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KENT STATE UNIVERSITY

MASTER PLAN REPORT

DRAFT
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TABLE OF CONTENTS

EXECUTIVE SUMMARY

CHAPTER I - BACKGROUND AND OBJECTIVES
Background . . . I-1
Goals and Objectives . . . I-2
Purpose and Need . . . I-2

CHAPTER II - INVENTORY
Study Area . . . II-1
Airport Location and Study Area Definition . . . II-1
Area and Land Use . . . II-1
Airport Access . . . II-3
Socioeconomic Characteristics . . . II-3
Area Airports in the Vicinity . . . II-3
Airport Facilities . . . II-5
Airfield Area . . . II-5
Runway and Taxiways . . . II-5
Drainage . . . II-7
Airfield Lighting and Navigation Aides . . . II-7
Runway Protection Zones and Safety Areas . . . II-10
Terminal Area . . . II-10
Terminal Building . . . II-10
Aircraft Parking Apron . . . II-10
Airfield Access . . . II-10
Auto Parking . . . II-12
Hangar Facilities . . . II-12
Fueling Facilities . . . II-12
Utilities . . . II-12

CHAPTER III - FORECASTS OF AVIATION DEMAND
Socioeconomic Characteristics . . . III-1
Population . . . III-1
Economic Conditions . . . III-3
Socioeconomic Summary . . . III-6
Aviation Demand Projections . . . III-6
Forecast Approaches . . . III-7
Kent State University Based Aircraft Forecasts . . . III-10
Aircraft Fleet Mix . . . III-13
Annual Airport Operations . . . III-17
Design Hour Operations . . . III-20
Annual Instrument Approaches . . . III-20
Summary of Aviation Forecasts . . . III-20

CHAPTER IV - AIRPORT CAPACITY ANALYSIS
Airport Layout . . . IV-1
Meteorological Conditions . . . IV-1
Aircraft Operational Fleet Mix . . . IV-1
Touch and Go Operations . . . IV-2
Runway Utilization . . . IV-2

CHAPTER V - FACILITY REQUIREMENTS
Landside V-2

A. Terminal/Administration Building V-2
B. Auto Parking V-3
C. Access Road V-4
Airside V-5
A. Runway Orientation V-5
B. Runway Length Requirements V-5
C. Runway Design Standards V-7
D. Pavement Strength V-9
E. Taxiways V-10
F. Airfield Approach, Navigational, and Lighting Aides V-10
G. Land Area V-10
H. Hangars and Hangar Apron V-11
I. Local and Itinerant Aircraft Apron V-13
J. Fuel Storage and Dispensing Equipment V-15
Summary of Facility Requirements V-16

CHAPTER VI - ANALYSIS OF ALTERNATIVES
Description of Airport Alternatives VI-1
Airfield Alternative #1 . . . . VI-1
Airfield Alternative #2 . . . . VI-7
Airfield Alternative #3 . . . . VI-16
Airfield Alternative #4 . . . . VI-21
Airfield Alternative #5 . . . . VI-26
Airfield Alternative #6 . . . . VI-36
Airfield Alternative #7 . . . . VI-38
Airfield Alternative #8 . . . . VI-42
General Aviation Terminal Apron Alternatives VI-44
General Aviation: Alternatives #2, #4 & #5 . . . . VI-44
Alternative #3 & #4E VI-45
Alternative #6 . . . . VI-45
Alternative #7 . . . . VI-46
Evaluation of Alternatives VI-47
Economic Evaluation VI-47
Present Worth Analysis VI-49
Environmental Evaluation VI-50
Noise VI-50
Compatible Land Use VI-60
Social Impacts VI-61
Induced Socioeconomic Impacts VI-61
Air Quality VI-62
Water Quality VI-63
Department of Transportation, Section 4(f) VI-63
Historic, Architectural, Archaeological, and Cultural Resources VI-63
Biotic Communities VI-64
Endangered and Threatened Species of Flora and Fauna VI-64
Wetlands VI-64
Floodplains VI-64

Coastal Zone Management Program . . . VI-65
Coastal Barriers . . . VI-65
Wild and Scenic Rivers . . . VI-65
Farmland . . . VI-65
Energy Supply and Natural Resources . . . VI-66
Light Emissions . . . VI-66
Solid Waste Impacts . . . VI-66
Construction Impacts . . . VI-67
Hazardous Waste . . . VI-67
Summary of Alternatives . . . VI-68
Pros and Cons . . . VI-68
Alternative #1 . . . VI-68
Alternative #1A . . . VI-68
Alternative #1B . . . VI-69
Alternative #2A . . . VI-69
Alternative #2C . . . VI-70
Alternative #3A . . . VI-70
Alternative #4A . . . VI-70
Alternative #4B . . . VI-71
Alternative #4C . . . VI-71
Alternative #4E . . . VI-71
Alternative #5 . . . VI-72
Alternative #6 . . . VI-72
Alternative #7 . . . VI-73
Alternative #8 . . . VI-73

CHAPTER VII - AIRPORT LAYOUT PLAN
Title Sheet and Airport Data Sheet . . . VII-1
Airport Layout Plan . . . VII-1
Aerial Photograph . . . VII-2
Runway Approach Zones . . . VII-2
Terminal Layout Plan . . . VII-2
FAR Part 77 Surfaces . . . VII-2
Airport Property Map . . . VII-3

CHAPTER VIII - PLAN IMPLEMENTATION
General . . . VIII-1
Phase Implementation Schedule . . . VIII-1
Financial Plan . . . VIII-2
Funding Sources . . . VIII-8
Financing Summary . . . VIII-9

CHAPTER IX - ECONOMIC IMPACT
Introduction and Purpose . . . IX-1
Definitions of Economic Impacts . . . IX-1
Direct Impact . . . IX-2
Indirect Impact . . . IX-2
Induced Impact . . . IX-3
Economic Impact of the Airport Summary . . . IX-3

GLOSSARY

APPENDIX
- KSU Approach Plate, VOR or GPS-A (EC-2, JAN 2003)
- KSU Approach Plate, GPS, Rwy 19 (EC-2, JAN 2003)
- KSU Approach Plate, NDB or GPS RWY 1 (EC-2, JAN 2003)
- Digital Raw Counts From 9 Week Recording Period (April and May 2003)
- Current T-Hangar Waiting List (2003)
- Sample Airport User Survey
- Comparable Real Estate Appraisals/Sales (Spalding/Emig Company 2002)
- Aeronautics Division: Strategic and Budget Plan (Dr. Isaac Nettey 2002)
- KSU Airport and Aerospace Technology Task Force Report (1995)
- Airport Design Airplane and Airport Data
- FAA Central Region "Takeoff Runway Length Requirements" spreadsheet program including Kent State University Itinerant BII Aircraft
- Decommissioning existing Airfield Line Item and Cost Breakdown (January 2004)
- Edinburg Township Zoning Map (1995)
- Existing Portage County Airport Layout Plan
- Notice of Landing Area Proposal (7480) Forms (for the Decommissioning of the sod runways)
- Zoning and Land Use Map
- Shalersville Township Zoning Map
- Letters to the US Fish and Wildlife Service, the Ohio Department of Natural Resources, and the Ohio Historic Preservation Office for environmental review
- Alternative Rating/Selection Criteria

PUBLIC RESPONSE APPENDIX (detached)

BIBLIOGRAPHY

TABLE OF EXHIBITS

CHAPTER II

State Location Map with Study Area II-2
Surface Transportation Access II-4
Kent State University Area Airports II-6
Kent State University Airport Layout Plan, 1984 (P. Zwick Associates, Inc.) II-8
Existing Airport Layout Plan, 2003 . . . . II-9
Terminal Layout Plan - Existing Conditions, 2003 . . . . II-11

CHAPTER III

Kent State University - Based Aircraft Forecast Graph III-22
Kent State University - Airport Operations Forecast Graph III-23

CHAPTER IV

Airport Capacity and Delay For Long Range Planning IV-4

CHAPTER VI

Airport Alternative #1 - "Do Nothing" VI-4
Airport Alternative #1A- "Upgrade to Meet AI Standards" VI-5
Airport Alternative #1B - "Upgrade to Meet AII Standards" VI-6
Airport Alternative #2A - "Runway End 1 Extended South over North River Road, Visibility Minimums Not Lower Than One Mile" VI-12
Airport Alternative #2B - "Runway End 1 Extended South over North River Road, Visibility Minimums Not Lower Than 3/4 Mile" VI-13
Airport Alternative #2C - "Runway End 1 Extended South, North River Road Relocated, Visibility Minimums Not Lower Than One Mile" VI-14
Airport Alternative #2D - "Runway End 1 Extended South, North River Road Relocated, Visibility Minimums Not Lower Than 3/4 Mile" VI-15
Airport Alternative #3A - "Runway, Taxiway and Airport Facilities Developed East of Runway 1-19 Centerline, Visibility Minimums Not Lower Than One Mile" VI-19
Airport Alternative #3B - "Runway, Taxiway and Airport Facilities Developed East of Runway 1-19 Centerline, Visibility Minimums Not Lower Than 3/4 Mile" VI-20
Airport Alternative #4A - "Runway End 19 Extended North over State Route 59 (Kent Road), Visibility Minimums Not Lower Than One Mile" VI-27
Airport Alternative #4B - "Runway End 19 Extended North over State Route 59 (Kent Road) Visibility Minimums Not Lower Than 3/4 Mile" VI-28
Airport Alternative #4C - "Runway End 19 Extended North, State Route 59 (Kent Road) Relocated, Visibility Minimums Not Lower Than One Mile" VI-29
Airport Alternative #4D - "Runway End 19 Extended North, State Route 59 (Kent Road) Relocated, Visibility Minimums Not Lower Than 3/4 Mile" VI-30
Airport Alternative #4E - "Runway End 19 Extended North over State Route 59 (Kent Road), Visibility Minimums Not Lower Than One Mile, Taxiway & Landside Facilities Developed East of Runway VI-31
Airport Alternative #5 - "Runway 1-19 Extended North and South, Visibility Minimums Not Lower Than One Mile VI-34

Airport Alternative #5A - "Runway 1-19 Extended North and South, Visibility Minimums Not lower Than 3/4 Mile (Runway End 19), Visibility Minimums Not Lower Than 1 Mile (Runway End 1) VI-35
Airport Alternative #6 - "New Airport Site" VI-37
Airport Alternative #7 - "Transfer Service to an Airport in the Vicinity" VI-39
Kent State University Airport Flight Tracks VI-54
Existing Noise Conditions (2003) VI-57
Future Noise Conditions With Development (2013) VI-58
Ultimate Noise Conditions with Development (2023) VI-59

CHAPTER VII
Title Sheet VII-4
Airport Data Sheet VII-5
Existing Airport Layout Plan VII-6
Aerial Photograph VII-7
Runway Approach Zones VII-8
Terminal Layout Plan VII-9
FAR Part 77 Surfaces VII-10
Airport Property Map VII-11

CHAPTER VIII
Alternative 7 Phasing VIII-7

Kent State University Airport Master Plan
Executive Summary

Kent State University initiated the Airport Master Plan process as encouraged by the Federal Aviation Administration (FAA) to update the 1974 Airport Master Plan and the 1984 Airport Layout Plan. Per FAA guidelines, a master plan is a periodic update that will provide the framework needed to guide future airport development of an airport. The purpose of the airport master plan is to provide a framework for future airport development which satisfies aviation demand and facility requirement in a financially feasible manner while resolving aviation, environmental, and socio-economic issues existing in the community. The process is to examine existing conditions, develop aviation demand forecast, analyze alternatives to select the best long-term approach to meet the master plan goals and objectives over the twenty year planning horizon. Kent State University, via a consultant selection process, employed Richland Engineering as the airport master plan consultant. The master plan process began in late 2001.

Kent State University Airport is located in the City of Stow, Summit County, in the State of Ohio. It consists of 287 acres, has one paved 4,000'* x 60' runway, parallel taxiway, medium intensity runway and taxiway lighting, terminal building, fuel farm, 14 T-hangars, community hangar, maintenance hangar, aircraft parking area, four mobile office trailers and gravel vehicle parking area.

*The physical length of the runway is 4,000', while the usable length is 3,950 ' due to a 50' displaced threshold on approach end 1.

The forecast demand shows substantial growth in air activities and increase in BII category aircraft. To accommodate demand, a runway expansion to 4,420 feet is needed to meet design standard of BII aircraft. Eighteen alternatives were developed and analyzed. Alternatives range from "do nothing," to expansion of existing site, to new airport and to merge operations taking advantage of existing airport infrastructure. Each alternative was analyzed in detail to determine potential for ultimate development in terms of aviation demand, social, environmental and financial feasibility.

Alternatives were reviewed by the airport sponsor, a standing committee consisting of airport users, area residents, adjacent city representative, airport staff, flight training representatives and brought forward to public meetings. Participation by the standing committee and well-attended public meetings during the planning process were very helpful in assessing both the short-term and long-term viability of the alternatives. The analysis process coupled with public scrutiny has weighed heavily in the decision making of the sponsor whether future development is possible at the existing site or to relocate and merge operations at a nearby existing airport.

Information contained in the master plan report and further presented during meetings and discussions, enabled decision making to recommend the preferred alternative that meets the master plan goals of aviation demand, design requirements using current FAA criteria, financial feasibility, environmental and community acceptance.

The alternative evaluation process narrowed the field from the eighteen developed alternatives to three feasible alternatives; Alternative 1A, a "do nothing" approach with safety upgrades, Alternative 1B also a "do nothing" approach coupled with runway widening, and Alternative 7 decommissioning existing site and further develop a nearby airport transferring all air service to that site.

Alternative 1A does not meet the goals and objectives of the master plan. This alternative is perhaps feasible from an environmental point of view. Although Alternative 1A received some organized last minute support, the Alternative did not have wide based community acceptance during the public involvement process. Alternative 1A would not offer economic opportunities to adjacent communities, it would not satisfy aviation demand, nor would it resolve aviation, social or economic issues in the community.

Alternative 1B does not meet the goals and objectives of the master plan, does not have wide-based community acceptance, offers little economic opportunity to adjacent communities, does not satisfy aviation demand nor resolve aviation, social and socio-economic issues in the community.

All alternatives at the existing site that considered physical expansion of the airport to meet forecast demand and increase air traffic were met with vocal and candid opposition, were not financially feasible, and did not support a financially strong airport. FAA Master Plan Guidelines refer to public involvement in the process and the importance of public acceptability.

The Kent State University Andrew Paton Airport once surrounded by open land, is now surrounded by residential and commercial development. Importantly, at both ends of the runway residential development has occurred. Noise, safety, property values, the possibility of additional land acquisition for future airport development, and increased air activity, were rejected by the public at large and by local elected officials. The same was true regarding Alternative 6, new airport in the Edinburg area. The "do nothing" alternative received limited public support but predicated on the caveat of "not one more foot of runway, not one more aircraft."

Alternative 7, decommission the existing airport and merge operations at a nearby airport, has received general public, local elected official support and encouragement. By the test of financially feasible, satisfying aviation demand, plan implementation, social, socioeconomic and environmental measures, Alternative 7 provides the most feasible airport development plan. It is recognized that Alternative 7 requires additional planning steps as outlined in alternative evaluations; Alternative 7, Chapter VI, pages 38 through 41.

It is recommended that Alternative # 7 is the sponsor-preferred alternative. Below is a listing of benefits supporting this choice:

Provides a high level of service. Merged operations with a nearby airport will accommodate forecast local, itinerant, general aviation and flight training activities and provide a high level of safety.

Provides a highly desirable level of service and convenience to all forecast users, both from an airside and landside perspective.

Has a high level of land use and compatibility for area wide planning, minimal, if any, impact on adjacent land use.

Is the best candidate for achieving highest efficiency in the preservation and use of resources.

Has the highest support for area wide acceptance.

Preliminary Site Assessment indicate it is the best site for development beyond the 20 year planning horizon of this study

Alternative #7 has an initial low cost, has the most favorable capital recovery potential, the lowest operating cost and the highest potential for becoming self-sustaining.

Is the prime candidate for providing a positive cash flow to cover the non federal (local) share required for capital outlays to sustain the aviation in the short and long term.

Alternative 7 has the highest present worth value and has the highest benefit cost ratio including the highest return on investment; provides for a financially strong airport.

Alternative #7 is supported by area road network and connects to expanded market areas. Direct access to I-80 offers significant long-range airport development potential and benefit.

The merger of the two existing airports into one creates a regionally significant airport that meets aviation demand, allows the Kent State University Flight Program to grow to its full potential, serves as an economic engine for the citizens of Northeast Ohio and resolves the air / land conflicts at the Stow site. As referenced in the Guidelines To Airport Master Planning, AC 150/5070-6A, the potential to have one airport serve the aeronautic interests of two or more communities should not be overlooked. In short, Alternative #7 is a win-win alternative.

The consultant team reviewed, on a preliminary basis, the Akron Fulton and Portage County airports for potential merged operations along with Alternative #6; Edinburg, as a new airport for comparison purposes. The master plan assessment shows the Portage County Airport as the best site for merged operations and the best fit for the Kent State University Flight Training activities. Based upon the preliminary screening, the sponsor supports the merged operation with Portage County Airport and acknowledges its potential to improve and expand to meet the forecast demand. The FAA Detroit Office has advised that the sponsor will need to initiate a site selection process. During the site selection process, assessment that is more detailed will be applied to each site option to best identify and support sponsor's preferred Alternative #7.

Sufficient information is available from the Portage County Airport master plan that demonstrates the airport is capable of supporting the development necessary to become a regionally significant airport. The Portage County Airport's existing master plan adopted by the Portage County Commissioners and the Portage County Airport Authority is based upon federal, state and local funds. This Master Plan will need to be updated regarding forecast and facility requirements to serve the regional needs plus completion of environmental assessment and public comment.

Preliminary conceptual configuration and airport size have been produced in support of evaluation of the site. Modifications of these concepts will be necessary during the master plan update, preparation of the environmental assessment and the final design and implementation phase. A systemic review of the Portage County airport layout plan reveals excellent potential to provide required operational capability, ground access, minimal development and operational cost, least known environmental consequences or impacts due to aircraft noise, air quality, land use, and is consistent with area wide planning and has community acceptance.

The goals of the master plan and the mission of the sponsor, Kent State University, match very well. In particular, a core mission to serve the interest of the local area and region in a proactive manner.

A significant advantage of preferred alternative recommended, Alternative 7, is to utilize existing infrastructure, take advantage of the ground transportation network and current land use to advance the nearby airport to regional significance. A concept being explored as a result of the synergy of Alternative 7 is a co-sponsorship arrangement. This will also be more fully developed in subsequent plan processes.

Preferred alternative recommended, Alternative 7, provides maximum benefit to all communities in the study area; best positions the advancement of aviation; and best serves the economic, social, socioeconomic and environmental issues in the area.

Findings and recommendations

The Master Plan makes the following findings and recommendations:

- The existing Andrew Paton Airport site of 287 acres has reached the end of its useful life as an airport. External development has surrounded the airport prohibiting cost-effective expansion. There is no political or public acceptance for any physical expansion or increase in air activity.

- The land use by the Andrew Paton Airport is not developed to the highest and best use. Continued airport use of the land restricts social and economic growth to the Stow and Munroe Falls communities.
- The Andrew Paton Airport should be decommissioned and all air activities transferred and merged with a nearby existing airport. This action provides synergistic results for general aviation demand for all communities in the area.
- A nearby existing airport, compatible with area land use and located in direct relationship to area interstate system, provides aviation opportunity for regionally-significant airport serving Northeast Ohio and general aviation.
- A merged airport would be positioned to improve revenues, lower overall operational and maintenance costs and capital costs by use of existing infrastructure that could result in a self-sufficient airport serving larger populated areas.
- By close proximity to commercial and industrial as well as private users located in Hudson, Kent, Ravenna and Streetsboro no negative impact with respect to driving distance or driving time is expected.
- The benefits of a regionally significant airport clearly outweighed the cost associated with this alternative. Importantly, the nearby airport is positioned to serve aviation well beyond the twenty-year planning horizon of this master plan.
- As a regional airport, co-sponsorship of the airport brings additional entities to the table with full commitment to improve safety and develop the airport to its full potential and thereby, best serve general aviation in the future.

KENT STATE UNIVERSITY AIRPORT
MASTER PLAN STUDY
ALTERNATIVE RATING/SELECTION CRITERIA

	PRIMARY ALTERNATIVE CONSIDERATION	EXISTING AIRPORT ALTERNATIVES Alt. 1	Alt. 1A	Alt.1B	Alt. 2A	Alt. 2B	Alt. 2C	Alt. 3A	Alt. 3B	Alt. 4A	Alt. 4B	Alt. 4C	Alt. 4E	Alt. 5	#6 *Construct Airport On New Site	#7 Transfer to Other Airport	#8 Transfer and Maintain Exist.
1.	Distance to primary users.	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	1
2.	Runway orientation/wind coverage.	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	2
3.	Public Acceptance.	3	4	4	5	5	5	4	5	4	5	5	4	5	3	2	2
4.	Land use issues.	2	3	3	4	5	5	3	4	4	5	5	4	4	3	2	2
5.	Land availability.	3	4	4	5	5	5	4	5	4	5	5	4	4	2	2	2
6.	No parcels/acres affected.	1	1	1	2	3	2	3	4	2	3	4	2	3	2	2	2
7.	No. of families/business relocation.	1	1	1	2	5	2	2	5	2	5	3	2	2	2	1	1
8.	Suitability for ultimate development.	4	4	4	4	5	4	4	5	4	5	4	3	4	2	2	3
9.	Anticipated ultimate development cost.	1	1	1	1	3	5	3	4	2	5	3	3	4	3	1	2
10.	Suitability for crosswind runway.	5	5	5	5	5	5	5	5	5	5	5	5	5	1	3	5
11.	Adaptability for ultimate land use.	4	5	5	5	5	5	5	5	5	5	5	5	5	2	2	3
12.	Existing adverse easements.	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	2
13.	Existing user/non-user agreements.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
14.	Tax base effect.	3	3	3	4	5	4	3	5	3	5	4	3	5	1	1	3
15.	Adverse topography effect.	2	3	3	3	5	4	3	4	3	5	3	3	5	2	2	2
16.	Wind data utilization.	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2
17.	Access to major business routes.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
18.	Adverse environmental issues.	2	2	3	4	5	4	4	5	3	5	4	4	4	3	2	2
19.	Positive environmental issues.	3	3	3	4	5	4	4	5	3	5	4	4	4	3	2	2
20.	Airspace compatibility.	3	3	3	3	3	3	3	3	3	3	3	3	3	1	2	2
21.	Obstruction effects.	2	3	3	3	5	4	3	4	3	5	3	3	3	2	2	2
22.	Available utilities.	1	1	1	1	1	1	1	1	1	1	1	1	1	4	2	2
23.	Soil conditions.	2	2	2	2	2	2	2	2	2	2	2	3	3	2	2	2
24.	Potential for community growth stimulus.	4	3	3	3	3	3	3	3	3	3	3	2	4	3	1	3
25.	Compatibility with regional plan.	3	3	3	4	4	4	4	4	4	4	4	4	4	2	2	3
26.	Compatibility with existing businesses.	4	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3
27.	Affect on energy uses/energy reserves.	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2
28.	Cost benefit ratio.	1	1	1	3	4	3	3	4	2	5	3	2	5	3	1	2
29.	Return on investment.	1	1	1	3	5	3	3	4	3	5	4	3	4	4	1	3
30.	Noise factor/maximum exposure rate/noise contours.	3	4	4	4	4	4	4	4	4	4	4	4	4	1	2	2
31.	Compatible with local philosophy.	3	3	3	3	4	4	3	5	4	5	5	3	5	3	2	2
32.	Other factors as become apparent from public and standing committee.	2	3	3	3	5	3	3	4	3	5	4	3	5	3	1	2
	TOTAL RATING	77	83	84	97	118	105	96	116	93	122	107	93	113	71	54	71

* The alternatives study investigated one potential site within Portage County. This site would adequately support the operational demands.
Estimated costs for developing the alternative site is $19.6 million dollars.

Point Ranking

1 = Desirable - Closest to ideal conditions
2 = Good - Meeting the required qualities
3 = Adequate - Meeting only minimum qualitites
4 = Poor - Not meeting minimum qualities (or requires extensive modifications.)
5 = Inadequate - Minimum qualities cannot be achieved without servere adverse affects.
Most Accpetable Alternative (Lowest Points)

KENT STATE UNIVERSITY
BOARD OF TRUSTEES
May 25, 2004

Resolution

KENT STATE UNIVERSITY AIRPORT MASTER PLAN

WHEREAS, Kent State University operates a public use airport in Stow, Ohio, for the benefit of its aeronautics program and general aviation; and

WHEREAS, in 2001 the Federal Aviation Administration (FAA) provided funding for the completion of a twenty-year master plan for the Airport; and

WHEREAS, the purpose of the master plan is to provide a framework for future development at the Airport that satisfies aviation demand in a financially feasible manner and is compatible with aviation, environmental and socioeconomic issues in the community; and

WHEREAS, after much study and deliberation it was determined that meeting future aviation needs at the current airport site is neither financially feasible nor compatible with community issues; and

WHEREAS, the recommendation resulting from the master plan process given these outcomes is that future needs of general aviation can best be served by decommissioning the Kent State University Airport and transferring air operations to a nearby airport; now, therefore,

BE IT RESOLVED, that the Kent State University Board of Trustees endorses the master plan recommendation to decommission the Kent State University Airport and transfer air operations to a nearby airport; and

BE IT FURTHER RESOLVED, that the Kent State University Board of Trustees recognizes that since the process to decommission the Airport will be lengthy and is not likely to occur for several years, the University will continue its past practice of working with area residents and elected officials to minimize the impact of flight operations on the nearby communities while still meeting the needs of general aviation.

current site, increased flight activity is almost assured and the need to eventually lengthen the runway is unavoidable. Even minor changes in the site like widening the runway for safety purposes or providing additional hangars in response to pilot demand will lead to greater flight activity and a more urgent need to lengthen the runway. It is impractical to effectively serve the needs of general aviation when there is so little flexibility at a site and the community issues conflict so strongly with general aviation needs.

While the current flight activity at the Airport is still consistent with the existing site and there is time to prepare for a change, the University needs to adopt a master plan that can meet general aviation needs in the future which requires that air operations be relocated to a nearby airport. This process will be lengthy so it is important that it proceed immediately. Until the transfer of air operations can be accomplished, the University will continue to work with area residents and political leaders to minimize the negative impacts of flight operations on area residents while still responding to the needs of general aviation.

While the primary focus of the master plan was on general aviation, the transfer of air operations to a nearby airport also is consistent with input provided on the Airport by the Provost. Such a transfer, though, would need to respond to academic program requirements such as ensuring the safety of flight instruction and avoiding problematic disruptions in flight training activities associated.

Alternatives and Consequences

Approval of the Kent State University Airport Master Plan is critical to serving the long-term needs of general aviation and the aeronautics program in a manner that is compatible with the local communities.

Specific Recommendation and Justification

It is recommended that the Board of Trustees adopt the Kent State University Master Plan, and this endorsement will be included with the plan when it is submitted to the FAA.

Timetable and Action Required

Approval by the Board of Trustees is requested at its meeting on May 6, 2004.

KENT STATE UNIVERSITY
BOARD OF TRUSTEES
May 6, 2004

Background

KENT STATE UNIVERSITY AIRPORT MASTER PLAN

General Information

Operating the Kent State University Airport is especially complex because of the many factors that must be considered when trying to meet the needs of so many different interests. More problematic is the reality that what best serves general aviation and Kent State's aeronautics program often conflicts with the needs or desires of the nearby communities.

The complexity of the Airport situation clearly requires a long-term plan that both identifies the general aviation needs that must be served and how these needs can best be met given the limitations of the current site and local community issues. Funding for a master plan was provided by the Federal Aviation Administration (FAA) and the project was undertaken late in 2001.

The planning process has helped to better clarify issues that were even more complex than initially expected. The aviation demand analysis that was completed showed an increase in the amount of flight activity by BII category aircraft at the Airport and conservatively estimated a growth in flight activity of 40% over the 20-year planning horizon.

To accommodate the projected demand, a runway lengthening and widening will eventually be needed to meet the design standards for the type of flight activity that is anticipated at the Airport. Since the existing site cannot accommodate the required lengthening of the runway, eight distinct alternatives along with ten additional refinements were developed, analyzed and discussed with the affected communities.

Through this process it was concluded that lengthening the runway at the existing site is neither financially feasible nor compatible with the communities that would be affected. The most viable alternative that emerged from the planning process was the decommissioning of the Airport and the transfer of the air operations to a nearby airport.

The planning process also identified a strong desire by the aviation community and some nearby residents for the Airport to remain at its current site. In response to this interest a status quo or "as is status" alternative was also considered, given additional study and presented for public comment along with the recommendation to transfer air operations.

In the final analysis, the status quo alternative was determined to be neither realistic nor responsive to meeting the changing needs of general aviation. If the Airport remains at the

Adopted: May 25, 2004, at Kent State University by its Board of Trustees present this date:

Margaret Ralston Payne

Margaret Ralston Payne
Executive Assistant to the President and
Secretary to the Board of Trustees

CHAPTER I

BACKGROUND AND OBJECTIVES

Background

The Kent State University Airport provides the needs for access to air transportation for the Kent State University and the communities within Summit and Portage Counties. The airport opened for public use in 1920 under the name of Stow Aviation Field. Since then incremental improvements were made based on need to serve aviation demand. The Kent State University acquired the airport in 1943 and made phased improvements to include the needs of the University's flight training program.

Currently the airport has one active 3,950 feet long and 60 feet wide asphalt runway. The runway has a south to north (1/19) orientation and has a full length 35 feet wide parallel taxiway. The airport also has a local fueling apron, a terminal building, a large conventional hangar, a maintenance hangar, a T-hangar, flight training facilities and vehicle parking. Two sod crosswind runways (Runway 5-23 and Runway 9-27) have been closed indefinitely but have not been decommissioned yet. The airside facilities meet current minimum federal safety and operational standards for small aircraft with wing span less than 49 feet and approach speed less than 91 knots. It appears, however, that the landside facilities to support the aviation demand are not adequate to satisfy user needs.

When constructed in 1920, the airport was located in predominantly rural surrounding. Since then the surrounding communities of Kent, Stow and Munroe Falls have experienced enormous growth and have extended their respective City Limits to enclose the airport. Specifically, the City of Stow has grown from 27,702 in 1990 to over 32,000 in 2000. This population growth shows that the City of Stow is one of the most rapidly growing cities in the State of Ohio. These ensuing residential and commercial developments have completely boxed in the facilities, and community growth effectively has eliminated the possibility to implement the cross-wind runway as depicted in the 1985 Airport Layout Plan.

Kent State University has played a major role in the success of the airport through its outstanding flight training program. The Division of Aeronautics prepares students for career opportunities in commercial aviation, as FAA certified pilots and aircrew members, in related air travel industries. The flight training program has outgrown its current building facilities. Surrounding airport development may limit its ability to grow and to meet the future demand for flight-training education.

The University elected to prepare a Master Plan for the Kent State University Airport in order to meet the ever-changing demands of professional aviation through a continued University policy to periodically evaluate the flight-training program and the airport facilities. This Master Plan document will serve as an update for the 1974 Master Plan and the 1985 Airport Layout Plan.

The Master Plan will define, in incremental time frames, the type and extent of aviation development activities that would be necessary for the airport to meet the community's current and projected aviation demand, including the university's flight training program. The ultimate planning period is for 20 years, i.e. until at least 2023. In addition, this plan will allow Kent State University to be proactive over the next 20 years.

Goals and Objectives

A proven method of achieving the goals established in the Master Plan is to provide guidelines for future airport development in a financially feasible manner while reconciling aviation, environmental, and socioeconomic issues. Specific objectives to satisfy community aviation demand are to:

- Provide an achievable and graphic presentation for the future development of an airport at a suitable location that is compatible with current and anticipated land uses.
- Establish a realistic schedule for implementing the recommended developments for short-term time frames, 5 years, intermediate-term time frames, 10 years, and long-term time frames, 20 years. The upfront 5 year capital improvement plan should be of particular interest.
- Investigate alternatives and their potential for meeting technical, social, economic and environmental qualities which are desirable and concurrent with aviation needs in the future.
- Develop and recommend an achievable financial plan that will support the implementation schedule.
- Present for public consideration, in a forthcoming manner, a plan which adequately addresses the issues and meets community, state, and federal requirements.
- Research and document policies, historic and future aviation demand (to reconcile spending), debt incurrence, land use, subdivision regulations and potential obstructions to navigation.
- Establish a framework for a continued process of planning and monitoring of achieved goals; and when circumstances change, recommend a plan modification.

These Master Plan objectives and goals will provide or ensure the following:

- ▸ A high level of safety
- ▸ A desirable level of service and convenience
- ▸ A desirable level of land use and compatibility between community and airport
- ▸ Highest efficiency in the preservation and use of resources
- ▸ A reasonable level of accessibility
- ▸ Area wide and community acceptance

Purpose and Need

The purpose of the Airport Master Plan is to provide achievable goals and guidance for future airport development to the community and Kent State University. The goals will meet aviation demand; they will be accepted by the community; they will be environmentally compatible; and they will coordinate with other modes of local, state, and national transportation.

The adoption of the Master Plan will be the impetus for making decisions regarding the following:

- The determination of the best feasible alternative for developing airport facilities to safely serve current and future airport users.

- The consideration of an alternative site.

- The justification and time frame for future runway, taxiway, terminal area and landside improvements. These improvements include upgrading the terminal building, corporate hangars, T-hangars, maintenance hangars, apron areas, vehicular parking, and fueling facilities.

- The need for additional land acquisition for approaches and expansion.

- The recommended obstruction removal and other developments that will contribute to safer runway approaches.

- An economic impact analysis that will compile economic, socio-economic and demographic data to accurately depict the value of the airport to the affected communities.

- The development of runway safety areas to meet the required FAA design standards.

- The establishment of a public information source and review program utilizing a standing committee, user survey and public hearing process.

- The determination of instrument approach minimum requirements needed to meet current and projected aviation demand and to maximize aviation safety.

- The prioritization of the improvements as they pertain to the financial capability of Kent State University, the Ohio Department of Transportation - Office of Aviation and the Federal Aviation Administration.

- The determination of physical facility developments as they relate to immediate planning, 5 to ten year, future planning, 20 year, and financial costs for these improvements.

CHAPTER II

INVENTORY

Study Area

Airport Location and Study Area Definition

Interstates 76 and 77 provide primary access to the Kent State University Airport which is located close to State Route 59 on the east boundary of Summit County. The airport is 1.4 miles west of the Portage County Line, 3.8 miles west of the City Center of Kent, 1.2 miles east of the City Center of Stow and 4.1 miles northeast of the City Center of Cuyahoga Falls. Summit County is located in northeastern Ohio and bordered on the north by Cuyahoga and Geauga counties, on the east by Portage County, on the south by Stark and Wayne counties, and on the west by Medina County.

The area for analysis in this master plan study is concentrated on a two county region in Northeast Ohio. At the centralized point of Summit and Portage County lines is the Kent State University Airport. However, since airport demand in this area is not dependent on jurisdictional boundaries, the airport's influence and users extend beyond the adjacent communities of Stow and Kent. Therefore, this Master Plan Study Area will include both Summit and Portage County with added emphasis on the western half of Portage County. A graphic representation is depicted on Exhibit II-2.

Area and Land Use

The Kent State University Airport is located in the City of Stow in the far eastern half of Summit County. The airport property consists of 287 acres of land currently owned by Kent State University. According to the Stow Comprehensive Plan, land use in the vicinity of the airport consists of retail/service industry and medium density residential to the east, low density residential and semi-public recreational to the south, mixed residential to the west and a combination of low to medium residential to the north. There is an elementary school and a church located to the northeast, and another school along North River Road to the southwest.

The Stow Comprehensive Plan outlines several planning area policies and goals for the Stow-Kent communities. The plan is prepared on the local level and does not reflect the official views or policy of the FAA. According to the plan, goals and guidelines pertaining to the airport are as follows:

- Consider airport overlay regulations for areas adjacent to the Kent State University Airport. Such regulations would limit the height and bulk of buildings according to their respective proximity to the airport and its related clear zones.
- Encourage the airport to gain ownership of the area encompassed by the clear zones, as this is the only guaranteed way to prohibit development of these areas.
- Support rezoning the airport property to a new public facilities zoning district to remove the industrial zoning in this part of the City; the Kent Road corridor is not appropriate for industrial development. Support the addition of office development on the airport property.
- Support office and retail uses for the four parcels between the Stow community shopping center and the Kent State University Airport, and combine the parcels into a single development site.
- Maintain mixed residential on the remaining vacant land to the west of the existing property. Consider residential at single-family densities to allow flexibility in design to create visual interest on relatively flat land and to provide for a variety of housing choices.

Source: Stow Comprehensive Plan (2001)

LOCATION MAP

KENT STATE UNIVERSITY AIRPORT
KENT, OHIO

II-2

Airport Access

Primary access to the Kent State University Airport from the adjoining cities, villages, and populated areas is from Kent Road (State Route 59) which is a west-east major arterial connecting with Interstate I-77 to the west and connecting with the cities of Cuyahoga Falls, Munroe Falls, Stow, Kent, Brady Lake and Ravenna. Outlying cities, villages and unincorporated areas have access to the airport through south and north running State Routes 43, 44, 5, 14 and 88. Most if not all of these state routes interchange or have connections to I-76 or I-80. While the routings from potential users to the Kent State University Airport is a relatively straight line, the actual experience to the traveler is less than desirable due to several characteristics. The characteristics for describing ground access to the airport are flow rate, speed (travel time) and density. The operational state of the various State Routes providing access to the airport users has been defined by the Akron Metropolitan Area Transportation Study (AMATS) at an acceptable Level C. A level of service C exists when the traffic movements experience delay between 15 seconds and 25 seconds per vehicle through intersections and through urban arterial. For S.R. 59 the "Arterial Level of Service" has also been established at Level C indicating stable operations. Nevertheless the consultant's personal observations during AM and PM peak hours indicates that the level of service encroaches into D. Evidence to D operation was observed through substantial increases in delays through intersections causing decreases in arterial speed. In fact, the average travel speed from the KSU campus facilities to the KSU Airport has been about 40 percent of the free flow speed. Future decline to travel speed from all directions may be anticipated due to further developments along the S.R. 59 corridor.

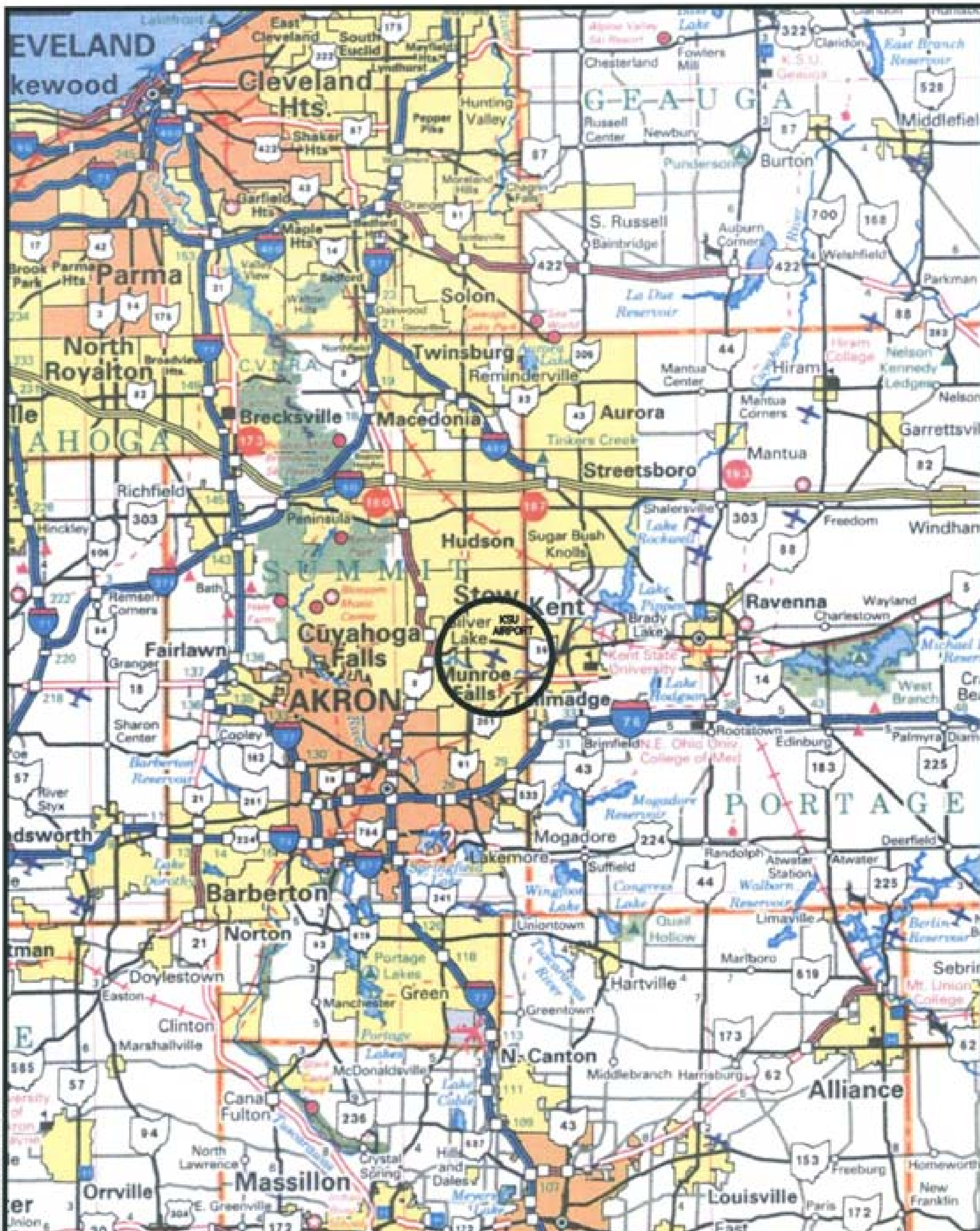
Exhibits II-4 shows a more complete depiction of surface transportation access.

Socioeconomic Characteristics

Socioeconomic characteristics such as population and economic conditions, provide insights concerning an area's historic and future growth. Moreover, socioeconomic characteristics usually have a positive relationship to aviation activity and are often useful tools in preparing estimates of future airport activity. The market area for this master plan study includes both Summit and Portage county. Both counties have received significant growth in population since 1990. In addition to population growth, the two county market area has also shown increased economic prosperity during the same time frame. A further analysis of socioeconomic characteristics can be referenced in Chapter III - Forecasts of Aviation Demand.

Area Airports in the Vicinity

There are currently thirteen airports within a 20 nautical mile radius of the Kent State University Airport. Only eight of these thirteen are open to the public. These airports are identified because they may affect the demand and projections associated with the Kent State University Airport. The locations of such facilities in the vicinity of the Kent State University Airport are depicted in Exhibit II-6. Notable facilities and selected characteristics of these airports are broken down in Table II-1.



SURFACE TRANSPORTATION ACCESS	KENT STATE UNIVERSITY AIRPORT KENT, OHIO	II-4

102174\EXHIBITS\LOCATION

TABLE II-1
AIRPORTS AND FACILITIES IN THE VICINITY OF
KENT STATE UNIVERSITY AIRPORT

Characteristics	Kent State University	Akron-Fulton International	Portage County	Mills	Mayfield	Freedom Air Field	Akron-Canton International	Medina Municipal	Wadsworth Municipal
Distance/Course	N/A	7.2 N.M./195°	8.3 N.M./65°	9 N/M./55°	9.6 N.M./184°	12.2 N.M./66°	13.6 N.M./192°	15.4 N.M./274°	17.6 N.M./250°
Ownership/Use	Public/Public	Public/Public	Public/Public	Private/Public	Private/Public	Private/Public	Public/Public	Public/Public	Public/Public
Runways	1	2	1	1	1	1	3	2	2
Orientation/Dimensions	1-19 (4,000 x 75')	7-25 (6,338' x 150') 1-19 (2,337' x 100')	9-27 (3,500 x 75')	3-21 (2,640' x 60')	9-27 (2,315' x 110')	2-20 (2,700 x 60')	5-23 (7,598' x 150') 1-19 (6,397' x 150') 14-32 (5,600' x 150')	9-27 (3,556' x 75') 18-36 (2,952' x 60')	2-20 (3,529' x 75') 10-28 (2,320' x 40')
Runway Surface	Asphalt	Asphalt	Asphalt	Turf	Turf	Turf	Asphalt	Asphalt	Asphalt
Radio	Unicom	Unicom	Unicom	Unicom	Unicom	Unicom	Tower, Ground, CLNC DEL, APP/DEP, Unicom	Unicom	Unicom
Lighting	MIRL, REIL, PAPI	HIRL, PAPI, VASI, REIL	MIRL, REIL, PAPI	None	None	None	HIRL, MALSR, REILS, VASI	MIRL, REILS, PAPI	MIRL, REILS, VASI
Instrument Approaches	VOR or GPS-A, GPS RWY 19, NDB or GPS RWY 1	NDB RWY25, LOC RWY 25	VOR or GPS-A VOR/DME RNAV or GPS RWY 27	None	None	None	ILS RWY 1, 19, 23; VOR or GPS, RWY 5 & 23; RNAV or GPS RWY 14 & 32	RNAV/GPS RWY 27 RNAV/GPS RWY 9 VOR RWY 27	NDB or GPS RWY 2, VOR/DME or GPS-A
NPIAS Airport	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
Other	-----	AWOS/ASOS	------	------	------	------	ASOS/ATIS	------	------

Airport Facilities

Airfield Area

Airfield facilities at the Kent State University Airport consist of one runway, a parallel taxiway with connectors, airfield lighting, runway protection zones and navigation aids. Exhibits II-8 and II-9 depict the previous 1984 airport layout plan and the updated existing airport layout plan.

Runway and Taxiways

There is currently one active runway and two indefinitely closed sod runways at the Kent State University Airport. The active runway has a physical length of 4,000 feet and is 60 feet wide with a north-south orientation (1-19). The effective or usable runway length due to a 50 feet relocated threshold is 3,950 feet long. Runway end 1 threshold is relocated due to the insufficient approach slope clearance of North River Road. The pavement is asphalt and is in good condition. Runway 1-19 has a 40 feet wide full parallel taxiway located 250 feet west of the runway centerline. The taxiway, has pavement sections in good conditions with some areas showing surface cracking. In addition to the parallel taxiway, there is also a compass calibration pad located approximately 1,900 feet north of runway end 1 perpendicular to the parallel taxiway. The latest ODOT/Office of Aviation Pavement Condition Index (PCI) rated the pavement sections at 100% without exceptions.

KENT STATE UNIVERSITY AIRPORT AREA AIRPORTS

KENT STATE UNIVERSITY AIRPORT
KENT, OHIO

II-6

Drainage

The existing airport drainage system is a combination of a closed and open system; whereby surface run-off is collected into catch basins or drainage ditches and then discharged through pipes and ditches outletting into Fish Creek, the Cuyahoga River, or their tributaries. This system is very efficient in draining surface and subsurface run-off, however, in some cases, the subsurface underdrains are aged and will require clean-out and/or rehabilitation during the 20 year planning period. The airport and the adjoining developments contribute substantial run-off. Future developments which will increase run-off will need to consider measures to retain or even reduce run-off to prevent possible downstream flooding.

Airfield Lighting and Navigation Aids

A variety of lighting and navigational aids are available at the Kent State University Airport for use during nighttime operations and during periods of reduced visibility. These aids include: Airport Beacon, Medium Intensity Runway Lighting (MIRL), Visual Approach Slope Indicators (VASI) and Runway End Identification Lights (REIL's) at Runway Ends 1 and 19.

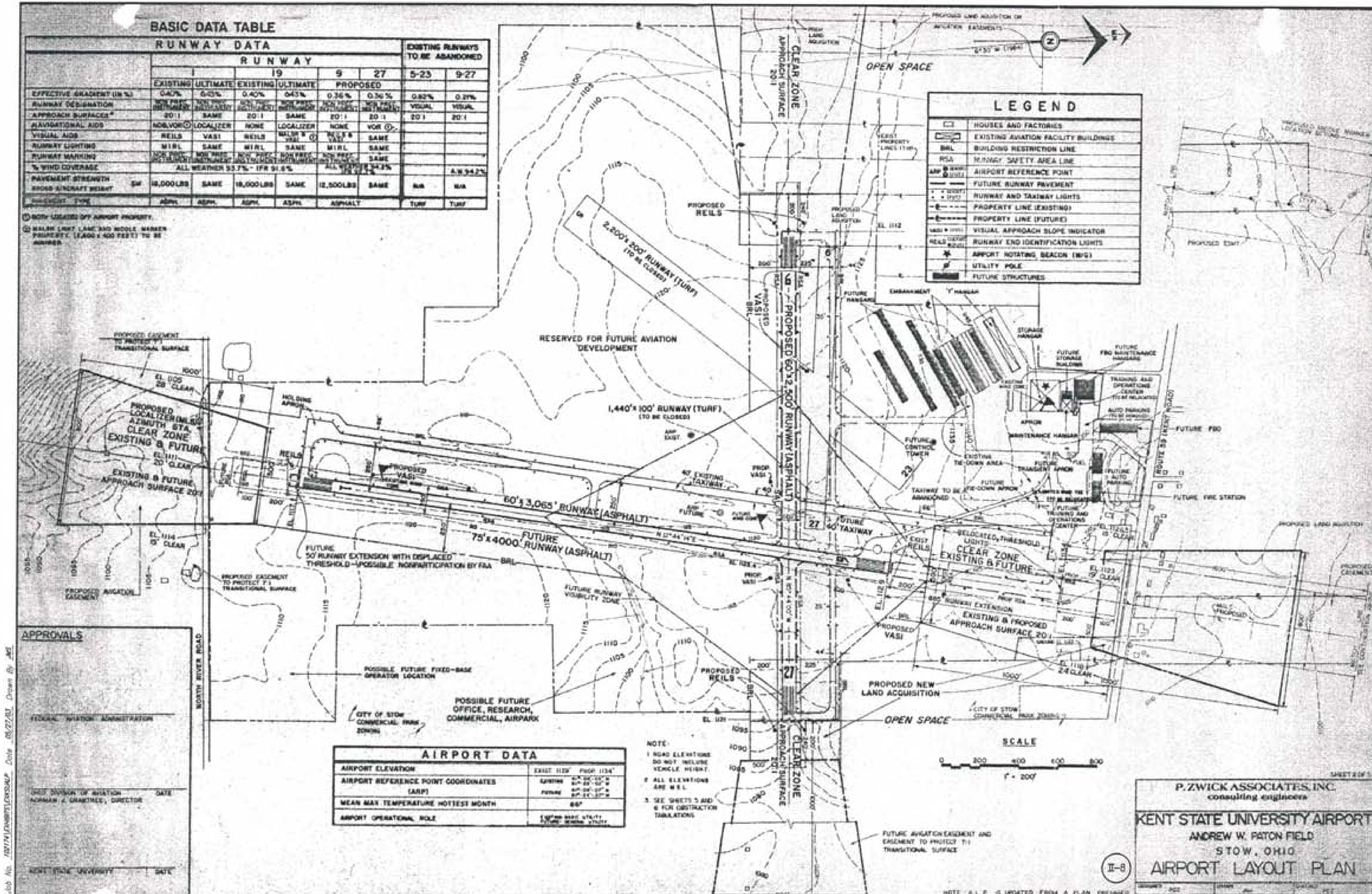
The airport is identified by a rotating beacon containing a FAA accepted optical system for lighted land airports, which casts an alternating green and white beam from dusk to dawn. When activated during daytime hours the beacon denotes a surface visibility of less than three miles and/or a cloud ceiling of less than 1,000 feet. The Kent State University Airport beacon is located on the Kent State University conventional flight training hangar.

REIL's and VASI's are located on both runway ends to provide pilots with runway alignment, position, and distance during periods of decreased visibility and/or nighttime operation. The edge lights are medium intensity and include displaced threshold lights to identify runway end 1. Coupled with the runway edge lights are the Medium Intensity Taxiway Edge Lighting (MITL). The taxiway edge lighting and illuminated signing provides taxiing aircraft with safe operation from the terminal apron area to the runway ends.

The airport has three published instrument approach procedures. They are a VOR or GPS-A for both runways, GPS for Runway 19, and NDB or GPS for Runway 1. The VOR or GPS-A procedure provides circling approach capabilities with a minimum decent altitude (MDA) of 2,020 feet or 870 feet above the airport elevation. Visibility minimums are one mile for Category A, one and a quarter mile for Category B, and two and one half miles for Category C. The current approach plate is attached to the Appendix for additional review.

GPS Runway 19 provides a straight in approach to Runway 19 with a MDA of 1,580 feet or 446 feet above the Runway End 19 elevation. Visibility limits are one mile for Categories A and B aircraft, and one and a quarter miles for Category C aircraft. A circling approach is also possible with a change in MDA to 1,760 feet or 626 feet above the airport. Category C aircraft visibility minimums are also increased to one and three quarter miles. The current approach plate is attached in the Appendix.

NDB or GPS Runway 1 also offers a straight-in approach with an MDA of 1,700 feet or 571 feet above Runway End 1 elevation. Visibility limits are one mile for Categories A and B and one and a half miles for Category C. This procedure also allows for circling approach with an MDA of 1,700 feet or 550 feet above the published airport elevation. Visibility minimums for the circling approach remain the same for all aircraft categories. The current approach plate is attached to the Appendix showing this approach.



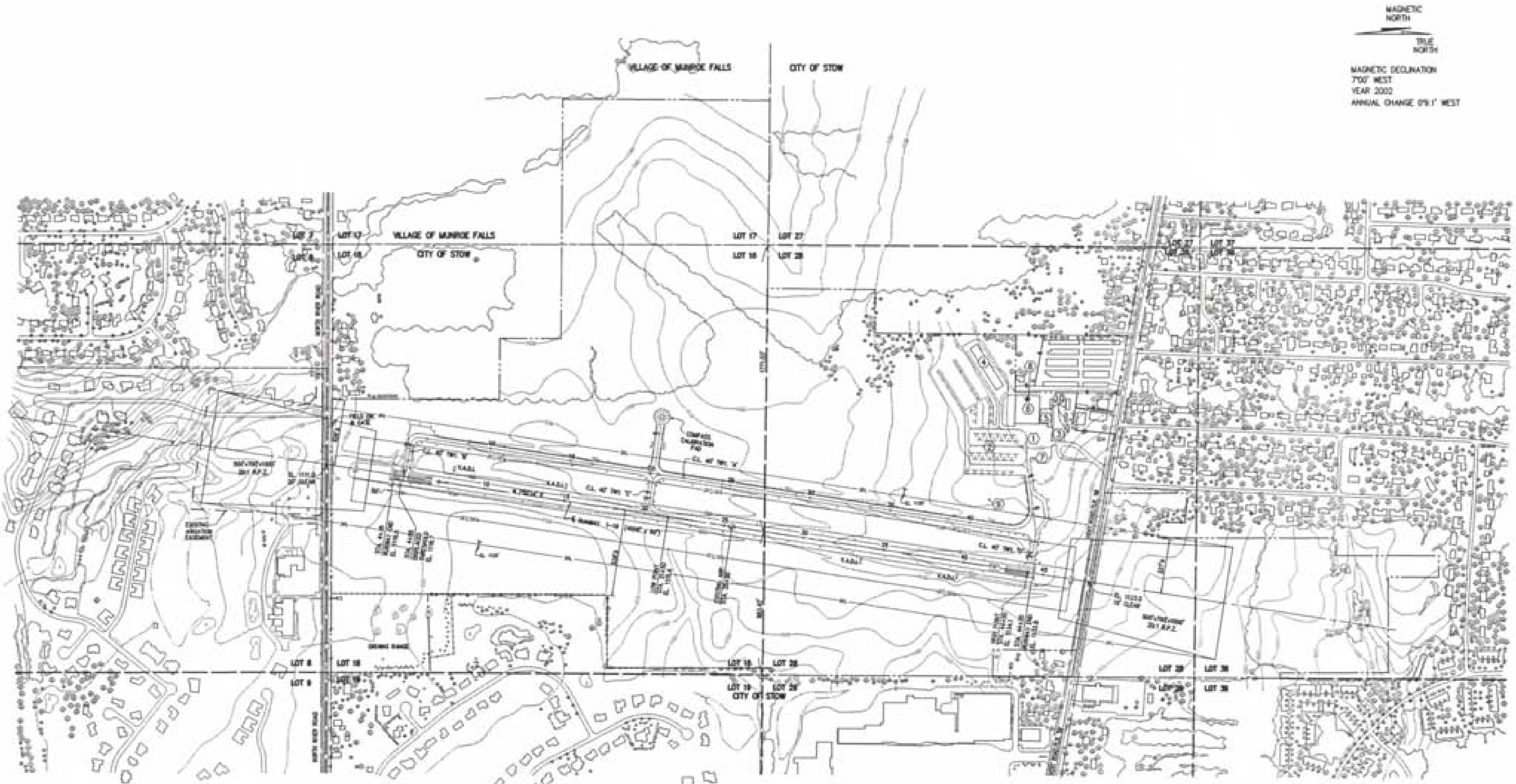
BASIC DATA TABLE

RUNWAY DATA	RUNWAY 1 EXISTING	RUNWAY 1 ULTIMATE	RUNWAY 19 EXISTING	RUNWAY 19 ULTIMATE	RUNWAY 9 PROPOSED	RUNWAY 27 PROPOSED	EXISTING RUNWAYS TO BE ABANDONED 5-23	EXISTING RUNWAYS TO BE ABANDONED 9-27
EFFECTIVE GRADIENT (IN %)	0.40%	0.40%	0.40%	0.43%	0.36%	0.36%	0.82%	0.27%
RUNWAY DESIGNATION	NON PREC. INSTRUMENT	NON PREC. INSTRUMENT	NON PREC. INSTRUMENT	NON PREC. INSTRUMENT	NON PREC. INSTRUMENT	NON PREC. INSTRUMENT	VISUAL	VISUAL
APPROACH SURFACES*	20:1	SAME	20:1	SAME	20:1	20:1	20:1	20:1
NAVIGATIONAL AIDS	NDB,VOR ①	LOCALIZER	NONE	LOCALIZER	NONE	VOR ①		
VISUAL AIDS	REILS	VASI	REILS	MALSR & VASI ②	REILS & VASI	SAME		
RUNWAY LIGHTING	MIRL	SAME	MIRL	SAME	MIRL	SAME		
RUNWAY MARKING	NON PREC. INSTRUMENT	NON PREC. INSTRUMENT	NON PREC. INSTRUMENT	NON PREC. INSTRUMENT	NON PREC. INSTRUMENT	SAME		
% WIND COVERAGE	ALL WEATHER 93.7% - IFR 91.6%				ALL WEATHER 94.3% [illegible]			A.W. 94.2%
PAVEMENT STRENGTH GROSS AIRCRAFT WEIGHT SW	18,000 LBS	SAME	18,000 LBS	SAME	12,500 LBS	SAME	N/A	N/A
PAVEMENT TYPE	ASPH.	ASPH.	ASPH.	ASPH.	ASPHALT		TURF	TURF

① BOTH LOCATED OFF AIRPORT PROPERTY.
② MALSR LIGHT LANE AND MIDDLE MARKER PROPERTY (2,400 x 400 FEET) TO BE ACQUIRED.

AIRPORT DATA

AIRPORT ELEVATION	EXIST. 1129' PROP. 1134'
AIRPORT REFERENCE POINT COORDINATES (ARP)	EXISTING [illegible] FUTURE [illegible]
MEAN MAX TEMPERATURE HOTTEST MONTH	85°
AIRPORT OPERATIONAL ROLE	[illegible] BASIC UTILITY [illegible] GENERAL UTILITY



EXISTING RUNWAY/TAXIWAY DATA	
	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	120'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	240'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBSTACLE FREE AREA WIDTH	400'
RUNWAY OBSTACLE FREE AREA LENGTH BEYOND RUNWAY END	240'
RUNWAY BUILDING RESTRICTION LINE	350'
RUNWAY BLAST PAD	80' x 100'
TAXIWAY EDGE SAFETY MARGIN	5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	49'
TAXIWAY OBJECT FREE AREA WIDTH	89'
TAXILANE OBJECT FREE AREA WIDTH	79'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	337'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	200'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	225'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	44.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	39.5'
TAXIWAY WINGTIP CLEARANCE	20'
TAXILANE WINGTIP CLEARANCE	15'

AIRPORT ITEM LEGEND		
NO.	DESCRIPTION	ELEV.
1	APRON AREA (150'x200')	1150±
2	TIE DOWN APRON (300'x350') 40 TIE-DOWNS	1145±
3	AUTO PARKING (250'x70') 56 PARKING SPACES	1153±
4	T-HANGAR	1168
5	FBO/MAINTENANCE HANGAR	1176
6	CORP. HANGAR	1195
7	FUEL PAD (VENTS)	1155
8	AIRPORT BEACON	1199
9	WIND TEE	1145
10	MOBILE CLASSROOMS	1165

LEGEND

LOT LINE	WIND CONE
EXISTING AIRPORT PROPERTY LINE	WIND TEE
EXISTING AIRPORT AVIGATION EASEMENT	LOT CORNER
EXISTING RIGHT-OF-WAY	SWALE
EXISTING RPZ	STORM SEWER/CATCH BASIN
EXISTING CORPORATION LINE	POLE LINE
EXISTING ELECTRIC LINE	AIRPORT REFERENCE POINT (A.R.P.) LON: 81°24'54.207"; LAT: 41°09'06.083"
EXISTING GAS LINE	AIRPORT BEACON
EXISTING WATER LINE	EXISTING FENCE LINE
EXISTING TELEPHONE LINE	EXISTING CONTOURS
EXISTING SANITARY LINE	

NO.	REVISION	BY	APPR.	DATE

EXISTING AIRPORT LAYOUT PLAN

FAA SITE NO.
18061.*A

KENT STATE UNIVERSITY
KENT, OHIO

II-9

Runway Protection Zones and Safety Areas

The runway protection zones (RPZ's) start 200 feet from the physical runway end and exist for the protection of people and property on the ground. The two dimensional imaginary trapezoidal zones are derived from the critical aircraft and the approach visibility minimums. It is desirable that the land under both RPZ's be owned by the airport owner, to control incompatible land use and community development. The current RPZ dimensions are a 500 foot inner width, 700 foot outer width and 1,000 foot total length. In addition to these dimensions, the approach slope is 20 to 1.

The runway safety area (RSA) is the surface area surrounding the runway centerline that is suitable for decreasing the risk of damage to aircraft in the event of an undershoot, overrun or excursion from the runway. The existing Runway 1-19 safety areas' dimensions are 120 feet wide and extend 240 feet beyond each runway end. Currently the runway safety areas meet the design requirements for an AI critical aircraft. The definition of AI critical aircraft is defined by aircraft having approach speeds less than 91 knots (105 m.p.h.) and wingspans less than 49 feet.

Terminal Area

Terminal facilities at the Kent State University consist of a terminal building, an aircraft parking apron, an access road, vehicular parking, hangars, fueling facilities, and utilities. Exhibit II-11 shows a graphical depiction of the existing terminal area facilities.

Terminal Building

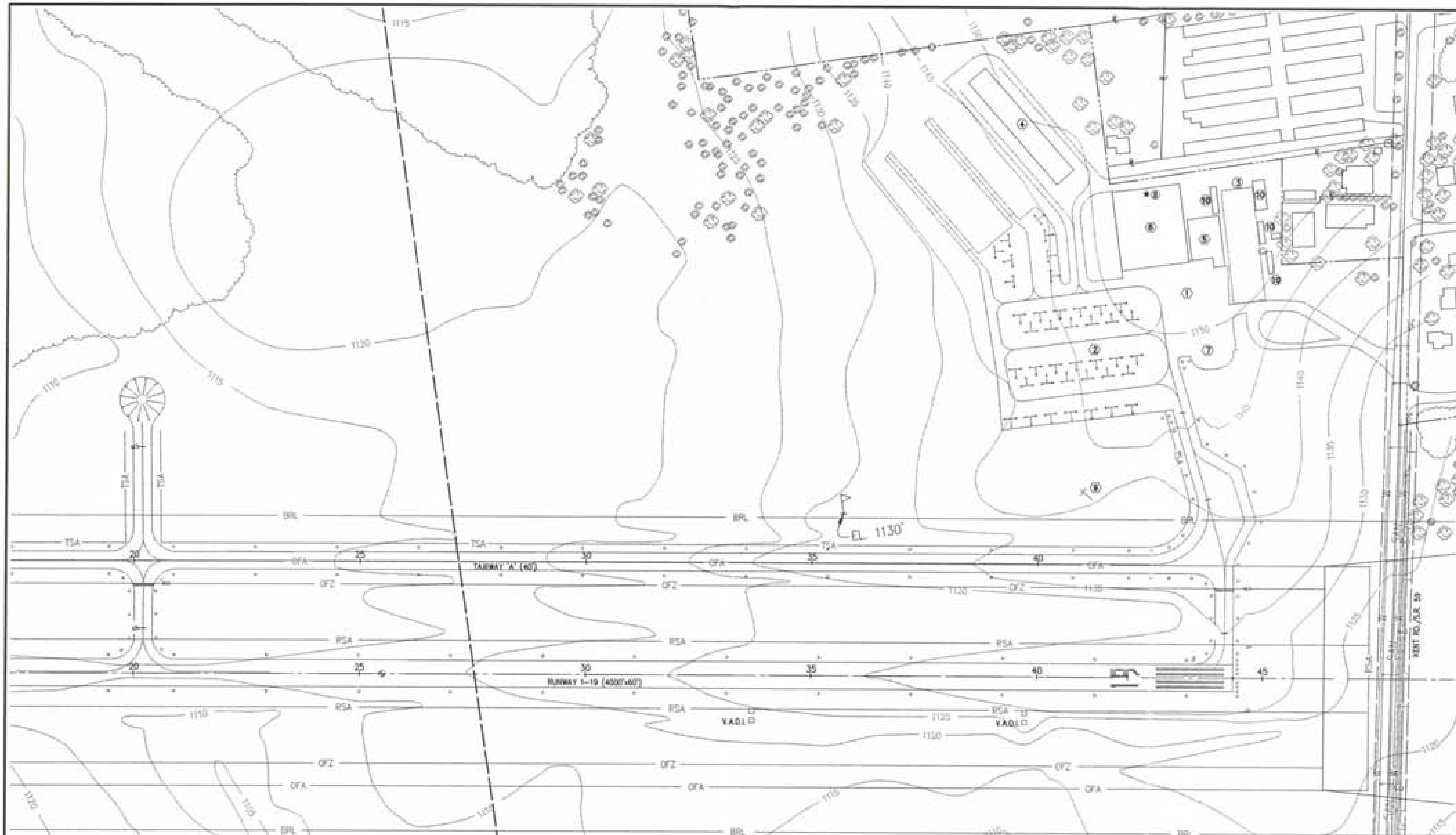
Terminal facilities at the Kent State University Airport provide approximately 1,880 square feet of terminal building floor space. The terminal building is located northwest of the apron area and south of the airport access road. The existing building is currently utilized by the Kent State University Flight Training Program, the Airport Manager, and both itinerant and local pilots. The terminal building is in poor condition, lacks a fire suppression system, and fails to meet the 1990 Americans With Disability Act (ADA) Requirements for buildings with public accommodations.

Aircraft Parking Apron

Currently, the Kent State University Airport has 14,000 square yards of paved apron area including a fueling area. The apron including fueling facilities are owned and operated by the University. The asphalt surfaced apron utilizes space for Kent State University flight training, and local and itinerant aircraft. A major portion of the terminal apron is dedicated for aircraft tie-down space. There are 40 aircraft tie-down spaces designed for AI aircraft. The aircraft parking apron is located southeast of the existing airport terminal building and is 550 feet west of Runway 1-19. The aircraft parking apron pavement was rehabilitated in 1999 and is generally in good condition.

Airfield Access

Students, passengers and visitors to Kent State University Airport gain access to the terminal building, FBO and flight training trailers from State Route 59 on the airport access road. The airport access road is a paved surface roadway that features a cul-de-sac and access to the airport parking lot. The access road is approximately 25 feet wide within the two lane section and 15 feet wide within the signal lane section. The general condition of this pavement is fair and would require rehabilitation in the immediate future.



LEGEND

LOT LINE	WIND CONE
EXISTING AIRPORT PROPERTY LINE	WIND TEE
PROPOSED AIRPORT PROPERTY LINE	SWALE
EXISTING RIGHT-OF-WAY	STORM SEWER/CATCH BASIN
EXISTING RPZ	POLE LINE
EXISTING ELECTRIC LINE	AIRPORT REFERENCE POINT (A.R.P.) LON: 81°24'54.207"; LAT: 41°09'06.083"
EXISTING GAS LINE	AIRPORT BEACON (RELOCATED)
EXISTING WATER LINE	EXISTING FENCE LINE
EXISTING TELEPHONE LINE	EXISTING CONTOURS
EXISTING SANITARY LINE	

STRUCTURE LEGEND

EXISTING

1. APRON AREA (150'x200')
2. TIE DOWN APRON (300'x350')
3. AUTO PARKING (250'x70')
4. T-HANGAR
5. FBO/MAINTENANCE HANGAR
6. CORP. HANGAR
7. FUEL PAD (VENTS)
8. AIRPORT BEACON
9. WIND TEE
10. MOBILE CLASSROOMS

MAGNETIC NORTH

TRUE NORTH

MAGNETIC DECLINATION
7°00' WEST
YEAR 2002
ANNUAL CHANGE 0°0.1' WEST

NO.	REVISION	BY	APPR.	DATE

10217A\EXHIBITS\
Job No. EXTLP Date 06/23/03 Drawn By JMS

TERMINAL LAYOUT PLAN - EXISTING CONDITIONS

FAA SITE NO. 18061.*A

KENT STATE UNIVERSITY
STOW, OHIO

II-11

Auto Parking

Auto parking is provided north of the terminal building with direct access to State Route 59. The parking area (approximately 2,000 square yards) provides 56 parking spaces. The parking facilities are limited and use frequently exceeds capacity level. The paved parking lot also provides surface access to the airfield and hangar area. The pavement in this area is in poor condition and requires rehabilitation.

Hangar Facilities

Two conventional hangars and one 14 unit T-hangar provide aircraft storage and maintenance. The largest conventional hangar is 22,400 square feet and is utilized by the Kent State University flight-training program for storage of the University's aircraft. In addition, airport management stores aircraft tugs, mowing equipment, snow removal equipment and miscellaneous airport maintenance equipment. The other conventional hangar is located between the terminal building and the Kent State University conventional hangar. This hangar is dedicated to aircraft maintenance and provides 4,480 square feet of gross floor space. The maintenance and large Kent State University flight training hangar were built in 1945 and 1966, respectively. The condition of these two conventional hangars are poor and are rapidly ending their useful life.

The one T-hangar unit situated on the Kent State University Airport provides storage for 14 aircraft with approximately 15,300 square feet of space. The existing T-hangar unit was constructed in 1966 and is in fair to poor condition. Hangar space is currently at 100% occupancy. The consultant's user survey revealed that additional hangar space could possibly be filled if additional facilities were available. The current Kent State University Airport waiting list, attached in the Appendix, indicates that 19 aircraft owners are currently waiting for hangar storage. From this waiting list, only one pilot is currently tied down at the Kent State University Airport awaiting hangar storage, the remaining 18 are situated in the surrounding communities.

Fueling Facilities

Fuel at the Kent State University Airport is provided by a hose and pump type overwing fueling facility. The fuel farm provides both Jet-A and 100 Octane Low Lead aviation fuel to the aircraft community. Currently, aviation fuel is stored in two underground 10,000 gallon tanks. The 10,000 gallon 100LL tank is a single wall fiberglass tank constructed in 1982. The aircraft fueling system is 21 years old and in need of rehabilitation. In addition to aircraft fueling, the airport stores 250 gallons of diesel fuel for use on airport support vehicles.

Utilities

The airfield is serviced by all essential utilities. Water, sanitary, electric, natural gas, and telecommunication lines are connected to the Terminal Building. The conventional hangars, including T-hangars, have electrical power service. Service providers include:

SBC/Ameritech - Telecommunications Services
Summit County - Water and Sanitary Sewer
First Energy Power Company - Electric Power Services
IGS/East Dominion - Natural Gas Distribution Service Lines

CHAPTER III

FORECASTS OF AVIATION DEMAND

Estimates of future activity levels are essential in preparing an Airport Master Plan Report. They provide the basis of evaluating the adequacy of existing airport facilities and their capability to handle increased traffic levels. Demand forecasts are also used to determine the types, quantities, and timing for needed improvement.

This chapter will examine the airport role based on historic, current and future socioeconomic and aviation activity. Utilizing this data, aviation demand will be projected for the following 20 year planning period. A considerable level of effort in research, survey, and selection of forecasting methods has been expended to minimize the risk and subsequent cost of errors. Aviation demand forecasts and the timing for improvements will be made on updated information.

Socioeconomic Characteristics

Demand for general aviation facilities is primarily based on demographic and economic characteristics of a market study area. The area east of State Route 8 between Interstates 76 and 80 including Ravenna is a commercially autonomous region located in the northeasterly outlying area of the dynamic Akron-Canton market area. The socioeconomic factors for the Kent State University Airport will focus on this autonomous market study area. This section will detail the socioeconomic factors of both Summit and Portage Counties as they pertain to the above mentioned market study area for Kent State University Airport's Master Plan.

Population

The U.S. Census Ohio Data Users Center Information shows that in the selected market area, population in the last 20 years has increased. During the same time period, the population of the State of Ohio also increased. Table III-1 depicts this comparison of population growth.

TABLE III-1 - HISTORICAL POPULATION TRENDS

	1980	1990	2000	% Change 1980-2000
Summit County	524,472	514,990	542,899	+ 3.5%
Portage County	135,856	142,585	152,061	+ 11.9%
Market Study Area	660,328	657,575	694,960	+5.2%
State of Ohio	10,797,630	10,847,115	11,353,140	+ 5.1%
Source: Ohio Department of Development, Office of Strategic Research (2003)				

A further analysis of historic population for Summit and Portage Counties has shown a steady growth. Since 1960, the population of Summit County has increased from over 513,000 to nearly 543,000 in 2000. In Portage County, during the same time frame, the population increased from 91,768 to 152,000. For additional population statistics see Tables III-2 to III-3.

TABLE III-2
SUMMIT COUNTY POPULATION GROWTH

Year	Market Study Area		County Total		Akron		Stow		Other Communities	
	Total	% Change	Total	% Change	Total	% Change	Total	% Change	Total	% Change
1960	605,337	N/A	513,569	N/A	290,351	N/A	12,194	N/A	73,331	N/A
1970	679,239	+12.2%	553,371	+7.8%	275,425	-5.1%	20,061	+64.5	90,390	+23.3%
1980	660,328	-2.8%	524,472	-5.2%	237,177	-13.8%	25,303	+26.1%	88,366	-2.2%
1990	657,575	-0.4%	514,990	-1.8%	223,019	-6.0%	27,998	+10.7%	99,859	+13.0%
2000	694,960	+5.7%	542,899	+5.4%	217,074	-2.7%	32,139	+14.8%	138,709	+38.9%
*2005	704,200	+1.3%	547,800	+0.9%	214,260	-1.3%	34,124	+6.2%	179,715	+29.6%
*2010	713,200	+1.3%	552,400	+0.8%	211,244	-1.4%	34,729	+1.8%	222,101	+23.6%

Other communities consist of Cuyahoga Falls, Barberton, Hudson, Tallmadge and Munore Falls.
Source: U.S. Census Ohio Data Users Center, Ohio Department of Development, Stow Planning Commission (2003)

* Projections interpolated by Consultant from Ohio Department of Development Records.

TABLE III-3
PORTAGE COUNTY POPULATION GROWTH

Year	Market Study Area		County Total		City of Kent		Other Communities	
	Total	% Change	Total	% Change	Total	% Change	Total	% Change
1960	605,337	N/A	91,768	N/A	18,521	N/A	24,890	N/A
1970	679,239	+12.2%	125,868	+37.2%	25,403	+37.2%	34,139	+37.2%
1980	660,328	-2.8%	135,856	+7.9%	27,419	+7.9%	36,848	+7.9%
1990	657,575	-0.4%	142,585	+5.0%	28,835	+5.2%	38,747	+5.2%
2000	694,960	+5.7%	152,061	+6.6%	27,906	-3.2%	45,601	+17.7%
*2005	704,200	+1.3%	156,400	+2.9%	28,222	+1.1%	46,117	+1.1%
*2010	713,200	+1.3%	160,800	+2.8%	28,902	+2.4%	47,229	+2.4%

Other communities consisting of Ravenna, Aurora, Streetsboro, and Brimfield
Source: U.S. Census Ohio Data Users Center (2003)

* Projections interpolated by Consultant from Ohio Department of Development Records.

Economic Conditions

The cost of owning, maintaining and operating aircraft has increased in the past 10 years. Aviation related activity is seldom likely to increase without a stable and prosperous economy. Summit and Portage Counties' economic growth will depend on their ability to market goods and services to other outside trading markets. Trade with other counties is a very good indicator of strength in the local economy. Two important economic factors in developing an economic profile are income and employment trends.

Table III-4 presents historic household per capita incomes for Summit and Portage Counties along with the market study area, the State of Ohio, and the United States. The per capita income levels in Summit County have exceeded the State of Ohio statistics in the past 10 years, whereas Portage County's per capita income has fallen below the State of Ohio average during the same time frame (1990 to 2000). The total market area per capita income, similar to Portage County, has fallen below the State of Ohio totals until the year 2000 when the market study area per capita income has exceeded the State of Ohio total. Summit County, Portage County, the market study area and the State of Ohio all fall below the national per capita income averages from 1990 to 2000. Included for additional information is the average national inflation rate for the corresponding 10 year historic time frame.

TABLE III-4
PER CAPITA INCOME MARKET STUDY AREA VS. STATE OF OHIO

Current (2002) Dollars	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Summit County	19,693	20,117	21,217	21,978	23,104	24,282	25,204	26,472	27,884	28,664	30,070
Portage County	16,377	16,733	17,635	18,468	19,686	20,488	20,871	22,288	23,330	24,155	25,289
Market Study Area	18,035	18,425	19,426	20,223	21,395	22,385	23,038	24,380	25,607	26,410	27,680
State of Ohio	18,788	19,196	20,202	20,940	21,982	22,790	23,613	24,916	26,189	27,171	27,433
United States	19,572	20,023	20,260	21,539	22,340	23,255	24,270	25,412	26,893	27,880	29,760
Inflation Rate (Percent)	5.39	4.22	3.01	2.98	2.60	2.76	2.96	2.35	1.51	2.21	3.38
Percent of State Average (Study Area)	96.0	96.0	96.2	96.6	97.3	98.2	97.6	97.8	97.8	97.2	100.9
Source: U.S. Department of Commerce, Bureau of Economic Analysis (2003)											

* "Market Study Area" includes the Summit Portage County area of S.R. 8 between USR 224 and USR 422.

TABLE III-5
MARKET STUDY AREA UNEMPLOYMENT STATISTICS

Civilian Labor Force Estimates						
Year	Labor Force	Employed	Unemployed	Unemployment Rate (%) Market Area	Ohio	U.S.
1990	333,455	315,980	17,475	5.2	5.7	5.6
1991	338,260	318,046	20,214	6.0	6.4	6.9
1992	344,916	320,975	23,941	6.9	7.3	7.5
1993	345,633	325,039	20,594	6.0	6.5	6.9
1994	352,704	334,708	17,996	5.1	5.5	6.1
1995	356,443	340,558	15,885	4.5	4.8	5.6
1996	361,549	345,003	16,546	4.6	4.9	5.4
1997	363,996	348,185	15,811	4.3	4.6	4.9
1998	359,577	345,351	14,226	4.0	4.3	4.9
1999	364,626	349,414	15,212	4.2	4.3	4.5
2000	360,596	344,723	15,873	4.4	4.1	4.2
2001	366,573	350,990	15,583	4.3	4.3	4.7
2002	372,627	354,679	17,948	4.8	5.3	6.0

Based Data Source: U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics (December 2003)

Employment conditions for both counties aide in further developing the current and projected state and local economies. Therefore, a stable and prosperous employment history would indicate a growth in aviation demand. The civilian labor force data for the market study area and the State of Ohio are shown in Table III-5 from 1990 to 2002. In the market study area, the civilian labor force has increased from 333,455 in 1990 to 372,627 in 2002.

Unemployment rates for the period 1990 to 2002 are also depicted in Table III-5. As shown, the annual employment rates recorded by the market area are comparable to the State of Ohio for the past 12 years. The unemployment rate in the market study area peaked in 1992 and decreased steadily until 2000. During the last two years slight increases have been noted in the market study area.

The breakdown of employment by industrial sector in the market study area can be seen in Table III-6. The three major industry groupings for the market study area in 2000 were wholesale/retail, service and manufacture. The service sector which includes education (Kent State University), and other major industries such as the manufacturing industry and the wholesale/retail sector rely on air transportation.

The service industries and wholesale/retail sectors, in particular, rely on and are served by air transportation services provided by Kent State University Airport and other airports in the market study area. Continued growth of communities surrounding the Kent State University Airport will bring increased demands for air transportation. These sectors combined employ 72.7% of the total work force in the market study area. Table III–7 indicates that the average weekly wage for the market study area is less than the statewide average from 1995 to 2000. The three sectors that average the highest weekly earnings are mining, manufacturing, and transportation and utilities. These sectors averaged $803.00 a week in earnings in 2002.

TABLE III-6
MARKET STUDY AREA EMPLOYMENT

Employment in Industrial Sector in the Market Study Area								
	1997	**%**	**1998**	**%**	**1999**	**%**	**2000**	**%**
Total	307,598	100	308,461	100	316,414	100	317,857	100
Agriculture, Forestry, Fishing	2,300	0.7	2,375	0.8	2,467	0.8	2,762	0.9
Mining	469	0.2	495	0.2	616	0.2	580	0.2
Construction	12,496	4.1	13,106	4.4	13,628	4.3	13,901	4.5
Manufacturing	64,728	21.0	65,198	21.1	64,953	20.5	63,582	20.1
Trans. & Utilities	14,144	4.6	14,377	4.6	14,427	4.6	14,841	4.8
Wholesale/Retail	79,186	25.7	79,282	25.6	81,924	25.9	82,648	26.2
Finance, Insurance & Real Estate	12,461	4.1	12,919	4.2	13,339	4.2	14,106	4.5
Services	83,307	27.1	82,023	26.6	86,059	27.2	83,167	26.4
Government	38,506	12.5	38,686	12.5	39,001	12.3	39,000	12.4

Source: Ohio County Indicators. Office of Strategic Research D.O.D. Ohio County Profiles (2003)

TABLE III-7
MARKET STUDY AREA EARNINGS

Market Area & State of Ohio Average Weekly Earning by Sector											
Year	Total All Industries State of Ohio	Total All Industries In Market Area	Agric. Forest Fish	Mining	Construction	Manuf.	Transp. & Utilities	Wholesale and Retail Trade	Finance Insurance Real Estate	Services	State & Local Govt.
1995	513.30	495.24	398.25	613.49	547.10	682.69	661.48	327.74	480.01	398.34	551.82
1996	530.34	514.65	420.22	718.56	574.29	707.04	680.71	355.49	503.32	408.93	571.58
1997	555.07	534.48	459.87	768.09	599.62	732.17	714.24	378.21	529.57	419.39	591.90
1998	580.22	567.43	472.64	792.18	634.07	773.07	713.51	392.57	569.66	457.19	624.10
1999	596.41	575.25	507.53	875.43	644.31	793.63	744.66	401.82	594.07	447.83	630.73
2000	618.35	595.35	512.28	817.26	664.18	809.39	781.47	425.69	621.07	464.77	659.76

Source: Ohio County Profiles - Summit and Portage Counties, Ohio, Office of Strategic Research D.O.D. (2003)

Socioeconomic Summary

The market study area's socioeconomic characteristics appear to indicate that economic growth will continue to increase; there is no projectable decline. Demand for transportation services, particularly in the aviation industry, will remain steady except for expected increase and periodic growth. It is expected that a high rate of growth will continue in the aviation service areas located within the study area.

Further trends supporting this conclusion are:

- A 5.7 percent increase in market study area population between 1990 and 2000.
- Per capita income growth since 1990 and the exceeding of the state-wide average in 2000.
- An 8.1 percent increase in market study area civilian labor force between 1990 and 2000.
- Single digit unemployment rates which consistently fall below the state and national averages.

Aviation Demand Projections

Aviation demand forecasts are generally prepared in a series of steps. First, historic aviation activity data is gathered and examined to identify existing and past levels of traffic and trends or patterns of growth. Simultaneously, data that might indicate conditions or circumstances that would alter growth patterns is examined. The second step involves projecting past patterns into the future and projecting historic relationships between aviation activity and other contributing indicators into the future. The resulting estimates are utilized in the third step, where a judgement is made concerning the extent to which one projection represents the most reasonable estimate of future activity. This judgmental evaluation culminates in the selection of a preferred forecast.

The forecasting process for the Kent State University Airport Master Plan was composed of the following methods:

1. Obtaining available data from the Kent State University Airport and Flight Training Program, Federal Aviation Administration, Ohio Department of Transportation/Office of Aviation, and local planning agencies.

2. Determining any past, current, and possible future local conditions that may affect the forecasting factors; for example, the T-hangar and corporate flight facilities waiting list.

3. Altering aviation activities to allow for special condition factors. (i.e. altered flight training program, fuel crisis in the 1970's, air traffic controller strike, and the events of September 11, 2001.)

4. Monitoring actual activity levels with 24 hour, 7 days per week digital counters, performing long term surveys, receiving mail back surveys, and interviewing users to determine if adjustments are necessary in the forecast estimates.

5. Obtaining national and state forecasts including anticipated levels of aircraft orders and new aircraft developments, from various published annual reports.

Forecast Approaches

Two major forecast methods are used in determining future airport activities for airport master planning. They are the analytical method followed by the judgmental approach. Each method focuses on past trends for aviation demand elements and extends the demand into the future using several techniques and incorporating assumptions.

Through the use of several reliable techniques, reasonable creditable forecasts can be achieved. Regression analysis, time-series extrapolation, market share analysis and direct survey analysis are some of the techniques used to generate forecasts and are defined in the following paragraphs.

Regression Analysis - Regression analysis techniques make it possible to forecast aviation demand. When applied, a statistical relationship is established with a rate of airtrip generation (the dependent variable) and a number of predictive variables (the independent variables). Historic values for both variables are analyzed to determine the relationship between the dependent and independent variable.

Regression analysis demand forecasting is then used to project aviation activity that includes dependent variables such as registered or based aircraft population.

Time-Series Extrapolation - Another widely used model is a simple time-series forecasting technique. This technique adequately projects future aviation demand by using past growth curves and extending them into the planning period.

This forecast method is based on the assumption that historic demands will continue to exert a similar influence on future demand levels.

Market Share Analysis - The market share analysis estimates an area's share of the total share of the total air transportation market on a regional, state or national level. The analysis is carried out by observing historical market share trends and projecting the trends into the future. The dynamic share or the static share, as influenced by a larger market, represents the two types of market share analysis methods. The dynamic share fluctuates as a percentage driven by a larger market, while the static share is a constant percentage scale. The market share analysis produces similar results to the trend extrapolation, therefore providing a check on the credibility of other techniques.

Direct Survey Analysis - More frequently, at general aviation airports, the survey analysis is the best method of obtaining existing demand and for forecasting demand. General aviation airports generally lack credible historical data due to the absence of a control tower. To fill this void surveys can be conducted to establish historic, present and future aviation activities by conducting mail back surveys, personal interviews and on site long term personal observations and automatic raw counts.

For the Kent State University Airport Master Plan Study, the consultant made extraordinary efforts to obtain credible data. Existing trip ends were obtained from 24 hour, 7 days per week, raw counts for a period of 9 weeks. The counts were obtained by automatic digital counters that indicated the number of trips, including the time of day that the trips were taken. The digital counter information is attached to the Appendix in tabular form.

In addition, mail-back questionnaires were conducted to obtain present activity levels and the need for additional facilities. The user surveys were mailed to 51 known airport users, with only 6 responses received. The survey results are summarized in Table III-8, and a copy of the questionnaire is provided in the Appendix. Also, personal interviews were conducted with current fixed base operators, airport managers, service personnel and flight instructors. The consultant also made personal observations since 1985 by staying informed of the activity levels through site visits and being involved with various airport improvement projects (AIP).

TABLE III-8
KENT STATE UNIVERSITY AIRPORT USER SURVEY
SUMMARY OF AIRCRAFT TYPE AND OPERATIONS

Owner	Aircraft Type	Operations	Percent
1. Business	AI	15	0.26%
	BI	20	
2. Business	BI	6	0.05%
3. Private	AI	100	0.76%
4. Private	AI	6	0.05%
5. Business	AI	150	1.13%
6. (Current FBO)	AI	12,930	97.75%
Total		**13,227**	**100%**
Source: Kent State University Airport User Survey (2003)			

The FAA Forecasting System - Terminal Area Forecast System (TAF)

The Federal Aviation Administration developed a national system of air transport demand forecasting. The system is an overall picture of air travel at various levels of activity. The forecasts provide information at three levels of air operations; national, hub and terminal area. While the forecasts may be reliable for FAA towered airports, the forecasts have been found less reliable for small general aviation airports having fewer than 100 based aircraft or less than 100,000 annual operation.

For this study the consultant used the FAA data primarily to verify historical data and as a check against the consultant's methods. It should be noted here that the consultant's forecasts are not congruent with the FAA-APO "TAF" forecasts. The consultant used several methods to achieve a reasonable forecast of based aircraft and operations. Considerations incorporated into each forecast method were trends or shifts in air transportation to compensate for current economic and safety/security related travel events. The corporate traveler that previously relied on carrier/commercial air travel finds it more efficient and convenient to use on demand air taxi, air charters or fractionally owned aircraft operating out of nearby general aviation airports. Further peak hour congestions at air carrier airports find it cost-effective to discourage general aviation operations from non-business or recreational aircraft owners. Also the rapid growth within the study area and the need and availability of quality flight training programs suggests consideration be given to a demand driven forecast within the planning period. Another important component considered in selecting a forecast methodology is the magnitude of aircraft owners that made a commitment or expressed a desire for basing an aircraft at the Kent State University Airport as soon as hangar space becomes available. Currently, all available hangar spaces are occupied and 19 aircraft owners/pilots have signed requests for hangar space to base aircraft at the airport. A waiting list of aircraft owners requesting Kent State University hangar space is included in the Appendix. It should be noted that only one of the listings are currently using tie-down space at the airport. The remaining aircraft owners are based at nearby private airports. Also, consideration should be given to a trend by private airports for public use to close such airports and venture into more lucrative investments. Privately owned airports for public use such as Mills, Mayfield and Freedom Field (See Chapter II, "Airports in the Vicinity") have potential for residential, commercial or industrial development.

In the consultant's opinion the flat or no growth forecasts shown in the Federal Aviation Administration Terminal Area Forecast (TAF) does not reflect the significant local conditions.

Forecasting Rational

This study attempted to overcome the short comings of using the mode specific models and in lieu used multimodels and professional judgement for projecting growth rates. Perhaps the best applied model is the judgmental approach when it is based on first hand knowledge of historic activities and an understanding of the market area. For general aviation activities, abstract models can be used to predict future demand. The forecasts will include weighted factors such as community location, desire for growth and expanded services, competitiveness within a larger market area, educational and job training opportunities, labor and energy costs, and long term demographic changes that include economic and environmental limitations.

Aviation Demand Elements

The analysis of air transport demand at Kent State University Airport must take into account the relationship between air passenger and flight training movements and the associated aircraft movements. Aviation demand can then be predicted for major elements defining the needs and impact of the airport. A considerable amount of professional judgement is used for estimating aviation demand. Four basic types of forecasts are made for this study:

1. Number of based aircraft
2. General aviation fleet mix
3. Number of aircraft operations
4. Type of aircraft operation (local, itinerant and flight training)

The magnitude of aviation activity that can be reasonably expected within the short term, intermediate term and long term planning periods is critical for determining airfield and landside facilities. Projected based aircraft, fleet mix and associated operations are determining elements for developing the Kent State University Airport Master Plan. The level of effort in forecasting threshold and general aviation demand are focused on the following:

1. Existing FAA and ODOT/OA area wide forecast.
2. FAA terminal area forecasts.
3. Analysis of significant local conditions or changes in forecast factors.
4. Analysis of the Kent State University Aeronautics Division Strategic and Budget Plan.
5. On site monitoring of actual activity levels.
6. Kent State University Airport Users Surveys.
7. Discussions with FAA/ADO Detroit planning personnel.

Kent State University General Aviation Based Aircraft Forecasts

This data is based on FAA historical based aircraft and forecast based aircraft within the market study area as published by Department of Transportation, Federal Aviation Administration "Terminal Area Forecast". The data is published in tabular form and contains based aircraft for every Airport, State and Region in the United States covered in the National Plan of Integrated Airport Systems (NPIAS). This information coupled with socioeconomic data obtained from the U.S. Department of Commerce, Bureau of Census and the foregoing forecast methodologies enabled projecting future based aircraft.

At non-towered general aviation airports, projections of based aircraft also aide in forecasting other components of demand, such as aircraft operations. Consequently, forecasts of based aircraft are vital in the master planning process. For this reason, both the market study area and the Kent State University Airport historic based aircraft are analyzed to achieve a credible 20 year projection of based aircraft.

The number of based aircraft at an airport is important in determining future activity levels and the need for expanded or improved airport facilities. Forecasts of based aircraft are used directly to estimate the need for facilities such as hangars and aircraft aprons.

Forecast techniques include historic trend, per capita trend, population regression, and the market share analysis. The historic trend analysis at this airport requires special scrutiny. Table III-9 depicts a sharp decline from 1991 to 1992. Investigation revealed that during that period the Kent State University reassessed its flight training program to accommodate a shift in the market demand and adjust the training program. And currently, the flight training program has been reassessed to yield to community pressure to reduce noise and increase safety by restricting night operations and reducing operations through limited enrollment in the flight training program. The later decline from 53 based aircraft to 50 based aircraft and the fact that there was no growth during the following years is primarily attributed to the limited landside facilities available for based aircraft (i.e. lack of hangar space, vehicle parking and pilot comfort facilities).

Population Regression, Per Capita Trend, and Historic Trend Forecasts

Population regression, per capita trend, and historic trend analysis of based aircraft are depicted in tabular form in Table III-9 As can be seen in the table all methods resulted in relatively low correlation ranges (0.56 for population regression, 0.42 for the per capita trend, and 0.43 for the historical trend) in 2023. The population regression analysis produced forecasts that were low when compared to the growth predicted in the market study area. For this reason this method was not utilized in the preferred forecasts. Both per capita and historical methods were also excluded from the final determination of based aircraft due to the overly optimistic growth trends produced.

TABLE III-9
POPULATION REGRESSION, PER CAPITA AND HISTORICAL TREND ANALYSIS OF KENT STATE UNIVERSITY AIRPORT BASED AIRCRAFT

Year	***Cities of Stow & Kent Population***[1]	***Kent State University Airport Based Airctaft***[2]	***Per Capita Trend***		***Historical Trend***
1990	56,850	62	1.0906		62
1991	57,021	62	1.0873		62
1992	57,329	53	0.9245		53
1993	57,670	53	0.9190		53
1994	57,964	53	0.9144		53
1995	58,578	53	0.9048		53
1996	58,682	53	0.9032		53
1997	59,006	50	0.8474		50
1998	59,040	50	0.8469		50
1999	59,554	50	0.8396		50
2000	60,045	50	0.8327		50
2001	60,347	50	0.8285		50
2002	60,675	50	0.8241		50
2003	60,935	50	0.8205		50
Forecasts			***Based Aircraft***	***Percentage***	
2008	62,144	54[3]	62	1.002[4]	63[5]
2013	63,679	59[3]	68	1.062[4]	68[5]
2023	67,490	70[3]	80	1.181[4]	77[5]

1 U.S. Department of Commerce, Bureau of Census; 1999 and 2000 U.S. Census. 2003-2023 interpolated by consultants and Department of Development - Office of Strategic Research.
2 U.S. Department of Transportation, Federal Aviation Administration: Terminal Area Forecast (TAF). U.S. Government Printing Office, Washington, D.C. Calendar Years 1990-2003.
3 Population Regression equation: $Y = 0.002880X - 124.649$ where Y = based aircraft and X = population with R squared = .56.
4 Per Capita Trend equation: $Y = 0.0118867X - 22.866$ where Y = based aircraft and X = year with R squared = .42.
5 Historical Trend equation: $Y = .91666X - 1777.388$ where Y = based aircraft and X = year with R squared = .43.

Dynamic and Static Market Share

The final forecast approach analyzed was the market share technique including both static and dynamic methods. The static market projection entailed the extension of the 2003 market share figure, 0.9239 percent, through the 20 year planning period. The resulting forecasts are shown in Table III-10 for the dynamic market share. A slightly greater market share was predicted over the next 20 years producing a measured increase in based aircraft.

TABLE III-10
MARKET SHARE ANALYSIS OF KENT STATE UNIVERSITY AIRPORT BASED AIRCRAFT

Year	*State of Ohio Based Aircraft*[1]	*Kent State University Airport Based Aircraft*[1]		*Kent State University Airport Market Share*	
1990	4,879	62		1.2708%	
1991	4,980	62		1.2450%	
1992	4,905	53		1.0805%	
1993	4,905	53		1.0805%	
1994	4,773	53		1.1104%	
1995	4,906	53		1.0803%	
1996	4,906	53		1.0803%	
1997	4,903	50		1.0198%	
1998	4,906	50		1.0191%	
1999	5,093	50		0.9817%	
2000	5,363	50		0.9323%	
2001	5,372	50		0.9308%	
2002	5,390	50		0.9276%	
2003	5,412	50		0.9239%	
Forecasts		*Static*	*Dynamic*	*Static*	*Dynamic*
2008	5,493	51	56	0.9239%	1.0195%[2]
2013	5,579	52	63	0.9239%	1.1292%[2]
2023	6,638	61	75	0.9239%	1.1299%[2]

1 U.S. Department of Transportation, Federal Aviation Administration; Terminal Area Forecasts. U.S. Government Printing Office, Washington, D.C. Calendar years 1990-2003.

2 Dynamic Market Share Percentage: was derived from actual raw counts, KSU student enrollment, Kent State University Airport Users Surveys, and the Market Study Area Historic Economic Growth with R squared = 0.50.

TABLE III-11
SUMMARY OF PROJECTIONS AND PREFERRED FORECAST OF KENT STATE UNIVERSITY AIRPORT BASED AIRCRAFT

Year	Population Regression	Per Capita Trend	Historical Trend	Market Share Static	Market Share Dynamic	Preferred Forecast
Existing 2003	50	50	50	50	50	**50**
Forecasts						
2008	54	62	63	51	56	**56**
2013	59	68	68	52	63	**63**
2023	70	80	77	61	75	**75**

Preferred Forecast of Based Aircraft

In selecting the preferred method of based aircraft a careful review of the survey questionnaires, digital counter recorded volumes, personnel interviews, T-hangar waiting list, and Kent State University Airport Historic Register Logs was carried out. In addition to these aviation records, socioeconomic growth was reviewed and factored into the selection of a preferred forecast.

As a result of the credible data discussed above, the ***dynamic market share*** methodology was selected as the forecast method of determining based aircraft. This preferred projection was further supported by the Kent State University Division of Aeronautics' consideration of expanding the flight technology program. This growth in the Division of Aeronautics is further explained in the "Aeronautics Division: Strategic Budget Plan (2002)". A copy of this plan by Mr. Issac Nettey, Ph.D is furnished in the Appendix. All forecast methodologies are displayed in tabular form in Table III-11 and in graphical form in Exhibit III-22.

In addition, recent surveys by the consultant indicate a trend initiated by corporate users to relocate from carrier type small hub and regional type airports to more localized general aviation airports. The incentives are lower tie down and hangar rental fees, no landing fees and in many instances better services at lower cost.

Aircraft Fleet Mix

Aircraft mix or fleet mix refers to the types of aircraft which use or will use the Kent State University Airport. This information is considered in determining requirements for runway length, strength and width. These are influenced by three main aircraft characteristics: approach speed, wingspan, and weight. This combination of aircraft specifications is referred to as the Airport Reference Code (ARC). The FAA "Advisory Circular" 150/5300-13 identifies these limits.

With respect to weight, the Advisory Circular identifies two categories:

Small Airplanes - Aircraft that weigh less than 12,500 pounds.
Large Airplanes - Aircraft that weigh more than 12,500 pounds.

With respect to approach speed, the Advisory Circular lists five categories of aircraft:

A. -- Speeds less than 91 knots
B. -- Speeds of 91 knots to 121 knots
C. -- Speeds of 121 knots to 141 knots
D. -- Speeds of 141 knots to 166 knots
E. -- Speeds greater than 166 knots

With respect to wingspan, the FAA's classification system divides aircraft into six airplane design groups as follows:

I. -- Wingspans up to 49 feet
II. -- Wingspans 49 feet to 79 feet
III. -- Wingspans 79 feet to 118 feet
IV. -- Wingspans 118 feet to 171 feet
V. -- Wingspans 171 feet to 214 feet
VI. -- Wingspans 214 feet to 262 feet

Based Aircraft Fleet Mix

A separate analysis of the based aircraft fleet mix was developed by modeling the projections from the user surveys, onsite interviews, T-hangar waiting list, and both the strategic budget plan written by Dr. Issac Nettey and the Kent State University Airport and Aerospace Technology Task Force Report. It should be noted from these two reports that the University Flight Training Program is considering acquiring aircraft of Category B, Design Group II (i.e. Beech King Air 200, Cessna 441 Conquest, Cessna Citation II or a similar type of aircraft). Other based aircraft factors such as economic conditions, population trends and other airports in the study area were seriously considered. Table III-12 presents the results of historic and forecast based aircraft mix respectively.

TABLE III-12 DETERMINED FLEET MIX OF BASED AIRCRAFT								
	Existing		Projected					
	2003		2008		2013		2023	
Aircraft Type	Existing Based Aircraft	Based Aircraft Percent	Based Aircraft	Percentage	Based Aircraft	Percentage	Based Aircraft	Percentage
AI	50	100%	53	94%	57	91%	67	89%
AII	0	0	0	0	0	0	0	0
BI	0	0	2	4%	4	6%	6	8%
BII	0	0	1	2%	2	3%	2	3%
CI	0	0	0	0	0	0	0	0
CII	0	0	0	0	0	0	0	0
DI	0	0	0	0	0	0	0	0
DII	0	0	0	0	0	0	0	0
Total	**50**	**100%**	**56**	**100%**	**63**	**100%**	**75**	**100%**
Source: Historic Data From ODOT/OA 5010 Records and FAA-Terminal Area Forecasts (TAF), Projections by Richland Engineering Limited								

Itinerant Aircraft Fleet Mix

Information concerning existing and future itinerant fleet mix at the airport was gathered from on-site visits, user surveys and seven year historic airport register logs. The most credible source utilized was the operation register logs due to their descriptive format. When reviewing these logs, noticeable trends between 1996 and 2003 are difficult to determine. These erratic trends are evidence of inconsistency with the recording practices. However, while the logs fail to aide in itinerant forecast operations, they do present an accurate depiction of the itinerant aircraft fleet mix at the airport. Table III-13 shows this 7 year historical data stream by year with the average aircraft type per year and the percentage of each. The table indicates a significant percentage of logins generated by BII aircraft, i.e. by aircraft having a maximum certified takeoff weight 12,500 pounds or more, operating at an approach speed between 91 knots and 121 knots and having a wingspan between 49-ft. and 118-ft. Federal Aviation Administration planning and safety standards recommend that an airport is designed to meet the requirements of the most demanding based aircraft or most demanding group of aircraft that generate more than 500 annual operations. The existing critical aircraft at the Kent State University Airport is an AII. Examples of these types of aircraft are the Beech Bonanza, Cessna 172, Piper Cherokee, and Mooney M20J. It is anticipated based on the projections shown in Table III-14 that the critical aircraft will change from AI to BII during the 20 year planning period. While Table III-12 indicates no BII based aircraft, Table III-14 clearly suggests more than 500 annual operations generated from itinerant BII or more demanding aircraft. Subsequently, this report recommends that all applicable airside and landside improvements consider the operational demands of the BII aircraft.

TABLE III -13
SUMMARY OF KENT STATE UNIVERSITY
HISTORIC ITINERANT AIRCRAFT FLEET MIX

	AIRCRAFT TYPE							
Year	AI	AII	BI	BII	CI	CII	DI	DII
1990	NR							
1991	NR							
1992	NR							
1993	NR							
1994	NR							
1995	NR							
1996	111	0	38	17	0	10	0	0
1997	156	0	71	13	0	9	2	4
1998	167	0	65	24	0	3	0	0
1999	129	0	44	19	0	2	0	1
2000	114	0	37	8	0	1	0	0
2001	104	0	51	11	0	0	0	0
2002	80	0	22	5	0	1	0	0
*2003	104	1	36	18	0	0	0	2
Avg. Per Year	**121**	**0**	**46**	**14**	**0**	**3**	**0**	**1**
Percent of Avg.	**65%**	**---**	**25%**	**7%**	**---**	**2%**	**---**	**1%**
NR - No Records available at the time of this study. Source: Kent State University Airport Operations Register Logs (1996 - 2003) Avg.								

* 2003 Historic Airport Operations Logs at the time of this study were only available from January to August.

TABLE III-14
DETERMINED FLEET MIX OF ITINERANT AIRCRAFT

	Existing			Projected					
	*Average Yearly Itinerant Activities	Itinerant Activities Percent	Annual Itinerant Operations	2008		2013		2023	
				%	Annual Itinerant Operations	%	Annual Itinerant Operations	%	Annual Itinerant Operations
AI	121	65%	4,225	63%	5,109	61%	5,612	58%	6,479
AII	NR	0	0	0	0	0	0	0	0
BI	46	25%	1,625	26%	2,109	27%	2,484	29%	3,239
BII	14	7%	455	8%	649	9%	828	10%	1,117
CI	NR	0	0	0	0	0	0	0	0
CII	3	2%	130	2%	162	2%	184	2%	223
DI	0	0	0	0	0	0	0	0	0
DII	1	1%	65	1%	81	1%	92	1%	112
Total	**185**	**100%**	**6,500**	**100%**	**8,110**	**100%**	**9,200**	**100%**	**11,170**

Source: Historic Data from KSU Airport Operations Records (1995-2002), ODOT/OA 5010 Records and Federal Aviation Administration Terminal Area Forecast (TAF). Projections by Richland Engineering Limited.
*It should be noted that KSU ops records represent a good indication of itinerant fleet mix but are inconsistent for airport operations determinations.

Table III-14 summarizes the itinerant aircraft fleet mix for the Kent State University Airport by comparing the itinerant aircraft fleet mix through the 20 year planning period. The 5, 10, and 20 year forecasts of itinerant fleet mix percents display a decrease in AI aircraft, increase in both BI and BII aircraft, and almost no change in the CII and DII categories. For the purpose of this study, it was concluded by the consultant that the critical aircraft at this facility would be an aircraft meeting the criteria for a BII ARC. Examples of this category aircraft are such planes as the Beech King Air 90 and 200, Cessna, 441 Conquest, and Cessna Citations II and III. See also "Aircraft Fleet Mix" defined in Pages III-13 and III-14.

Annual Airport Operations

The Kent State University Airport, as discussed previously, is a non-towered general aviation airport that supports the Kent State University flight technology major, both local and itinerant traffic, and two Fixed Base Operators. Because of these components, the development of operation projections was divided into enrollment and private based including itinerant operations. An operation is defined as either a take-off or a landing.

When examining enrollment data, it is necessary to note a decreasing trend from 1990 to 1997 due to the initiation of "restrained" or "controlled enrollment". The reason for this "limited enrollment" is to provide a balance between growth and the quality of flight training with the resources available to the Division of Aeronautics. The Kent State University Airport is one of those resources. Since 1997, the program, while operating under "Selective Admission", has still demonstrated an average growth rate of 10.5 percent. Dr. Issac Netty's report titled "Kent State University Aeronautics Division: Strategic and Budget Plan (2002)" and "Kent State University Airport and Aerospace Technology Task Force Report (1995)" can be referenced in the Appendix for further justification.

Table III-15 displays historic and projected enrollment information by major divisions in the program. The "All Other Major Subjects" row incorporates students from aeronautical systems engineering technology, aviation management, aeronautical studies, aerospace engineering technology, aerospace manufacturing management technology and airway computer science. Projected enrollment was calculated for both limited and open enrollment by applying a fixed percentage to the baseline year 2003 enrollment totals. These percentages were derived from historic student enrollment trends shown in Figure A-1: "Enrollment breakdown in Aeronautics Courses 1980-2000" located in the Appendices of the Kent State University Aeronautics Division: Strategic Budget Plan. The difference between limited and open enrollment growth percentages is an average of 18% through the duration of the 20 year planning period. The forecasted enrollment in the program calls for an increase of 3.8% in 2008, 8.9% in 2013, and an 18.5% increase by the year 2023 if the enrollment is still limited. On the other hand, if enrollment was opened and based on demand, the program would display an increase of 19.7% in 2008, 21.3% in 2013 and 37.7% in 2023.

TABLE III-15
KENT STATE UNIVERSITY, DIVISION OF AERONAUTICS
ENROLLMENT ACTIVITY PROJECTIONS

ENROLLMENT CURRICULUM	HISTORIC ENROLLMENT (FALL SEMESTER)														PROJECTED ENROLLMENT (FALL SEMESTER)					
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	**2008**		**2013**		**2023**	
															(LE)	OE	(LE)	OE	(LE)	OE
Undeclared	39	35	32	30	23	21	19	22	26	38	31	25	26	30	(28)	25	(30)	20	(30)	10
Flight Technology	214	190	174	165	125	114	103	114	116	153	169	183	185	185	(194)	228	(212)	283	(254)	400
All Other Major Subjects	101	90	82	78	59	54	49	38	51	62	70	85	109	130	(136)	160	(148)	198	(178)	280
Totals	**354**	**315**	**288**	**273**	**207**	**189**	**171**	**174**	**193**	**253**	**270**	**293**	**320**	**345**	**(358)**	**413**	**(390)**	**501**	**(462)**	**690**

LE = Limited Enrollment (Restraint)
OE - Open Enrollment (Demand Driven)
Source: Kent State University Aeronautics Division: Strategic and Budget Plan (Jan. 2002).
1990 to 1997 Enrollment and Projections Interpolotated by Consultant based on "Enrollment Breakdown in Aeronautics Courses 1980-2002"

Demand Enrollment identifies all students interested in flying related courses regardless of their major.

Restraint Enrollment restricts enrollment in flight courses to only those that have declared flight related majors (i.e. Kent State University, School of Technology, Division of Aeronautics Program).

To calculate the annual operations, the annual student enrollment in flight technology was multiplied by an average of 260 operations per year. This number of operations was further verified by gathering 9 weeks (April to May) of raw aircraft counts and projecting the results forward to 52 weeks taking into account student holidays and breaks. The summary of these counts can be referenced in the Appendix. Following the enrollment operations is the private based and itinerant aircraft. The operations associated with these two areas were produced with the same supporting information as enrollment including mail-back surveys and personal interviews. The private based and itinerant operation forecasts depict an increase of 16% in 2008, 14% in 2013, and 21% in 2023. This information is presented in Table III-16 along with total annual operations per year.

TABLE III-16
KENT STATE UNIVERSITY AIRPORT
20 YEAR OPERATION PROJECTIONS

Operations Type	Existing 2003	2008		2013		2023	
		LE	OE	LE	OE	LE	OE
Flight Technology Enrollment (@ 260 ops)	48,100	50,440	59,280	55,120	73,580	66,040	104,000
Private Based and Itinerant Aircraft	12,220	14,210	14,210	16,170	16,170	19,600	19,600
Total Annual Operations	**60,320**	**64,650**	**73,490**	**71,290**	**89,750**	**85,640**	**123,600**

LE = Limited Enrollment (Restraint)
OE = Open Enrollment (Demand Driven)
Source: Kent State University Operations Register Logs, on-site interviews with personnel, actual 24 hour raw counts.

Operations per privately based aircraft; existing OPS 470/per based aircraft
projected OPS 490/per based aircraft

* Total estimated annual operations are based "Hoekstra (2000)" regression analysis.

1A. OPS = 21,555 + 242 x 50 = 21,555 + 12,100 = 33,655 < 5010 Data
1B. OPS = 21,555 + 242 x 24 + 34,000 = 21,555 + 5,808 + 34,000 = 61,363 ≅ to 9 week raw count data projected to 52 weeks OPS.

*Source: Model for estimating General Aviation Operations at Non-Towered Airports, July 2001, Statistics and Forecasts Branch. Office of Aviation Policy and Plans, Federal Aviation Administration.

Design Hour Operations

Design hour operations were also forecast as a function of total annual operations. The methodology used involved three steps. In Step 1, average day operations were calculated by dividing total annual operations by 365. In Step 2, design day operations were calculated with an assumption that a typical design hour constituted a fixed percentage (12 percent) of design day operations. Accordingly, design hour operations equaled 0.12 times design day operations. The projections are shown in the "Summary of Forecasts", Table III-17.

Annual Instrument Approaches

Data from the FAA Air Traffic Activity Date System (ATADS), calendar years 1990 to 2002, reveal an average of 148 annual instrument approaches (AIA's) for this time frame. The survey results, however, show three respondents of the six received (50%) feel that better instrument equipment would be beneficial during periods of reduced visibility. Because of the low response rate on the mail back surveys (6 out of 51 or 12%), several personal interviews were also conducted that yielded many comments concerning the use of other airports due to weather conditions and the availability of better approaches. The conclusion drawn from this information is that the number of existing AIA's is depressed due to the lack of adequate approach capabilities at the Kent State University Airport.

To forecast future AIA's it was assumed from the user surveys and personal interviews that 17 instrument approaches could be made in 2008 if the necessary approach capabilities are in place. Therefore, using this data and the operation projections, a ratio of AIA's to total operations was developed. This ratio was then applied to forecast total operations to produce the figures of AIA's shown in Table III-17.

TABLE III-17
KENT STATE UNIVERSITY AIRPORT MASTER PLAN
SUMMARY OF FORECASTS

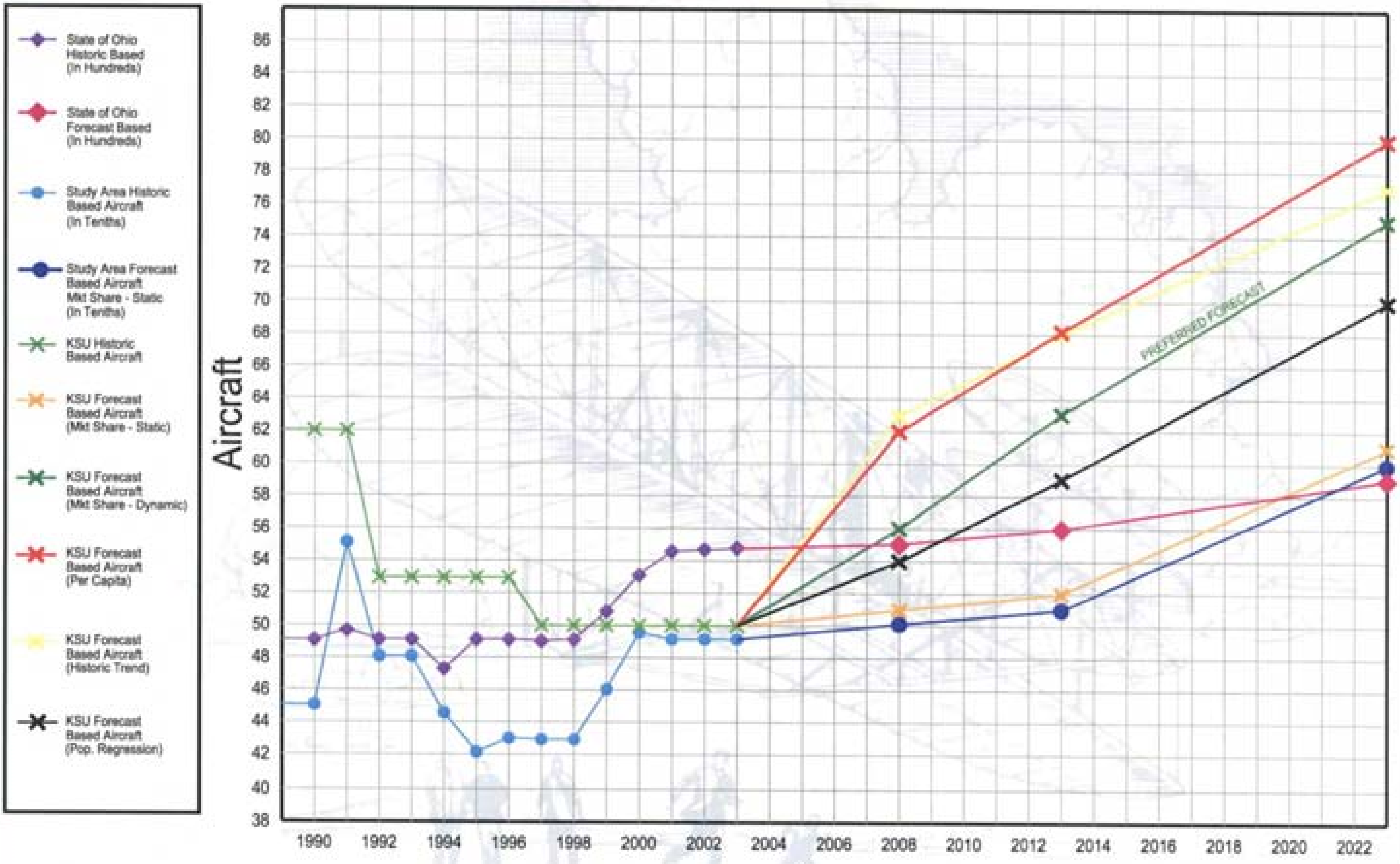
		Annual Flight Training Operations		Annual Operations		Total Annual Operations		Design Hour Operations*		Annual Instrument Approaches	
Development Year	Based Aircraft	Restraint Enrollment	Demand Driven Enrollment	Itinerant Operations	Local General Aviation Operations	Restraint Operations	Demand Operations	Restraint Operations	Demand Operations	Restraint Operations	Demand Operations
2003 (Existing)	50	48,100	50,700	6,500	5,720	60,320	62,290	38	39	148	153
2008	56	50,440	59,280	8,110	6,100	64,650	73,490	40	46	165	182
2013	63	55,120	73,580	9,200	6,970	71,290	89,750	45	56	178	222
2023	75	66,040	104,000	11,170	8,430	85,640	123,600	54	77	216	315

* Design Hour Operations - AOPS ÷ 365 x 1.9 = [April/May] PD OPS x 0.12 = DHOPS or Annual OPS x 0.000625

Summary of Aviation Forecasts

The aviation forecasts were derived from extensive data compiled from the socioeconomic climate, historic airport climate, university records, user surveys, personal interviews, and digital raw counts for a 9 week period. Although the data when examined individually is inconsistent for projecting airport development as a whole, it does create a fairly accurate overall picture of the airport when used together. The Kent State University Airport forecast process began with determining based aircraft by utilizing a dynamic market analysis. From here, itinerant records were reviewed to formulate an aircraft fleet mix. After the fleet mix, Kent State University enrollment was studied and forecast into the 20 year planning period to aid in the preparation of determined operations. In addition to enrollment, itinerant and private based aircraft operations were also produced and added to enrollment operations to arrive at the total annual airport operations and fleet mix. Design hour and AIA's were then forecast from the total annual operations. For the purpose of avoiding either deficiencies in future Kent State University operations or poor economic performance from over investing, all of the methodologies were carefully weighed in estimating the magnitude of future demand. In summary, the long term regional trend in air transport activities will continue at an annual rate of approximately one and one half percent. The airport currently has 50 based aircraft with 60,320 total restraint annual operations. The forecasts based on the preceding data indicates that the Kent State University Airport will ultimately reach 75 based aircraft with 85,640 total annual restraint operations. The fleet mix of future based aircraft, including current and future operations, strongly suggest that the most demanding aircraft will be the BII category aircraft. Exhibits III-22 and III-23 depict the results of this chapter in graphical form.

Kent State University
Based Aircraft Forecast



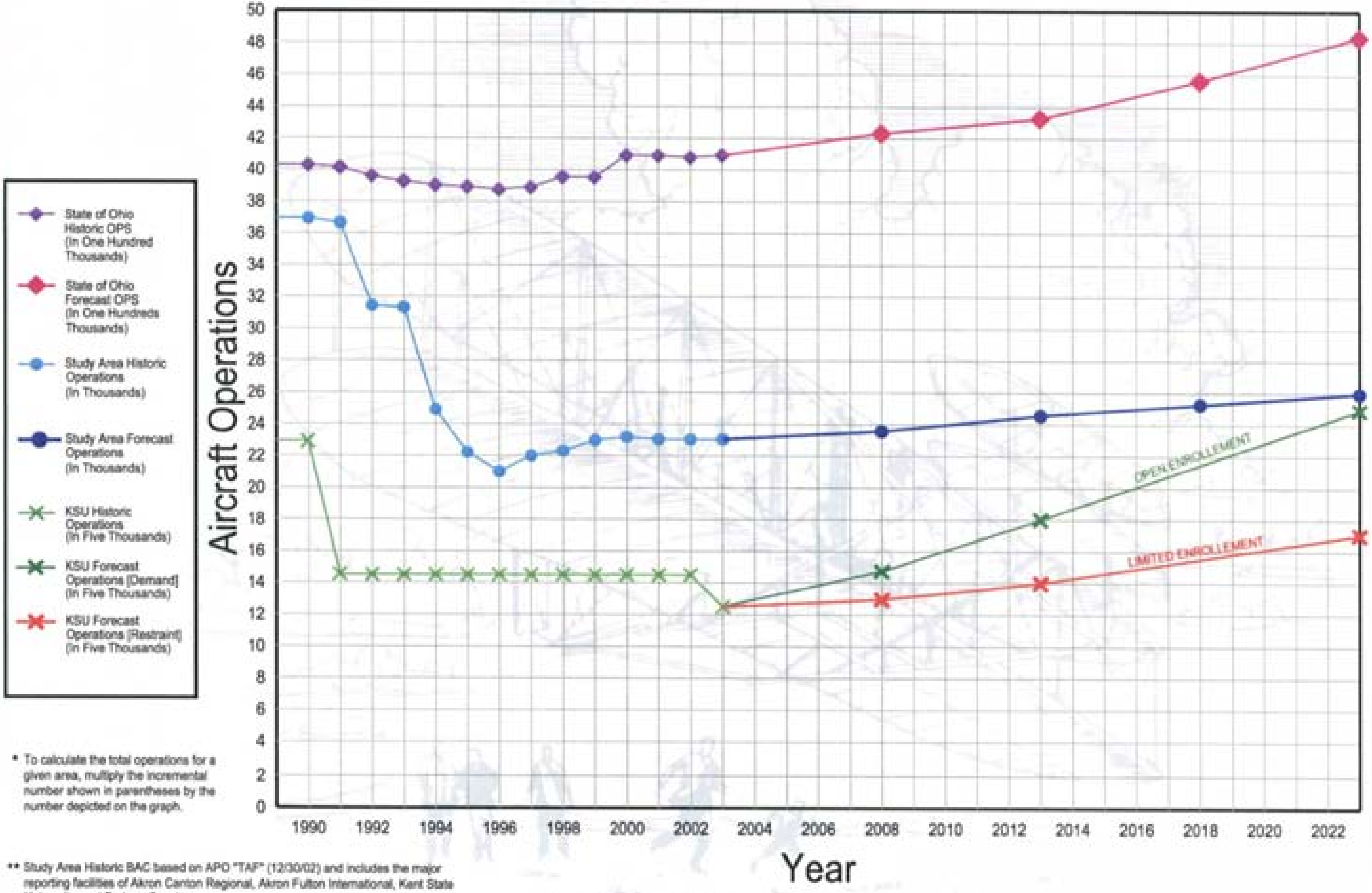
* Study Area, State of Ohio, and KSU Historic BAC based on APO "TAF" (12/30/02)

** Study Area includes the major reporting facilities of Akron Canton Regional, Akron Fulton International, Kent State University, and Portage County

Exhibit III-22

102174

Kent State University
Aircraft Operations Forecast



* To calculate the total operations for a given area, multiply the incremental number shown in parentheses by the number depicted on the graph.

** Study Area Historic BAC based on APO "TAF" (12/30/02) and includes the major reporting facilities of Akron Canton Regional, Akron Fulton International, Kent State University, and Portage County

Exhibit III-23

102174

CHAPTER IV

AIRPORT CAPACITY ANALYSIS

Several methods have been developed for the analysis of airfield capacity. Typically, the approach in FAA Advisory Circular 150/5060-5, Airport Capacity and Delay is used. Examination of the airport capacity and delay model (ACDM) reveals a series of inputs needed to determine the estimated capacity of an airfield. This includes the following:

- Airport Layout
- Meteorological Conditions
- Aircraft Operations Fleet Mix
- Touch-and-Go Operations
- Runway Capacity and Utilization

Airport Layout

The airport layout refers to the location and orientation of runways, taxiways, and other airport facilities. Kent State University Airport has one active runway. This runway has an orientation of 1-19 and dimensions of 4,000 feet x 60 feet. Access to this runway is furnished from a 40 foot wide full parallel taxiway with three connectors. The taxiway connectors are located at each runway end with a third situated approximately 1,450 feet north of Runway End 1.

Meteorological Conditions

Runway utilization at an airfield is affected by changes in wind direction, velocity, visibility, and ceiling. Prevailing wind and visibility determine the direction in which aircraft can take-off and land.

FAA guidelines suggest runway orientation should provide ample coverage for 95% of crosswinds in excess of 10.5 or 13 knots for a runway width of 60 or 75 feet respectively depending on the Airport Reference Code (ARC). From the available information compiled by the Akron-Canton Regional Airport, which is the closest airport with reliable current weather observation data, 40,903 observations were taken from 1968 to 1978. From these operations, the wind coverage of existing AI Runway 1-19 at the Kent State University Airport is approximately 90.25% for a 10.5 knot crosswind component. Since the percentage falls below 95%, a crosswind runway should be recommended if the airport maintains AI classification. However, a crosswind runway is not feasible on the existing site considering the lack of safety for people and property on the ground. Specifically closed sod Runway 5-23 has two schools located in the approach paths. Another crosswind scenario for BII ultimate development examines the crosswind component of 13 knots and yields a total percent coverage of 94.89%. Due to the small difference in required and actual wind coverage for BII classification, no justification exists for a crosswind runway.

Aircraft Operational Fleet Mix

The FAA's Airport Capacity and Delay Model requires that total operations be converted to operations by specific aircraft classification categories. The capacity model identifies an airport's aircraft fleet mix in terms of four classifications ranging from A (small, single engine with gross weight of 12,500 lbs. or less) to D (large aircraft with gross weights over 300,000 lbs.). These classifications and examples of each are identified in Table IV-1. Class A and Class B aircraft utilize Kent State University Airport.

TABLE IV-1
ACDM AIRCRAFT CLASSIFICATION SYSTEM

Class A: Small single-engine, gross weight 12,500 pounds or less	
Cessna 172/182	Mooney 201
Beech Bonanza	Piper Cherokee/Warrior
Class B: Twin-engine, gross weight 12,500 pounds to 60,000 pounds	
Beech Baron	Piper Aztec
Cessna 414/421	Piper Navajo
Cessna Citation I	Beech King Air 90
Class C: Large aircraft, gross weight 60,000 pounds to 300,000 pounds	
Boeing 737	Douglas DC-9
Beech King Air 350	Cessna Citation X
Gulfstream V	Lear 35/60
Class D: Large aircraft, gross weight more than 300,000 pounds	
Boeing 747	Airbus A-300/310
Boeing 777	Douglas DC-10
Source: FAA Advisory Circular 150/5060-5, Table 1-1 Aircraft Classification	

Touch and Go Operations

A touch and go operation is defined when an aircraft lands and then makes an immediate takeoff without coming to a stop on the runway. The primary use of a touch and go operation is for flight training. On-site observations and interviews with flight instructors determined that the Kent State University Flight Training Program generates 3 on-site touch and go operations for each training runup.

Runway Utilization

One of the areas needed for input into the airport capacity and delay model is the percent of time in which runway operating layout is used. The runway is described in terms of number, location, and orientation of active runways. It involves the direction and type of aircraft operations utilizing each runway.

The Kent State University Airport has only one active runway. Runway End 1 handles approximately 40% of the operations, while Runway End 19 is utilized for the remaining 60%. A review of the APO Facilities Utilization Report ("Report By Facilities") reveals that the Kent State University Airport generates approximately 148 instrument approaches annually. During periods of instrument flight rules (IFR) both runway ends are utilized for the instrument approaches.

The Kent State University Airport's ability to meet aviation demand depends primarily on its runway maximum capacity to serve visual and instrument flight operations. Runway 1-19 capacity was analyzed using Advisory Circular 150/5060-5. For a single runway configuration (Runway 1-19) with less than 10% of aircraft over 12,500 lbs., it was determined that Runway 1-19 could serve 98 visual flight operations per hour or 59 instrument flight operation with a combined annual service volume (ASV) of 230,000 operations. The determination is a very favorable demand over capacity ratio of 0.27 and a very desirable level of service, almost no perceptible delay. Exhibit IV-4 depicts this information output from the FAA computer program "Airport Design, Version 4.2D".

The adequacy of an airport facility is determined in part, by the demand for runway access time for take-offs or landings. It is then necessary to compare the forecast demand with the capacity of the runway. As discussed in Chapter III, 123,600 annual demand driven operations were forecast for the 20 year planning period. By comparing the annual demand with the annual capacity (123,600 vs. 230,000). It is found that theoretically, the airport could accommodate an additional 54 percent of the total forecast operations. Good planning practices require further analyses of capacities and demands utilizing design hour volumes. Examination of the Kent State University flight training records, user surveys and interviews, and digital traffic counters, it was determined that May and April accommodate approximately 16.9% of the annual operations.

A summary comparison between demand and capacity for restraint and open enrollment (demand driven) conditions for the 20 year planning period is depicted in Table IV-2.

TABLE IV-2
RUNWAY CAPACITY VS. DEMAND

				Annual Airport Operations		
Year	**Condition**	**Capacity Peak Hour**	***Design Hour Operations**	**Service Volume**	**Demand Volume**	**Annual Demand to Annual Service Volume Ratio**
2003	Restraint	98	38	230,000	60,320	26.2%
	Demand Driven	98	39	230,000	62,290	27.4%
2008	Restraint	98	42	230,000	64,650	28.1%
	Demand Driven	98	47	230,000	73,490	32.0%
2013	Restraint	98	46	230,000	71,290	31.0%
	Demand Driven	98	59	230,000	89,750	39.0%
2023	Restraint	98	55	230,000	85,640	37.2%
	Demand Driven	98	79	230,000	123,600	53.7%

* Design Hour Operations - Airport Operations ÷ 365 x 1.9 = April/May Peak Day Operations x 0.12 = Design Hour Operations.

Prudent development guidelines recommend that planning consideration be given when capacity levels of 60% have been reached. Further, implementation efforts to enhance capacity should be initiated at the 80% level.

AIRPORT CAPACITY AND DELAY DATA

C =	Percent of airplanes over 12,500 lbs but not over 300,000 lbs .	10
D =	Percent of airplanes over 300,000 lbs	0
Mix Index (C+3D)	. . . .	10
Annual demand	. . . .	63,000

General aviation operations dominate

AIRPORT CAPACITY AND DELAY FOR LONG RANGE PLANNING

Runway-use Configuration (Sketch) No.	Capacity (Ops/Hour) VFR	IFR	ASV	Ratio of Annual Demand to ASV Ratio	Average Delay per Aircraft (Minutes) Low	High	Minutes of Annual Delay (000) Low	High
8	394	119	715,000	0.09	0.0	0.1	0	6
7	295	119	625,000	0.10	0.0	0.1	0	6
5	295	62	385,000	0.16	0.0	0.1	0	6
6	295	62	385,000	0.16	0.0	0.1	0	6
18	301	59	385,000	0.16	0.0	0.1	0	6
16	295	59	385,000	0.16	0.0	0.1	0	6
19	264	59	375,000	0.17	0.0	0.1	0	6
4	197	119	370,000	0.17	0.0	0.1	0	6
12	197	119	370,000	0.17	0.0	0.1	0	6
3	197	62	355,000	0.18	0.1	0.1	6	6
11	197	62	355,000	0.18	0.1	0.1	6	6
2	197	59	355,000	0.18	0.1	0.1	6	6
10	197	59	355,000	0.18	0.1	0.1	6	6
13	197	59	355,000	0.18	0.1	0.1	6	6
17	197	59	355,000	0.18	0.1	0.1	6	6
14	150	59	270,000	0.23	0.1	0.1	6	6
15	132	59	260,000	0.24	0.1	0.1	6	6
1	98	59	230,000	0.27	0.1	0.2	6	13
9	98	59	230,000	0.27	0.1	0.2	6	13

REFERENCE: Chapter 2 of AC 150/5060-5, Airport Capacity and Delay, including Changes 1 and 2.

CHAPTER V

FACILITY REQUIREMENTS

General Existing Airport Dimensional Standards

The existing airside facilities have been examined for meeting the demand of existing airport reference code AI & BI and feasibility to meet future BII requirements. The analysis focused on runway orientation, length, width and pavement design strength. Airport and runway dimensional standards are attached in the Appendix.

1. Runway Dimensional Criteria
   The current effective runway length of 3,950 feet is sufficient to accommodate the AI & BI small aircraft, visual runway with not lower than 3/4 statute mile approach visibility minimums.

2. Runway Orientation
   Runway orientation as a primary function of wind coverage to determine if additional runways are needed to provide the necessary 95% of 10.5 knots wind coverage. It was determined that the present orientation has only 88.54% coverage and that the present orientation would not meet the 95% minimum.

3. Runway Length
   The length of the runway as noted above is sufficient to meet AI and BI ARC requirements but would fall about 470 feet short to meet BII requirements. Aircraft falling into the BII and larger category presently use the airport at 60% or less certified takeoff weight. If consideration would be given to serve BII and larger aircraft at 100% useful load then the runway should be extended by 470 feet for a total effective length of 4,420 feet.

4. Runway Width
   Runway width of 60 feet as a function to existing 3/4 mile or greater, approach visibility minimum would be adequate to meet requirements of AI and BI aircraft. To lower visibility minimums of less than 3/4 mile or to meet requirements of BII and larger aircraft a 75 feet wide runway should be considered.

5. Taxiway Requirements
   The existing full length parallel taxiway and taxiway runups all 35 feet wide provide safe and efficient aircraft movement to and from runway 1-19, the apron and fueling facility including the T-hangars and terminal hangar. Also the runway centerline to parallel taxiway centerline separation of 250 feet meets the 225 minimum dimensional standard for AI and BI aircraft.

6. Other Separation and Dimensional Criteria
   Runway shoulder width, blast pad dimensions, runway safety area width and length beyond the runway, object and obstacle free area, aircraft parking, taxiway safety margin, taxiway shoulder width, taxiway safety area, taxiway object free area meet minimum dimensional standards.

7. Electronic And Visual Navigation Aids
   Runway 1-19 has pilot activated medium intensity runway lights, runway end identification lights and visual approach slope indicators. Runway end 1 has straight-in approach using the Akron Canton NDB or GPS Approach 118.6 & 226.4. The MIRL, REIL and VASI are activated on Unicom 122.9. Runway 1-19 also has a circling approach using Akron Canton VOR.DME, or GPS-A. Runway end 19 also has a straight-in GPS approach. Applicable approach plates are included in the Appendix.

8. Airspace Criteria

The KSU Airport existing airspace classification is "Visual Runway B" having a primary surface width of 500 feet and a horizontal surface radius of 5,000 feet. The approach surface length is 5,000 feet and its width at the end is 1,500 feet and the approach slope is 20:1. Runway end 1 has a group of trees penetrating the existing approach surface by 13.4 feet. It is proposed to remove or trim the penetrating trees at the earliest opportunity. No penetrations were found within Runway end 19 approach when surveyed in 2003.

This chapter presents a description of facility requirements dictated by forecast demand and other appropriate planning criteria. It does so for two broad areas.

- **Landside**
  - Terminal/Administration Building
  - Auto Parking
  - Access Roads

- **Airside**
  - Runways and Taxiways
  - Instrumentation and Lighting
  - Landing Area
  - Hangars and Hangar Apron
  - Local/Itinerant Apron
  - Fuel Dispensing/Storage

Requirements for specific kinds of facilities were determined for the Kent State University Airport based upon Forecasts of Aviation Demand and applicable planning standards as specified in various advisory circulars and other publications of the FAA. Among the most frequently consulted sources was Advisory Circulars 150/5300-13, Airport Design.

The facility requirements are developed with an assumption that the existing facilities will continue to be used throughout the planning time frame. If for any reason the existing facilities would need to be replaced, relocated, or rehabilitated they would be added to the requirements detailed in this section.

Landside

Facilities requirements were developed for general aviation operations at the Kent State University Airport. These operations, developed previously in Chapter III - Forecasts of Aviation Demand, depict an increased demand trend that will continue to grow throughout the planning time frame.

A. Terminal/Administration Building

The current terminal and administration facility are described in Chapter II. The area is partially occupied by airport management and the Kent State University flight training program. The building includes offices, waiting room, and restroom facilities.

FAA planning guidelines for terminal development uses operational peak pilot and passenger hour to calculate total terminal area required. Tables V-1 and V-2 show the breakdown of pilots, passenger, and support personnel and the projected area requirements for each division of the terminal building. Due to the condition of the structure and the growth projected in the pilot and passenger design hour, additional terminal space is warranted in the first five years of the planning period.

TABLE V-1
FORECAST OF PILOTS, PASSENGERS & SUPPORT PERSONNEL

Development Year		Average Day/ Peak Month Operations	Design Hour Operations	Pilot and Passenger	Airport Support Personnel	Design Hour Vehicles
2003 (Existing)		314	38	76	7	39
Requ ire d	2008	337	40	84	8	41
	2013	371	45	92	8	46
	2023	446	54	110	10	55

Flight Training Ratio DHV/PPS = 0.4 @ 84% of DHV = 0.336
Local & Itinerant Ratio DHV/PPS = 0.8 @ 16% of DHV = 0.128
Average Weighed Ratio DHV/PPS = 0.464

TABLE V-2
TERMINAL FACILITY REQUIREMENTS (SQUARE FEET)

Development Year		Management & Operations	Pilot Briefing & Lounge	Public Convenience	Concession & Eating	Circulation & Utilities	Total Terminal Building Area
Existing		251	500	603	0	526	1,880
Required	2003	250	1,260	125	420	2,055	4,110
	2008	280	1,380	140	460	2,260	4,520
	2013	300	1,500	150	500	2,450	4,900
	2023	360	1,800	180	600	2,940	5,880

B. Auto Parking

FAA planning guidelines were used to estimate the number of auto parking spaces and associated areas required for each planning period. The number of auto parking spaces is determined by the average day peak month (ADPM) of local, itinerant, and flight training operations. Vehicle parking planning standards are also based on the following items:

1. Aircraft occupancy level of 2.8 persons per operation.
2. Vehicle occupancy of 1.5 persons per vehicle.
3. Use 35 square yard per vehicle for parking space and access maneuvers for two way access;

use 48 square yard per vehicle for one way access.

4. Assumption for surface transportation for flight training 5% by bus 95% by car. Turnover rate is 4 per parking space.
5. Add one parking space for each based aircraft.
6. Check total vehicle parking against ITE landuse (022) trip end data.

TABLE V-3
AUTO PARKING

Vehicle Parking		Average Day Peak Month (ADPM) Operations		Parking Spaces[3]	One Space Per Based Aircraft	Recommended	
		Local & Itinerant[1]	Flight Training[2]			Parking Spaces	Area (Sq. Yd.)
Existing		40	53	44	50	56	2,000
Required	2003	40	53	44	50	94	3,290
	2008	47	56	49	56	105	3,675
	2013	53	62	55	63	118	4,130
	2023	65	74	66	75	141	4,935

1 Local and Itinerant ADPM Operations = Local + Itinerant ADPM calculated in Table V-3
2 Flight Training ADPM Operations = 75% of ADPM Flight Training Programs from Table V-3
3 Parking Spaces = ("Local & Itinerant" + "Flight Training" ADPM Operations) x 0.475

C. Access Road

Airport user ground access to airport landside facilities such as terminal area, conventional hangars, T-hangars and maintenance facilities should be secure, readily available, easy to transfer personnel and cargo from ground transportation through the terminal or hangar areas to the aircraft. Recommended ground access should include a 24-ft. wide, all weather road directly connecting parking or loading/unloading facilities with a collector or arterial street system. The access road should connect to curbside loading or unloading of passengers, baggage or cargo in a secure and efficient manner.

For any alternatives under consideration the most prevalent mode of airport access would be by personal automobile, by public or campus bus or to a lesser extent by taxicabs. Appropriate access to and from existing street system should be provided in accordance with applicable State of Ohio and Local Access Management Policy and in reasonable conformance with "A Policy on Geometric Design of Highways and Streets[1]" and with the "Transportation and Traffic Engineering Handbook[2]".

1 Published by Institute of Transportation Engineers, Washington, D.C.
2 Published by American Association of State Highway and Transportation Officials, Washington, D.C.

Airside

For the purposes of this study, airside facilities include the following:

- Runway and Taxiways
- Instrumentation and Lighting
- Land Area

Future needs for these facilities were determined on the basis of demand, especially levels of operations and aircraft mixes. Guidelines from the FAA were also used, most notably those present in the FAA Advisory Circulars referenced earlier in this report.

A. Runway Orientation

The orientation of the runway for take-off and landing operations is dependent on wind direction and velocity together with the ability of aircraft to operate under adverse meteorological conditions. The general planning guideline situates the runway as closely as possible to the direction of the wind. The most desirable runway layout would incorporate 95% or greater of total wind coverage.

For BII Aircraft the existing Runway 1-19 orientation has slightly less than 95% of recommended wind coverage. However 94.89% is acceptable. For AI aircraft the 1-19 orientation, as outlined in the previous chapter, has wind coverage of 88.54%. Therefore no requirement exists to adjust Runway 1-19's orientation.

B. Runway Length Requirements

Ultimate recommended runway length is determined by considering either the most critical aircraft based at the airport or a fleet mix having similar performance characteristics. There are no aircraft based at Kent State University Airport that specifically require a longer than the existing 4000 feet runway. However, fueling records and operation logs indicate that a group of aircraft having approach speeds of more than 94 knots and wing span greater than 49 feet generate more than 500 operations per year.

The recommended runway length for the Kent State University Airport was developed using a combination of Advisory Circular 150/5325-4 and the FAA Computer Program “Airport Design, Version 4.2D”. Input factors for this program to determine runway length are displayed in the Appendix.

The Aircraft Reference Code (ARC) is a coding system used to match the operational and physical characteristics of the airplanes intended to operate at an airport. The ARC has two identifiers related directly to the most demanding type of aircraft expected to use the airport. These two components consist of a letter A through E designating approach speed and a roman numeral I through VI designating wing span. The ARC coding system can be seen in Chapter III - Forecasts of Aviation Demand: Aircraft Fleet Mix.

The critical aircraft selected to the Kent State University Airport with at least 500 annual operations is a Category "B" Design Group "II" Aircraft. A BII critical aircraft has an approach speed greater than 91 knots but less than 121 knots and a wing span greater than 49 feet but less than 79 feet. Examples of this aircraft type that frequent the Kent State University Airport are the Cessna Citation II and III, Beech King Air 90, 200, and 350, Sabre Liner 65, Dassault Falcon 50 and Cessna 441

Conquest. The FAA central region computer program for runway length requirements for BII aircraft is attached to the Appendix. In addition, Table V-8 summarizes takeoff distance for BII aircraft described above that frequent the Kent State University Airport. The aircraft are presently using the Airport at severely reduced loads.

Kent State University has in the past served aircraft in Approach Categories A and B and in Design Groups I and II. The required runway length as per "Airport Design, Version 4.2D" to serve 100% of the small aircraft (i.e. aircraft weighing less than 12,500 lbs.) is 4,420 feet x 75 feet.

This report used several methods to determine the required runway length to serve small airplanes having less than 10 passenger seats. AC 150/5325-4A Figure 2-1 at 90% useful load determines the runway length 3850 feet without adjustments for differences in runway centerline elevations or providing for wet or slippery runway surface conditions. Allowing adjustments to compensate for 17.3 feet difference between runway centerline elevations or for wet and icy runway surface would add 15% to above calculated runway length making the recommended ultimate runway length 4428 feet.

The master plan study also used the FAA computer programs cited in AC 150/5300-13 to double check with the above method for determining recommended runway length. All three of the optional methods used provided similar runway lengths.

TABLE V-4
SUMMARY OF BII AIRCRAFT
TAKEOFF DISTANCE

Aircraft Type	Max Grosse Weight (lbs.)	Certified Takeoff Distance (feet)	Adjusted takeoff[1] Distance (feet)
Beechcraft			
King Air 90	10,100	2,577	3,391
King Air 200	12,500	2,579	3,393
King Air 350	15,000	3,680	4,768
Cessna			
441 Conquest	9,925	2,465	3,251
Citation II	14,300	3,450	4,481
Citation III	22,200	5,150	6,604
Saberliner			
Sabre 65	24,000	5,150	6,604
Dassault			
Falcon 50	38,800	4,700	6,042
Source: Aviation week and space technology - Aircraft Specifications			

[1] Adjusted takeoff distance was calculated using the FAA central regions spreadsheet program with airport elevation equal to 1,152 feet ASL, mean daily temperature 86˚ Fahrenheit and a difference of 17.3 feet in runway end elevations.

C. Runway Design Standards

FAA Advisory Circular 150/5300-13 provides runway design and separation standards. Runway and taxiway width and clearance standard dimensions for the Kent State University Airport were calculated to reflect approach visibility minimums for an ARC of BII and visibilities of visual, not lower than one mile, and not lower than 3/4 mile. These standards are referenced in computer print out sheets developed from “Airport Design, Version 4.2d” located in the Appendix.

Through further analysis of the existing facilities at the Kent State University Airport, several areas were found to be deficient according to the design standards. These areas include runway width, length, and runway safety areas. The current Runway 1-19 length is 4,000 feet, but would need to be extended to at least 4,420 feet to meet the BII design standards. In addition to runway length, the current 60 foot runway width is required to be at least 75 feet to satisfy BII design standards. Included for further justification in the Appendix is output data from "Airport Design, Version 4.2d" and the Central Region’s "Takeoff Runway Length Requirements" spreadsheet program.

The runway safety area for runway 19 currently exceeds the maximum allowable profile and transverse grades outlined in Advisory Circular 150/5300-13 for AI or BII critical design aircraft. Runway 1 safety area also fails to meet minimum design standards and would require grading to meet the minimum allowable profile grade.

The user survey had a low response rate, therefore, quantifying the demand for lower approach minimums and an instrument approach is difficult. However, the returns indicated demand for lower approach minimums and an instrument approach in lieu of the existing visual approach.

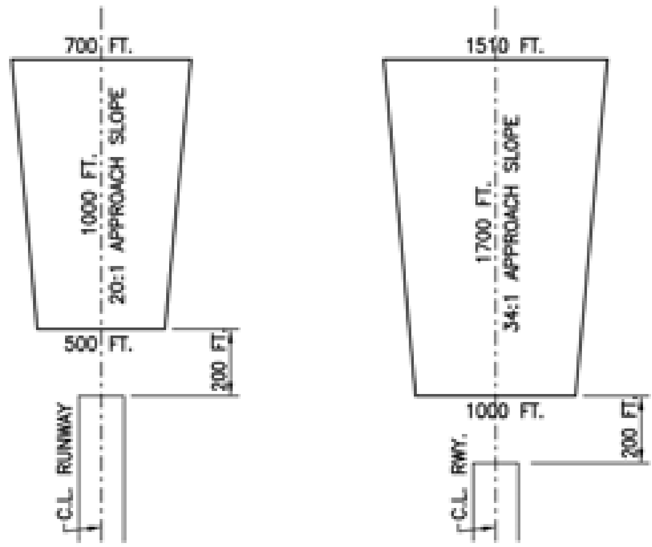
Comparing the existing runway facilities to the recommended design standards shows several deficiencies:

	Existing Condition [AI]	**Forecast Demand [BII]**	
Design Standards	**Visual Approach**	**Visual Approach**	**Non-Precision Approach**
Runway Length	4,000 feet	4,420 feet	4,420 feet
Runway Width	60 feet	75 feet	75 feet
Shoulder Width	10 feet	10 feet	10 feet
Safety Area Width	120 feet	150 feet	150 feet
Safety Area Length	240 feet	30 feet	300 feet
Object Free Area Width	400 feet	500 feet	500 feet
Object Free Area Length	240 feet	300 feet	300 feet

	Existing Condition	**Forecast Demand**	
Design Standards	**Visual Approach**	**Visual Approach**	**Non-Precision Approach**
*Separation Standards from Runway Centerline			
Taxiway Centerline	250 feet	250 feet	300 feet
Parallel Taxiway Width	35 feet	35 feet	35 feet
Aircraft Parking Area	400 feet	400 feet	500 feet
Object Free Area	400 feet	400 feet	500 feet

The existing facilities meet currently applicable A-I & B-II design standards for visual runways. Improvements would be warranted to meet B-II visual and non-precision approach standards.

EXHIBIT V-1 RUNWAY PROTECTION ZONE DIMENSIONS STANDARDS



Visual Runway, Visibility Minimums
Not Lower Than 1-Mile
Aircraft Categories A and B

Existing airfield meets Runway Protection Zone Dimensional Standards for Not Lower Than 1-Mile

Non-Precision Instrument Approach
Visibility Minimums Not Lower Than 3/4 Mile
All Aircraft Categories

Existing airfield would not meet Runway Protection Zone Dimensional Standards for Not Lower Than 3/4-Mile

A quick comparison of the RPZ's with respect to aircraft categories and visibility minimums brings forth the following conclusions:

1. The existing airside facilities meet the dimensional standards for A and B aircraft for visual runways with visibility not lower than 1-mile.

2. The existing airside facilities would not meet the dimensional standards for any aircraft category for visibility minimums lower than 1-mile but not lower than 3/4-mile.

In addition to the foregoing airport design requirements the FAA has established desirable airport imaginary surfaces for protection of runway approach ends and airspace overlying airports. The size of such imaginary surface is based on the category of each runway end and associated with the type of approach available or planned for the future. The approach slope and approach surface dimensions are determined by the most precise approach available for the respective runway end. Table V-9 defines dimensional and slope minimums for applicable imaginary surfaces. The existing airport imaginary surfaces are shown under column "Visual Runway B". The potential imaginary surfaces are shown under column "Non-Precision Instrument Runway B". While the existing site meets the visual runway dimensional standards it would not meet the non precision or precision instrument runway dimensional standards. It is very unlikely that an instrument approach with lower than 1-mile visibility is feasible on the existing site and could not presently be justified.

TABLE V-5
FEDERAL AVIATION REGULATION (FAR) PART 77 COMPARISON

ITEM	DIMENSIONAL STANDARDS (FEET)					
	VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
			B			
	A	B	A	C	D	
Width of Primary Surface and Approach Surface Width at Inner End	250	500	500	500	1,000	1,000
Radius of Horizontal Surface	5,000	5,000	5,000	10,000	10,000	10,000
	VISUAL APPROACH		NON-PRECISION INSTRUMENT LANDING			PRECISION INSTRUMENT APPROACH
			B			
	A	B	A	C	D	
Approach Surface Width at End	1,250	1,500	2,000	3,500	4,000	16,000
Approach Surface Length	5,000	5,000	5,000	10,000	10,000	*
Approach Slope	20:1	20:1	20:1	34:1	34:1	*

A - Utility Runways
B - Runways Larger Than Utility
C - Visibility Minimums Greater Than 3/4 Mile
D - Visibility Minimums As Low As 3/4 Mile

* - Precision Instrument Approach Slope is 50:1 for Inner 10,000 Feet and 40:1 for an additional 40,000 feet
Source: FAR Part 77 - objects affecting navigable airspace, paragraph 77.25 - Civil Airport Imaginary Surfaces

D. Pavement Strength

A critical component of any runway or taxiway is its pavement strength or the runway's ability to support critical aircraft at their maximum certified take off weight. In order to satisfactorily fulfill these requirements the pavement must be of quality and thickness to support existing and future imposed loads. AC150/5320-6D - Airport Pavement Design and Evaluation outlines specification standards for evaluating existing and projected pavement strength. The existing asphalt surface runway has pavement strength of 13,000 lbs. for single wheel gear. The recommended future pavement strength is 15,000 lb. for single wheel gear. The strength can be achieved on the existing Runway 1-19 with a 2.5 inch asphalt overlay.

Pavement strength for alternative sites if selected should also be designed for 15,000 lbs. single wheel gear. The actual pavement buildup would depend on the subgrade support and its associated site drainage system. In all circumstances the pavement should be designed to adequately accommodate the pavement for a given period of time or until the next upgrade is implemented.

E. Taxiways

Runway 1-19 has a 40 foot wide full parallel taxiway with three exit taxiways and one apron connection. The critical design aircraft will require 35-foot minimum taxiway width, 10-foot shoulders, 79-foot wide safety area, and 131-foot wide object free area. Runway and taxiway separation (centerline to centerline) should be 240-feet for the BII design group. The current separation is 250 feet. All existing taxiways meet and/or exceed the required dimensional standards. The parallel taxiway should be extended 420 feet to match the runway extension, with one added connection to the Runway End 1.

This information is also depicted on the "Airport Design Airport and Airplane" data sheets located in the Appendix.

F. Airfield Approach, Navigational, and Lighting Aids

The Kent State University Airport has three published instrument approach procedures as noted in Chapter II. These are used extensively with annual instrument approaches (AIA) forecasted to reach 165 by 2008 and 216 in 2023. To compliment this approach plate, the airport also has Visual Approach Slope Indicators (VASI's) for both runway ends. These approach aids are approved for visual minimums only.

The runway is also equipped with Medium Intensity Runway Lighting (MIRL) with Runway End Identification Lights (REIL's) at both runway ends. The taxiway system is equipped with Medium Intensity Taxiway Lighting (MITL). Both of these lighting systems were constructed in 1982 and are in poor condition. The airfield lighting will need to be rehabilitated during the first 10 years of the study period. It is assumed that if any development Alternatives are selected on the existing site the improvements would include replacing the existing medium intensity runway and taxiway lights.

In addition to the rehabilitation of the airfield lighting, an automated weather observation system (AWOS) is proposed during the twenty year study period. An AWOS consists of various weather reporting sensors that transmit up-to-date weather conditions to pilots via radio or telephone. The Kent State University Airport users have justified the need to plan for an AWOS-IV through airport user surveys, the increasing number of AIA's and the high volume of flight training activities.

G. Land Area

Airport land compatibility requirements were developed by FAA Planning Standards for different airport classifications. Runway, Runway Protection Zones (RPZ's), and area within the Building Restriction Lines (BRL) are included as the minimal required land at an airfield such as Kent State University Airport. Existing incompatible land uses would include the medium density residential development within Runway End 1 protection zone.

The total land area of this airport is approximately 287 acres. However, it is recommended that the airport owned land be extended to include land area that falls under the RPZ's and BRL's. By owning these parcels or achieving an avigation easement, the Kent State University Airport could restrict construction of incompatible land development such as homes, obstructions, schools, or churches.

While the existing runway and associated RSA, OFA, RPZ and approach surfaces are protected by fee simple ownership or by avigation easement any Alternative that proposes extending the existing runway or opts for lower approach visibility minimum would require additional land.

As detailed in the previous sections, Runway 1-19 should be lengthened 420 feet. With the extension of the runway, additional land should be acquired to allow this runway construction and control of the Runway Safety Areas, Runway Protection Zones, and Building Restriction Lines. Likewise, with the various alternatives and options, land acquisition should be expanded to encompass the above runway surfaces referenced previously.

H. Hangars and Hangar Apron

Requirements for hangars and hangar apron depend on several factors. These factors include; number and types of based aircraft, local preferences for hangar verses tie-down storage, preferences for T-hangar or conventional hangar, and associated fees. In addition other considerations include number of fixed based operators at the airport and the types of services, especially maintenance they provide.

Hangar requirements at the Kent State University Airport were calculated using current aircraft storage patterns and forecasts of based aircraft. Inventory data revealed that currently approximately 15% of single engine aircraft are tied down. Data also showed that approximately 28% of based aircraft are in T-hangar units, with the remaining 57% in conventional hangars. Table V-1 shows the current and projected requirements for T-hangars and conventional hangar space.

The Kent State University Airport has 22,400 square feet of existing conventional hangar space and 15,300 square feet of T-hangar area. However, this conventional hangar is used to store all of the Kent State University flight training aircraft. The Maintenance/FBO hanger provides an additional 4,880 square feet utilized for maintenance, flight training, and FBO services. Based on demand and the above information the airport is deficient in both T-hangar and conventional hangar storage for the airport users. Attached in the Appendix is a listing of 19 aircraft waiting to be hangared at the Kent State University Airport to further justify demand for hangar units.

Higher construction costs for conventional verses T-hangars have generally produced increased popularity for the latter as an airport is developed. This assertion was considered relevant to the Kent State University Airport; consequently, it was assumed that T-hangars would be used for the growing percentage of hangar storage needed throughout the future development of the airport. The configuration would require construction of 34 additional T-hangar facilities by the year 2023.

Prevailing practices and forecasts of based aircraft suggest that additional conventional hangar space will be warranted in the future development of the Kent State University Airport. The projected conventional hangar surface will be provided in the form of 5 smaller 4,900 square foot corporate hangars and 2 large 12,500 square foot conventional hangars.

The use of conventional hangars for aircraft storage does not provide for maintenance facilities. Therefore, it is recommended that at least one maintenance building be constructed for current and projected demand, with 6,800 square feet of space. This is also reflected in Table V-1.

TABLE V-6
TOTAL DEMAND REQUIREMENTS FOR HANGAR AREAS

	Development Year	Total Based* and Stored Aircraft	Conventional Hangar (Includes Aircraft Maint.)		T-Hangar Units		Terminal Facility		Flight Training Facility Classroom/Offices	
			Units	**Square Ft.**	**Units**	**Square Ft.**	**Units**	**Square Ft.**	**Units**	**Square Ft.**
	(Existing) Single Engine Multi Engine Turbo-Prop	50 48 2 0	1 KSU	25,400 (E)	14	15,300 (E)	1	1,880 (E)	4	3,420 (E)
Required	2003 Single Engine Multi Engine Turbo Prop	50 48 2 0	1 KSU	25,400 (E)	24	28,800	1	4,110	1	10,000
	2008 Single Engine Multi Engine Turbo-Prop	56 53 2 1	1 KSU 1	25,400(E) 1,800	26	31,200	1	4,520 (E)	1	20,000
	2013 Single Engine Multi Engine Turbo-Prop	63 57 4 2	1 KSU 2	25,400 3,600	28	33,600	1	4,900 (80' x 100')	1	20,000
	2023 Single Engine Multi Engine Turbo-Prop	75 67 6 2	1 KSU 1 KSU 6	25,400 15,500 10,800	34	40,800	1	5,880 (80' x 100')	1	20,000

Assumptions used for Ohio Climate: Corporate & multi engine aircraft hangared
85% of single engine aircraft hangared*
(E) = Existing Hangar Site 1 Aircraft = 1,200 s.f. gfa.

KSU Assumption - to continue the current practice of storing flight training aircraft in conventional hangars. Private aircraft hangared vs. tie down aircraft ratio of 85/15% is based on availability of hangars and cost of hangar rental vs. tie-down rental. Currently there are 40 aircraft tie-downs available for local and itinerant aircraft at the Kent State University Airport.

* Facility requirements are based on minimum planning standards. They do not necessarily reflect the buildings depicted on the Terminal Layout Plan (TLP). The buildings shown on the TLP are shown based on economic feasibility and ultimate development outside of the 20 year planning period.

The aviation industry planning guidelines recommends that hangar apron area should equal the total hangar building area. The total required hangar areas that is required for the Kent State University Airport was calculated by converting total hangar square feet to square yards. This permits airport movements into and from the hangars without blocking taxilanes or using itinerant ramp or tie down areas for temporary parking of hangared aircraft. Table V-7 shows the hangar apron area required during the planning period.

TABLE V-7
HANGAR APRON REQUIRED

Development Year		Type of Units (S.Y.)		Total Apron Area
		Conventional Hangar Area	T-Hangar Area	
Existing		3,985	3,975	7,960
Required	2003	2,489	1,867	4,356
	2008	2,689	3,467	6,156
	2013	2,900	3,733	6,633
	2023	5,422	4,533	9,955

The current hangar apron area covers approximately 7,960 square yards. Part of this apron area is utilized for local and itinerant parking, and will need to be expanded towards the latter part of the 20 year planning period.

I. Local and Itinerant Aircraft Ramp

Aprons or aircraft parking ramps provide parking for aircraft, access to terminal facilities, fueling, and surface transportation. Planning guidelines suggest that aircraft parking areas be provided for both local and itinerant aircraft. Local apron area is designed for based aircraft, whereas itinerant apron area is designated for transient aircraft that utilize the Kent State University Airport. An on site study of the current terminal operations revealed these basic activities:

- Flight training program conducted by Kent State University
- Flight training/cargo/maintenance activities by private concern
- Normal fixed based operations activities consisting of daily business and recreational flights
- For the planning period there will be insufficient space to accommodate transient aircraft
- Loading and unloading in the terminal area must be accomplished near aircraft operations area and aircraft parking ramp

Local Apron Ramp

FAA guidelines suggest that aircraft parking areas, or apron be provided for at least the number of aircraft not stored in hangars. Experience has proven that separate based aircraft parking or tie-down will minimize apron area requirements. The area required for parking based aircraft is slightly smaller than for itinerants because the size and operations characteristics of the based aircraft is known. As indicated previously, present practices results in approximately 15% of based aircraft being stored on local aprons. This percentage was applied to operations forecasts and the average day/peak month averages to develop local apron requirements. Included in the local ramp area, is the flight training apron requirements. It was determined that 45% of the flight training operations for an average day during a peak month (April or May) will require parking space. According to AC

150/5300-13 Appendix 5, an area of 300 square yards should be provided per local or flight training aircraft. Table V-3 depicts this methodology in tabular form.

Itinerant Apron Ramp

Itinerant ramps accommodate transient aircraft due to their normal location near the terminal facilities, based aircraft owners may also from time to time use this ramp for short periods.

For the itinerant apron ramp, it was determined that 25% of the itinerant operations for the average day/peak month will require parking space. Standard planning practices state that an area of 360 square yards should be allotted for each itinerant aircraft. This method was used in conjunction with forecasts of demand from Chapter III to prepare recommendations for itinerant ramps. Results are presented in Table V-3.

TABLE V-8
LOCAL AND ITINERANT APRON

Development Year		Annual Operations[1]			Average Day/Peak Month						Required Apron Area [4] (Square Yards)			
					Operations[2]			Aircraft[3]						
		Local	Itinerant	Flight Training	Local	Itinerant	Flight Training	Local	Itinerant	Flight Training	Local	Itinerant	Flight Training	Total Apron Area
2003 (Existing)		5,720	6,500	21,645	19	21	71	6	6	21	1,800	2,160	6,300	10,260
Required	2008	6,100	8,110	22,698	20	27	75	6	7	23	1,800	2,520	6,900	11,220
	2013	6,970	9,200	24,804	23	30	82	7	8	25	2,100	2,880	7,500	12,480
	2023	8,430	11,170	29,718	28	37	98	9	10	30	2,700	3,600	9,000	15,300

[1] Indicates trips where one take off and one landing is one trip, i.e. one operation. Flight training operations were calculated as 45% of total "restraint" operations for apron parking.
[2] Average Day/Peak Month (ADPM) "Operations" = 20% more activity than an average day or [annual operations ÷ 365 x 1.2] = ADPM
[3] Average Day/Peak Month "Aircraft" have been estimated as:
25% of the itinerant operations
15% of the local operations + 15% of permanent tie downs
30% of adjusted flight training operation
[4] Required apron area for local and flight training aircraft was calculated using 300 S.Y. per aircraft. Itinerant apron was determined by using 360 S.Y. per aircraft (AC 150/5300-13 Appendix 5)
+ Includes only 90% of projected operation, use 45% for apron pkg. 10% of aircraft are hangared for maintenance.

J. Fuel Storage and Dispensing Equipment

Fuel storage requirements are directly proportional to the number of aircraft operations. The method used for determining the Kent State University Airport fuel storage requirements involved 4 steps. In Step 1, average daily operations were estimated by dividing total annual operations by 365. In addition to these calculations, the average daily operations were further divided into piston and turbine type aircraft since both 100 low lead and Jet-A fuels are available. Step 2, involved assumptions for average fuel required per aircraft operation. These rates were: 0.07 gallons per touch and go, 4.5 gallons per cross country operation, 7.0 gallons per private aircraft itinerant operation of 100LL per piston operation per day, and 400 gallons of Jet-A per turbine operation per day. These rates were then multiplied by average daily operations from Step 1 to determine average daily fuel usage. Step 3, translated these requirements into weekly consumption needs by multiplying average daily usages by 7. Finally, step 4 provided for peaks in utilization by increasing total minimum storage requirements by 10%.

Table V-6 presents forecasts of fuel storage requirements developed using the methodology described above. It should be noted that this approach assumes weekly fuel deliveries. Less frequent fuel deliveries will require proportionally more fuel storage capacity. From the fuel storage forecasts it is recommended that the dispensing equipment include: 2 standard hose reel fuelers for self and attendant fueling of 100 low lead and 1 standard hose reel for self and attendant fueling of Jet A (underwing and overwing nozzles).

TABLE V-9
FUEL STORAGE AND DISPENSING EQUIPMENT

	Development Year	Average Daily Operations		Weekly Fuel Consumption (Gallons)			
		Piston Type	Turbine Type	Piston Type 100L	Turbine Type Jet-A	Total Minimum Storage	
						100LL	Jet-A
	2003 (Existing)	148	17	3,989	4,760	10,000	10,000
Required	2008	157	20	4,231	5,600	10,000	10,000
Required	2013	172	23	4,635	6,440	10,000	10,000
Required	2023	202	33	5,444	9,240	12,000*	12,000*

* The remaining life of the existing tanks is 20 years.

Summary of Facility Requirements

The preceding sections have provided recommendations concerning landside and airside facilities to serve aviation demand at the Kent State University Airport. These recommendations and analyses on which they are derived, clearly show the airport as requiring the necessary facilities for BII, small turbine powered aircraft traffic. Accommodating aircraft such as these indicates the need for some expansion of the current airport. Alternatives have been detailed in pertaining to how these expansions can be accomplished and are explained in the next chapter. A summary of existing and projected restraint demand for general aviation facilities at the Kent State University Airport is presented in Table V-10.

If enrollment was unrestrained by the University, the facility requirements listed herein, would depict an increase of approximately 16.5 percent on the average for all identified facilities in this section. Chapter III - "Forecasts of Aviation Demand" discusses these two types of demand and lists in tabular the differences in projections.

TABLE V-10
GENERAL AVIATION DEMAND
SUMMARY OF FACILITY REQUIREMENTS

Identifying Facilities	Existing	Forecast Planning Requirements			
		2003	2008	2013	2023
Terminal Building (Sq. Ft.)	1,880	4,110	4,520	4,900	5,880
Flight Training Facility (Sq. Ft.)	3,420	10,000	20,000	20,000	20,000
Conventional Hangars (Sq. Ft.)	22,400	22,400	24,200	26,100	48,800
T-Hangars (Units)	14	24	26	28	34
(Sq.Ft.)	15,300	28,800	31,200	33,600	40,800
Maintenance Hangar (Sq. Ft.)	3,000	3,000	3,000	4,800	6,800
Apron Areas Totals	11,660	11,660	12,990	15,150	19,080
Flight Training (Sq. Yd.)	6,300	6,300	6,900	7,500	9,000
Local Parking (Sq. Yd.)	1,800	1,800	1,800	2,100	2,700
Itinerant Parking (Sq. Yd.)	2,160	2,160	2,520	2,880	3,600
Maintenance Parking (Sq. Yd.)	----	----	270	270	380
Conven. Hangar Parking	----	----	100	200	600
Fuel Apron Parking	1,400	1,400	1,400	2,200	2,800
Vehicle Parking					
Parking Spaces	56	94	105	118	141
Parking Area	2,000	3,290	3,675	4,130	4,935
Fuel Storage (Weekly)					
100LL (Gallon)	10,000	10,000	10,000	10,000	12,000
Jet A (Gallon)	10,000	10,000	10,000	10,000	12,000

CHAPTER VI

ANALYSIS OF ALTERNATIVES

The analysis described in the preceding chapter indicates the need for significant improvements of the Kent State University Airport. This chapter will detail the process of developing and evaluating several construction alternatives. As with most projects, needed development can be accomplished in several ways. The purpose of an evaluation of alternatives is to identify the plan that will, on balance, best serve the local community's aviation needs.

Description of Airport Alternatives

The primary goal is to maximize safety and meet aviation demand while optimizing land use of existing facilities and maintaining established social and environmental qualities. Seven primary alternatives and several variations have been developed to improve the airport's ability to meet critical aircraft demand. An eighth alternative, a do-nothing concept is detailed as a criterion to provide comparison between alternatives. Each alternative will be examined and scrutinized with focus on environmental impacts, economic and operational efficiency and feasibility for implementation during the planning period.

- **Airfield Alternative #1** In analyzing and comparing the cost and benefits of various development alternatives, one of the important elements is the result of no future development at the airport. The no development alternative is basically a status quo approach. This alternative fixes the current facilities in place and maintains the airport in its current state and is shown in Exhibit VI-4.

  The consequences of this "do-nothing" alternative would have no immediate or short term effect to users operating on the existing runway with a reasonable degree of safety. The small turbine or jet users would have to make adjustments in either the number of passengers, the amount of cargo, or the amount of fuel to operate under various conditions, such as during summer days when temperatures are above 80 degrees fahrenheit. Long term consequences of inaction will, however, severely impact the level of service provided by the Kent State University Flight Technology Department and other private training firms who specialize in flight training at the Kent State University Airport. Other impacted users of the airport would include all general aviation traffic, specifically local businesses engaged in interstate commerce, involving goods and services for industrial, commercial, institutional, and agricultural needs. The Flight Technology Department would find it necessary to conduct instrument approach procedures at other airports. Similarly flight training in aircraft grouped BII or higher would need to be based at other airports including the training activities for the larger grouped aircraft. Private users would be subjected to the procedures. Continued inaction will certainly also retard air transportation and economic activities in communities located within the vicinity of the Kent State University Airport. In addition, the existing site fails to meet the FAA design standards for runway safety area grading. The runway safety areas do not meet existing profile grade and crown design standards and would require safety grading. It should also be assumed that runways and taxiways overlays would take place during the 20 year planning period. The total cost of Airfield Alternative 1 is estimated at $**2,173,075**. However, applying for continued federal assistance for runway pavement would trigger the need for runway safety area grading to meet current FAA design minimums. Runway safety grading costs would be similar or equal to the costs shown in Alternative 1A.

- **Airfield Alternative #1A** This alternate fixes the airside facilities in place leaving 3,950 feet of usable runway 60 feet wide. With the current dimensions fixed, the airport would meet AI and BI Critical Aircraft design standards. The focus, similar to Alternate 1, then becomes maintaining the existing facilities such as the terminal building, conventional hangar, maintenance hangar and T-hangar unit.

Maintaining these facilities includes repairs to roofs and doors, electrical, plumbing and HVAC systems. The other aspect of the alternate is the runway safety area grading on both runway 1-19 ends. Runway end 19 safety area would require minimal grading to achieve the required minimum slope requirements. However, runway end 1 would entail moderate excavation construction to achieve the 3% to 5% slope required. This alternative brings the existing airfield conditions into compliance with current design standards. Exhibit VI-5 presents this alternative in graphical format. The approximate cost of this Airfield Alternative is **$2,497,075**.

- **Airfield Alternative #1B** As shown in Exhibit VI-6, this alternative upgrades the existing airport reference code (ARC) of AI to BII. The change in ARC affects the dimensions of several runway design standards, such as the runway safety area, object free area and obstacle free zone. Along with these design standards, the current runway 1-19 width of 60 ft. would need to be widened to 75 feet to meet the FAA Design Standards outlined for BII operations. Along with the increase in runway width, improving the runway gradient was also considered. Improving Runway 1-19 gradient from 0.43% to 0% would reduce the ultimate runway length required from 4,420 feet to 4,300 feet. The associated additional development cost of approximately $2,294,000.00 would not justify the 120 foot reduction in runway length. As stated in Alternative #1A, safety area improvements would also be required for both runway ends. This alternative does not include an extension of the existing runway. Development of Airfield Alternative 1B is estimated to be **$3,230,185**.

AIRFIELD ALTERNATIVE #1 - DO NOTHING

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Taxiway Overlay	25,020	S.Y.	$15.00	$375,300
Apron Overlay	19,340	S.Y.	$16.00	$309,440
Topsoiling and Turfing	23,000	S.Y.	$3.90	$89,700
* T-Hangar	16,800	S.F.	$4.50	$75,600
* Flight Training Hangar	22,400	S.F.	$5.30	$118,720
* Maintenance/FBO Hangar	8,050	S.F.	$6.50	$52,325
Maintaining Runway/Taxiway Lighting & Navaids	1	L.S.	$180,000.00	$180,000
Fuel Facilities	1,500	S.Y.	$48.00	$72,000
Improve Runway 1-19 Safety Area Grading	1	L.S.	$500,000.00	$500,000
Total Cost				**$2,173,075**

* Present Worth of 20 Year Building Maintenance Costs

AIRFIELD ALTERNATIVE #1A - UPGRADE AIRFIELD TO MEET "A-I" STANDARDS

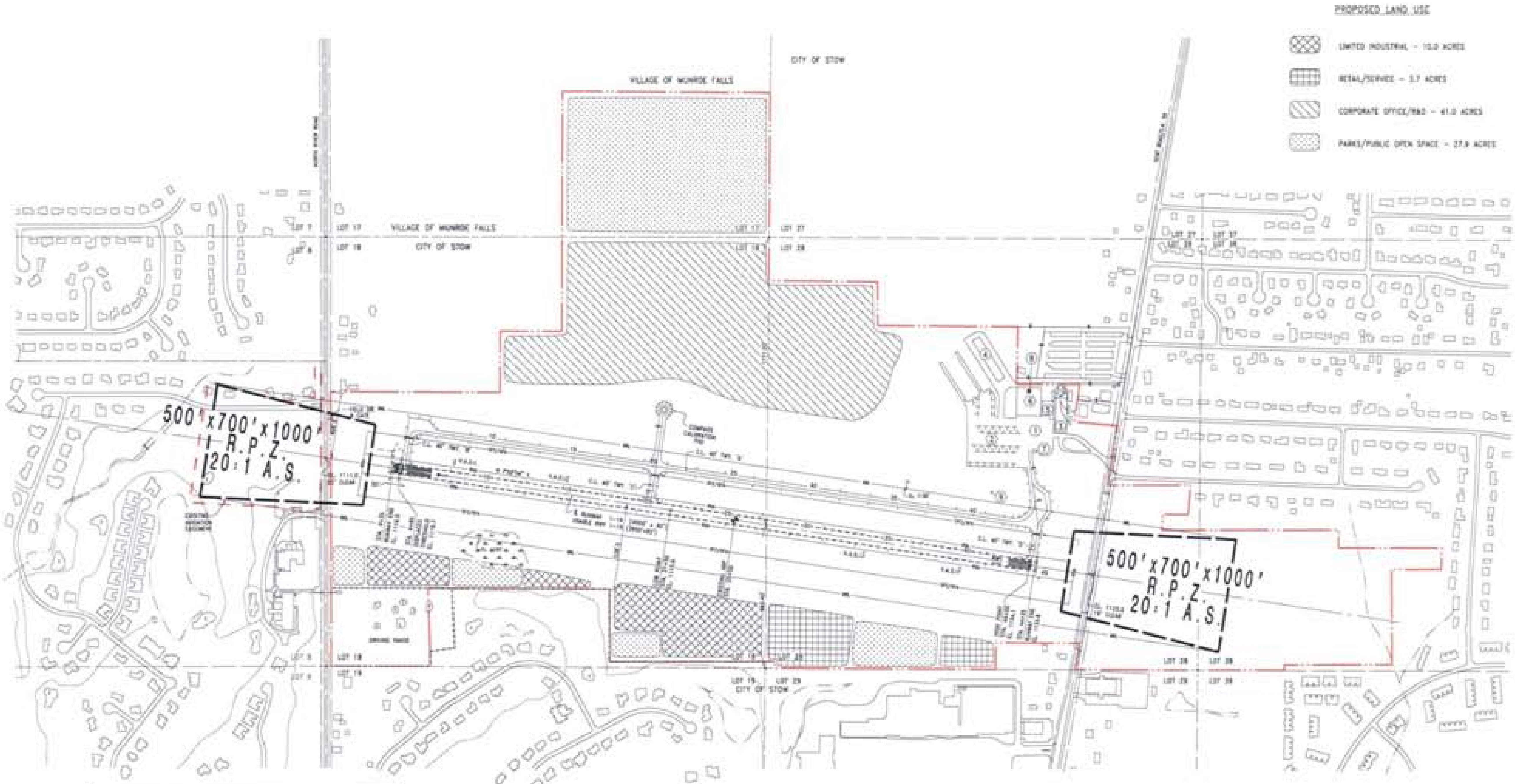
Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Taxiway Overlay	25,020	S.Y.	$15.00	$375,300
Apron Overlay	19,340	S.Y.	$16.00	$309,440
Topsoiling and Turfing	23,000	S.Y.	$3.90	$89,700
*Fuel Facilities	1,320	S.Y.	$300.00	$396,000
Building Maintenance Cost Subtotal (Alternate 1)	1	L.S.	$246,645.00	$246,645
Maintaining Runway/Taxiway Lighting & Navaids	1	L.S.	$180,000.00	$180,000
Improve Runway 1-19 Safety Area	1	L.S.	$500,000.00	$500,000
Total Cost				**$2,497,075**

AIRFIELD ALTERNATIVE #1B - UPGRADE AIRFIELD TO MEET "B-II" STANDARDS

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Taxiway Overlay	25,020	S.Y.	$15.00	$375,300
Apron Overlay	19,340	S.Y.	$16.00	$309,440
Topsoiling and Turfing	23,000	S.Y.	$3.90	$89,700
**Runway Widening	6,700	S.Y.	$60.00	$402,000
MIRL, MITL, REIL's & VADI	1	L.S.	$400,000.00	$400,000
AWOS IV	1	L.S.	$111,110.00	$111,110
Improve Runway 1-19 Safety Area	1	L.S.	$500,000.00	$500,000
Building Maintenance Costs Subtotal (Alternate 1)	1	L.S.	$246,645.00	$246,645
* Fuel Facilities	1,320	S.Y.	$300.00	$396,000
Total Cost				**$3,230,185**

* Includes U.G. Tanks, dispensing units and SARA System including emergency spill containment facilities.

** Includes excavation, embankment and base courses.



EXISTING RUNWAY/TAXIWAY DATA	
	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	120'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	240'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	300'
RUNWAY OBJECT FREE AREA WIDTH	400'
RUNWAY OBJECT FREE AREA LENGTH BEYOND RUNWAY END	240'
RUNWAY BUILDING RESTRICTION LINE	350'
RUNWAY BLAST PAD	80' x 100'
TAXIWAY EDGE SAFETY MARGIN	5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	49'
TAXIWAY OBJECT FREE AREA WIDTH	89'
TAXILANE OBJECT FREE AREA WIDTH	79'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	337'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	200'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	225'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	44.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	39.5'
TAXIWAY WINGTIP CLEARANCE	20'
TAXILANE WINGTIP CLEARANCE	15'

AIRPORT ITEM LEGEND		
NO.	DESCRIPTION	ELEV.
1	APRON AREA (150'x200')	1150±
2	TIE DOWN APRON (300'x350') 40 TIE-DOWNS	1145±
3	AUTO PARKING (250'x70') 56 PARKING SPACES	1153±
4	T-HANGAR	1168
5	FBO/MAINTENANCE HANGAR	1176
6	CORP. HANGAR	1195
7	FUEL PAD (VENTS)	1155
8	AIRPORT BEACON	1199
9	WIND TEE	1145
10	MOBILE CLASSROOMS	1165

LEGEND

LOT LINE	WIND CONE
EXISTING AIRPORT PROPERTY LINE	WIND TEE
EXISTING AIRPORT AVIGATION EASEMENT	LOT CORNER
EXISTING RIGHT-OF-WAY	SWALE
EXISTING RPZ	STORM SEWER/CATCH BASIN
EXISTING CORPORATION LINE	POLE LINE
AIRPORT BEACON	AIRPORT REFERENCE POINT (A.R.P.) LON: 81°24'34.207"; LAT: 41°09'08.083"
EXISTING FENCE LINE	

AIRPORT ALTERNATIVE #1, "DO NOTHING"

EXISTING RWY, TWY, AND AIRPORT FACILITIES MAINTAINED

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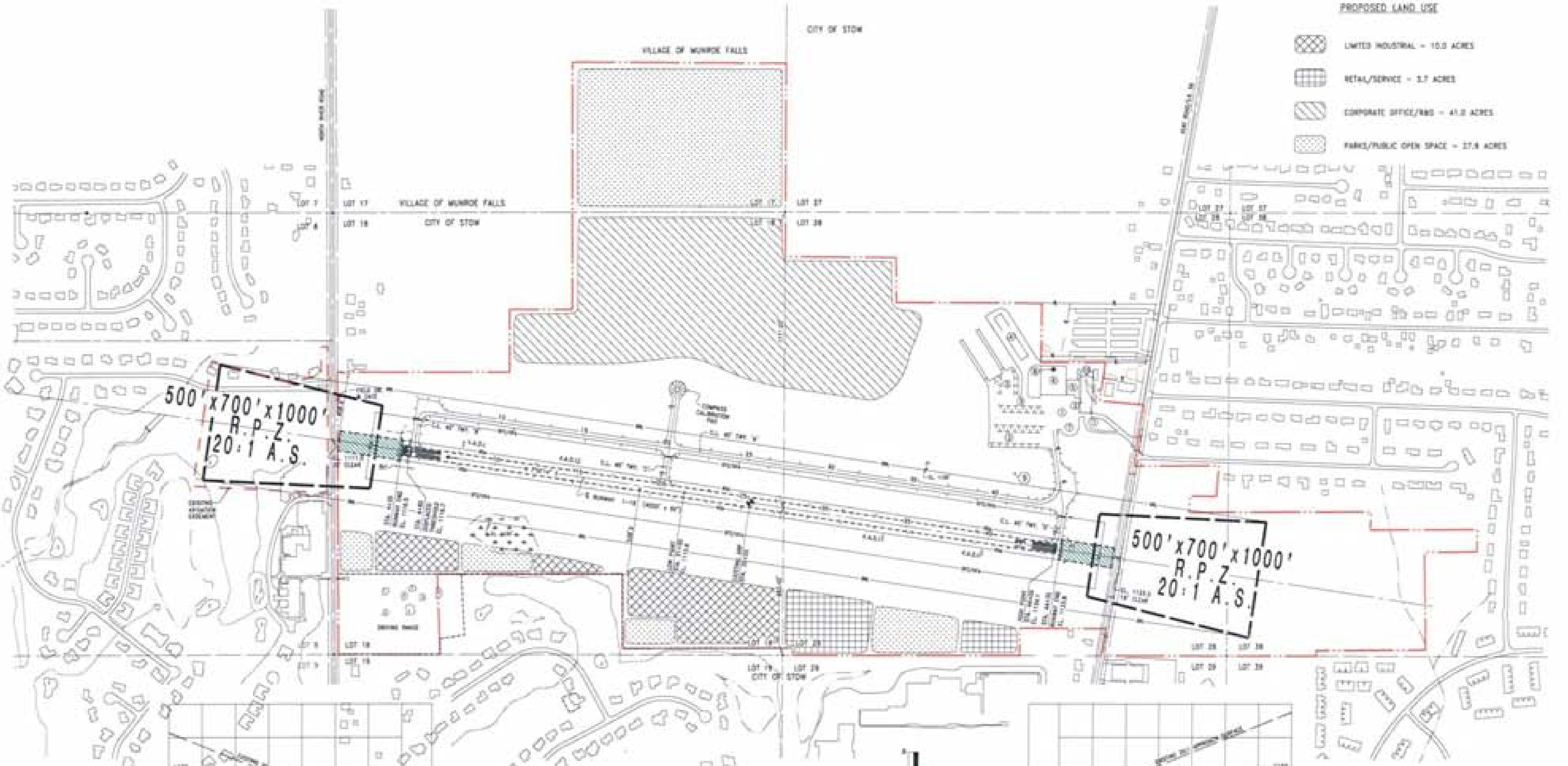
XI-4

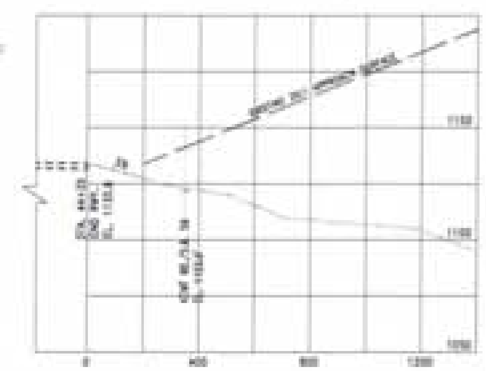


APPROACH END 1 PROFILE

EXISTING RUNWAY/TAXIWAY DATA	
	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	120'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	240'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBJECT FREE AREA WIDTH	400'
RUNWAY OBJECT FREE AREA LENGTH BEYOND RUNWAY END	240'
RUNWAY BUILDING RESTRICTION LINE	350'
RUNWAY BLAST PAD	80' x 100'
TAXIWAY EDGE SAFETY MARGIN	5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	49'
TAXIWAY OBJECT FREE AREA WIDTH	89'
TAXILANE OBJECT FREE AREA WIDTH	79'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	337'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	200'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	225'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	44.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	39.5'
TAXIWAY WINGTIP CLEARANCE	20'
TAXILANE WINGTIP CLEARANCE	15'

VERTICAL SCALE

AIRPORT ITEM LEGEND		
NO.	DESCRIPTION	ELEV.
1	APRON AREA (150'x200')	1150±
2	TIE DOWN APRON (300'x350') 40 TIE-DOWNS	1145±
3	AUTO PARKING (250'x70') 56 PARKING SPACES	1153±
4	T-HANGAR	1168
5	FBO/MAINTENANCE HANGAR	1176
6	CORP. HANGAR	1195
7	FUEL PAD (VENTS)	1155
8	AIRPORT BEACON	1199
9	WIND TEE	1145
10	MOBILE CLASSROOMS	1185



APPROACH END 19 PROFILE

LEGEND

- LOT LINE
- EXISTING AIRPORT PROPERTY LINE
- EXISTING AIRPORT AVIATION EASEMENT
- EXISTING RIGHT-OF-WAY
- EXISTING RPZ
- EXISTING CORPORATION LINE
- AIRPORT BEACON
- PROP. RUNWAY SAFETY AREA GRADING
- WIND CONE
- WIND TEE
- LOT CORNER
- SWALE
- STORM SEWER/CATCH BASIN
- POLE LINE
- AIRPORT REFERENCE POINT (A.R.P.) LON: 81°24'54.207"; LAT: 41°09'06.083"
- EXISTING FENCE LINE

AIRPORT ALTERNATIVE #1A

UPGRADE TO "A" STANDARDS AND MEET FACILITY DEMAND

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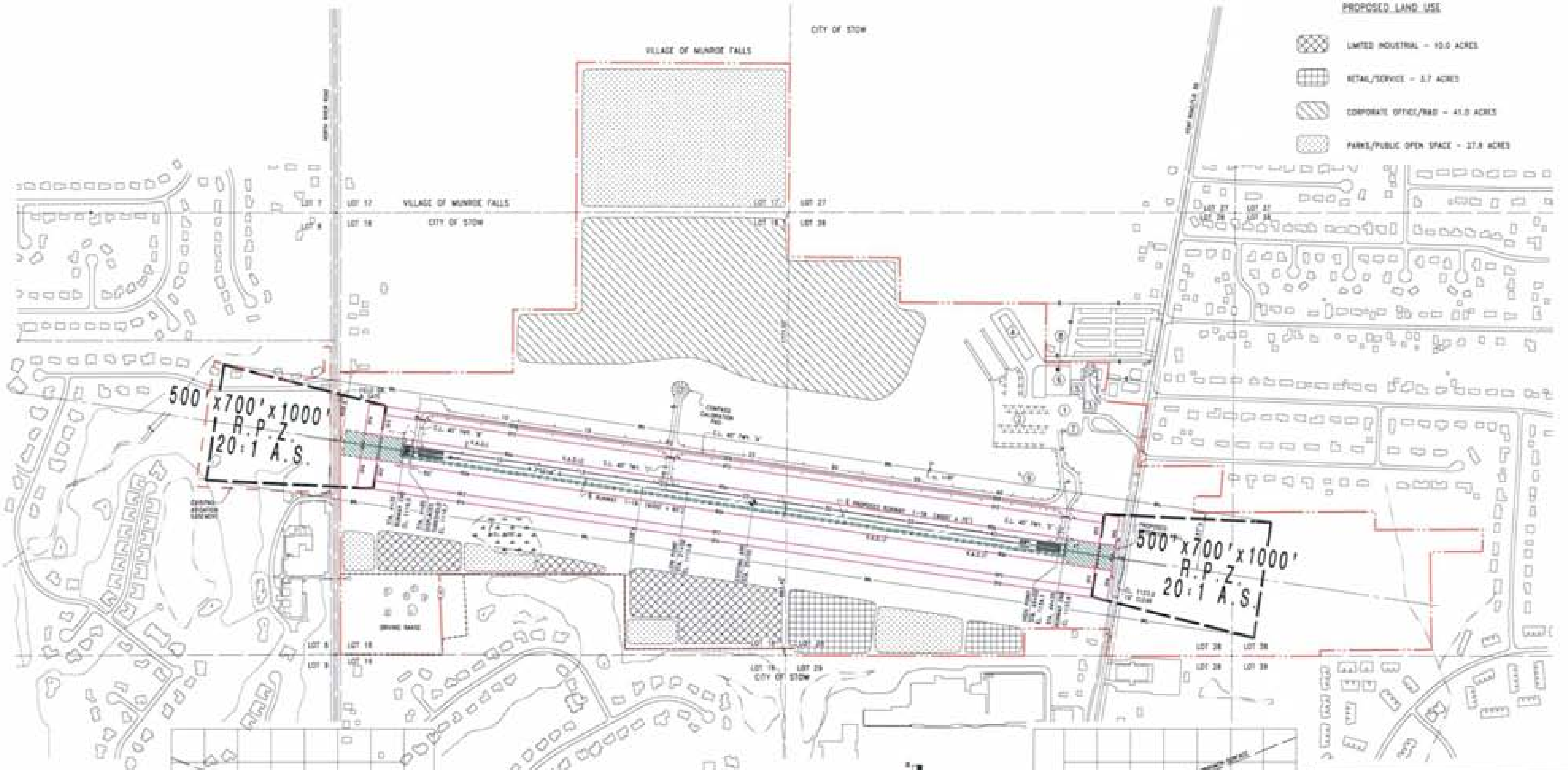
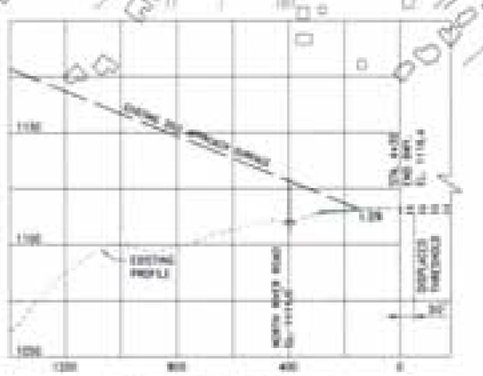
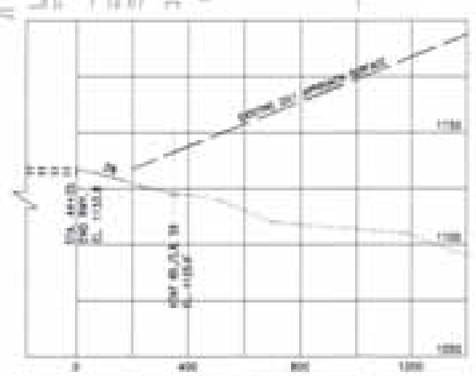
VI-5





APPROACH END 1 PROFILE



APPROACH END 19 PROFILE

VERTICAL SCALE

PROPOSED RUNWAY/TAXIWAY DATA	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBSTACLE FREE AREA WIDTH	500'
RUNWAY OBSTACLE FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	460'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	344.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	240'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND

NO.	DESCRIPTION	ELEV.
1	APRON AREA (150'x200')	1150±
2	TIE DOWN APRON (300'x350') 40 TIE-DOWNS	1145±
3	AUTO PARKING (250'x70') 56 PARKING SPACES	1153±
4	T-HANGAR	1168
5	FBO/MAINTENANCE HANGAR	1176
6	CORP. HANGAR	1195
7	FUEL PAD (VENTS)	1155
8	AIRPORT BEACON	1199
9	WIND TEE	1145
10	MOBILE CLASSROOMS	1165

LEGEND

- LOT LINE
- EXISTING AIRPORT PROPERTY LINE
- EXISTING AIRPORT AVIGATION EASEMENT
- RSA — OFZ — OFA: PROPOSED RSA, OFZ, OFA
- EXISTING RIGHT-OF-WAY
- EXISTING RPZ
- EXISTING CORPORATION LINE
- AIRPORT BEACON
- PROPOSED RUNWAY WIDENING & SAFETY AREA GRADING
- WIND CONE
- WIND TEE
- LOT CORNER
- SWALE
- STORM SEWER/CATCH BASIN
- POLE LINE
- AIRPORT REFERENCE POINT (A.R.P.) LON: 81°24'54.237"; LAT: 41°09'06.083"
- EXISTING FENCE LINE

HORIZONTAL SCALE: 1" = 300'

AIRPORT ALTERNATIVE #1B

UPGRADE TO "A2" STANDARDS

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XI-6

- **Airfield Alternative #2** This alternative proposes extending and widening the runway from its existing 4,000 ft. x 60 ft. dimension to an ultimate size of 4,420 ft. long and 75 ft. wide. This alternative would meet the minimum design standards for a B-II aircraft as discussed previously in Chapter V. This alternative also proposes the lengthening of the full parallel taxiway from the extended end of Runway 1 to the existing taxiway. Other items covered in this alternative include, Medium Intensity Runway Lights (MIRL), Medium Intensity Taxiway Lights (MITL), runway and taxiway overlays and the improvement of Runway End 19 Safety Area.

  - **Airfield Alternative #2A** - This option, as shown in Exhibit VI-12, categorizes the approach visibility minimums for the Kent State University Airport as visual with visibility minimums not lower than one mile. With these visibility minimums, the Runway Protection Zones (RPZ's) on both runway ends would have an inner width of 500 feet, an outer width of 700 feet, and a total length of 1,000 feet to accommodate the Aircraft Reference Code (ARC) BII. The RPZ's in this Alternative are the same RPZ dimensions currently in place at the Airport. The approach slope would be 20 to 1. This option would also require the acquisition and relocation of several housing units involving approximately 36 acres. Land acquisition would be required to protect the RSA, OFA, RPZ, and relevant FAR Part 77 surfaces from encroachment of incompatible land development. This alternative would require constructing a 600 foot underpass of North River Road and the relocation of approximately 800 feet of the entrance drive to the housing development "Pambi Farms". The development described in this Airfield Alternative is estimated to cost **$14,527,718**.

  - **Airfield Alternative #2B** As shown in Exhibit VI-13, this option defines the approach visibility minimums for the airport as non-precision with visibility minimums not lower than 3/4 mile. With these minimums, the RPZ's for each runway end are increased in size to include an inner width of 1,000 feet an outer width of 1,510 feet, and total length of 1,700 feet. The approach slope would decrease to a ratio of 34 to 1. This option would require the acquisition, relocation, demolition of numerous housing units involving approximately 59 acres. Along with these acquisitions, several roadways would also need to be relocated and cul-de-sacs constructed. The acquisition would be required to protect the RSA, OFA, RPZ, and relevant FAR Part 77 surfaces from encroachment of incompatible development. This alternative would require constructing a 600 foot underpass of North River Road and the relocation of approximately 800 feet of the entrance drive associated with the housing development "Pambi Farms". However due to severe negative impacts as per public input, including environmental (light emissions), cost **($24,004,000)** and lack of demand for this approach minimum, Airfield Alternative 2B has been excluded from further analysis.

  - **Airfield Alternative #2C** This option involves relocating North River Road approximately 2,620 feet to provide required runway design standards. The relocation of North River Road would require similar land acquisition to Alternative 2A including an additional 7 parcels for the proposed runway. This scenario would require a total of 38 acres of land. Similar to Alternative 2A, this scenario fixes the airport RPZ's on both ends of the runway as visual with minimums not lower than one mile and dimensions of 500 foot inner width, 700 foot outer width, a total length of 1,000 feet and an approach surface slope of 20:1. This Airfield Alternative can be seen in Exhibit VI-14 and would cost approximately **$13,019,668**.

  - **Airfield Alternative #2D** Similar to Alternative #2C this scenario also includes the relocation of approximately 2,620 feet of North River Road to provide adequate clearance for the runway safety area, obstacle free area, FAR Part 77 surfaces and the RPZ. Runway End 1 would have a visibility minimum of not lower than one mile and a RPZ of 500 feet x 700 feet with a length of 1,000 feet and a 20:1 approach surface. The Runway End 19 visibility minimum would be lowered to "not lower than 3/4 mile visibility" with an approach slope of 34:1. The minimum then define the RPZ dimensions of Runway End 19 as 1,000 feet inner width, 1,510 feet outer width, and a total length of 1,700 feet. As previously analyzed in Alternative 2B, this option would require substantial acquisition of property for the proposed roadway and runway design standards in the amount of 60 acres. The graphic depiction for this option can be seen in Exhibit VI-15. As discussed in Alternative 2B, severe negative impacts including environmental (light emissions) and cost **($22,394,388)** have excluded this development scenario from further analysis.

AIRFIELD ALTERNATIVE #2A

Runway 1-19 Extended South over North River Road -
Visibility Minimums Are Not Lower than One Mile

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Environmental Assessment	1	L.S.	$60,000.00	$60,000
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Taxiway Overlay	25,020	S.Y.	$15.00	$375,300
Runway Extension	3,500	S.Y.	$54.00	$189,000
Runway Widening	6,700	S.Y.	$60.00	$402,000
Taxiway Extension	3,111	S.Y.	$58.00	$180,438
Land Acquisition - (Includes Building Values)	36	Acres	$174,975.00	$6,299,100
Relocation Assistance	13	Units	$10,000.00	$130,000
Building & Obstruction Removal	12	Units	$43,530.00	$522,360
Road Underpass (North River Road)	600	Ft.	$5,000.00	$3,000,000
Site Preparation	1	L.S.	$1,200,000.00	$1,200,000
MIRL, REIL's & VADI	4,420	Ft.	$55.00	$243,100
MITL & Signing	5,460	Ft.	$42.00	$229,320
AWOS IV	1	Ea.	$111,110.00	$111,110
Runway End 19 Safety Area Grading	1	L.S.	$418,000.00	$418,000
Relocation Pampi Farms Entrance Drive	775	Ft.	$480.00	$372,000
* Fuel Facilities	1,320	S.Y.	$300.00	$396,000
Total				**$14,527,718**

* Includes U.G. Tanks, dispensing units and SARA System including emergency spill containment facilities.

AIRFIELD ALTERNATIVE #2B

Runway 1-19 Extend South over North River Road
Visibility Minimums Are Not Lower than 3/4 Mile

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Environmental Assessment	1	L.S.	$60,000.00	$60,000
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Taxiway Overlay	25,020	S.Y.	$15.00	$375,300
Runway Extension	3,500	S.Y.	$54.00	$189,000
Runway Widening	6,700	S.Y.	$60.00	$402,000
Taxiway Extension	3,111	S.Y.	$58.00	$180,438
Land Acquisition - (Includes Building Values)	59	Acres	$248,388.00	$14,654,892
Relocation Assistance	45	Units	$10,000.00	$450,000
Building & Obstruction Removal	30	Units	$44,095.00	$1,322,850
Road Underpass (North River Road)	600	Ft.	$5,000.00	$3,000,000
Site Preparation	1	L.S.	$1,200,000.00	$1,200,000
MIRL, REIL's & VADI	4,420	Ft.	$55.00	$243,100
MITL & Signing	5,460	Ft.	$42.00	$229,320
AWOS IV	1	Ea.	$111,110.00	$111,110
Runway End 19 Safety Area Grading	1	L.S.	$418,000.00	$418,000
Relocation Pampi Farms Entrance Drive	775	Ft.	$480.00	$372,000
* Fuel Facilities	1,320	S.Y.	$300.00	$396,000
Total				**$24,004,000**

* Includes U.G. Tanks, dispensing units and SARA System including emergency spill containment facilities.

AIRFIELD ALTERNATIVE #2C

Runway 1-19 Extend South, North River Road Relocated
Visibility Minimums Are Not Lower than One Mile

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Environmental Assessment	1	L.S.	$60,000.00	$60,000
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Taxiway Overlay	25,020	S.Y.	$15.00	$375,300
Runway Extension	3,500	S.Y.	$54.00	$189,000
Runway Widening	6,700	S.Y.	$60.00	$402,000
Taxiway Extension	3,111	S.Y.	$58.00	$180,438
Land Acquisition - (Includes Building Values)	38	Acres	$174,975.00	$6,649,050
Relocation Assistance	13	Units	$10,000.00	$130,000
Building & Obstruction Removal	12	Units	$43,530.00	$522,360
Road Relocation (North River Road)	2,620	Ft.	$500.00	$1,310,000
Site Preparation	1	L.S.	$1,200,000.00	$1,200,000
MIRL, REIL's & VADI	4,420	Ft.	$55.00	$243,100
MITL & Signing	5,460	Ft.	$42.00	$229,320
AWOS IV	1	Ea.	$111,110.00	$111,110
Runway End 19 Safety Area Grading	1	L.S.	$418,000.00	$418,000
Relocation Pampi Farms Entrance Drive	425	Ft.	$480.00	$204,000
* Fuel Facilities	1,320	S.Y.	$300.00	$396,000
Total				**$13,019,668**

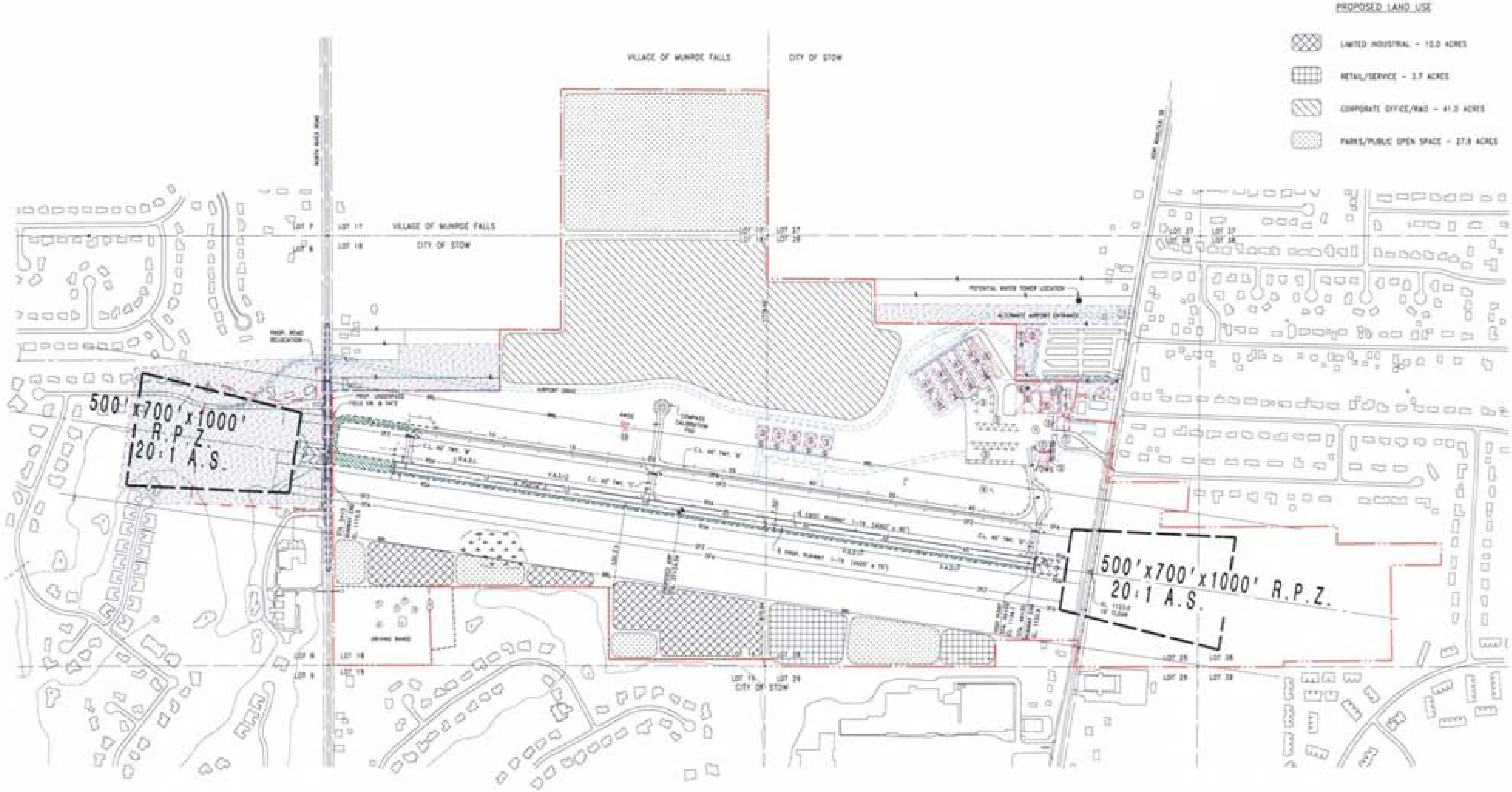
* Includes U.G. Tanks, dispensing units and SARA System including emergency spill containment facilities.

AIRFIELD ALTERNATIVE #2D

Runway 1-19 Extend South, North River Road Relocated
Visibility Minimums Are Not Lower than 3/4 Mile on Approach End 19
Visibility Minimums Are Not Lower Than One Mile on Approach End 1

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Environmental Assessment	1	L.S.	$60,000.00	$60,000
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Taxiway Overlay	25,020	S.Y.	$15.00	$375,300
Runway Extension	3,500	S.Y.	$54.00	$189,000
Runway Widening	6,700	S.Y.	$60.00	$402,000
Taxiway Extension	3,111	S.Y.	$58.00	$180,438
Land Acquisition - (Includes Building Values)	60	Acres	$248,388.00	$14,903,280
Relocation Assistance	45	Units	$10,000.00	$450,000
Building & Obstruction Removal	30	Units	$44,095.00	$1,322,850
Road Relocation (North River Road)	2,620	Ft.	$500.00	$1,310,000
Site Preparation	1	L.S.	$1,200,000.00	$1,200,000
MIRL, REIL's & VADI	4,420	Ft.	$55.00	$243,100
MITL & Signing	5,460	Ft.	$42.00	$229,320
AWOS IV	1	Ea.	$111,110.00	$111,110
Runway End 19 Safety Area Grading	1	L.S.	$418,000.00	$418,000
Relocation Pampi Farms Entrance Drive	425	Ft.	$480.00	$204,000
* Fuel Facilities	1,320	S.Y.	$300.00	$396,000
Total				**$22,394,388**

* Includes U.G. Tanks, dispensing units and SARA System including emergency spill containment facilities.



PROPOSED RUNWAY/TAXIWAY DATA	
	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBJECT FREE AREA WIDTH	500'
RUNWAY OBJECT FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	460'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	344.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	240'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND		
NO.	DESCRIPTION	ELEV.
1	TERMINAL BUILDING	1180
2	MAINTENANCE HANGAR	1182
3	CONVENTIONAL HANGAR (1)	1182
3	CONVENTIONAL HANGAR (4)	1148
4	T-HANGAR (12-UNIT)	1170
5	FUEL PAD	1149
6	APRON AREA	1118
7	DIESEL/GASOLINE TANKS	1156
8	AIRPORT BEACON	1199
9	AIRPORT WIND TEE	1145
10	AWOS IV	1155

LEGEND

LOT LINE
EXISTING AIRPORT PROPERTY LINE
EXISTING AVIAGATION EASEMENT
PROPOSED LAND ACQUISITION
EXISTING RIGHT-OF-WAY
FUTURE RPZ (500'x700'x1000')
EXISTING CORPORATION LINE
PROP. RUNWAY EXTENSION AND WIDENING
PROPOSED PAVEMENT AREAS
PROPOSED BUILDINGS
EXISTING BUILDINGS (TO BE REMOVED)
PROPOSED UNDERPASS
WIND CONE
WIND TEE
LOT CORNER
STORM SEWER/CATCH BASIN
AIRPORT REFERENCE POINT (A.R.P.)
LON: 81°24'34.207"; LAT: 41°09'06.083"
AIRPORT BEACON
EXISTING FENCE LINE
PROPOSED AWOS IV

STRUCTURE LEGEND

EXISTING

1. APRON AREA (150'x200')
2. TIE DOWN APRON (300'x350') 40 TIE-DOWNS
3. AUTO PARKING (250'x70') 56 SPACES
4. T-HANGAR
5. FBO/MAINTENANCE HANGAR
6. CORP. HANGAR
7. FUEL PAD (VENTS)
8. AIRPORT BEACON
9. WIND TEE
10. MOBILE CLASSROOMS

PROPOSED

1. TERMINAL BUILDING
2. MAINTENANCE HANGAR
3. CONVENTIONAL HANGAR
4. T-HANGAR (14-UNIT)
5. FUEL PAD
6. APRON AREA
7. DIESEL/GASOLINE TANKS

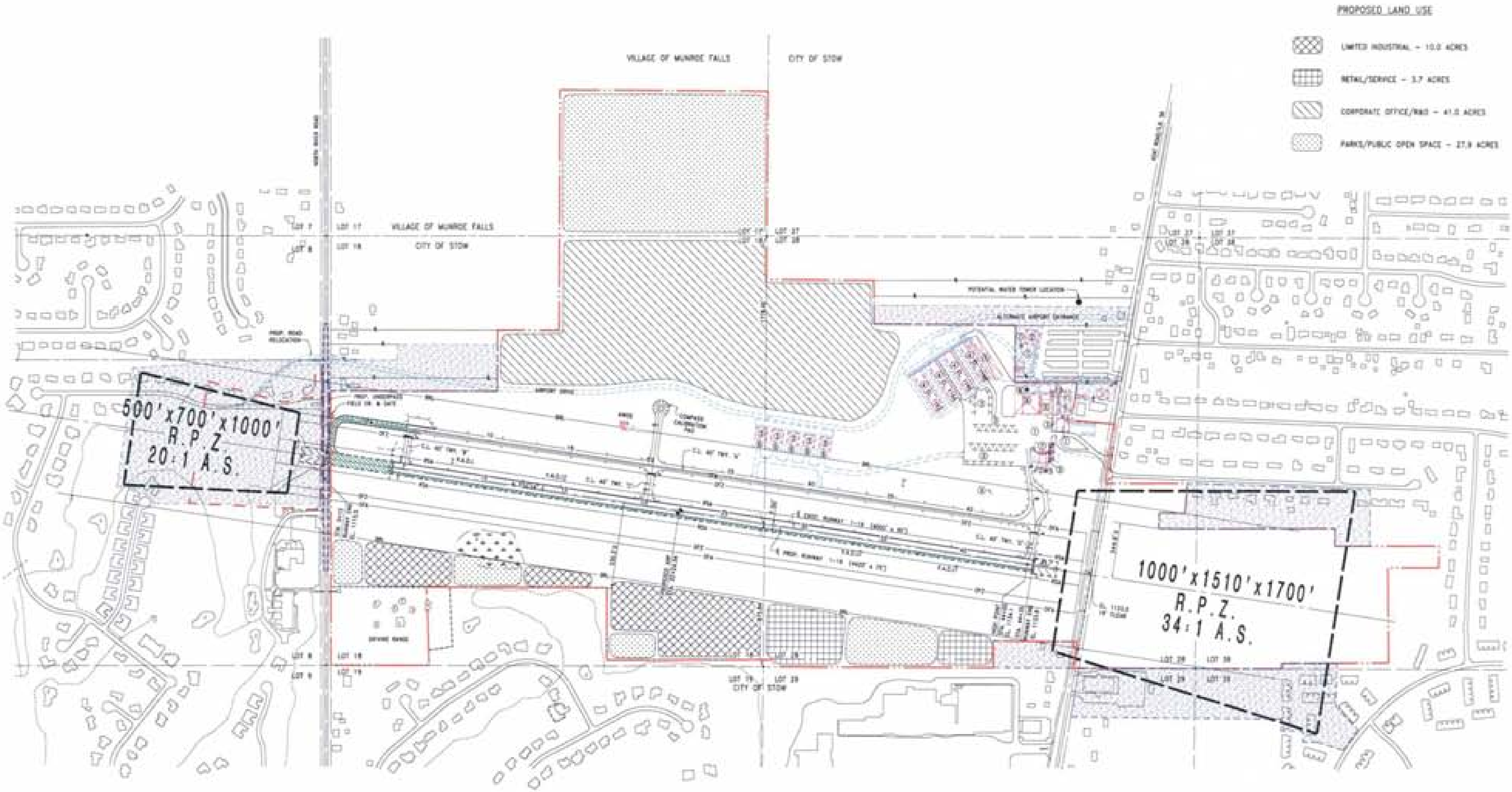
FOWS FUEL/OIL/WATER SEPARATOR
CATCH BASIN

AIRPORT ALTERNATIVE #2A
RUNWAY END 1 EXTENDED SOUTH OVER NORTH RIVER ROAD
VISIBILITY MINIMUMS NOT LOWER THAN 1 MILE

FAA SITE NO.
18061.*A

KENT STATE UNIVERSITY
KENT, OHIO

VI-12



PROPOSED RUNWAY/TAXIWAY DATA	
	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBSTACLE FREE AREA WIDTH	500'
RUNWAY OBSTACLE FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	460'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	344.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	257.3'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND		
NO.	DESCRIPTION	ELEV.
1	TERMINAL BUILDING	1180
2	MAINTENANCE HANGAR	1182
3	CONVENTIONAL HANGAR (1)	1182
3	CONVENTIONAL HANGAR (4)	1148
4	T-HANGAR (12-UNIT)	1170
5	FUEL PAD	1148
6	APRON AREA	1118
7	DIESEL/GASOLINE TANKS	1156
8	AIRPORT BEACON	1199
9	AIRPORT WIND TEE	1145
10	AWOS IV	1155

LEGEND

LOT LINE
EXISTING AIRPORT PROPERTY LINE
EXISTING AVIAGATION EASEMENT
PROPOSED LAND ACQUISITION
EXISTING RIGHT-OF-WAY
FUTURE RPZ
EXISTING CORPORATION LINE
PROP. RUNWAY EXTENSION AND WIDENING
PROPOSED PAVEMENT AREAS
PROPOSED BUILDINGS
EXISTING BUILDINGS (TO BE REMOVED)
PROPOSED UNDERPASS
WIND CONE
WIND TEE
LOT CORNER
STORM SEWER/CATCH BASIN
AIRPORT REFERENCE POINT (A.R.P.)
LON: 81°24'54.207"; LAT: 41°09'08.083"
AIRPORT BEACON
EXISTING FENCE LINE
PROPOSED AWOS IV

STRUCTURE LEGEND

EXISTING

1 APRON AREA (150'x200')
2 TIE DOWN APRON (300'x350')
40 TIE-DOWNS
3 AUTO PARKING (250'x70')
56 SPACES
4 T-HANGAR
5 FBO/MAINTENANCE HANGAR
6 CORP. HANGAR
7 FUEL PAD (VENTS)
8 AIRPORT BEACON
9 WIND TEE
10 MOBILE CLASSROOMS

PROPOSED

1 TERMINAL BUILDING
2 MAINTENANCE HANGAR
3 CONVENTIONAL HANGAR
4 T-HANGAR (14-UNIT)
5 FUEL PAD
6 APRON AREA
7 DIESEL/GASOLINE TANKS
FOWS FUEL/OIL/WATER SEPARATOR
CATCH BASIN

AIRPORT ALTERNATIVE #2B
RUNWAY END 1 EXTENDED SOUTH OVER NORTH RIVER ROAD
VISIBILITY MINIMUMS NOT LOWER THAN 3/4 MILE (RUNWAY END 19)

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18061.*A

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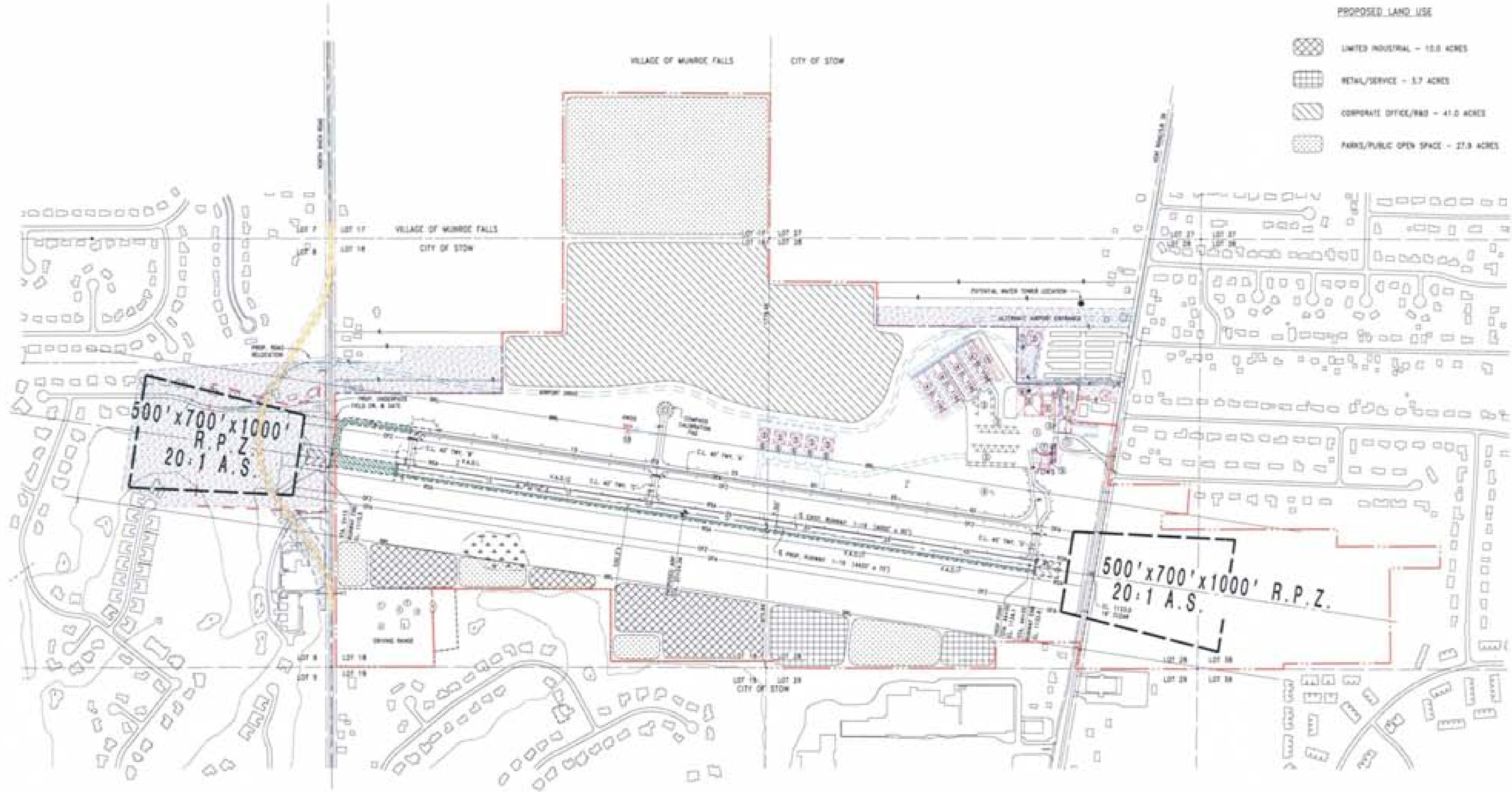
VI-13



PROPOSED RUNWAY/TAXIWAY DATA	
	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBJECT FREE AREA WIDTH	500'
RUNWAY OBJECT FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	460'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	344.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	240'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND		
NO.	DESCRIPTION	ELEV.
1	TERMINAL BUILDING	1180
2	MAINTENANCE HANGAR	1182
3	CONVENTIONAL HANGAR (1)	1182
3	CONVENTIONAL HANGAR (4)	1148
4	T-HANGAR (12-UNIT)	1170
5	FUEL PAD	1149
6	APRON AREA	1118
7	DIESEL/GASOLINE TANKS	1156
8	AIRPORT BEACON	1199
9	AIRPORT WIND TEE	1145
10	AWOS IV	1155

LEGEND

LOT LINE
EXISTING AIRPORT PROPERTY LINE
EXISTING AVIAGATION EASEMENT
PROPOSED LAND ACQUISITION
EXISTING RIGHT-OF-WAY
FUTURE RPZ (500'x700'x1000')
EXISTING CORPORATION LINE
PROP. RUNWAY EXTENSION AND WIDENING
PROPOSED ROAD RELOCATION
PROPOSED BUILDINGS
EXISTING BUILDINGS (TO BE REMOVED)
WIND CONE
WIND TEE
LOT CORNER
STORM SEWER/CATCH BASIN
AIRPORT REFERENCE POINT (A.R.P.)
LON: 81°24'54.207"; LAT: 41°09'06.083"
AIRPORT BEACON
EXISTING FENCE LINE
PROPOSED AWOS IV

STRUCTURE LEGEND

EXISTING

1. APRON AREA (150'x200')
2. TIE DOWN APRON (300'x350') 40 TIE-DOWNS
3. AUTO PARKING (250'x70') 56 SPACES
4. T-HANGAR
5. FBO/MAINTENANCE HANGAR
6. CORP. HANGAR
7. FUEL PAD (VENTS)
8. AIRPORT BEACON
9. WIND TEE
10. MOBILE CLASSROOMS

PROPOSED

1. TERMINAL BUILDING
2. MAINTENANCE HANGAR
3. CONVENTIONAL HANGAR
4. T-HANGAR (14-UNIT)
5. FUEL PAD
6. APRON AREA
7. DIESEL/GASOLINE TANKS

FOWS FUEL/OIL/WATER SEPARATOR
CATCH BASIN

AIRPORT ALTERNATIVE #2C
RUNWAY END 1 EXTENDED SOUTH, NORTH RIVER ROAD RELOCATED
VISIBILITY MINIMUMS NOT LOWER THAN ONE MILE

FAA SITE NO. 18061.*A

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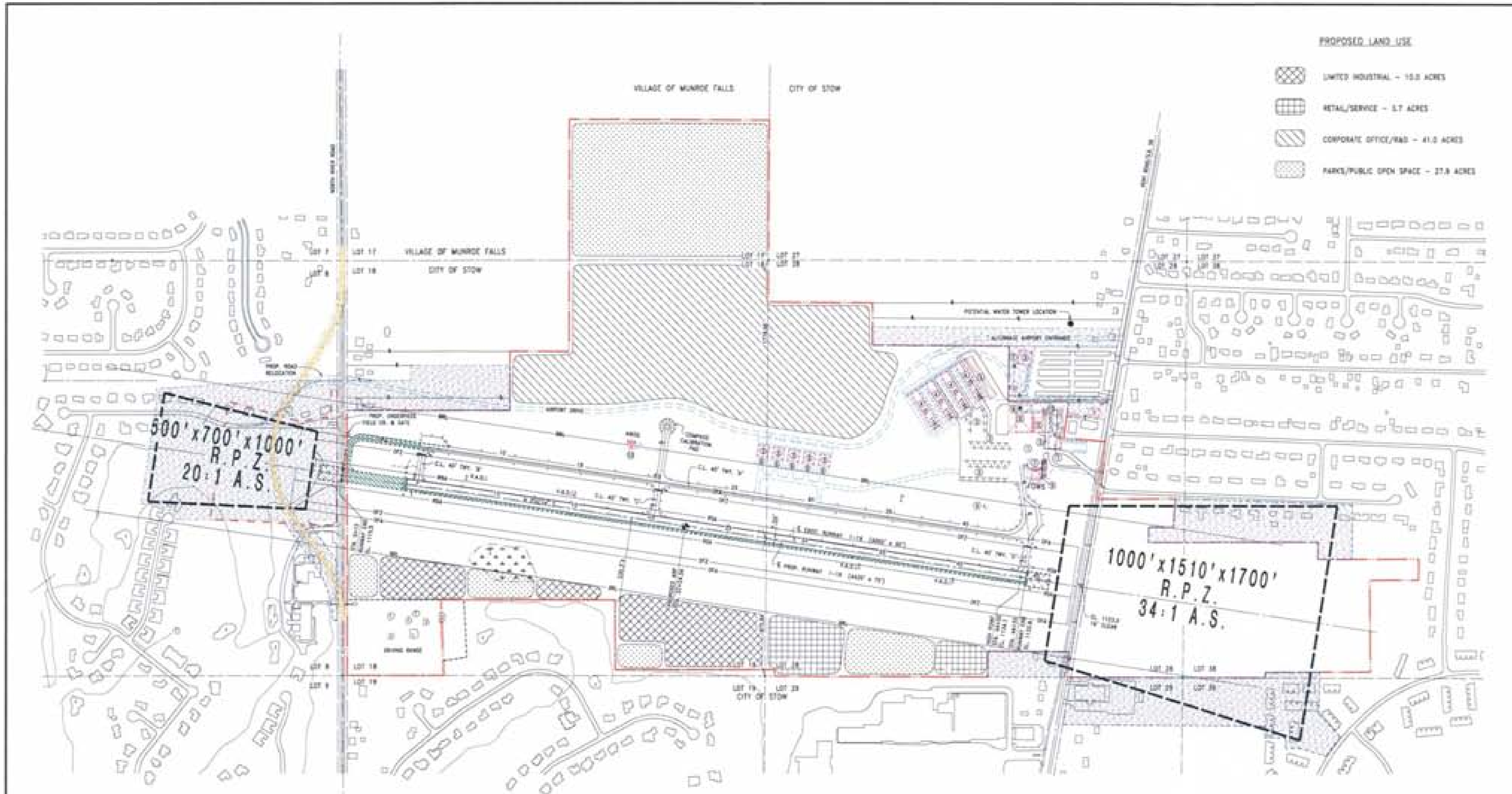
KENT, OHIO

TI-14



PROPOSED RUNWAY/TAXIWAY DATA	
	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBJECT FREE AREA WIDTH	500'
RUNWAY OBJECT FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	460'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	544.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	240'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND		
NO.	DESCRIPTION	ELEV.
1	TERMINAL BUILDING	1180
2	MAINTENANCE HANGAR	1182
3	CONVENTIONAL HANGAR (1)	1182
3	CONVENTIONAL HANGAR (4)	1148
4	T-HANGAR (12-UNIT)	1170
5	FUEL PAD	1149
6	APRON AREA	1118
7	DIESEL/GASOLINE TANKS	1156
8	AIRPORT BEACON	1199
9	AIRPORT WIND TEE	1145
10	AWOS IV	1155

LEGEND

LOT LINE
EXISTING AIRPORT PROPERTY LINE
EXISTING AVIGATION EASEMENT
PROPOSED LAND ACQUISITION
EXISTING RIGHT-OF-WAY
FUTURE RPZ
EXISTING CORPORATION LINE
PROP. RUNWAY EXTENSION AND WIDENING
PROPOSED ROAD RELOCATION
PROPOSED BUILDINGS
EXISTING BUILDINGS (TO BE REMOVED)

WIND CONE
WIND TEE
LOT CORNER
STORM SEWER/CATCH BASIN
AIRPORT REFERENCE POINT (A.R.P.)
LON: 81°24'54.207"; LAT: 41°09'06.083"
AIRPORT BEACON
EXISTING FENCE LINE
PROPOSED AWOS IV

STRUCTURE LEGEND

EXISTING

1. APRON AREA (150'x200')
2. TIE DOWN APRON (300'x350') 40 TIE-DOWNS
3. AUTO PARKING (250'x70') 58 SPACES
4. T-HANGAR
5. FBO/MAINTENANCE HANGAR
6. CORP. HANGAR
7. FUEL PAD (VENTS)
8. AIRPORT BEACON
9. WIND TEE
10. MOBILE CLASSROOMS

PROPOSED

1. TERMINAL BUILDING
2. MAINTENANCE HANGAR
3. CONVENTIONAL HANGAR
4. T-HANGAR (14-UNIT)
5. FUEL PAD
6. APRON AREA
7. DIESEL/GASOLINE TANKS

FOWS FUEL/OIL/WATER SEPARATOR

CATCH BASIN

AIRPORT ALTERNATIVE #2D

RUNWAY END 1 EXTENDED SOUTH, NORTH RIVER ROAD RELOCATED
VISIBILITY MINIMUMS NOT LOWER THAN 3/4 MILE (RUNWAY END 19)
VISIBILITY MINIMUMS NOT LOWER THAN 1 MILE (RUNWAY END 1)

FAA SITE NO. 18061.*A

KENT STATE UNIVERSITY
KENT, OHIO

VI-15

- **[Airfield Alternative #3]** This alternative proposes many of the same improvements discussed in Alternative #2. However, this alternative additionally requires the full length parallel taxiway and the medium intensity taxiway lighting to be relocated east of the runway centerline. This would also allow the transfer of all airport related activities and facilities to be redeveloped east of the runway and allow an 80 acre area west of Runway 1-19 for airport compatible development. Airport compatible development would include land lease for offices and research and training facilities that would not interfere with airport operations.

  Alternative 3 considered two options for ultimate development Option 3A and 3B each, depending on type of approach minimums desired would have varying degrees of impact and acceptability to the community.

  - **Airfield Alternative #3A** As shown in Exhibit VI-19, this option sets the approach visibility minimums for the Kent State University Airport as visual with visibility requirements not lower than one mile. The RPZ dimensions are 500 feet x 700 feet x 1,000 feet, with a 20:1 approach slope. This option would require the acquisition and relocation of 12 residential housing units including 26 acres. This action would also impact the 18 hole Golf Course. The impact would require replacing two holes including the associated fairways, sand traps, cart paths and other associated appurtenances. This alternative would also lower North River Road and enclose the road in a tunnel. The cost to implement Alternative 3A is approximately **$14,440,213**.

  - **Airfield Alternative #3B** As shown in Exhibit VI-20, this option would set the approach visibility minimums for runway approach end 19 as non-precision instrument with visibility requirements not lower than 3/4 mile. The RPZ dimensions for this option are 1,000 feet x 1,510 feet x 1,700 feet with a 34:1 approach slope. Runway approach end 1 would remain a visual approach not lower than 1 mile with RPZ dimension of 500 feet x 700 feet x 1,000 feet and a 20:1 approach slope. The option would also require acquisition, relocation, and demolition of numerous housing units in the amount of 48 acres. Along with these acquisitions, several roadways would also need to be removed and cul-de-sacs constructed. The acquisition would be required to protect the RSA, OFA, RPZ, and relevant FAR Part 77 surfaces from encroachment of incompatible land development. This action would further impact the Golf Course by replacing three holes including its associated fairways, sand traps, cart paths, land requirements and other associated appurtenances. The action would also lower North River Road and enclose the road into a tunnel. Likewise with previous alternatives, this development option produces several negative social, economic and environmental impacts. Insufficient user demand including cost **($20,869,532)** excludes Airfield Alternative #3B from further examination.

AIRFIELD ALTERNATIVE #3A

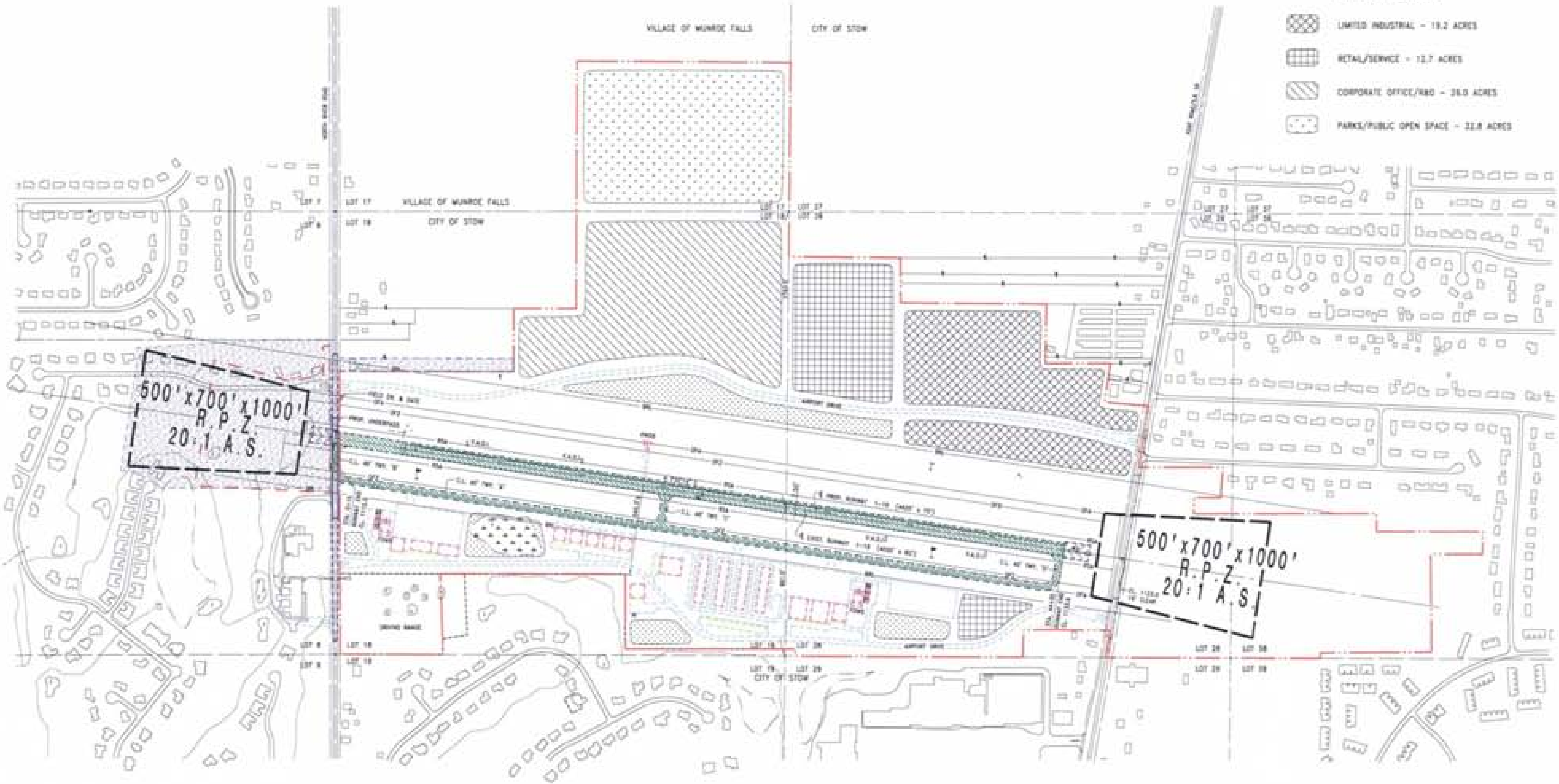
Runway, Taxiways, and Airport Facilities Developed East of Runway 1-19 Centerline, Visibility Minimums Are Not Lower than One Mile

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Environmental Assessment	1	L.S.	$90,000.00	$90,000
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Runway Extension	3,500	S.Y.	$54.00	$189,000
Runway Widening	6,700	S.Y.	$60.00	$402,000
Parallel Taxiway Relocation	25,311	S.Y.	$23.00	$582,153
Land Acquisition - (Including Building Values)	26	Acres	$174,975.00	$4,549,350
Relocation Assistance	12	Units	$10,000.00	$120,000
Building & Obstruction Removal	11	Units	$43,530.00	$478,830
Road Underpass (North River Road)	600	L.F.	$5,000.00	$3,000,000
Site Preparation	1	L.S.	$1,500,000.00	$1,500,000
MIRL, REIL's, & VADI	4,420	Ft.	$55.00	$243,100
MITL & Signing	5,140	L.F.	$42.00	$215,880
AWOS IV	1	Ea.	$111,110.00	$111,110
Runway End 19 Safety Area Grading	1	L.S.	$418,000.00	$418,000
Relocated Golf Course Entrance Drive	460	L.F.	$480.00	$220,800
Relocate two Golf Holes including Land Requirements	2	Ea.	$420,000.00	$840,000
Fueling Facilities	1,320	S.Y.	$300.00	$396,000
Apron Relocation	18,000	S.Y.	$38.00	$684,000
Total				**$14,440,213**

AIRFIELD ALTERNATIVE #3B

Runway, Taxiways, and Airport Facilities Developed East of Runway 1-19 Centerline, Visibility Minimums Are Not Lower than 3/4 Mile On Approach End 19 And Not Lower Than 1 Mile on Approach End 1

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Environmental Assessment	1	L.S.	$90,000.00	$90,000
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Runway Extension	3,500	S.Y.	$54.00	$189,000
Runway Widening	6,700	S.Y.	$60.00	$402,000
Parallel Taxiway Relocation	25,311	S.Y.	$23.00	$582,153
Land Acquisition - (Including Building Values)	38	Acres	$248,388.00	$9,438,744
Relocation Assistance	44	Units	$10,000.00	$440,000
Building & Obstruction Removal	29	Units	$44,095.00	$1,278,755
Road Underpass (North River Road)	600	L.F.	$5,000.00	$3,000,000
Site Preparation	1	L.S.	$1,500,000.00	$1,500,000
MIRL, REIL's, & VADI	4,420	Ft.	$55.00	$243,100
MITL & Signing	5,140	L.F.	$42.00	$215,880
AWOS IV	1	Ea.	$111,110.00	$111,110
Runway End 19 Safety Area Grading	1	L.S.	$418,000.00	$418,000
Relocated Golf Course Entrance Drive	460	L.F.	$480.00	$220,800
Relocate three Golf Holes including Land Requirements	3	Ea.	$420,000.00	$1,260,000
Fueling Facilities	1,320	S.Y.	$300.00	$396,000
Apron Relocation	18,000	S.Y.	$38.00	$684,000
Total				**$20,869,532**



PROPOSED LAND USE

- LIMITED INDUSTRIAL - 19.2 ACRES
- RETAIL/SERVICE - 12.7 ACRES
- CORPORATE OFFICE/R&D - 26.0 ACRES
- PARKS/PUBLIC OPEN SPACE - 32.8 ACRES

PROPOSED RUNWAY/TAXIWAY DATA	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBJECT FREE AREA WIDTH	500'
RUNWAY OBJECT FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	460'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	344.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	257.5'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND

NO.	DESCRIPTION	ELEV.
1	TERMINAL BUILDING	1180
2	MAINTENANCE HANGAR	1182
3	CONVENTIONAL HANGAR (1)	1182
3	CONVENTIONAL HANGAR (4)	1148
4	T-HANGAR (12-UNIT)	1170
5	FUEL PAD	1149
6	APRON AREA	1118
7	DIESEL/GASOLINE TANKS	1156
8	AIRPORT BEACON	1159
9	AIRPORT WIND TEE	1145
10	AWOS IV	1155

LEGEND

- LOT LINE
- EXISTING AIRPORT PROPERTY LINE
- EXISTING AVIAGATION EASEMENT
- PROPOSED LAND ACQUISITION
- EXISTING RIGHT-OF-WAY
- FUTURE RPZ (500'x700'x1000')
- EXISTING CORPORATION LINE
- PROP. RWY & TWY EXTENSION AND WIDENING
- PROPOSED PAVEMENT AREAS
- PROPOSED BUILDINGS
- EXISTING BUILDINGS (TO BE REMOVED)
- PROPOSED UNDERPASS
- WIND CONE
- WIND TEE
- LOT CORNER
- STORM SEWER/CATCH BASIN
- AIRPORT REFERENCE POINT (A.R.P.) LON: 81°24'34.207"; LAT: 41°09'06.083"
- AIRPORT BEACON
- EXISTING FENCE LINE
- PROPOSED AWOS IV

STRUCTURE LEGEND

EXISTING

1. APRON AREA (150'x200')
2. TIE DOWN APRON (300'x350') 40 TIE-DOWNS
3. AUTO PARKING (250'x70') 36 SPACES
4. T-HANGAR
5. FBO/MAINTENANCE HANGAR
6. CORP. HANGAR
7. FUEL PAD (VENTS)
8. AIRPORT BEACON
9. WIND TEE
10. MOBILE CLASSROOMS

PROPOSED

1. TERMINAL BUILDING
2. MAINTENANCE HANGAR
3. CONVENTIONAL HANGAR
4. T-HANGAR (14-UNIT)
5. FUEL PAD
6. APRON AREA
7. DIESEL/GASOLINE TANKS

FOWS FUEL/OIL/WATER SEPARATOR

CATCH BASIN

AIRPORT ALTERNATIVE •3A

RWY, TWY, AND AIRPORT FACILITIES DEVELOPED EAST OF RUNWAY 1-19 CENTERLINE, VISIBILITY MINIMUMS NOT LOWER THAN ONE MILE

FAA SITE NO. 18061.•A

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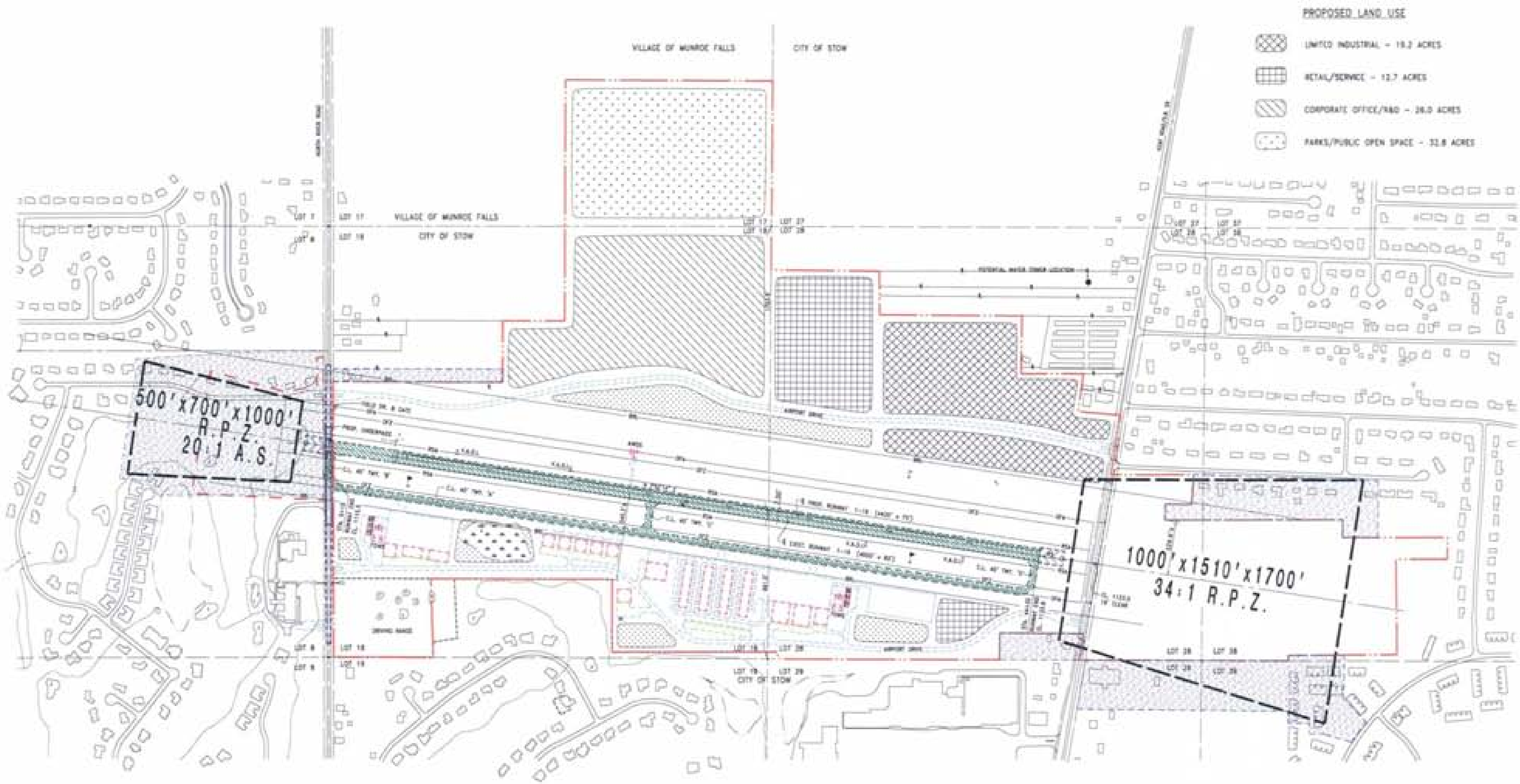

PROPOSED RUNWAY/TAXIWAY DATA	
	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBJECT FREE AREA WIDTH	500'
RUNWAY OBJECT FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	460'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	344.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	257.5'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND		
NO.	DESCRIPTION	ELEV.
1	TERMINAL BUILDING	1180
2	MAINTENANCE HANGAR	1182
3	CONVENTIONAL HANGAR (1)	1182
3	CONVENTIONAL HANGAR (4)	1148
4	T-HANGAR (12-UNIT)	1170
5	FUEL PAD	1149
6	APRON AREA	1118
7	DIESEL/GASOLINE TANKS	1156
8	AIRPORT BEACON	1199
9	AIRPORT WIND TEE	1145
10	AWOS IV	1150

LEGEND

LOT LINE
EXISTING AIRPORT PROPERTY LINE
EXISTING AVIAGATION EASEMENT
PROPOSED LAND ACQUISITION
EXISTING RIGHT-OF-WAY
FUTURE RPZ
EXISTING CORPORATION LINE
PROP. RUNWAY EXTENSION AND WIDENING
PROPOSED PAVEMENT AREAS
PROPOSED BUILDINGS
EXISTING BUILDINGS (TO BE REMOVED)
PROPOSED UNDERPASS
WIND CONE
WIND TEE
LOT CORNER
STORM SEWER/CATCH BASIN
AIRPORT REFERENCE POINT (A.R.P.)
LON: 81°24'34.207", LAT: 41°09'06.085"
AIRPORT BEACON
EXISTING FENCE LINE
PROPOSED AWOS IV

STRUCTURE LEGEND

EXISTING

1. APRON AREA (150'x200')
2. TIE DOWN APRON (300'x350') 43 TIE-DOWNS
3. AUTO PARKING (250'x70') 56 SPACES
4. T-HANGAR
5. FBO/MAINTENANCE HANGAR
6. CORP. HANGAR
7. FUEL PAD (VENTS)
8. AIRPORT BEACON
9. WIND TEE
10. MOBILE CLASSROOMS

PROPOSED

1. TERMINAL BUILDING
2. MAINTENANCE HANGAR
3. CONVENTIONAL HANGAR
4. T-HANGAR (14-UNIT)
5. FUEL PAD
6. APRON AREA
7. DIESEL/GASOLINE TANKS

FOWS FUEL/OIL/WATER SEPARATOR
CB CATCH BASIN

AIRPORT ALTERNATIVE #3B
RWY, TWY, AND AIRPORT FACILITIES DEVELOPED WEST OF RUNWAY 1-19 CENTERLINE, VISIBILITY MINIMUMS NOT LOWER THAN 3/4 MILE

FAA SITE NO. 18081.*A

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KENT, OHIO

- **Airfield Alternative #4** - This alternative proposes an extension to Runway 1-19 by adding 470 feet on Runway End 19, adding 15 feet in width and runway safety area grading on Runway 1 End. The existing RPZ and Navigation Easement would remain and have the same dimensional standards. This would provide a total usable runway length of 4,420 feet and a total width of 75 feet. Due to the removal of the existing 50 foot displaced threshold, the runway extension in this alternative is increased in order to achieve the required 4,420 feet. This alternative additionally proposes the extension of the full parallel taxiway from the extended end of Runway 19 to the existing taxiway. Other items would include extension of Medium Intensity Taxiway Lights (MITL), extension of Medium Intensity Runway Lights (MIRL), runway and taxiway overlays, and land acquisition including removing obstructing homes and trees on at least two of the four options.

  - **Airfield Alternative #4A** - This option as shown in Exhibit VI-27 would fix the approach visibility minimums as visual with visibility requirements not lower than one mile. The RPZ dimensions are 500 feet x 700 feet x 1,000 feet with a 20:1 approach slope. The RPZ's in this alternative are the same RPZ dimensions currently in place at the airport. This option would require 28 acres of land acquisition including relocation and removal of several housing units. This alternative also proposes construction of a 600 foot underpass of State Route 59 (Kent Road) to allow clearance of all applicable runway design standards. The cost of developing Alternative 4A is **$11,915,838**.

  - **Airfield Alternative #4B** - This option as shown in Exhibit VI-28 would define the Runway End 19 approach visibility minimums as non-precision with visibility minimums not lower than 3/4 mile. The RPZ dimensions are 1,000 feet x 1,510 feet x 1,700 feet with an approach slope of 34:1. This option will require acquisition and relocation of numerous housing units in the amount of 55 acres. Along with these acquisitions, several roadways would also need to be removed and cul-de-sacs constructed. The acquisition would be required to protect the RSA, OFA, RPZ, and relevant FAR Part 77 surfaces from encroachment of incompatible land development. The primary focus of this option is similar to Alternative 4A which consists of constructing a 600 foot underpass in order to allow an extension of 470 feet to the Runway End 19. Due to several negative impacts including environmental (light emissions) cost **($25,272,548)** and lack of demand for this approach minimum, Alternative 4B has been removed from further analysis.

  - **Airfield Alternative #4C** - This option focuses on 3,250 feet relocation of State Route 59 in order to achieve RPZ, RSA, FAR Part 77 and OFA clearance. This development would require several parcels of land and several housing units in the amount of 41 acres. In addition, this alternative defines the runway approach as visual. The RPZ dimensions for these criteria if defined as 500 feet inner width, 700 feet outer width, and a length of 1,000 feet with an approach slope of 20:1. The estimated cost of this Alternative is **$18,093,583**. Airport Alternative 4C is attached as Exhibit VI-29.

  - **Airfield Alternative #4D** - As discussed in Alternative 4C, this option would require approximately 3,250 feet of State Route 59 to be relocated to allow the required runway design standards for the proposed 470 foot Runway End 19 extension. However, in this scenario, the visibility minimums are lowered to 3/4 mile visibility. The RPZ dimensions and applicable runway design standards are then defined as stated in Alternative 4B and would require the acquisition of 67 acres. Exhibit VI-30 depicts the ultimate build-out of this option. As referenced previously in this chapter, Alternative 4D was also excluded from further evaluation due to several adverse impacts such as cost **($25,883,143)**, environmental (light emissions) and lack of airport user demand for a non-precision/precision approach.

- **<u>Airfield Alternative #4E</u>** Development of the existing airfield would combine desirable features presented in either Alternative 3A or 4A. Approach visibility requirements would not be lower than one mile and the RPZ dimensions would be visual 500 feet x 700 feet x 1,000 feet, with a 20:1 approach surface slope. Similar to the proposal presented in Alternative 4A Runway 1-19 would be extended 470 feet to the north and widened from 60 feet to 75 feet. The option would also extend Runway End 19 over State Route 59 with the construction of a 600 foot underpass. Existing runway lighting would be upgraded to include Medium Intensity Runway Lights. The existing portion of Runway 1-19 would be overlaid to improve the profile and transverse grade of the surface course. In tune with Alternative 3A, a full parallel taxiway including all required airport landside facilities would be developed east of Runway 1-19.

  Medium Intensity Taxiway Edge Lights and Signing and Visual Navigation Aids would complete the airside development. Similar to Alternative 4A additional land requirements would be necessary. However only 16 acres consisting of 6 residential properties and relocation assistance of 6 families would be involved. The reduced property takes and relocation assistance significantly reduces the project cost to **$14,221,353**. Exhibit VI-31 shows the ultimate development of Alternative 4E.

AIRFIELD ALTERNATIVE #4A
Runway 1-19 Extended North over State Route 59 (Kent Road)
Visibility Minimums Are Not Lower than One Mile

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Environmental Assessment	1	L.S.	$60,000.00	$60,000
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Runway Extension	3,920	S.Y.	$54.00	$211,680
Runway Widening	6,700	S.Y.	$60.00	$402,000
Taxiway Extension	3,111	S.Y.	$58.00	$180,438
Land Acquisition	28	Acres	$63,650.00	$1,782,200
Relocation Assistance	8	Units	$10,000.00	$80,000
Building & Obstruction Removal	8	Units	$40,000.00	$320,000
Road Underpass (State Route 59 - Kent Road)	600	L.F.	$10,000.00	$6,000,000
Site Preparation	1	L.S.	$1,500,000.00	$1,500,000
MIRL, REIL's, & VADI	4,420	Ft.	$55.00	$243,100
MITL & Signing	5,460	L.F.	$42.00	$229,320
AWOS IV	1	Ea.	$111,110.00	$111,110
Fueling Facilities	1,320	S.Y.	$300.00	$396,000
Total				**$11,915,838**

AIRFIELD ALTERNATIVE #4B

Runway 1-19 Extended North over State Route 59 (Kent Road)
Visibility Minimums Are Not Lower than 3/4 Mile

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Environmental Assessment	1	L.S.	$60,000.00	$60,000
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Runway Extension	3,920	S.Y.	$54.00	$211,680
Runway Widening	6,700	S.Y.	$60.00	$402,000
Taxiway Extension	3,111	S.Y.	$58.00	$180,438
Land Acquisition	55	Acres	$242,210.00	$13,321,550
Relocation Assistance	55	Units	$10,000.00	$550,000
Building & Obstruction Removal	32	Units	$52,105.00	$1,667,360
Road Underpass (State Route 59 - Kent Road)	600	L.F.	$10,000.00	$6,000,000
Site Preparation	1	L.S.	$1,500,000.00	$1,500,000
MIRL, REIL's, & VADI	4,420	Ft.	$55.00	$243,100
MITL & Signing	5,460	L.F.	$42.00	$229,320
AWOS IV	1	Ea.	$111,110.00	$111,110
Fueling Facilities	1,320	S.Y.	$300.00	$396,000
Total				**$25,272,548**

AIRFIELD ALTERNATIVE #4C

Runway 1-19 Extended North, State Route 59 (Kent Road) Relocated
Visibility Minimums Are Not Lower than One Mile

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Environmental Assessment	1	L.S.	$60,000.00	$60,000
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Runway Extension	3,920	S.Y.	$54.00	$211,680
Runway Widening	6,700	S.Y.	$60.00	$402,000
Taxiway Extension	3,111	S.Y.	$58.00	$180,438
Land Acquisition	41	Acres	$242,210.00	$9,930,610
Relocation Assistance	26	Units	$10,000.00	$260,000
Building & Obstruction Removal	27	Units	$52,105.00	$1,406,835
State Route 59 - Kent Road Relocated	3,250	L.F.	$850.00	$2,762,500
Site Preparation	1	L.S.	$1,500,000.00	$1,500,000
MIRL, REIL's, & VADI	4,420	Ft.	$55.00	$243,100
MITL & Signing	5,460	L.F.	$42.00	$229,320
AWOS IV	1	Ea.	$111,110.00	$111,110
Fueling Facilities	1,320	S.Y.	$300.00	$396,000
Total				**$18,093,583**

AIRFIELD ALTERNATIVE #4D

Runway 1-19 Extended North, State Route 59 (Kent Road) Relocated
Visibility Minimums Are Not Lower than 3/4 Mile

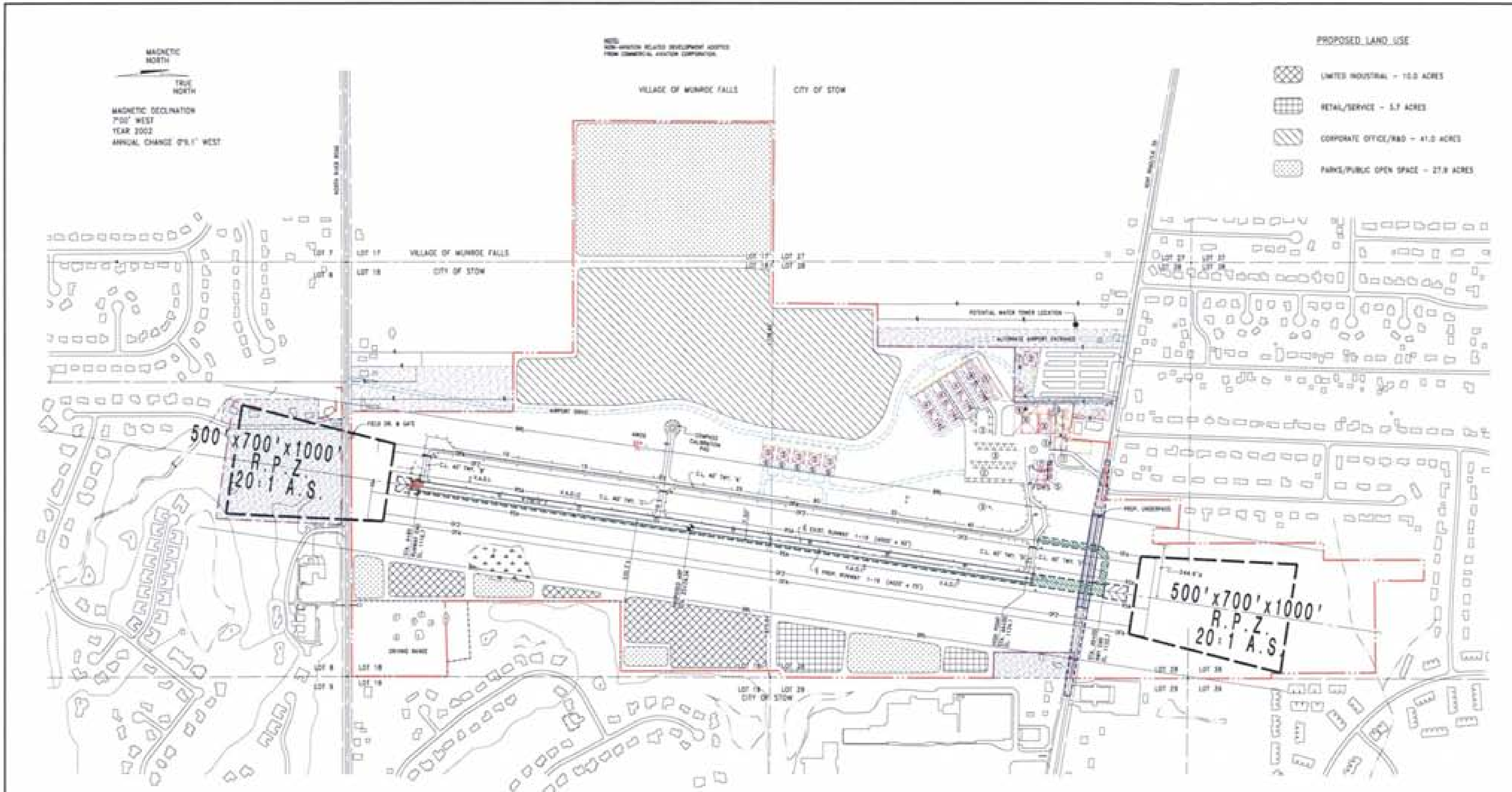
Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Environmental Assessment	1	L.S.	$60,000.00	$60,000
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Runway Extension	3,920	S.Y.	$54.00	$211,680
Runway Widening	6,700	S.Y.	$60.00	$402,000
Taxiway Extension	3,111	S.Y.	$58.00	$180,438
Land Acquisition	67	Acres	$242,210.00	$16,228,070
Relocation Assistance	71	Units	$10,000.00	$710,000
Building & Obstruction Removal	47	Units	$52,105.00	$2,448,935
State Route 59 - Kent Road Relocated	3,250	L.F.	$850.00	$2,762,500
Site Preparation	1	L.S.	$1,500,000.00	$1,500,000
MIRL, REIL's, & VADI	4,420	Ft.	$55.00	$243,100
MITL & Signing	5,460	L.F.	$42.00	$229,320
AWOS IV	1	Ea.	$111,110.00	$111,110
Fueling Facilities	1,320	S.Y.	$300.00	$396,000
Total				**$25,883,143**

AIRFIELD ALTERNATIVE #4E

Runway 1-19 Extended North over State Route 59 (Kent Road)
Visibility Minimums Are Not Lower than One Mile
Taxiway & Landside Facilities Developed East of the Airport

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Environmental Assessment1	1	L.S.	$90,000.00	$90,000
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Runway Extension	3,920	S.Y.	$54.00	$211,680
Runway Widening	6,700	S.Y.	$60.00	$402,000
Taxiway Relocation	25,311	S.Y.	$23.00	$582,153
Land Acquisition	16	Acres	$165,000.00	$2,640,000
Relocation Assistance	6	Units	$10,000.00	$60,000
Building & Obstruction Removal	6	Units	$52,000.00	$312,000
Road Underpass (State Route 59 - Kent Road)	600	L.F.	$10,000.00	$6,000,000
Site Preparation	1	L.S.	$1,500,000.00	$1,500,000
MIRL, REIL's, & VADI	4,420	Ft.	$55.00	$243,100
MITL & Signing	5,460	L.F.	$42.00	$229,320
S.R. 59 Left Turn Lanes (2)	1,000	S.Y.	$360.00	$360,000
AWOS IV	1	Ea.	$111,110.00	$111,110
Apron Relocation	18,000	S.Y.	$38.00	$684,000
Fueling Facilities	1,320	S.Y.	$300.00	$396,000
Total				**$14,221,353**

- **Airfield Alternative #5** - This development option looks at extending Runway 1-19 on both ends 210 feet. As with the other alternatives, both roadway relocations and land acquisitions are the two primary cost items. Extending the runway at both ends 210 feet, the runway safety areas are impacted on both runway 1 and 19 ends by North River Road and State Route 59 (Kent Road). Therefore, underpassing or relocation would be required to meet runway design standards. Due to the cost of underpassing or relocating both roadways, only a visual approach of 20:1 with RPZ dimensions of 500 feet inner width, 700 feet outer width, and a total length of 1,000 feet was analyzed for this alternate. This option can be seen graphically depicted in Exhibit VI-34.



PROPOSED RUNWAY/TAXIWAY DATA	
	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBSTACLE FREE AREA WIDTH	500'
RUNWAY OBSTACLE FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	460'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	344.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	257.5'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND		
NO.	DESCRIPTION	ELEV.
1	TERMINAL BUILDING	1180
2	MAINTENANCE HANGAR	1182
3	CONVENTIONAL HANGAR (1)	1182
3	CONVENTIONAL HANGAR (4)	1148
4	T-HANGAR (12-UNIT)	1170
5	FUEL PAD	1149
6	APRON AREA	1119
7	DIESEL/GASOLINE TANKS	1156
8	AIRPORT BEACON	1199
9	AIRPORT WIND TEE	1145
10	AWOS IV	1155

LEGEND

- LOT LINE
- EXISTING AIRPORT PROPERTY LINE
- EXISTING AVIGATION EASEMENT
- PROPOSED LAND ACQUISITION
- EXISTING RIGHT-OF-WAY
- FUTURE RPZ (500'x700'x1000')
- EXISTING CORPORATION LINE
- PROP. RUNWAY EXTENSION AND WIDENING
- PROPOSED PAVEMENT AREAS
- PROPOSED BUILDINGS
- EXISTING BUILDINGS (TO BE REMOVED)
- PROPOSED UNDERPASS
- WIND CONE
- WIND TEE
- LOT CORNER
- STORM SEWER/CATCH BASIN
- AIRPORT REFERENCE POINT (A.R.P.) LON: 81°24'54.207"; LAT: 41°09'06.083"
- AIRPORT BEACON
- EXISTING FENCE LINE
- PROPOSED AWOS IV
- ABANDONED RUNWAY PAVEMENT

STRUCTURE LEGEND

EXISTING

1. APRON AREA (130'x200')
2. TIE DOWN APRON (300'x350') 40 TIE-DOWNS
3. AUTO PARKING (250'x70') 56 SPACES
4. T-HANGAR
5. FBO/MAINTENANCE HANGAR
6. CORP. HANGAR
7. FUEL PAD (VENTS)
8. AIRPORT BEACON
9. WIND TEE
10. MOBILE CLASSROOMS

PROPOSED

1. TERMINAL BUILDING
2. MAINTENANCE HANGAR
3. CONVENTIONAL HANGAR
4. T-HANGAR (14-UNIT)
5. FUEL PAD
6. APRON AREA
7. DIESEL/GASOLINE TANKS

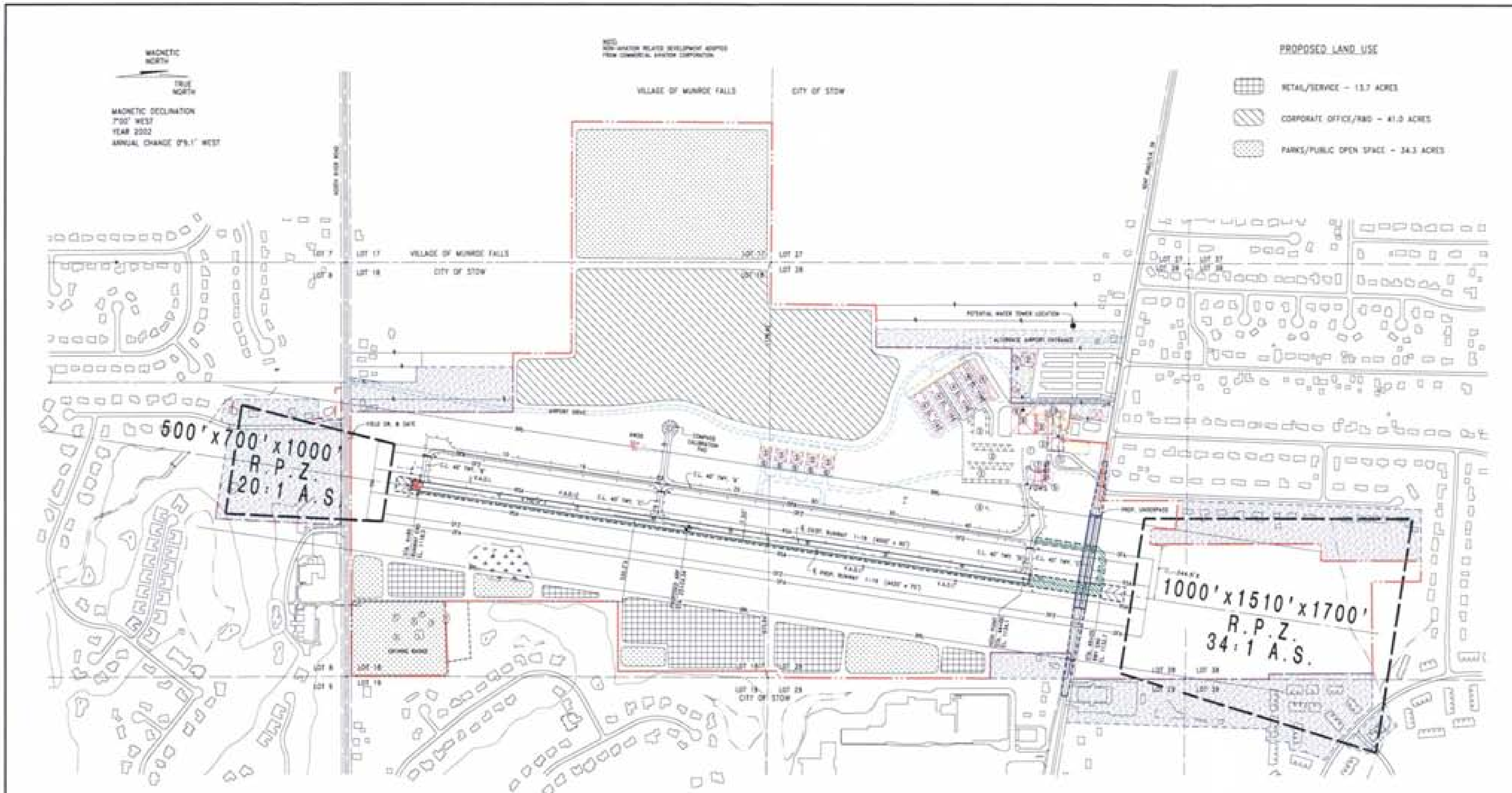
FOWS FUEL/OIL/WATER SEPARATOR
CATCH BASIN

AIRPORT ALTERNATIVE #4A

RUNWAY END 19 EXTENDED NORTH OVER S.R. 59 (KENT ROAD)
VISIBILITY MINIMUMS ARE NOT LOWER THAN ONE MILE

FAA SITE NO. 18061.*A

KENT STATE UNIVERSITY
KENT, OHIO



PROPOSED RUNWAY/TAXIWAY DATA

	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBSTACLE FREE AREA WIDTH	500'
RUNWAY OBSTACLE FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	460'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	344.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	257.5'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND

NO.	DESCRIPTION	ELEV.
1	TERMINAL BUILDING	1180
2	MAINTENANCE HANGAR	1182
3	CONVENTIONAL HANGAR (1)	1182
3	CONVENTIONAL HANGAR (4)	1148
4	T-HANGAR (12-UNIT)	1170
5	FUEL PAD	1149
6	APRON AREA	1118
7	DIESEL/GASOLINE TANKS	1156
8	AIRPORT BEACON	1199
9	AIRPORT WIND TEE	1145
10	AWOS IV	1155

LEGEND

- LOT LINE
- EXISTING AIRPORT PROPERTY LINE
- EXISTING AVIAGATION EASEMENT
- PROPOSED LAND ACQUISITION
- EXISTING RIGHT-OF-WAY
- FUTURE RPZ
- EXISTING CORPORATION LINE
- PROP. RUNWAY EXTENSION AND WIDENING
- PROPOSED PAVEMENT AREAS
- PROPOSED BUILDINGS
- EXISTING BUILDINGS (TO BE REMOVED)
- PROPOSED UNDERPASS
- WIND CONE
- WIND TEE
- LOT CORNER
- STORM SEWER/CATCH BASIN
- AIRPORT REFERENCE POINT (A.R.P.) LON: 81°24'54.207", LAT: 41°09'06.083"
- AIRPORT BEACON
- EXISTING FENCE LINE
- PROPOSED AWOS IV
- ABANDONED RUNWAY PAVEMENT

STRUCTURE LEGEND

EXISTING

1. APRON AREA (150'x200')
2. TIE DOWN APRON (300'x350') 40 TIE-DOWNS
3. AUTO PARKING (250'x70') 56 SPACES
4. T-HANGAR
5. FBO/MAINTENANCE HANGAR
6. CORP. HANGAR
7. FUEL PAD (VENTS)
8. AIRPORT BEACON
9. WIND TEE
10. MOBILE CLASSROOMS

PROPOSED

1. TERMINAL BUILDING
2. MAINTENANCE HANGAR
3. CONVENTIONAL HANGAR
4. T-HANGAR (14-UNIT)
5. FUEL PAD
6. APRON AREA
7. DIESEL/GASOLINE TANKS

FOWS FUEL/OIL/WATER SEPARATOR
CATCH BASIN

AIRPORT ALTERNATIVE #4B

RUNWAY END 19 EXTENDED NORTH OVER S.R. 59 (KENT ROAD)
VISIBILITY MINIMUMS ARE NOT LOWER THAN 3/4 MILE (RUNWAY END 19)

FAA SITE NO. 18061.*A

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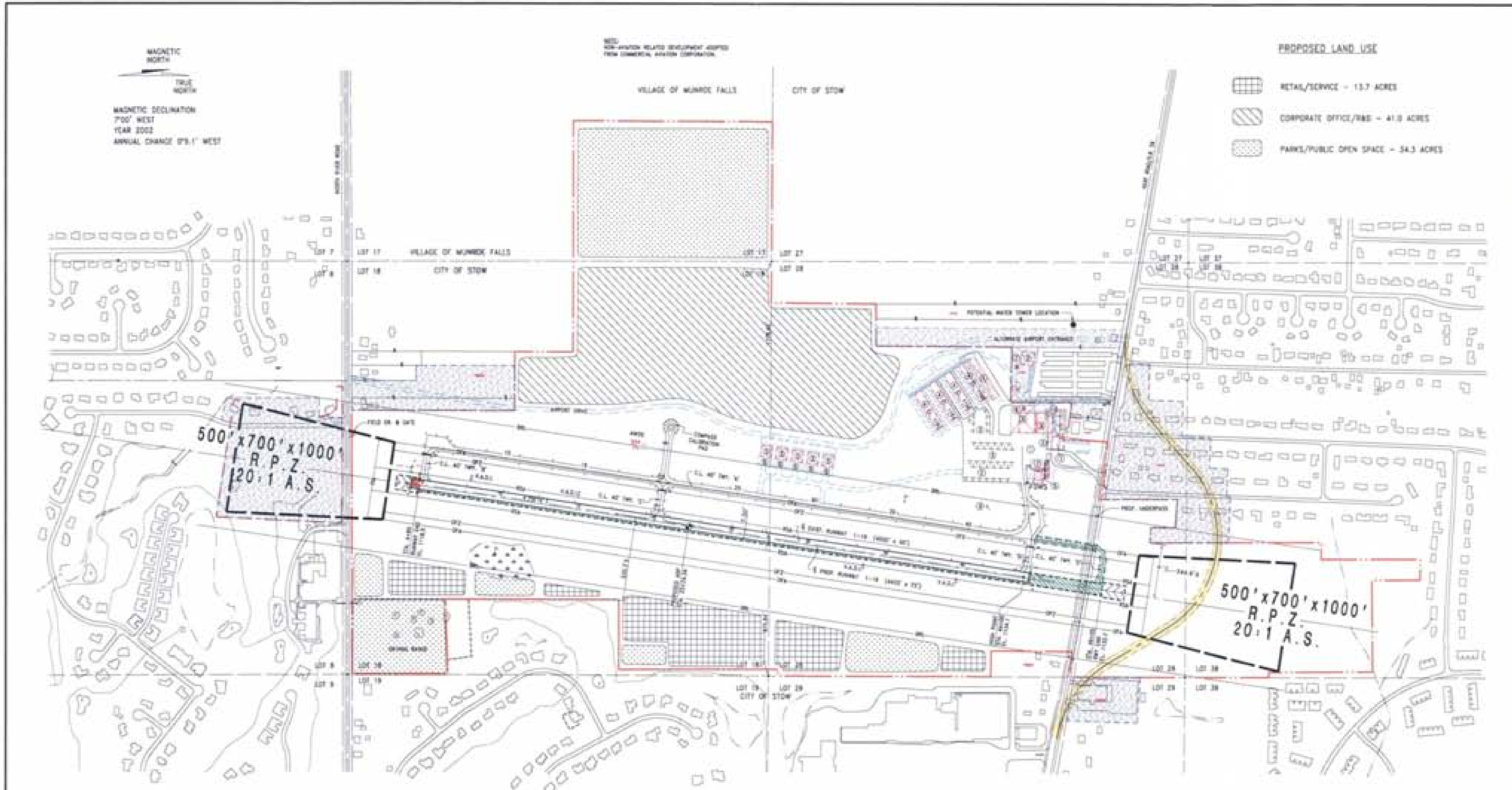

PROPOSED RUNWAY/TAXIWAY DATA	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBSTACLE FREE AREA WIDTH	500'
RUNWAY OBSTACLE FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	460'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	344.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	257.5'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND

NO.	DESCRIPTION	ELEV.
1	TERMINAL BUILDING	1180
2	MAINTENANCE HANGAR	1182
3	CONVENTIONAL HANGAR (1)	1182
3	CONVENTIONAL HANGAR (4)	1148
4	T-HANGAR (12-UNIT)	1170
5	FUEL PAD	1149
6	APRON AREA	1118
7	DIESEL/GASOLINE TANKS	1156
8	AIRPORT BEACON	1199
9	AIRPORT WIND TEE	1145
10	AWOS IV	1155

LEGEND

LOT LINE
EXISTING AIRPORT PROPERTY LINE
EXISTING AVIAGATION EASEMENT
PROPOSED LAND ACQUISITION
EXISTING RIGHT-OF-WAY
FUTURE RPZ (500'x700'x1000')
EXISTING CORPORATION LINE
PROP. RUNWAY EXTENSION AND WIDENING
PROPOSED ROAD RELOCATION
PROPOSED BUILDINGS
EXISTING BUILDINGS (TO BE REMOVED)
WIND CONE
WIND TEE
LOT CORNER
STORM SEWER/CATCH BASIN
AIRPORT REFERENCE POINT (A.R.P.)
LON: 81°24'54.207"; LAT: 41°09'06.083"
AIRPORT BEACON
EXISTING FENCE LINE
PROPOSED AWOS IV
ABANDONED RUNWAY PAVEMENT

STRUCTURE LEGEND

EXISTING

1. APRON AREA (150'x200')
2. TIE DOWN APRON (300'x350') 40 TIE-DOWNS
3. AUTO PARKING (250'x70') 56 SPACES
4. T-HANGAR
5. FBO/MAINTENANCE HANGAR
6. CORP. HANGAR
7. FUEL PAD (VENTS)
8. AIRPORT BEACON
9. WIND TEE
10. MOBILE CLASSROOMS

PROPOSED

1. TERMINAL BUILDING
2. MAINTENANCE HANGAR
3. CONVENTIONAL HANGAR
4. T-HANGAR (14-UNIT)
5. FUEL PAD
6. APRON AREA
7. DIESEL/GASOLINE TANKS

FOWS FUEL/OIL/WATER SEPARATOR
CATCH BASIN

AIRPORT ALTERNATIVE #4C
RUNWAY END 19 EXTENDED NORTH, S.R. 59 (KENT ROAD) RELOCATED
VISIBILITY MINIMUMS NOT LOWER THAN ONE MILE

FAA SITE NO. 18061.*A

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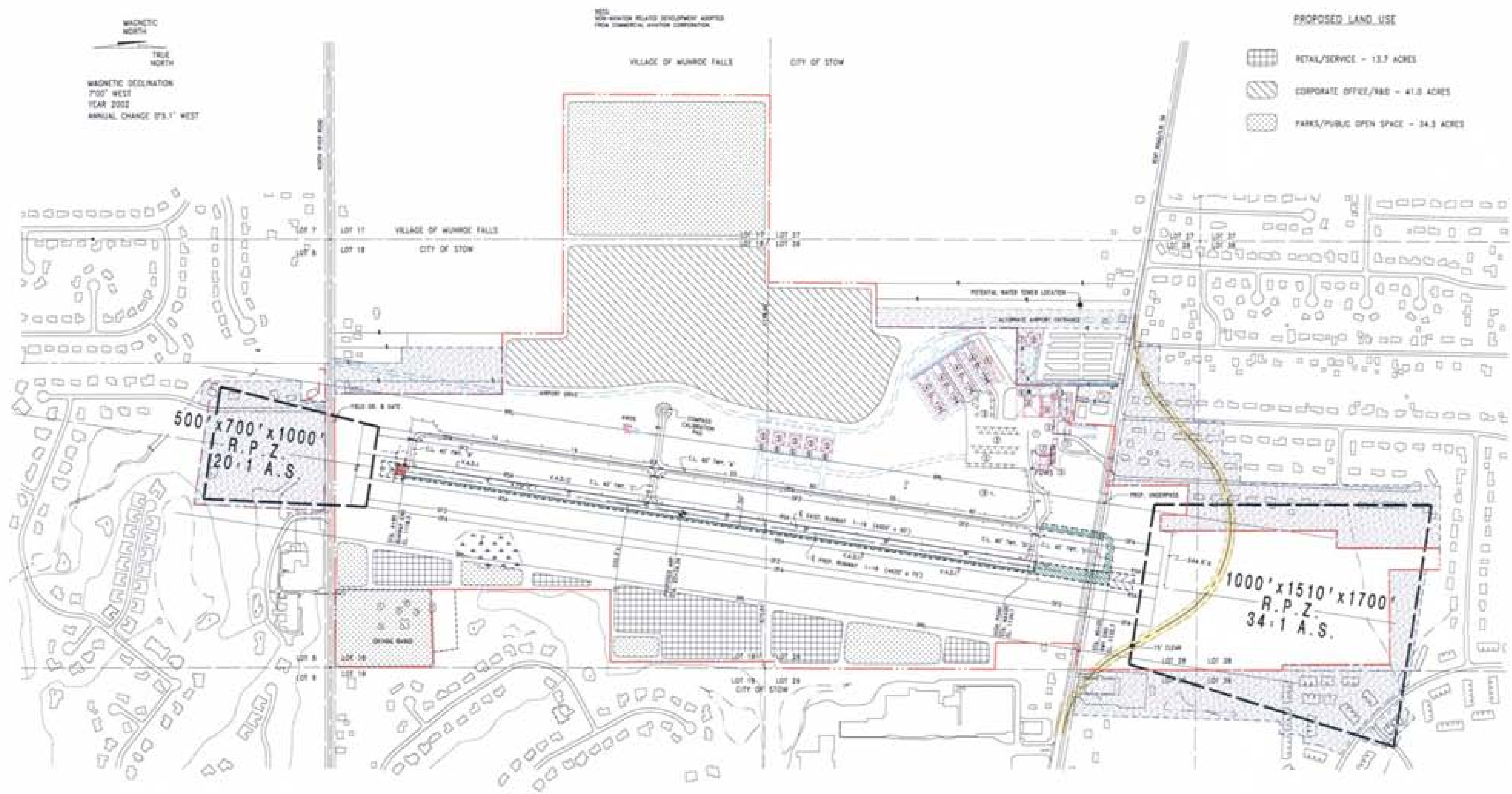
VI-29



PROPOSED RUNWAY/TAXIWAY DATA	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBSTACLE FREE AREA WIDTH	500'
RUNWAY OBSTACLE FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	460'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	344.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	257.5'
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TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND

NO.	DESCRIPTION	ELEV.
1	TERMINAL BUILDING	1180
2	MAINTENANCE HANGAR	1182
3	CONVENTIONAL HANGAR (1)	1182
3	CONVENTIONAL HANGAR (4)	1148
4	T-HANGAR (12-UNIT)	1170
5	FUEL PAD	1149
6	APRON AREA	1118
7	DIESEL/GASOLINE TANKS	1156
8	AIRPORT BEACON	1199
9	AIRPORT WIND TEE	1145
10	AWOS IV	1155

LEGEND

LOT LINE
EXISTING AIRPORT PROPERTY LINE
EXISTING AVIGATION EASEMENT
PROPOSED LAND ACQUISITION
EXISTING RIGHT-OF-WAY
FUTURE RPZ
EXISTING CORPORATION LINE
PROP. RUNWAY EXTENSION AND WIDENING
PROPOSED ROAD RELOCATION
PROPOSED BUILDINGS
EXISTING BUILDINGS (TO BE REMOVED)
WIND CONE
WIND TEE
LOT CORNER
STORM SEWER/CATCH BASIN
AIRPORT REFERENCE POINT (A.R.P.)
LON: 81°24'54.207", LAT: 41°09'06.083"
AIRPORT BEACON
EXISTING FENCE LINE
PROPOSED AWOS IV
ABANDONED RUNWAY PAVEMENT

STRUCTURE LEGEND

EXISTING
1 APRON AREA (150'x200')
2 TIE DOWN APRON (300'x350')
40 TIE-DOWNS
3 AUTO PARKING (250'x70')
56 SPACES
4 T-HANGAR
5 FBO/MAINTENANCE HANGAR
6 CORP. HANGAR
7 FUEL PAD (VENTS)
8 AIRPORT BEACON
9 WIND TEE
10 MOBILE CLASSROOMS

PROPOSED
1 TERMINAL BUILDING
2 MAINTENANCE HANGAR
3 CONVENTIONAL HANGAR
4 T-HANGAR (14-UNIT)
5 FUEL PAD
6 APRON AREA
7 DIESEL/GASOLINE TANKS
FOWS FUEL/OIL/WATER SEPARATOR
CATCH BASIN

AIRPORT ALTERNATIVE #4D
RUNWAY END 19 EXTENDED NORTH, S.R. 59 (KENT ROAD) RELOCATED
VISIBILITY MINIMUMS NOT LOWER THAN 3/4 MILE

FAA SITE NO.
18061.*A

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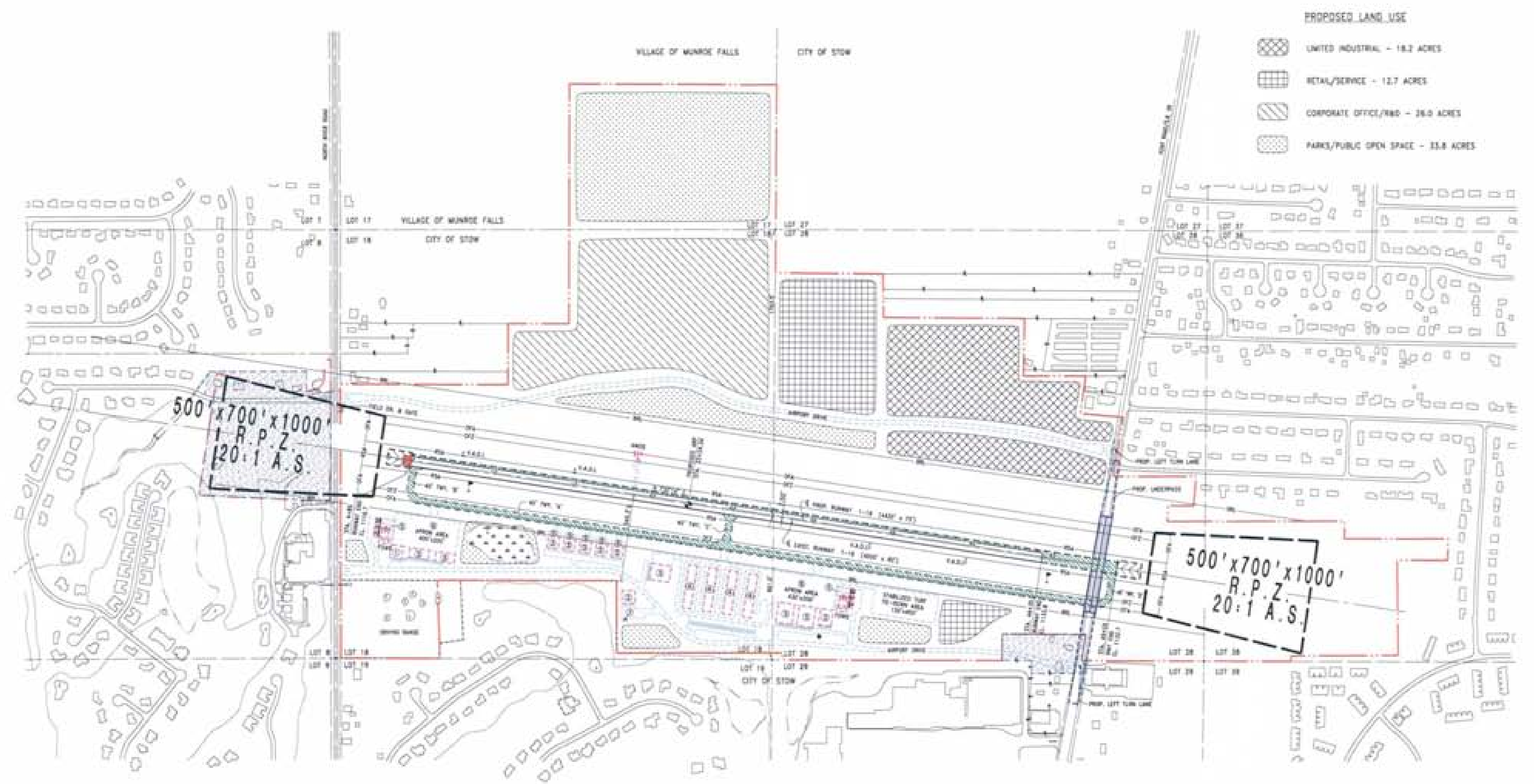

PROPOSED RUNWAY/TAXIWAY DATA	
	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBJECT FREE AREA WIDTH	500'
RUNWAY OBJECT FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	480'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	344.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	257.5'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND		
NO.	DESCRIPTION	ELEV.
1	TERMINAL BUILDING	1180
2	MAINTENANCE HANGAR	1182
3	CONVENTIONAL HANGAR (5)	1145±
3	CONVENTIONAL HANGAR (5)	1150±
4	T-HANGAR (12-UNIT)	1132±
5	FUEL PAD	1110±
6	APRON AREA	1115±
7	DIESEL/GASOLINE TANKS	1118
8	AIRPORT BEACON	1175
9	AIRPORT WIND TEE	1145
10	AWOS IV	1135

LEGEND

LOT LINE
EXISTING AIRPORT PROPERTY LINE
EXISTING AVIAGATION EASEMENT
PROPOSED LAND ACQUISITION
EXISTING RIGHT-OF-WAY
FUTURE RPZ (500'x700'x1000')
EXISTING CORPORATION LINE
PROP. RWY & TWY EXTENSION AND WIDENING
PROPOSED PAVEMENT AREAS
PROPOSED BUILDINGS
EXISTING DISPL. THRES. (TO BE REMOVED)
PROPOSED UNDERPASS
WIND CONE
WIND TEE
LOT CORNER
STORM SEWER/CATCH BASIN
AIRPORT REFERENCE POINT (A.R.P.)
LON: 81°24'34.207"; LAT: 41°08'06.083"
AIRPORT BEACON
EXISTING FENCE LINE
PROPOSED AWOS IV

STRUCTURE LEGEND

PROPOSED

1 TERMINAL BUILDING
2 MAINTENANCE HANGAR
3 CONVENTIONAL HANGAR
4 T-HANGAR (14-UNIT)
5 FUEL PAD
6 APRON AREA
7 DIESEL/GASOLINE TANKS
FOWS FUEL/OIL/WATER SEPARATOR
CB CATCH BASIN

AIRPORT ALTERNATIVE •4E

RWY, TWY, AND AIRPORT FACILITIES DEVELOPED EAST OF RUNWAY
RUNWAY 1-19 EXTENDED NORTH OVER S.R. 59

FAA SITE NO.
18081.•A

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VI-31

AIRFIELD ALTERNATIVE #5

Runway 1-19 Extended North over State Route 59 (Kent Road)
and South over North River Road
Visibility Minimums Are Not Lower than One Mile

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Environmental Assessment	1	L.S.	$60,000.00	$60,000
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Runway End 19 Extension	1,750	S.Y.	$64.80	$113,400
Runway End 1 Extension	1,750	L.F.	$64.80	$113,400
Runway Widening	6,700	S.Y.	$60.00	$402,000
Taxiway Extension	3,111	S.Y.	$58.00	$180,438
Land Acquisition - (Includes Building Values)	34	Acres	$174,975.00	$5,949,150
Relocation Assistance	9	Units	$10,000.00	$90,000
Building & Obstruction Removal	9	Units	$40,000.00	$360,000
Road Underpass (State Route 59 - Kent Road)	600	L.F.	$10,000.00	$6,000,000
Road Underpass (North River Road)	600	L.F.	$5,000.00	$3,000,000
Site Preparation	1	L.S.	$1,500,000.00	$1,500,000
MIRL, REIL's, & VADI	4,420	Ft.	$55.00	$243,100
MITL & Signing	5,460	L.F.	$42.00	$229,320
AWOS IV	1	Ea.	$111,110.00	$111,110
Fueling Facilities	1,320	S.Y.	$300.00	$396,000
Total				**$19,147,908**

- **Airfield Alternative #5A** -This development alternative would be similar to Alternative 5 except that the primary runway approach end 19 would provide visibility minimums that are not lower than 3/4 mile. As in Alternative 5 the runway would extend 210 feet beyond the current runway ends. The runway extensions and the required safety areas would impact both, North River Road to the south and State Route 59 (Kent Road) to the north.

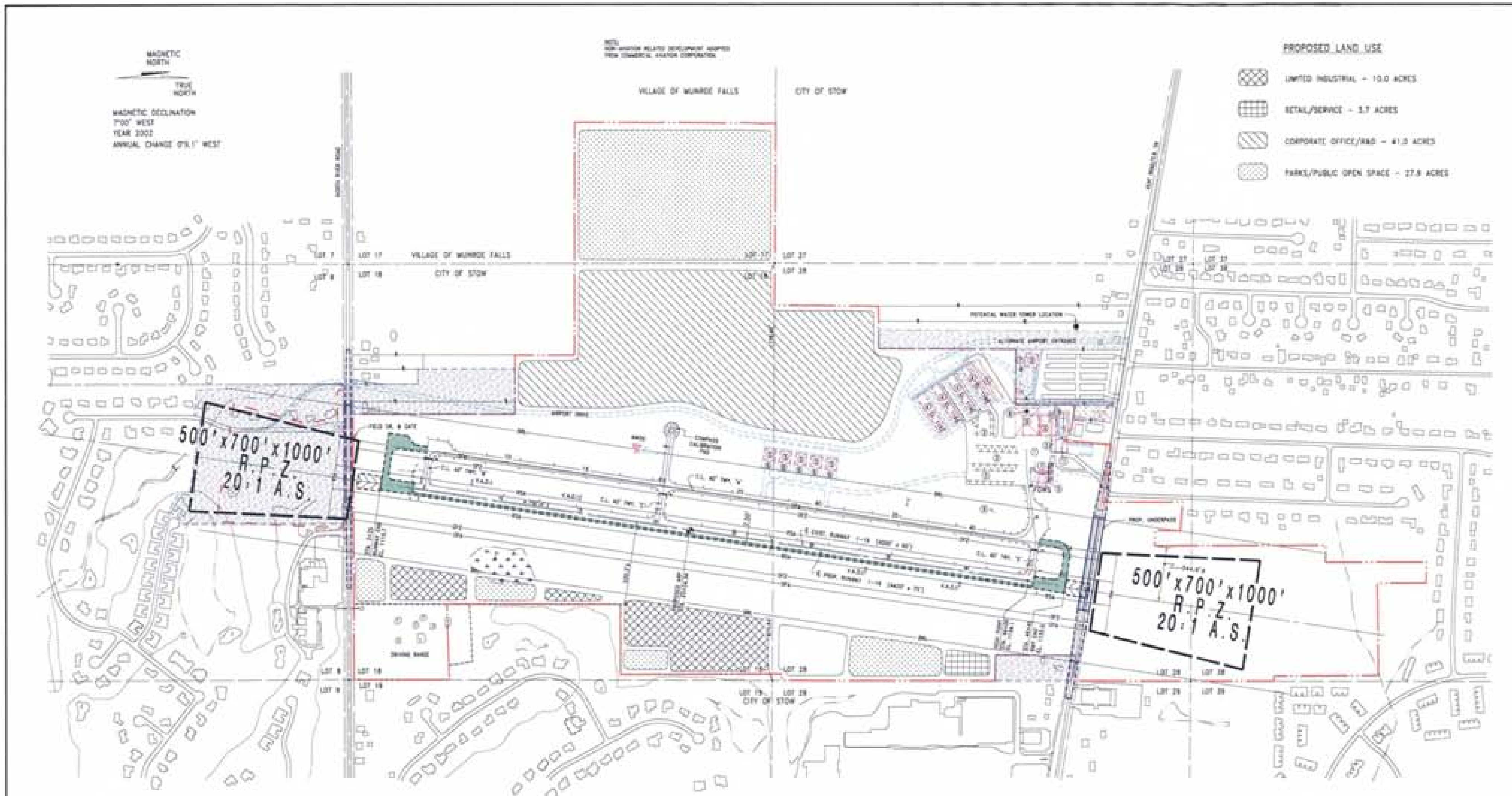
  This alternative would require relocating by underpassing or enclosing in a tunnel portions of both roads. Providing visibility minimums not lower than 3/4 mile for the primary runway approach end 19 would require enclosing Kent Road in a 1,100 feet long 4 lane width tunnel. Maintaining the existing visibility minimums on the secondary runway approach end 1 not lower than 1 mile would require enclosing North River Road in a 600 feet long 2 lane width tunnel. RPZ dimensions to the runway end 1 would be 500 feet inner width, 700 feet outer width and a total length of 1,000 feet having a 20:1 approach slope. The RPZ dimension to approach end 19 would have an inner width of

1,000 feet and an outer width of 1,510 feet and a length of 1,700 feet with a 34:1 approach slope. The impact to adjoining properties moderately if not minor while the impact under approach surface to runway end 19 would be significant. The graphic rendering of Exhibit VI-34 together with the economic analysis reveals the feasibility of the Alternative. The anticipated adverse social and economic impacts would exclude Alternative 5A from further consideration.

AIRFIELD ALTERNATIVE #5A

Runway 1-19 Extended North over State Route 59 (Kent Road)
and South over North River Road
Visibility Minimums Are Not Lower than One Mile On Approach End 1
and Visibility Minimums Not Lower Than 3/4 Mile on Approach End 19

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Environmental Assessment	1	L.S.	$60,000.00	$60,000
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Runway End 19 Extension	1,750	S.Y.	$64.80	$113,400
Runway End 1 Extension	1,750	L.F.	$64.80	$113,400
Runway Widening	6,700	S.Y.	$60.00	$402,000
Taxiway Extension	3,111	S.Y.	$58.00	$180,438
Land Acquisition - (Includes Building Values)	58	Acres	$176,000.00	$10,208,000
Relocation Assistance	51	Units	$10,000.00	$510,000
Building & Obstruction Removal	31	Units	$40,000.00	$1,240,000
Road Underpass (State Route 59 - Kent Road)	1,100	L.F.	$10,000.00	$11,000,000
Road Underpass (North River Road)	600	L.F.	$5,000.00	$3,000,000
Site Preparation	1	L.S.	$1,500,000.00	$1,500,000
MIRL, REIL's, & VADI	4,420	Ft.	$55.00	$243,100
MITL & Signing	5,460	L.F.	$42.00	$229,320
AWOS IV	1	Ea.	$111,110.00	$111,110
Fueling Facilities	1,320	S.Y.	$300.00	$396,000
Total				**$29,706,758**



PROPOSED RUNWAY/TAXIWAY DATA	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBSTACLE FREE AREA WIDTH	500'
RUNWAY OBSTACLE FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	460'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	344.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	257.5'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND

NO.	DESCRIPTION	ELEV.
1	TERMINAL BUILDING	1180
2	MAINTENANCE HANGAR	1182
3	CONVENTIONAL HANGAR (1)	1182
3	CONVENTIONAL HANGAR (4)	1148
4	T-HANGAR (12-UNIT)	1170
5	FUEL PAD	1149
6	APRON AREA	1118
7	DIESEL/GASOLINE TANKS	1156
8	AIRPORT BEACON	1199
9	AIRPORT WIND TEE	1145
10	AWOS IV	1150

LEGEND

- LOT LINE
- EXISTING AIRPORT PROPERTY LINE
- EXISTING AVIAGATION EASEMENT
- PROPOSED LAND ACQUISITION
- EXISTING RIGHT-OF-WAY
- FUTURE RPZ (500'x700'x1000')
- EXISTING CORPORATION LINE
- PROP. RUNWAY EXTENSION AND WIDENING
- PROPOSED PAVEMENT AREAS
- PROPOSED BUILDINGS
- EXISTING BUILDINGS (TO BE REMOVED)
- PROPOSED UNDERPASS
- WIND CONE
- WIND TEE
- LOT CORNER
- STORM SEWER/CATCH BASIN
- AIRPORT REFERENCE POINT (A.R.P.) LON: 81°24'34.207"; LAT: 41°09'06.083"
- AIRPORT BEACON
- EXISTING FENCE LINE
- PROPOSED AWOS IV

STRUCTURE LEGEND

EXISTING

1. APRON AREA (150'x200')
2. TIE DOWN APRON (300'x350') 40 TIE-DOWNS
3. AUTO PARKING (250'x70') 56 SPACES
4. T-HANGAR
5. FBO/MAINTENANCE HANGAR
6. CORP. HANGAR
7. FUEL PAD (VENTS)
8. AIRPORT BEACON
9. WIND TEE
10. MOBILE CLASSROOMS

PROPOSED

1. TERMINAL BUILDING
2. MAINTENANCE HANGAR
3. CONVENTIONAL HANGAR
4. T-HANGAR (14-UNIT)
5. FUEL PAD
6. APRON AREA
7. DIESEL/GASOLINE TANKS

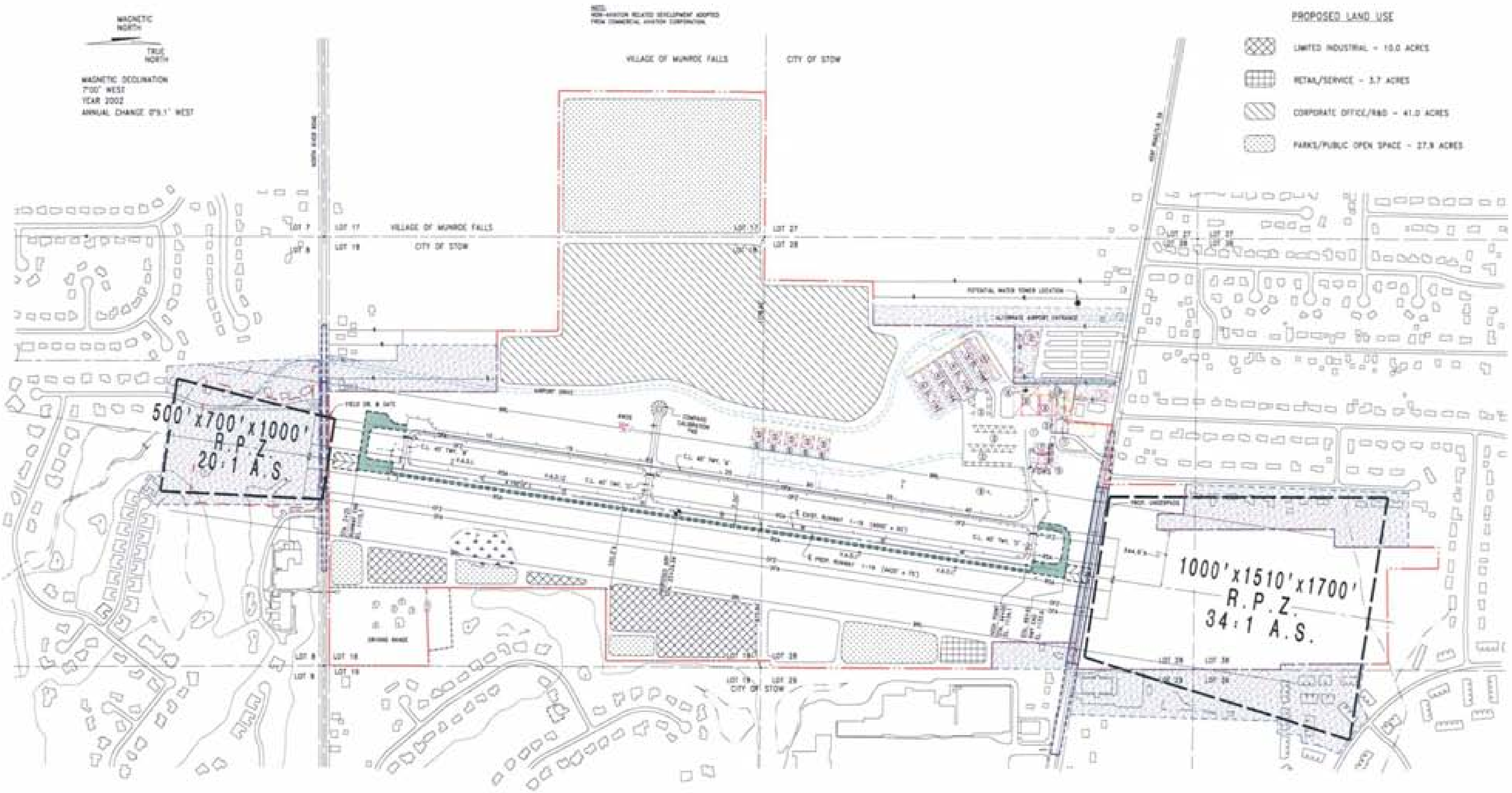
FOWS FUEL/OIL/WATER SEPARATOR
CATCH BASIN

AIRPORT ALTERNATIVE #5
RUNWAY 1-19 EXTENDED NORTH AND SOUTH
VISIBILITY MINIMUMS ARE NOT LOWER THAN ONE MILE

FAA SITE NO. 18061.*A

KENT STATE UNIVERSITY
KENT, OHIO

VI-34



PROPOSED RUNWAY/TAXIWAY DATA	
	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBSTACLE FREE AREA WIDTH	500'
RUNWAY OBSTACLE FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	460'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	344.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	257.5'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND		
NO.	DESCRIPTION	ELEV.
1	TERMINAL BUILDING	1180
2	MAINTENANCE HANGAR	1182
3	CONVENTIONAL HANGAR (1)	1182
3	CONVENTIONAL HANGAR (4)	1148
4	T-HANGAR (12-UNIT)	1170
5	FUEL PAD	1149
6	APRON AREA	1118
7	DIESEL/GASOLINE TANKS	1156
8	AIRPORT BEACON	1199
9	AIRPORT WIND TEE	1145
10	AWOS IV	1155

LEGEND

- LOT LINE
- EXISTING AIRPORT PROPERTY LINE
- EXISTING AVIAGATION EASEMENT
- PROPOSED LAND ACQUISITION
- EXISTING RIGHT-OF-WAY
- FUTURE RPZ
- EXISTING CORPORATION LINE
- PROP. RUNWAY EXTENSION AND WIDENING
- PROPOSED PAVEMENT AREAS
- PROPOSED BUILDINGS
- EXISTING BUILDINGS (TO BE REMOVED)
- PROPOSED UNDERPASS
- WIND CONE
- WIND TEE
- LOT CORNER
- STORM SEWER/CATCH BASIN
- AIRPORT REFERENCE POINT (A.R.P.) LON: 81°24'34.207"; LAT: 41°09'06.083"
- AIRPORT BEACON
- EXISTING FENCE LINE
- PROPOSED AWOS IV

STRUCTURE LEGEND

EXISTING

1. APRON AREA (150'x200')
2. TIE DOWN APRON (300'x350') 40 TIE-DOWNS
3. AUTO PARKING (230'x70') 58 SPACES
4. T-HANGAR
5. FBO/MAINTENANCE HANGAR
6. CORP. HANGAR
7. FUEL PAD (VENTS)
8. AIRPORT BEACON
9. WIND TEE
10. MOBILE CLASSROOMS

PROPOSED

1. TERMINAL BUILDING
2. MAINTENANCE HANGAR
3. CONVENTIONAL HANGAR
4. T-HANGAR (14-UNIT)
5. FUEL PAD
6. APRON AREA
7. DIESEL/GASOLINE TANKS

FOWS FUEL/OIL/WATER SEPARATOR
CATCH BASIN

AIRPORT ALTERNATIVE #5A

RUNWAY 1-19 EXTENDED NORTH AND SOUTH
VISIBILITY MINIMUMS ARE NOT LOWER THAN 3/4 MILE (RUNWAY END 19)
VISIBILITY MINIMUMS ARE NOT LOWER THAN ONE MILE (RUNWAY END 1)

FAA SITE NO. 18061.*A

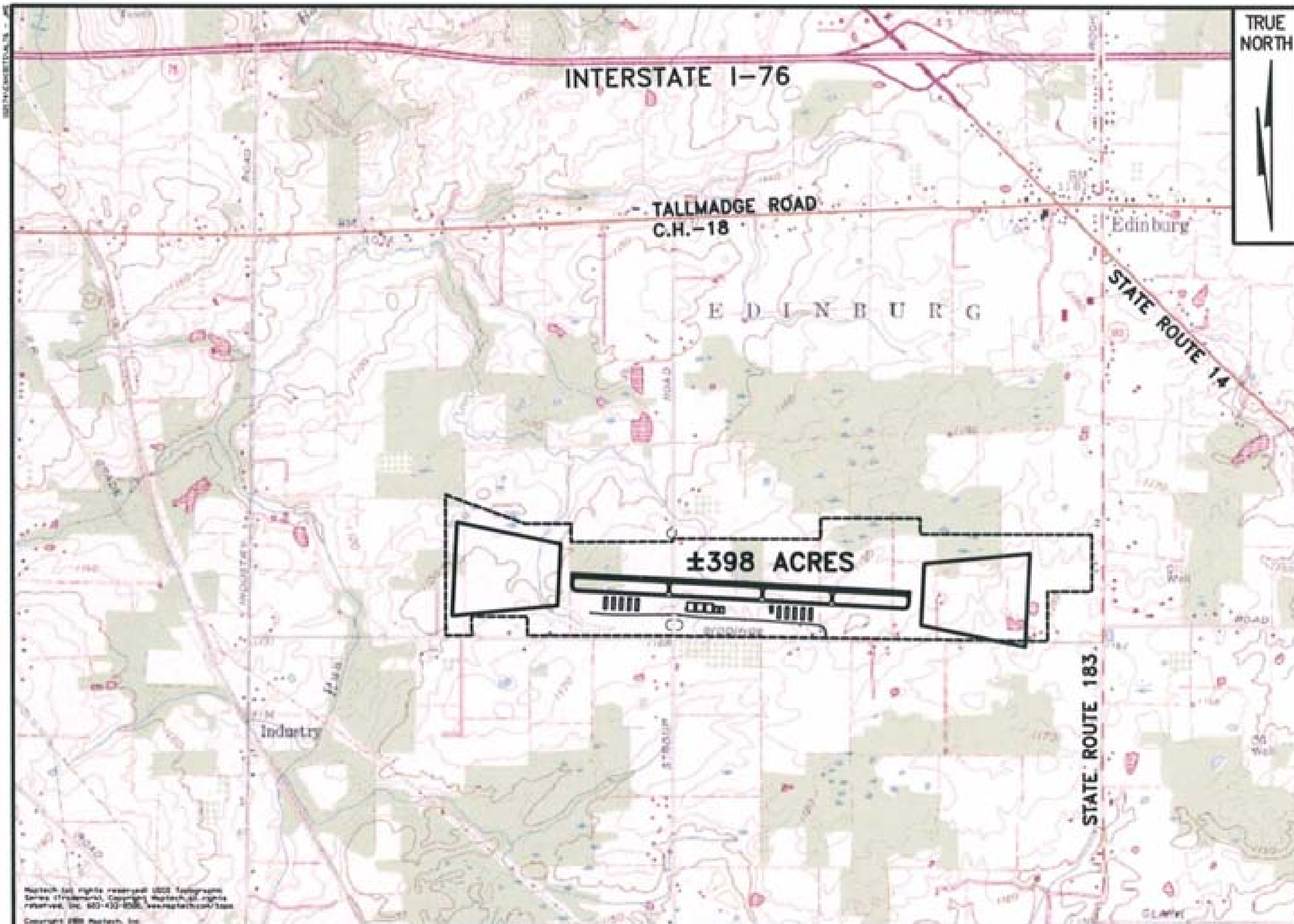
KENT STATE UNIVERSITY
KENT, OHIO

- **Airfield Alternative #6** This alternative proposes with the development of an airport at a new site in Portage County to meet the aviation demand of the community and the requirements set forth in FAA Order 5090.3C. This alternative would require extensive and perhaps unjustifiable environmental mitigation due to potential ecologic impacts. In addition, the financial support for the $20,961,640 estimated construction cost for a general aviation airport most likely will not be available. The annual capital recovery cost of $1,681,962 estimated of 5% cost of money plus the initial investment would fall well below the most optimistic economic benefits. This alternative does however provide good access to the communities currently utilizing the Kent State University Airport by allowing access to State Route 14 and Interstate 76. The selected site is shown on Exhibit VI-36 along with the approximate acreage and runway orientation.

  The site would be feasible for constructing 5,000 feet x 75 feet non-precision runway with visibility minimums less than 3/4 mile, parallel taxiway and sufficient apron and landside facilities to meet aviation demand well beyond the 20 year planning period.

  The preparation of the Master Plan did not require a separate site evaluation study for a new airport at a new location. However, a preliminary screening of potential sites conforming to the requirements of Order 5090.3C "Field Formulation of the National Plan of Integrated Airport Systems" (NPIAS) was performed. Alternative No. 6 site appeared superior to other sites considered, however, further more rigorous evaluation should be performed to review pertinent physical characteristics along with overriding political, environmental and financial considerations. Alternative No. 6 was developed as an option to accommodate existing and forecast aviation demand should the existing site be found unacceptable. Page VI-36 can be used with minimum refinement to determine general location, airport size and airside requirements to meet demand forecasts and capacity needs. The site would generally meet the guiding principals of the NPIAS plan, however a formal site selection plan would be required.

  Facilities requirement and general airport sizing have been shown in Chapters IV and V and the information should be sufficient for initial size screening. It is anticipated that the concepts and cost estimates presented for Alternative No. 6 may require modification during the preparation of its own master plan and associated environmental assessment. The approximate development cost of this alternative is **$20,961,640.00**.



VI-37 KENT STATE UNIVERSITY AIRPORT
MASTER PLAN STUDY

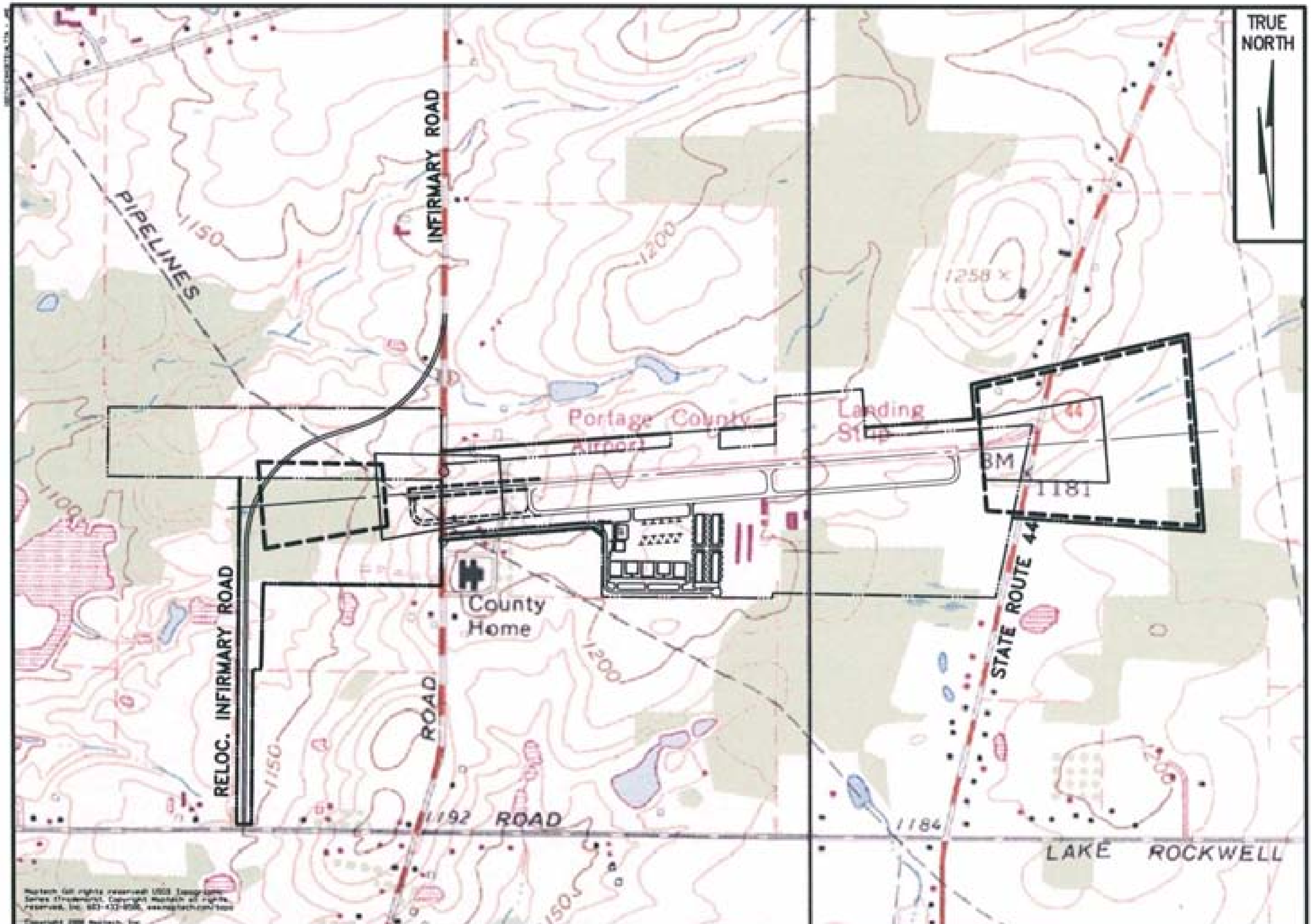
AIRPORT ALTERNATIVE #6
NEW AIRPORT SITE

AIRFIELD ALTERNATIVE #6 - NEW AIRPORT SITE

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Administrative and Legal	1	L.S.	$300,000.00	$300,000
Preliminary Planning and Environmental Including Site Assessment Study	1	L.S.	$480,000.00	$480,000
Decommissioning Existing Airfield	1	L.S.	$355,000.00	$355,000
Stream/Wetland Mitigation	1	L.S.	$200,000.00	$200,000
Design/Bid Phase	1	L.S.	$1,144,000.00	$1,144,000
Land Acquisition/Obstruction Removal/Relocation Assistance	1	L.S.	$6,139,300.00	$6,139,300
Site Preparation	1	L.S.	$1,960,700.00	$1,960,700
Runway Construction	45,833	S.Y.	$110.00	$5,041,630
Taxiway Construction	27,000	S.Y.	$90.00	$2,430,000
Apron Construction	18,000	S.Y.	$50.00	$900,000
* Road Vacating (Stroup Rd.)	1	L.S.	$70,000.00	$70,000
Utilities	1	L.S.	$850,000.00	$850,000
MIRL, REIL's & VADI's	5,500	L.F.	$55.00	$302,500
MITL	6,700	L.F.	$42.00	$281,400
AWOS IV	1	Ea.	$111,110.00	$111,110
Fuel Facilities	1,320	S.Y.	$300.00	$396,000
Total				**$20,961,640**

* See detailed decommissioning line item and cost breakdown in Appendix.

- **Airfield Alternative #7** Alternatives 2 through 6 require substantial initial investments to accommodate forecast demand. Consideration should be given to an alternative that would transfer all operations to another nearby airport. Alternative No. 7 addresses the investment that would be required to support forecast activities on aeronautical, financial and environmental issues. This alternative's most important objective is to make the best use of existing facilities at a nearby site. A likely candidate meeting the criteria set forth in Order 5090.3C would be a general aviation airport that is included in an accepted National Plan of Integrated Airport Systems (NPIAS). There are several existing nearby airports accepted in the NPIAS that would meet the criteria of Section 2-5 of Order 5090.3C. All of these airport have overlying Class E airspace with floor 700 ft. above surface or greater.



VI-39

KENT STATE UNIVERSITY AIRPORT
MASTER PLAN STUDY

AIRPORT ALTERNATIVE #7
TRANSFER SERVICE

Two airports in particular would be within less than 30 minutes ground travel time and fall inside a 20 mile radius of the study area. Either of the two airports could provide the services currently provided by the Kent State University Airport. The communities would include Macedonia, Aurora, Streetsboro, Hudson, Kent, Stow, Munroe Falls, Tallmadge, Cuyahoga Falls, Mogadore, Lakemore and others. The nearby airports have adequate land and facilities equal to or better than the existing facilities. Several have updated master plans or airport layout plans that indicate upgrading its facilities beyond the forecast facility requirements of the Kent State University Airport.

For feasibility purposes only and for fair economic and political analysis a nearby airport was selected for preliminary evaluation along side other potential alternatives. This report realizes that additional studies such as a site selection, master plan and environmental studies would be necessary before a definite recommendation can be made.

The nearby airport used for greater analysis would have efficient access through the use of existing State and Interstate highway system, has potential for acquiring additional land if needed and has reasonable airside facilities and low operations. Alternative No. 7 has a 3,500 feet long by 75 feet wide runway, a 35 feet full length parallel taxiway with 240 feet taxiway centerline to runway centerline separation including aircraft category BII runway safety area, object free area and visual approach runway protection zone minimum standards. The potential alternative is shown in Exhibit VI-39. If Alternative 7 is considered as the preferred alternative the decision would initiate the site selection, master plan and associated environmental assessment studies.

Additional support from the Ohio Office of Aviation will also be necessary for incorporating the services into a regional system plan for northeast Ohio. The regional systems plan would determine which airports would be capable to serve the needs of the Kent State University Flight Technology Department and if the region could support the closure of the existing airport. Support from of the FAA Administrator is also required for a release from obligations of prior grant agreements which would permit abandoning or disposing the existing airport for non airport purposes[1]. Alternative No. 7 site has improved airspace and airspace capacity. Development costs for this alternative are significantly lower than for any of alternatives 2 through 6. User ground access costs including value of travel time are not significant and would not be passed on to University's flight training students. Airport and aircraft operational costs due to enhanced economy of scale are anticipated to be significantly lower when compared to any of the other alternatives.

Potential environmental and social impacts should be minimal because the site is compatible with comprehensive land use and transportation plans, land ownership , land value, land use controls and building regulations. Further the site would be consistent with area wide planning goals and would become a desired influence on local growth patterns. No private residences or businesses would be acquired and no families or businesses would need to be relocated. Because of the sites rural location airport noise would affect considerably fewer people than would be affected by the existing site. Air quality and water quality could be more readily maintained on Alternative Site 7 than on the existing alternatives. Wetland and parkland issues should not require separate consideration or impact assessments.

Overall, Alternative No. 7 appears to fit regional land use policy, has few if any known environmental or social issues and has desirable potential for economic benefits to the area.

[1] FAA Order 5190.6A Airports Compliance Handbook 10/01/89

AIRFIELD ALTERNATIVE #7

Transfer Service to An Airport In The Vicinity

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Site Selection Study	1	L.S.	$60,000.00	$60,000
Update Master Plan	1	L.S.	$56,000.00	$56,000
Environmental Assessment	1	L.S.	$80,000.00	$80,000
*Decommissioning Existing Airfield	1	L.S.	$355,000.00	$355,000
Runway Overlay	29,167	S.Y.	$15.00	$437,505
Taxiway Overlay	17,196	S.Y.	$19.02	$327,068
Runway Extension	7,667	S.Y.	$75.00	$575,025
Taxiway Extension	4,667	S.Y.	$70.00	$326,690
Land Acquisition - Approach Surface Protection	43	Acres	$5,600.00	$240,800
MIRL & MITL Extension	3,250	L.F.	$32.00	$104,000
AWOS IV	1	Ea.	$111,110.00	$111,110
Road Relocation (Infirmary Road)	4,950	L.F.	$320.00	$1,584,000
Powerline Relocation	1	L.S.	$215,000.00	$215,000
Gas Line Encasing	685	L.F.	$250.00	$171,250
Apron Construction	18,000	S.Y.	$38.00	$684,000
Fueling Facilities	1,320	S.Y.	$300.00	$396,000
Obstruction Removal/Site Preparation	43	Acres	$6,000.00	$258,000
Total				**$5,981,448**

* See detailed decommissioning line item and cost breakdown in Appendix.

AIRFIELD ALTERNATIVE #8

Transfer Flight Training Operations and AII & BII Greater Aircraft Services to An Airport in the Vicinity While Maintaining the Existing Airport for AI Operations Only

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Update Master Plan	1	L.S.	$56,000.00	$56,000
Environmental Assessment	1	L.S.	$80,000.00	$80,000
Runway Overlay	29,167	S.Y.	$15.00	$437,505
Taxiway Overlay	17,196	S.Y.	$19.02	$327,068
Runway Extension	7,667	S.Y.	$75.00	$575,025
Taxiway Extension	4,667	S.Y.	$70.00	$326,690
Land Acquisition - Approach Surface Protection	43	Acres	$5,600.00	$240,800
MIRL & MITL Extension	3,250	L.F.	$32.00	$104,000
AWOS IV	1	Ea.	$111,110.00	$111,110
Road Relocation (Infirmary Road)	4,950	L.F.	$320.00	$1,584,000
Powerline Relocation	1	L.S.	$215,000.00	$215,000
Gas Line Encasing	685	L.F.	$250.00	$171,250
Apron Construction	18,000	S.Y.	$38.00	$684,000
Fueling Facilities	1,320	S.Y.	$300.00	$396,000
Obstruction Removal/Site Preparation	43	Acres	$6,000.00	$258,000
Runway Overlay	26,666	S.Y.	$15.00	$399,990
Taxiway Overlay	25,020	S.Y.	$15.00	$375,300
Apron Overlay	19,340	S.Y.	$16.00	$309,440
Topsoiling and Turfing	23,000	S.Y.	$3.90	$89,700
*T-Hangar	16,800	S.F.	$4.50	$75,600
*Flight Training Hangar	22,400	S.F.	$5.30	$118,720
*Maintenance/FBO Hangar	8,050	S.F.	$6.50	$52,325
Maintaining Runway/Taxiway Lighting & Navaids	1	L.S.	$180,000.00	$180,000
Fuel Facilities	1,500	S.Y.	$48.00	$72,000
Improve Runway 1-19 Safety Area	1	L.S.	$500,000.00	$500,000
Total				**$7,739,523**

- **Alternative 8** Alternative 8 would transfer Kent State University Flight Training activities and encourage based and itinerant BII activities to use other nearby General Aviation airports. General aviation activities with operational requirements for aircraft less than BII (i.e. approach speed less than 121 knots and wing span less than 49 feet) would remain at existing airfield. Runway length, width and approach minimums including taxiway and all landside facilities would remain in the "do nothing" mode as further outlined under Alternative 1.

  Table II-1 lists seven nearby airports within a 20 mile radius and 30 minutes driving time. Three airports are private public use airports within inadequate airside and landside facilities and no potential for expansion to meet demand. One transport category airport, Akron Canton International, and Akron Fulton International, a reliever, would have facilities to accommodate critical aircraft. However both airports have substantial and rapidly expanding carrier and cargo activities and would not be able to accommodate or absorb transfer operations. Further transferring the large volumes of existing and forecast flight training including, local and itinerant BII operations to either Akron-Canton or Akron-Fulton airports would severely impact safety and capacity including operational, security and ground access at these locations.

  The remaining sites have airside and landside facilities as described under Alternative 7. The sites, where deficiencies exist, could be improved to accommodate BII aircraft requirements. Several of the sites are within a 20 mile radius or 30 minute driving time of Kent State University. One nearby airport is only 9.6 miles from the University. While one of the nearby airports has a large number of based aircraft the annual local and itinerant operations are very low, making capacity concerns not an issue.

  The airport could also provide the service volume demand from the flight training operations but would require runway/taxiway extension to accommodate BII operations. Alternative 8 would require administration, managing, operating and maintaining efforts including capital improvement outlays at two locations. Implementation of this alternative would include the entire costs of Alternatives 1 and 7 but excluding the cost for decommissioning the existing airfield and conducting a site selection study. The savings would include cost for appraisal, engineering/closure management and administrative/legal expenses estimated at $131,000. The cost of implementing Alternative 8 would be approximately **$7,739,523**.

  It is very unlikely that the Kent State University would be financially able to maintain and operate the existing airport while at the same time establishing flight training facilities including operations at another nearby airport.

GENERAL AVIATION TERMINAL APRON ALTERNATIVES

The terminal apron facilities discussed previously in Chapter 2, named several deficiencies in the current T-hangar units, maintenance facility, automobile parking, FBO Terminal Building, and the airport access road. The Kent State University Airport primarily serves the general aviation sector, making the development of support facilities a major item of the master planning process. The following alternatives identify four terminal layouts that could be utilized to meet the general aviation demands in this market area. These alternatives include two existing site layouts, a new site layout, and another nearby airport site layout. These layouts of terminal buildings can be referenced in Alternatives 2 through 7. For planning purposes, the applicable cost estimates are attached. The terminal development cost are generally not eligible for Federal Aid due to the fact that these facilities are "Revenue Producing".

GENERAL AVIATION TERMINAL AREA
ALTERNATIVES 2, 4 AND 5
AIRPORT FACILITIES DEVELOPED WEST OF RUNWAY

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Airport Building Removal	47,250	S.F.	$2.00	$94,500
T-Hangars	40,800	S.F.	$40.00	$1,632,000
Taxilanes	1,200	L.F.	$200.00	$240,000
Flight Training Hangars	38,000	S.F.	$60.00	$2,280,000
Flight Training Facility	20,000	S.F.	$115.00	$2,300,000
Terminal Building	5,880	S.F.	$80.00	$470,400
Maintenance Hangar	6,800	S.F.	$60.00	$408,000
Corporate Hangars	10,800	S.F.	$50.00	$540,000
Access Roads	6,660	Ft.	$154.00	$1,025,640
Vehicle Parking	4,935	S.Y.	$48.00	$236,880
Total Cost				**$9,227,420**

GENERAL AVIATION TERMINAL APRON
ALTERNATIVE 3 AND 4E - AIRPORT FACILITIES DEVELOPED EAST OF RUNWAY

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Airport Building Removal	47,250	S.F.	$2.00	$94,500
T-Hangars	40,800	S.F.	$40.00	$1,632,000
Taxilanes	1	L.S.	$320,000.00	$320,000
Flight Training Hangars	38,000	S.F.	$60.00	$2,280,000
Flight Training Facility	20,000	S.F.	$115.00	$2,300,000
Terminal Building	5,880	S.F.	$80.00	$470,400
Maintenance Hangar	6,800	S.F.	$60.00	$408,000
Corporate Hangars	10,800	S.F.	$50.00	$540,000
Access Road	10,500	L.F.	$154.00	$1,617,000
Vehicle Parking	4,935	S.Y.	$48.00	$236,880
Total Cost				**$9,898,780**

GENERAL AVIATION TERMINAL APRON
ALTERNATIVE 6 - AIRPORT FACILITIES DEVELOPED ON A NEW SITE

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
T-Hangars	40,800	S.F.	$40.00	$1,632,000
Taxilanes	1	L.S.	$320,000.00	$320,000
Flight Training Hangars	38,000	S.F.	$60.00	$2,280,000
Maintenance Hangar	6,800	S.F.	$60.00	$408,000
Terminal Building	5,880	S.F.	$80.00	$470,400
Flight Training Facility	20,000	S.F.	$115.00	$2,300,000
Corporate Hangars	10,800	S.F.	$50.00	$540,000
Utilities	1	L.S.	$223,000.00	$223,000
Site Preparation	1	L.S.	$270,000.00	$270,000
Vehicle Parking	4,935	S.Y.	$48.00	$236,880
Access Road	4,500	L.F.	$168.00	$756,000
Airport Security	1	L.S.	$250,000.00	$250,000
Landscaping	1	L.S.	$100,000.00	$100,000
Total				**$9,786,280**

GENERAL AVIATION TERMINAL AREA
ALTERNATIVE 7 AND 8 - TRANSFER AIRPORT FACILITIES TO AN EXISTING AIRFIELD

Work Item Description	Estimated Quantity	Unit	Unit Cost	Total for Item
Access Road	2,820	L.F.	$154.00	$434,280
T-Hangars	40,800	S.F.	$40.00	$1,632,000
Taxilane	1	L.S.	$320,000.00	$320,000
Flight Training Hangars	38,000	S.F.	$60.00	$2,280,000
Maintenance Hangar	6,800	S.F.	$60.00	$408,000
Terminal Building	5,880	S.F.	$80.00	$470,400
Flight Training Facility	20,000	S.F.	$115.00	$2,300,000
Corporate Hangars	10,800	S.F.	$50.00	$540,000
Utilities	1	L.S.	$187,000.00	$187,000
Site Preparation	1	L.S.	$180,000.00	$180,000
Vehicle Parking	4,935	S.Y.	$48.00	$236,880
Airport Security	1	L.S.	$250,000.00	$250,000
Landscaping	1	L.S.	$100,000.00	$100,000
Total				**$9,338,560**

Evaluation of Alternatives

Economic Evaluation

The economic analysis of alternatives examines the associated development cost for the alternatives described previously in this chapter. These specific alternatives range from a "status quo" or "do nothing" alternative which has the lowest cost of $1,700,000 to the highest cost of $31,000,000 for Alternative 6 which includes constructing a new facility on a new site. Numerous variations to this alternative have been included also including runway extension north, airside and landside development east, runway extension south, runway extension north and south and transferring services to an airport in the vicinity. Table VI-1 depicts in tabular form the economic comparison between the financially feasible alternatives.

TABLE VI-1
COST COMPARISON OF AIRSIDE AND LANDSIDE FACILITIES

AIRSIDE			LANDSIDE		Total Development Cost
Description[1]	Cost	Airport Reference Code	Description	Cost	
Airfield Alternative -1	$2,173,075	AI	N/A	N/A	$2,173,075
Airfield Alternative -1A	$2,497,075	AI	N/A	N/A	$2,497,075
Airfield Alternative -1B	$3,230,185	AII	N/A	N/A	$3,230,185
Airfield Alternative -2A	$14,527,718	BII	GA Alternative - 2	$9,227,420	$23,755,138
Airfield Alternative -2C	$13,019,668		GA Alternative - 2	$9,227,420	$22,247,088
Airfield Alternative -3A	$14,440,213	BII	GA Alternative - 3	$9,898,780	$24,338,993
Airfield Alternative - 4A	$11,915,838	BII	GA Alternative - 4	$9,227,420	$21,143,258
Airfield Alternative - 4C	$18,093,583		GA Alternative - 4	$9,227,420	$27,321,003
Airfield Alternative - 4E	$14,221,353	BII	GA Alternative - 4E	$9,898,780	$24,120,133
Airfield Alternative - 5	$19,147,908	BII	GA Alternative -5	$9,227,420	$28,375,328
Airfield Alternative - 6	$20,961,640	BII/CII	GA Alternative - 6	$9,786,280	$30,747,920
Airfield Alternative - 7	$5,981,448	BII/CII	GA Alternative -7	$9,338,560	$15,320,008
Airfield Alternative - 8	$7,739,523	AI/BII/CII	GA Alternative - 8	$9,338,560	$17,078,083

[1] Due to several adverse impacts related to the proposed 3/4 mile visibility approach, Alternatives 2B, 2D, 3B, 4B and 4D have been excluded from this cost analysis.

A cursory review of Table VI-1 reveals eight primary alternatives. Alternate 1, 1A and 1B all include a minimal amount of improvement to the existing airport site including maintaining the existing facilities, safety area grading, runway widening and lighting upgrades. The cost is the smallest of all the alternatives at $1,700,000 for Alternative 1, $2,500,000 for Alternative 1A and $3,200,000 for Alternative 1B. However, given the results from user surveys, raw counts, flight training and operating personnel interviews, Kent State University Historic Operation Logs, and the projected growth outlined in Chapter III - Forecasts of Aviation Demand, the benefits to the Kent State University Airport users would justify the facilities and services connected with Alternatives 2 through 8.

Alternative 2 through 5 contemplates development on the existing airport site by examining several runway extension and facility layouts. Alternative 2 examines a proposed 420 foot runway extension south with North River Road relocated by either a 600 foot underpass (Alt. 2A) or a 2,620 foot road relocation (Alt. 2B). The costs of these two improvement options are related to the amount of land acquisition required and are consequently among the highest of the development options. Alternative 3 is a variation of the 420 foot extension south and includes the relocation of all airside and landside facilities east of the current runway centerline. The major cost items include site preparation, underpassing North River Road, and land acquisition. Alternative 3 is comparable in cost to Alternative 2 due to the 47 acres of land required for the runway safety area, road relocation and approach surface protection.

Alternatives 4A, 4B, 4C and 4D each proposes extending the existing runway end 470 feet to the north. Each alternative would impact the existing four lane thoroughfare, State Route 59. To provide necessary clearances from roadway encroachment into the RSA and RPZ including avoiding penetrating the approach surface to runway end 19 it would be necessary to relocate State Route 59. Alternatives 4A and 4B propose enclosing State Route 59 into a tunnel and extending runway end 19 over the State Route 59. Alternatives 4C and 4D propose relocating State Route 59 approximately 800 feet to the north around the RSA, ROFA and a portion of the RPZ to provide the necessary 15 ft. clearance under the approach surface. Alternatives 4A and 4C would maintain existing approach visibility minimums of not lower than 1 mile while Alternatives 4B and 4D would have minimums not lower than 3/4 mile for runway approach end 19 only.

By enclosing and lowering State Route 59 into a tunnel in reasonable conformity with existing alignment, the social and environmental impact would be minimized under Alternative 4A because very little additional right of way would be necessary. Alternative 4B would require significantly greater property acquisition due to the dimensional increases for the larger RPZ. Alternatives 4C and 4D due to the major road relocation and the associated land acquisition would create considerable environmental, social and economic impacts and should be eliminated from further consideration.

Alternative 4E is a combination of Alternatives 3A and 4A. The development outlines the relocation of landside and airside facilities east of the current runway centerline. Along with the facilities relocation, Alternative 4E includes a 470 foot runway extension north with State Route 59 underpassed. Major cost items attached to this Alternative include left turn lanes, site preparation, apron and taxiway relocations, State Route 59 underpass and land acquisition. Alternative 4E has a lower development cost of $13,355,353.

With Alternative 5, the construction requirements call for a runway extension of 210 feet on both the north and south side of the airport with both North River Road and State Route 59 underpassed. While the pavement is contained on airport property, the RSA's encroach into the two roadways , providing adequate RSA would require relocating both roadways. While this option minimizes land acquisition, it requires two costly roadway relocations to implement the proposed development. For this reason Alternative 5 has an estimated development cost of $20,357,758.

Alternative 6 and 7 are prerequisites of the airport master planning process and must be analyzed as viable options. Alternative 6, the development of a new airport on a new site is estimated to be $20,961,640. Alternative 7 examines the transfer of service to an airport in the vicinity and is estimated to cost $5,981,448. The major cost items of this alternative are possible runway/taxiway extension, obstruction removal, apron construction and road relocation. The "transfer of service" alternative provides the most cost efficient method of meeting the current and projected airport user demand. A variation to the "Transfer of Service" alternative was the last development option examined. Alternative 8 examines the transfer of the flight training and BII or greater aircraft to an airport in the vicinity. Since this alternative is a combination of Alternatives 1 and 7 the estimated total cost is slightly larger than Alternative 7 with a cost of $7,734,523. Although alternatives 1, 1A and 1B are lower in cost, they do not address the needed improvements to provide safety and operational needs demanded by existing and forecast fleet mix.

Present Worth Analysis

The economic analysis for the various alternatives detailed total cost, reduced to its "Present Worth" value. Present worth is defined as the initial investment necessary to procure the promise of future (20 year) payments required to achieve the desired development. Table VI-2 examines this evaluation of present worth and the associated costs in tabular form.

TABLE VI-2
ECONOMIC ANALYSIS
(PRESENT WORTH METHOD)

Description	Initial[1] Investment	Operating and Maintenance Cost[2]	Estimated Operating Income Annual[3]	Estimated Operating Income Present Worth	Salvage[4] Value	Estimated[5] Present Worth
Alternative 1	$1,673,075	$5,976,000	$436,000	$3,842,000	$8,846,500	($5,039,425)
Alternative 1A	$2,497,075	$5,976,000	$436,000	$3,842,000	$8,846,500	($4,215,425)
Alternative 1B	$3,230,185	$7,245,000	$484,000	$4,265,000	$8,846,500	($2,636,315)
Alternative 2A	$23,755,138	$7,768,800	$509,000	$4,485,000	$8,846,500	$18,192,438
Alternative 2C	$27,404,038	$7,768,800	$484,000	$4,265,000	$8,846,500	$22,061,338
Alternative 3A	$24,338,993	$6,872,000	$484,000	$4,265,000	$9,714,000	$17,231,993
Alternative 4A	$20,861,358	$6,872,000	$484,000	$4,265,000	$8,846,500	$14,621,858
Alternative 4C	$27,321,003	$7,768,800	$484,000	$4,265,000	$8,846,500	$21,978,303
Alternative 4E	$24,120,133	$6,872,000	$484,000	$4,265,000	$9,714,000	$17,013,133
Alternative 5	$29,585,178	$7,768,800	$484,000	$4,265,000	$8,846,500	$24,424,478
Alternative 6	$30,747,920	$6,815,500	$590,000	$4,199,000	$30,709,000	$2,655,420
Alternative 7	$15,320,008	$5,400,000	$590,000*	$5,199,000*	$30,709,000	($15,187,992)
Alternative 8	$16,578,083	$11,376,000	$590,000*	$5,199,000*	$8,846,500	$13,908,583

1 Initial investment equals the total development cost from Table VI-1.
2 Operating and Maintenance Cost for 20 years was estimated to equal $10,000,000. The Present Worth = Airport Operating/Maintenance Cost (Sinking Fund). x 0.5436.
3 Current actual operating income projected at 3 1/2% annually growth rate.
4 Salvage value was calculated based on comparable sales information and is equal to $107,000 per acre of land utilized for airport compatible development.
5 Estimated Present Worth = [Initial Investment + (Operating and Maintenance Cost - Present Worth of Operating Income)] - Salvage Value. Total Cost values in parentheses are negative values or net gain.
* Does not include current FBO's Income or Operating Cost. Potential additional income from current FBO's = $480,000.

A general test of financial feasibility of the various alternatives under consideration would be the ability of the airport owner/operator to cover the potential costs of development concepts. During the development of the Master Plan the University and Consultant considered several methods of economic analysis. These methods were a return on investment analysis, cost benefit analysis and the traditional viability of each alternative.

It would be very difficult to quantify all sources of revenues including tax accruals to show a point during a period of debt services when total revenues begin to match or exceed total outlays for each of the alternatives. A present worth analysis is thought to present the best scenario for assessing the economic viability of each alternative.

An overview of the Present Worth Method reveals distinctive economic variations among the alternatives. While Alternatives 1, 1A and 1B require only modest initial investment, all other alternatives except Alternative 7 require enormous upfront capital expenditures. In all probability the benefit would not justify the investment. Alternative 7, although having a higher cost than Alternatives 1, 1A and 1B initial expenditures appears to have the most promising economic advantages. As Table VI-2 indicates all alternatives require similar operating and maintenance expenses and have relatively equal potential operating incomes. Alternatives 6 and 7 enjoy particular advantages over the other alternatives because all airport services would be transferred to either a new or existing airport making the existing site available for other uses and thereby generating the highest salvage cost. Considering the high initial investment that Alternative 6 requires, more than double the amount required for Alternative 7, clearly makes Alternative 7 the best economic candidate. Additional economic advantages should be realized from cost savings in operating and maintenance expenses and from additional revenue sources currently realized at the airport. An evaluation of Alternative 8 upfront appears somewhat desirable, however it would place significant long term cost burden on the sponsor for supporting two airports with limited opportunity to redirect aviation investment.

Environmental Evaluation

This section will analyze the potential environmental effect of land acquisition, airport improvements and development of airport facilities at the Kent State University Airport, a new airport site and a surrogate airport. The examination is only intended as an overview of possible consequences which the short term (5 years) and long term (20 years) improvements may have on the associated environment. An environmental assessment report will be prepared for the recommended improvements as a stand alone document.

The finalized airport layout plan and the potential actions required for its ultimate implementation along with the "Airport Environmental Handbook" (FAA Order 5050.4A) will be the foundation for discussing the possible environmental effects. The information provided in the handbook and its format for evaluating potential improvement actions will aide in identifying both beneficial and adverse effects.

A brief examination of each of the applicable effect areas is completed to determine if there are causes for concern and whether the concerns may be significant.

Noise

The most noticeable environmental effect that an airport will have on a surrounding community is the sound emissions of aircraft operations. If the sound is sufficiently loud or frequent in occurrence, it may interfere with various other activities and be considered objectionable. To determine noise related impacts surrounding the Kent State University Airport, noise exposure patterns have been analyzed. Included in this analysis is an examination of existing operations, future operations, and ultimate restraint operations as they relate to noise levels. For this examination, three sets of noise contours have been developed: existing conditions (2003), future conditions (2013), and ultimate conditions (2023). Both future and ultimate scenarios include the effect of proposed build out and improvements. When reviewing the potential noise impacts reviewers should be aware that the Federal Aviation Administration Guidelines recognize noise levels of 65 DNL or greater as threshold of significance.

1. Noise Contour Development

The basic methodology employed to define aircraft noise involves the extensive use of a mathematical model for aircraft noise prediction. This model, the Federal Aviation Administration (FAA) Integrated Noise Model (INM) is the standard noise model used in the United States. Version 6.1 is the most current version of the INM. The use of a computerized overflight noise prediction model is necessitated in noise studies because the development of noise contours directly from field studies would require months of data collection at numerous measurement sites; a very impractical, extremely expensive, and less accurate method of evaluation. The INM is the only federally approved method of measuring and analyzing aircraft noise.

The Integrated Noise Model contains a data base that relates slant range distance and engine thrust to noise levels for each aircraft. On an irregular grid around the airport, the Model computes the associated noise exposure level for the specific aircraft and engine thrust used at that point along the flight track. The individual noise exposure levels are summed for each grid location. Equal noise levels are then indicated by a series of contour lines superimposed on a map of the airport and its environs. Although lines on a map tend to be viewed as definite, it should be emphasized that the model is only a planning tool. The model does not precisely define noise impacts. The day-night average sound level (Ldn) is used in this study to assess aircraft noise. Ldn is defined as the average A-weighted sound level, as measured in decibels, during a 24-hour period. A 10 decibel (dB) penalty is applied to noise events occurring at night (10:00 p.m. to 7:00 a.m.) Ldn is summation metric which allows objective analysis. Ldn is the approved metric by the FAA for aircraft noise evaluation.

Since noise spreads from a source at a consistent rate in all directions, equal Ldn noise levels are indicated by a series of contour lines superimposed on a map of the airport and its surrounding area. These levels are calculated for designed points on the ground from the weighted summation of the effects of all aircraft operations. The FAA recognizes the 65 DNL contour a level of significance and useful in:

- highlighting existing or potential incompatibility between an airport and its surrounding land uses
- assessing relative exposure levels
- assisting in the preparation of land use plans around the airport
- providing guidance in the development of land use control devices, such as zoning ordinances, subdivision regulations and building codes

2. *INM Program Input*

To use the Integrated Noise Model, a variety of user-supplied data is required. This data includes a definition of the airport, operations by aircraft type, flight tracks, runway use percents and prevailing winds, etc. The current Airport Layout Plan and portions of the current Airport Master Plan were source data for the noise analysis of Kent State University Airport.

Airport Layout Plan. The present Airport Layout Plan for Kent State University Airport shows an existing 4,000 foot long runway. Alternatives 2 through 5A show ultimate development plans and include the extension of the runway to a length of 4,420 feet.

Forecast Operations and Fleet Mix. Aircraft operations data and based fleet mix were derived from the current and historical aircraft registered logs kept by the University. The operations data for a typical day during a busy month was used in preparing the noise analysis. This information is presented in Table VII-1. For ultimate conditions in the years 2013 and 2023, two fleet mix arrangements were used. The projected operations were distributed evenly based upon a 10 year and 20 year forecast to define the conditions if development occurs.

Data Base Selection. Operations characteristics and noise data for all aircraft modeled were drawn from the INM data base. Single engine general aviation aircraft vary greatly in their operating characteristics and noise profiles. However, the data base has a model for representing a composite single engine aircraft which was used in the noise model. The twin engine piston and twin turbo-prop aircraft was represented in the model by the Cessna 421, Cessna 340, Piper Aztec, Piper Seneca and Beech Baron. For the corporate jet aircraft, the Citation II, Citation V, Citation VII, Beech King Air 90, 200, 350, Cessna 441 Conquest, and the Sabreliner 60 were used.

TABLE VI-3

Aircraft Fleet Mix and Daily Operations Summary
Kent State University Airport
Stow, Ohio

Type/Classification	2003 Existing	2013 Future With Development	2023 Ultimate with Development
AI - Single Engine	159	189	228
BI - Single Engine	4	7	10
BII - Twin Engine Piston & Turbo Prop.	2	3	4
CI - Twin Jet & Turbo Prop	0	0.5	1
CII - Corporate Jet	0	0	0
DI - Corporate Jet	0	0	0
DII - Corporate Jet	0	0	0
Total	**165**	**200**	**243**

Source: Kent State University Aircraft Register Log 1996 to 2002

Flight Tracks. The flight tracks represent the flight path used by arriving and departing aircraft. At larger airports, flight track information is obtained from radar tracking and supplemented by field observations. At airports with close-in sensitive receptors, precise flight tracking is important. However, at a general aviation airport, such as Kent State University Airport, where there are no large carrier or military aircraft exact flight tracking is less important.

Typically, general aviation flight plans consist of a combination of circling and straight-in approaches. However, due to the occurrence of heavy flight training at this facility, a third flight track was implemented. This flight is defined as a touch and go circuit with left hand turns and was applied to both Runway Ends 1 and 19. For the Kent State University Airport noise analysis, flight tracks were drawn based upon standard FAA flight operations. These flight tracks are depicted in Exhibit VI-50.

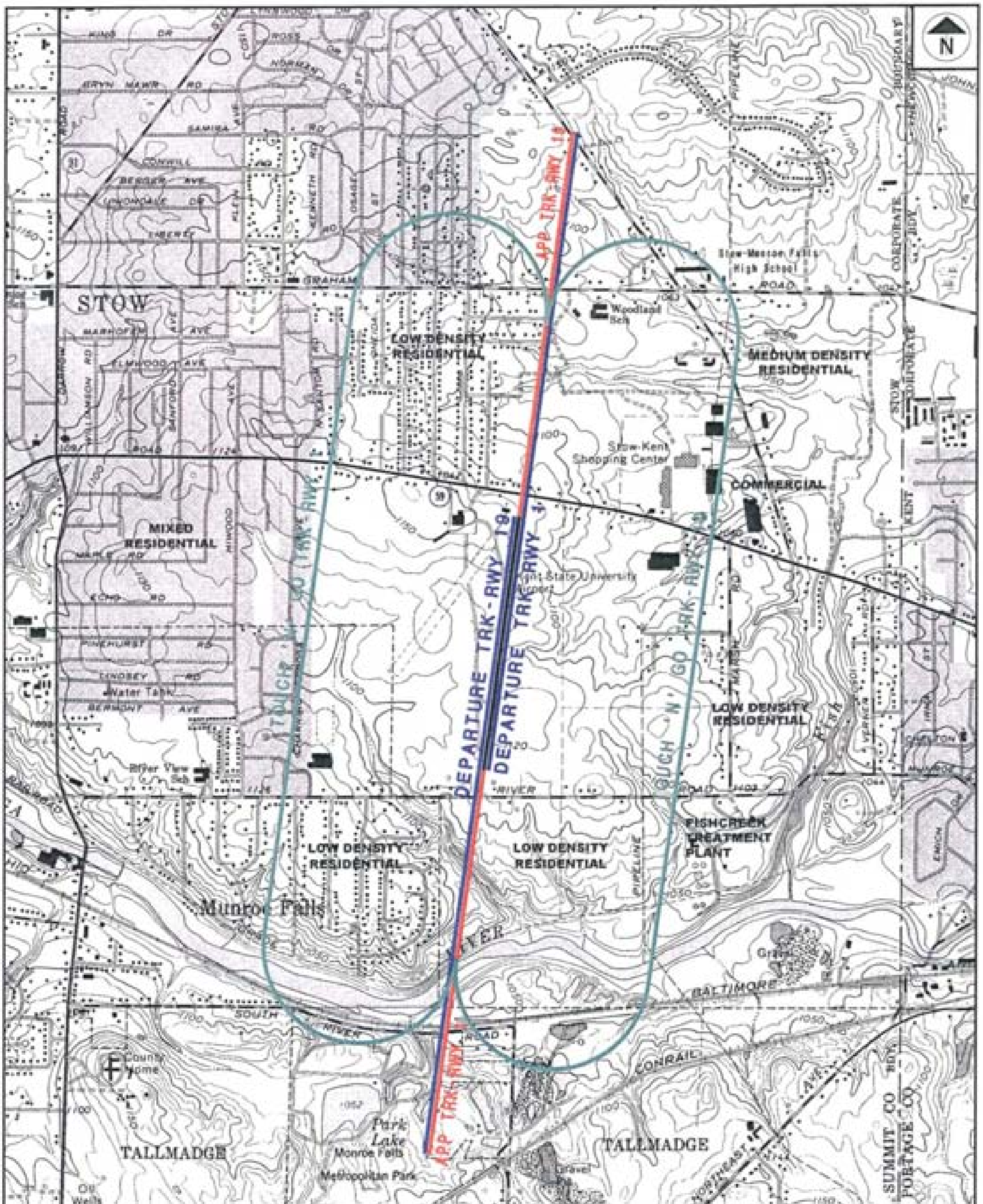
3. *INM Output*

Several methodologies are available for analyzing aircraft noise exposure impacts. Each has its own advantages and disadvantages in measuring the properties and response to aircraft noise. For master planning purposes the FAA has selected the day/night average levels as the standard for forecasting cumulative noise exposure. For each measure there are established levels or zones where aircraft noise ranges from clearly acceptable over residential property to clearly unacceptable levels. Table VI-4 depicts a Federal Aviation Administration Land Use Noise Guidance Chart for evaluating noise levels. Reviewers of Table VI-4 should be aware that the FAA does not recognize DNL below 65 as significant to warrant land use or noise controls.

Computer output files were prepared for the existing (2003) conditions, the future conditions (2013) with development and the ultimate (2023) with development. Contours representing Ldn 55, 60, 65, 70, 75 and 80 were prepared. The coordinates were plotted and connected by contour lines.

The lower level contour, Ldn 55, was developed for reference as clearly acceptable. The 55 to 65 dB range is generally defined as an acceptable level of noise. An average conversation at 3 feet, for example, is rated at 60 dB. In general, it is not until noise levels of Ldn 65 are experienced that land use becomes sensitive to noise. Ldn 65 is the threshold of significant noise impact as defined by the FAA.

Existing Noise Conditions (2003). The land area falling under the year 2003 noise level contours include 430.6 acres within the Ldn 55 contour, 148.0 acres within the Ldn 60 contour, 73.8 acres within the 65 Ldn contour, 28.6 acres within the Ldn 70 contour, and 2.8 acres within the Ldn 75 contour. While the Ldn 55 contour extends well beyond the airport boundary (particularly to the south), all significant noise levels as defined by Ldn 65 and higher are within the airport boundary. Several noise abatement procedures are currently in place to minimize the noise exposure to the surrounding community. These procedures include; no touch and go operation between 2200 and 0700 during the weekdays, aircraft should avoid nearby schools whenever possible. On departure aircraft should climb out at Vx to the airport boundary then reduce climb out to Vy, and departures from Runway 19 should climb out to airport boundary then turn 180˚ to the Cuyahoga River. Single event noise readings were taken and there are no known noise impacts that would fall inside or exceed the FAA recognized 65 DNL contour. The existing aircraft noise contours for Kent State University Airport are depicted on Exhibit VI-57.



INTEGRATED NOISE MODEL 6.0

KENT STATE UNIVERSITY FLIGHT TRACKS

0 1000 2000 HORIZONTAL SCALE IN FEET

TABLE VI-4
LAND USE GUIDANCE CHART I: AIRPORT NOISE INTERPOLATION

LAND USE GUIDANCE ZONES (LUG)	NOISE EXPOSURE CLASS	INPUTS: AIRCRAFT NOISE ESTIMATING METHODOLOGIES				HUD NOISE ASSESSMENT GUIDELINES	SUGGESTED NOISE CONTROLS
		LDN DAY-NIGHT AVG. SOUND LEVEL	NEF NOISE EXPOSURE FORECAST	CNR COMPOSITE NOISE RATING	CNEL COMMUNITY NOISE EQUIVALENT LEVEL		
A	Minimal Exposure	0 TO 55	0 TO 20	0 TO 90	0 TO 55	"Clearly Acceptable"	Normally Requires No Special Considerations
B	Moderate Exposure	55 TO 65	20 TO 30	90 TO 100	55 TO 65	"Normally Acceptable"	Land Use Controls Should Be Considered
C	Significant Exposure	65 TO 75	30 TO 40	100 TO 115	65 TO 75	"Normally Unacceptable"	Noise Easements, Land Use, and Other Compatibility Controls Recommended
D	Severe Exposure	75 & Higher	40 & Higher	115 & Higher	75 & Higher	"Clearly Unacceptable"	Containment Within Airport Boundary or Use of Positive Compatibility Controls Recommended

Future Noise Conditions With Development (2013). The activity levels at the Kent State University Airport will continue to increase even if the development and improvements of the airport are not accomplished. With the increased activity, noise levels will also increase from the existing conditions. The noise contours for the year 2013 are larger than the noise contours for 2003. The area within the Ldn 55 contour increases to include 539.7 acres. This contour extends well beyond the airport to the south and beyond State Route 59 (Kent Road) to the north. The Ldn 65 and higher levels in the immediate airport area extend slightly to the south and are contained within the airport property limits to the north. The area of the Ldn 65 contour increases by approximately 15 acres. Similar increases are experienced with the Ldn 70 and Ldn 75 areas. Ldn 80 contour shows a first time significant increase of 0.96. Exhibit VI-54 depicts the 2013 noise exposure contours with future operations and proposed development. There are no non-compatible land uses located in the 65 DNL noise contour and land outside airport property would not be impacted.

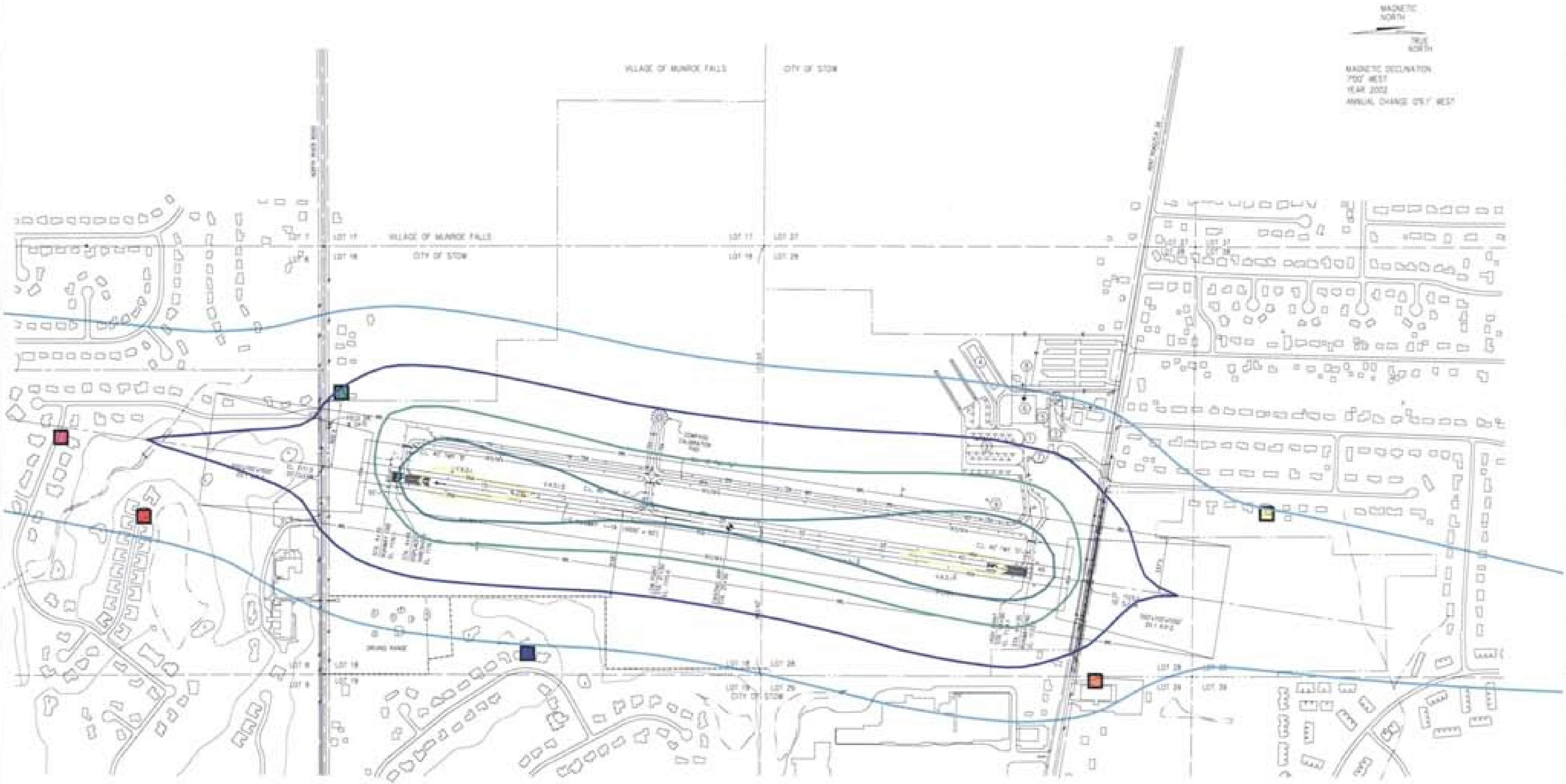
Ultimate Noise Conditions With Development (2023). For the proposed development, the level of activity would be depicted to show an ultimate 20 year projection. The differences in this condition are the projected increase in the number of operations by Kent State University Flight Training Program if enrollment was restrained. These differences result in an increase in the area within the various noise levels. The area within the Ldn 55 contour would increase to 656.4 acres, within the Ldn 65 contour to 99.2 acres, within the Ldn 70 to 45.7 acres, within the Ldn 75 contour to 8.6 acres, within the Ldn 80 contour to 1.6 acres, and the Ldn 85 contour would show a first time increase to include 0.02 acres. With the proposed purchase of the additional land for the runway extension and obstruction removal, all of the Ldn 65 and higher areas would be within the airport property. In noise sensitive areas, noise abatement procedures, property acquisition should be instituted in order to minimize the sound exposure experienced due to the increased operations. The noise contours for the ultimate conditions with development are shown in Exhibit VI-55. Currently one residential property located under runway approach surface end 19 would qualify for noise abatement.

The accompanying Sound Level Comparison Chart (Table VII-3) provides some representative sounds that occur at the various levels shown on the logarithmic decibel scale. The Chart also provides insight into the fact that there is a difference between the relative sound energy and the perceived loudness. In essence, the perceived loudness doubles for every increase of 10 decibels. For instance, if a person adjusts a stereo to 60 decibels as a comfortable and normal sound, a listener raising it to 70 decibels would perceive the sound as being twice as loud. Raising it to 80 decibels would make it four times louder than 60 decibels. Similarly, turning it down to 50 decibels would be perceived by the listener to be half as loud as the normal 60 decibels to which the listener was originally tuned.

TABLE VI-5
SOUND LEVEL COMPARISON

SOURCE OF SOUND	Sound Level dB(A)	Perceived Loudness	Relative Sound Energy
Threshold of Pain →			
Military Jet Takeoff @ 50 ft. →	------130------	------128-----	-----10,000,000-----
Turbofan Aircraft Takeoff @ 200 ft. →	------120------	------64------	-----1,000,000------
Rock Band →	------110------	------32------	------100,000------
Business Jets on Takeoff & Approach @ 300 ft. →	------100------	------16------	------10,000------
Motorcycle @ 25 ft. →	------90------	------8------	------1,000------
Busy Commercial Street →	------80------	------4------	------100------
Interior of Department Store →	------70------	------2------	------10------
Ordinary Conversation @ 3 ft. →	------60------	------1------	------1------
Quiet Auto @ Low Speed →	------50------	-----1/2------	------.1------
City Residential Dwelling Indoors →	------40------	------1/4-----	------.01------
Country Dwelling Indoors →	------30------	------1/8-----	------.001------
Rustle of Leaves →	------20------	-----1/16----	------.0001------
	------10------	-----1/32-----	-----.00001------
Threshold of Hearing →	------0------	-----1/64----	-----.000001-----

Source: Coffman, S. Aircraft Noise and Land Use Compatibility



EXISTING RUNWAY/TAXIWAY DATA	
	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBSTACLE FREE AREA WIDTH	500'
RUNWAY OBSTACLE FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	350'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	337'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'/316'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	250'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	63.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND		
NO.	DESCRIPTION	ELEV.
1	APRON AREA (150'x200')	1150±
2	TIE DOWN APRON (300'x350')	1145±
3	AUTO PARKING (250'x70')	1152±
4	T-HANGAR	1170
5	FBO/MAINTENANCE HANGAR	1180
6	CORP. HANGAR	1185
7	FUEL PAD (VENTS)	1155
8	AIRPORT BEACON	1199
9	WIND TEE	1145
10	MOBILE CLASSROOMS	1162

LEGEND

LOT LINE
EXISTING AIRPORT PROPERTY LINE
EXISTING RIGHT-OF-WAY
EXISTING RPZ
EXISTING CORPORATION LINE
EXISTING ELECTRIC LINE
EXISTING GAS LINE
EXISTING WATER LINE
EXISTING TELEPHONE LINE
EXISTING SANITARY LINE
WIND CONE
WIND TEE
LOT CORNER
SWALE
STORM SEWER/CATCH BASIN
POLE LINE
AIRPORT REFERENCE POINT (A.R.P.) LON: 81°24'54.207", LAT: 41°09'06.083"
AIRPORT BEACON
EXISTING FENCE LINE
EXISTING CONTOURS

Location Points Legend (In decibels)

- 56.4 Decibels
- [illegible] Decibels
- 60.4 Decibels
- 54.8 Decibels
- 58.2 Decibels
- 57.4 Decibels

Day - Night Noise Equivalent Contours Legend (In Acres)

80 - 0.0 Acres
[illegible]
70 - 28.6 Acres
65 - 73.8 Acres
60 - 148.0 Acres *
55 - 430.6 Acres *

* FAA DOES NOT RECOGNIZE ANY AREAS BELOW THE 65 DNL CONTOUR AS A LEVEL OF SIGNIFICANCE

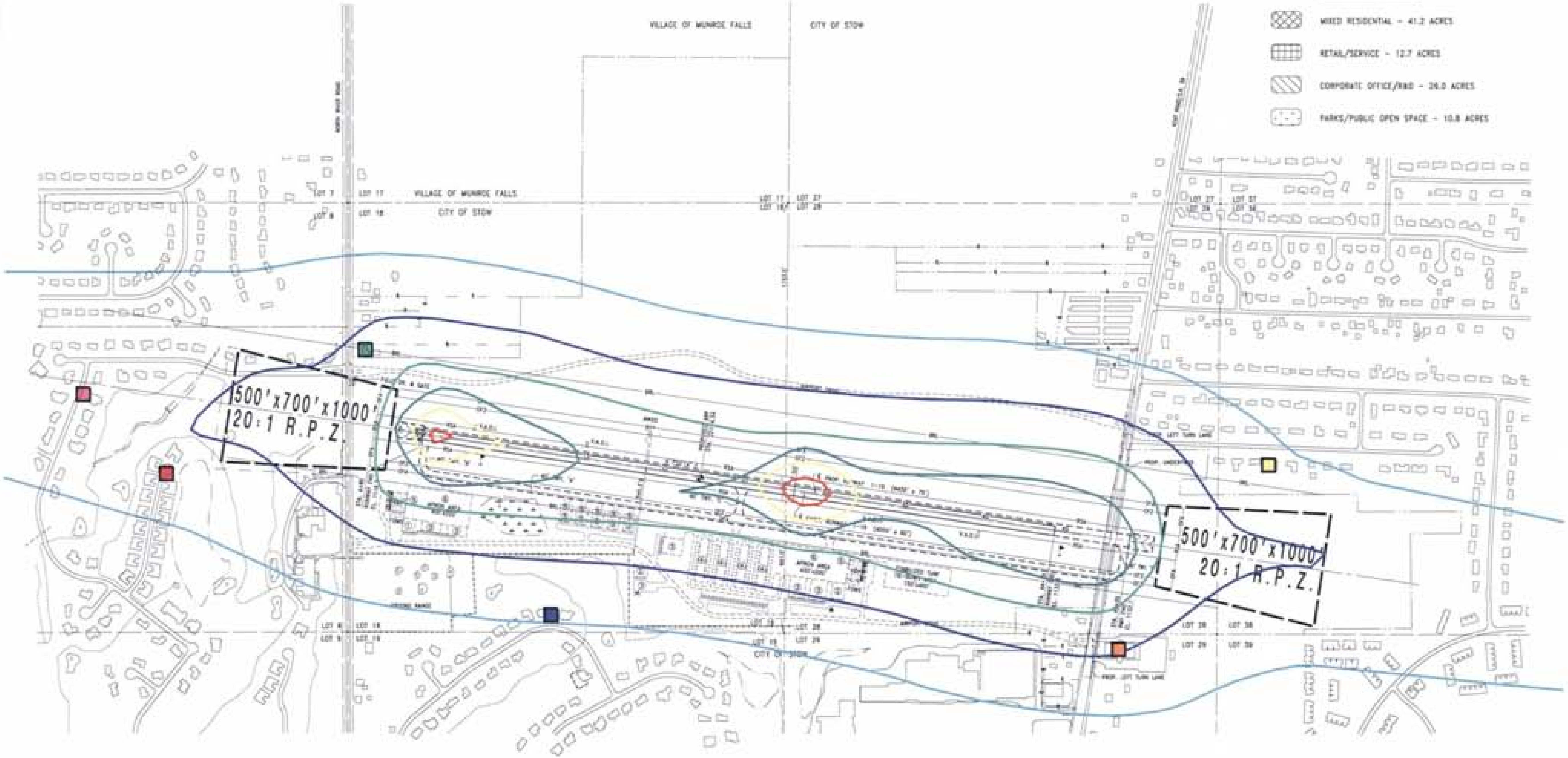
KENT STATE UNIVERSITY
KENT, OHIO

FAA SITE NO. 18081.*A

EXISTING DNL AIRPORT NOISE CONTOURS (2003)

VI-57

FUTURE DNL AIRPORT NOISE CONTOURS (2013)



PROPOSED LAND USE

- MIXED RESIDENTIAL - 41.2 ACRES
- RETAIL/SERVICE - 12.7 ACRES
- CORPORATE OFFICE/R&D - 36.0 ACRES
- PARKS/PUBLIC OPEN SPACE - 10.8 ACRES

PROPOSED RUNWAY/TAXIWAY DATA	
	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBJECT FREE AREA WIDTH	500'
RUNWAY OBJECT FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	460'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	344.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	257.5'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND		
NO.	DESCRIPTION	ELEV.
1	TERMINAL BUILDING	1180
2	MAINTENANCE HANGAR	1182
3	CONVENTIONAL HANGAR (5)	1145±
3	CONVENTIONAL HANGAR (5)	1150±
4	T-HANGAR (12-UNIT)	1132±
5	FUEL PAD	1110±
6	APRON AREA	1115±
7	DIESEL/GASOLINE TANKS	1118
8	AIRPORT BEACON	1175
9	AIRPORT WIND TEE	1145
10	AWOS IV	1155

LEGEND

- LOT LINE
- EXISTING AIRPORT PROPERTY LINE
- EXISTING AVIGATION EASEMENT
- PROPOSED AIRPORT PROPERTY LINE
- EXISTING RIGHT-OF-WAY
- FUTURE RPZ (500'x700'x1000')
- EXISTING CORPORATION LINE
- PROP. RWY & TWY EXTENSION AND WIDENING
- PROPOSED PAVEMENT AREAS
- PROPOSED BUILDINGS
- EXISTING DISPL. THRES. (TO BE REMOVED)
- PROPOSED UNDERPASS
- WIND CONE
- WIND TEE
- LOT CORNER
- STORM SEWER/CATCH BASIN
- AIRPORT REFERENCE POINT (A.R.P.) LON: 81°24'54.207"; LAT: 41°09'06.083"
- AIRPORT BEACON
- EXISTING FENCE LINE
- PROPOSED AWOS IV

Location Points Legend

- 58.2 Decibels
- [illegible]
- 60.1 Decibels
- 55.5 Decibels
- 61.8 Decibels
- 57.6 Decibels

Day - Night Noise Equivalent Contours Legend

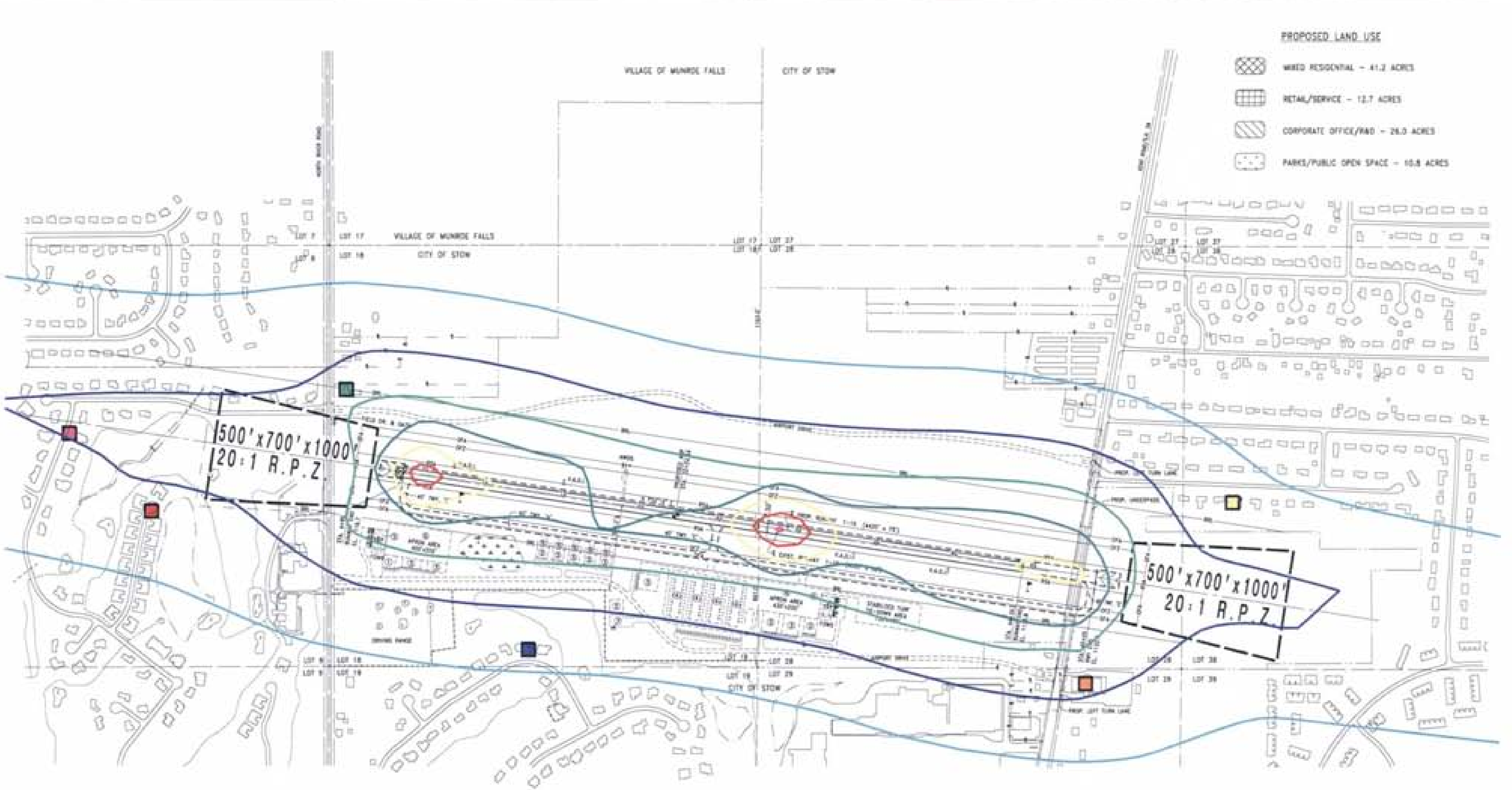
- 85 — - 0.0 Acres
- 80 — - 0.96 Acres
- [illegible]
- 70 — - 36.0 Acres
- 65 — - 88.8 Acres
- 60 — - 179.1 Acres *
- 55 — - 539.7 Acres *

* FAA DOES NOT RECOGNIZE ANY AREAS BELOW THE 65 DNL CONTOUR AS A LEVEL OF SIGNIFICANCE

FAA SITE NO. 18081.*A

KENT STATE UNIVERSITY
KENT, OHIO

XI-58



PROPOSED RUNWAY/TAXIWAY DATA	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	150'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBJECT FREE AREA WIDTH	500'
RUNWAY OBJECT FREE AREA LENGTH BEYOND RUNWAY END	300'
RUNWAY BUILDING RESTRICTION LINE	460'
RUNWAY BLAST PAD	95' x 150'
TAXIWAY EDGE SAFETY MARGIN	7.5'
TAXIWAY SHOULDER WIDTH	10'
TAXIWAY SAFETY AREA WIDTH	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'
TAXILANE OBJECT FREE AREA WIDTH	115'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	344.6'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	257.5'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	57.5'
TAXIWAY WINGTIP CLEARANCE	26'
TAXILANE WINGTIP CLEARANCE	18'

AIRPORT ITEM LEGEND

NO.	DESCRIPTION	ELEV.
1	TERMINAL BUILDING	1160
2	MAINTENANCE HANGAR	1162
3	CONVENTIONAL HANGAR (5)	1145±
3	CONVENTIONAL HANGAR (5)	1150±
4	T-HANGAR (12-UNIT)	1132±
5	FUEL PAD	1110±
6	APRON AREA	1115±
7	DIESEL/GASOLINE TANKS	1118
8	AIRPORT BEACON	1175
9	AIRPORT WIND TEE	1145
10	AWOS IV	1155

LEGEND

LOT LINE
EXISTING AIRPORT PROPERTY LINE
EXISTING AVIAGATION EASEMENT
PROPOSED AIRPORT PROPERTY LINE
EXISTING RIGHT-OF-WAY
FUTURE RPZ (500'x700'x1000')
EXISTING CORPORATION LINE
PROP. RWY & TWY EXTENSION AND WIDENING
PROPOSED PAVEMENT AREAS
PROPOSED BUILDINGS
EXISTING DISPL. THRES. (TO BE REMOVED)
PROPOSED UNDERPASS

WIND CONE
WIND TEE
LOT CORNER
STORM SEWER/CATCH BASIN
AIRPORT REFERENCE POINT (A.R.P.)
LON: 81°24'34.207"; LAT: 41°09'06.083"
AIRPORT BEACON
EXISTING FENCE LINE
PROPOSED AWOS IV

Location Points Legend

- 59.2 Decibels
- 64.8 Decibels
- 57.3 Decibels
- 63.1 Decibels
- 60.8 Decibels

Day - Night Noise Equivalent Contours Legend

85 - 0.02 Acres
80 - 1.6 Acres
70 - 45.7 Acres
65 - 99.23 Acres
60 - 213.5 Acres *
55 - 656.4 Acres *

* FAA DOES NOT RECOGNIZE ANY AREAS BELOW THE 65 DNL CONTOUR AS A LEVEL OF SIGNIFICANCE

ULTIMATE DNL AIRPORT NOISE CONTOURS (2023)

FAA SITE NO. 18081.*A

KENT STATE UNIVERSITY
KENT, OHIO

XI-59

Compatible Land Use

Maintaining compatibility between the airport and its surroundings is the primary objective of contemporary land use planning. Changes in urban living patterns and transportation preferences have generated a new interest with the land utilization around airports. Land use patterns inconsistent with an airport environment sometimes constrain the growth of airport facilities necessary to support increased demand. At the same time, aircraft noise may interfere with the normal daily activities of residents located in the areas of airport operations and safety concerns may arise from communities located in the approach and departure path of aircraft. Finally, great importance should be placed in the protection of private and public investments in facilities for which there is no feasible or prudent replacement.

The current airport site has seven different types and several densities of landuse encircling the Kent State University airport property. To the north of the airport is low and medium residential along with Woodland Elementary School. To the east is a mixture of medium density residential, retail/service, low density residential and private open space. To the south boundary is low and medium density residential along with private open space. Adjacent to the airport on the west is primarily low density and mixed residential, a small area of office/limited industrial and Kimpton Junior High School.

Alternative 6 which explores constructing a new airport site focuses in on the Township of Edinburg located in Portage County. Land use in this area is primarily residential, although several areas northeast around Interstate 76 and State Route 14 Interchange of the proposed site are zoned commercial. Along with commercial zoning one small allotment of industrial area is identified approximately 5.8 miles southwest. Edinburg Township landuse/zoning is attached to the Appendix for a graphical representation.

The final alternative for transferring services investigates a nearby airport with sufficient potential for meeting the goals and objectives of the master plan as listed on page I-2 of this study. The perceived airport land use consists primarily of light industrial with areas of agriculture and rural residences. An applicable County and Township "Zoning District Map" is included in the Appendix for additional clarification.

As discussed previously, compatible landuse is essential in the master plan process. Generally landuse categories are described by the letter reference shown in Table VI-4. A further breakdown of these areas are as follows:

- Residential = Categories A to B
- Educational = Categories A to B
- Retail/Service = Categories B to C
- Public Open Space = Categories A to C
- Agricultural = Categories C to D
- Industrial = Categories C to D

From this landuse guidance, it is apparent that the most noise sensitive areas are residential and educational both rated between "A" and "B". Likewise, the least sensitive noise areas are agricultural and industrial which are rated between "C" and "D". A summary review of potential noise impacts if any of the alternatives were selected indicates that very little if any private property or public noise sensitive areas would be subjected to noise greater than the FAA recognized 65 DNL contour.

Social Impacts

The principal impacts to be considered are those associated with property acquisition, family relocation, or other community disruptions that may be caused by a proposed development.

Adjacent property values may be impacted as a result of alternatives two through seven. Currently there are no industry standards or techniques available to assess property value impact regarding highest and best use of adjacent developed or vacant land not acquired for airport improvement. In all public meetings, it should be noted, that adjacent property owners and local elected officials strongly voiced their opinion that any airport expansion or increased activity would negatively impact respective property values and this in turn would trigger a lower assessed value for property tax purposes.

The consultant has reviewed master plans that have been prepared over the last twenty years and concludes that there is no convincing evidence that improvements made on small general aviation airports have a significant impact on property values. Improvements recommended for feasible alternatives shown on Table VI-1 will require landside and airside facilities upgrade that are normally considered small or insignificant. Excepting from that conclusion Alternative No. 6. This alternative would be located on a new site currently not developed and sparsely populated. Only two occupied properties would be directly impacted as a result of airport development on that site. Land values of the selected alternative will be addressed in greater detail during the environmental assessment process. In the event that the environmental assessment discovers a significant impact to land values because of the proposed improvement a separate socioeconomic impact study would be initiated. FAA Order 5050-4A Chapter 8 addresses the particulars of the study. In addition any improvements that require or impact property will demand compliance with **Section 47105(d) of the Federal Aviation Administration Act of 1994** including the **Uniform Relocation Assistance and Real Property Policies Act of 1970**, as amended.

Induced Socioeconomic Impacts

For an airport development proposal, there is a potential for induced or secondary impacts on surrounding communities. These impacts include shifts in development patterns or population movements and growth, public service demands, and changes in business and economic activity.

The direct socioeconomic impacts resulting from the potential improvements would primarily depend on the alternative selected for ultimate development. Implementing any one of the Alternative Numbers 1, 1A or 1B would limit the improvements within areas presently unoccupied by any residential or commercial activities. The area is open land and has been mostly cleared of obstructions to permit aircraft to operate in relative safety. In all of the above alternatives the runway safety areas, object free areas and runway protection zones would not physically affect any dwelling units. No structures would penetrate or encroach into any of the air operation safety areas or zones. No shift in patterns of population movement, population growth, public service demand is anticipated. Several of the Alternatives, including the "Do Nothing" have potential for inducing significant economic activities. Significant increases in economic activities, normally affects other issues such as noise, light emission, land use which then create direct social impacts. Alternative Numbers 2, 3, 4, and 5 would directly impact well established neighborhoods by varying degrees. Alternative 4A and 4E would require removal of two single unit dwellings and one double town house. Alternatives 4B and 4D would require acquisition and removal of eleven single unit dwellings and eleven 4-unit townhouses. While removing trees, dwelling units and relocating the occupants may be significant, any one of the remaining alternatives would require more extensive land acquisition and relocation assistance that would greatly affect three existing and adjoining residential neighborhoods. Realignment of streets and appurtenances is possible to reduce overall impacts. The potential induced impacts in other categories would require a more thorough analysis in an Environmental Assessment Study.

The induced socioeconomic impacts, depending on the alternative and intensity of development could be significant and quite distinguishable from the existing conditions. For example should any of the above Alternatives, other than the "Do Nothing" be selected and the non-obligated airport land developed to its highest and best use the potential impact would be noticed in expanded commercial activities and the associated increases in vehicular traffic, noise and hydrocarbon emissions. The potential Alternatives that feature extended runway 1-19 and improved approach minimums would also allow for larger aircraft flying extended destination lengths to use the airport. While this could be considered a positive economic impact, it may not be a desirable benefit when compared with the present or "Do Nothing" land use. Public awareness and input showed active opposition to airport related issues and development on the existing site. Aircraft noise, safety, possible forced relocation of homes and business including the potential for reduced property values and associated diminished tax revenues were the main issues against developments or remaining at the existing site. It will be extremely difficult to convince an unreceptive public that alternatives 1 through 6 are in the best interest of the affected communities and therefore should not be accepted for further consideration. The public has strong economic, social, and environmental arguments in support of their position.

Input from the public, local officials and from the sponsors prepared scope of services required consideration of potential sites offsite from the existing site. During the master plan development process it became evident that the existing site could not accommodate aviation demand without expanded existing facilities. Offsite alternatives 6, 7, and 8 could in various degrees meet the forecast demand.

Implementation of Alternatives Number 6, 7 or 8 would not diminish the development potential of the existing site. Land value of the existing airport land in all cases is based on its highest and best use. Current tax revenues have been estimated at $27,800 annually. Developing non-obligated airport land or the entire airport property has a potential to generate up to 100 times the current amount in local and state taxes. Potential revenues from light industrial or commercial activities could generate income, sales and personal property taxes ranging from $1,412,000 to $2,824,000 annually. Transferring portions of the existing air operations or all airport activities to a new site or to a nearby existing airport would make Summit and Portage Counties more accessible to business with less disruption to the existing immediate social, economic and environmental conditions. While this could be considered a positive affect the overall impact would be difficult to quantify. The obvious socioeconomic impacts that would occur as a result of locating some or all the airport operations to other sites would be jobs and income associated with the construction and operation of improvements near the potential sites. Impacts to existing social structures would be minimal in comparison to using the existing site.

Air Quality

Section 176(c) of the **"Clean Air Act Amendments of 1977"** states in part that no federal agency shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity that does not conform to a state implementation plan. The FAA has established criteria for determining if an air quality analysis is needed. FAA Order 5050.4A, **Airport Environmental Handbook**, sets a threshold for this requirement for general aviation airports of 180,000 forecast annual operations. In Chapter III the annual forecast operations for the planning year 2023, did not exceed 85,640 for restraint operations and 123,600 for demand driven operations. With this information it can be concluded that the planned improvements would have no appreciable adverse effect to federal minimum air quality standards.

Water Quality

The Federal Water Pollution Control Act, as amended by the **"Clean Water Act of 1977"** established water quality standards. Chapter II addressed in detail the surface and subsurface airport drainage facilities and discharge controls. Airport drainage is primarily surface drainage and is considered adequate. Storm water runoff from the runways, taxiways, apron areas including hangars is collected in a series of very flat swales and ditches. The storm water outfall ditches are relatively deep and have been constructed at minimum slope. The ditches, when properly maintained, serve as storm water detention basins and as such are controlling peak flows into existing Fish Creek and Cuyahoga River.

The planned runway widening, lengthening, additional apron area, roof areas, access road and paved auto parking will increase the rate and volume of storm water runoff. Downstream flooding and other adverse water quality effects could be minimized or avoided by continued and expanded use of the existing detention ditch system. Drainage design criteria and discharge of storm water into Fish Creek and the Cuyahoga River will require coordination with Soil Conservation officials, Ohio EPA, Fish and Wild Life, Summit County Engineer and possibly the Army Corps of Engineers.

In the vicinity of aircraft parking and service areas where fuel, lubricant spills, deicing runoff, and aircraft related wastes could be or are generated the use of special protection, retention and disposal techniques is recommended. To avoid introduction of contaminants into the surface and ground water system, special fuel and oil interceptors should be employed. Fuel and dispensing equipment will require fuel leak monitoring and repair, rehabilitation or replacement in compliance with applicable regulations. Erosion and siltation control measures should also be specified for grading and construction areas. Such measures would minimize any adverse effects to local water quality.

Department of Transportation, Section 4(f)

The Secretary of Transportation, under provision of Section 4(f) of the **Department of Transportation Act,** "will not approve any program or project which requires the use of any publicly owned land from a public park, recreation area, or wildlife and water foul refuge or national, state, or local significance as determined by the officials having jurisdiction thereof unless there is no feasible and prudent alternative to the use of such land and such program or project included all possible planning to minimize harm resulting from the use."

Although there are a number of parks and recreation areas in Summit County and Portage Counties, none are in the immediate area of the airport and the proposed development will have no direct or indirect impact on any of these areas.

Historic, Architectural, Archaeological, and Cultural Resources

The planned development must comply with two basic laws. The first law is the **National Historic Preservation Act of 1966**, as amended, and the second law is the **Archaeological and Historic Preservation Act of 1974**. In either case a review of Ohio Historic Preservation Office (OHPO) data files indicates that no historic properties or sites included in or eligible for listing in the National Register of Historic Places have been identified. Archaeological sites of prehistoric or cultural significance were also investigated and none were identified.

Biotic Communities

The planned development would not take or affect a publicly owned wildlife or waterfowl refuge. However development actions may affect endangered or threatened species under the **Endangered Species Act**, and may affect water resources. Special threshold evaluations may need to be implemented as described in FAA Order 5050.4A paragraph 47.

The planned improvements will require a considerable amount of habitat, much if not all of the affected development areas are either wooded, residential or other man-made commercial conversions. Changes to habitat will mostly be limited to grading and some minor tree and brush removal. Should any wildlife be affected by the improvements or expansion there are ample habitat areas available for relocation. In all cases, coordination letters with the Fish and Wildlife Service would resolve any concerns.

Endangered and Threatened Species of Flora and Fauna

Section 7 of the Endangered Species Act as amended requires each Federal agency to insure that any action authorized, funded, or carried out is not likely to jeopardize the continued existence of any endangered or threatened species.

The procedure to be followed to determine impacts on endangered or threatened species and on critical habitat would be to contact Ohio Department of Natural Resources (ODNR) Division of Natural Areas and Preserves for minor actions; or the U.S. Fish and Wildlife Services for major actions. The environmental assessment will address this concern by initiating a field review of the improvement areas.

Wetlands

Executive Order 11990, **Protection of Wetlands**, defines wetlands as "those areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, and natural ponds."

The proposed development alternatives 2 through 5 would consist of the ultimate lengthening and widening of Runway 1-19 from its current 4,000 feet x 60 feet to 4,420 feet x 75 feet including the extension of a parallel 40 foot wide taxiway. The runway extensions would not affect the existing wetlands which measures approximately 1.74 acres. It is not anticipated that a Section 402 permit would be required for these alternatives. Alternative 6 however, would include a large amount of wetland and stream mitigation during construction. Included with this alternative would be a Section 402 Permit, wetland mitigation/monitoring and a variety of other jurisdictional agency coordination and approvals.

Transferring services to an airport in the vicinity (Alternative7), proposes lengthening of a runway by 920 feet, while the runway extension does include road relocation, it would not impact existing wetlands in the proposed area of development. Additional wetlands concerns outlined in Executive Order 11990 may be resolved by coordination letters with the U.S. Soil Conservation Service including the Fish and Wildlife Service.

Floodplains

Executive Order 11988, **Floodplain Management,** defines floodplains as "the lowland and relatively flat area adjoining inland and coastal waters including flood prone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year (i.e. the area that would be inundated by a 100 year flood)."

The planned improvement areas have been evaluated with the Federal Insurance Administration Flood Hazard Boundary Maps. The proposed improvement alternatives are not within the flood hazard zone boundaries and would not be subject to flooding from a 100 year flood. Every effort would also be made during design and construction of the improvements to minimize potential risks to human safety and property damage including any adverse impacts to natural and beneficial floodplains.

Coastal Zone Management Program

Detailed procedures for determining the improvements consistency with approved coastal zone management programs are contained in the National Oceanic and Atmospheric Administration (NOAA) Regulations.

The Kent State University Airport master plan alternatives, however, are not located near any designated coastal zones and the NOAA Regulations are subsequently not applicable to the proposed actions.

Coastal Barriers

The **Coastal Barriers Resources Act of 1982**, PL97-348 (CBRA), prohibits, with some exceptions, Federal financial assistance for development within the Coastal Barriers Resources System which consists of undeveloped coastal barriers along the Atlantic and Gulf Coasts.

The Kent State University Airport master plan alternatives are not located near any designated Coastal Barriers therefore the Coastal Barriers Resources Act is not applicable to the planned development.

Wild and Scenic Rivers

The **Wild and Scenic Rivers Act** (PL90-542 as amended) describes those river areas eligible to be included in a system afforded protection under the Act as free flowing and possessing "outstanding remarkable scenic, recreational, geological, fish and wildlife, historic, cultural or other similar values".

The waterways which would be directly affected by the planned alternatives are Fish Creek, the Cuyahoga River, Willow Creek, Deer Creek and the Mahoning River. These rivers do not appear to be protected by the Wild and Scenic Rivers Act. The environmental assessment will contact the Department of Interior and check the proposed development for compliance with PL90-542.

Farmland

The **Farmland Protection Policy Act** (FPPA), PL97-98 authorizes the Department of Agriculture (USDA) to develop criteria for identifying the effects of Federal programs on the conversion of farmland to non-agricultural uses. The Act primarily protects prime and unique farmland i.e. farmland required for production of specific high value food and fiber crops.

The significance of converting agricultural lands to non-agricultural use will be determined by the Department of Agriculture. Coordination of that effort will be done during the preparation of the environmental assessment. However, due to the lack of agricultural land on the existing site, adverse effects are not expected for alternatives 1 through 5. Alternative 6, developing the airport on a new site, would include the use of several areas of farmland to accommodate the new airport site. A great deal of effort would be expended in this alternative to reduce the amount of farmland inundated. In addition to this option, Alternative 7 also includes a small amount of farmland for acquisition. This farmland purchase does not require airport facilities development but would be needed for approach surface protection.

Energy Supply and Natural Resources

Energy requirements which would be directly affected by the planned actions are:

- those related to changed demands for stationary facilities such as airfield lighting and terminal building heating.

- those which involve movement of aircraft and ground vehicles.

The proposed alternatives would not require significant increases in lighting and heating energy which would effect local supplies. No major increases in fuel consumption by aircraft and ground vehicles is anticipated. Also, no unusual materials or natural resources which may be in short supply would be needed for implementation of the proposed improvements.

Light Emissions

FAA Order 5050.4A requests the Kent State University to consider the extent to which any lighting associated with the planned development would create an annoyance among people living in the vicinity of the installation.

The Kent State University Airport's ultimate airfield lighting would be medium intensity runway and taxiway lighting for Runway 1-19. Runway 1-19 is equipped with runway end identification lights and visual approach slope indicators. During the planning period this system would require rehabilitation due to the advanced age of the system. This rehabilitation would require relocating and extending the existing lighting facilities on approach end 1 to match the runway extension scenarios. The nearest residence (single family residence east of the runway) would be located approximately 1,260 feet from Runway End 19 and the annoyance from light emission should be negligible. On runway end 1 the nearest occupied building subjected to light emissions is located 800 feet from the approach end. Special baffling or shielding may be necessary to reduce annoyance due to light emissions.

The new airport site (Alternative 6) would also require MITL, MIRL and associated NAVAIDS similar to the existing airport. The proposed lighting system would factor in all nearby residences and plan for the appropriate siting and clearance requirements.

Due to the underdeveloped area around the airport outlined in Alternative 7, lighting emissions from the proposed improvements should not negatively affect surrounding residents. The nearest residence to the emissions from Alternative 7 would be located approximately 1,100 feet from the proposed runway and currently has a treeline barrier around the property.

Solid Waste Impacts

Airport actions that relate only to airfield development (Safety Area Grading, Runways, Taxiways, and Related Items) do not normally include any direct relationship to solid waste collection, control, or disposal other than that associated with the construction itself. Terminal area development may involve circumstances which require consideration of solid waste impacts. Additionally, FAA Order 5200.5, **FAA Guidance concerning Sanitary Landfills of Solid Waste Impacts**, states that "sanitary landfills will be considered as an incompatible land use" if located within 1,500 meters (approx. 5,000 feet) of all runways planned to be used for all piston type aircraft and within 3,000 meters (approx. 10,000 feet) of all runways planned to be used by turbojets.

The planned alternatives including: the existing site, new site, and surrogate airport site are not expected to leave any effect to solid waste collection, control, or disposal. The development of the existing terminal area site would involve demolition of existing structures and disposal of degradable and non-degradable debris. (Wood concrete and metals are readily recyclable. Glass and asphaltic material would require an insignificant amount of landfill space for proper disposal.) Currently no evidence has been encountered which would suggest the existence of hazardous waste.

Construction Impacts

During the various stages of construction, the environment would be effected by noise from construction equipment and dust from grading operations and delivery of materials; possibly some minor air pollution from permitted burning may result. In general, adverse effects during construction are expected to be minimal to considerable. Temporary roadways and detours would be necessary around construction activities and severe inconvenience due to traffic delays may be realized during peak hour traffic. The incorporation of the FAA Advisory Circular 150/5370-10A Standards for Specifying Construction of Airports would assure that Item P-156 Temporary Air and Water Pollution, Soil Erosion and Siltation Control measures are employed. Any material generated or located at the airport during construction which cannot be recycled or incorporated into the construction would require disposal at the Summit or Portage County Landfill. The landfill is permitted to accept and dispose of materials normally encountered or generated by heavy construction and demolition.

Hazardous Waste

In recent years, hazardous waste and associated problems with improper disposal of hazardous materials has become an issue which has received much attention. The **Resource Conservation and Recovery Act of 1976 (RCRA)** established the regulation of hazardous waste and related activities that include hazardous waste generators, transporters, treatment, storage, and disposal facilities. The Ohio Environmental Protection Agency (Ohio EPA) has been delegated the authority to implement the Federal RCRA Program of Ohio.

An interview conducted with the Kent State University Transportation personnel and airport manger including operations and maintenance personnel revealed no evidence or suspicion of the presence of toxic waste material. During the preparation of the environmental assessment, a more detailed investigation which would comply with Ohio Department of Transportation Guidelines for a Phase I Environmental Site Assessment would be done.

Summary of Alternatives

Pros and Cons

Alternative #1

Pros
- Lower Cost
- Airspace impacts are minimal
- Environmental factors are not affected
- No family or business relocation
- Allows current unused land for development
- No adverse environmental impacts from development
- Good accessibility
- Available land for development

Cons
- Lack of suitable airside development area (approach surfaces and runway protection zones)
- Noise levels will continue to grow
- Public acceptance/community development
- Prevents future growth in air operations
- Facilities need rehabilitation
- Runway safety areas fail to meet federal standards
- Useable runway is 3,950 feet, with one displaced threshold to provide adequate road clearance
- Insufficient parking
- Surrounding landuse zoned residential
- Crosswind runway is not feasible with surrounding landuse
- Does not meet forecast demand
- Highest best use of land
- Limits general aviation activity including flight training

Alternative #1A

Pros
- Lower cost
- Airspace impacts are minimal
- Lack of adverse affects to environment
- No family of business relocations
- Allows current unused land for development
- Good accessibility
- Meets AI Design Standards without loss in runway length (3,950 feet)
- Provides increased safety

Cons
- Lack of suitable airside development area
- Noise levels will continue to escalate
- Prevents growth of based aircraft and operations
- Facilities require rehabilitation
- Insufficient parking area
- Surrounding landuse incompatible with airport activity
- Retaining wall required for runway 19 end
- Public acceptance/community development
- Crosswind runway is not feasible
- Does not meet forecast demand
- Highest best use of land
- Limits general aviation activity including flight training

Alternative #1B

Pros
- Lower cost
- Meet AII design standards
- Provides increased safety
- Allows current unused land for development
- Wind coverage is acceptable at 94.89%
- 75 foot wide runway
- No adverse environmental impacts from development
- Good accessibility

Cons
- Noise levels will continue to grow
- Restricts BII traffic due to 3,950 foot runway length
- Retaining wall will be needed for runway end 19
- Lack of facilities
- Public acceptance
- Insufficient parking
- Surrounding landuse zoned residential
- Does not meet forecast demand
- Highest and best use of land
- Limits general aviation activity including flight training

Alternative #2A

Pros
- 4,420 feet of useable runway
- Satisfies demand of BII aircraft
- Develops new facilities
- Allows current unused land for development
- Increases based aircraft by providing facilities
- Increases safety
- Airspace impacts are minimal
- Increased economic benefits
- Wind coverage is acceptable at 94.89%
- Runway width increased to 75 feet
- Good accessibility

Cons
- Higher cost
- Family and business relocations
- Adverse environmental impacts from runway extension
- Road relocation to clear object free area
- Generates significant public opposition
- Large amount of land acquisition
- Surrounding landuse zoned residential

Alternative #2C

Pros
- 4,420 feet of useable runway
- Satisfies demand for BII critical aircraft
- Develops new facilities
- Allows current unused land for development
- Increases based aircraft and operations by providing facilities
- Increases safety
- Airspace impacts are minimal
- Increases safety
- Increased economic benefits
- Wind coverage is acceptable at 94.89%
- Runway width increased to 75 feet
- Good accessibility

Cons
- High cost
- Family and business relocations
- Adverse environmental impacts from runway extension
- Road relocation to clear object free area
- No public support, likely to provoke public opposition or contumacy
- Large amount of land acquisition, 66 acres
- Surrounding landuse zoned residential
- Relocation disrupts surface transportation
- More land required than Alternative 2A

Alternative #3A

Pros
- High cost
- Maximizes land utilization
- New facilities
- Satisfies demand projected
- Increased safety
- Good accessibility
- Meets BII design standards
- Allows current unused land for development

Cons
- Higher cost
- Family and business relocations
- Adverse environmental impacts from runway extension
- Road relocation to clear object free area
- Negative public acceptance
- Large amount of land acquisition
- Surrounding landuse zoned residential
- Major roadwork

Alternative #4A

Pros
- Meets BII design requirements
- 4,420 feet of usable runway
- 75 feet runway width
- New facilities
- Accessibility is good
- Available utilities

Cons - Major four lane road relocation
- Negative public acceptance
- High cost
- Environmental impacts from development
- Surrounding landuse zoned residential

Alternative #4B

Pros - Meets BII design requirements
- 4,420 feet of usable runway
- 75 feet runway width
- Lower approach minimums
- New facilities
- Good accessibility
- Available utilities

Cons - Major four lane road relocation (tunneling)
- High cost
- No public support
- Environmental impacts from development
- Major land acquisition
- Relocation assistance
- Obstruction removal

Alternative #4C

Pros - Meets BII design requirements
- 4,420 feet of usable runway
- 75 feet runway width
- New facilities
- Community economic benefits
- Accessibility is good
- Available utilities
- Wind coverage is acceptable at 94.89%

Cons - Major four lane road relocation
- Negative public acceptance
- Environmental impacts from development
- Surrounding landuse zoned residential
- Increased land acquisition
- High cost
- Family relocations
- Obstruction removal
- Substantial land acquisition for roadway

Alternative #4E

Pros - Meets BII standards
- 4,420 feet of useable runway
- 75 feet runway width
- New facilities
- Reduced land acquisition
- Good accessibility
- Available utilities
- Allows current unused land for development

Cons
- Major four lane road relocation
- Negative public acceptance
- Surrounding land use zoned residential
- High cost
- Environmental impacts from development
- Facility relocation

Alternative #5

Pros
- Meets BII design requirements
- 4,420 feet of usable runway
- 75 feet runway width
- New facilities
- Minimal land acquisition
- Community economic benefits
- Accessibility is good
- Available utilities
- Wind coverage is acceptable at 94.89%

Cons
- High cost
- Two major road relocations
- Negative public/community acceptance
- Land acquisition required for south development
- Environmental impacts from development
- Family relocations
- Obstruction removal
- Surrounding landuse conflicts

Alternative #6

Pros
- Ultimate build-out feasible
- Meets BII standards
- 4,420 feet of useable runway
- Potential for future runway extension
- New facilities
- Airspace impacts - relieves CAK and AKR and YNG
- Good Interstate Access
- Wind coverage
- Lower minimums potential NPI (Non-Precision Instrument) approach
- Can meet CII standards
- Direct access to interstate system
- Potential air freight
- Potential passenger service
- Lower land cost

Cons
- Driving distance to users from Stow, Munroe Falls and Tallmadge area would be longer
- Utilities
- Potential environmental impacts - stream relocation/wetland mitigation
- Land acquisition
- Alters surface transportation/origin to destination traffic pattern
- High cost
- Soil conditions
- Suitability of crosswind runway
- Family relocations
- Obstruction removal

- Removal of farmland from crop production
- Major earthwork
- Surrounding landuse zoned residential

Alternative #7

Pros
- No medium or high density residential
- New facilities
- Meets BII standards
- At least 4,420 feet of useable runway to satisfy BII Design Standards
- Existing utilities
- Compatible adjacent landuse
- Lower cost
- Existing runway width that is equal to or greater than the required 75 feet
- Lower approach minimums, potential NPI approach
- Can meet CII standards
- Potential air freight
- Potential passenger service
- Direct access to interstate system
- Existing airport authority in place or governed by Airport Commission

Cons
- Additional preplanning activities
- Cooperative legislation
- Unknown environmental issues
- Added road trip length from KSU Bus Garage
- Added driving time from KSU Bus Garage

Alternative #8

Pros
- Airspace impacts are minimal
- Environmental impacts are reduced.
- No family or business relocations
- Good accessibility
- Minimal land acquisition
- Ultimate build-out feasible without development on existing site
- Airport closure not required
- Community/public acceptance
- Minimizes noise levels on the existing site by restricting BII aircraft reducing or eliminating BII operations
- Area economic activity
- Restricts future growth in operations on existing site

Cons
- Obstruction removal
- Incompatible landuse around existing site
- Unknown environmental conditions on nearby sites
- Cooperative legislation
- Highest and best use of land on existing site
- Operations at two locations
- Higher cost
- Cost for Capital Improvements
- Maintenance of two facilities

CHAPTER VII

AIRPORT LAYOUT PLAN

The inventory, demand forecasts, facility requirements, development concepts, and environmental overview provided the synthesis for landside and airside development concepts. Development concepts coupled with the Federal Aviation Administration minimum design standards are the basic criteria necessary to develop a complete ALP. The creation of the ALP's is conceptual only and does not include design plans, architectural drawings, grading, drainage details, pavement design, pavement sections, final profile grades, pavement elevations, or detailed calculations.

This Master Plan Study has developed an Airport Layout Plan (ALP) consisting of 8 drawings, which graphically display existing, future, and ultimate airport facilities and other support data. The following 8 drawings, updated in April 2004, are 11 x 17 inch reproductions derived from the 24 x 36 inch originals.

Index of Sheets

Title Sheet VII-4
Airport Data Sheet VII-5
Existing Airport Layout Plan VII-6
Aerial Photograph VII-7
Runway Approach Zones VII-8
Terminal Layout Plan VII-9
FAR Part 77 Surfaces VII-10
Property Map VII-11

Title Sheet and Airport Data Sheet

The title sheet, Exhibit VII-4 and VII-5, provides summary data about the airport including: location, vicinity and area map of the airfield with respect to Kent, and the approval signatures of key officials representing all participating agencies. In addition to this information the airport data sheet provides all-weather wind coverages, runway and approach data, and general airport information.

Airport Layout Plan

Exhibit VII-6 presents the existing airport layout plan, Alternative I, for the Kent State University Airport. The Airport Layout Plan (ALP) depicts the existing facilities and the sites limited potential for the airport to remain in compliance with current Federal Aviation Administration regulations.

FAA publications including Advisory Circular AC150/5300-13, Airport Design were utilized to develop this ALP. Inputs were derived from the result of analyses outlined in Chapters V and VI. Notable improvements through the year 2023 shown in the Airport Layout plan include:

- Runway End 19 Safety Area Construction
- Runway End 1 Safety Area Grading

Aerial Photograph

The aerial photograph (Exhibit VII-7), from the Ohio Department of Transportation flight in May 2000, is presented at a scale of 1 inch equals 300 feet. The existing airport property including adjoining properties, structures, buildings, terrain features such as surface drainage and ponds/lakes, and runway protection zones.

Runway Approach Zones

Exhibit VII-8 portrays a plan and profile of Runway 1-19, Runway Protection Zones, approach surfaces, transition surfaces and also shows the controlling structures, trees, terrain and their associated elevations, clearances, or penetrations. The runway approach zone sheet typically does not depict greater than 3,000 feet from each runway end. In addition to this information, the plan also depicts, in tabular form, the disposition of all objects which encroach the FAR Part 77 airspace surfaces.

Terminal Layout Plan

The Terminal Layout Plan (TLP) is depicted in Exhibit VII-19 The plan has three main elements, they include: Airport Access, Hangar Areas and Aircraft Parking Areas. The Terminal Layout Plan intends to show only the existing site's potential for landside development to meet demand. It does not necessarily depict the highest and best use of the land.

Projections in aviation demand and facility requirements presented earlier in Chapters III and VI indicated potential need in several areas during the 20 year planning period. These areas of need comprise a terminal building, expanded automobile parking, additional T-hangars and corporate hangars, and a maintenance building. Additional area is required east of the fueling pad to aid in the efficiency of fuel dispensing.

The proposed facilities shown on the TLP drawing have been divided into planning phases to conform to the following periods:

- Phase I (Short-Term) 2003-2008
- Phase II (Intermediate-Term) 2008-2013
- Phase III (Long-Term) 2013-2023

These phases of proposed improvements are forecast in Chapter III.

FAR Part 77 Surfaces

Shown in Exhibit VII-10 are the areas around the airport which should be subject to height restriction regulations. The airspace is superimposed on a current U.S.G.S. 7 1/2" minute quadrangle map and displays the FAR Part 77 surfaces for the ultimate development of the airport. The drawing also depicts objects which violate the FAR Part 77 surfaces that have not been identified on the Airport Layout Plan or Runway Approach Zone Sheets. Elevation of all obstructions and predominant land uses are also shown.

These area are described by Federal Aviation Regulations (FAR) Part 77 and are defined therein as stated, in part, below:

- Horizontal Surface - "A horizontal plane 150 feet above the established airport elevation."

- Conical Surface - "A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet."

- Primary Surface - "A surface longitudinally centered on the runway. When the runway has a specifically prepared hard surface, the primary surface extends 200 feet beyond each end of that runway...the elevation of any point on the primary surface is the same elevation of the nearest point on the runway centerline." The width of the primary surface is based on the type of approach available or planned for that runway end.

- Approach Surface - "A surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of each runway based on the type of approach available or planned for that runway end."

- Transitional Surface - "These surfaces extend outward and upward at right angles to the runway centerline and runway centerline extended at a slope of 7:1 from the sides of the primary surface and from the sides of the approach surfaces."

According to the FAR Part 77, an obstruction includes, but is not limited to, an existing object, including a mobile object, that is within the area described for each of these surfaces and whose height exceeds the limits stated for these respective areas and surfaces. These surfaces, in part, have resulted in the areas defined in the property map for which obstruction removal must be undertaken.

Airport Property Map

The property map, Exhibit VII-11, indicates existing and ultimate airport property. Along with these items the airport property map also depicts present owner, existing easements, lease areas, acreages, quality of interest and date of acquisition. The drawing depicts two general land areas. They include:

- Existing airport property (approximately 280 acres)

- Lease areas (approximately 7 acres)

AIRPORT LAYOUT PLAN

KENT STATE UNIVERSITY

SUMMIT COUNTY
KENT, OHIO
APRIL 2004

LEGEND

TOPOGRAPHIC INFORMATION

- ROADS
- ROAD MARKERS
- RAILROAD
- POWER TRANSMISSION LINES
- TANK-WATER, OIL OR GAS
- MINES AND QUARTERS

AIRPORTS

- OTHER THAN HARD-SURFACED RUNWAYS
- HARD-SURFACED RUNWAYS 1500 FT. TO 8069 FT. IN LENGTH
- HARD-SURFACED RUNWAYS GREATER THAN 8069 FT.
- PRIVATE
- MILITARY

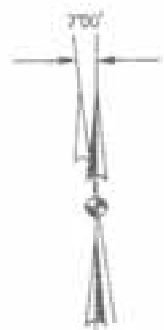
OBSTRUCTIONS

- 1000 FT. AND HIGHER AGL
- BELOW 1000 FT. AGL
- GROUP OBSTRUCTION
- OBSTRUCTION WITH HI-INTENSITY LIGHTS
- 2049 ELEVATION OF THE TOP ABOVE MEAN SEA LEVEL
- (1149) HEIGHT ABOVE GROUND
- UC UNDER CONSTRUCTION OR REPORTED POSITION AND ELEVATION UNVERIFIED

INDEX OF SHEETS

TITLE SHEET	1
AIRPORT DATA SHEET	2
EXISTING AIRPORT LAYOUT PLAN	3
AERIAL PHOTO	4
RUNWAY APPROACH ZONES	5
TERMINAL LAYOUT PLAN	6
ZONING AND LAND USE MAP	7
FAR PART 77	8
PROPERTY PLAN	9

OHIO AERONAUTICAL CHART



LOCATION MAP

FAA APPROVAL LETTER AREA

ALP CHECKLIST CERTIFICATION FOR AIRSPACE REVIEW

ON BEHALF OF RICHLAND ENGINEERING LIMITED, I CERTIFY THAT THE ALP PREPARED FOR THE KENT STATE UNIVERSITY AIRPORT, WAS PREPARED ACCORDING TO THE ALP CHECKLIST AND ACCURATELY DEPICTS THE PROPOSED USE OF AIRSPACE. THE ALP CONFORMS WITH FAA DESIGN STANDARDS, EXCEPT AS NOTED:

SIGNED ______________ DATE ______________

OHIO DEPT. OF TRANSPORTATION
OFFICE OF AVIATION
APPROVED: ______________
DATE: ______________

MANAGER, KENT STATE UNIVERSITY TRANS. SERVICES
APPROVED: ______________
DATE: ______________ PRESIDENT

RICHLAND ENGINEERING LIMITED
MANSFIELD, OHIO

NO.	REVISION	BY	APPR.	DATE
1	ADDED LAND USE DRAWING TO SHEET LEGEND	SCB		05/25/06

TITLE SHEET

FAA SITE NO. 18061.*A

KENT STATE UNIVERSITY
KENT, OHIO

VII-4

AIRPORT DATA TABLE		
County: SUMMIT	City: STOW	Town: N/A
Mean Maximum Temperature:	86°	Range: N/A
Ult. Airport Reference Point: Lat: 41°09'06.083"		Long: 81°24'54.207"
	Existing	Ultimate
Airport Elevation	1150	* 1115.5
Airport and Terminal Navaids	VADI, REIL	VADI, REIL
Service Level	General Aviation	General Aviation
Airport Role	General Utility	General Utility
Approach Category	A	A
Airplane Design Gr.	I	I

* ULTIMATE AIRPORT ELEVATION IS BASED ON THE NEW LOCATION OF THE AIRPORT REFERENCE POINT. THE TURF RUNWAYS 5-23 AND 9-27 ARE CLOSED AND WILL BE DECOMMISSIONED.

COORDINATES ARE CONSISTENT WITH NORTH AMERICAN DATUM OF 1983 (NAD 83).

ALL WEATHER WIND ROSE

WIND SOURCE DATA

SOURCE: AKRON-CANTON REGIONAL AIRPORT
PERIOD: JANUARY, 1968 - JANUARY, 1978
OBSERVATIONS: 40,903

CALMS PREVAIL 25.56% OF THE TIME.
WIND COVERAGE LESS THAN 13 KNOTS 94.89% COMBINED
WIND COVERAGE LESS THAN 10.5 KNOTS 90.25% COMBINED

RUNWAY AND APPROACH DATA TABLE:

RUNWAY AND APPROACH DATA					
RUNWAY		1	19	1	19
		EXISTING		FUTURE	
RUNWAY LENGTH		4,000	4,000	4,000	4,000
EFFECTIVE RUNWAY LENGTH DATA		3,950	4,000	3,950	4,000
LANDING LENGTH TAKEOFF LENGTH DISPLACED DISTANCE		3,950 4,000 50	4,000 3,950 50	3,950 4,000 50	4,000 3,950 50
DECLARED DISTANCES TORA TODA ASDA LDA		N.A.	N.A.	N.A.	N.A.
STOPWAY WIDTH		N.A.	N.A.	N.A.	N.A.
CLEARWAY WIDTH		N.A.	N.A.	N.A.	N.A.
RUNWAY GRADIENT		+0.43%	-0.43%	+0.43%	-0.43%
RUNWAY WIDTH		60	60	60	60
PAVEMENT TYPE		ASPHALT	ASPHALT	ASPHALT	ASPHALT
PAVEMENT STRENGTH		13K	13K	13K	13K
AIRCRAFT GEAR		SWG	SWG	SWG	SWG
RUNWAY LIGHTING		MIRL	MIRL	MIRL	MIRL
RUNWAY MARKING		VISUAL	VISUAL	VISUAL	VISUAL
NAVIGATIONAL AIDS		BEACON	BEACON	BEACON	BEACON
VISUAL AIDS		REIL, VADI	REIL, VADI	REIL, VADI	REIL, VADI
APPROACH LIGHTING		N.A.	N.A.	N.A.	N.A.
AIRPORT REFERENCE CODE		A I	A I	B II	B II
CRITICAL AIRCRAFT		PIPER SEMINOLE	PIPER SEMINOLE	*CITATION II	*CITATION II
CRITICAL AIRCRAFT - ANNUAL OPERATIONS		550	550	1,452	1,452
APPROACH RATIO FAR PART 77		20:1	20:1	20:1	20:1
RUNWAY PROTECTION ZONE		500 x 700 x 1000	500 x 700 x 1000	500 x 700 x 1000	500 x 700 x 1000
APPROACH VISIBILITY MINIMUMS		1 MILE	1 MILE	1 MILE	1 MILE
RUNWAY END COORDINATES	LAT.	41°08'45.424"	41°09'24.492"	41°08'45.424"	41°09'24.492"
	LONG.	81°24'38.332"	81°24'50.530"	81°24'38.332"	81°24'50.530"

* AIRCRAFT REPRESENTING THE THRESHOLD OF THE PROJECTED CRITICAL AIRCRAFT FLEET MIX

RUNWAY SAFETY AREA INVENTORY TABLE:

RUNWAY SAFETY AREA INVENTORY DATA					
RUNWAY	RUNWAY CATEGORY	RSA LENGTH	RSA WIDTH	OBJECTS ENCROACHING RSA	
				TYPE OF STRUCTURE	DISPOSITION
EXISTING 1-19	A I	240'	120'	TERRAIN	GRADING

NO.	REVISION	BY	APPR.	DATE
5	REVISED APPROACH DATA TABLE	SCB	HS	06/28/06
4	REVISED TOTAL SHEET NUMBER TO 9	SCB	HS	06/29/06
3	ADDED 10 KNOTS ON WINDROSE	SCB	HS	03/07/06
2	AIRPORT REFERENCE CODE-AI TO BII (FUTURE)	SCB	HS	03/03/06
1	NOTE UNDER "AIRPORT DATA TABLE"	SCB	HS	03/03/06

AIRPORT DATA SHEET

FAA SITE NO.
18061.*A

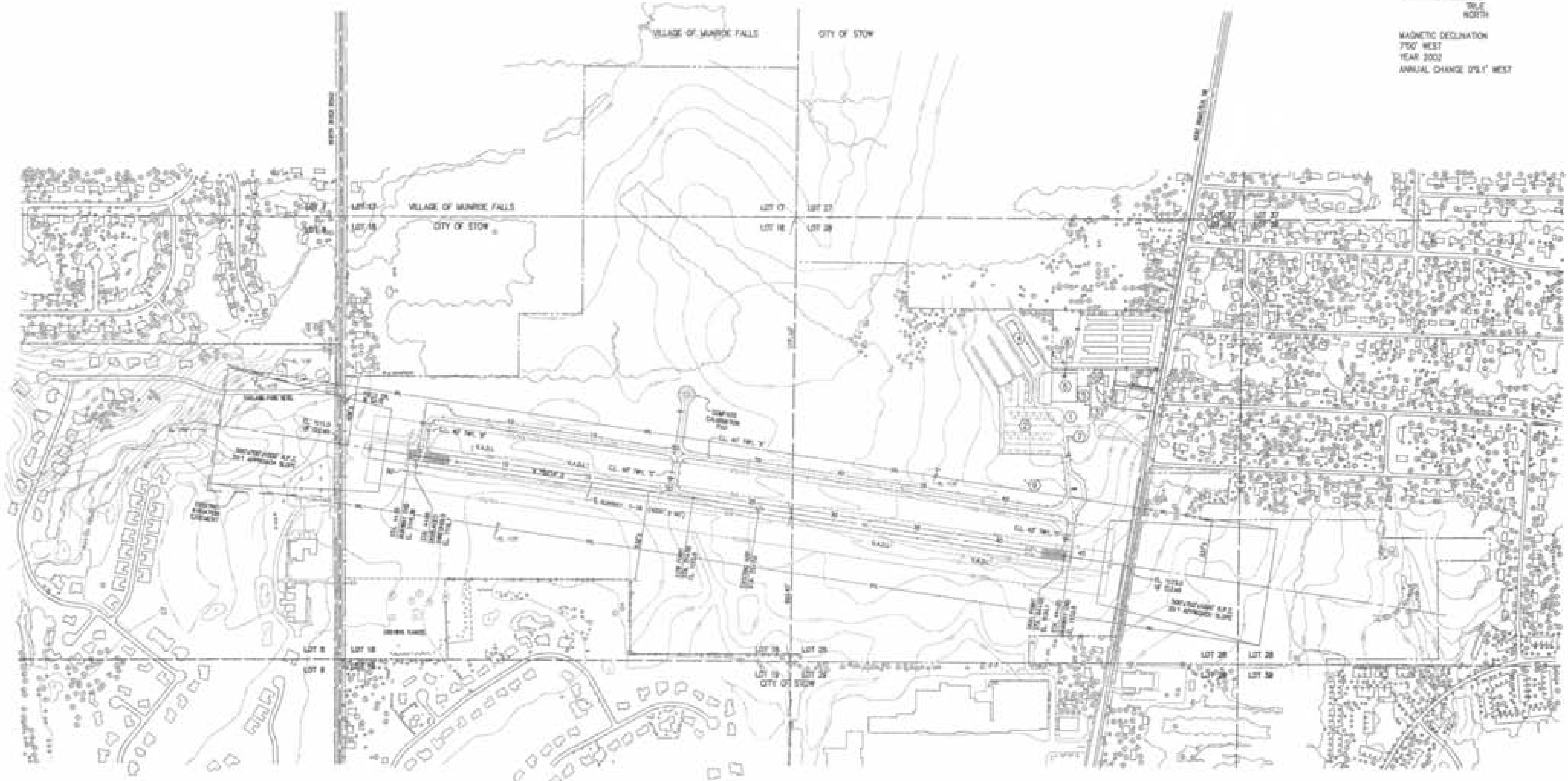
KENT STATE UNIVERSITY
KENT, OHIO

VII-5

MAGNETIC NORTH

TRUE NORTH

MAGNETIC DECLINATION
7°50' WEST
YEAR 2002
ANNUAL CHANGE 0°0.1' WEST



EXISTING RUNWAY/TAXIWAY DATA	
	1-19
RUNWAY SHOULDER WIDTH	10'
RUNWAY SAFETY AREA WIDTH	120'
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	240'
RUNWAY OBSTACLE FREE ZONE WIDTH	400'
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200'
RUNWAY OBSTACLE FREE AREA WIDTH	400'
RUNWAY OBSTACLE FREE AREA LENGTH BEYOND RUNWAY END	240'
RUNWAY BUILDING RESTRICTION LINE	350'
RUNWAY BLAST PAD	80' x 100'
TAXIWAY SAFETY AREA WIDTH	49'
TAXIWAY OBJECT FREE AREA WIDTH	89'
TAXILANE OBJECT FREE AREA WIDTH	79'
RUNWAY CENTERLINE TO HOLD LINE	200'
RUNWAY CENTERLINE TO PROPERTY LINE	327'
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING	200'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE	220'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	44.5'
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	39.5'
TAXIWAY WINGTIP CLEARANCE	20'
TAXILANE WINGTIP CLEARANCE	15'

AIRPORT ITEM LEGEND		
NO.	DESCRIPTION	ELEV.
1	APRON AREA (150'x350')	1150±
2	TIE DOWN APRON (300'x350') 40 TIE-DOWNS	1145±
3	AUTO PARKING (250'x70') 56 PARKING SPACES	1152±
4	T-HANGAR	1165
5	FBO/MAINTENANCE HANGAR	1173
6	CORP. HANGAR	1195
7	FUEL PAD (VENTS)	1155
8	AIRPORT BEACON	1189
9	WIND TEE	1145
10	MOBILE CLASSROOMS	1165

LEGEND

LOT LINE
EXISTING AIRPORT PROPERTY LINE
EXISTING AIRPORT AVIGATION EASEMENT
EXISTING RIGHT-OF-WAY
EXISTING RPZ
EXISTING CORPORATION LINE
EXISTING ELECTRIC LINE
EXISTING GAS LINE
EXISTING WATER LINE
EXISTING TELEPHONE LINE
EXISTING SANITARY LINE
WIND CONE
WIND TEE
LOT CORNER
SWALE
STORM SEWER/CATCH BASIN
POLE LINE
AIRPORT REFERENCE POINT (A.R.P.)
LON: 81°24'34.207"; LAT: 41°09'06.063"
AIRPORT BEACON
EXISTING FENCE LINE
EXISTING CONTOURS

NO.	REVISION	BY	APPR.	DATE
3	REVISED EXISTING RUNWAY DATA TABLE	SCB	HS	09/28/06
2	REVISED TOTAL SHEET NUMBER TO 8	SCB	HS	08/29/06
1	REMOVED TAXIWAY SAFETY MARGIN LINES	SCB	HS	05/24/06

EXISTING AIRPORT LAYOUT PLAN

FAA SITE NO. 18061.*A

KENT STATE UNIVERSITY
KENT, OHIO

VII-6

AERIAL PHOTOGRAPH: BARTON AERIAL JULY 17, 2003

MAGNETIC DECLINATION
7°00' WEST
YEAR 2002
ANNUAL CHANGE 0°5.1' WEST

MAGNETIC NORTH
TRUE NORTH

LEGEND

EXISTING AIRPORT PROPERTY LINE
EXISTING AVIGATION EASEMENT
EXISTING RPZ
EXISTING CENTERLINE
EXISTING CULVERT
SWALE

NO.	REVISION	BY	APPR.	DATE
2	ADDED NAME TO AERIAL PHOTOGRAPH DATE	SCB	HS	09/28/06
1	REVISED TOTAL SHEET NUMBER TO 8	SCB	HS	08/29/06

KENT STATE UNIVERSITY
KENT, OHIO

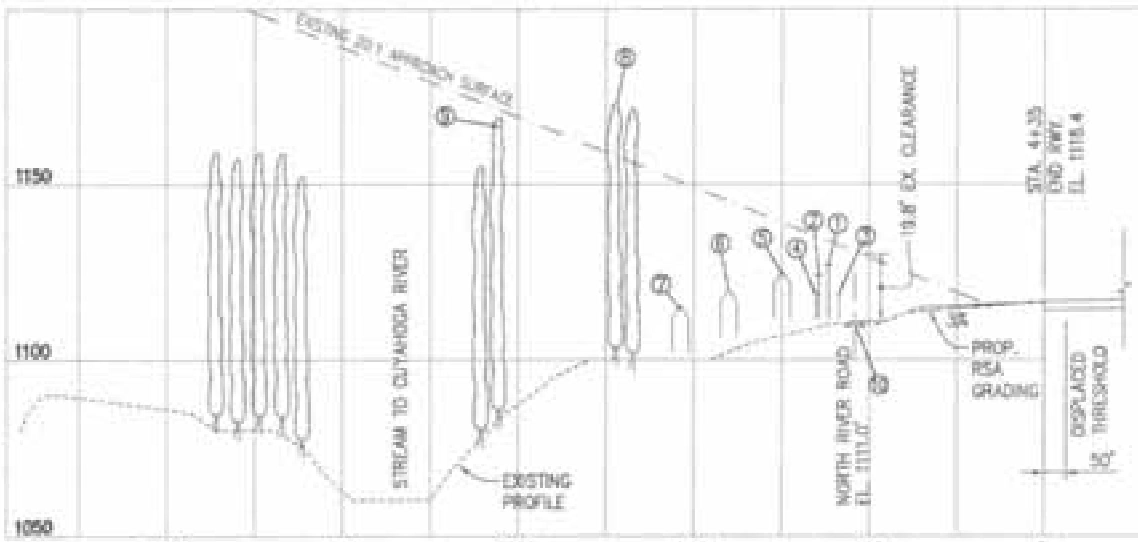
FAA SITE NO.
18061.*A

AERIAL PHOTO

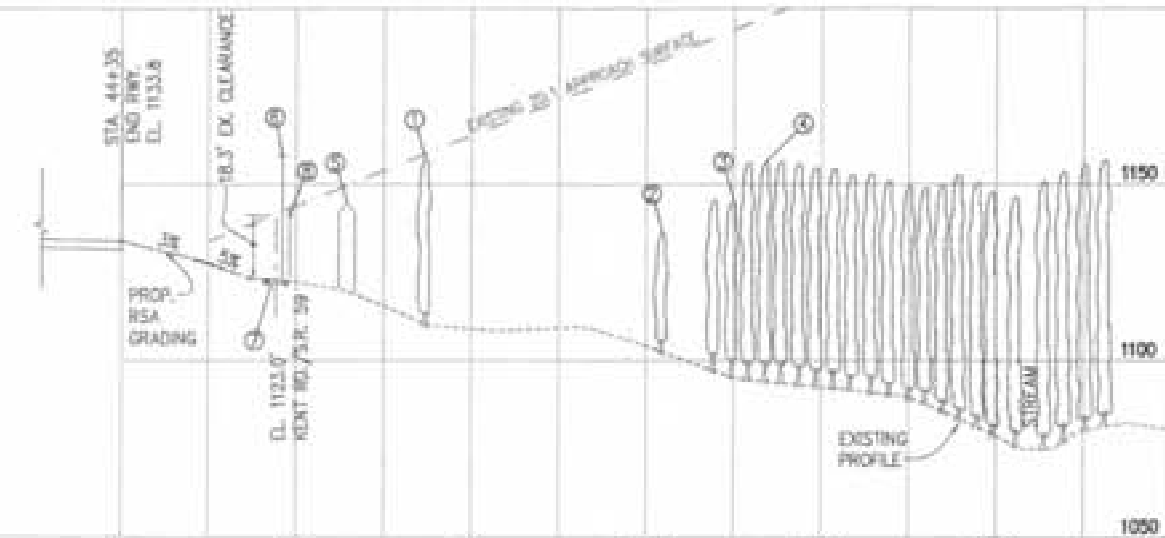
SCB 01/03
HS 01/03

HORIZONTAL SCALE: 1" = 300'

VII-7



APPROACH END 1 PROFILE



APPROACH END 19 PROFILE

MAGNETIC NORTH

TRUE NORTH

MAGNETIC DECLINATION
7°00' WEST
YEAR 2002
ANNUAL CHANGE 0°9.1' WEST

0 100 200 400

1" = 200'

1" = 20'

HORIZONTAL SCALE VERTICAL SCALE

GRAPHIC SCALES IN FEET

RUNWAY END 1 APPROACH DATA TABLE								
OBJECT		TOP ELEV.	MAX. ALLOWABLE ELEV.		PENETRATION		PROPOSED DISPOSITION	
NO.	DESCRIPTION		EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE
1	LIGHT POLE, 383' RT	1125.9	1139.2	–	NONE	–	NONE	–
2	LIGHT POLE, 141' RT	1124.1	1136.4	–	NONE	–	NONE	–
3	UTILITY POLE, 405' LT	1119.0	1160.4	–	NONE	–	NONE	–
4	POWER POLE, 407' LT	1119.0	1161.8	–	NONE	–	NONE	–
5	HOUSE, 375' LT	1125.0	1163.8	–	NONE	–	NONE	–
6	HOUSE, 348' LT	1120.0	1165.2	–	NONE	–	NONE	–
7	HOUSE, 354' LT	1115.5	1165.5	–	NONE	–	NONE	–
8	TREES, 214' LT	1172.0	1160.4	–	12.8	–	REMOVE	–
9	TREES, 33' RT	1168.0	1171.4	–	NONE	–	NONE	–
10	NORTH RIVER ROAD	1111.0	1130.8	–	NONE	–	NONE	–

LEGEND

- AIRPORT PROPERTY
- EXISTING RPZ
- LOT LINE
- EX. RIGHT-OF-WAY
- STREAM
- STORM SEWER/CATCH BASIN
- EXISTING FENCE LINE
- PROP. RWY GRADING
- EXISTING RUNWAY
- EXISTING AVIGATION EASEMENT
- GAS LINE
- ELECTRIC LINE
- POLE LINE
- REIL's
- GROUND CONTOUR
- LOT CORNER
- RWY/TWY LIGHTS

RUNWAY END 19 APPROACH DATA TABLE								
OBJECT		TOP ELEV.	MAX. ALLOWABLE ELEV.		PENETRATION		PROPOSED DISPOSITION	
NO.	DESCRIPTION		EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE
1	TREES, 376' LT	1157.0	1179.3	–	NONE	–	NONE	–
2	TREES, 502' LT	1136.0	1229.3	–	NONE	–	NONE	–
3	TREES, CL	1145.0	1183.8	–	NONE	–	NONE	–
4	TREES, 428' RT	1156.0	1223.2	–	NONE	–	NONE	–
5	CHURCH STEEPLE, 671' RT	1145.0	1212.0	–	NONE	–	NONE	–
6	POWER POLE, 383' RT	1141.4	1185.4	–	NONE	–	NONE	–
7	S.R. 59 (KENT ROAD)	1123.0	1141.3	–	NONE	–	NONE	–
8	POWER POLE, 464' LT	1158.0	1174.9	–	NONE	–	NONE	–

NO.	REVISION	BY	APPR.	DATE
3	REVISED TOTAL SHEET NUMBER TO 8	SCB	HS	06/29/06
2	ADDED LABELS #7 & #10 IN APPROACH PROFILES	SCB	HS	03/03/06
1	APPROACH END 1 PROFILE-APPROACH SLOPE TEXT	SCB	HS	03/03/06

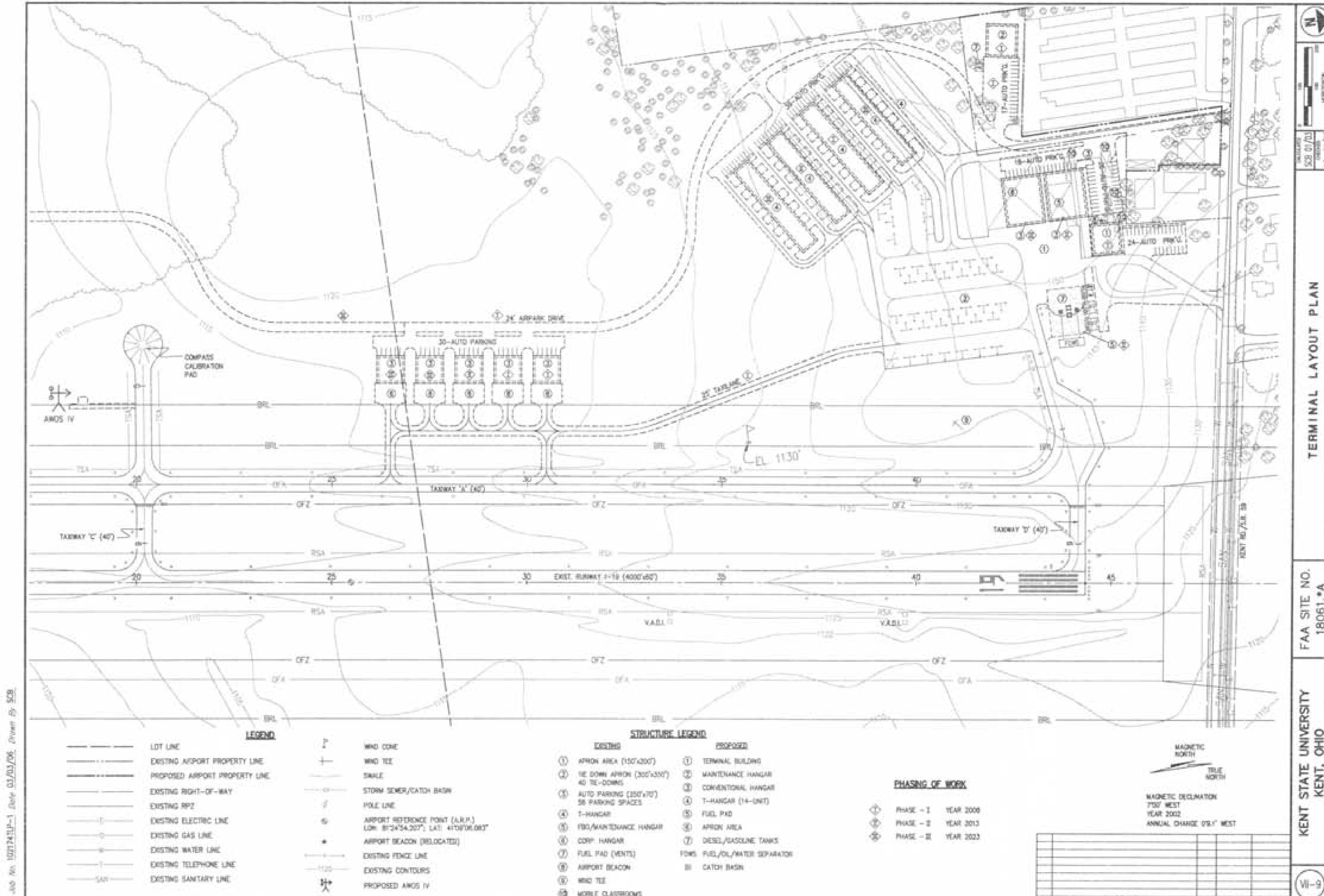
Job No. 102174RAZ Date 09/28/06 Drawn By SCB

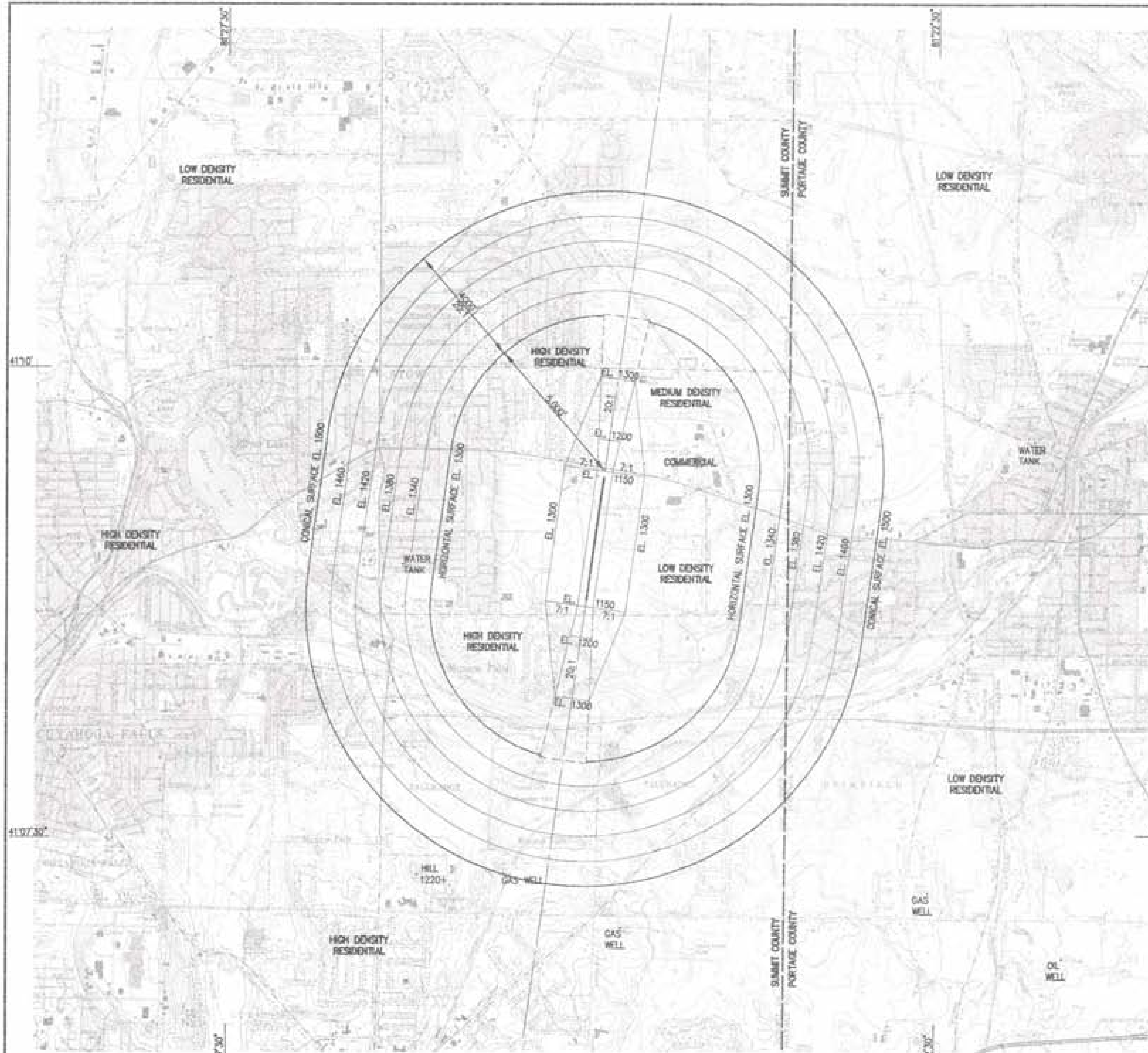
RUNWAY APPROACH ZONE

FAA SITE NO. 18061.*A

KENT STATE UNIVERSITY
KENT, OHIO

VII-8


TERMINAL LAYOUT PLAN
FAA SITE NO. 18061.*A
KENT STATE UNIVERSITY
KENT, OHIO
VII-9
24' AIRPARK DRIVE
30-AUTO PARKING
COMPASS CALIBRATION PAD
AWOS IV
25' TAXILANE
TAXIWAY "A" (40')
TAXIWAY "C" (40')
TAXIWAY "D" (40')
EXIST. RUNWAY 1-19 (4000'x60')
EL. 1130'
V.A.S.I.
17-AUTO PRK'G.
18-AUTO PRK'G.
24-AUTO PRK'G.
FOWS
KENT RD./S.R. 59
BRL
TSA
OFA
OFZ
RSA
LEGEND
LOT LINE
EXISTING AIRPORT PROPERTY LINE
PROPOSED AIRPORT PROPERTY LINE
EXISTING RIGHT-OF-WAY
EXISTING RPZ
EXISTING ELECTRIC LINE
EXISTING GAS LINE
EXISTING WATER LINE
EXISTING TELEPHONE LINE
EXISTING SANITARY LINE
WIND CONE
WIND TEE
SWALE
STORM SEWER/CATCH BASIN
POLE LINE
AIRPORT REFERENCE POINT (A.R.P.) LON: 81°24'54.207"; LAT: 41°09'06.083"
AIRPORT BEACON (RELOCATED)
EXISTING FENCE LINE
EXISTING CONTOURS
PROPOSED AWOS IV
STRUCTURE LEGEND
EXISTING
1 APRON AREA (150'x200')
2 TIE DOWN APRON (300'x350') 40 TIE-DOWNS
3 AUTO PARKING (250'x70') 58 PARKING SPACES
4 T-HANGAR
5 FBO/MAINTENANCE HANGAR
6 CORP. HANGAR
7 FUEL PAD (VENTS)
8 AIRPORT BEACON
9 WIND TEE
10 MOBILE CLASSROOMS
PROPOSED
1 TERMINAL BUILDING
2 MAINTENANCE HANGAR
3 CONVENTIONAL HANGAR
4 T-HANGAR (14-UNIT)
5 FUEL PAD
6 APRON AREA
7 DIESEL/GASOLINE TANKS
FOWS FUEL/OIL/WATER SEPARATOR
CATCH BASIN
PHASING OF WORK
PHASE - I YEAR 2008
PHASE - II YEAR 2013
PHASE - III YEAR 2023
MAGNETIC NORTH
TRUE NORTH
MAGNETIC DECLINATION
7°00' WEST
YEAR 2002
ANNUAL CHANGE 0°6.1' WEST
NO.
REVISION
BY
APPR.
DATE
HORIZONTAL SCALE IN FEET
Job No. 10212411LP-1 Date 03/03/06 Drawn By SCB

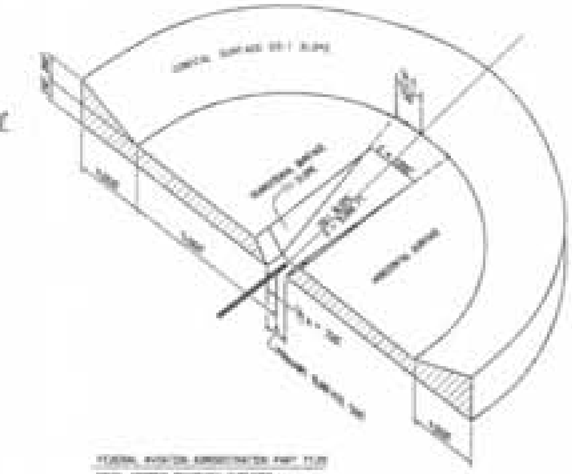


MAGNETIC DECLINATION
7°00' WEST
YEAR 2002
ANNUAL CHANGE 0°6.1' WEST

TRUE NORTH
MAGNETIC NORTH

DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	C	D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	C	D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A- UTILITY RUNWAYS
B- RUNWAYS LARGER THAN UTILITY
C- VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D- VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
*- PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET



FEDERAL AVIATION ADMINISTRATION PART 77.23
CIVIL AIRPORT IMAGINARY SURFACES

THERE ARE NO KNOWN OBSTRUCTIONS THAT PENETRATE FAR 77 SURFACES.
LAST DATE OF SURVEY JULY 30, 2002

LEGEND

- ELECTRIC TRANSMISSION LINE
- OBJECTS WHICH VIOLATE PART 77
- (OL) OBSTRUCTION LIGHT
- INTERSTATE ROUTE
- U.S. ROUTE
- STATE ROUTE

ROAD CLASSIFICATION

HEAVY DUTY — LIGHT DUTY
MEDIUM DUTY — UNIMPROVED DIRT

NO.	REVISION	BY	APPR.	DATE
1	REVISED TOTAL SHEET NUMBER TO 8 OF 8	SCB	HS	06/29/06

DESIGNED SCB 01/03
CHECKED HS 01/03

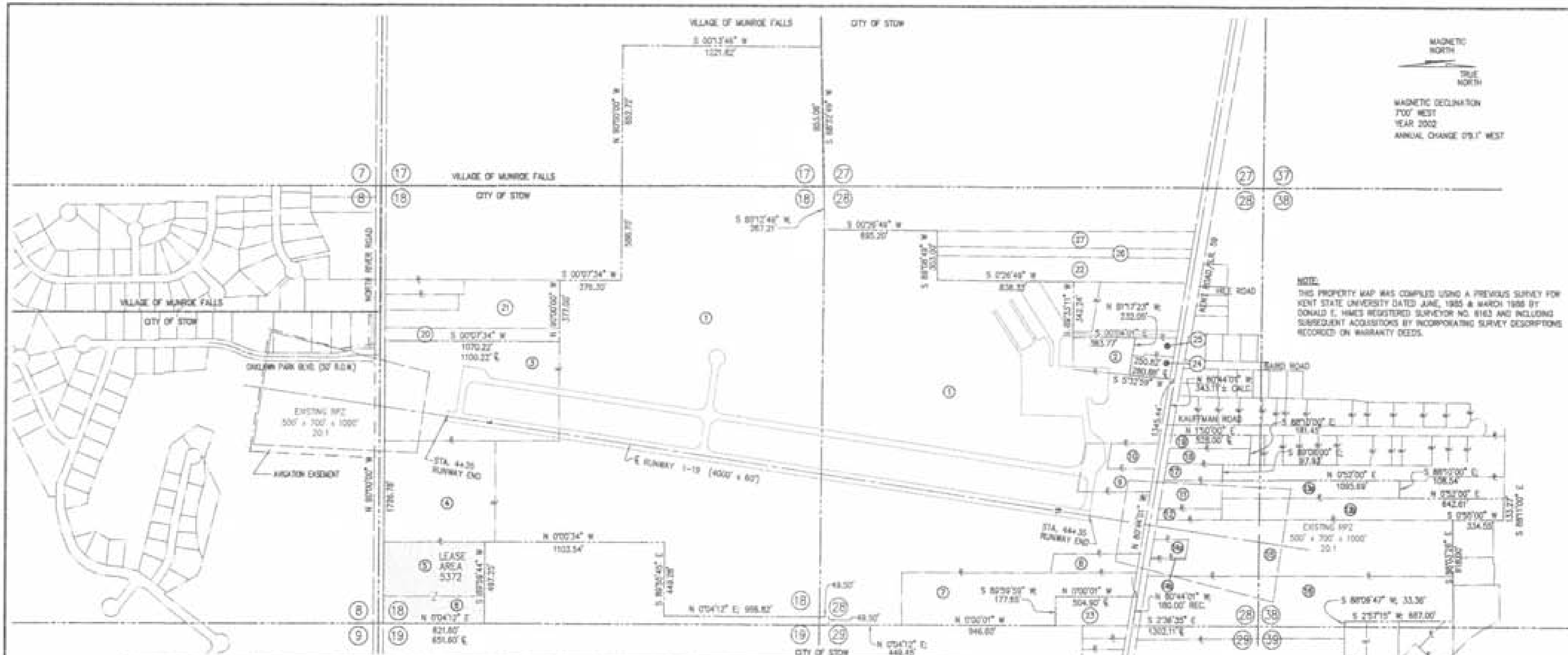
HORIZONTAL SCALE: 1" = 300'

FAR PART 77

FAA SITE NO. 18061.*A

KENT STATE UNIVERSITY
KENT, OHIO

VII-10



PARCEL REF. NO.	PRESENT OWNER	TYPE OF DEED	QUALITY OF INTEREST	DEED VOL. PAGE NO.	ACREAGE OWNED	ACREAGE TO BE ACQUIRED	DATE OF ACQUISITION	FEDERAL PROJECT NO. FOR ACQUISITION
1	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	N/A	199.18	–	OCT. 24, 1942	------------
2	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 3103/P 095	1.79	–	DEC. 11, 1953	------------
3	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 4358/P 347	15.40	–	OCT. 13, 1964	3-39-0042-01-82
4	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 4358/P 347	10.01	–	OCT. 13, 1964	3-39-0042-02-83
5	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 4358/P 347	4.29	–	OCT. 13, 1964	3-39-0042-03-84
6	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 4358/P 347	2.45	–	OCT. 13, 1964	------------
7	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	N/A	8.00	–	DEC. 27, 1985	3-39-0042-03-84
8	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	N/A	1.46	–	DEC. 27, 1985	3-39-0042-03-84
9	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	N/A	3.00	–	DEC. 27, 1985	3-39-0042-03-84
10	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 6878/P 705	1.00	–	DEC. 20, 1985	3-39-0042-03-84
11	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 7562/P 807	1.63	–	DEC. 4, 1987	3-39-0042-04-86
12	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 7564/P 280	0.69	–	DEC. 15, 1987	3-39-0042-04-86
13a	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 7561/P 992	2.73	–	NOV. 30, 1987	3-39-0042-04-86
13b	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 7561/P 992	5.33	–	NOV. 30, 1987	3-39-0042-04-86
14a	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 7562/P 204	0.64	–	DEC. 1, 1987	3-39-0042-04-86
14b	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 7562/P 204	0.05	–	DEC. 1, 1987	3-39-0042-04-86
15	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 7086/P 438	14.48	–	MAR. 13, 1985	3-39-0042-02-83
16	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 7562/P 201	13.07	–	DEC. 1, 1987	3-39-0042-04-86
17	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 456/P 854-855	0.91	–	APR. 20, 1990	------------
18	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 456/P 856-857	1.22	–	APR. 20, 1990	------------
19	BOARD OF TRUSTEES OF KENT STATE UNIVERSITY	WD	FEE SIMPLE	V 506/P 434-435	1.00	–	JUL. 12, 1990	------------
20	TONY CALCO (1.97)	WD	FEE SIMPLE	V 3822/P 220		–		
21	DONALD L. & DONNA PALMER (5.42)	WD	FEE SIMPLE	V 6821/P 652		–		
22	KEITH M. & LINDA A. KOVACH (5.51)	WD	FEE SIMPLE	V 340/P 401-403		–		
23	DENISE METROPULOS THARP (2.01)	WD	FEE SIMPLE	–		–		
24	DENNIS & HOLLY SUTTON (0.70)	WD	FEE SIMPLE	–		–		
25	IVAN EXTRUDERS (0.89)	WD	FEE SIMPLE	–		–		
26	NOTIE L. HICKEY (1.84)	WD	FEE SIMPLE	–		–		
27	NOTIE L. HICKEY (3.67)	WD	FEE SIMPLE	–		–		
	TOTAL ACREAGE OWNED BY BOARD OF TRUSTEES OF KENT STATE UNIVERSITY				287.33			

REF. NO.	LEASE HOLDS	ACREAGE
5372	PAMBI DEVELOPMENT/ W.G. LOCKHART CONSTRUCTION	7.4312

LEGEND

- SECTION LINE & QUARTER SECTION LINES
- EXISTING AIRPORT PROPERTY LINE
- EXISTING CORPORATION LINE
- EXISTING PROPERTY LINE OR LOT LINE
- EXISTING RIGHT-OF-WAY
- EXISTING RPZ (500'x700'x1000')
- FUTURE VISUAL RPZ (500'x700'x1000')
- EXISTING AVIGATION EASEMENT
- LEASE HOLD AREAS

NO.	REVISION	BY	APPRL.	DATE
1	REVISED TOTAL SHEET NUMBER TO 8 OF 9	SCB	HS	08/28/06

PROPERTY MAP

FAA SITE NO. 18061.*A

KENT STATE UNIVERSITY
KENT, OHIO

VI-11

CHAPTER VIII

PLAN IMPLEMENTATION

General

General guidelines for development of any airport strongly recommend that potential owners and operators of a proposed general aviation airport will have the entrepreneurial and financial capacity to undertake the airport development and also provide for continued services demanded by the users. The Master Plan Study assumes that formal ownership of the airport will be vested in an Airport Authority with Kent State University being a cosponsor.

The development of this Master Plan repeatedly tested the financial feasibility of several development concepts that could meet the requirements. Although the implementation plan is phased to meet forecast demand at the critical stages during the 20 year development period. Local shifts in demographics and economic conditions including legislative actions and inflation may change demands and activity levels that could greatly influence the selected plan. Subsequently, the implementation phases including the financial plan should be re-evaluated and adjusted to meet warranting conditions.

The financial plan which will support the implementation schedule is recommended according to the activity level anticipated along with the airports ability to generate needed revenues. This report assumes that the airport is operated as a business and the community it is located in benefits from its presence because:

- Needed services are provided
- Jobs are created
- Local tax base is increased
- Need for flight training and associated education is expanded.
- Need for various other services and supplies is expanded.

The plan implementation i.e. the overall airport development plan should follow the logical and proven format:

- Implementation Schedule based on need
- Financial Plan based on cost allocation and financing mechanism
- Financial Feasibility Plan based on the ability of the airport operations to cover the potential cost of the development

Phased Implementation Schedule

The financial feasibility of the airport developments depends on linking the phased implementation with anticipated revenues to cover expenditures. Using the "as needed" or "just in time" approach provides reasonable expectations that revenues derived from operating the facilities will support development and operating expenses. The phased implementation of the developments are keyed to the facilities requirements shown on the Airport Layout Plan in three major phases.

- Phase I (Up Front, Short Term) 2004-2008
- Phase II (Follow Up, Intermediate Term) 2009-2013
- Phase III (Final Buildout, Long Term) 2014-2023

For each of the development phases, major line item cost estimates are prepared in 2003 dollar value and summarized. The costs reflect estimated quantities of line item improvements and applying current prices paid for similar improvements in the market area. Interested agencies or entities that normally participate or benefit from the developments and airport operations are historically the Federal Aviation Administration, Ohio Department of Transportation/Office of Aviation, Local Jurisdictional Governments and Institutions and Private Investors. This financial approach will assign sponsorship and public and private cost sharing to all four interested participants.

Financial Plan

General aviation airports, such as Kent State University Airport historically operate without operating revenue surplus. The primary purpose of Kent State University Airport is to educate and train students interested in a career in aviation related fields and to provide general aviation services to the community. This airport, like many other airports in the NPIAS system will rely on Federal, State, University, City/County and Private Investments. The financial plan for this master plan will incorporate available funding from public and private sources as listed in the following breakdown:

Federal and State programs for airside improvements would be used for projects that maintain the Airports existing infrastructure based on eligibility, i.e. rehabilitation and improvements to existing airport pavements and equipment. The improvements would include:

- resurfacing or reconstruction of runways, taxiways and aprons
- obstruction survey and removing obstructions to navigation
- on-airport lighting, signing and marking
- airport visual landing aids
- drainage improvements and safety grading
- communications equipment
- security fencing and security facilities

Federal and State funding would also be used for capital improvement projects, i.e. for new construction or installation of new equipment and for land acquisition and relocation assistance. The capital improvement projects would include:

- runway, taxiway, apron extensions or widening to meet design standards (safety requirements)
- on-airport lighting
- airport visual lighting aids, signing and marking
- automated weather observing system (AWOS)
- NAVAID acquisition
- land acquisition, relocation assistance and obstruction removal

Funding for landside improvements would rely on local public and private support derived from tuitions, municipal operating funds, general obligation bonds and private funds based on return on investment risk. Local landside improvements would include:

- classroom and flight training facilities
- ground vehicle access and parking facilities
- aircraft maintenance and aircraft hangars
- conventional/corporate hangars
- hangar aprons and taxilanes
- fuel storage and fuel dispensing equipment
- maintenance building(s) and maintenance equipment
- terminal building, administration, passenger, pilot facilities and landside security and lighting

The financial plan recognizes the dependence on Federal, State, including County/Municipal support, the owner/operator should not place complete reliance on eligibility to obtain all funds listed in the itemized breakdown.

The financial plan focuses on analysis of one candidate with the best potential for meeting the goals of the master plan. Tables VIII-1 through VIII-5 evaluate Alternative 7 and Table VIII-6 provides Financial Feasibility data.

TABLE VIII-1
ALTERNATIVE 7, PHASE I (2004-2008)
PRELIMINARY PROJECT COST ESTIMATE

Description of Work Airfield Developments	2004	2005	2006	2007	2008	Total Cost
Site Selection Study	$60,000					$60,000
Update Airport Master Plan	$56,000					$56,000
Environmental Assessment		$80,000				$80,000
Land Acquisition			$240,800			$240,800
Relocate Infirmary Road (Plans & Specs.)				$158,400		$158,400
Obstruction Removal/Site Preparation				$258,000		$258,000
Gasline Relocation/Encasement					$171,250	$171,250
Relocate Infirmary Road (Construction)					$1,425,600	$1,425,600
Powerline Relocation					$215,000	$215,000
TOTAL	**$116,000**	**$80,000**	**$240,800**	**$416,400**	**$1,811,850**	**$2,665,050**

Costs are in 2003 Constant Dollars and include 12% legal, administrative and contingencies.

TABLE VIII-2
ALTERNATIVE 7, PHASE II (2009-2013)
PRELIMINARY PROJECT COST ESTIMATE

DESCRIPTION OF WORK	TOTAL COST
Airside Developments Runway Extension (920 L.F.)	$575,000
Parallel Taxiway Extension	$327,000
Runway Overlay (Existing Section)	$438,000
Taxiway Overlay (Existing Section)	$327,000
Runway/Taxiway Lighting (New Section)	$104,000
Apron Construction	$684,000
Automatic Weather Observation System	$111,000
TOTAL AIRSIDE DEVELOPMENTS	**$2,566,000**
Landside Developments Fueling Facilities	$396,000
Access Road	$434,000
Terminal Site Preparation and Drainage	$180,000
Utilities (Electric, Water, Communication Lines)	$187,000
Vehicle Parking	$237,000
T-Hangars	$816,000
Taxilanes	$160,000
Flight Training Hangar	$1,140,000
Airport Maintenance Building	$408,000
Terminal Building	$470,000
Flight Training Facilities (Classrooms)	$1,150,000
Corporate Hangars	$270,000
TOTAL LANDSIDE DEVELOPMENTS	**$5,848,000**

TABLE VIII-3
ALTERNATIVE 7, PHASE II (2009-2013)
PRELIMINARY COST ESTIMATE
ASSOCIATED WITH CLOSING EXISTING AIRPORT
AND TRANSFERRING ALL SERVICES TO A NEW AIRPORT

Relocation Assistance 2 FBO Trailers	$17,000
5 Based Aircraft Relocation and Rental Assistance	$6,000
Maintenance Facilities (3,000 s.f.)	$30,000
Kent State University Flight School (3,500 s.f.; 4 Trailers)	$32,000
Terminal Facilities (1,200 s.f.)	$12,000
Tenants Relocation and Rental Assistance (9 aircraft @ $2,000)	$18,000
Tie Down Tenants Relocation and Rental Assistance (5 aircraft @ $1,000)	$5,000
Hangars (KSU) Removal/Utilities Disconnect	$95,000
Hazard Evaluation Survey/Report	$5,000
Runway Decommission/Closed Marking	$4,000
Appraisals	$80,000
Engineering/Closure Management	$25,000
Administrative/Legal	$26,000
TOTAL AIRFIELD CLOSURE COST	**$355,000**
TOTAL FOR PHASE II	**$8,769,000**

Costs in 2003 Constant Dollars and include 20% for engineering, legal, administrative and contingencies. All line items are rounded to nearest thousand dollar.

TABLE VIII-4
ALTERNATIVE 7, PHASE III (2014-2023)
PRELIMINARY COST ESTIMATE

Landside Development	**Cost**
T-Hangars	$816,000
Taxilanes	$160,000
Flight Training Hangar	$1,140,000
Flight Training Facilities	$1,150,000
Corporate Hangars	$270,000
Airport Security	$250,000
Landscaping	$100,000
TOTAL LANDSIDE DEVELOPMENT	**$3,886,000**

Costs are in 2003 Constant Dollars and include 20% for engineering, legal and administrative and contingencies.

TABLE VIII-5
ANTICIPATED FUNDING SOURCES FOR ALTERNATIVE 7

	FEDERAL	STATE	*LOCAL	PRIVATE		TOTAL
Phase I (2004-2008)	$2,501,547	$0	$128,503	$0		**$2,630,050**
Phase II (2009-2013)	$2,261,000	$0	$119,000	$1,246,000 $4,788,000 $355,000	P I N	**$8,769,000**
Phase III (2014-2023)	$190,000	$0	$10,000	$2,440,000 $1,246,000	I P	**$3,886,000**
Total Development Costs	**$4,952,547**	**$0**	**$257,503**	**$10,075,000**		**$15,285,050**

* Local Share is 5% of all Federal and State Matching Grant funded projects.
I Includes Institutional (Flight Training) Capital Spending.
P Private Investments.
N Normally eligible for Federal and State Participation based on available funds.

TABLE VIII-6
ESTIMATED COST PER AIR OPERATION

<u>Existing Cost Per Operation</u> Annual Operating and Maintenance Cost (Local Share) Annual Maintenance Cost (Federal Share) Total Annual Operating and Maintenance Cost ∴ $621,000 ÷ 60,320 (Annual Operations) =	 $486,000 <u>$135,000</u> **$621,000** **$10.30 Per Operation**
<u>Alternative 4E Cost Per Operation (Demand Operations)</u> Present Worth of 20 Year Operating and Maintenance Cost (Local Share) Present Worth of Improvements for 20 Year Period $24,120,133 x 0.5436 = Total Annual Operating and Maintenance Cost ∴ $19,983,370 ÷ [(62,920 + 127,240)÷2] x 20 =	 $6,872,000 <u>$13,111,704</u> **$19,983,370** **$10.51 Per Operation**
<u>Alternative 7 Cost Per Operation (Demand Operations)</u> Present Worth of 20 Year Operating and Maintenance Cost (Local Share) Present Worth of Improvements for 20 Year Planning Period $15,320,008 x 0.5436 = Total Annual Operating and Maintenance Cost ∴ $13,727,956 ÷ [(62,920 + 127,240) ÷2 x 20] +[(9,620 + 12,980) ÷ 2 x 20] =	 $5,400,000 <u>$8,327,956</u> **$13,727,956** **$6.45 Per Operation**

STRUCTURE LEGEND

1	FBO/TERMINAL BUILDING		EXISTING AIRPORT PROPERTY
2	MAINTENANCE HANGAR		PROPOSED AIRPORT PROPERTY
3	CONVENTIONAL HANGAR	FOWS	FUEL/OIL/WATER SEPARATOR
4	T-HANGAR (10-UNIT)		AUTO PARKING
5	FUEL PAD		FUEL TANK
6	APRON AREA		APPROX. GASLINE LOCATION
7	DIESEL/GASOLINE TANKS		

ALTERNATIVE 7 – DEVELOPMENT PHASES

PHASE I (2004–2008)
PHASE II (2008–2013)
PHASE III (2013–2023)

AIRPORT ALTERNATIVE #7
PHASED DEVELOPEMENT (2004-2023)

FAA SITE NO.
18432.5A

PORTAGE COUNTY AIRPORT
RAVENNA, OHIO

XIII-7

Funding Sources

Anticipated funding for implementing the major line items of improvements would come from four major sources (i.e. Federal, State, Local and Private). With reference to the existing site alternatives, local contributions may not be available because the Kent State University Airport would be an entirely state owned institution. Subsequently the University's commitment for furnishing general aviation services to the local area will also commit the University to provide the necessary local funding. Implementing Alternative 7 and operating the airport jointly with an Airport Authority or Airport Commission (i.e. as co-sponsors) could funnel local funds through the Airport Authority or Operating Commission.

Local (Sponsors Share) Financing

Most County, City or Institutional owned airports are operated and in part developed using locally generated funds. Locally generated funds would include revenues from fuel sales, building and ground leases, shop, storage and similar miscellaneous, auto rental and concession revenues. Most notably in this master plan is the Kent State University's commitment to provide the local area with general aviation services along with continued flight training programs. Kent State University funds generated by the flight training programs will continue to be the primary funding source to cover operating and maintenance expenses. In case of joint sponsorships many communities have committed themselves to return a portion of the revenues derived from induced spending toward the local share for capital improvements.

State Share Financing

The Ohio Department of Transportation provides financial assistance to public-owned airport through its annual Ohio Airport Grant Program. However in the event that an alternative is selected where the Kent State University becomes the exclusive sponsor the potential for obtaining funds (local funds) through the Ohio Airport Grant Program would be lost or limited to receiving discretionary funding only. Eligible sponsors and eligible projects could receive an annual contribution of $175,000.

Federal Share Financing

For most if not all airside facilities improvements including planning, engineering and land acquisition and relocation assistance federal participation under the Airport Improvement Program (AIP) is anticipated. FAA Order 5100.38B Airport Development Aid Program (ADAP) Handbook current edition would be used for program guidance for obtaining funds. The AIP Program objective is to assist public use airports to provide facilities to meet current and forecast growth of civil aviation.

The AIP Program in various formats has been in effect since 1946 and during that period have participated in eligible airport development projects ranging from 50 percent matching grant funds to the current 95 percent AIP Grants. Periodically federal legislation authorizes money for airport developments. It should be noted that in addition to authorization, an actual appropriation has to be included in the annual budget to release funds to the Secretary of Transportation for distribution towards eligible projects. Actual appropriations are most often independent from the authorized amount and are frequently reduced to control deficit spending. It would not be prudent to expect full funding during any grant year.

Private and Other Financing

Private and other financing are identified under Table VIII-5 and include sources from Kent State University's flight training programs, private investments and projects sometimes funded by federal and state discretionary moneys or through local jurisdictional entities (i.e. cities, counties, townships). Other financing sources are available depending on project eligibility through "Enterprise Zones" tax incentives; "Community Reinvestment Areas" tax incentives for residents and businesses that invest in designated areas (i.e. at a nearby airport east of the current Kent State University Airport); Research and Development Sales Tax Exemption"; Manufacturing "Machinery and Equipment Sales Tax Exemption"; Warehouse Inventory Tax Exemption"; "166 Regional Loan Program"; and Port Authority Bond Reserve Fund" and several others[1].

Financing Summary

Chapter VIII analyzes the financial viability of one feasible alternative should Kent State University be willing to continue to support its flight training programs including the local and itinerant air activities. This chapter foreshadows the value of an airport to the surrounding community. Undeniably the airport is an asset to the community. Dollars are and will be funneled into the local economy through payroll and capital expenditures. Chapter VI, Table VI-2 addresses the economic viability of 13 of the 18 alternatives considered for development. Of the 13 alternatives for which a present worth analysis was conducted, Alternative 7 is the apparent most feasible candidate for development. It is very unlikely that the University or a public entity can provide continued financial support in the amount greater than that estimated for Alternatives 1 and 7. Chapter IX will address financial feasibility of the existing site and defines the financial impact.[1]

[1]"Ohio Department of Transportation Program Resource Guide" and "Resource Ohio" www.resourceohio.com Ohio Department of Development

CHAPTER IX

ECONOMIC IMPACT

Introduction and Purpose

Kent State University Airport is a public use institutional/municipal general aviation airport serving a two county area.

The purpose of this chapter is to quantify the direct effects of the general aviation activities in terms of economic impacts. The airport provides two basic economic functions. First and foremost it provides the most efficient mode of transportation for business, people and cargo. Secondly, because of the need for the transportation services the airport generates employment opportunities, educational opportunities, stimulates use and consumption of goods and services and payment of taxes.

Many communities view an airport as merely another part of the infrastructure or part of a city or county department, or in this case part of the Kent State University infrastructure. In any case a community will benefit from the presence of an airport for reasons stated at the beginning of Chapter VIII. The impacts to the local economy is threefold A.) Direct Impacts, B.) Indirect Impacts, and C.) Induced Impacts.

Definitions of Economic Impacts

In previous chapters various impact categories were addressed and combined to form the economic base of this airport. The overall economic impacts can be broken down into three separate groups:

Direct Impacts - These impacts are associated with airport related dollars that flow directly into the local economy. The dollars are spent by various airports users and providers of services. The financial functions include expenditures for capital improvements, maintenance and operations, miscellaneous airport support expenditures, fuel, taxes and payroll.

Indirect Impacts - These impacts occur within the community as offsite expenditures by businesses and industries and by the traveling public through purchase of food, shelter, transportation, recreational and educational activities generated by air travel.

Induced Impacts - These impacts are associated with the "multiplier effect". The multiplier effect is an economic principal that provides an estimate of the total amount of respending of money generated by direct and indirect impacts.

Direct Impact

Data for expenditures and impacts associated with airport related activities at the Kent State University Airport were collected from several sources. The Kent State University Transportation Services, the School of Aviation Technology, Kent State University Flight Training and statistics available from government agencies provided information for estimating direct expenditures. The estimated direct economic impact of the Kent State University is:

Operating and Maintenance	$116,000
Aircraft/Hangar Rental Tie-Down	$37,920
Capital Improvements (Construction)	$235,000
Payroll	$670,000
Fixed Base Operations	$250,000
*Taxes (SST, FET, LIT & PPT)	$27,800
Total	**$1,336,720**

* SST - State Sales Tax, FET - Fuel Excise Tax, LIT - Local Income Tax,& PPT - Personal Property Tax

Indirect Impact

As defined earlier, indirect, economic impacts are positive cash flows generated by visitors arriving by air and require services for ground transportation, food, lodging, and other economic activities as a spinoff of airport use. The moneys brought in by aviation visitors are cash infusions spent in the surrounding communities of the airport.

Chapter III defines historic and forecast itinerant operations and fleet mix. Table III-17 indicates 6,500 annual itinerant operations; statistics prepared by the aviation industry shows that on average 2.8 persons are on board of each general aviation flight. Surveys from car rental agencies (daily and overnight) and from personal observations and tie-down records indicate that about 15% of itinerant flights stay overnight and 20% of itinerant operations drop off passengers for overnight or longer stays. Estimated expenditures per visitor per trip is $84.35.[1]

The given data would provide the following estimated indirect economic impact:

6,500 annual itinerant operation ÷ 2 operations per trip = 3,250 trips
3,250 trips x 2.8 pilot/passenger per trip = 9,100 visitors
9,100 visitors x $84.35 = **$767,585**

Note: Indirect costs associated with offsite education and flight training activities are not included.

[1]Interpolated by Consultant from Transportation Research Circular ISSN0097-8515 and Airport Finance, Norman Ashford & Clifton A. Moore, Published by Van Nostrand Reinhold New York

Induced Impact

The definitions of economic impacts shows that every dollar expended produces a ripple effect or is recycled somewhere in the community to generate additional dollars of income or revenue. The Air Transportation Association has conducted several economic impact studies and based on the surveys uses a conservative multiplier factor of two. It is very unlikely that a local more comprehensive study has produced a similar or higher factor.

Multiplier effects would show their economic impact induced by airport capital improvement projects. Airport related construction expenditures in the community would increase employment including payroll in the local construction industry. Using twenty year capital improvement expenditure for airside and landside improvements and adjusting for inflation would produce annual capital improvement expenditures of $382,500 Federal[1] and $57,380 Local or $439,880.

Applying the multiplier effect, the estimated induced economic impact would be:

$439,880 x 2 = **$879,760**

Economic Impact of The Airport Summary

A review of Chapters VIII and IX should conclude that the general aviation activities at the Kent State University Airport irrespective of the location of the airfield within the study area is and will continue to be a consistent contributor to the local economy. The economic impact study concluded that total annual economic impact in primary and secondary spending can be summarized as per the following:

Direct Impact	$1,336,720
Indirect Impact	$767,585
Inducted Impact	$879,760
TOTAL ANNUAL IMPACT	**$2,984,065**

[1] FAA Grant History 1982 to 2002