the encroachment analysis goals and objectives include the following:

Goal:

Foster compatible land use planning and development surrounding a sample airport to enable the long-term development of the airport and adjacent property for the benefit of both the community and region.

Objectives:

- Prevent non-compatible development in locations adjacent to the airport
- Identify existing and potential future airspace obstructions
- Evaluate airport noise and anticipated impacts
- Foster the development of mutual goals of the community, airport, and property owners
- Provide a forum for public discussion of airport development scenarios

The encroachment analysis contains a review from two main perspectives, aerial and land. The aerial perspective includes a review of mapping and spatial analysis of Federal Aviation Regulations (FAR) Part 77 Obstructions, and airside access and demand at the airport. The land perspective includes an analysis of current and future land use and zoning surrounding the airport with the noise contours created by aircraft activity operating at the airport. As such, the general sections of the Demonstration Encroachment Analysis include:

1. Inventory and Development Review

   A review of the following items to ensure the analysis is based on the most useful data:
   - The current airport master plan and all associated documents and reports to obtain a clear understanding of the current situation at the airport and its background
   - Forecasts to understand where the airport is headed and its future needs
   - Existing land use and zoning surrounding the airport, as well as any future land use and development plans
   - All planned, proposed, and off-airport development projects

2. Noise and Land-Use Review and Analysis

The airport's master plan is used to review off-airport locations subject to high airport noise levels. This information was used to identify locations incompatible for residential or other noise sensitive development based on Federal Aviation Administration (FAA) criteria – the 65 DNL (Day-Night Average Noise Level). In addition, locations with moderate noise levels (e.g., 55 to 65 DNL) can also be identified as general noise disturbance is often reported in these locations.

The noise review typically requires some additional noise analysis beyond that available in the master plan, as such studies may not be current or may not include evaluation of levels below 65 DNL. Therefore, a simple analysis using Integrated Noise Modeling (INM) (Version 7.0) was conducted specifically for the encroachment analysis. Data input includes approved forecasts of activity (master plan or FAA terminal area forecasts), and estimated runway use, fleet mix, and night time percentages.

The evaluation provides future noise contours specific for the airport, incorporating approved runway changes and extensions. The noise levels were compared to the land use and zoning data to assess potential compatibility issues. Note that the INM analysis level of detail is appropriate for long-term planning, but is not adequate for federal funding associated with noise mitigation activities.

3. Obstruction Analysis

An FAA Part 77 Obstruction Analysis was completed using GCR's Photoslope technology (an FAA approved procedure). The Photoslope process utilizes advanced high-resolution digital photography taken within the designated approach boundary. Images of the approach surface are taken at three separate positions; from the centerline, the left edge of the approach, and the right edge of the approach. Using these photographs, combined with sophisticated computer modeling, obstructions were digitized to determine the precise x, y, and z location. This unique process gives Photoslope the ability to visually display the Runway Approach Surface and identify objects obstructing the approach.

The resulting Photoslope analysis was a precise record of the Approach Surface airspace, containing visual depictions and dimensions of obstructions. This analysis can also be used in zoning restrictions pertaining to height limitations of buildings surrounding airports.

Based on the findings of Section 1 and 2, Photoslope was conducted for existing conditions as well as future runway extensions and other special conditions associated with the Lancaster Airport.

4. Recommendations and Implementation Plan

Once the encroachment analysis was reviewed and discussed, recommendations based on the analysis were provided. Implementation requires effort from the airport management, owner, and regulatory bodies. An implementation plan should be developed and enacted which will ensure adequate protection of the airport from encroachment.

After a review and analysis of Lancaster Airport, as the model for the Demonstration Encroachment Analysis, the following actions are recommended:

Recommendations

Immediate actions recommended:

- Implement the currently proposed LanPort Zoning District to prevent future incompatible development
- Discuss with The Allen Group the specific future role of Lancaster Airport
- Complete land acquisition to the south for the runway extension (to 7,500') and protect land to the north and east from development
- Conduct presentations to City Council and planning and zoning commission members about the importance of Lancaster Airport
- Meet with neighboring local governments
- Consider an institutional structure/agreements to protect future airport development

Action recommended within five years:

- Update Airport Layout Plan and Capital Improvement Plan to reflect new goals of the airport
- Review all proposed development to ensure long-term compatibility
- To accommodate runway extensions, relocate Ferris Road, relocate Belt Line Road in Lancaster, and acquire easements for property to north to accommodate future runway extensions
- Establish development review procedures with neighboring municipalities

Action recommended within ten years:

- Study alternate runway configurations and analyze possible locations and associated land requirements.

Long-term action recommended:

- Purchase property to the east of the runway for potential future landside development

Recommended Property to Acquire/Protect	
Location	**Acres**
Current Runway 13 Runway Protection Zone (RPZ)	12
Runway 31 Extension to 7,500' & RPZ	123
Additional acreage for Runway 13 extension to 10,000'	143
Future Airport Development to the east of the airport property	157
Total	**423**

1. INVENTORY AND DEVELOPMENT REVIEW

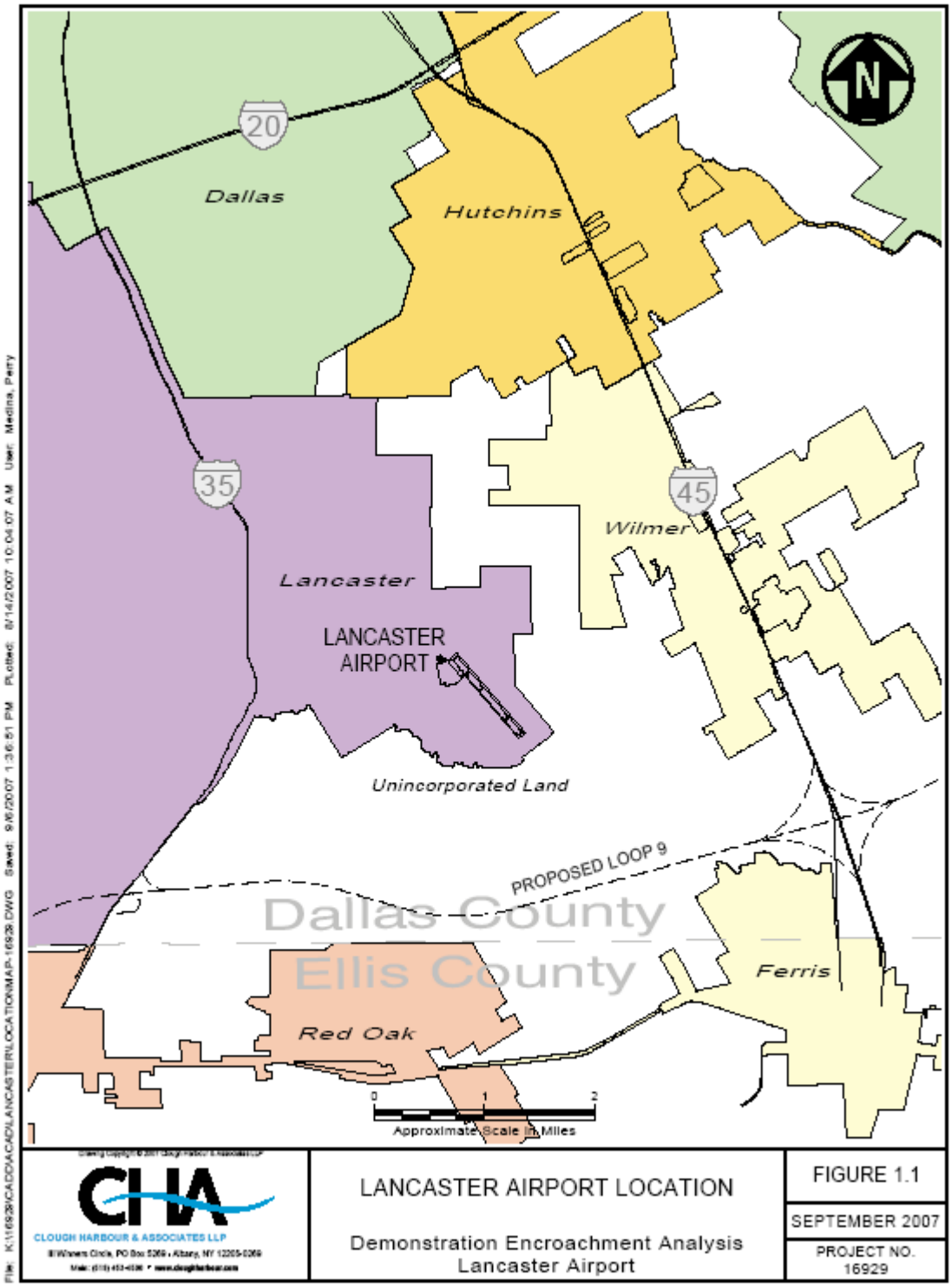
This section of the Demonstration Encroachment Analysis contains a review of the airport facilities, the 2006 airport master plan and available documents and reports regarding Lancaster Municipal Airport. Appendix E references all material reviewed for this analysis.

The following information is presented in this section:

- Location
- Population
- Airport Designation
- Airport Facilities
- Airport Development
- Economic Impact
- Current Land Use and Zoning
- Future Land Use and Zoning

Location

Lancaster Municipal Airport (LNC), owned and operated by the City of Lancaster, is located approximately 2 miles south of the city of Dallas in Dallas County on 306 acres and is surrounded by agricultural land, with access to two local roads and three freeways. (See Figure 1.1 – Lancaster Municipal Airport Location) As the North Central Texas region expands, a future freeway, Loop 9, is being developed to grant easier access to the cities outside of downtown Dallas and Fort Worth. The plan for Loop 9 will position Lancaster as the southern transportation gateway for the Dallas-Fort Worth Metroplex. The current runway lies within the City of Lancaster limits, but the airport property extends to the south outside of city property.


20
Dallas
Hutchins
N
35
45
Wilmer
Lancaster
LANCASTER AIRPORT
Unincorporated Land
PROPOSED LOOP 9
Dallas County
Ellis County
Ferris
Red Oak
0
1
2
Approximate Scale in Miles
CHA
CLOUGH HARBOUR & ASSOCIATES LLP
LANCASTER AIRPORT LOCATION
Demonstration Encroachment Analysis
Lancaster Airport
FIGURE 1.1
SEPTEMBER 2007
PROJECT NO. 16929

Population

Table 1.1 below displays the projected population growth for the surrounding counties, North Central Texas region, and the state of Texas as a whole. The North Central Texas region as a whole is projected to grow 40% over the next 20 years; 8% more than the State of Texas. Dallas County and Kaufman County are projected to grow 34% between 2006 and 2025. The City of Lancaster also has plans to develop the medical district on the west side of the city along I-35. An expanded medical district will facilitate growth as associated businesses and medical personnel move to the area.

TABLE 1.1 – POPULATION PROJECTIONS (Period 2006-2025)

Location	2006	2015	2025	% Change
Dallas County	2,345,815	2,746,567	3,158,164	34%
Ellis County	139,300	150,569	181,098	30%
Kaufman County	93,241	100,335	124,787	34%
North Central TX	5,826,256	6,933,816	8,176,312	40%
State of Texas	22,489,182	26,156,715	29,897,443	32%
USA	302,544,537	322,365,787	349,439,199	13%

Source: US Census Bureau

TABLE 1.2 – LANCASTER POPULATION STATISTICS

2000 Population	25,894
2007 Population	35,050
% Change from 2000 to 2007	35.3%

Source: US Census Bureau

Airport Designation

Lancaster Municipal Airport is designated as a "Reliever" in the National Plan of Integrated Airport System (NPIAS) and as a "Transport Reliever[1]" in the 2002 Texas Airport System Plan Update (TASP). LNC's main function as a reliever is to provide an alternative facility for general aviation aircraft operations and thereby relieve congestion at Dallas/Fort Worth International Airport (DFW) and Dallas Love Field (DAL).

As a reliever to DFW and DAL, LNC lies below the outer ring of DFW's Class B airspace with a lower altitude of 4,000 feet Mean Sea Level (MSL). There is no air traffic control tower (ATCT) at Lancaster Municipal Airport, but clearance delivery for Instrument Flight Rules (IFR) departures are provided by Fort Worth Air Route Traffic Control Center (ARTCC). There is a Non-Directional beacon (NDB) on the airfield, which is used as an initial approach fix (IAF) for the ILS approach to Dallas Executive Airport. The NDB is also used for a non-precision instrument approach into LNC along with an area navigation (RNAV) approach. There are also four Standard Terminal Arrivals (STARs) and seven Standard Instrument Departures (SIDs) to help aid pilots and controllers in poor weather conditions (i.e. IFR).

Airport Facilities

Terminal Building

There is one asphalt-paved runway at a length of 5,000 feet by 100 feet wide with a magnetic direction designation of 13-31. The pavement strength can currently accommodate 20,000 lbs single wheel and 40,000 lbs dual wheel. This runway heading provides wind coverage for over 95% of aircraft operations. There is a full parallel taxiway (Taxiway "A") with a 300 foot offset and width of 50 feet. The two exit taxiways at the runway ends are 100 feet wide, while the other three exit taxiways are 40 feet wide. The runway is equipped with Medium Intensity Runway Lights (MIRLs), Runway End Identifier Lights (REILs), and Precision Approach Path Indicators (PAPIs) at both runway ends. The taxiways are equipped with Medium Intensity Taxiway Edge Lights (MITLs). A rotating beacon, lighted wind cone with a segmented circle, and an Automatic Weather Observation System III (AWOS) are also located on the airfield.

The City of Lancaster took over the role as the Fixed Based Operator (FBO) in January of 2007. The City provides airport management, aircraft parking, fuel, pilot supplies and a planning room, and passenger lounge, Airport tenants include The Runway Cafe, Commemorative Air Force, ENPARTS, GTA Air, Inc, Cross Country Aviation and Select Aircraft Services. GTA Air, Inc is a Part 135 Certified Air Carrier which conducts aircraft freight and passenger charter, and aircraft maintenance. Although located off airport property, Air Salvage attracts pilots to Lancaster Airport looking for aircraft parts and engine testing.

Hangars

There are total of 175 T-hangar bays located on the airfield; 76 are privately-owned. The T-hangars range in size from 832 to 1,628 square feet to accommodate different sized aircraft. The T-hangars are currently 100% occupied. Ten new large private corporate hangars have been recently constructed at the airport creating 175,000 square feet of hangar space.

Airport Development

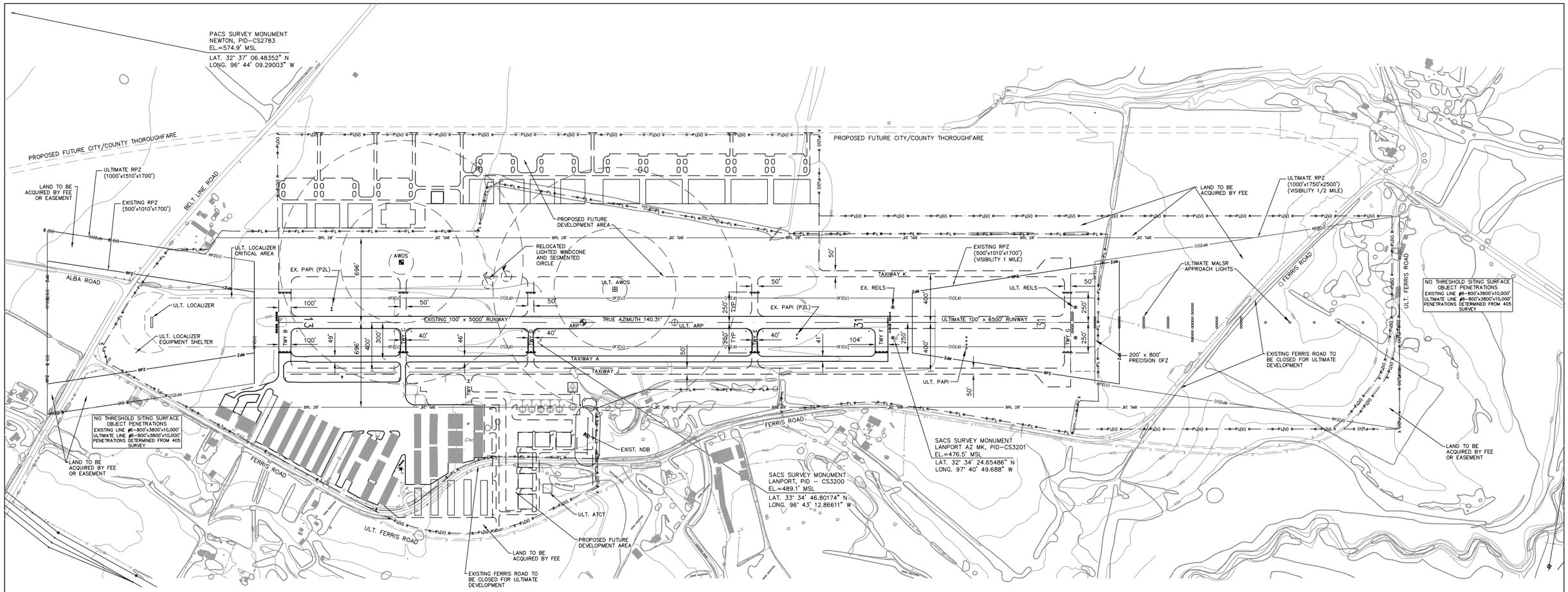
The Airport Master Plan includes a three phased capital improvement plan (CIP) spanning over the next 20 years. In order to accommodate the requirements of corporate aviation aircraft, the runway is being extended to the south (Runway 31) in two phases from 5,000 feet to 7,500 feet. All associated lighting and taxiways will be extended as well as proposed in the Airport Master Plan. In the short term, besides the runway extension, the Airport plans to install an Instrument Landing System (ILS), acquire land to control the Runway Protection Zone (RPZ) associated with the runway extension to the south, overlay the existing runway, taxiways, and

aprons to improve pavement strength, install an airport perimeter fence to increase safety, and construct self-fueling facilities, storm water detention, and an east side access road and parking lot.

Mid-term projects include increasing the runway-taxiway separation from 300 feet to 400 feet to meet design standards and constructing more apron space. Long-term development includes constructing a parallel taxiway on the east side of the airfield and construction of additional aprons, signage, and access roads to the airport. Additional corporate hangars are depicted on the Airport Layout Plan (ALP), but are not currently outlined in the CIP for the planning period.

Table 1.3 and Figure 1.2 display the current Capital Improvement Plan. Figure 1.2, from the 2006 Master Plan Update, depicts a runway length of 6,500 feet on the Airport Layout Plan (ALP). The ALP should to be updated to reflect changes in the Airport's goal of 7,500 feet.

TABLE 1.3 – AIRPORT CAPITAL IMPROVEMENT PLAN	
Short-Term 0 – 5 Years	Land Acquisition to the south
	Overlay existing runway, taxiways, aprons
	Extend runway 1,500 feet to the south
	Extend parallel taxiway
	Install all associated lighting
	Construct aircraft parking apron
	Construct east side access road and parking
	Install airport fence
	Install Instrument Landing System (ILS)
	Construct storm water detention facilities
	Construct self fueling facilities
Mid-Term 6 – 10 Years	Land Acquisition to the south
	Extend Runway 1,000' to the south
	Separate and extend parallel taxiway
	Install all associated lighting
	Construct aircraft parking apron
Long-Term 11 – 20 Years	Construct additional parallel taxiway
	Install signage
	Construct aircraft parking apron
Source: Lancaster Airport Master Plan 2006	



RUNWAY DATA TABLE				
	RW 13-31			
	EXISTING		ULTIMATE	
RUNWAY LENGTH & WIDTH (ft.)	5000' X 100'		6500' X 100'	
PAVEMENT DESIGN STRENGTH (lbs.)	20 (S), 40 (D)		60,000 SWL	
RUNWAY LIGHTING	MIRL		MIRL	
PERCENT EFFECTIVE GRADE	0.4%		0.4%	
PERCENT WIND COVERAGE	99.64%		99.64%	
MAXIMUM ELEVATION ABOVE MSL	500.7'		500.7'	
RW SURFACE TYPE	ASPHALT		ASPHALT	
RSA - LENGTH BEYOND RW END	1000'		1000'	
RSA - WIDTH	500'		500'	
OFA - LENGTH BEYOND RW END	1000'		1000'	
OFA WIDTH	800'		800'	
OFZ - LENGTH BEYOND RW END	200'		200'	
OFZ WIDTH	400'		400'	
RUNWAY END	13	31	13	31
FAR PART 77 APPROACH CATEGORY	B(V) OTU	C	PIR	PIR
APPROACH TYPE	VIS	NP	P	P
APPROACH SLOPE	20:1	34:1	50/40:1	50/40:1
RUNWAY MARKING	NP	NP	NP	P
RUNWAY VISUAL AIDS	REIL,PVASI	REIL,PAPI	REIL,PAPI	REIL,PAPI, MALSR
APPROACH VISIBILITY MINIMA	VISUAL	1 MILE, LPV	1 MILE	1/2 MILE, LPV
TOUCHDOWN ZONE ELEVATION	500.7'	492.3	SAME	486.2
TAKE-OFF RUN AVAILABLE (TORA)	5000'	5000'	6500'	6500'
TAKE-OFF DISTANCE AVAILABLE (TODA)	5000'	5000'	6500'	6500'
APPROACH STOP DISTANCE AVAILABLE (ASDA)	5000'	5000'	6500'	6500'
LANDING DISTANCE AVAILABLE (LDA)	5000'	5000'	6500'	6500'
NOTES				

MODIFICATIONS TO FAA STANDARDS TABLE		
EXIST./ULT.	DESCRIPTION OF MODIFICATION	REASON FOR MODIFICATION

NOTES:

(1) NO OFZ OBJECT PENETRATIONS.

(2) FOR THRESHOLD SITING SURFACE OBJECT PENETRATIONS, AND APPROACH PENETRATIONS SEE OBSTRUCTION SURVEY DRAWINGS, SHEETS 8, 9 AND 10, AND INNER PORTION OF THE APPROACH SURFACE DRAWINGS, SHEETS 6 AND 7.

(3) HORIZONTAL DATUM NAD 1983 STATE PLANE, TEXAS NORTH CENTRAL FIPS 4202 SURVEY FEET,VERTICAL DATUM NAVD 1988, DO NOT APPLY CORRECTION FACTOR.

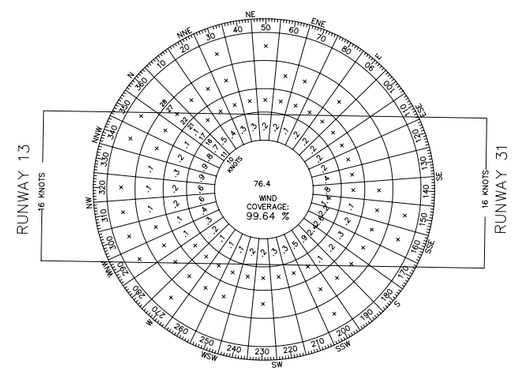
(4) DRAWING PRODUCED BY COMPOSITE OF THE FOLLOWING SOURCES:
USGS 7.5 MINUTE (TOPOGRAPHIC) QUADRANGLE
FERRIS, TX. 1959, PHOTOREVISED 1968

AERIAL PHOTOGRAPHY AND AERIAL SURVEY BY
GEODETIX INC. ON DEC 4, 2004.

(5) CAUTION ZONE LIGHTS ARE PRESENT IN THE FINAL 2000' OF BOTH RUNWAY ENDS.

RUNWAY END COORDINATES AND ELEVATIONS			
RUNWAY END	LATITUDE	LONGITUDE	ELEVATION
EXISTING END OF RWY 13	32°35'04.125" N	96°43'27.272" W	500.7'
EXISTING END OF RWY 31	32°34'26.056" N	96°42'49.955" W	480.0'
ULTIMATE END OF RWY 13	SAME	SAME	SAME
ULTIMATE END OF RWY 31	32°34'14.636" N	96°42'38.760" W	475.32'
Comments			

AIRPORT DATA TABLE		
	EXISTING	ULTIMATE
AIRPORT ELEVATION (MSL)	500.7	SAME
AIRPORT NAVIGATION AIDS	NDB, GPS	NDB, GPS, LOCALIZER
MEAN MAX TEMP (Hottest Month °F)	96°F (July)	96°F (July)
AIRPORT REFERENCE CODE (ARC)	C II	D II
TAXIWAY MARKING	CENTER STRIPE	SAME
TAXIWAY LIGHTING	MITL	SAME
WIND COVERAGE (%)	99.64% (16 KTS)	99.64% (16 KTS)
AIRPORT REFERENCE POINT COORDINATES	32°34'45.091" N 96°43'08.612" W	32°34'39.381" N 96°43'03.014" W
ALL COORDINATES HORIZONTAL NAD 83, VERTICAL NAVD 88		



WIND ROSE

SOURCE:

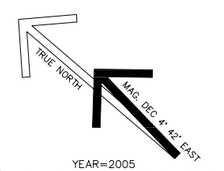
U.S. NATIONAL OCEANIC AND ATMOSPHERIC SERVICE
WEATHER STATION 72259
DALLAS EXECUTIVE AIRPORT, DALLAS, TX.
53,555 OBSERVATIONS DURING PERIOD 1997 - 2004

ALL WEATHER WIND COVERAGE

	CROSSWIND
	16 KNOTS
RUNWAY 13-31	99.64%

IFR WIND COVERAGE

	CROSSWIND
	16 KNOTS
RUNWAY 13-31	99.52%



YEAR=2005
7' WEST - RATE OF CHANGE PER YEAR

0 400' 800' 1200'

SCALE: 1" = 800'

LEGEND		
	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE with FENCE		
AIRPORT REFERENCE POINT (ARP)		
WIND CONE AND SEGMENTED CIRCLE		
THRESHOLD LIGHTS		
C&G BEACON		
FENCE LINE		
TELEPHONE/POWER POLE LINE		
NONDIRECTIONAL BEACON (NDB)		
RWY END IDENTIFIER LIGHTS (REILS)		
BUILDING RESTRICTION LINE (BRL)		BRL 28'
GROUND CONTOURS	1620	
TREES/BRUSH		
AWOS		
HOLD POSITION AND SIGN		
SURVEY MARKERS		

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NO.	REVISIONS	BY	CHK'D	DATE

TEXAS DEPARTMENT OF TRANSPORTATION
AVIATION DIVISION

ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CH 8 PLUS THE REQUIREMENTS OF A FAVORABLE ENVIRONMENTAL FINDING PRIOR TO THE START OF ANY LAND ACQUISITION OR CONSTRUCTION AND AN FAA FORM 7460-1 SUBMITTED PRIOR TO ANY CONSTRUCTION ON AIRPORT PROPERTY

DIRECTOR, AVIATION DIVISION — DATE

AIRPORT SPONSOR

CURRENT AND FUTURE DEVELOPMENT DEPICTED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR

TITLE, AIRPORT SPONSOR'S REPRESENTATIVE

SIGNATURE — DATE

PREPARED BY:
GRW Willis, Inc.
1161 CORPORATE DRIVE WEST SUITE 170
ARLINGTON, TEXAS 76006
(817) 543-1100 FAX (817)274-8878

JPK	JULY 2005
DESIGNED BY	DATE
JPK	JULY 2005
DRAWN BY	DATE
RCJ	JULY 2005
CHECKED BY	DATE

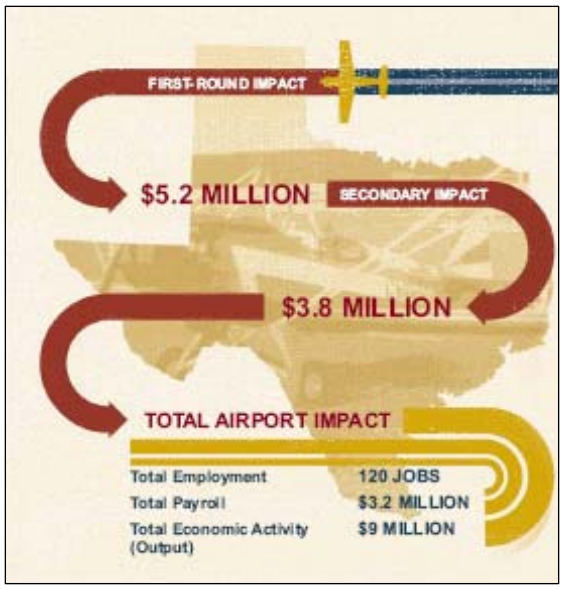
AIRPORT LAYOUT DRAWING

LANCASTER AIRPORT (LNC)
LANCASTER, TEXAS

Texas Department of Transportation Aviation Division

Economic Impact

The Texas Department of Transportation (TXDOT) prepared Economic Impact statements for several commercial and general aviation airports in the state of Texas in 2005. The economic impact of all General Aviation airports reviewed yielded a total of 56,600 jobs, $1.9 billion in payroll, and $5.9 billion in economic output. Of this total impact, LNC creates 120 jobs and has a total economic output of $9 million (includes direct and indirect economic impacts).



Current Land Use and Zoning

The current Lancaster land use and zoning plan, the *Comprehensive Plan*, was adopted in 2002 and recognizes the 306 acres of airport property as public/semi-public land use. In this plan, the area surrounding the airport is mainly zoned as agriculture and light industrial to the north with small sections of commercial service, residential, and planned development to the north. Agriculture-Open (A-O) is reserved by the city for future growth and is retained as A-O as long as possible to prevent overdevelopment. Areas are typically zoned A-O due to lack of utilities, capacity or service, or where ultimate land use has not been determined. According to the District Development Standards, the maximum height allowed in this zone is 35 feet.

Single-family homes are allowed in the A-O district on lots larger than 5 acres. Currently, there a few houses along Ferris Road within A-O and experience high noise levels from aircraft operations. As these homes are on agricultural land, they would be considered compatible upon the condition of sound insulation. There are several single-family residences located to the northwest along Ferris Road and Beltline Road, approximately 2 miles from the Runway 13 end. This area is zoned as Single-Family Residence (SF-6) and borders A-O. The current land use and zoning surrounding Lancaster Municipal Airport is considered compatible.

Future Land Use and Zoning

The future land use surrounding the airport, as laid out in the currently adopted 2002 Comprehensive Plan, is an airport industrial park with residential to the north and west. As this land is not currently zoned as an industrial park, there is no guarantee in the years to come it will actually become an industrial park. In a typical market, a well laid out city plan may be pushed to the wayside due to an increase in the market value of the land for an alternative use, such as residential development. The North Central Texas region has witnessed the closing of several airports due to encroachment in recent years. The city recognized the need for a new

plan when concerns about new residential development and amount of available land for development near the Airport arose.

The future land use and zoning plan, *Lancaster Airport Sector Plan and LanPort Zoning District and Development Standards* (attached as Appendix F*),* is currently being reviewed by the City of Lancaster for approval and is described in detail below. This future plan's purpose is to provide compatible zoning for the developable land surrounding the Airport, while taking into consideration the future expansion plans for LNC and its role in the Dallas Logistics Hub. The City of Lancaster wants to ensure the realization of the potential of the airport as an economic engine for its citizens and businesses.

The LanPort District outlines the existing characteristics of the City of Lancaster and the opportunities and constraints of each area. From this information, themes were developed. The City defines Lancaster Municipal Airport as being used primarily for on-demand and recreational flying and corporate jets. It takes into consideration the proposed Master Plan expansion of the runway to the south and moving airport facilities to the east side of the airport. The major constraint to the airport is the limitation of the uses of the land due to noise and safety compatibility requirements. The LanPort District identifies an opportunity for the significant expansion of the airport and as a key component of developing the intermodal facility and Dallas Logistics Hub.

Based on the themes, the LanPort District was introduced to provide development standards that are more restrictive and contain better guidelines for appropriate site development. Three subdistricts were created, Commerce, Business Park, and Intensity; with permitted uses defined for each subdistrict. The Airport lies within the proposed Commerce district and borders the Business Park district. (See Figure 2.5) The Business Park Subdistrict is designed to provide a buffer zone between the residential and commercial/light industry zones. The Commerce Subdistrict is to be used as a combination of airport-dependent and freight uses and is less focused on open space with an attention on functionality rather than aesthetics.

All three subdistricts are required to adhere to the height restrictions of the currently adopted Airport Master Plan. Restrictions placed on development are based on Federal Aviation Regulations (FAR) Part 77 *Objects Affecting Navigable Airspace* as outlined in the Airport Master Plan. The Master Plan identifies all airspace surfaces with horizontal and vertical distances, (Explained in more detail in Appendix D). Table 1.4 below displays the existing and proposed zoning districts surrounding the airport and the associated noise sensitivity.

TABLE 1.4 – AIRPORT NOISE SENSITIVITY BY ZONE				
	Zoning District	**Noise Sensitive**	**Compatible >65 DNL**	**Permitted Uses**
Existing	Agriculture-Open (A-O)	No	Yes	farming, ranching, public park
	Light Industry (LI)	No	Yes	office, hospital, school, recreation, restaurant, retail, mechanical
	Single-Family Residences (SF-6)	Yes	No	single-family homes, schools, public parks
Future	Intensity	No	Yes	office 5,000+sf, R&D, brewery, manufacturing, salvage, distribution, storage, utility
	Business Park	No	Yes	office, retail, restaurant, car rental, light manufacturing, utility
	Commerce	No	Yes	heavy equipment, auto & marine, food processing, manufacturing, salvage, distribution, utility

As stated above, the LanPort Zoning Districts were developed with heavy consideration of the impact the Dallas Logistics Hub would have on Lancaster and surrounding cities. The Dallas Logistics Hub is a combined effort, with a twenty year timeline, of the cities of Dallas, Hutchins, Wilmer, and Lancaster to provide a strategically located manufacturing and distribution center in the southwest region of the Dallas-Fort Worth Metroplex. The Allen Group is the major private developer, property owner, and proponent of the Hub. Over 6,000 acres across the four cities, along with the Union Pacific Intermodal Terminal and Lancaster Municipal Airport, have been designated as the future development area of the Hub. 1,600 acres of this property borders Lancaster Airport. The property acquired for the Dallas Logistics Hub can be seen in Figure 1.3.

LNC's role in the Hub is as an air cargo facility to be used in conjunction with all other logistics facilities. Since Fort Worth Alliance and Dallas/Fort Worth International Airport already cater to the air cargo market, the Airport management's goal is to continue serving general aviation users while supporting corporate aviation and developing a niche within the air cargo market. This niche will include smaller, crucial, high-end cargo such as electronics or cut flowers rather than the large parcel shipments. Unique trade shippers, such as African Trade Shippers and Puerto Nuevo, have expressed an interest in opening facilities near LNC.

In order to accommodate freight aircraft, an additional extension of 2,500 feet to the north (Runway 13) (beyond the 2500 feet to the south) is under consideration to yield a total runway length of 10,000 feet. This further extension is proposed to the north due to the environmental impact of a creek relocation that would be required if the runway was extended to the south past the currently planned 2,500 feet. The City of Lancaster is not extending the runway to 10,000 at

this time, but is seeking to protect the surrounding land to ensure the possibility for the future through zoning, land acquisitions, and project approvals in the area. The Lancaster Municipal Airport ALP (Figure 1.2) should also be updated to reflect the long-term goal of a 10,000 foot runway as all projects with requests for Federal funding must be represented on the ALP.

Table 1.5 represents the aircraft that can utilize each proposed runway length.

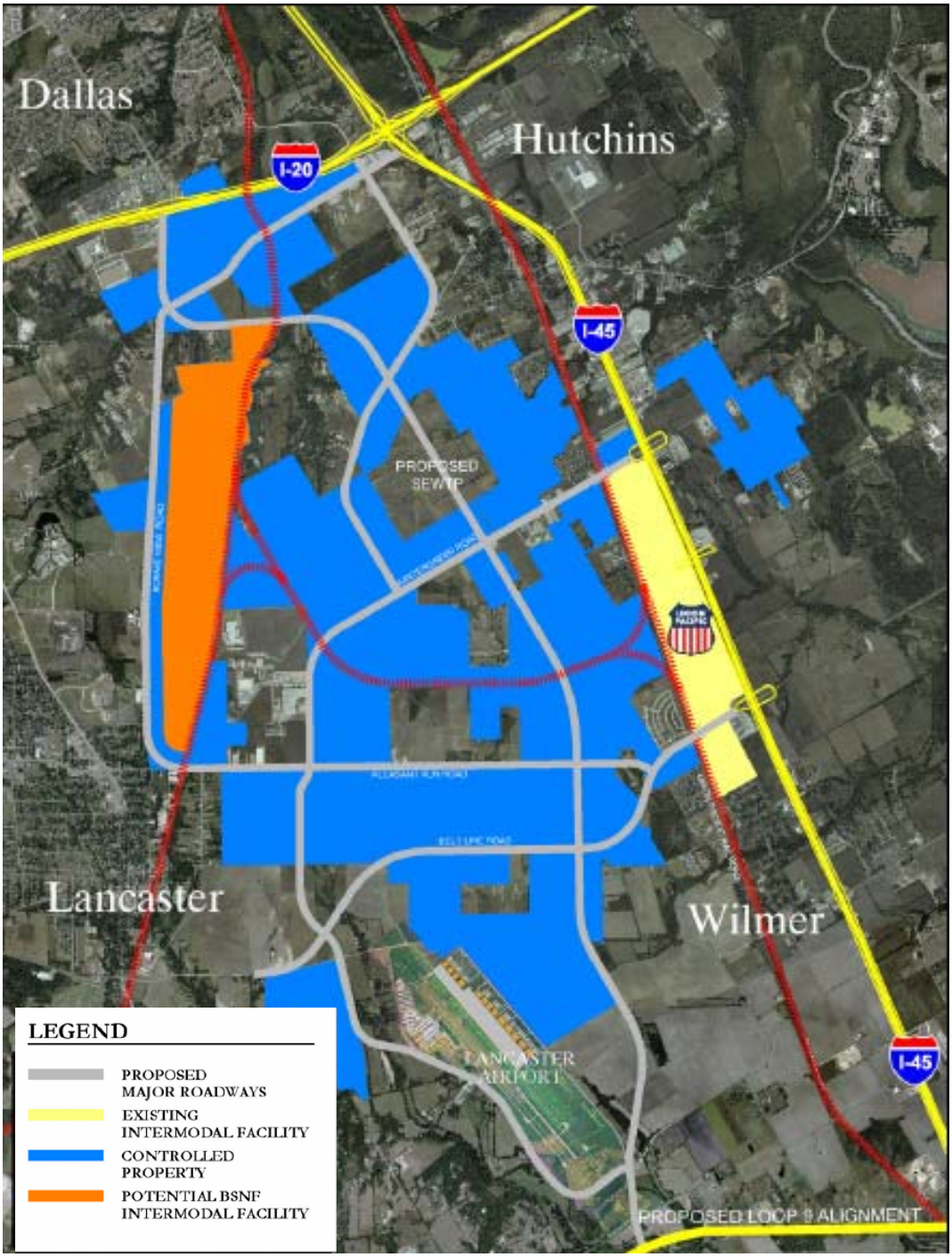
Table 1.5
CORPORATE, CHARTER, & GENERAL AVIATION AIRCRAFT

Current 5,000' Runway	Extended 7,500' Runway	Ultimate 10,000' Runway
Midsize Jets: Falcon 2000, Hawker	All Corporate Jets: Gulfstream IV, V	All Corporate Jets: Gulfstream IV, V

AIR CARGO & AIRLINE AIRCRAFT

Current 5,000' Runway	Extended 7,500' Runway	Ultimate 10,000' Runway
Regional Turboprops: DHC-8, Saab 340	Most Narrowbody Jets: MD80, B737	Widebody Jets: MD-11, B747

[1] Transport airports provide access to turboprop & turbojet business aircraft and are located where there is sufficient population or economic activity to support a moderate to high level of business jet activity and/or provide capacity in metropolitan areas.



N

CLOUGH HARBOUR & ASSOCIATES LLP

Figure 1.3 – Dallas Logistics Hubs Infrastructure Map

CHA Project No.	**16929**

Notes:
Map from Dallas Logistics Hub
http://www.dallaslogisticshub.com

2. NOISE AND LAND USE ANALYSIS

This section of the Demonstration Encroachment Analysis contains an analysis of the noise created by aircraft activity operating at Lancaster Airport and the land use and zoning of the surrounding area to identify compatible and incompatible land use.

The following information is presented in this section:

- Definition of Noise
- Day-Night Average Noise Level Metric
- Land Use Compatibility
- Integrated Noise Model
- Lancaster Airport Compatible Land Use Analysis

Definition of Noise

Noise is defined as an "unwanted sound." By this very definition, the perception of noise is a subjective process. Several factors, such as loudness, pitch, and time variation affect the level and quality of noise as perceived by the human ear.

The loudness, or magnitude, of noise determines intensity and is measured in decibels (dB). As the decibel is based on a logarithmic scale, a 10-decibel increase in noise level is generally perceived as a doubling of loudness, while a 3-decibel increase in noise is just barely perceptible to the human ear. Pitch, or frequency, describes the character of noise ranging from a very low-pitched "rumbling" noise to a very high-pitched whistling. Frequency is measured in hertz. The time variation of noise sources can be characterized as continuous (e.g. building ventilation fan), intermittent (e.g. aircraft fly over), or impulsive (e.g. car backfire). Table 2.1 displays the representative noise levels in decibels of different activities and their noise effect. Peak aircraft noise surrounding an airport ranges from 50dB to 100dB depending on the distance from the aircraft and the aircraft type. For instance, to experience 100dB, the person must typically be very close to the runway as a large jet aircraft is taking off or landing.

TABLE 2.1 – REPRESENTATIVE NOISE LEVELS		
Source	**Noise Level**	**Noise Effect**
Breathing	0-10 dB	Threshold of Hearing
Whispering at 5 ft.	20 dB	Quiet, Rarely Distracting
Quiet office, library	40 dB	
Refrigerator	50 dB	
Large office	50 dB	Moderate Noise
Normal conversation	60 dB	
Vacuum cleaner	70 dB	Annoying
Garbage disposal	80 dB	Potential Hearing Damage
Power lawn mower	90 dB	Hearing Damage
Motorcycle	100 dB	Serious Hearing Damage
Snow blower	105 dB	
Ambulance siren	110 dB	Human Pain Threshold
Concert	120 dB	
Firecracker	150 dB	Eardrum Rupture
Source: League for the Hard of Hearing, 2001		

Day-Night Average Noise Level Metric

The FAA regulations require the use of the metric Day-Night Average Noise Level (DNL) to determine if aircraft noise impacts are "significant." DNL represents the total accumulation of aircraft noise spread out uniformly throughout the day. Unlike the peak noise levels listed in Table 2.1, the DNL is an average noise level, incorporating the intermittent noise of aircraft operations, with the periods of the day during which there is no aircraft noise. As such, a location that can experience a peak noise level of 100 dB during a fly-over may have a DNL of 70 dB.

The DNL metric includes a 10-decibel multiplier (i.e. penalty) to operations that occur at night. In other words, the DNL metric equates one operation at night to 10 daytime operations. This penalty is used to compensate for the added annoyance created by nighttime[1] aircraft activity. The DNL is typically illustrated through the use of contour lines, which represent lines of equal exposure, with noisier levels centered on the runway and quieter levels expanding outwards.

Land Use Compatibility

Under the FAA's Land Use Compatibility Guidelines, a DNL below 65 dB is considered compatible with all land uses. Noise levels between DNL 65 and 75 are considered incompatible with residential areas and schools, but compatible with all other activities. According to the currently adopted Lancaster District Development Standards, night time noise levels within residential zoning are not to exceed 49 dB; however airport activity directly related to flight operations is an exception to this standard. Table 2.2 displays the general compatibility guidelines for airport noise.

TABLE 2.2 – GENERAL COMPATIBILITY GUIDELINES

Land Use	DNL Levels (dB)		
	<65	65-70	70-75
Residential	Yes	No	No
Schools, Churches, & Hospitals	Yes	No	No
Office & Professional	Yes	Yes	No
Parks & Recreation	Yes	Yes	No
Commercial & Industrial	Yes	Yes	Yes

Source: FAA. Refer to Appendix G for full table

The FAA recommends homes within the DNL 75 dB range be purchased and converted into compatible uses. Within the DNL 65 to 75 dB range, homes and schools may be acquired or insulated to reduce noise while inside (residents may still not accept the level of noise while outside their homes). Noise level below the DNL 65dB is considered compatible for all land uses. Nevertheless, noise complaints are common within the DNL 55 dB, particularly at general aviation airports where residents may not have an understanding of the airport's role and value. For this reason, this analysis took into consideration noise contours to a DNL level of 55 dB.

Integrated Noise Model

The FAA's Integrated Noise Model (INM) Version 7.0 was used to conduct the Lancaster Airport noise analysis with a based year of 2006. The INM application requires a variety of input data, including aircraft types, an estimated number of takeoffs and landings conducted by each aircraft type, runway data, and operational flight tracks. Appendix A contains the INM input files used in this study. The forecasts from the 2006 Master Plan were revised to reflect the long term potential of LNC as an air cargo facility. Table 2.3 displays the annual operations and runway lengths used to develop the study noise contours. Appendix A describes in detail the INM inputs and assumptions made.

TABLE 2.3 – Airport Statistics		
Year	**Annual Operations**	**Runway Length**
2006	65,883	5,000'
2011	77,314	6,500'
2016	98,881	7,500'
2026	176,538	10,000'
Source: Appendix A - INM		

Lancaster Municipal Airport Compatible Land Use Analysis

A determination of overall noise exposure is made by overlaying the DNL noise contours onto a land use map. Figure 2.1 is the current land use (2006) of the City of Lancaster with the noise contours based on current activity levels and aircraft types of LNC. Industrial, Commercial Service, and Planned Development zones fall within the 55 DNL and 60 DNL noise contours. There is no incompatible zoning surrounding the airport. A few of residential properties located on agricultural land lie within the 65 DNL noise contours and would be considered compatible with the condition of sound insulation. The Planned Development site to the north partially lies within the 55 DNL noise contour and should be restricted from being developed as a residential site to prevent future noise impacts. Furthermore, with only a few homes located on agricultural land within the 55 DNL noise contour, little noise disturbance would be expected.

Figure 2.2 displays the noise contours and land use as projected in 2011 based on current zoning. It can be seen that the noise contours would extend further to the north and south as the operational levels increase at LNC with the 1,500 foot extension (6,500 feet total). Almost the entire 65 DNL noise contour is within the airport property. Figure 2.2 conceptualizes the city's growth by extending residential and commercial service development into the Agriculture-Open (A-O) zone. A-O is designed to be developed as the city expands. The noise contours are based on the Airport Master Plan forecasts as presented in Table 2.3. The potential future development, along with the completed planned development from 2006, would lie within the DNL 55 contour. Although deemed compatible land use by the FAA, LNC will most likely begin receiving noise complaints from residents within the 55 DNL contour.

Figure 2.3 displays the noise contours and land use as projected in 2016 without zoning changes. The noise contours extended even further out to the north and south due to increased operations from large aircraft with the runway extended an additional 1,000 feet to the south (7,500 feet total). The 65 DNL noise contour is no longer contained within the airport property line. Figure 2.3 further conceptualizes the city's growth by extending the development of residential to the south and east. The previously agriculture-open zone has been developed by residential and begins to fall within the DNL 65 range to the north of the airfield, which is considered to be **incompatible**.

Figure 2.4 shows by 2026, a 10,000 foot runway would no longer be plausible due to the encroaching development from the north if no changes in zoning are made to prevent development in this area. As time continues past the planning period of this analysis, the residential development could extend south along the west side of LNC. This development would essentially land-lock Lancaster Municipal Airport and prevents any future airfield development. As such, it is demonstrated here that the current zoning and anticipated

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development surrounding the Airport is expected to result in incompatible land use (as has occurred at many other airports in the region).

Although the analysis is only a projection or scenario, the strong local population growth and history of other airports certainly provides good evidence of pending encroachment. Thus, at this point in the analysis, recommended zoning changes would be identified.

However, if the proposed LanPort District Plan is adopted, it could prevent incompatible land use and encroachment upon the Airport. Figure 2.5 shows the noise contours and land use for 2026 with the LanPort zoning. It can be seen that there is no incompatible land use between the airport operations and surrounding businesses.

The City of Lancaster needs to ensure that adequate property is acquired to protect the future development and airspace requirements of LNC so that compatible business development does not prevent airport expansion.

[1] Nighttime activity refers to activity between the hours of 10 PM and 6 AM.

3. Obstruction Analysis

As a part of the Demonstration Encroachment analysis, GCR employed the FAA approved Photoslope technique to evaluate the approaches to the existing and future runway ends at Lancaster Airport.

The following information is presented in this section:

- Photoslope Technique
- Runway 31 Existing Conditions
- Runway 31 – 1,500' Extension
- Runway 31 – 2,500' Extension
- Runway 13 Existing Conditions
- Runway 13 – 2,500' Extension

Photoslope Technique

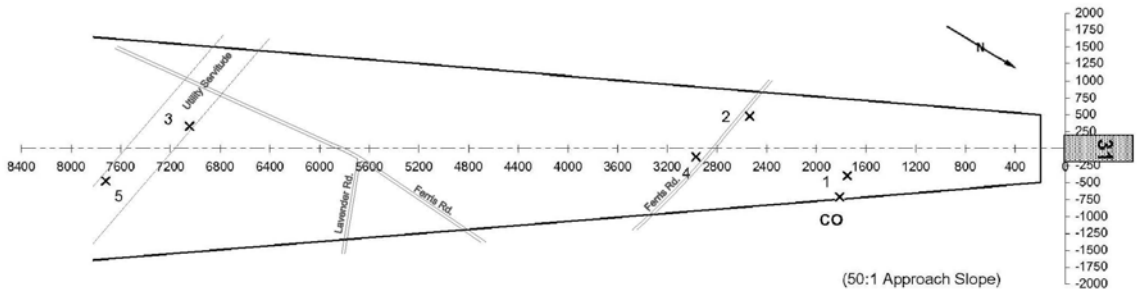
Using ground based terrestrial photography and surveying techniques, GCR's Photoslope process has been used to rapidly and cost effectively determine the condition of State Standard Approach Surfaces, FAR Part 77 Approach Surfaces[1] or Terminal Instrument Procedures (TERPs) Approach and Missed Approach Surfaces.

The Photoslope process utilizes advanced high-resolution digital photography taken within the designated approach boundary. Images of the approach surface are taken at three separate positions; from the centerline, the left edge of the approach, and the right edge of the approach. Using these photographs, combined with sophisticated computer modeling, obstructions are digitized to determine the precise x, y, and z location. This unique process gives Photoslope the ability to visually display the Runway Approach Surface and identify objects obstructing the approach. The resulting Photoslope report is a precise record of the Approach Surface airspace, containing visual depictions and dimensions of obstructions.

The Photoslope process was initially developed by GCR in 1982 to certify the condition of the runway end approach surface to local, state and federal aviation administrators. Photoslope is now implemented by the FAA, state aeronautics agencies and individual airport managers. Photoslope has been used to photogram-metrically document the status of the Runway Approach Surface to over 3,200 runway ends at over 829 airports throughout the United States.

Runway 31 Existing Conditions

Runway End 31 was evaluated in accordance with FAR Part 77 Category PIR[2]. The location and height of the Controlling Obstruction[1] (CO) relative to Runway End 31 is illustrated in Figure 3.1. This tree top penetrates the evaluated approach surface of Runway End 31 by 6 feet. A clearance slope of 42:1 is required to clear this obstruction. Refer to Appendix C for photographs of objects as noted in Figure 3.1.



Object Reference No.	Description	Centerline Offset (X) Ft.	Distance From Runway End (Y) Ft.	Height Above Runway End (Z) Ft.	Object Clearance Slope	Height of Penetration	Object Noted On Photograph
C.O.	Tree	-707	1814	38	42 :1	6	CE and C'E'
1	Tree	-402	1752	26	59 :1	------	C'E'
2	Tree	482	2536	39	59 :1	------	D'G'
3	Tower	329	7047	107	63 :1	------	D'G'
4	Tree	-119	2970	41	67 :1	------	BF
5	Tower	-477	7722	53	141 :1	------	CE
	Additional Object Data						
6	Hill	-2037	14039	119	116 :1	------	CE
7	Water Tower	21	17592	133	130 :1	------	CE

*(C.O.) Controlling Obstruction

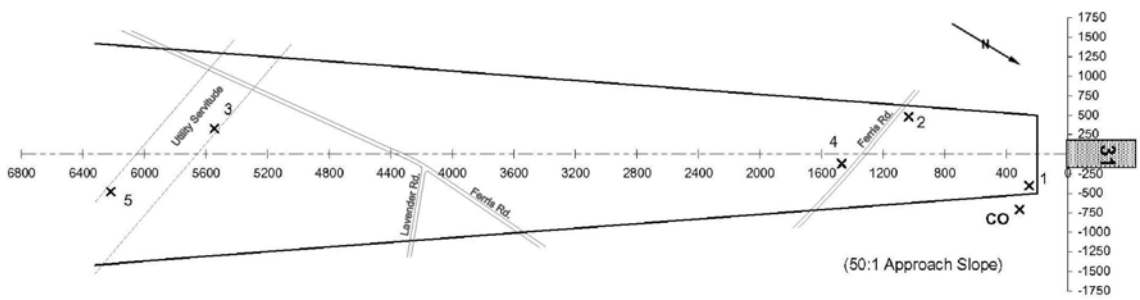
Figure 3.1: Runway End 31 - Existing Conditions

Runway 31 – 1,500' Extension

The future 1,500' extension to Runway End 31 was evaluated in accordance with FAR Part 77 Category PIR. This proposed 1,500' extension was recommended in the Master plan Update completed in January 2006. For this obstruction analysis, the proposed elevation of 475.32 msl from the Airport Layout Plan was used.

The location and height of the CO relative to the future 1,500' extension to Runway End 31 is illustrated in Figure 3.2. This tree penetrates the evaluated future 50:1 approach surface of Runway End 31 by 41 feet. A clearance slope of 2:1 is required to clear this obstruction.

Although the CO of the existing Runway End 31 evaluation is no longer within the future 50:1 approach surface, it is still shown on Figure 3.2 because it is a significant obstruction to the 7:1 transitional surface. This CO, along with Ferris Road and other trees identified in this evaluation, would need to be relocated or removed outside of the future approach. Refer to Appendix C for photographs of objects as noted in Figure 3.2.



Object Reference No.	Description	Centerline Offset (X) Ft.	Distance From Runway End (Y) Ft.	Height Above Runway End (Z) Ft.	Object Clearance Slope	Height of Penetration	Object Noted On Photograph
C.O.	Tree	-707	314	43	2 :1	41	CE and C'E'
1	Tree	-402	252	31	1 :1	30	C'E'
2	Tree	482	1036	44	19 :1	28	D'G'
3	Tower	329	5547	112	47 :1	5	D'G'
4	Tree	-119	1470	46	27 :1	21	BF
5	Tower	-477	6222	58	103 :1	------	CE
	Additional Object Data						
6	Hill	-2037	12539	124	99 :1	------	CE
7	Water Tower	21	16092	138	115 :1	------	CE

*(C.O.) Controlling Obstruction

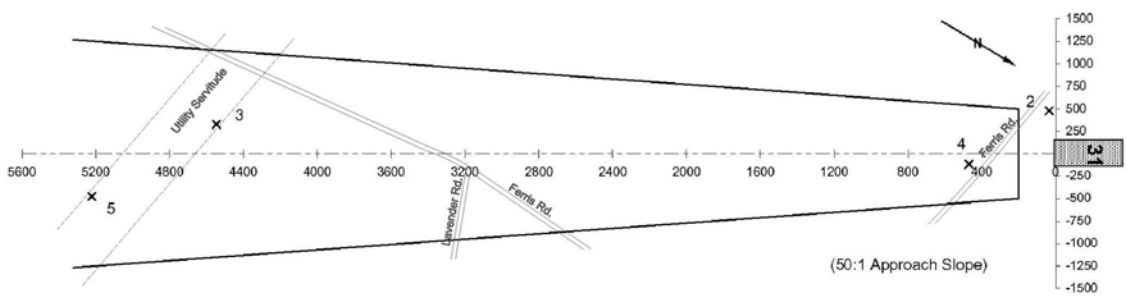
Figure 3.2: Runway End 31 – 1,500' Runway Extension

Runway 31 – 2,500' Extension

The future 2,500' extension to Runway End 31 was evaluated in accordance with FAR Part 77 Category PIR. Although this proposed 2,500' extension was a recommendation of the Master plan Update completed in January 2006, no specific elevation for the extension was provided. For this obstruction analysis, the runway end elevation of the 2,500' extension was projected based upon the existing runway end elevation and the proposed 1,500' extension. The projected elevation of the 2,500' extension is 472.13 msl.

The location and height of obstruction #4 relative to the future 2,500' extension to Runway End 31 is illustrated in Figure 3.3. This tree penetrates the evaluated future 50:1 approach surface of Runway End 31 by 44 feet. A clearance slope of 5:1 is required to clear this obstruction.

Although the tree identified as #2 in Figure 3.3 is a greater penetration to navigable airspace, this tree is not a penetration to the future approach but a close-in obstruction to the future 2,500' extension to Runway End 31. Obstructions #2 and #4 (trees) were previously evaluated in the 1,500' extension evaluation and would be removed within the scope of that project. Due to an existing grouping of trees north of a utility right of way, it was not possible to survey all electric towers and poles within the approach. Further survey data would need to be acquired to determine if additional poles/towers west of #3 are a penetration to the approach of the future 2,500' extension to Runway End 31. Refer to Appendix C for photographs of objects as noted in Figure 3.3.



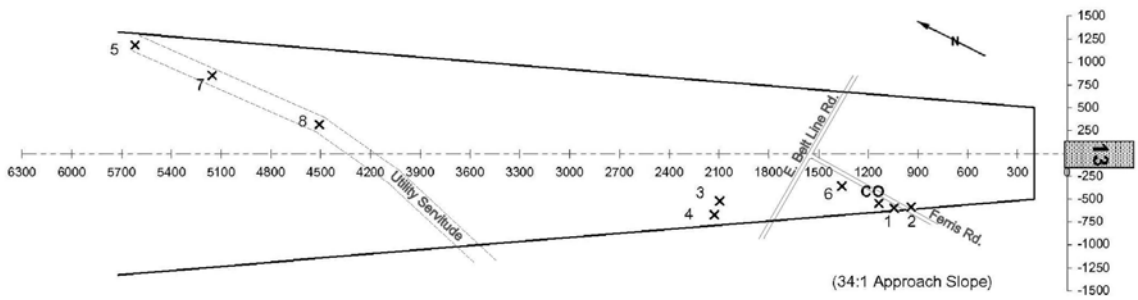
Object Reference No.	Description	Centerline Offset (X) Ft.	Distance From Runway End (Y) Ft.	Height Above Runway End (Z) Ft.	Object Clearance Slope	Height of Penetration	Object Noted On Photograph
2	Tree	482	36	47	Close-in Obstr.	47	D'G'
3	Tower	329	4547	115	37 :1	28	D'G'
4	Tree	-119	470	49	5 :1	44	BF
5	Tower	-477	5222	61	82 :1	------	CE
	Additional Object Data						
6	Hill	-2037	11539	127	89 :1	------	CE
7	Water Tower	21	15092	141	105 :1	------	CE

*(C.O.) Controlling Obstruction

Figure 3.3: Runway End 31 – 2,500' Runway Extension

Runway 13 Existing Conditions

Runway End 13 was evaluated in accordance with FAR Part 77 Category D, a non-precision instrument runway end with a (34:1) approach slope surface having visibility minimums as low as ¾ mile. The location and height of the CO relative to Runway End 13 is illustrated in Figure 3.4. This tree top penetrates the evaluated approach surface of Runway End 13 by 15 feet. A clearance slope of 22:1 is required to clear this obstruction. Refer to Appendix B for photographs of objects as noted in Figure 3.4.



Object Reference No.	Description	Centerline Offset (X) Ft.	Distance From Runway End (Y) Ft.	Height Above Runway End (Z) Ft.	Object Clearance Slope	Height of Penetration	Object Noted On Photograph
C.O.	Tree	-547	1136	42	22 :1	15	CE and C'E'
1	Tree	-597	1044	37	22 :1	13	CE
2	Pole	-587	942	28	26 :1	7	CE
3	Tree	-521	2095	68	27 :1	13	C'E'
4	Tree	-671	2128	71	27 :1	15	C'E'
5	Pole	1188	5619	156	34 :1	------	DG
6	Pole	-356	1360	33	35 :1	------	C'E'
7	Pole	855	5155	113	43 :1	------	DG
8	Tower	315	4509	91	47 :1	------	D'G'

*(C.O.) Controlling Obstruction

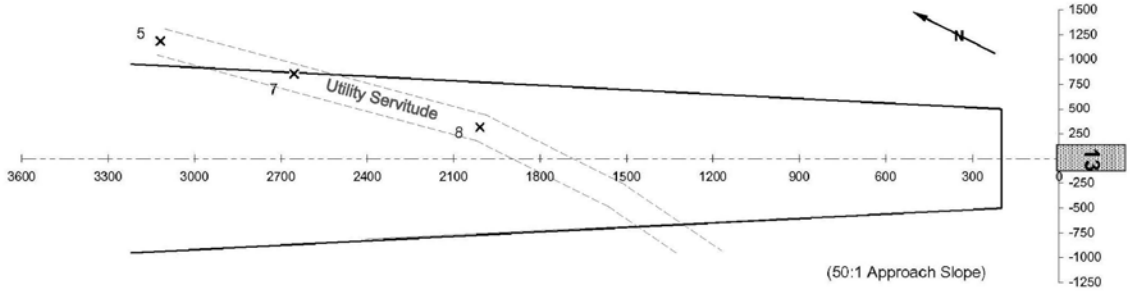
Figure 3.4: Runway End 13 - Existing Conditions

Runway 13 – 2,500' Extension

The future 2,500' extension to Runway End 13 was evaluated in accordance with FAR Part 77 Category PIR. This proposed 2,500' extension was not a recommendation of the Master plan Update completed in January 2006. To determine an elevation for this extension for this study, the team calculated the slope between the existing runway ends and projected that slope 2,500' to the north. The projected elevation of the 2,500' extension is 510.70 msl.

The location and height of obstruction #8 relative to the future 2,500' extension to Runway End 13 is illustrated in Figure 3.5. This tower penetrates the evaluated future 50:1 approach surface of Runway End 13 by 45 feet. A clearance slope of 22:1 is required to clear this obstruction.

Due to an existing grouping of trees east of a utility right of way, it was not possible to survey all electric towers and poles within the approach. Further survey data would need to be acquired to determine if additional poles/towers south of #8 are a penetration to the approach of the future 2,500' extension to Runway End 13. Refer to Appendix B for photographs of objects as noted in Figure 3.5.



Object Reference No.	Description	Centerline Offset (X) Ft.	Distance From Runway End (Y) Ft.	Height Above Runway End (Z) Ft.	Object Clearance Slope	Height of Penetration	Object Noted On Photograph
5	Pole	1188	3119	146	19 :1	88	DG
7	Pole	855	2655	103	23 :1	54	DG
8	Tower	315	2009	81	22 :1	45	D'G'

*(C.O.) Controlling Obstruction

Figure 3.5: Runway End 13 – 2,500' Runway Extension

[1] See Appendix E for detailed description of FAR Part 77 Surfaces
[2] A precision instrument runway end with a (50:1) approach slope surface.
[3] The Controlling Obstruction is an object within the boundaries of the approach surface that controls the Object Clearance Slope to the runway end (not the displaced threshold, if applicable).

4. Recommendations and Implementation Plan

The City of Lancaster has foreseen the potential issue of urban development encroaching upon Lancaster Municipal Airport and has commenced the necessary steps towards protecting the airport and fostering related economic development. As explained in Section 1 – Inventory and Development Review, the City of Lancaster is in the approval process of the *Lancaster Airport Sector Plan and LanPort Zoning District and Development Standards.* The City of Lancaster's goal is to protect LNC by regulating the zoning surrounding the Airport. The City Councils' consideration of the final adoption of this plan is expected in October of 2007.

The following information is presented in this section:

- General Guidance
- Lancaster Airport Specific Recommendations
- Review of LanPort Zoning District
- Recommend Action for the City of Lancaster

General Guidance

Texas Department of Transportation (TXDOT) developed the *Airport Compatibility Guidelines* in 2003*,* based on the Federal Aviation Administration (FAA) guidelines as a reference for elected officials, zoning board members, and city and county staff responsible for assuring compatibility between an airport and the community it serves.

The TXDOT guidelines explain several methods for implementing airport land use compatibility. The airport management may be able to reduce the aircraft noise the community is exposed to by changing the facilities, such as runway alignment, or changing the operational procedures of aircraft with noise abatement procedures. Neither of these methods will completely remove the noise exposure to the surrounding community.

It is the responsibility of the airport sponsor to foster land use compatibility in order to reduce disruptive noise exposure and provide for safe aircraft operations. A municipality may encourage compatibility by

- Acquiring the land surrounding the airport
- Requiring noise contours to be drawn on planning documents and disclosed in real estate transactions
- Develop stricter building development codes
- Restrict the extension of public utilities into the undeveloped areas around the airport
- Develop zoning regulations that are compatible with airport operations

While it is the most expensive, acquiring the land is the surest way to guarantee compatibility.

One alternative zoning method suggested by TXDOT is airport overlay zoning upon the current zoning. The airport overlay zoning would be based upon the DNL noise contours, e.g., Zone 1 could be the land between the 65 DNL to 70 DNL noise contours. Areas closer to the runway are subject to higher levels of noise due to aircraft operations and could have more restrictions. This overlay zoning allows for the most flexibility of land use while maintaining compatibility.

It is important to note that TXDOT has not gone beyond the FAA guidelines by recommending land use planning in locations above the 65 DNL contour. As discussed in Section 2 of this analysis, noise complaints are often received within areas below the 65 DNL noise contour in residential locations. As such, general aviation airports benefit from land use planning to the 55 DNL contour as a minimum.

Lancaster Airport Specific Recommendations

As discussed in Section 1, LNC is planning to extend the runway in two phases to 7,500 feet as recommended by the 2006 Master Plan. The City of Lancaster is pursuing the acquisition of the land to the south for the first 1,500 feet of the extension and the associated Runway Protection Zone (RPZ). The City of Lancaster should also pursue the acquisition of the land further to the south for the additional 1,000 foot extension and associated RPZ. The proposed Loop 9, as illustrated in Figure 1.1, is offset approximately 3,000 feet from the future location of the RPZ associated with a runway length of 7,500 feet. The Loop 9 project should be carefully monitored to ensure the projected freeway location is not moved to where it will fall within the RPZ or so close that the land to the south of the Airport may not be developed as efficiently.

Figure 4.1 depicts the land that should be protected for the future runway extension to the length of 7,500 feet according the FAA Advisory Circular 150/5300-13 *Airport Design*. The safety areas include the Runway Protection Zone (RPZ), the Runway Safety Area (RSA), and the Runway Object Free Area (ROFA). The dimensions of these zones are based on the airport reference code for Lancaster Airport (D-II[i]), a precision approach with approach visibility minimums of less than ¾ mile for Runway 31, and a visual approach for Runway 13. In addition, property to protect for future airport development to the east and the 35 foot building restriction line (BRL) is also depicted. This data was based on the 2016 activity forecast provided in Appendix A and the future goals of the Airport as described in Section 1.

As much of the land surrounding Lancaster Airport is currently open space, it should be noted that there was not an expectation of a large number of

obstructions to be identified in the approach surfaces of the runway. For the current runway conditions there are no obstruction penetrations. If instrument approaches were affixed to the current runway ends, obstructions, as shown in Section 3, would need to be cleared in order to meet FAA regulations. As for the tree obstructions identified in these scenarios, they should either be cleared or topped to ensure safe operations at Lancaster Airport. Obstruction lighting is recommended on the tower and poles that were identified in accordance with the FAA Advisory Circular 70/7460 *Obstruction Marking and Lighting.* Ideally, for safety, the tree clearing and marking and lighting for the full 7,500 foot runway would be conducted as part of the initial extension to 6,000 feet if property rights at the time permit.

The City of Lancaster should begin protecting the land from development for the potential runway extension of 2,500 feet to the north, as suggested for the Dallas Logistics Hub. As depicted in Figure 2.4, the property to the north may not be available for airport development if there is no protection of that area. As Belt Line Road will need to be relocated for the extension, land acquisition will be required. It is expected with a 10,000 foot runway, a precision approach will be added to Runway 13, significantly expanding the Part 77 Approach Surfaces applicable to the surrounding airspace. These approach surfaces must be taken into consideration with land use and height restrictions. For long-term planning, the City of Lancaster should also consider acquiring the land to the east of the Airport to reserve for a potential parallel or intersecting runway and land for future development.

Figure 4.2 depicts the land that should be protected for the future runway extension to a length of 10,000 feet according the FAA Advisory Circular 150/5300-13 *Airport Design*. The safety areas include the Runway Protection Zone (RPZ), the Runway Safety Area (RSA), and the Runway Object Free Area (ROFA). In addition, property to protect for future airport development to the east and the 35 foot building restriction line (BRL) is also depicted. The dimensions of these zones are based on the airport reference code for Lancaster Airport (D-III[ii]) and a precision approach with approach visibility minimums of less than ¾ mile for both runway ends. This data was based on the activity forecast provided in Appendix A and the future goals of the Airport as described in Section 1.

To ensure future compatibility, significant property acquisition and surrounding zoning changes would be recommended to ensure protection of the Airport and airspace. The City of Lancaster has already begun this step of protection of the Airport with the proposed *LanPort Zoning District and Development Standards.* These changes would prevent further noise sensitive development; however, only property acquisition provides the control needed to enable the actual runway extensions. **The avid support, adoption and implementation of guidelines presented in the LanPort Zoning District are crucial towards the realization of long term plans for this airport.**

Lancaster Airport's Airport Layout Plan (ALP) was developed prior to the planning of the Dallas Logistics Hub, and as such should be updated to reflect the 2,500 foot extensions to both runway ends for an ultimate runway length of 10,000 feet. With this change on record, the City may use it as an official planning document for future development planning in the area surrounding the Airport.

FAA Funding Eligibility

All Airport proposed projects must be compliant with the National Environmental Policy Act (NEPA), depicted on a FAA approved Airport Layout Plan (ALP) and listed in the Airport Capital Improvement Plan (ACIP) in order to be eligible for Airport Improvement Program (AIP) funding. As stated in the Section 1, the City of Lancaster needs to update the current ALP to reflect the new goals of the Airport with the runway extensions. If the City of Lancaster desires FAA funding to develop LNC into a cargo airport, the project must be justified and consistent with the approved Master Plan. The City should begin discussing with the Allen Group, the developers of the Dallas Logistics Hub, their specific goals and uses of LNC. This would start the process of justification to the FAA, which must directly document the demand for a cargo airport in this location. The ALP and CIP should then be changed to depict runway extensions of 2,500 feet to both the north and south, for a total runway length of 10,000 feet, and precision approaches for both runway ends.

As FAA documentation of demand typically requires direct input from cargo operators, (e.g., business plans of FedEx, UPS, etc. to operate from LNC) the justification may be several years in the future. Nevertheless, proactive planning is needed today to "reserve" the required property.

Easement Options

According to the FAA Advisory Circular 150/1300-13 *Airport Design*, "Control of the Runway Protection Zone is preferably exercised through the acquisition of sufficient property interest." In order to control the land, when the high purchase cost of acquiring the land is unattainable for a city, easements are recommended. If the City of Lancaster can not purchase the land in fee depicted on Figures 4.1 and 4.2, easements should be purchased in order to maintain control of that land for future runway extensions. As most of the acquisition to the north of the Airport is not currently eligible for FAA funding, easements may be a reasonable alternative.

Easements can be purchased for the development rights of a property, to place development restrictions, or first-chance to buy rights (i.e., purchase options). Development rights of a property easement will give the City the control over what is developed upon the land. In LNC's situation, this could allow the agricultural land surrounding the Airport to continue to be used for agriculture, but restricts the

owners' ability to develop the land or selling their property to commercial or residential developers. A development restrictions easement limits the use of and structures developed on the property; much like zoning. A purchase option easement requires the owners' of land to first offer the land for sale to the City. If the City does not act on the purchase opportunity, it forfeits the right and the owner may sell the land to whom they choose. The actual easement method, if pursued, would be negotiated between the owner and the City. Table 4.1 below shows the property location and acreage that should be controlled for the future runway extensions.

Table 4.1 – Recommended Property to Acquire/Protect

Location	Acres
Current Runway 13 Runway Protection Zone (RPZ)	12
Runway 31 Extension to 7,500' & RPZ	123
Additional acreage for Runway 13 extension to 10,000'	143
Future Airport Development to the east of the airport property	157
Total	**423**

Review of LanPort Zoning District

As can be seen in Figure 2.5, the LanPort Zoning Districts would change the zoning surrounding LNC from Agriculture-Open to Business Park and Commerce and would extend beyond even the projected 2026 55 DNL contour recommended for airport land use planning. The LanPort Plan incorporates airport height restrictions and limits residential and other incompatible development. As such, the LanPort Plan would provide an excellent method to ensure future airport land use compatibility. The plan positions the City of Lancaster to take advantage of its location in North Central Texas and the prospective Dallas Logistics Hub.

From the airport planning perspective, the LanPort Plan should be approved and implemented as soon as possible to ensure continued compatible development. Nevertheless, The City of Lancaster would still need to acquire the land required for future runway extensions and thoroughly inspect all future projects within the area for possible conflicts. This Demonstration Encroachment Analysis may be used as a technical document to validate the proposed zoning districts of the *LanPort Zoning District Plan* from a long-range airport planning perspective.

A more typical airport encroachment analysis would identify airport specific land use and zoning changes for the sole purpose of fostering future airport

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Lancaster Airport's Airport Layout Plan (ALP) was developed prior to the planning of the Dallas Logistics Hub, and as such should be updated to reflect the 2,500 foot extensions to both runway ends for an ultimate runway length of 10,000 feet. With this change on record, the City may use it as an official planning document for future development planning in the area surrounding the Airport.

FAA Funding Eligibility

All Airport proposed projects must be compliant with the National Environmental Policy Act (NEPA), depicted on a FAA approved Airport Layout Plan (ALP) and listed in the Airport Capital Improvement Plan (ACIP) in order to be eligible for Airport Improvement Program (AIP) funding. As stated in the Section 1, the City of Lancaster needs to update the current ALP to reflect the new goals of the Airport with the runway extensions. If the City of Lancaster desires FAA funding to develop LNC into a cargo airport, the project must be justified and consistent with the approved Master Plan. The City should begin discussing with the Allen Group, the developers of the Dallas Logistics Hub, their specific goals and uses of LNC. This would start the process of justification to the FAA, which must directly document the demand for a cargo airport in this location. The ALP and CIP should then be changed to depict runway extensions of 2,500 feet to both the north and south, for a total runway length of 10,000 feet, and precision approaches for both runway ends.

As FAA documentation of demand typically requires direct input from cargo operators, (e.g., business plans of FedEx, UPS, etc. to operate from LNC) the justification may be several years in the future. Nevertheless, proactive planning is needed today to "reserve" the required property.

Easement Options

According to the FAA Advisory Circular 150/1300-13 *Airport Design*, "Control of the Runway Protection Zone is preferably exercised through the acquisition of sufficient property interest." In order to control the land, when the high purchase cost of acquiring the land is unattainable for a city, easements are recommended. If the City of Lancaster can not purchase the land in fee depicted on Figures 4.1 and 4.2, easements should be purchased in order to maintain control of that land for future runway extensions. As most of the acquisition to the north of the Airport is not currently eligible for FAA funding, easements may be a reasonable alternative.

Easements can be purchased for the development rights of a property, to place development restrictions, or first-chance to buy rights (i.e., purchase options). Development rights of a property easement will give the City the control over what is developed upon the land. In LNC's situation, this could allow the agricultural land surrounding the Airport to continue to be used for agriculture, but restricts the

owners' ability to develop the land or selling their property to commercial or residential developers. A development restrictions easement limits the use of and structures developed on the property; much like zoning. A purchase option easement requires the owners' of land to first offer the land for sale to the City. If the City does not act on the purchase opportunity, it forfeits the right and the owner may sell the land to whom they choose. The actual easement method, if pursued, would be negotiated between the owner and the City. Table 4.1 below shows the property location and acreage that should be controlled for the future runway extensions.

Table 4.1 – Recommended Property to Acquire/Protect

Location	Acres
Current Runway 13 Runway Protection Zone (RPZ)	12
Runway 31 Extension to 7,500' & RPZ	123
Additional acreage for Runway 13 extension to 10,000'	143
Future Airport Development to the east of the airport property	157
Total	**423**

Review of LanPort Zoning District

As can be seen in Figure 2.5, the LanPort Zoning Districts would change the zoning surrounding LNC from Agriculture-Open to Business Park and Commerce and would extend beyond even the projected 2026 55 DNL contour recommended for airport land use planning. The LanPort Plan incorporates airport height restrictions and limits residential and other incompatible development. As such, the LanPort Plan would provide an excellent method to ensure future airport land use compatibility. The plan positions the City of Lancaster to take advantage of its location in North Central Texas and the prospective Dallas Logistics Hub.

From the airport planning perspective, the LanPort Plan should be approved and implemented as soon as possible to ensure continued compatible development. Nevertheless, The City of Lancaster would still need to acquire the land required for future runway extensions and thoroughly inspect all future projects within the area for possible conflicts. This Demonstration Encroachment Analysis may be used as a technical document to validate the proposed zoning districts of the *LanPort Zoning District Plan* from a long-range airport planning perspective.

A more typical airport encroachment analysis would identify airport specific land use and zoning changes for the sole purpose of fostering future airport

improvements. However, as the proposed LanPort Plan would accomplish that and more, this analysis did not result in additional zoning recommendations. Implementation of the LanPort Plan would sufficiently protect Lancaster Airport from encroachment and incompatible activities.

Recommended Actions for the City of Lancaster

To summarize the recommendations and implementation plan, the follow table provides action steps by priority, as related to the long term development of Lancaster Airport.

Table 4.2 – Recommended Actions

Action	Timeline
Implement the currently proposed LanPort Zoning District to prevent future incompatible development	Immediate
Discuss with The Allen Group the specific future role of Lancaster Airport	
Complete land acquisition to the south for the runway extension (to 7,500') and protect land to the north and east from development	
Conduct presentations to City Council and planning and zoning commission members about the importance of Lancaster Airport	
Meet with neighboring local governments	
Consider an institutional structure/agreements to protect future airport development	
Update Airport Layout Plan and Capital Improvement Plan to reflect new goals of the airport	Within 5 years
Review all proposed development to ensure long-term compatibility	
To accommodate runway extensions, relocate Ferris Road, relocate Belt Line Road in Lancaster, and acquire easements for property to north to accommodate future runway extensions	
Establish development review procedures with neighboring municipalities	
Study alternate runway configurations and analyze possible locations and associated land requirements.	Within 10 years
Purchase property to the east of the runway for potential future landside development.	Long-Term

[i] Airport Reference Code is based on the aircraft approach speed and aircraft wingspan of the design aircraft. Approach speeds between 141 and 165 kts are classified as D. Wingspans between 49 and up to but not including 79 feet are classified as II.
[ii] Approach speeds between 141 and 165 kts are classified as D. Wingspans between 79 and up to but not including 119 feet are classified as III.

5. Glossary

Air Route Traffic Control Center (ARTCC)	A facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the enroute phase of flight.
Air Traffic Control Tower (ATCT)	A central operations facility in the terminal air traffic control system, consisting of a tower, including an associated instrument flight rule (IFR) if radar equipped, using air/ground communications, and/or visual signaling, and other devices to provide safe and expeditious movement of terminal air traffic.
Airport Layout Plan (ALP)	The drawing of the airport showing the layout of existing and proposed airport facilities.
Airport Reference Code (ARC)	A coding system used to relate airport design criteria to the operational and physical characteristics of the airplanes intended to operate at the airport.
Approach Surface	The defined area the dimensions of which are measured horizontally beyond the threshold over which the landing and takeoff operations are made.
Approach Visibility Minimums	The altitude below which an aircraft may not descend while on an IFR approach unless the pilot has the runway in sight.
Automatic Weather Observation System (AWOS)	Equipment used to automatically record weather conditions.
Building Restriction Line (BRL)	The minimal distance from the runway centerline where a building may be positioned
Class B Airspace	Generally, the airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports. The configuration of Class B airspace is unique to each airport, but typically consists of two or more layers of airspace and is designed to contain all published instrument approach procedures to the airport. An air traffic control clearance is required for all aircraft to operate in the area.

Controlling Obstruction	An object within the boundaries of the approach surface that controls the Object Clearance Slope to the runway end (not the displaced threshold, if applicable).
Day-Night Average Noise Level (DNL)	The 24-hour average sound level obtained after the addition of ten decibels to sound level for the periods between 10 P.M. and 6 A.M. as averaged over a span of one year. It is the FAA Standard metric for determining the cumulative exposure of individuals to noise.
Daytime Operations	Operations between the hours of 6:01 A.M. and 9:59 P.M.
Extraterritorial Jurisdiction (ETJ)	An area adjacent to and outside of a city in which the city has authority to exercise planning, zoning, building and subdivision regulation.
Fixed Based Operator (FBO)	A provider of services to users of an airport. Such services include, but are not limited to, hangaring, fueling, flight training, repair, and maintenance.
Initial Approach Fix (IAF)	A navaid or reporting point that signals the start of an instrument approach.
Instrument Approach	A series of predetermined maneuvers for the orderly transfer of an aircraft under IFR conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.
Instrument Flight Rules (IFR)	Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan.
Instrument Landing System (ILS)	A precision instrument approach system which normally consists of the following electronic components and visual aids: Localizer, Glide Slope, Outer Market, Middle Marker, Approach Lights
Integrated Noise Model	Computer software used to estimate the noise impacts of airport operations on a surrounding region.
Mean Seal Level (MSL)	The elevation above sea level.
Missed Approach	The flight route to be followed if, after an instrument approach, a landing is not affected.
Nighttime Operations	Operations between the hours of 10:00 P.M. and 6:00 A.M.
Non-Directional Beacon (NDB)	A beacon transmitting non-directional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his bearing to and from the radio beacon.
Non-precision Instrument Approach	A standard instrument approach in which no electronic glide slope is provided.
Precision Approach Path Indicators	A lighting system providing visual approach glide slope guidance to aircraft during a landing approach.
Precision Instrument Approach	A standard instrument approach which provides runway alignment and glide slope (descent) information.
Reliever Airport	An airport to serve general aviation aircraft which might otherwise use a congested air-carrier served airport
RNAV Approach	Area navigation - airborne equipment which permits

	flights over determined tracks within prescribed accuracy tolerances without the need to overfly ground-based navigation facilities. Used enroute and for approaches to an airport.
Runway End Identifier Lights	Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.
Runway Object Free Area (ROFA)	An area on the ground centered on a runway centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for the objects that need to be located in the OFA for air navigation.
Runway Protection Zone (RPZ)	An area off the runway end to enhance the protection of people and property on the ground.
Runway Safety Area (RSA)	A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.
Standard Instrument Departures (SIDs)	A preplanned coded air traffic control IFR departure routing, preprinted for pilot use in graphic and textual form.
Standard Terminal Arrivals (STARs)	A preplanned coded air traffic control IFR arrival routing, preprinted for pilot use in graphic and textual form.
Terminal Instrument Procedures (TERPs)	Procedures used for conducting independent instrument approaches to converging runways under instrument meteorological conditions.
Visual Approach	An approach wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of an air traffic control facility and having an air traffic control authorization, may proceed to the airport of destination in VFR conditions.
Visual Flight Rules (VFR)	Rules that govern the procedures for conducting flight under visual conditions. Used by pilots and controllers to indicate a type of flight plan and weather conditions equal to or greater than minimum VFR requirements.

Abbreviations

AIP	Airport Improvement Program
A-O	Agricultural Open
ARC	Airport Reference Code
ARTCC	Air Route Traffic Control Center
ATCT	Air Traffic Control Center
AWOS	Automated Weather Observation Center
BRL	Building Restriction Line
CIP	Capital Improvement Program
CO	Controlling Obstruction
dB	Decibel
DFW	Dallas-Fort Worth International Airport
DNL	Day-Night Noise Level
ETJ	Extraterritorial Jurisdiction
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FBO	Fixed Based Operator
IFR	Instrument Flight Rules
ILS	Instrument Landing System
INM	Integrated Noise Model
LI	Light Industrial
LNC	Lancaster Airport
MIRL	Medium Intensity Runway Lights
MITL	Medium Intensity Taxiway Lights
MSL	Mean Sea Level
NDB	Non-directional Beacon
NPIAS	National Plan of Integrated Airport Systems
PAPI	Precision Approach Path Indicators
PIR	
REIL	Runway End Identifier Lights
RNAV	Area Navigation
ROFA	Runway Object Free Area
RPZ	Runway Protection Zone
RSA	Runway Safety Area

SF-6	Single Family Residence
SID	Standard Instrument Departure
STAR	Standard Terminal Arrival Route
TASP	Texas Airport System Plan
TERPs	Terminal Instrument Procedures
TXDOT	Texas Department of Transportation
VFR	Visual Flight Rules

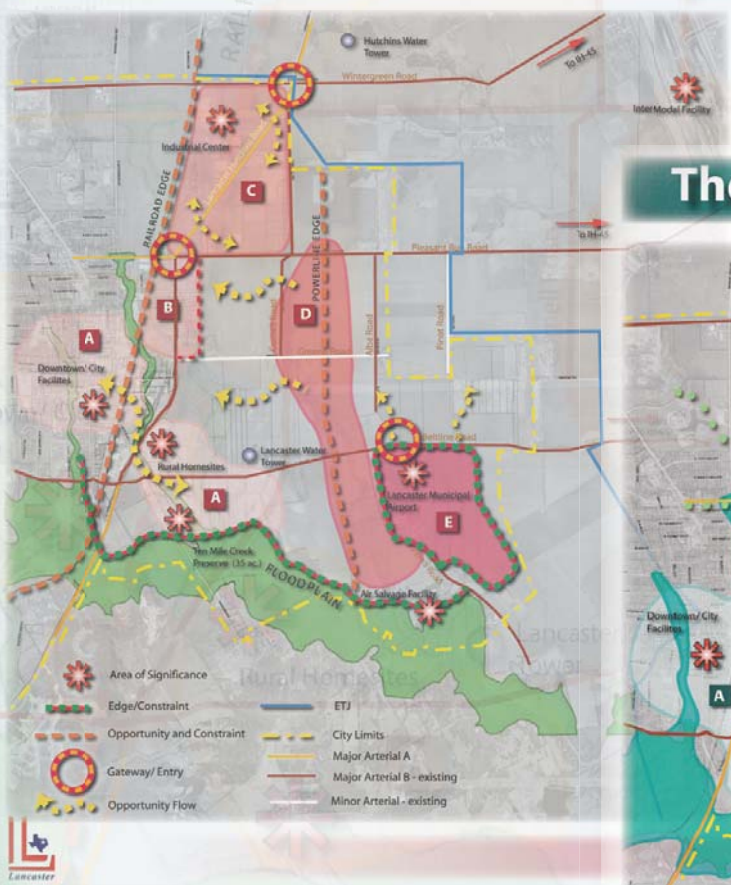
6. TECHNICAL APPENDICES

Appendix A – Integrated Noise Model Inputs
Appendix B – Runway 13 Evaluation of Obstructions
Appendix C – Runway 31 Evaluation of Obstructions
Appendix D – FAR Part 77 Approach Surfaces
Appendix E – Reference Materials
Appendix F – Lancaster Airport Sector Plan and LanPort Zoning District and Development Standards
Appendix G – FAA Land Use Compatibility Table
Appendix H – Expansion Plan

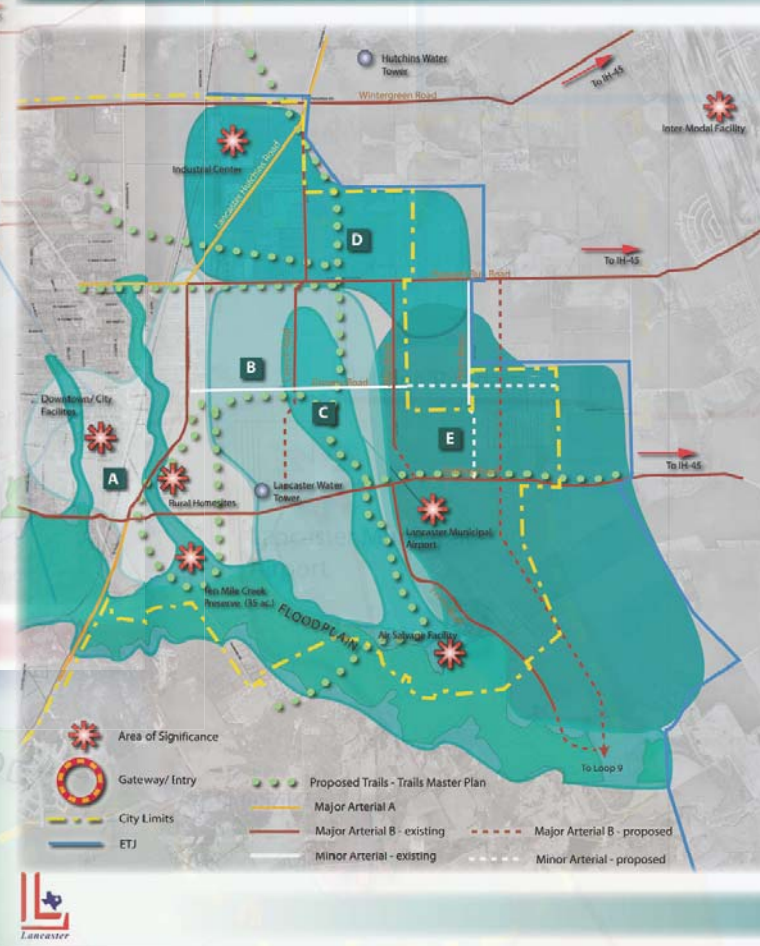
TABLE G-1 – FAA LAND USE COMPATIBILITY WITH DNL GUIDELINES				
Land Use	**DNL Levels (in dB)**			
	<65	**65-70**	**70-75**	**75-80**
RESIDENTIAL				
Residential, Other than Mobile Homes	**Y**	**N[1]**	**N[1]**	**N**
Mobile Home Parks	**Y**	**N**	**N**	**N**
Transient Lodgings	**Y**	**N[1]**	**N[1]**	**N[1]**
PUBLIC USE				
Schools	**Y**	**N[1]**	**N[1]**	**N**
Hospitals, & Nursing Homes	**Y**	**25**	**30**	**N**
Churches, Auditoriums & Concert Halls	**Y**	**25**	**30**	**N**
Government Services	**Y**	**Y**	**25**	**30**
Transportation	**Y**	**Y**	**Y[2]**	**Y[3]**
Parking	**Y**	**Y**	**Y[2]**	**Y[3]**
COMMERCIAL USE				
Offices, Business & Professional	**Y**	**Y**	**25**	**30**
Wholesale & Retail-Building Materials, Hardware & Farm Equipment	**Y**	**Y**	**Y[2]**	**Y[3]**
Retail Trade-General	**Y**	**Y**	**25**	**30**
Utilities	**Y**	**Y**	**Y[2]**	**Y[3]**
Communication	**Y**	**Y**	**25**	**30**
MANUFACTURING & PRODUCTION				
Manufacturing-General	**Y**	**Y**	**Y[2]**	**Y[3]**
Photographic & Optical	**Y**	**Y**	**25**	**30**
Agriculture (Except Livestock) & Forestry	**Y**	**Y[6]**	**Y[7]**	**Y[3]**
Livestock Farming & Breeding	**Y**	**Y[6]**	**Y[7]**	**N**
Mining & Fishing, Resource Production & Extraction	**Y**	**Y**	**Y**	**Y**
RECREATIONAL				
Outdoor Sports Arenas & Spectator Sports	**Y**	**Y[5]**	**Y[5]**	**N**
Outdoor Music Shells, Amphitheaters	**Y**	**N**	**N**	**N**
Nature Exhibits & Zoos	**Y**	**Y**	**N**	**N**
Amusement Parks, Resorts & Camps	**Y**	**Y**	**Y**	**N**
Golf Courses, Riding Stables & Water Recreation	**Y**	**Y**	**25**	**30**
KEY:				
Y (Yes): Land use and related structures compatible without restrictions.				
N (No): Land use and related structures are not compatible and should be prohibited.				
NLR: Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.				
25, 30 or 35: Land use and related structures generally compatible; measures to achieve NLR of 25, 30 or 35 dB must be incorporated into design and construction of structure.				
NOTES:				
[1]Where the community determines that residential uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30dB should be incorporated into building codes and be considered in individual approvals. Normal construction can be expected to provide and NLR of 20dB. Thus, the reduction requirements are often stated as 5, 10 or 15dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.				
[2]Measures to achieve NLR of 25 must be incorporated into the design and construction of portions of these buildings where the public is received; office areas, noise sensitive areas or where the normal noise level is low.				
[3]Measures to achieve NLR of 30 must be incorporated into the design and construction of portions of these buildings where the public is received; office areas, noise sensitive areas or where the normal noise level is low.				
[5]Land use compatible provided special sound reinforcement systems are installed.				
[6]Residential buildings require NLR of 25.				
[7]Residential buildings require NLR of 30.				
Sources: FAA, FAR Part 150				

Lancaster Airport Sector Plan and LanPort Zoning District and Development Standards

Opportunities and Constraints



Themes



Lancaster

DRAFT

March 15, 2007

Introduction

The City of Lancaster is located in the southern part of the DFW Metroplex. Founded in 1852 as a frontier post, the City has evolved from a small town on the rail line to an outstanding residential community, and was a 2005 and 2006 Finalist for "All America City". Located just minutes from downtown Dallas, residents of Lancaster are able to enjoy the amenities of the big city while maintaining a home town environment that celebrates a rich and proud history. The City has been experiencing tremendous growth and economic development opportunities over the past few years, and is continuing to position itself to manage and guide its growth and development for the future.

Purpose

The Lancaster Municipal Airport is a major economic engine for the City. Located on over 300 acres in the southwest part of the City, the airport provides a number of services and economic benefits to the City of Lancaster. The airport is also surrounded by over 6,000 acres of developable land much of which is currently zoned/used as agricultural/open space. Lancaster has just completed its recently adopted Airport Master Plan which recommends for the extension of the current runway toward the south and the development of the east side of the airport property. A major transportation hub is proposed which will include land in Lancaster, Wilmer, Hutchins, Dallas and parts of Dallas County.

Based on these east side sector development opportunities, the City initiated an update to the Comprehensive Plan to address development concerns on the relatively undeveloped land around the airport. Accompanying development standards were written to guide the development of the lands surrounding the airport. These standards are designed to take advantage of the development energies in the area, yet be cognizant of the desires and concerns of residents of Lancaster. As the airport is an all important economic engine for the City, it was important to develop a Plan that not only looked at the possibilities that the surrounding lands presented, but to protect the existing land uses from airport uses, as well as the airport from the surrounding land uses. The outcome evolved into the *Lancaster Airport Sector Plan* and design standards are means of providing this protection.

Analysis of Plans

The *City of Lancaster Comprehensive Land Use Plan 2002,* the *Lancaster Airport Master Plan* and the *Lancaster Thoroughfare Plan* provided much of the background for the development of the **Airport Sector Plan.** Proposed residential developments around the airport and the 2002 Future Land Use Plan that allowed for Mixed Use and Traditional Neighborhood Developments north of the runway caused concern for the City. The City's Thoroughfare Plan shows the existing roadway network in the study area and proposed future roadways. These proposed roadways are logical extensions of existing roadways and create an evenly spaced grid of roadways around the airport.

The need to re-evaluate the 2002 Future Land Use Plan arose from the concerns about residential developments in relatively close proximity to the airport. Decibel levels were a concern as well. Upon examination, it was found that the noise contours around the airport are acceptable for residential, retail and commercial activity, as is stated in the *Airport Master Plan*. The opportunities that arise from the proposed logistics hub development, the proximity of the Inter-Modal Facility and the growth and expansion of the airport provide the reasoning for re-evaluation of land uses and for creating a new district that supports this new development.

Sector Study Area

For the purposes of this sector plan, the designated area was defined as the area east on Lancaster Hutchins road, and within the Extraterritorial Jurisdiction (ETJ). **FIGURE 1 – EXISTING LAND USE** shows current general land uses in the City. A "windshield survey" of the sector area was conducted by driving the streets of the sector area and recording land uses as they exist today. It should be noted that Figure 1 does not represent how land is zoned, rather how the land is currently being used. Much of the sector land is agricultural with small pockets of residential uses. Light industrial, commercial and public uses are found along Lancaster Hutchins Road. An important part of the Sector area is the light industrial activities that exist in the northern part of the sector, an important employment sector for the entire community. The southern part of the Sector contains several well established rural residential developments, and new residential developments just outside the city limits. Agricultural uses are predominant in the ETJ. Just east of the city, along I-45 is the Intermodal Facility which provides important economic opportunities to the City, particularly in relation to the expansion of

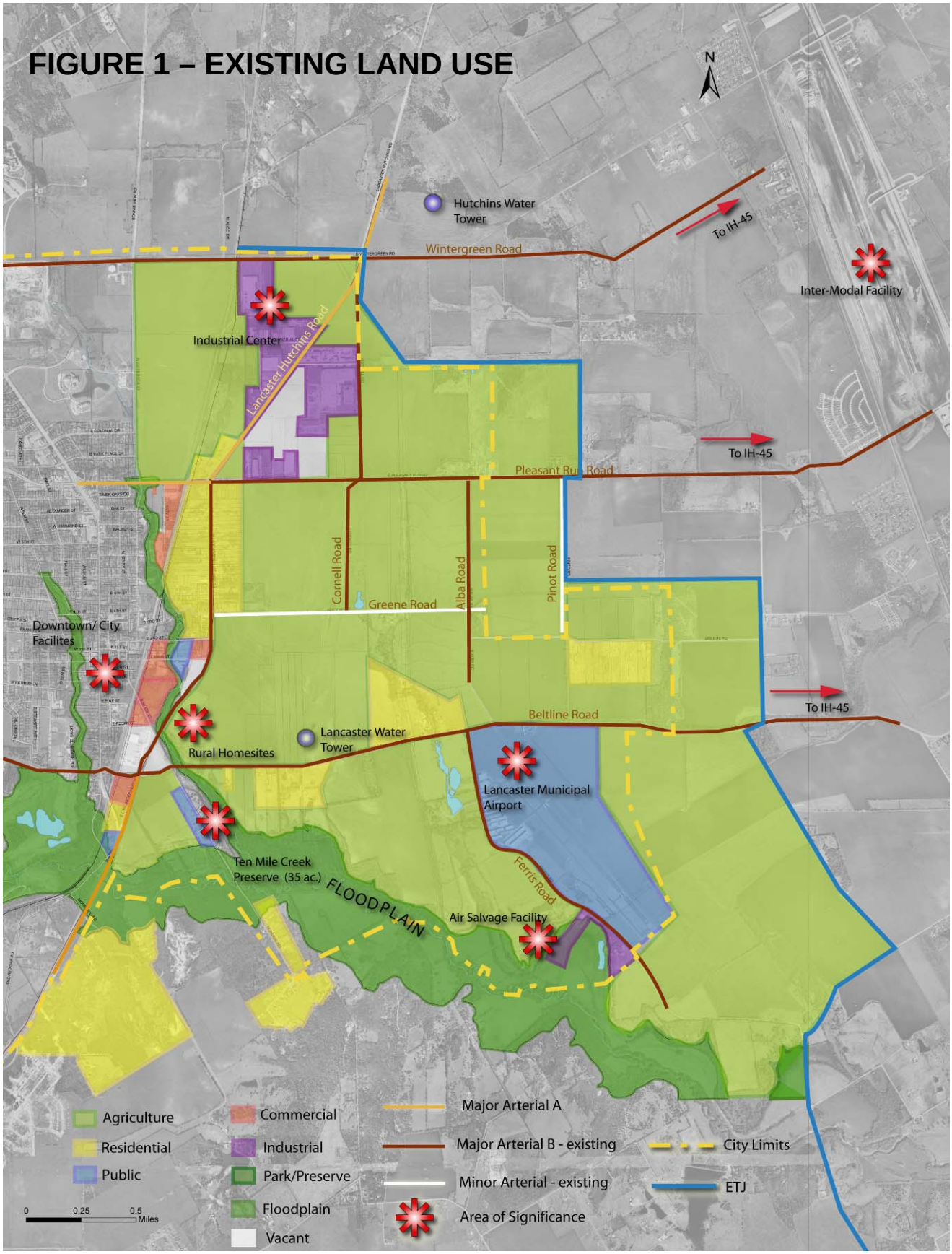


FIGURE 1 – EXISTING LAND USE
N
Hutchins Water Tower
Wintergreen Road
To IH-45
Inter-Modal Facility
Industrial Center
Lancaster Hutchins Road
To IH-45
Pleasant Run Road
Cornell Road
Alba Road
Pinot Road
Greene Road
Downtown/ City Facilites
To IH-45
Beltline Road
Rural Homesites
Lancaster Water Tower
Lancaster Municipal Airport
Ten Mile Creek Preserve (35 ac.)
FLOODPLAIN
Ferris Road
Air Salvage Facility
Agriculture
Residential
Public
Commercial
Industrial
Park/Preserve
Floodplain
Vacant
Major Arterial A
Major Arterial B - existing
Minor Arterial - existing
Area of Significance
City Limits
ETJ
0
0.25
0.5
Miles

Lancaster's Municipal Airport and the development of the areas adjacent to the Intermodal. Figure 1 also illustrates the existing thoroughfare system in the City. Areas of importance to the City and the Sector Area are highlighted with stars. These include the airport, the Air Salvage Facility, the Intermodal Facility on I-45, the industrial areas in the northern part of the sector, the City Facilities and Lancaster Downtown, and the Ten Mile Creek Preserve.

Guiding Principles

In developing the Sector Plan, certain guiding principles, resulting from discussions with the City, formed the basis for the direction and development of the Plan. These include:

- Promoting the airport as an economic engine for the City
- Taking advantage of the airport's proximity to the Intermodal facility and the abundance of vacant/agricultural land surrounding the airport.
- Recommending appropriate uses for the area.
- Being cognizant of the ideas/ plans of the Allen Group for the Dallas Logistics Hub yet ensuring that the City's and residents' concerns for the area are addressed.
- Assuring an attractive transition from Lancaster's downtown area to the airport.
- Taking advantage of Lancaster's location in the southern Metroplex, as well as the freight and transportation routes that exist.
- Controlling residential development in the Sector Area or heavy industrial uses.

Goals and Objectives

To guide the development of any plan, a set of Goals and Objectives are necessary to ensure that the Plan satisfies its purpose and that it is able to respond to the needs and desires of the community.

The following are Goals and Objectives for the Lancaster Airport Sector Plan:

Goal: Ensure the City of Lancaster's realization of the potential of the airport and its environs are a successful productive economic engine that is aligned with the desires and needs of its citizens and businesses.

Objective 1: Develop a new Zoning District that addresses the unique needs of the Lancaster Airport sector.

Objective 2: Identify land uses for the Zoning District and/ or Subdistricts that are appropriate and in line with the guiding principles of development for this area.

Objective 3: Develop appropriate design/development standards for land surrounding the airport to ensure compatibility with desired theme for the area.

Existing Character

Before any recommendations can be made for the sector, it is important to develop a thorough understanding of the area. A series of maps were created to illustrate a thought process that would determine future land uses in the area. The first map, the Character Map, is illustrated in **FIGURE 2 – EXISTING CHARACTER**. This map illustrates prominent characteristics (physical, perceived, and experienced) in the area, including areas of significance, visible and perceived edges or constraints in the City, and the roadway designations. City limits and ETJ are also shown. Areas of significance include Lancaster's downtown, some of the more rural home sites that exist along Beltline Road, the Ten Mile Creek Preserve, Lancaster Airport, the Air Salvage Facility adjacent to the airport, the Inter-Modal facility at I-45, and an important industrial center in the northern part of the study area. The Burlington Northern railroad line and the TXU power line form edges in the study area. A brief description of each of the "character areas" is provided along with the map to help define each area and the relationship of each area to the other in creating the overall character for the sector. The character areas are:

A: Historic/ Preservation Areas

Rural home sites provide important reminders of the past and define much of the character of the area.

The Historic/ Preservation Area is located in the western part of the Study Area, both east and west of Lancaster-Hutchins Road, close to Beltline Road. This character area is divided into two areas: the Historic Area that includes Lancaster's Downtown, and the Preservation Area that includes some of the rural home sites and natural resources of the area. This character area is also at the intersection of two major roads, namely Lancaster-Hutchins Road and Beltline Road. Both areas have a character of the past, with the historic buildings of downtown with their awnings, and arcades, and use of brick stone and wood, and the preservation areas with the rural home sites, some of which are Victorian styled or are reminders of Lancaster's

* Please refer to **Existing Character** Map*

agricultural past. This area is adjacent to the floodplain and the Ten Mile Creek Preserve which are valuable natural resources to the area.

B: Residential (East Side Acres)

East Side Acres is a stable residential community within the study area, lying to the east and west of Lancaster-Hutchins Road between Greene Road and Pleasant Run. This community is a mixture of old and new homes, all single stories on narrow lots. Many of these homes are in disrepair. This community is adjacent to the industrial and manufacturing activities to the north of Pleasant Run Road. As such, this community is very vulnerable to incompatible adjacent uses, and future developments should ensure its protection.

C: Industrial/ Manufacturing Centers

A significant industrial and manufacturing hub for the City is located in the northern part of the Study Area as well as near the intersection of Lancaster-Hutchins Road and Beltline. This is an established employment center and economic generator for the City. Most of the buildings in this area have metal, brick or stone facades, and have minimal landscaping. Outdoor storage and loading bays are visible from the major roads.

Industrial sites in the northern part of the city are important employment centers.

D: Greenbelt/ Power Line

Character Area D represents both a natural resource in the study area and an edge or constraint. The creek that runs into the Ten Mile Creek floodplain creates an environment that is heavily treed with several smaller water bodies, and a rolling terrain. This area again is a resource for the Study Area. The TXU power line easement also runs alongside the creek, creating a constraint to development along this definite natural resource to the City.

The creek is a natural resource for the area.

E: Airport

Character Area E comprises the Lancaster Airport and the Air Salvage Facility just southwest of it. The airport is primarily used for on-demand and recreational flying, and corporate jets. The City has just completed its Airport Master Plan which calls for expansion of the runway to the south and moving airport facilities to the east side of the airport. The airport is an important economic engine for the city and provides great opportunities for growth and coordination with expanding land uses, the Inter-Modal Facility along I-45, and the new development energies that are locating in the area.

Lancaster Municipal Airport is a major economic engine for the City.

F: Residential

Just south of the Ten Mile Creek floodplain is a residential area. There are both established residential communities in this area as well as new residential developments. These are primarily single family residences, and due to the floodplain, there are large, expansive tree clusters and groves which provide valuable natural resources to this residential area.

New residential developments south of the sector area take advantage of natural resources.

Opportunities and Constraints

The second step in the analysis of the study area is to identify the opportunities and constraints that exist. The process involves identifying the resources of the area that can be expanded upon, such as historic, natural and cultural resources. Also, constraints to development are identified, and the challenge then becomes taking the constraint and turning it into an opportunity. **FIGURE 3 – OPPORTUNITIES AND CONSTRAINTS** is a graphical representation of the opportunities and constraints that exist in the study area. There are several intersections that are of importance as they represent major entries or gateways into the study area. These include Wintergreen and Lancaster Hutchins Roads, Pleasant Run and Lancaster Hutchins Roads, and Beltline and Alba Roads. The yellow arrows in the diagram indicate “opportunity flows”, or how and where opportunity can expand to another area. The red dashed lines represent edges or constraints in the study area. The red and green dashed lines represent what can be seen as both an opportunity and constraint. Brief descriptions of the different areas in the study area are provided.

* Please refer to **Opportunity and Constraints** Map*

A: Historic/ Preservation Area

This area of the Study Area defines the opportunities for tying the historic Lancaster Downtown with the preservation areas and rural home sites to the east of Lancaster Hutchins Road at Beltline. There is available vacant land in which to expand a variety of uses. When leaving the airport and approaching Downtown Lancaster, this area helps create that transition from higher industrial and airport related activities to less intense, more people oriented uses. The yellow arrows indicate the opportunity to demonstrate a connection between these two areas. Both are links to the past and opportunities exist through availability of vacant or agricultural lands to expand on these cultural and historic resources. Although the railroad forms an edge or barrier that passes between these two areas, the opportunity to connect them can overcome this. The floodplain also provides a rural natural setting.

B: East Side Acres

The East Side Acres residential community lies adjacent to an industrial/ manufacturing area. Any new developments should be sensitive to the residential community and negative impacts should be minimized. The intersection on the north side of East Side Acres at Lancaster-Hutchins and Pleasant Run Roads is an important intersection. East Side Acres represents a “constraint” to new development to the extent that all new developments adjacent to the community should be cognizant of protecting it from incompatible uses and ensuring compatible adjacent uses. The presence of this established and stable residential entity limits the types of development to only residential compatible uses.

C: Industrial Center

The Industrial Center in the northern part of the Study Area provides an opportunity to expand upon this important economic and employment center of the City. Yellow arrows represent opportunity for expansion. Vacant tracts of land surround the current industrial and manufacturing developments, and the high visibility from Wintergreen and Lancaster-Hutchins Roads and Pleasant Run and Lancaster-Hutchins Roads provide opportunity to showcase the area’s economic potential. This area is also in close to the Inter-Modal Facility, another linkage opportunity.

Available land around the industrial activities in the northern part of the sector area provide growth opportunities.

D: Greenbelt/ Power Line

Area D offers both an opportunity and a constraint. The natural features such as the creek and water bodies can be expanded upon to create natural and attractive areas for water retention and detention. As the yellow arrows indicate, these features can be integrated into adjacent developments creating an opportunity for a more natural landscape. The Power Line however, does create a constraint to development. The physical presence of the power line limits the development along the power line easement. However, it also provides the location for extension of the trails system north-south through the area along the easement. The floodplain presents both an opportunity and constraint. As a natural resource, it is an opportunity to be expanded upon providing scenic views to neighboring properties, but also limits development.

The Power line Easement acts as a constraint to development, where the creek acts as an opportunity.

E: Airport

Area E is the airport, both an opportunity and constraint in the area. The yellow arrows show potential for expansion of the airport and compatible uses to adjacent vacant lands. The intersection of Beltline and Alba Roads is an important entry to the airport. The airport is a constraint to development as airport operations will not be compatible with many types of land use.

Themes/Conceptual Future Land Use Map

The final step in determining land uses for the Airport Sector Study Area is developing recommendations based on the information and analysis of current conditions in the study area. After examining and analyzing the existing character and the opportunities and constraints, a series of themes for future development patterns begin to emerge. This is illustrated in **FIGURE 4 – THEMES**. This Themes Map is essentially a Conceptual Future Land Use Map. Different theme or land use areas are shown on the map, each having a distinct character and pattern of development. The areas of significance and gateways/entries are shown, along with current roadways classifications. Future roadways are also shown based on possible types of developments planned for the area. The theme areas descriptions include samples of the types of developments that are proposed in each area. The boundaries of the theme area are not meant to be "hard" lines or defined by parcels, but are "bubbles" that represent the different themes and show how overlapping bubbles may occur in transition areas.

A: Preservation Theme

The western part of the Study Areas has cultural and historic areas of significance that need to be preserved. This area of the Study Area represents the "Preservation Theme" – the area that must be protected yet allowed to continue developing in a manner sensitive to existing development. The East Side Acres neighborhood is included in this area, as is Downtown Lancaster, and the rural home site areas. It is an area to be protected as it plays an important role in the plans for future development within the Study Area.

B: Business Park Theme

The Business Park Theme area acts as a buffer between the existing residential uses in the East Side neighborhood area and the higher intensity industrial uses around the airport and the existing industrial to the north. The Business Park should be one to three story buildings placed in a well landscaped open space to take advantage of the natural resources in the area (floodplain areas and Ten Mile Creek Preserve). Loading bays should be located to the rear of the buildings ensuring attractive views from public streets.

The Business Park area will be well landscaped and will take advantage of the natural resources of the area.

* Please refer to **LanPort Themes** Map*

C: Natural Theme

The Natural Theme area represents an opportunity that can be expanded into adjacent areas. The creek and floodplain are natural resources that can be incorporated into the site planning of the Business Park. Drainage basins and attractive water bodies can add to the desired open space feel. This area also provides an ideal setting for a walking or biking trail, an amenity that can be used by employees and visitors in the Business Park area as well as some of the higher intensity land use areas around the Business Park.

D: Intensity Theme

The Intensity Theme is the northern part of the sector area where many of the City's industrial uses are currently located. This area is an important employment and economic activity area for the City. The Intensity Theme area builds on the existing land uses in the area and plans for expansion to the vacant parcels in this area of the City. Opportunities to link with the Intermodal Facility exist as well. As this area is adjacent to East Side Acres as well as the Business Park theme area, it is important that their adjacencies ensure the least negative impact on each other. Design guidelines for this area of the City should include new and higher standards of screening, landscaping, signage and lighting standards that will not create any negative impacts on surrounding uses.

Intensity Theme capitalizes on the important industrial activities of the northern part of the sector area, and its connection with the Inter-Modal and other industrial compatible activities.

The LanPort District

Based on all the analysis and recommended theme areas, The **LanPort Distric**t was created. This district consists of three subdistricts based on the themes: the Business Park Subdistrict, the Commerce Subdistrict and the Intensity Subdistrict. The Preservation and Natural Themed areas are not included as subdistricts although these two areas represent valuable natural, cultural and historic resources that should be continued and encouraged. **FIGURE 5 – LANPORT ZONING DISTRICT MAP** illustrates these three new subdistricts and their physical boundaries. This map shows a parcel specific delineation based on of the theme areas of the sub-districts. The LanPort Zoning District and Development Standards, a separate document, describes the permitted uses in each of the Subdistricts, and provides detailed development standards for each Subdistrict.

Transportation

Lancaster's current Thoroughfare Plan shows the functional classifications of streets within the sector area. These roads vary from rural collectors to major arterials. Definitions of these functional classifications can be found in the *City of Lancaster Master Thoroughfare Plan, 2003*. Future roadway networks shall be in accordance with the City's Thoroughfare and appropriate to future developments. The current configuration and capacities of existing streets is not in conflict with desired future developments. As new developments are proposed to the City, the adequacy of existing roadways will need to be determined.

Street Framework, Development Standards and Architectural Controls

Streetscape details within the LanPort District will be subject to the *City of Lancaster Streetscape Plan* and design guidelines of proposed developments. The *LanPort Zoning District and Development Standards* set the minimum required development standards and architectural controls to be followed within the district.

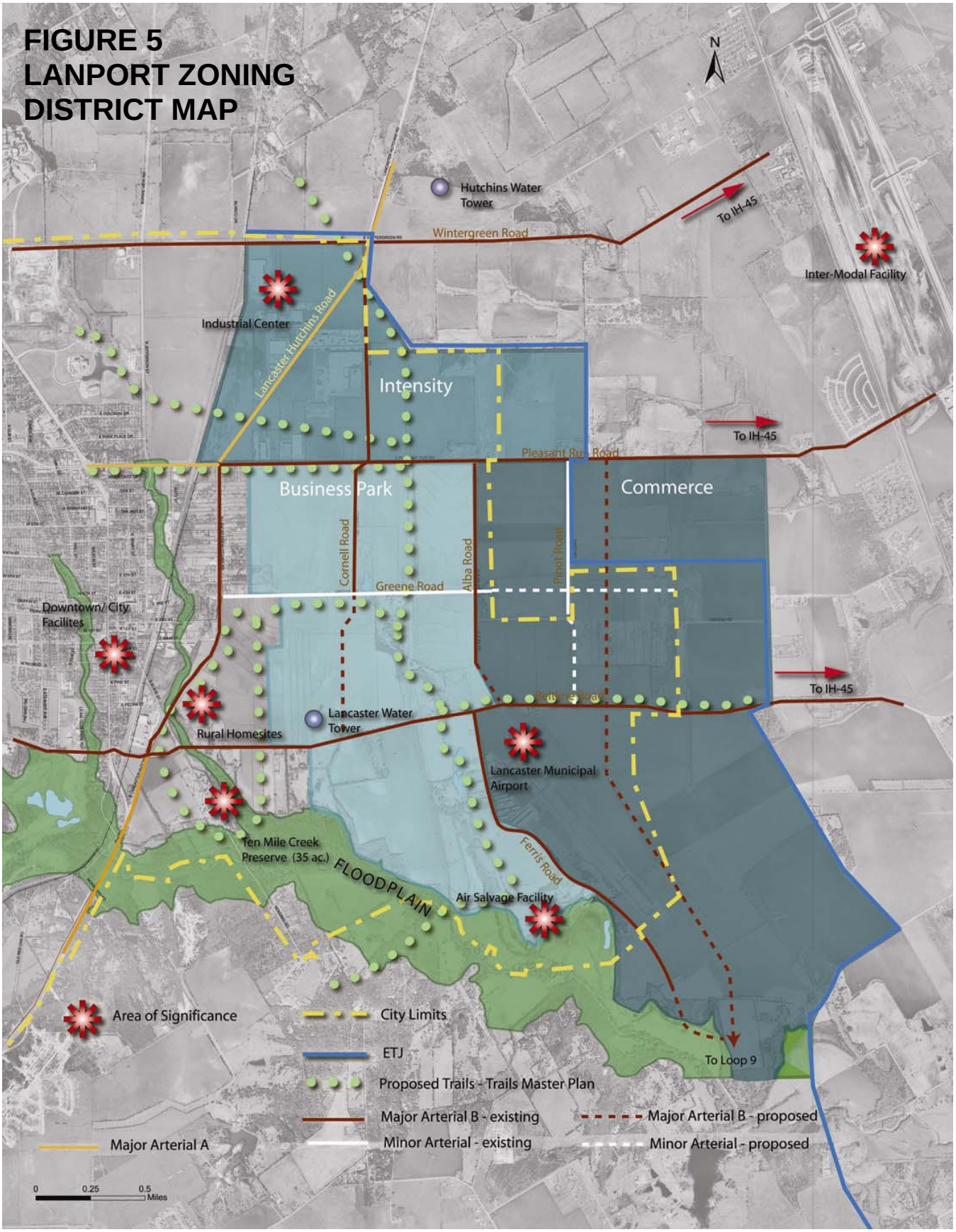


FIGURE 5
LANPORT ZONING
DISTRICT MAP
N
Hutchins Water Tower
Wintergreen Road
To IH-45
Inter-Modal Facility
Industrial Center
Lancaster Hutchins Road
Intensity
To IH-45
Pleasant Run Road
Business Park
Commerce
Cornell Road
Alba Road
Pippit Road
Greene Road
Downtown/ City Facilites
To IH-45
Rural Homesites
Lancaster Water Tower
Lancaster Municipal Airport
Ten Mile Creek Preserve (35 ac.)
FLOODPLAIN
Ferris Road
Air Salvage Facility
Area of Significance
City Limits
ETJ
To Loop 9
Proposed Trails - Trails Master Plan
Major Arterial B - existing
Major Arterial B - proposed
Major Arterial A
Minor Arterial - existing
Minor Arterial - proposed
0
0.25
0.5
Miles

Amendments to the City's Comprehensive Plan and Lancaster Development Code

This Lancaster Airport Sector Plan document is designed to be an update to the City's current Comprehensive Plan. Once the LanPort District and associated subdistricts have been adopted, the *City of Lancaster Comprehensive Plan* and *Lancaster Development Code* will need to be amended. The Lancaster Development Code shall be amended as per *Section 14.1104 – Development Code Amendments* of the *Lancaster Development Code.*

Airport Development Procedure

The growth and expansion of the airport has been documented in the Lancaster Airport Master Plan. This Plan details the future plans for the airport's runway extensions and the expansion of existing facilities. Any future airport developments will need to follow the procedures set by the City and any requirements by the Federal Aviation Administration (FAA) and by Texas Department of Transportation (TXDOT).

The Creation of the LanPort Zoning District

One of Lancaster's greatest assets is its Municipal Airport. Located on over 300 acres in the southwest part of the City, the airport provides aviation services and their associated economic benefits to the City of Lancaster. The airport is surrounded by thousands of acres of developable land, much of which is currently zoned and used as agricultural/open space. The recently completed *Lancaster Airport Master Plan* recommends the extension of the current runway toward the south and the development of the east side of the airport property. The City is entertaining the opportunity for major development of much of the land surrounding the Airport as part of a larger logistics hub planned development. The development, which may eventually encompass over 6,000 acres of land, will include development in Lancaster, Wilmer, Hutchins, Dallas and parts of Dallas County. Lancaster is the ideal candidate to initiate this development as much of the infrastructure and the ability to serve this ambitious endeavor is already in place.

To prepare the City for this upcoming development and ensure that all development and any future development is in line with the desires and vision of the City of Lancaster and its citizens, a new zoning district for the lands surrounding the airport was developed: the **LanPort Zoning District**. The LanPort District is bounded by Lancaster Hutchins Road to the west and by the eastern, northern and southern boundaries of the Extraterritorial Jurisdiction (ETJ).

This district ensures that development around the airport supports its economic growth and takes advantage of development opportunities that exist with the Inter-Modal Facility and other energies around the airport, while being cognizant of the neighborhoods and other economic engines in the eastern sector of the City. Development should not negatively impact any of the surrounding residential, commercial and industrial areas, nor should these existing developments hinder growth of the airport. The current zoning in this area mainly consists of agricultural zoning, limited single family residential, and some light industrial. The LanPort District was thus created to provide development standards that better support the proposed developments, are more restrictive than the current zoning, and that provide better guidelines for appropriate site development.

The different subdistricts contained within the LanPort District help to transition development from the residential areas to the higher intensity uses, while creating an attractive, cohesive and dynamic area of the City. The subdistricts include the Business

Park Subdistrict, the Commerce Subdistrict and the Intensity Subdistrict. Descriptions of each subdistrict and related design standards follow. **FIGURE 1- LANPORT ZONING DISTRICT MAP** shows the LanPort District and the boundaries of each of the Subdistricts. **TABLE 1 – LANPORT USE TABLE** lists permitted uses in each of the LanPort Subdistricts.

FIGURE 1
LANPORT ZONING DISTRICT MAP

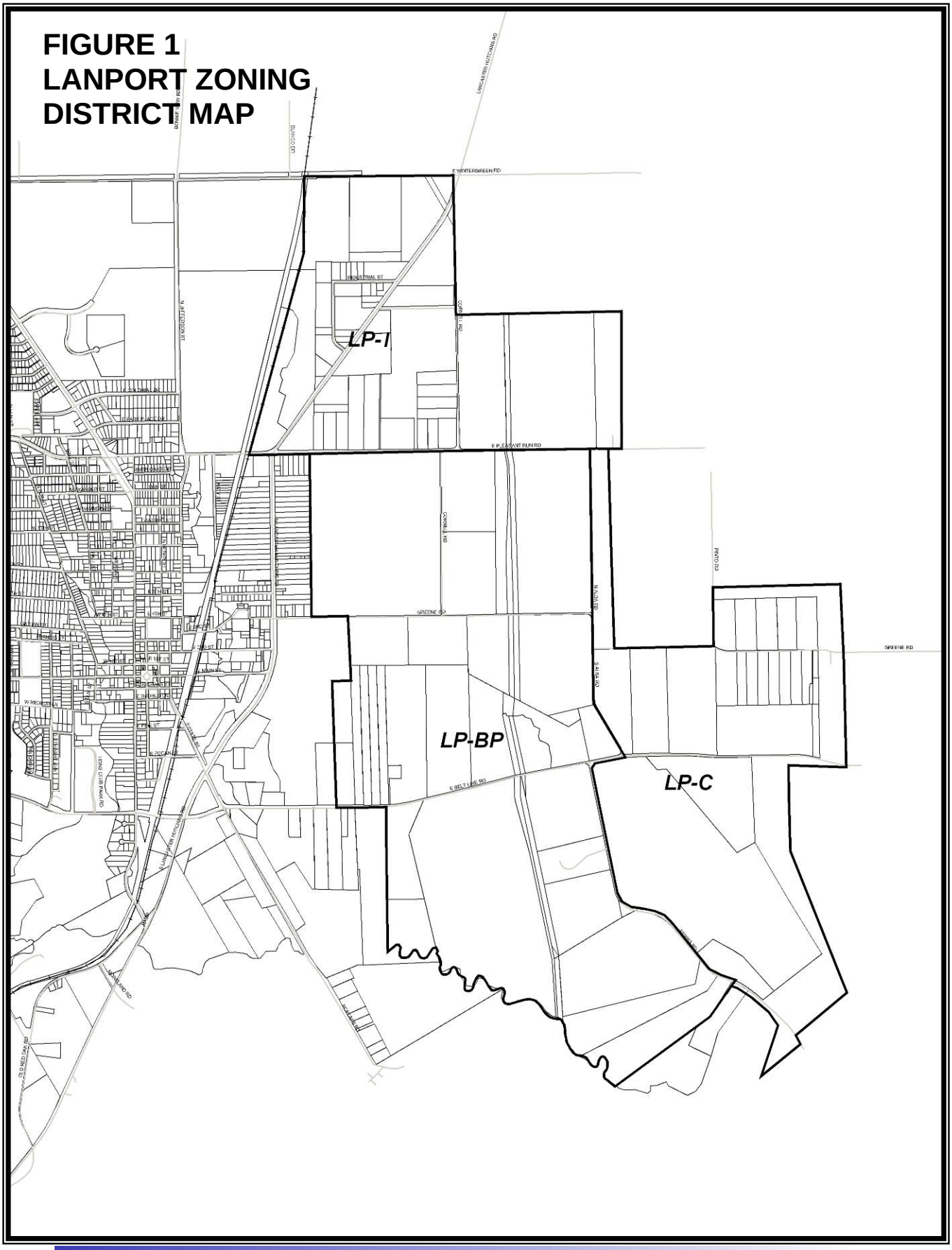


TABLE 1
LANPORT USE TABLE

Permitted Uses	***LanPort Subdistricts***		
	Business Park	**Commerce**	**Intensity**
Rural and Animal Related			
Agricultural Uses on Un-Platted Land	P	P	P
Animal Boarding/ Kennel without Outside Pens	P		
Animal Clinics for small animals, no outdoor pens	P		
Animal Hospital, Clinic	S	P	
Animal Shelter (shelter)		S	S
Wholesale Nursery for Growing of Plants, No Retail Sale on Site	P	P	P
Residential & Lodging	**Business Park**	**Commerce**	**Intensity**
Accessory Building	P	P	P
Bed & Breakfast Operation	S		
Caretakers Quarters/ Domestic or Security Unit	S	S	S
Hotel or Motel	S	S	S
Institutional & Community Service	**Business Park**	**Commerce**	**Intensity**
Assisted Living Facility	S		
Child Care Center	S		
College, University or Seminary	S		
Convalescent Care Facility/ Nursing Home	S		
Day Care (7 or more children)	S		
Emergency Ambulance Services, Ground	S	P	P
Government Facility	P	P	P
Library, Art Gallery or Museum (Public)	P		
Mortuary or Funeral Chapel	S		
Post Office, Local	P		
Post Office, Regional		P	P
Office & Professional	**Business Park**	**Commerce**	**Intensity**
Financial Institution with Drive-Through	S		
Financial Institution without Drive-Through	P		
Office less than 5,000 s.f.	P		
Office 5,000 s.f or more	P	P	P
Recreation, Entertainment & Amusement	**Business Park**	**Commerce**	**Intensity**
Commercial Amusement/ Recreation (Outside)	S	S	S
Community or Recreation Club, Public or Private (Accessory)	S		
Country Club, Private	S		
Health Club	P	P	P
Public Park or Playground	P	P	
Retail & Personal Services	**Business Park**	**Commerce**	**Intensity**
Antique/ Collectible Store	P		
Banquet Facility	P		
Business School	P		
Catering Service	P		

P - Permitted Use by Right
S - Special Use Permit Required
Blank - Not Permitted

TABLE 1
LANPORT USE TABLE

Permitted Uses	***LanPort Subdistricts***		
	Business Park	**Commerce**	**Intensity**
Christmas Tree Sales Lot & Similar Uses, Temporary	S		
Copy Center	P	P	
Garden Supply/ Plant Nursery	P		
Pawn Shop			P
Rental Store, w/o Outside Storage and Display	P		
Restaurant, less than 2000 s.f. w/Drive Through	P		
Restaurant, less than 2000 s.f. w/o Drive Through	P	P	
Restaurant, 2000 s.f. or more, w/ Drive Through	P		
Restaurant, 2000 s.f. or more, w/o Drive Through	P		
Retail store with gasoline product sales limited to 2 fuel dispensers and 4 vehicles	P	P	
Retail store with more than 2 fuel dispensers	P	P	
Secondhand Dealer	P		
Commercial & Business Services	**Business Park**	**Commerce**	**Intensity**
Building & Landscape Material with Outside Storage	P		
Building Maintenance, Service & sales with Outside Storage	S	P	
Feed Store, Ranch Supply	P		
Food Processing	P	P	
Furniture or Cabinet Repair	P		
Furniture Upholstery, Refinishing or Resale	P		
Heavy Machinery & Equipment (Rental, Sales & Service)	P	P	
Locksmith	P		
Machine Shop	P		
Medical or Scientific Research Lab	P	P	
Research and Technology/ Light Assembly	P	P	P
Trade School	P		
Temporary On-site Construction Office	S	S	S
Auto & Marine Related	**Business Park**	**Commerce**	**Intensity**
Auto Repair Garage, Major		P	
Automobile Rental	P	P	
Boat & Trailer Dealership (New and Used)	P	P	
Car wash/ Auto Detail	P	P	
Car Wash, Self Service	P	P	
Recreational Vehicle (RV) Sales and Service		P	
Service Station	S	P	P
Towing Service, No Storage		P	
Truck Rental		P	P
Industrial & Manufacturing	**Business Park**	**Commerce**	**Intensity**
Asphalt or Concrete Batch Plant, Temporary		S	P
Bottle Works, Milk or Soft Drinks		P	P
Brewery, Distillery or Winery (Excluding Brew Pub)_		P	P

P - Permitted Use by Right
S - Special Use Permit Required
Blank - Not Permitted

TABLE 1
LANPORT USE TABLE

Permitted Uses	***LanPort Subdistricts***		
	Business Park	**Commerce**	**Intensity**
Carpet and Rug Cleaning	P		
Food Processing (No Slaughtering)		P	
Light Assembly & fabrication	P	P	P
Manufacturing, Heavy		P	P
Manufacturing, Light	P	P	P
Metal Plating, Electro Plating		P	P
Monument Works, Stone and Metal		P	P
Printing & Publishing	P	P	
Salvage or Reclamation of Products (Indoors)	S	P	P
Salvage or Reclamation of Products (Outdoors)		P	P
Sheet Metal Shop	P		P
Tool, Dye, Gauge and Machine Shop			P
Welding Repair		P	P
Wholesale, Distribution & Storage	**Business Park**	**Commerce**	**Intensity**
Cold Storage Plant	P	P	P
Heavy Construction Trade Yard		P	P
Mini-warehouse	S	P	P
Outside Storage			P
Recycling Collection Center	S	S	P
Warehouse/ Distribution Center	P	P	P
Wholesale Showroom Facility	P	P	P
Utilities, Communications & Transportation	**Business Park**	**Commerce**	**Intensity**
Airport, Heliport or Landing Field	S	S	S
Antenna, Accessory	P		
Antenna, Commercial	P		
Antenna, Dish	P		
Antenna, Commercial, Mounted	P		
Bus Charter Service & Service Facility			P
Helipad	S	S	S
Utilities (Non-Municipally owned or controlled), including Sanitary Landfill, Water Treatment, and Supply and Wastewater Treatment	P	P	P
Municipally Owned or Controlled Facilities, Utilities and Uses	P	P	P
Private Streets	P	P	P
Railroad Yard or Shop	P	P	P
Recording Studio	P		P
Satellite Dish	P	P	P
Transit Passenger Facility	P	P	P
Utilities Holding a Franchise from city of Lancaster	S	P	P
Utility Installation, Other than Listed	S	P	P
Utility/ Transmission Lines	P	P	P
Wireless Communication Tower	S	S	S

P - Permitted Use by Right
S - Special Use Permit Required
Blank - Not Permitted

LanPort Business Park (LP-BP)

Purpose:

The LanPort Business Park Subdistrict is designed to provide a buffer area between the residential and commercial/ light industrial uses along Lancaster Hutchins Road and the more intense uses further east of the district in a heavily landscaped, open space setting. Business activities should be compatible with and/or provide ancillary services to the airport, Intermodal facilities, and uses that meet the intent of the subdistrict. Drainageways, floodplains and utility easements should be used to create ponds and water features that function as attractive amenities to the area, but also provide areas for water retention and detention that can provide workers and visitors with ponds, seating, landscaping, and trails.

As the transition between the onsite and surrounding airport activities and the activities closer the Lancaster's downtown, loading docks and truck bays should be located away from the street frontage and perimeter areas adjacent to the uses along Lancaster Hutchins Road. This area provides an attractive location for a variety of businesses and a positive "first impression" of the City for business travelers leaving the airport along Belt Line Road toward Lancaster's original downtown.

1. Permitted Uses:

In general, lots in the Business Park Subdistrict shall be used for office, retail, commercial, and limited light industrial and manufacturing without outdoor storage. The permitted uses and special uses in the Business Park Subdistrict are listed in **TABLE 1-LANPORT PERMITTED USES** preceding the Subdistrict descriptions.

2. Building Placement:

Buildings in the Business Park Subdistrict shall be located on the site in a manner that best takes advantage of the natural topography and vegetation of the area in a park-like environment, open, well landscaped, and following the topography.

a. Building Setbacks – To create the park style environment of the Business Park Subdistrict, there will be minimum build-to line established that will allow for minimum landscaping requirements and the open feel.

> Front yard: Minimum fifty (50) feet from interior public or private street. From major streets and service roads, the front yard shall be one hundred (100) feet.

Rear yard: Minimum fifty (50) feet when adjacent to other office buildings and one (1) additional foot for every two feet in height above 30 feet when within 100 feet of a residential development.

Side yard: Minimum twenty-five (25) feet and one (1) additional foot for every two feet in height above 30 feet when within 100 feet of a residential development.

b. Development Street Frontage – To allow for some differentiation, but a similar and uniform street front, a minimum of 80 (eighty) percent of the total building frontage shall be built on the build-to lines as described above. The remaining 20 (twenty) percent may be set back further.

c. Setback encroachments: Any building feature or architectural attachment to the primary building façade may encroach up to five (5) feet from the building face into the setback area. These features include, but are not limited to, the following:

- Awnings
- Canopies
- Mounted signs
- Planters
- Porches

3. Site Controls:

a. Lot Coverage: Building coverage on any lot or tract shall not exceed fifty percent (50%). Building coverage shall be determined by dividing the area of a lot which is occupied by the total horizontal projected surface of all buildings, but not including roof overhangs or projections, by the gross area of the lot.

b: Impervious Coverage: Impervious coverage on any lot or tract shall not exceed eighty percent (80%). The ground coverage shall be determined by dividing the area of a lot that is occupied by an impervious surface by the gross area of the lot. Impervious surface shall include any material that substantially prevents the infiltration of storm water into previously undeveloped land, including driveways, parking areas, loading areas and sidewalks, but excluding buildings and accessory buildings. The remainder of the lot shall be maintained as landscaped open space in accordance with the landscape requirements.

c. Site Massing and FAR: Massing shall be consistent in the Business Park Subdistrict, with Floor Area Ratio shall be a maximum of 2.0.

d. Height: Buildings in the Business Park Subdistrict shall not be more than three (3) stories or forty-five (45) feet when adjacent to a residential district and shall be subject to the height restrictions of the currently adopted Airport Master Plan. See **FIGURE 2 – HEIGHT RESTRICTIONS** and **FIGURE 3 –RUNWAY CLEAR ZONE** of the Appendix for more details.

4. Exterior Appearance

a. Façade Materials: One hundred percent (100%) of each exterior wall facing a public street shall be finished with brick, stone, synthetic stone, stucco, EIFS (Exterior Insulation and Finish Systems), architectural CMU (Concrete Masonry Unit), architecturally finished concrete tilt-wall construction, or architectural metal panels. In general, metal cladding shall not be permitted except for cladding that meets ASTM standards.

b. Transparency: A minimum of forty percent (40%) of the façade may be made up of glass.

c. Articulation: Facades which face streets shall meet the following minimum standards for articulation:

i. Horizontal Articulation. No building wall shall extend for a distance equal to 4 times the wall's height without having an off-set of a minimum of 10% of the wall's height, and that new plane shall extend for a distance equal to at least 15% of the maximum length of the first plane.

ii. Vertical Articulation. No horizontal wall shall extend for a distance greater than 4 times the height of the wall without changing height by a minimum of 15% of the wall's height.

5. Exterior Illumination

All lighting shall be designed and arranged to meet the following requirements:

a. The source of light shall not be visible from, nor a glare produced upon any adjoining residential zoned property.

b. Illumination shall be directed downward or on to buildings, signs, landscaping, sidewalks, walkways or parking areas.

6. Parking

Parking requirements for the Business Park Subdistrict shall conform to Article 14.600 of the Lancaster Development Code.

7. Off Street Loading

All off-street loading in the Business Park Subdistrict shall be toward the rear of the building or on the side, to minimize visibility from major streets or residential areas. Where the building is adjacent to a residential use, the loading docs shall not be in the immediate adjacent area.

a. For retail, commercial, sales, service, or industrial use buildings and establishments, off-street loading facilities shall be provided in accordance with the following schedule:

Square Feet of Gross Floor Area	Minimum Required Spaces or Berths
0 to 5,000	None
5,001 to 15,000	1
15,001 to 40,000	2
41,001 to 65,000	3
65,001 to 100,000	4
Each additional 100,000	1 additional

b. Each required loading space shall meet the following minimum size requirements:

   i. Twelve feet (12') by sixty feet (60') for industrial or warehouse uses.

   ii. Twelve feet (12') by thirty-five feet (35') for commercial and institutional uses.

   iii. Fourteen feet (14') minimum vertical clearance.

c. Distance from property lines.

   i. Any loading dock or structure facing any street shall be a minimum of two hundred feet (200') from the right-of-way line.

   ii. All loading facilities shall either

      a) be set back a minimum distance of fifty feet (50') from any front property line or from any adjacent residential use or district, and there shall be no minimum setback if the subject property abuts a commercial use or lot line, or

      b) be set back a minimum distance of seventy five feet (75') from any front property line or from any adjacent residential use or district, and there shall be no minimum setback if the property abuts a commercial

use or lot line. If adjacent to a residential district or use, the loading dock shall be screened as follows:

i. An eight foot (8') masonry wall atop a three foot (3') berm shall be required.

ii. Evergreen trees shall be planted 20' on center screening the loading dock from any adjoining residential use or district.

iii. The wall, evergreen trees, and berm shall be located in a twenty foot (20') wide landscape strip.

c) All loading spaces not associated with a loading dock or structure shall be set back a minimum distance of fifty feet (50') from any front property line or adjacent residential use or district, and there shall be no minimum setback if the subject property abuts a commercial use or lot line.

d. Noise: Loading docks that are within 400 feet of a residential district shall be equipped with noise attenuation devices and screened from view of adjacent residential lots.

e. Service and equipment areas

i. All service areas in the Business Park Subdistrict shall be placed toward the rear of the building or on the side, to minimize visibility from major streets or residential areas. Where the building is adjacent to a residential use, the service areas shall not be in the immediate adjacent area.

ii. All service area screening shall be roof mounted equipment.

8. Screening Requirements

a. Screening device: A screening device shall be erected or placed in all locations and in accordance with all provisions specified below:

i. A screening device required under this section shall meet the following minimum requirements:

a) . Minimum height of screening device:

i. Garbage, trash or refuse container screening: 7'0"

ii. Screening of outdoor storage: 7'0"

iii. All other required screening: 6'0"

b) 2. Maximum height of screening device: 10’0”

c) 3. Materials:

i. Brick masonry, stone masonry, or other architectural masonry finish, or,

ii. Tubular steel (primed and painted) or wrought iron fence with masonry columns spaced a maximum of twenty feet (20’) on center with structural supports spaced every ten feet (10’), and with sufficient evergreen landscaping to create a screening effect, or,

iii. Living plant screen, or,

iv. Alternate equivalent screening

9. Lighting and Glare Regulations

Lighting and Glare regulations are necessary to reduce the annoyance and inconvenience to property owners and traffic hazards to motorists. This allows for reasonable enjoyment of adjacent and nearby property by their owners and occupants while requiring adequate levels of lighting of parking areas.

a. Site lighting and glare standards for all sites, excluding single family residential and two-family residential.

i. All uses shall be constructed and operated so as not to produce obnoxious and intense glare or direct illumination across the bounding property line from a visible source of illumination or reflective surface of such intensity as to create a nuisance or detract from the use or enjoyment of adjacent property. The allowable maximum intensity measured at the property line of a residential use in a residential district shall be 0.25 foot candles.

ii. All off-street parking areas for nonresidential uses in nonresidential districts which are used after dark shall be illuminated during the period beginning not later than one-half hour after sunset and continuing at least throughout the hours of business operation. Lighting within uncovered parking areas shall meet the following minimum requirements and maximum limits. Limits for covered parking shall be as specified on an approved site plan.

a) Illuminance.

i. In parking areas used by the public after dark, minimum at any point on the parking area surface to be at least 0.6 foot candles initial, and at least 0.3 foot candles maintained or one-third of the average, whichever is greater. In areas used by employees, members of an organization and like persons, minimum at any point on the parking area surface to be at least 0.2 foot candles initial.

ii. Illumination shall not exceed an average of one foot candle at ground level and shall distribute not more than 0.25 foot candles of light upon any adjacent residentially zoned area.

b) Height.

i. On tracts or lots over three (3) acres in size, the maximum height for poles with lights is 30 feet.

ii. On tracts or lots less than three (3) acres, the maximum height of poles with lights is 20 feet.

iii. Special lighting or lighting higher than 30 feet may be approved as specifically noted on a site plan.

c) Color rendition. The quality of the light source shall be a minimum of 55 CRI (color reading index) as indicated by the lamp manufacturing.

b. Luminaries. Light sources shall be of a down-light type and/or indirect, diffused, or shielded type luminaries installed and maintained so as to reduce glare effect and consequent interference with use of adjacent properties and boundary streets. Bare bulbs above 75 watts and strings of lamps are prohibited except for temporary lighting as provided below.

c. Special or temporary lighting: Low wattage. Bare bulbs or strings of lamps are prohibited, except during holidays, when special lighting shall be permitted for a maximum time period of 45 days for each holiday used.

10. Landscaping

Landscaping requirements for the Business Park Subdistrict shall conform to Article 14.800 of the Lancaster Development Code.

11. Sign Standards

Sign standards for the Business Park Subdistrict shall comply with those of Article 14.1200 of the Lancaster Development code.

12. Streetscape

Streetscape standards for the Business Park Subdistrict shall conform to the requirements set by the Lancaster Streetscape Plan.

13. Utilities

All utilities shall be placed underground except for transmission lines.

LanPort Commerce Subdistrict (LP-C)

Purpose:

The Commerce Subdistrict derives its requirements from the Light Industrial district as described in the *Lancaster Development Code*. Because this Subdistrict surrounds the Lancaster Airport, the uses are a combination of airport-dependent and freight uses. Given the location of the airport and its economic potential for area, and with respect to the Intermodal Facility, there are opportunities to expand on airport and related uses. As an entry point/gateway to the area, additional landscaping requirements and development standards and guidelines are recommended to better create the transition from Business Park Subdistrict to the airport.

1. Permitted Uses:

In general, the Commerce Subdistrict lots will be for airport and Intermodal compatible uses. These include mostly light industrial, manufacturing, wholesale, distribution and storage uses with some very limited retail uses. Specific uses permitted in the Commerce Subdistrict are listed in **TABLE 1-LANPORT PERMITTED USES** preceding the Subdistrict descriptions.

2. Building Placement:

Buildings in the Commerce Subdistrict shall be located on the site in a manner that best takes advantage of access and circulation while ensuring attractive views along major streets.

a. Building Setbacks – Minimum setback requirements for the Commerce Subdistrict are as follows:

> Front yard: Minimum twenty-five (25) feet from interior public or private street. From major streets and service roads, the front yard shall be one hundred (100) feet.
>
> Rear yard: Minimum twenty (20) feet when adjacent to other office buildings and one (1) additional foot for every two feet in height above 30 feet when within 100 feet of a residential development.
>
> Side yard: Minimum twenty- (20) feet and one (1) additional foot for every two feet in height above 30 feet when within 100 feet of a residential development.

b. Development Street Frontage – To allow for some differentiation, but a similar and uniform street front, a minimum of 80 (eighty) percent of the total building frontage shall

be built on the build-to lines as described above. The remaining 20 (twenty) percent may be set back further.

c. Setback encroachments: Any building feature or architectural attachment to the primary building façade may encroach up to five (5) feet from the building face into the setback area. These features include, but are not limited to, the following:

- Mounted signs
- Pilasters
- Planters

3. Site Controls:

a. Lot coverage: Building coverage on any lot or tract shall not exceed fifty percent (50%). Building coverage shall be determined by dividing the area of a lot which is occupied by the total horizontal projected surface of all buildings, but not including roof overhangs or projections, by the gross area of the lot.

b: Impervious Coverage: Impervious coverage on any lot or tract shall not exceed eighty percent (80%). The ground coverage shall be determined by dividing the area of a lot that is occupied by an impervious surface by the gross area of the lot. Impervious surface shall include any material that substantially prevents the infiltration of storm water into previously undeveloped land, including driveways, parking areas, loading areas and sidewalks, but excluding buildings and accessory buildings. The remainder of the lot shall be maintained as landscaped open space in accordance with the landscape requirements.

c. Site massing and FAR: Massing shall be consistent in the Commerce Subdistrict, with Floor Area Ratio shall be a maximum of 1.0.

d. Height Restrictions: Buildings in the Commerce Subdistrict shall not be more than four (4) stories or sixty-four (64) feet when adjacent to a residential district and shall be subject to the height restrictions of the currently adopted Airport Master Plan. See **FIGURE 2 – HEIGHT RESTRICTIONS** and **FIGURE 3 –RUNWAY CLEAR ZONE** of the Appendices for more details.

4. Exterior Appearance

a. Façade Materials: One hundred percent (100%) of each exterior wall facing a public street shall be finished with brick, stone, synthetic stone, stucco, EIFS (Exterior Insulation and Finish Systems), architectural CMU (Concrete Masonry Unit),

architecturally finished concrete tilt-wall construction, or architectural metal panels. . In general, metal cladding shall not be permitted except for cladding that meets ASTM standards.

b. Transparency: A minimum of thirty percent (30%) of the façade may be made up of glass.

c. Articulation: Facades which face streets shall meet the following minimum standards for articulation:

iii. Horizontal Articulation. No building wall shall extend for a distance equal to 4 times the wall's height without having an off-set of a minimum of 10% of the wall's height, and that new plane shall extend for a distance equal to at least 15% of the maximum length of the first plane.

iv. Vertical Articulation. No horizontal wall shall extend for a distance greater than 4 times the height of the wall without changing height by a minimum of 15% of the wall's height.

5. Exterior Illumination

All lighting shall be designed and arranged to meet the following requirements:

a. The source of light shall not be visible from, nor a glare produced upon any adjoining residential zoned property.

b. Illumination shall be directed downward or on to buildings, signs, landscaping, sidewalks, walkways or parking areas, and shall in no way affect airport operations.

6. Parking

Parking requirements for the Business Park Subdistrict shall conform to Article 14.600 of the Lancaster Development Code.

7. Off Street Loading:

All off-street loading in the Commerce Subdistrict shall be toward the rear of the building or on the side, to minimize visibility from major streets or residential areas. Where the building is adjacent to a residential use, the loading docs shall not be in the immediate adjacent area

a. For retail, commercial, sales, service, or industrial use buildings and establishments, off-street loading facilities shall be provided in accordance with the following schedule:

Square Feet of Gross Floor Area	Minimum Required Spaces or Berths
0 to 5,000	None
5,001 to 15,000	1
15,001 to 40,000	2
41,001 to 65,000	3
65,001 to 100,000	4
Each additional 100,000	1 additional

b. Each required loading space shall meet the following minimum size requirements:

i. Twelve feet (12') by sixty feet (60') for industrial or warehouse uses.

ii. Twelve feet (12') by thirty-five feet (35') for commercial and institutional uses.

iii. Fourteen feet (14') minimum vertical clearance.

c. Distance from property lines.

i. Any loading dock or structure facing any street shall be a minimum of two hundred feet (200') from the right-of-way line.

ii. All loading facilities shall either

a) be set back a minimum distance of fifty feet (50') from any front property line or from any adjacent residential use or district, and there shall be no minimum setback if the subject property abuts a commercial use or lot line, or

b) be set back a minimum distance of seventy five feet (75') from any front property line or from any adjacent residential use or district, and there shall be no minimum setback if the property abuts a commercial use or lot line. If adjacent to a residential district or use, the loading dock shall be screened as follows:

i. An eight foot (8') masonry wall atop a three foot (3') berm shall be required.

ii. Evergreen trees shall be planted 20' on center screening the loading dock from any adjoining residential use or district.

iii. The wall, evergreen trees, and berm shall be located in a twenty foot (20') wide landscape strip.

c) All loading spaces not associated with a loading dock or structure shall

i. be set back a minimum distance of fifty feet (50') from any front property line or adjacent residential use or district, and there shall be no minimum setback if the subject property abuts a commercial use or lot line.

d. Noise: Loading docks that are within 400 feet of a residential district shall be equipped with noise attenuation devices and screened from view of adjacent residential lots.

e. Service and equipment areas

iii. All service areas in the Business Park Subdistrict shall be placed toward the rear of the building or on the side, to minimize visibility from major streets or residential areas. Where the building is adjacent to a residential use, the service areas shall not be in the immediate adjacent area.

iv. All service area screening shall be roof mounted equipment.

8. Screening Requirements

a. Screening device: A screening device shall be erected or placed in all locations and in accordance with all provisions specified below:

ii. A screening device required under this section shall meet the following minimum requirements:

d) . Minimum height of screening device:

i. Garbage, trash or refuse container screening: 7'0"

ii. Screening of outdoor storage: 7'0"

iii. All other required screening: 6'0"

e) 2. Maximum height of screening device: 10'0"

f) 3. Materials:

v. Brick masonry, stone masonry, or other architectural masonry finish, or,

vi. Tubular steel (primed and painted) or wrought iron fence with masonry columns spaced a maximum of twenty feet (20') on center with structural supports spaced every ten

feet (10'), and with sufficient evergreen landscaping to create a screening effect, or,

vii. Living plant screen, or,

viii. Alternate equivalent screening

9. Lighting and Glare Regulations:

Lighting and Glare regulations are necessary to reduce the annoyance and inconvenience to property owners and traffic hazards to motorists. This allows for reasonable enjoyment of adjacent and nearby property by their owners and occupants while requiring adequate levels of lighting of parking areas.

a. Site lighting and glare standards for all sites, excluding single family residential and two-family residential.

i. All uses shall be constructed and operated so as not to produce obnoxious and intense glare or direct illumination across the bounding property line from a visible source of illumination or reflective surface of such intensity as to create a nuisance or detract from the use or enjoyment of adjacent property. The allowable maximum intensity measured at the property line of a residential use in a residential district shall be 0.25 foot candles.

ii. All off-street parking areas for nonresidential uses in nonresidential districts which are used after dark shall be illuminated during the period beginning not later than one-half hour after sunset and continuing at least throughout the hours of business operation. Lighting within uncovered parking areas shall meet the following minimum requirements and maximum limits. Limits for covered parking shall be as specified on an approved site plan.

a) Illuminance.

i. In parking areas used by the public after dark, minimum at any point on the parking area surface to be at least 0.6 foot candles initial, and at least 0.3 foot candles maintained or one-third of the average, whichever is greater. In areas used by employees, members of an organization and like persons, minimum at any point on the parking area surface to be at least 0.2 foot candles initial.

ii. Illumination shall not exceed an average of one foot candle at ground level and shall distribute not more than 0.25 foot

candles of light upon any adjacent residentially zoned area.

b) Height.

i. On tracts or lots over three (3) acres in size, the maximum height for poles with lights is 30 feet.

ii. On tracts or lots less than three (3) acres, the maximum height of poles with lights is 20 feet.

iii. Special lighting or lighting higher than 30 feet may be approved as specifically noted on a site plan.

c) Color rendition. The quality of the light source shall be a minimum of 55 CRI (color reading index) as indicated by the lamp manufacturing.

b. Luminaries. Light sources shall be of a down-light type and/or indirect, diffused, or shielded type luminaries installed and maintained so as to reduce glare effect and consequent interference with use of the airport or adjacent properties and boundary streets. Bare bulbs above 75 watts and strings of lamps are prohibited except for temporary lighting as provided below.

c. Special or temporary lighting: Low wattage. Bare bulbs or strings of lamps are prohibited, except during holidays, when special lighting shall be permitted for a maximum time period of 45 days for each holiday used.

10. Landscaping

Landscaping requirements for the Commerce Subdistrict shall conform to Article 14.800 of the Lancaster Development Code.

11. Sign Standards

Sign standards for the Commerce Subdistrict shall comply with those of Article 14.1200 of the Lancaster Development code.

12. Streetscape

Streetscape standards for the Commerce Subdistrict shall conform to the requirements set by the Lancaster Streetscape Plan.

13. Utilities

All utilities shall be placed underground except for transmission lines.

LanPort Intensity Subdistrict (LP-I)

Purpose:

The Intensity Subdistrict is similar to the Light (and to some extent, the Medium) Industrial district of the *Lancaster Development Code*; however it includes more heavy freight related industries or activities. This area already includes industrial and manufacturing activities east of Lancaster Hutchins Road and north of Pleasant Run to the city limits. This area is directly tied to the Intermodal Facility to the east so height and setback restrictions may be less restrictive than in the other two districts. Landscaping and development standards will still be required, but the attention will be more on the functionality of the area to carry out the desired uses and to accommodate the movement of vehicles and materials to and from the Intermodal Facility.

1. Permitted Uses:

Uses in the Intensity Subdistrict are intended to be compatible with the Intermodal facility. These primarily include industrial, manufacturing, wholesale, and distribution. Specific uses permitted in the Intensity Subdistrict are listed in **TABLE 1-LANPORT PERMITTED USES** preceding the Subdistrict descriptions.

2. Building Placement:

Buildings in the Intensity Subdistrict will be located on the site in a manner that best takes advantage of access and circulation while ensuring attractive lots.

a. Building Setbacks – To create the campus style environment of the Intensity Subdistrict, there will be minimum build-to line established that will allow for minimum landscaping requirements and the open feel.

> Front yard: Minimum twenty five (25) feet from interior public or private street. From major streets and service roads, the front yard shall be one hundred (100) feet.
>
> Rear yard: Minimum twenty (20) feet when adjacent to other office buildings and one (1) additional foot for every two feet in height above 30 feet when within 100 feet of a residential development.
>
> Side yard: Minimum twenty (20) feet and one (1) additional foot for every two feet in height above 30 feet when within 100 feet of a residential development.

b. Development Street Frontage – To allow for some differentiation, but a similar and uniform street front, a minimum of 80 (eighty) percent of the total building frontage shall

be built on the build-to lines as described above. The remaining 20 (twenty) percent may be set back further.

c. Setback encroachments: Any building feature or architectural attachment to the primary building façade may encroach up to five (5) feet from the building face into the setback area. These features include, but are not limited to, the following:

- Mounted signs
- Pilasters
- Planters

3. Site Controls:

a. Lot Coverage: Building coverage on any lot or tract shall not exceed seventy percent (70%). Building coverage shall be determined by dividing the area of a lot which is occupied by the total horizontal projected surface of all buildings, but not including roof overhangs or projections, by the gross area of the lot.

b: Ground coverage: Ground coverage on any lot or tract shall not exceed eighty percent (80%). The ground coverage shall be determined by dividing the area of a lot that is occupied by an impervious surface by the gross area of the lot. Impervious surface shall include any material that substantially prevents the infiltration of storm water into previously undeveloped land, including driveways, parking areas, loading areas and sidewalks, but excluding buildings and accessory buildings. The remainder of the lot shall be maintained as landscaped open space in accordance with the landscape requirements.

c. Site Massing and FAR: Massing shall be fairly consistent in the Intensity Subdistrict, with Floor Area Ratio shall be a maximum of 1.0.

d. Height Restrictions: Buildings in the Intensity Subdistrict shall not be more than four (4) stories or sixty-four (64) feet when adjacent to a residential district and shall be subject to the height restrictions of the currently adopted Airport Master Plan. See **FIGURE 2 – HEIGHT RESTRICTIONS** and **FIGURE 3 –RUNWAY CLEAR ZONE** of the Appendix for more details.

4. Exterior Appearance

a. Façade Materials: One hundred percent (100%) of each exterior wall facing a public street shall be finished with brick, stone, synthetic stone, stucco, EIFS (Exterior Insulation and Finish Systems), architectural CMU (Concrete Masonry Unit),

architecturally finished concrete tilt-wall construction, or architectural metal panels. . In general, metal cladding shall not be permitted except for cladding that meets ASTM standards.

b. Transparency: A minimum of twenty percent (20%) of the façade may be made up of glass

c. Articulation: Facades which face streets shall meet the following minimum standards for articulation:

i. Horizontal Articulation. No building wall shall extend for a distance equal to 4 times the wall's height without having an off-set of a minimum of 5% of the wall's height, and that new plane shall extend for a distance equal to at least 10% of the maximum length of the first plane.

ii. Vertical Articulation. No horizontal wall shall extend for a distance greater than 4 times the height of the wall without changing height by a minimum of 10% of the wall's height.

5. Exterior Illumination

All lighting shall be designed and arranged to meet the following requirements:

a. The source of light shall not be visible from, nor a glare produced upon any adjoining residential zoned property.

b. Illumination shall be directed downward or on to buildings, signs, landscaping, sidewalks, walkways or parking areas.

6. Parking

Parking requirements for the Business Park Subdistrict shall conform to Article 14.600 of the Lancaster Development Code.

7. Off Street Loading:

All off-street loading in the Intensity Subdistrict shall be toward the rear of the building or side, so long as loading bays are not visible from major streets.

a. For retail, commercial, sales, service, or industrial use buildings and establishments, off-street loading facilities shall be provided in accordance with the following schedule:

Square Feet of Gross Floor Area	Minimum Required Spaces or Berths
0 to 5,000	None
5,001 to 15,000	1
15,001 to 40,000	2
41,001 to 65,000	3
65,001 to 100,000	4
Each additional 100,000	1 additional

b. Each required loading space shall meet the following minimum size requirements:

iv. Twelve feet (12') by sixty feet (60') for industrial or warehouse uses.

v. Twelve feet (12') by thirty-five feet (35') for commercial and institutional uses.

vi. Fourteen feet (14') minimum vertical clearance.

c. Distance from property lines.

i. Any loading dock or structure facing any street shall be a minimum of two hundred feet (200') from the right-of-way line.

ii. All loading facilities shall either

a) be set back a minimum distance of fifty feet (50') from any front property line or from any adjacent residential use or district, and there shall be no minimum setback if the subject property abuts a commercial use or lot line, or

b) be set back a minimum distance of seventy five feet (75') from any front property line or from any adjacent residential use or district, and there shall be no minimum setback if the property abuts a commercial use or lot line. If adjacent to a residential district or use, the loading dock shall be screened as follows:

i An eight foot (8') masonry wall atop a three foot (3') berm shall be required.

ii Evergreen trees shall be planted 20' on center screening the loading dock from any adjoining residential use or district.

iii The wall, evergreen trees, and berm shall be located in a twenty foot (20') wide landscape strip.

c) All loading spaces not associated with a loading dock or structure shall be set back a minimum distance of fifty feet (50') from any front property line or adjacent residential use or district, and there shall be no minimum setback if the subject property abuts a commercial use or lot line.

d. Noise: Loading docks that are within 400 feet of a residential district shall be equipped with noise attenuation devices and screened from view of adjacent residential lots.

e. Service and equipment areas

v. All service areas in the Business Park Subdistrict shall be placed toward the rear of the building or on the side, to minimize visibility from major streets or residential areas. Where the building is adjacent to a residential use, the service areas shall not be in the immediate adjacent area.

vi. All service area screening shall be roof mounted equipment.

8. Screening Requirements:

a. Fence or wall.

b. Screening device. A screening device shall be erected or placed in all locations and in accordance with all provisions specified below:

i. A screening device required under this section shall meet the following minimum requirements:

a) . Minimum height of screening device:

i. Garbage, trash or refuse container screening: 7'0"

ii. Screening of outdoor storage: 7'0"

iii. All other required screening: 6'0"

b) Maximum height of screening device: 10'0"

c) Materials:

i. Brick masonry, stone masonry, or other architectural masonry finish, or,

ii. Tubular steel (primed and painted) or wrought iron fence with masonry columns spaced a maximum of twenty feet (20') on center with structural supports spaced every ten feet (10'), and

with sufficient evergreen landscaping to create a screening effect, or,

iii. Living plant screen, or,

iv. Alternate equivalent screening

9. Lighting and Glare Regulations:

Lighting and Glare regulations are necessary to reduce the annoyance and inconvenience to property owners and traffic hazards to motorists. This allows for reasonable enjoyment of adjacent and nearby property by their owners and occupants while requiring adequate levels of lighting of parking areas.

a. Site lighting and glare standards for all sites, excluding single family residential and two-family residential.

i. All uses shall be constructed and operated so as not to produce obnoxious and intense glare or direct illumination across the bounding property line from a visible source of illumination or reflective surface of such intensity as to create a nuisance or detract from the use or enjoyment of adjacent property. The allowable maximum intensity measured at the property line of a residential use in a residential district shall be 0.25 foot candles.

ii. All off-street parking areas for nonresidential uses in nonresidential districts which are used after dark shall be illuminated during the period beginning not later than one-half hour after sunset and continuing at least throughout the hours of business operation. Lighting within uncovered parking areas shall meet the following minimum requirements and maximum limits. Limits for covered parking shall be as specified on an approved site plan.

a) Illuminance.

i. In parking areas used by the public after dark, minimum at any point on the parking area surface to be at least 0.6 foot candles initial, and at least 0.3 foot candles maintained or one-third of the average, whichever is greater. In areas used by employees, members of an organization and like persons, minimum at any point on the parking area surface to be at least 0.2 foot candles initial.

ii. Illumination shall not exceed an average of one foot candle at ground level and shall distribute not more than 0.25 foot

candles of light upon any adjacent residentially zoned area.

b) Height.

i. On tracts or lots over three (3) acres in size, the maximum height for poles with lights is 30 feet.

ii. On tracts or lots less than three (3) acres, the maximum height of poles with lights is 20 feet.

iii. Special lighting or lighting higher than 30 feet may be approved as specifically noted on a site plan.

c) Color rendition. The quality of the light source shall be a minimum of 55 CRI (color reading index) as indicated by the lamp manufacturing.

b. Luminaries. Light sources shall be of a down-light type and/or indirect, diffused, or shielded type luminaries installed and maintained so as to reduce glare effect and consequent interference with use of adjacent properties and boundary streets. Bare bulbs above 75 watts and strings of lamps are prohibited except for temporary lighting as provided below.

c. Special or temporary lighting: Low wattage. Bare bulbs or strings of lamps are prohibited, except during holidays, when special lighting shall be permitted for a maximum time period of 45 days for each holiday used.

10. Landscaping

Landscaping requirements for the Intensity Subdistrict shall conform to Section Article 14.800 of the Lancaster Development Code.

11. Sign Standards

Sign standards for the Intensity Subdistrict shall comply with those of Article 14.1200 of the Lancaster Development code.

12. Streetscape

Streetscape standards for the Intensity Subdistrict shall conform to the requirements set by the Lancaster Streetscape Plan.

13. Utilities

All utilities shall be placed underground except for transmission lines.

APPENDICES

FIGURE 2 – HEIGHT RESTRICTIONS

FIGURE 3 – RUNWAY CLEAR ZONES

FIGURE 2 – HEIGHT RESTRICTIONS

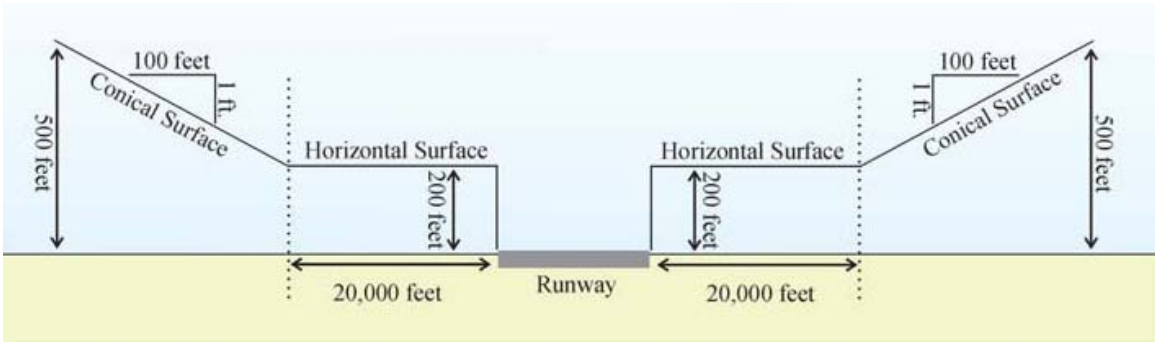
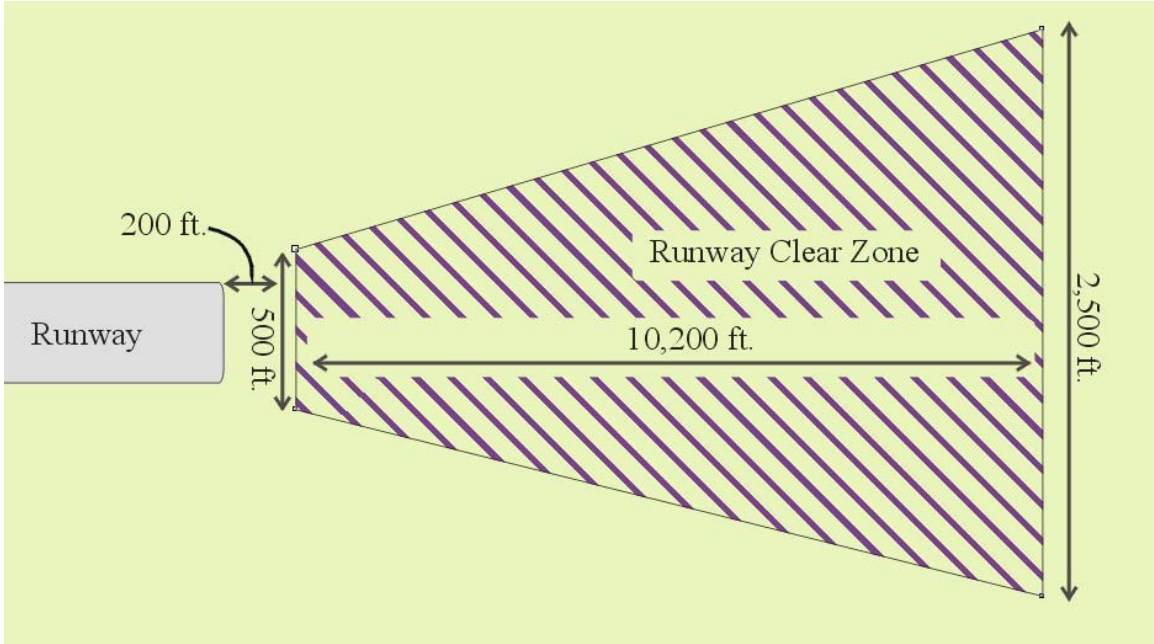


FIGURE 3 – RUNWAY CLEAR ZONE



ENGINEERS
PLANNERS
ECONOMISTS

WilburSmith
ASSOCIATES

APPENDIX E

REFERENCE MATERIALS

Lancaster Airport Master Plan Update
Adopted: 2006
Developed by GRW Willis, INC
Available through request at Lancaster Airport

Texas Airport System Plan Update
Adopted: 2002
Developed by Texas Department of Transportation
Available at:
ftp://ftp.dot.state.tx.us/pub/txdot-info/avn/tasp2002.pdf

The Economic Impact of Lancaster Airport
Adopted: 2005
Developed by Texas Department of Transportation
Available at:
http://www.dot.state.tx.us/publications/aviation/economic_impact/lnc_lancaster.pdf

Comprehensive Plan – City of Lancaster, TX
Adopted: 2002
Developed by Dunkin, Sefko, & Associates, Inc.
Available at:
http://www.lancaster-tx.com/index.php?option=com_content&task=view&id=144&Itemid=446

Lancaster Airport Sector Plan and LanPort Zoning District and Development Standards
Currently in review
Developed by Wilbur Smith Associates
Available at:
http://www.lancaster-tx.com/images/stories/Planning_Zoning/lanportmasterplan03_15_07.pdf

Federal Aviation Regulations (FAR) - Part 77 Objects Affecting Navigable Airspace
Developed by the Federal Aviation Administration
Available at:
http://www.access.gpo.gov/nara/cfr/waisidx_07/14cfr77_07.html

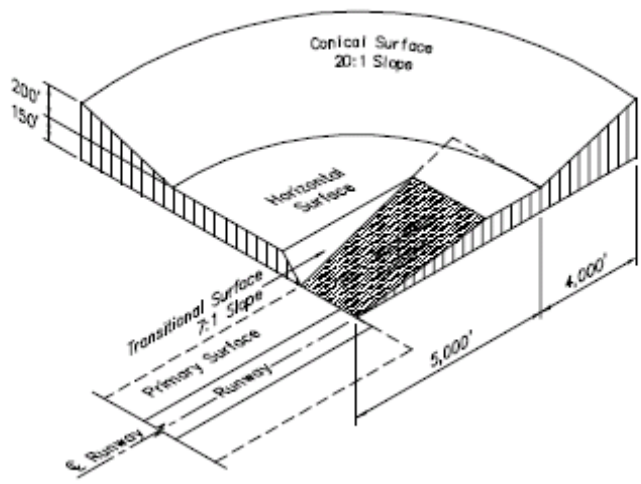
FAA Advisory Circular 150/5300-13 Airport Design
Developed by the Federal Aviation Administration
Available at*:*
http://www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars/media/150-5300-13/150_5300_13_consolidated_with_chg10.pdf

Dallas Logistics Hub
Currently in planning stage
Developed by the Allen Group
http://dallaslogisticshub.com/

APPENDIX D

FAR PART 77 APPROACH SURFACES

Evaluation of FAR Part 77 approach surfaces allows the FAA to identify potential aeronautical hazards surrounding airports in advance of development, thus preventing or minimizing the adverse impacts to the safe and efficient use of navigable airspace. To accomplish this, imaginary surfaces are established with relation to the airport and each runway. The size, slope, and dimensions of each approach surface is based on the category of each runway according to the type of approach available or planned for that runway. Figure D.1 depicts the Part 77 Approach Surfaces for Lancaster Airport with a runway length of 6,500 feet.



Primary Surface

The primary surface is longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond the ends of the runway; but when the runway has no specially prepared surface, or planned hard surface, the primary surface ends at the physical ends of the runway. The elevation of any point on the Primary Surface is the same as the elevation of the nearest point on the runway centerline. Primary surface widths vary with the classification of the runway; however, the width is uniform throughout and is based on the most precise approach existing or planned for either end of that runway. The width of a primary surface is:

- For utility runways[1] the width is:
    - 250 feet for utility runways having only visual approaches.

[1] Designed to handle propeller driven aircraft 12,500 pounds or less

- 500 feet for utility runways having non-precision instrument approaches.

- For other than utility runways the width is:

  - 500 feet for visual runways having only visual approaches.
  - 500 feet for non-precision instrument runways having visibility minimums greater than three-fourths statute mile.
  - 1,000 feet for a non-precision instrument runway having a non-precision instrument approach with visibility minimums as low as three-fourths of a statute mile.
  - 1,000 feet for precision instrument runways.

Approach Surface

The approach surface is longitudinally centered on the extended runway centerline and extends outward and upward from each end of the primary surface. An approach surface is applied to the ends of each runway based upon the type of approach available or planned for that runway end.

The inner edge of the approach surface is the same width as the primary surface and it expands uniformly to a width of:

- 1,250 feet for that end of a utility runway with only visual approaches;
- 1,500 feet for that end of a runway other than a utility runway with only visual approaches;
- 2,000 feet for that end of a utility runway with a non-precision instrument approach;
- 3,500 feet for that end of a non-precision instrument runway other than utility, having visibility minimums greater than three-fourths of a statute mile;
- 4,000 feet for that end of a non-precision instrument runway, other than utility, having a non-precision instrument approach with visibility minimums as low as three-fourths statute mile; and
- 16,000 feet for precision instrument runways.

The approach surface extends for a horizontal distance of:

- 5,000 feet at a slope of 20 to 1 for all utility and visual runways;
- 10,000 feet at a slope of 34 to 1 for all non-precision instrument runways other than utility; and,
- 10,000 feet at a slope of 50 to 1 with an additional 40,000 feet at a slope of 40 to 1 for all precision instrument runways.

The outer width of an approach surface to an end of a runway will be that width for the most precise approach existing or planned for that runway end.

Transitional Surface

The transitional surface extends outward and upward, at right angles to the runway centerline and the extended runway centerline, from the sides of the Primary Surface and the Approach Surfaces.

- The slope is 7-1 and the surface extends until it intersects the Horizontal or Conical Surface.
- A PIR Approach Surface that project beyond the limits of the Conical Surface extends a distance of 5,000 feet measured horizontally from the edge of the Approach Surface. The slope is 7-1.

Horizontal Surface

The horizontal surface is a horizontal plane 150 feet above the established airport elevation; the perimeter of which is constructed by swinging arcs of a specified radii from the center of each end of the Primary Surface of each runway. Tangents then connect the adjacent arcs.

Size of arcs:

- For all runways designed visual or utility, the radius of each arc is 5,000 feet.
- For PIR and Non-Precision Instrument Runways, the radius of each arc is 10,000 feet.

The radius of the arcs specified for each end of a runway will have the same numerical value, that value being the highest determined for either end of the runway. When a 5,000 foot arc is encompassing by tangents connecting two adjacent 10,000 foot arcs, it shall be disregarded.

Conical Surface

The conical surface is an imaginary surface which extends upward and outward from the outer limits of the Horizontal Surface for a horizontal distance of 4,000 feet. The slope of the conical surface is 20-1.

Runway 31 - Evaluation of Obstructions

LANCASTER AIRPORT

Lancaster, Texas

(July, 2007)

PHOTOGRAPH DATA

All photographs are identified by their Line-of-Sight. Photographs CE, C'E', BF, D'G' and DG were taken on a 50:1 approach slope surface to Runway End 31. Due to existing ground conditions, Photograph CE was taken 50 feet above and parallel to the 50:1 approach slope surface. The overall centerline photograph RF is included for a general view of the approach surface. The overlay placed on photograph RF is approximate and is not to be used for evaluating obstructions.

IDENTIFICATION OF OBSTRUCTIONS

Listed below are obstructions that penetrate the approach surface to Runway End 31.

OBSTRUCTIONS	PHOTOGRAPHS
Treetops	CE and C'E'

CONTROLLING OBSTRUCTION

The tree top shown in photographs CE and C'E' is the most extreme obstruction in the evaluated approach surface to Runway End 31.

EVALUATION RESULTS

Runway End 31 was evaluated in accordance with FAR Part 77 Category PIR, a precision instrument runway end with a (50:1) approach slope surface. The location and height of the Controlling Obstruction (C.O.) relative to Runway End 31 is illustrated in figures 1 and 2. This tree top penetrates the evaluated approach surface of Runway End 31 by 6 feet. A clearance slope of 42:1 is required to clear this obstruction.

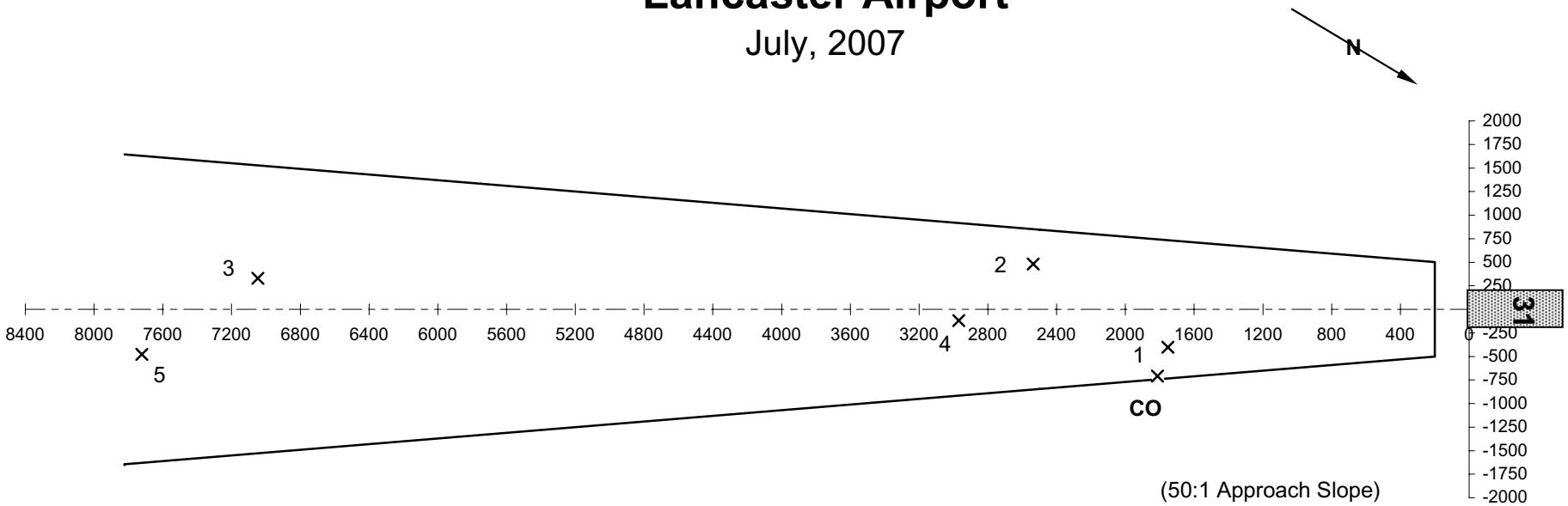
Runway End 31 was further evaluated to identify additional objects within the evaluated approach surface area. The illustration on page 3 describes the objects, their location and clearance slope. The reference objects are identified on the Photoslope Photograph noted in the table.

(ILLUSTRATIONS SHOWN ON PAGES 2 - 3)

Runway 31 - Additional Evaluation of Objects

Lancaster Airport

July, 2007



Object Reference No.	Description	Centerline Offset (X) Ft.	Distance From Runway End (Y) Ft.	Height Above Runway End (Z) Ft.	Object Clearance Slope	Height of Penetration	Object Noted On Photograph
C.O.	Tree	-707	1814	38	42 :1	6	**CE and C'E'**
1	Tree	-402	1752	26	59 :1	------	C'E'
2	Tree	482	2536	39	59 :1	------	D'G'
3	Tower	329	7047	107	63 :1	------	D'G'
4	Tree	-119	2970	41	67 :1	------	BF
5	Tower	-477	7722	53	141 :1	------	CE
	Additional Object Data						
6	Hill	-2037	14039	119	116 :1	------	CE
7	Water Tower	21	17592	133	130 :1	------	CE

***(C.O.) Controlling Obstruction**

Runway 31 - Evaluation of Obstructions
Lancaster Airport

(July, 2007)

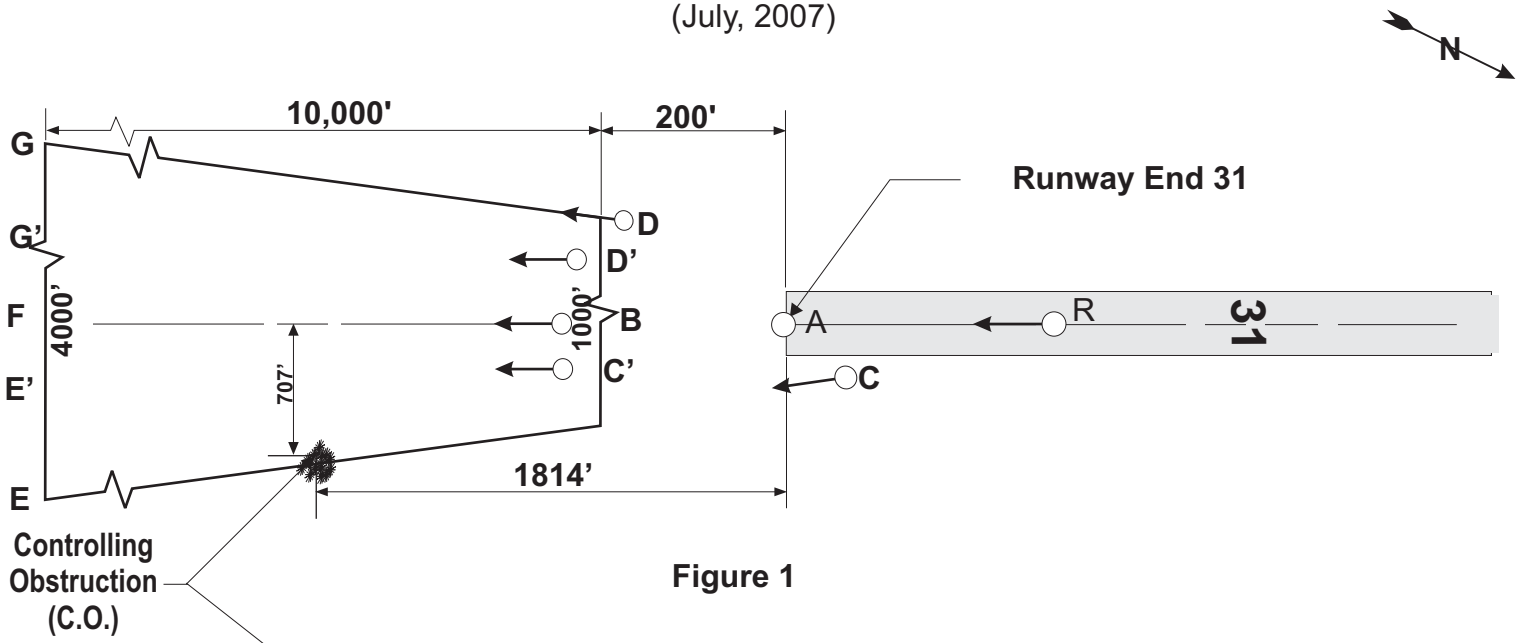


Figure 1

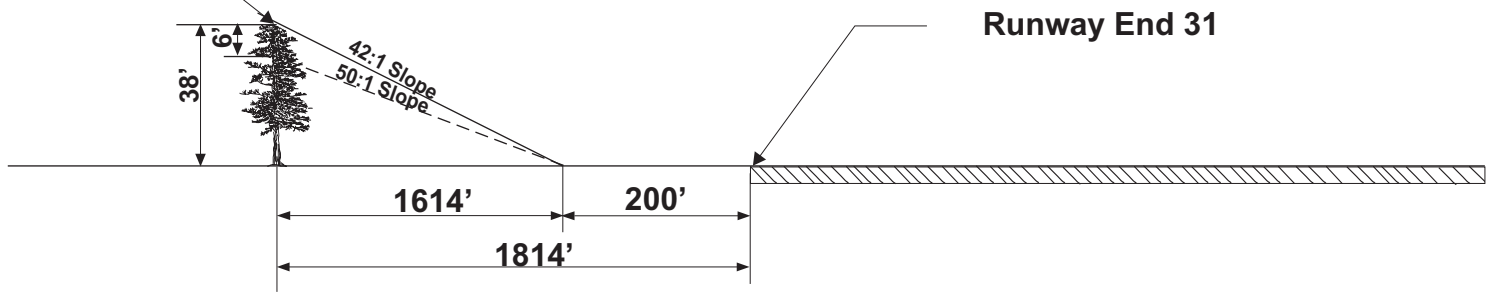


Figure 2

Legend

○ Indicates Station Set-up Point

← Indicates Camera Line-of-sight

Runway 31 - Evaluation of Obstructions w/ 1,500' Extension

LANCASTER AIRPORT

Lancaster, Texas

(July, 2007)

PHOTOGRAPH DATA

All photographs are identified by their Line-of-Sight. Photographs CE, C'E', BF, D'G' and DG were taken on a 50:1 approach slope surface to Runway End 31. Due to existing ground conditions, Photograph CE was taken 50 feet above and parallel to the 50:1 approach slope surface. The overall centerline photograph RF is included for a general view of the approach surface. The overlay placed on photograph RF is approximate and is not to be used for evaluating obstructions.

IDENTIFICATION OF OBSTRUCTIONS

Listed below are obstructions that penetrate the future 50:1 approach surface to Runway End 31 (with a 1,500' extension).

OBSTRUCTIONS	PHOTOGRAPHS
Trees	CE, C'E', BF and D'G'
Tower	D'G'

CONTROLLING OBSTRUCTION

The tree shown in photograph C'E' (#1) is the most extreme obstruction in the evaluated future 50:1 approach surface to Runway End 31.

EVALUATION RESULTS

The future 1,500' extension to Runway End 31 was evaluated in accordance with FAR Part 77 Category PIR, a precision instrument runway end with a (50:1) approach slope surface. The location and height of the Controlling Obstruction (#1) relative to the future 1,500' extension to Runway End 31 is illustrated in the subsequent figure. This tree penetrates the evaluated future 50:1 approach surface of Runway End 31 by 41 feet. A clearance slope of 2:1 is required to clear this obstruction.

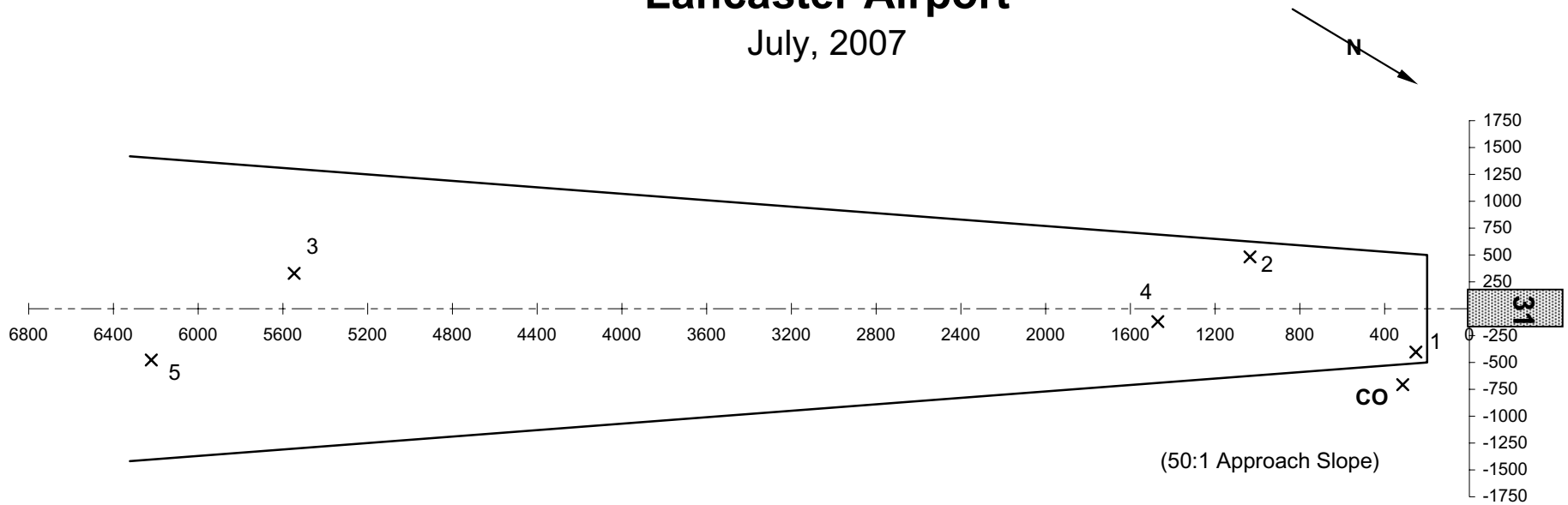
Although the Controlling Obstruction (CO) of the existing Runway End 31 evaluation is no longer within the future 50:1 approach surface, it is still shown on the subsequent illustration because it is a significant obstruction to the 7:1 transitional surface. This CO, along with Ferris Road and other trees identified in this evaluation, would be relocated or removed outside of the future approach.

Runway End 31 was further evaluated to identify additional objects within the evaluated approach surface area. The subsequent illustration describes the objects, their location and clearance slope. The reference objects are identified on the Photoslope Photograph noted in the table.

Runway 31 - Evaluation of Objects w/ 1,500' Extension

Lancaster Airport

July, 2007



Object Reference No.	Description	Centerline Offset (X) Ft.	Distance From Runway End (Y) Ft.	Height Above Runway End (Z) Ft.	Object Clearance Slope	Height of Penetration	Object Noted On Photograph
C.O.	Tree	-707	314	43	2 :1	41	**CE and C'E'**
1	Tree	-402	252	31	1 :1	30	C'E'
2	Tree	482	1036	44	19 :1	28	D'G'
3	Tower	329	5547	112	47 :1	5	D'G'
4	Tree	-119	1470	46	27 :1	21	BF
5	Tower	-477	6222	58	103 :1	------	CE
	Additional Object Data						
6	Hill	-2037	12539	124	99 :1	------	CE
7	Water Tower	21	16092	138	115 :1	------	CE

***(C.O.) Controlling Obstruction**

Runway 31 - Evaluation of Obstructions w/ 2,500' Extension

LANCASTER AIRPORT

Lancaster, Texas

(July, 2007)

PHOTOGRAPH DATA

All photographs are identified by their Line-of-Sight. Photographs CE, C'E', BF, D'G' and DG were taken on a 50:1 approach slope surface to Runway End 31. Due to existing ground conditions, Photograph CE was taken 50 feet above and parallel to the 50:1 approach slope surface. The overall centerline photograph RF is included for a general view of the approach surface. The overlay placed on photograph RF is approximate and is not to be used for evaluating obstructions.

IDENTIFICATION OF OBSTRUCTIONS

Listed below are obstructions that penetrate the future 50:1 approach surface to Runway End 31 (with a 1,500' extension).

OBSTRUCTIONS	PHOTOGRAPHS
Trees	BF and D'G'
Towers	CE and D'G'

CONTROLLING OBSTRUCTION

The tree shown in photograph BF (#4) is the most extreme obstruction in the evaluated future 50:1 approach surface to Runway End 31.

EVALUATION RESULTS

The future 2,500' extension to Runway End 31 was evaluated in accordance with FAR Part 77 Category PIR, a precision instrument runway end with a (50:1) approach slope surface. The location and height of the Controlling Obstruction (#4) relative to the future 2,500' extension to Runway End 31 is illustrated in the subsequent figure. This tree penetrates the evaluated future 50:1 approach surface of Runway End 31 by 44 feet. A clearance slope of 5:1 is required to clear this obstruction.

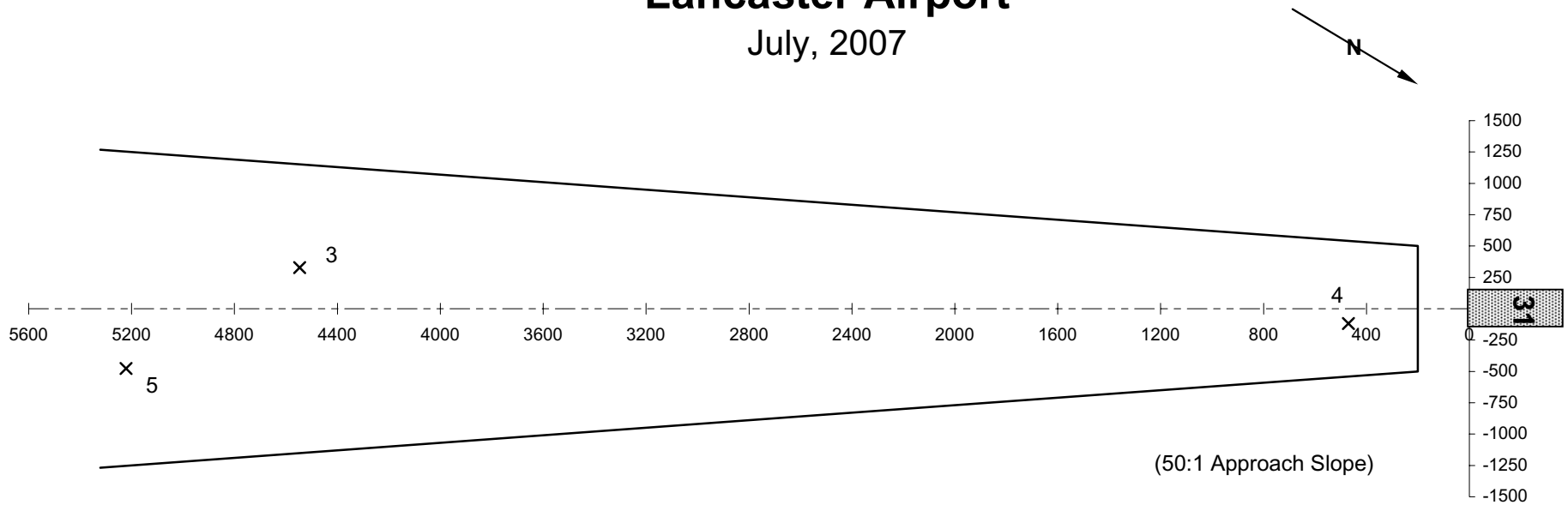
Although the tree identified as #2 on the subsequent illustration is a greater penetration to navigable airspace, this tree is not a penetration to the future approach but a close-in obstruction to the future 2,500' extension to Runway End 31. Obstructions #2 and #4 (trees) were previously evaluated in the 1,500' extension evaluation and would be removed within the scope of that project. Due to an existing grouping of trees north of an utility right of way, it was not possible to survey all electric towers and poles within the approach. Further survey data would need to be acquired to determine if additional poles/towers west of #3 are a penetration to the approach of the future 2,500' extention to Runway End 31.

Runway End 31 was further evaluated to identify additional objects within the evaluated approach surface area. The subsequent illustration describes the objects, their location and clearance slope. The reference objects are identified on the Photoslope Photograph noted in the table.

Runway 31 - Evaluation of Objects w/ 2,500' Extension

Lancaster Airport

July, 2007



Object Reference No.	Description	Centerline Offset (X) Ft.	Distance From Runway End (Y) Ft.	Height Above Runway End (Z) Ft.	Object Clearance Slope	Height of Penetration	Object Noted On Photograph
3	Tower	329	4547	115	37 :1	28	D'G'
4	Tree	-119	470	49	5 :1	44	BF
5	Tower	-477	5222	61	82 :1	------	CE
	Additional Object Data						
6	Hill	-2037	11539	127	89 :1	------	CE
7	Water Tower	21	15092	141	105 :1	------	CE

***(C.O.) Controlling Obstruction**

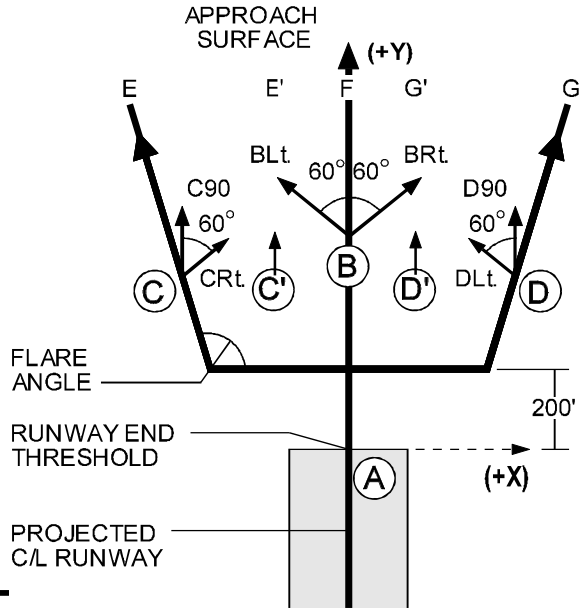
STATE OF TEXAS
PHOTOSLOPE RUNWAY INFORMATION SHEET

RUNWAY END 31

Airport :	Lancaster
Approach Slope :	50 :1
Primary Surface Width :	1000
Flare Angle (D.MMSS) :	8.3151
FAR Part 77 (Category) :	PIR
RPZ (Photoslope Code) :	A
Project No.:	13300
Survey Date:	17-Jul-07
RW End Latitude:	32 - 34 - 26.0560 N
RW End Longitude:	96 - 42 - 49.9550 W

NOTE: Coordinates, elevations and heights are in feet. Angles are in degrees, minutes, and seconds (D.MMSS). A vertical angle of 0 degrees is level or horizontal. Station elevations and coordinates are to be used for Photoslope Survey Only.

STATION	STATION ELEVATION	MONUMENT DESCRIPTION	MONUMENT LOCATION X	MONUMENT LOCATION Y
A	19.98	nail	0.00	0.00
C	24.63	Temporary station set.	-199.99	-1799.88
CP	17.51	Temporary station set.	-248.39	298.85
B	17.02	Temporary station set.	0.04	275.01
DP	15.95	Temporary station set.	251.97	237.97
D	15.08	Temporary station set.	497.09	180.00
T	19.99	Temporary station set.	0.00	148.28



STATION SET UP	CAMERA HEIGHT	BACK SIGHT STATION	LINE OF SIGHT	HORIZONTAL ANGLE	VERTICAL ANGLE
C	5.37	T	CE	345.3629 R	1.0759
CP	4.47	T	C'E'	238.4635 R	1.0845
B	4.48	T	BF	179.5850 R	1.0845
DP	4.81	T	D'G'	109.3540 R	1.0845
D	4.52	T	DG	102.1056 R	1.0759

Camera line-of-sight (CE) set 50' above and parallel to the approach surface.

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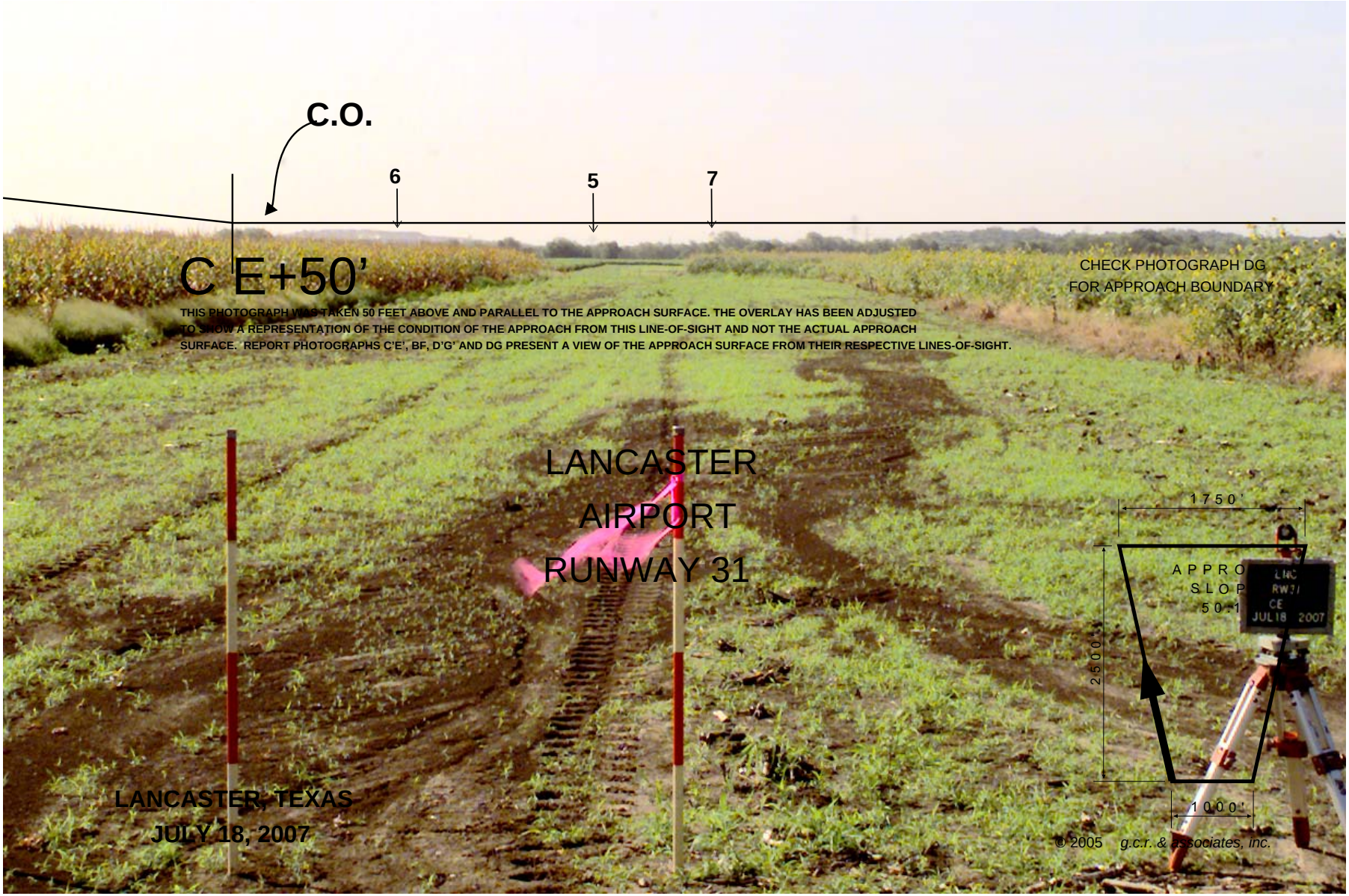
NOT TO BE USED FOR EVALUATING OBSTRUCTIONS
LANCASTER
AIRPORT
RUNWAY 31
LANCASTER, TEXAS
JULY 18, 2007
4,000'
APPROACH
SLOPE
50:1
10,000'
1000'
© 2005 g.c.r. & associates, inc.


C.O.
6
5
7
C'E+50'
THIS PHOTOGRAPH WAS TAKEN 50 FEET ABOVE AND PARALLEL TO THE APPROACH SURFACE. THE OVERLAY HAS BEEN ADJUSTED TO SHOW A REPRESENTATION OF THE CONDITION OF THE APPROACH FROM THIS LINE-OF-SIGHT AND NOT THE ACTUAL APPROACH SURFACE. REPORT PHOTOGRAPHS C'E', BF, D'G' AND DG PRESENT A VIEW OF THE APPROACH SURFACE FROM THEIR RESPECTIVE LINES-OF-SIGHT.
CHECK PHOTOGRAPH DG
FOR APPROACH BOUNDARY
LANCASTER
AIRPORT
RUNWAY 31
1750'
2500'
1000'
LANCASTER, TEXAS
JULY 18, 2007
© 2005 g.c.r. & associates, inc.

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NOT TO BE USED FOR EVALUATING OBSTRUCTIONS
LANCASTER
AIRPORT
RUNWAY 31
LANCASTER, TEXAS
JULY 18, 2007
4,000'
APPROACH
SLOPE
50:1
10,000'
1000'
© 2005 g.c.r. & associates, inc.

4
B F
CHECK PHOTOGRAPH CE
FOR APPROACH BOUNDARY
CHECK PHOTOGRAPH DC
FOR APPROACH BOUNDARY
LANCASTER
AIRPORT
RUNWAY 31
LNC
RW31
BF
JUL18 2007
1750'
APPROACH
SLOPE
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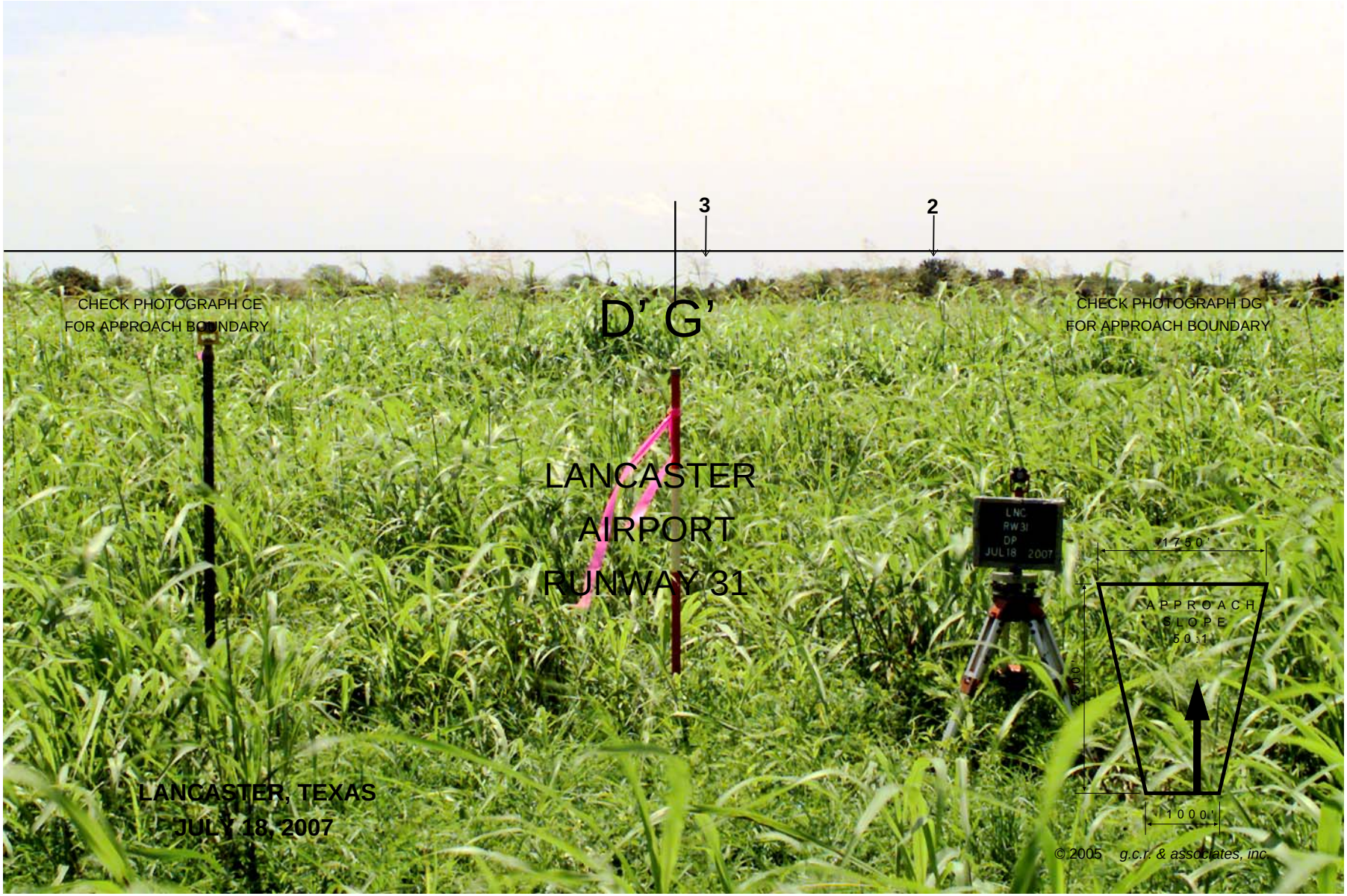
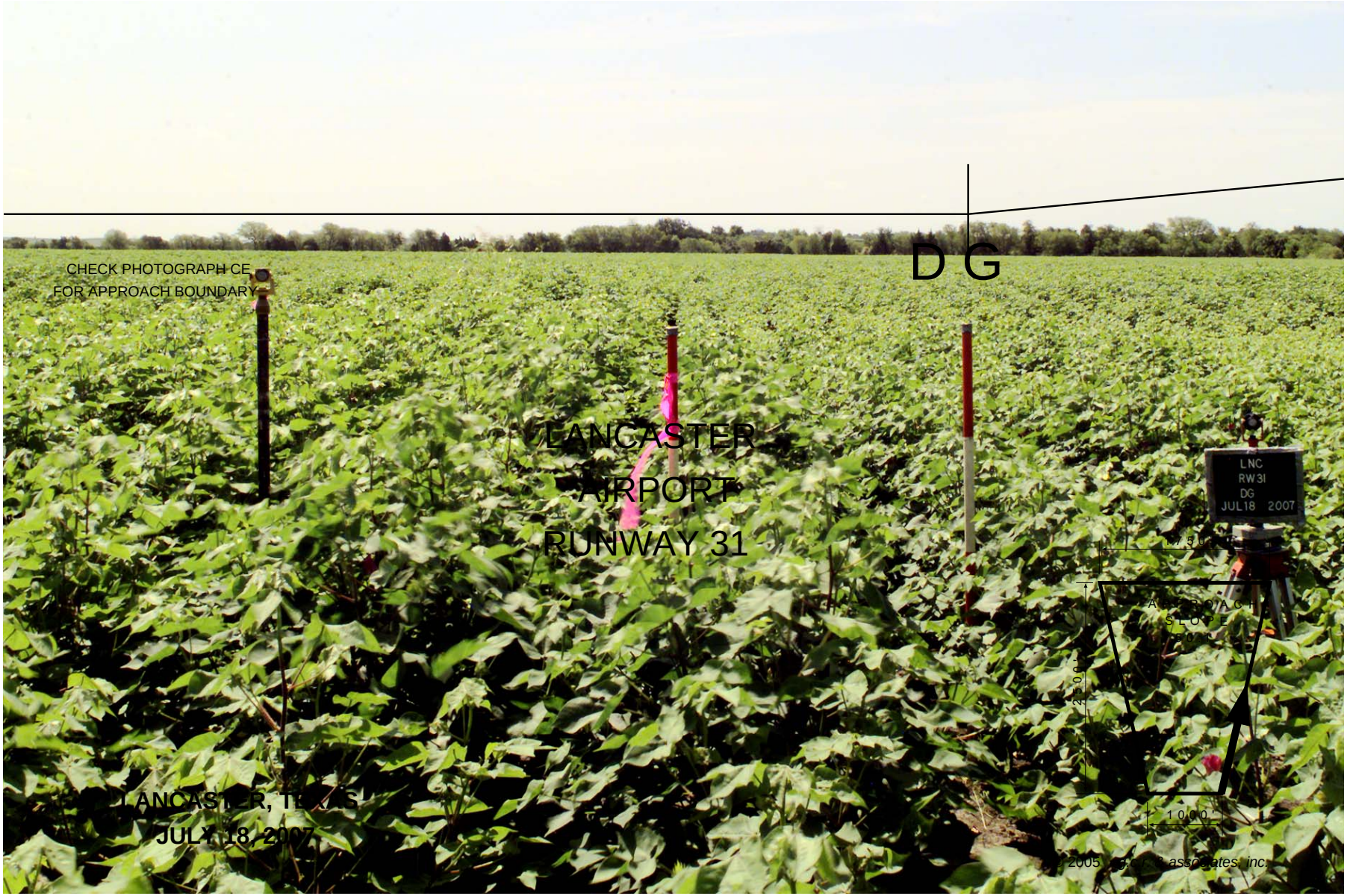
2500'
1000'
LANCASTER, TEXAS
JULY 18, 2007
© 2005 g.c.r. & associates, inc.


3
2
CHECK PHOTOGRAPH CE
FOR APPROACH BOUNDARY
D' G'
CHECK PHOTOGRAPH DG
FOR APPROACH BOUNDARY
LANCASTER
AIRPORT
RUNWAY 31
LNC
RW31
DP
JUL18 2007
1750'
APPROACH
SLOPE
50:1
2000'
1000'
LANCASTER, TEXAS
JULY 18, 2007
© 2005 g.c.r. & associates, inc.


CHECK PHOTOGRAPH CE
FOR APPROACH BOUNDARY
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LANCASTER
AIRPORT
RUNWAY 31
LNC
RW 31
DG
JUL 18 2007
1750
1000
1000
LANCASTER, TEXAS
JULY 18, 2007
2005 Kimley-Horn Associates, Inc.

Runway 13 - Evaluation of Obstructions

LANCASTER AIRPORT

Lancaster, Texas

(July, 2007)

PHOTOGRAPH DATA

All photographs are identified by their Line-of-Sight. Photographs CE, C'E', BF, D'G' and DG were taken on a 34:1 approach slope surface to Runway End 13. Due to existing ground conditions, Photograph DG was taken 59 feet above and parallel to the 34:1 approach slope surface. The overall centerline photograph RF is included for a general view of the approach surface. The overlay placed on photograph RF is approximate and is not to be used for evaluating obstructions.

IDENTIFICATION OF OBSTRUCTIONS

Listed below are obstructions that penetrate the approach surface to Runway End 13.

OBSTRUCTIONS	PHOTOGRAPHS
Pole	CE
Treetops	CE and C'E'

CONTROLLING OBSTRUCTION

The tree top shown in photographs CE and C'E' is the most extreme obstruction in the evaluated approach surface to Runway End 13.

EVALUATION RESULTS

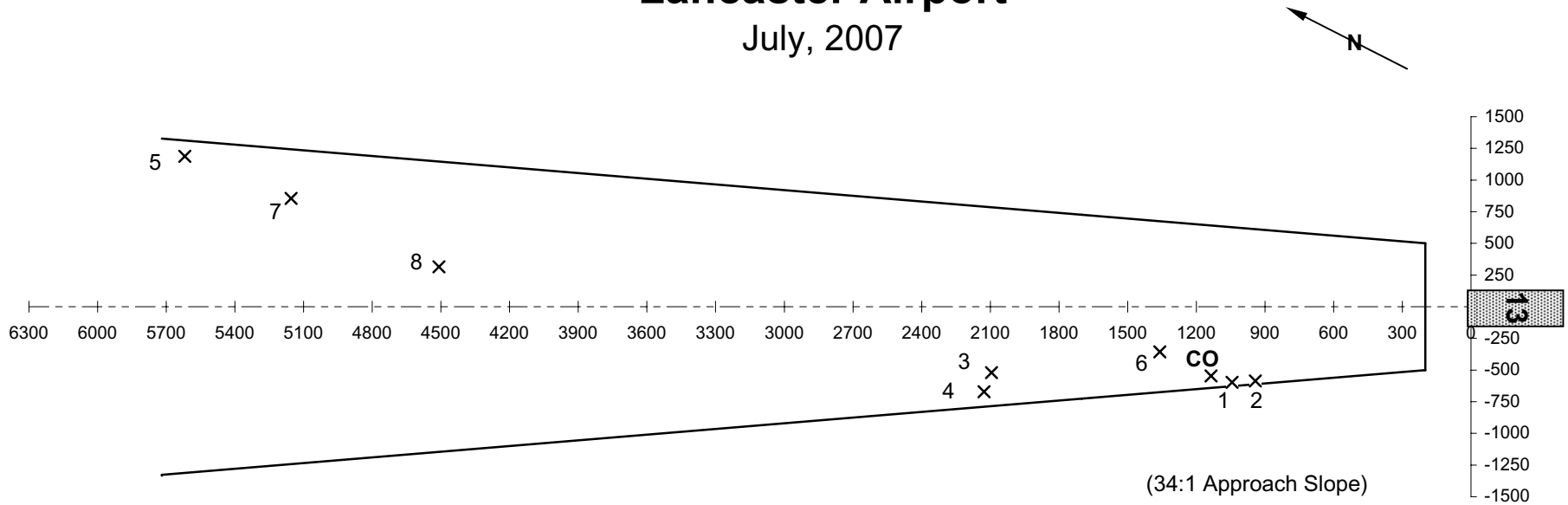
Runway End 13 was evaluated in accordance with FAR Part 77 Category D, a nonprecision instrument runway end with a (34:1) approach slope surface having visibility minimums as low as ¾ mile. The location and height of the Controlling Obstruction (C.O.) relative to Runway End 13 is illustrated in figures 1 and 2. This tree top penetrates the evaluated approach surface of Runway End 13 by 15 feet. A clearance slope of 22:1 is required to clear this obstruction.

Runway End 13 was further evaluated to identify additional objects within the evaluated approach surface area. The subsequent illustration describes the objects, their location and clearance slope. The reference objects are identified on the Photoslope Photograph noted in the table.

Runway 13 - Additional Evaluation of Objects

Lancaster Airport

July, 2007



Object Reference No.	Description	Centerline Offset (X) Ft.	Distance From Runway End (Y) Ft.	Height Above Runway End (Z) Ft.	Object Clearance Slope	Height of Penetration	Object Noted On Photograph
C.O.	Tree	-547	1136	42	22 :1	15	**CE and C'E'**
1	Tree	-597	1044	37	22 :1	13	CE
2	Pole	-587	942	28	26 :1	7	CE
3	Tree	-521	2095	68	27 :1	13	C'E'
4	Tree	-671	2128	71	27 :1	15	C'E'
5	Pole	1188	5619	156	34 :1	------	DG
6	Pole	-356	1360	33	35 :1	------	C'E'
7	Pole	855	5155	113	43 :1	------	DG
8	Tower	315	4509	91	47 :1	------	D'G'

***(C.O.) Controlling Obstruction**

Runway 13 - Evaluation of Obstructions
Lancaster Airport

(July, 2007)

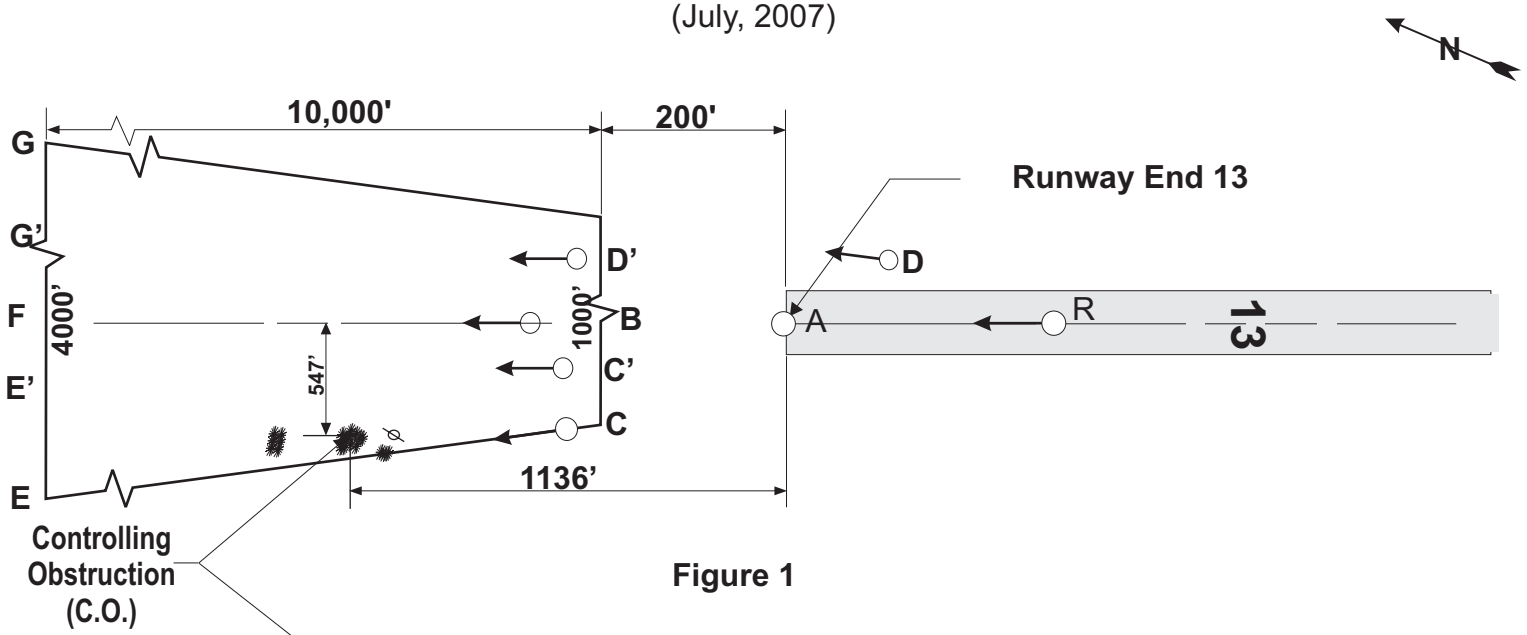


Figure 1

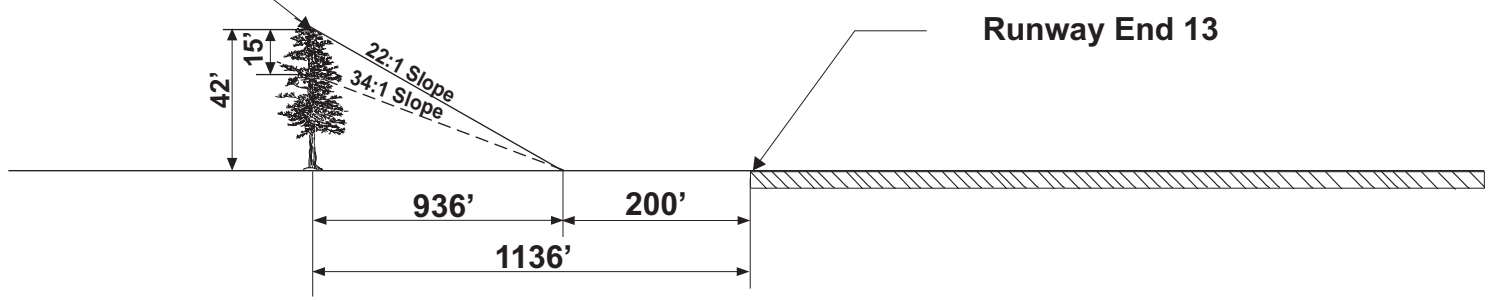


Figure 2

Legend

○ Indicates Station Set-up Point

← Indicates Camera Line-of-sight

Runway 13 - Evaluation of Obstructions w/ 2,500' Extension

LANCASTER AIRPORT

Lancaster, Texas

(July, 2007)

PHOTOGRAPH DATA

All photographs are identified by their Line-of-Sight. Photographs CE, C'E', BF, D'G' and DG were taken on a 34:1 approach slope surface to Runway End 13. Due to existing ground conditions, Photograph DG was taken 59 feet above and parallel to the 34:1 approach slope surface. The overall centerline photograph RF is included for a general view of the approach surface. The overlay placed on photograph RF is approximate and is not to be used for evaluating obstructions.

IDENTIFICATION OF OBSTRUCTIONS

Listed below are obstructions that penetrate the future 50:1 approach surface to Runway End 13 (with a 2,500' extension).

OBSTRUCTIONS	PHOTOGRAPHS
Pole	CE
Tower	D'G'

CONTROLLING OBSTRUCTION

The tower shown in photograph D'G' is the most extreme obstruction in the evaluated future 50:1 approach surface to Runway End 13.

EVALUATION RESULTS

The future 2,500' extension to Runway End 13 was evaluated in accordance with FAR Part 77 Category PIR, a precision instrument runway end with a (50:1) approach slope surface. The location and height of the Controlling Obstruction (#8) relative to the future 2,500' extention to Runway End 13 is illustrated in the subsequent figure. This tower penetrates the evaluated future 50:1 approach surface of Runway End 13 by 45 feet. A clearance slope of 22:1 is required to clear this obstruction.

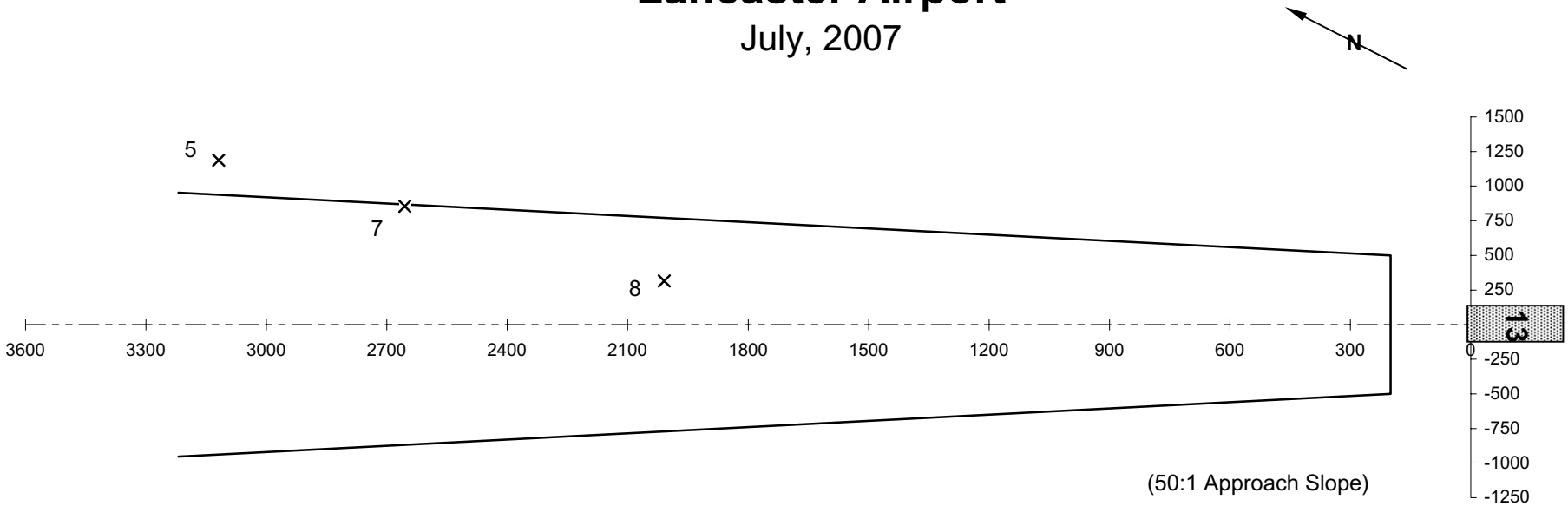
Due to an existing grouping of trees east of an utility right of way, it was not possible to survey all electric towers and poles within the approach. Further survey data would need to be acquired to determine if additional poles/towers south of #8 are a penetration to the approach of the future 2,500' extention to Runway End 13.

Runway End 13 was further evaluated to identify additional objects within the evaluated approach surface area. The subsequent illustration describes the objects, their location and clearance slope. The reference objects are identified on the Photoslope Photograph noted in the table.

Runway 13 - Evaluation of Objects w/ 2,500' Extension

Lancaster Airport

July, 2007



Object Reference No.	Description	Centerline Offset (X) Ft.	Distance From Runway End (Y) Ft.	Height Above Runway End (Z) Ft.	Object Clearance Slope	Height of Penetration	Object Noted On Photograph
5	Pole	1188	3119	146	19 :1	88	DG
7	Pole	855	2655	103	23 :1	54	DG
8	Tower	315	2009	81	22 :1	45	D'G'

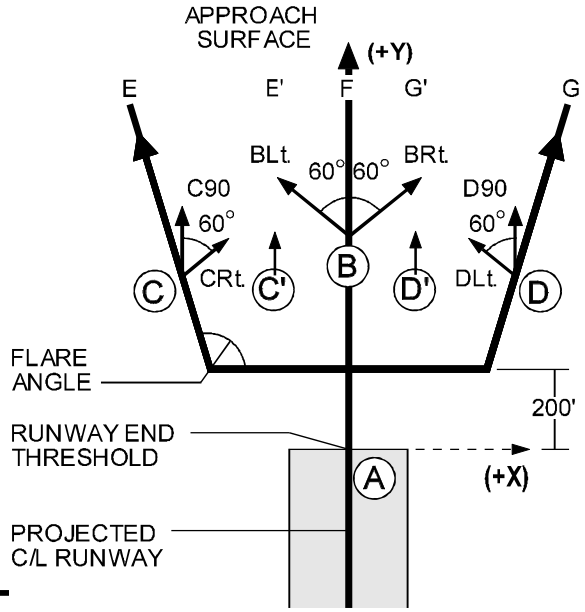
***(C.O.) Controlling Obstruction**

STATE OF TEXAS
PHOTOSLOPE RUNWAY INFORMATION SHEET

RUNWAY END 13

Airport :	Lancaster
Approach Slope :	34 :1
Primary Surface Width :	1000
Flare Angle (D.MMSS) :	8.3151
FAR Part 77 (Category) :	D
RPZ (Photoslope Code) :	C
Project No.:	13300
Survey Date:	16-Jul-07
RW End Latitude:	32 - 35 - 04.1250 N
RW End Longitude:	96 - 43 - 27.2720 W

NOTE: Coordinates, elevations and heights are in feet. Angles are in degrees, minutes, and seconds (D.MMSS). A vertical angle of 0 degrees is level or horizontal. Station elevations and coordinates are to be used for Photoslope Survey Only.



STATION	STATION ELEVATION	MONUMENT DESCRIPTION	MONUMENT LOCATION X	MONUMENT LOCATION Y
A	20.34	Nail found.	0.00	0.00
C	18.58	nail	-517.68	319.22
CP	19.18	nail	-252.81	334.41
B	20.03	nail	0.00	379.72
DP	17.58	nail	241.74	274.25
D	8.60	nail	168.43	-2009.92
T	19.24	Temporary station set.	0.00	261.74

STATION SET UP	CAMERA HEIGHT	BACK SIGHT STATION	LINE OF SIGHT	HORIZONTAL ANGLE	VERTICAL ANGLE
C	4.92	T	CE	255.0759 R	1.3958
CP	4.77	T	C'E'	253.5745 R	1.4105
B	5.26	T	BF	180.0000 R	1.4105
DP	4.60	T	D'G'	92.5745 R	1.4105
D	5.40	T	DG	12.4616 R	1.3958

Camera line-of-sight (DG) set 59' above and parallel to the approach surface.

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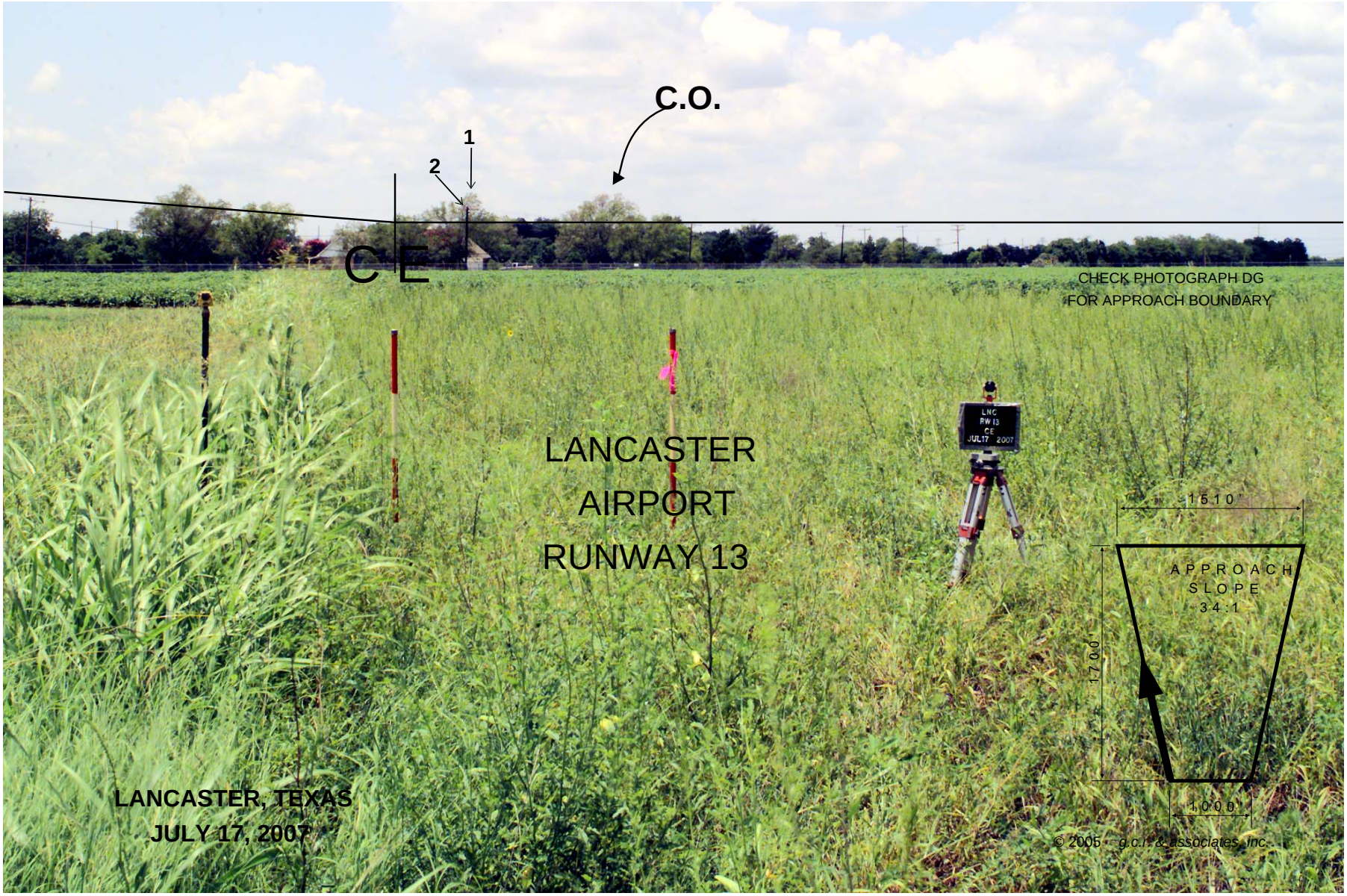
NOT TO BE USED FOR EVALUATING OBSTRUCTIONS
LANCASTER
AIRPORT
RUNWAY 13
LANCASTER, TEXAS
JULY 17, 2007
4,000'
APPROACH
SLOPE
34:1
10,000'
1000'
© 2005 g.c.r. & associates, inc.


C.O.
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CE
CHECK PHOTOGRAPH DG
FOR APPROACH BOUNDARY
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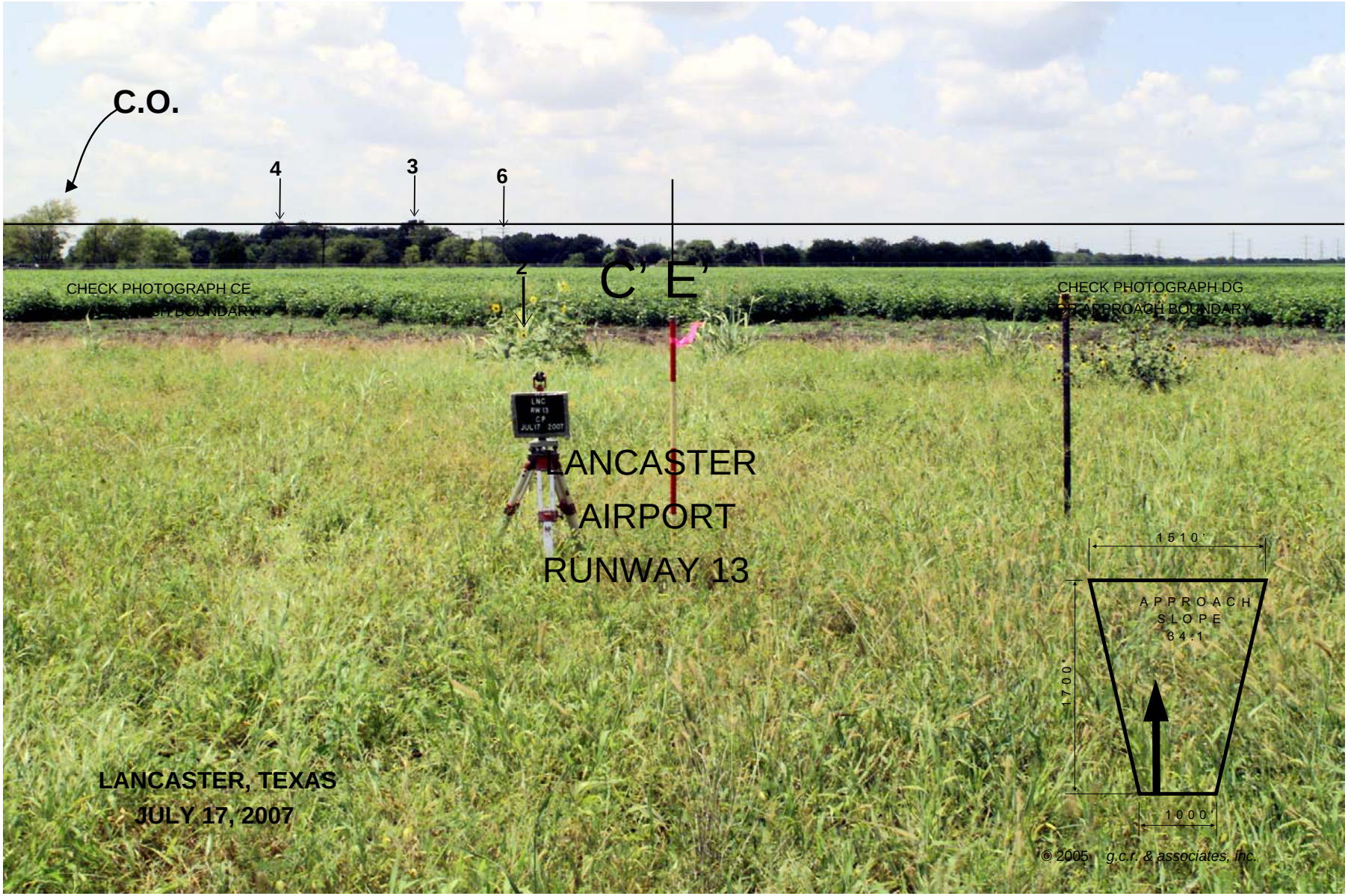
RW13
CE
JUL17 2007
LANCASTER
AIRPORT
RUNWAY 13
1510'
APPROACH
SLOPE
34:1
1700'
1000'
LANCASTER, TEXAS
JULY 17, 2007
© 2005 g.c.r. & associates, inc.


C.O.
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C' E'
CHECK PHOTOGRAPH CE
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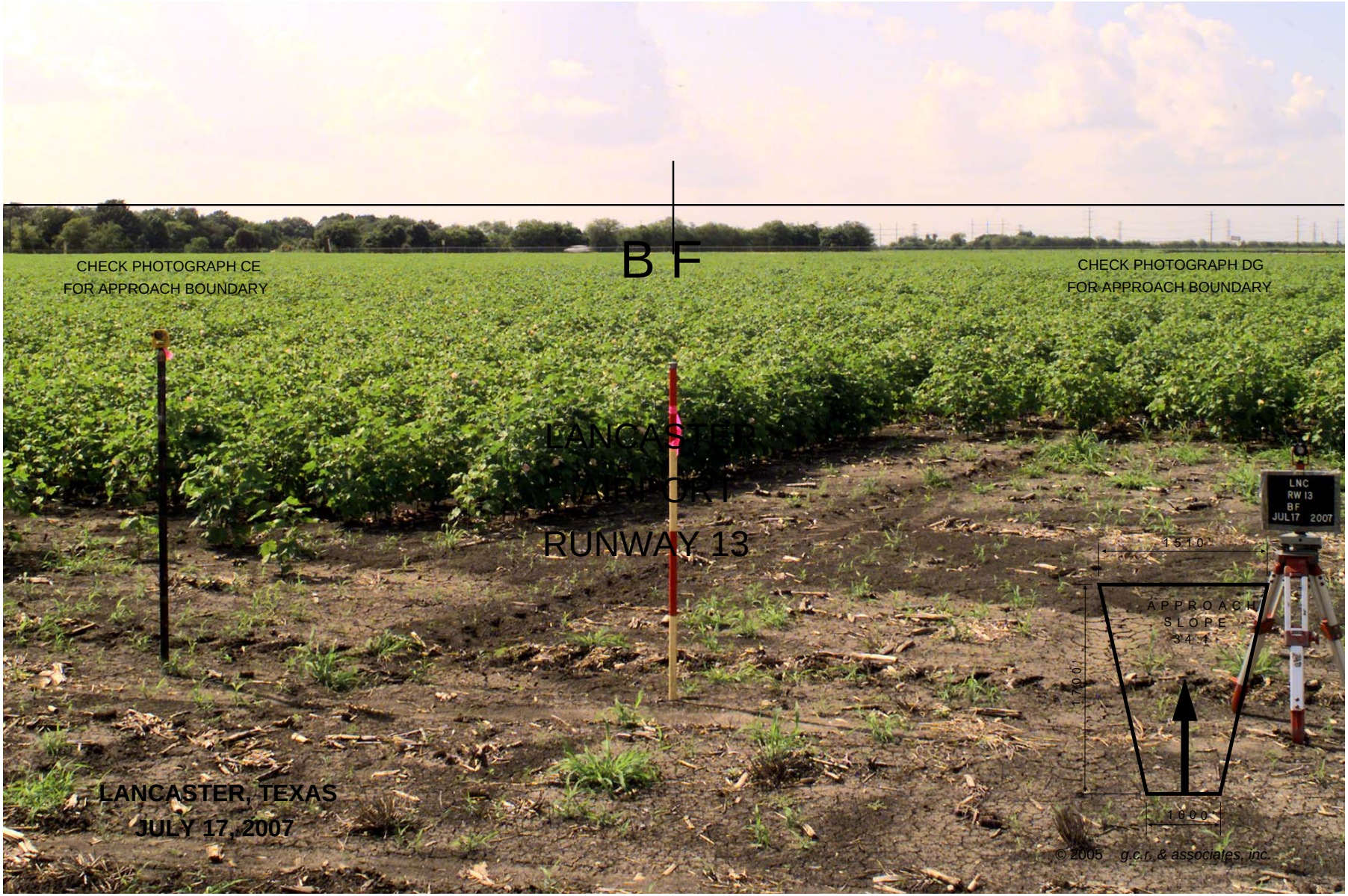
LANCASTER
AIRPORT
RUNWAY 13
1510'
APPROACH
SLOPE
64:1
1700'
1000'
LANCASTER, TEXAS
JULY 17, 2007
© 2005 g.c.r. & associates, inc.


B F
CHECK PHOTOGRAPH CE
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LANCASTER, TEXAS
JULY 17, 2007
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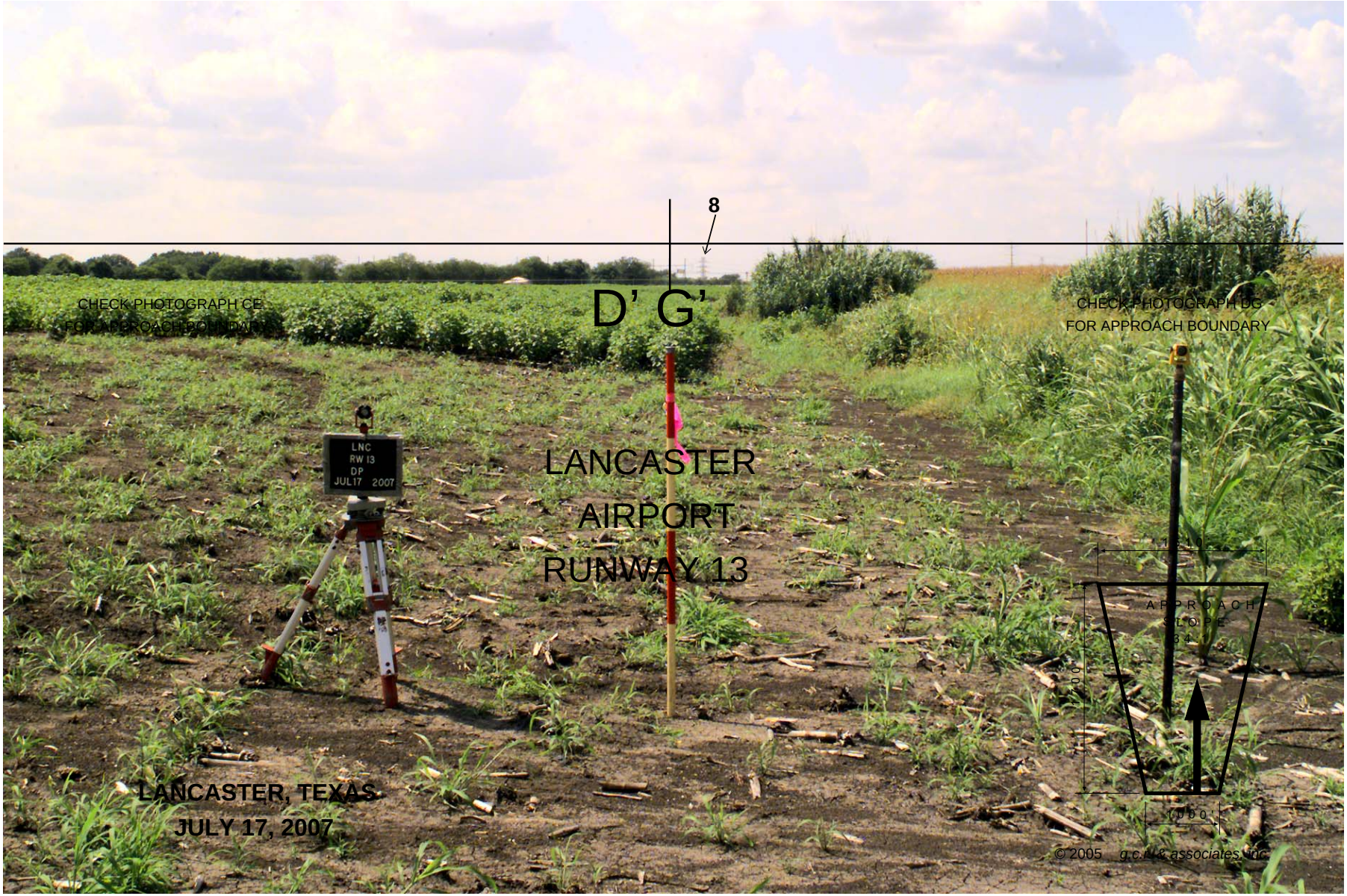
8
D' G'
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LNC
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LANCASTER
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LANCASTER, TEXAS
JULY 17, 2007
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7
5
CHECK PHOTOGRAPH CE
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D G+59'
THIS PHOTOGRAPH WAS TAKEN 59 FEET ABOVE AND PARALLEL TO THE APPROACH SURFACE. THE OVERLAY HAS BEEN ADJUSTED TO SHOW A REPRESENTATION OF THE CONDITION OF THE APPROACH FROM THIS LINE-OF-SIGHT AND NOT THE ACTUAL APPROACH SURFACE. REPORT PHOTOGRAPHS CE, C'E', BF AND D'G' PRESENT A VIEW OF THE APPROACH SURFACE FROM THEIR RESPECTIVE LINES-OF-SIGHT.
LANCASTER
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LANCASTER, TEXAS
JULY 17, 2007
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APPENDIX A

SUMMARY OF NOISE ANALYSIS INM INPUTS

Section 2 of the Encroachment Analysis describes the results of the four Integrated Noise Model (INM) scenarios (listed below) conducted to illustrate the effect of the potential long-term growth of Lancaster Airport (LNC).

1. Baseline 2006 Scenario – Existing 5,000' Runway Length and Configuration
2. Forecast 2011 Scenario – 1,500' Extension to Runway 31 (Total Runway Length of 6,500')
3. Forecast 2016 Scenario – 2,500' Extension to Runway 31 (Total Runway Length of 7,500')
4. Forecast 2026 Scenario – 2,500' Extension to Both Runway Ends (Total Runway Length of 10,000')

This appendix describes the formulation of the Noise Analysis INM inputs, which are primarily based on data from the *January 2006 LNC Master Plan Update*. All modifications to the *LNC Master Plan* data are noted where appropriate, and are related to the goals outlined in the *Lancaster Airport Sector Plan*.

This appendix presents the INM inputs in the following order:

- Aircraft Inputs
- Flight Tracks and Runway Use
- Day and Night Operations
- Summary of Inputs

Aircraft Inputs

A comparison of the INM aircraft inputs from the *LNC Master Plan* and Encroachment Analysis is provided in Table A-1 – modifications are summarized in the "Notes" column. As shown, the GIIB (Gulfstream II or III corporate jet) aircraft was replaced with the GIV (Gulfstream IV corporate jet) aircraft because GIV operations are becoming increasingly more common at corporate aviation facilities like LNC. For the Forecast 2026 Scenario, new business jet and freight aircraft were added to the fleet mix to account for the potential long-term developments at LNC (e.g., construction of runway extensions, corporate aviation and cargo facilities, and a control tower).

TABLE A.1 – AIRCRAFT INPUTS

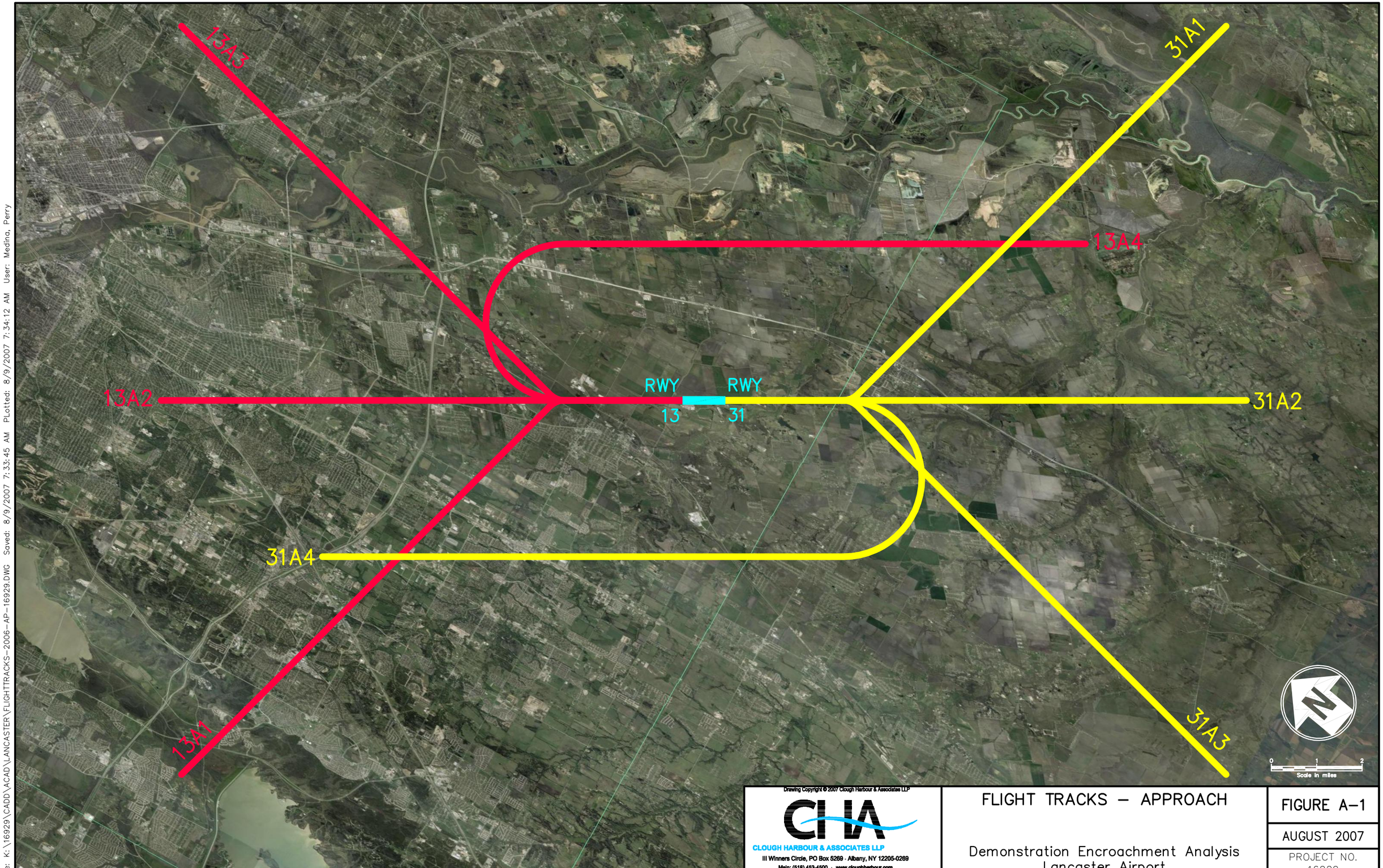
Master Plan	Encroachment Analysis	Group	Notes
GASEPF	GASEPF	SE Piston	
GASEPV	GASEPV	SE Piston	
BEC58P	BEC58P	ME Piston	
CNA441	CNA441	Turboprop	
DHC6	DHC6	Turboprop	
MU3001	MU3001	Exp. Jet	
LEAR25	LEAR25	Jet	
LEAR35	LEAR35	Jet	
GIIB	GIV	Jet	GIV Operations More Common
	CNA750	Jet	Medium Business Jet for Forecast 2026 Scenario
	CL610	Jet	Large Business Jet for Forecast 2026 Scenario
	A310-304	Freight	Large Freight Jet for Forecast 2026 Scenario
	MD81	Freight	Medium Freight Jet for Forecast 2026 Scenario
	EMB120	Freight	Freight Turboprop for Forecast 2026 Scenario

Flight Tracks and Runway Use

The *LNC Master Plan* identified a total of eight approach flight tracks (see Figure A-1), eight departure flight tracks (see Figure A-2), and two touch-and-go flight tracks (see Figure A-3). These flight tracks are incorporated into all four INM scenarios of the Encroachment Analysis. Table A-2 summarizes the estimated usage of each flight track.

TABLE A.2 – ESTIMATED FLIGHT TRACK USAGE					
Approach		**Departure**		**Touch-And-Go**	
Track	**Est. Usage**	**Track**	**Est. Usage**	**Track**	**Est. Usage**
13A1	16.25%	13D1	16.25%	13T1	65%
13A2	16.25%	13D2	16.25%	31T1	35%
13A3	16.25%	13D3	16.25%		
13A4	16.25%	13D4	16.25%		
31A1	8.75%	31D1	8.75%		
31A2	8.75%	31D2	8.75%		
31A3	8.75%	31D3	8.75%		
31A4	8.75%	31D4	8.75%		
Total:	**100%**	**Total:**	**100%**	**Total:**	**100%**

Per the *LNC Master Plan* and Table A-2, approximately 65 percent of all LNC operations occur on Runway 13 and 35 percent occur on Runway 31.



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FLIGHT TRACKS – APPROACH

Demonstration Encroachment Analysis
Lancaster Airport

FIGURE A–1

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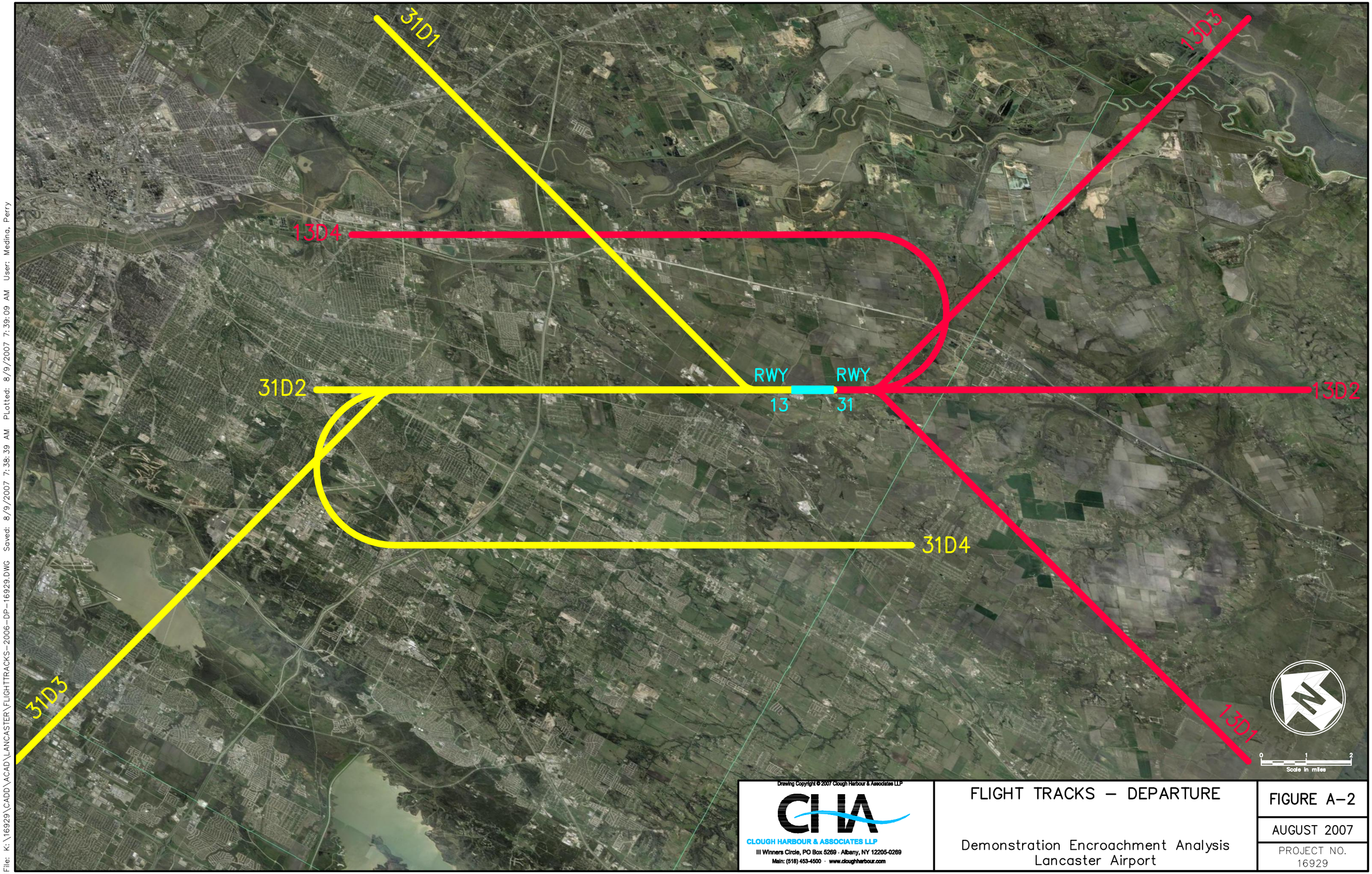

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FLIGHT TRACKS – DEPARTURE

Demonstration Encroachment Analysis
Lancaster Airport

FIGURE A–2

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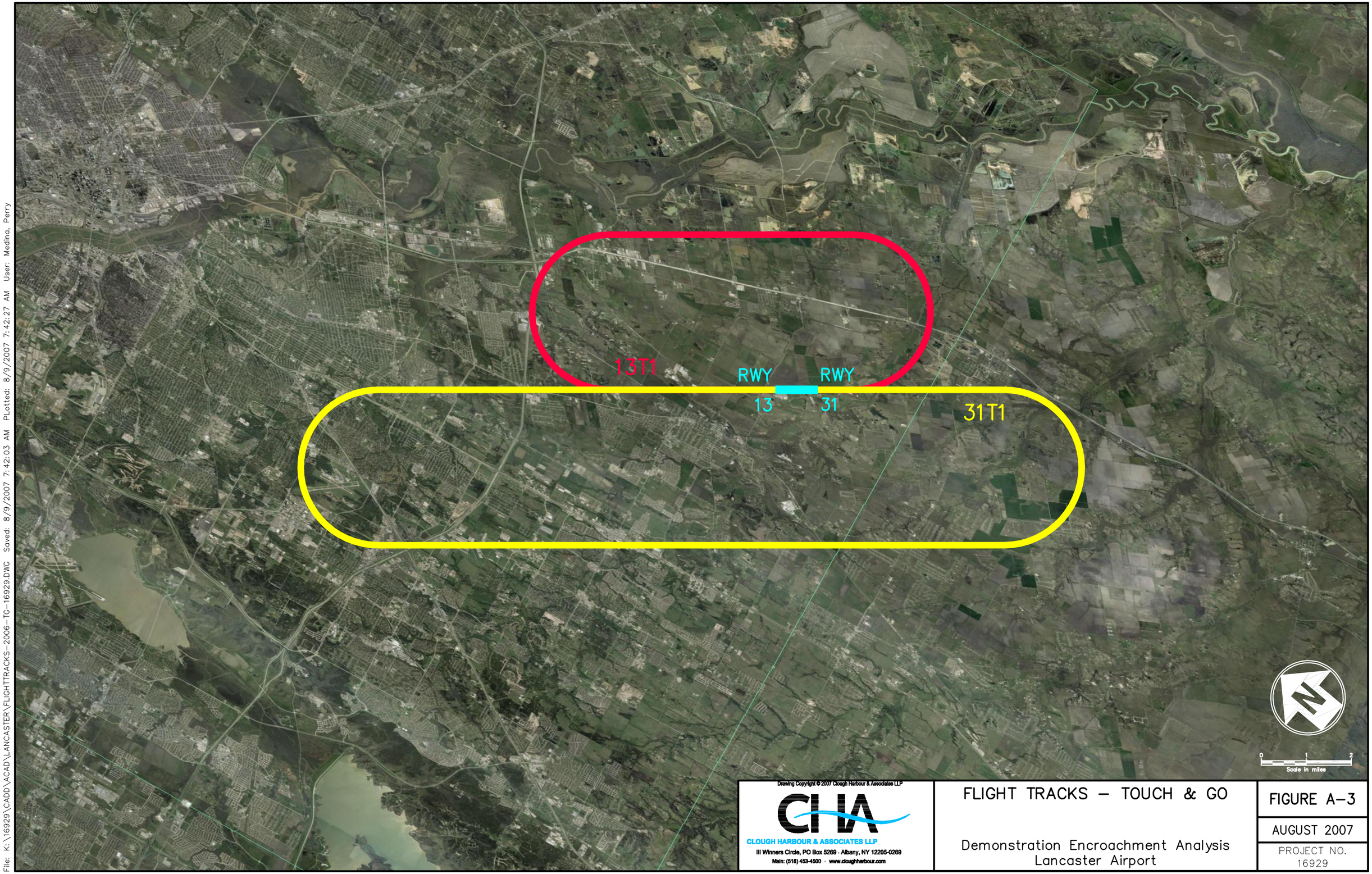

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FLIGHT TRACKS – TOUCH & GO

Demonstration Encroachment Analysis
Lancaster Airport

FIGURE A–3

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Day and Night Operations

The INM defines daytime and nighttime operations as follows:

- Daytime Operations – Between the Hours 7:00 a.m. and 10:00 p.m.
- Nighttime Operations – Between the Hours 10:00 p.m. and 7:00 a.m.

A comparison of the INM day/night splits from the *LNC Master Plan* and Encroachment Analysis is provided in Table A-3 – modifications are summarized in the "Notes" column.

TABLE A.3 – DAY/NIGHT SPLITS BY AIRCRAFT GROUP

Group	Master Plan	Encroachment Analysis	Notes
SE Piston	99/1	99/1	
ME Piston	99/1	99/1	
Turboprop	100/0	95/5	Increased Night % for Business Operations
Exp. Jet	99/1	95/5	Increased Night % for Business Operations
Jet	100/0	95/5	Increased Night % for Business Operations
Freight	N/A	33/67	Based on Alliance Airport Data

Because LNC is non-towered, it is difficult to obtain accurate activity counts, and therefore, all existing and forecast activity is estimated. As shown in Table A-3, all four scenarios of the Encroachment Analysis assumes a higher nighttime activity percentage for business aircraft operations (i.e., turboprops and jets) than the *LNC Master Plan*. FAA data for Alliance Airport was used to estimate the day/night split of freight operations at LNC.

Summary of Inputs

Aircraft activity data was primarily collected from the *January 2006 Lancaster Airport Master Plan Update*. As shown in Table A-4, the *LNC Master Plan* data had a base year of 2005 and an ultimate forecast year of 2025. Note that operations are input into INM as daily values – total annual operations are shown in the "Annual" row.

TABLE A.4 – MASTER PLAN INM DATA												
INM Aircraft	**2005**			**2010**			**2015**			**2025**		
	ARR	**DEP**	**TGO**	**ARR**	**DEP**	**TGO**	**ARR**	**DEP**	**TGO**	**ARR**	**DEP**	**TGO**
GASEPF	29.30	29.30	1.81	35.58	35.35	2.18	43.07	43.07	2.66	80.53	80.53	4.98
GASEPV	29.30	29.30	1.81	35.58	35.35	2.18	43.07	43.07	2.66	80.53	80.53	4.98
BEC58P	16.33	16.33	0.33	17.64	17.64	0.35	18.73	18.73	0.38	26.17	26.17	0.53
CNA441	2.12	2.12	--	2.36	2.36	--	2.59	2.59	--	3.70	3.70	--
DHC6	2.12	2.12	--	2.36	2.36	--	2.59	2.59	--	3.70	3.70	--
LEAR25	0.18	0.18	--	0.10	0.10	--	0.07	0.07	--	--	--	--
LEAR35	5.26	5.26	--	5.45	5.45	--	5.43	5.43	--	6.24	6.24	--
GIIB	--	--	--	0.52	0.52	--	0.66	0.66	--	1.27	1.27	--
MU3001	0.80	0.80	--	0.73	0.73	--	0.85	0.85	--	1.48	1.48	--
Total	**85.41**	**85.41**	**3.95**	**100.32**	**100.32**	**4.71**	**117.06**	**117.06**	**5.70**	**203.62**	**203.62**	**10.49**
Annual	**63,791**			**74,953**			**87,534**			**152,472**		

As previously described, the Encroachment Analysis used a base year of 2006 and an ultimate forecast year of 2026. Data from the *LNC Master Plan* was used to interpolate (used to estimate in-between values based on average annual growth rates) the Encroachment Analysis activity levels for 2006, 2011, 2016, and 2026.

Due to the anticipated increase in activity from runway extensions and other developments at LNC (related to the goals outlined in the *LNC Sector Plan*), the following assumptions were incorporated into the INM scenarios of the Encroachment Analysis:

- Aircraft fleet mix percentages are based on the most recent year of available data from the *LNC Master Plan*, except in 2016 and 2026 (as described in the bullets below)
- In 2016 and 2026, CNA441 and DHC6 turboprop operations will increase 25% over the *LNC Master Plan* forecast
- In 2016 and 2026, MU3001, LEAR35, and GIV business jet operations will increase 100% over the *LNC Master Plan* forecast
- In 2026, CNA750 and CL610 business jets will each conduct 1,000 operations

- In 2026, a total of 5,000 freight operations will be conducted by EMB120 turboprops (2,500 operations), MD81 medium jets (1,750 operations), and A310-304 large jets (750 operations)

Based on these assumptions, the Encroachment Analysis INM inputs are summarized in Table A-5.

TABLE A.5 – ENCROACHMENT ANALYSIS INM DATA												
INM Aircraft	**2006 (Scenario 1)**			**2011 (Scenario 2)**			**2016 (Scenario 3)**			**2026 (Scenario 4)**		
	ARR	**DEP**	**TGO**	**ARR**	**DEP**	**TGO**	**ARR**	**DEP**	**TGO**	**ARR**	**DEP**	**TGO**
GASEPF	30.26	30.26	1.87	36.69	36.69	2.27	45.52	45.52	2.82	85.13	85.13	5.27
GASEPV	30.26	30.26	1.87	36.69	36.69	2.27	45.52	45.52	2.82	85.13	85.13	5.27
BEC58P	16.87	16.87	0.34	18.19	18.19	0.37	19.80	19.80	0.40	27.66	27.66	0.56
CNA441	2.19	2.19	--	2.43	2.43	--	3.42	3.42	--	4.89	4.89	--
DHC6	2.19	2.19	--	2.43	2.43	--	3.42	3.42	--	4.89	4.89	--
MU3001	0.83	0.83	--	0.75	0.75	--	1.80	1.80	--	3.13	3.13	--
LEAR25	0.19	0.19	--	0.10	0.10	--	0.07	0.07	--	--	--	--
LEAR35	5.43	5.43	--	5.62	5.62	--	11.48	11.48	--	13.19	13.19	--
GIV	--	--	--	0.54	0.54	--	1.40	1.40	--	2.68	2.68	--
CNA750	--	--	--	--	--	--	--	--	--	1.37	1.37	--
CL610	--	--	--	--	--	--	--	--	--	1.37	1.37	--
A310-304	--	--	--	--	--	--	--	--	--	1.03	1.03	--
MD81	--	--	--	--	--	--	--	--	--	2.40	2.40	--
EMB120	--	--	--	--	--	--	--	--	--	3.42	3.42	--
Total	**88.21**	**88.21**	**4.08**	**103.46**	**103.46**	**4.91**	**132.44**	**132.44**	**6.03**	**236.29**	**236.29**	**11.09**
Annual	**65,885**			**77,314**			**98,882**			**176,538**		

The *LNC Master Plan* forecasts strong activity growth through 2025 (increase from approximately 64,000 to 152,000 operations over a 20-year period). Due to the *LNC Airport Sector Plan* and proposed *Dallas Logistics Hub*, the total activity was increased to approximately 177,000 by 2026 for the Encroachment Analysis, with higher percentages of turboprop and jet activity. For comparison purposes, Alliance Airport had approximately 107,000 operations in 2006.

APPENDIX H

EXPANSION PLAN

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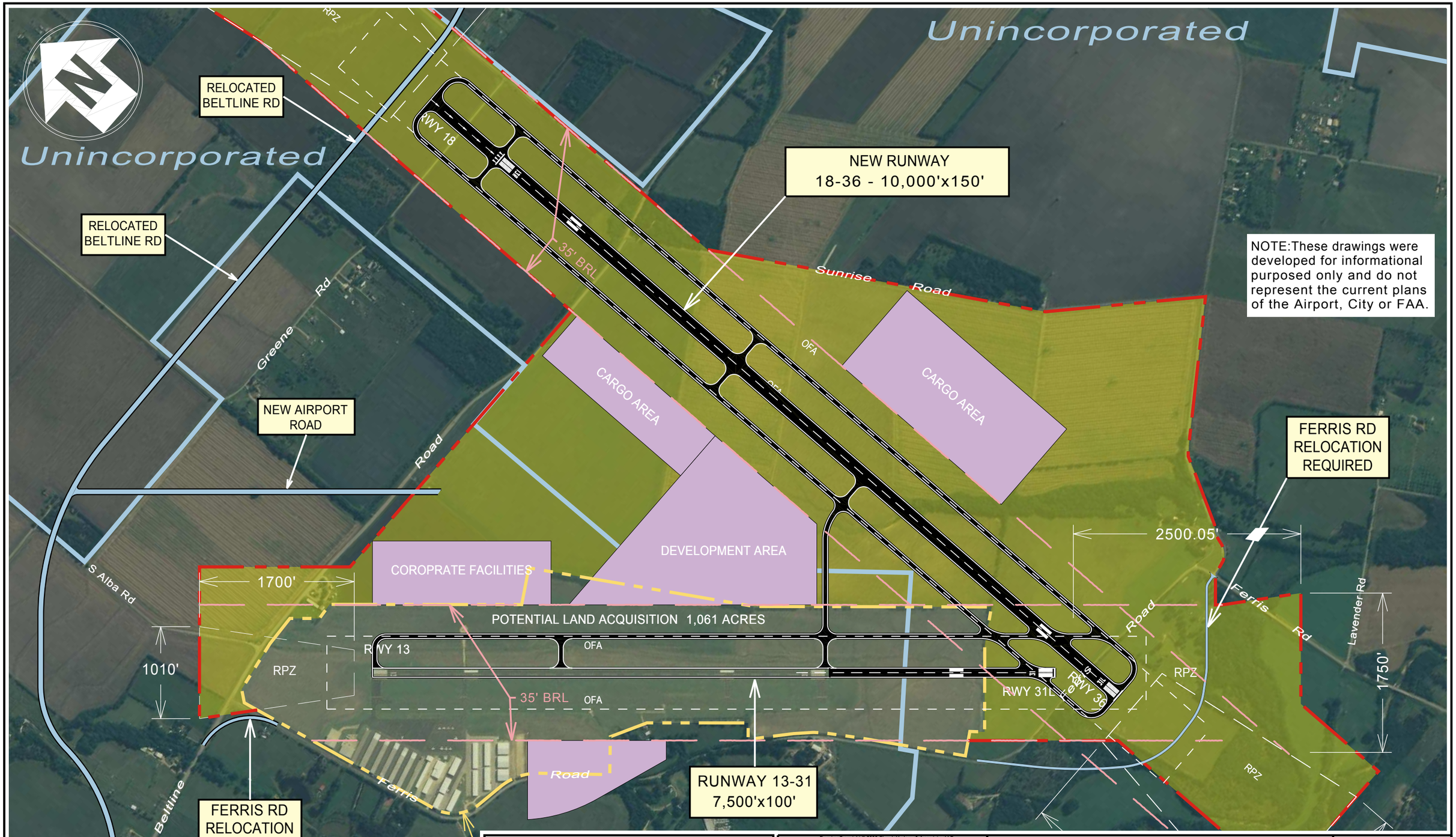

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Potential Land Acquisition

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CONCEPTUAL EXPANSION PLAN
LAYOUT 3

Demonstration Encroachment Analysis
Lancaster Airport

FIGURE H-3

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CONCEPTUAL EXPANSION PLAN LAYOUT 2

Demonstration Encroachment Analysis
Lancaster Airport

FIGURE H-2

JANUARY 2008

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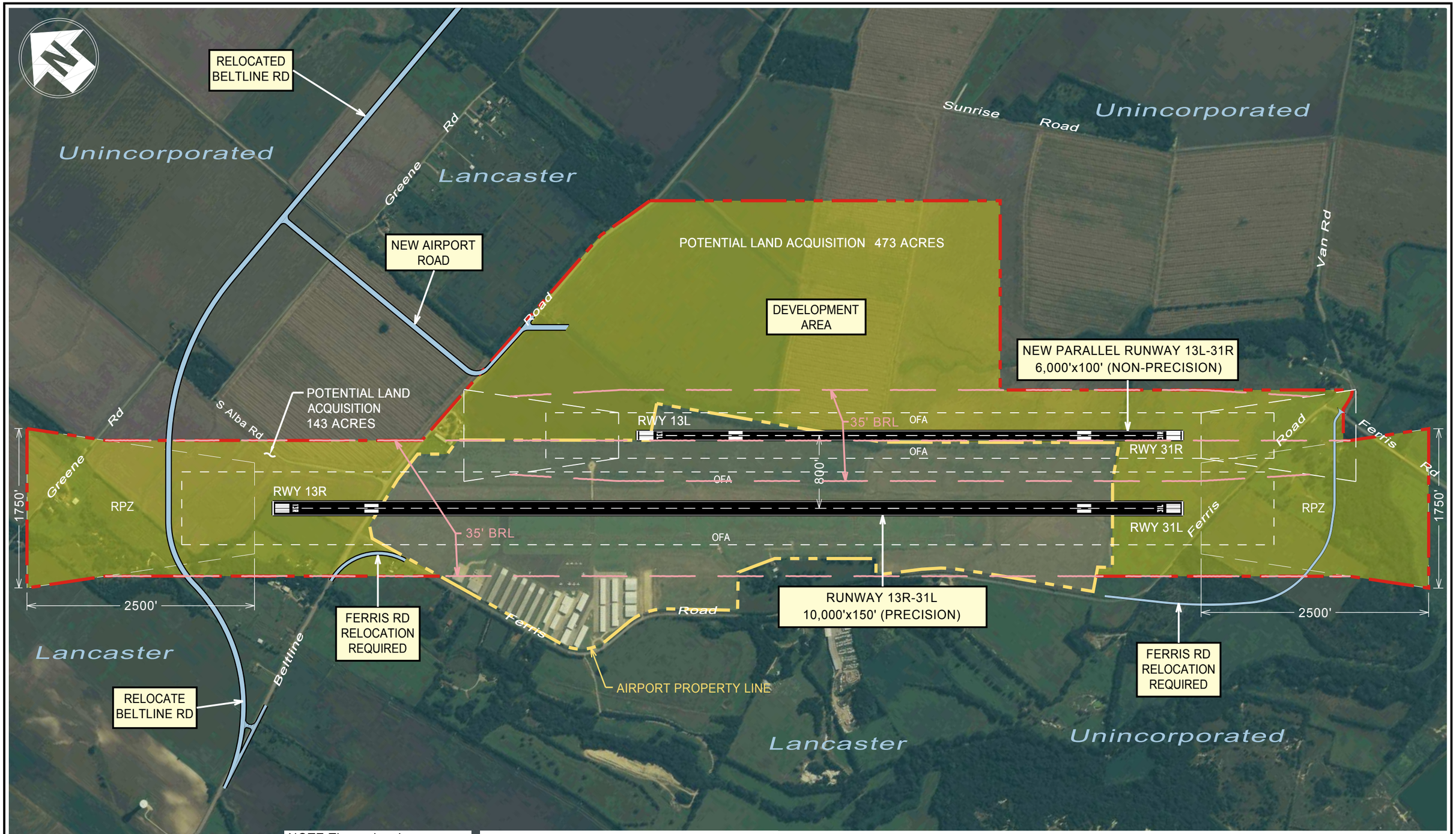

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CONCEPTUAL EXPANSION PLAN
LAYOUT 1

Demonstration Encroachment Analysis
Lancaster Airport

FIGURE H-1

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CONCEPTUAL EXPANSION PLAN LAYOUT 3, WITH ROAD NETWORK

Demonstration Encroachment Analysis
Lancaster Airport

FIGURE H-4

JANUARY 2008

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