WATERTOWN MUNICIPAL AIRPORT (RYV)

AIRPORT MASTER PLAN

2013-2033

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in association with

the Wisconsin Department of Transportation Bureau of Aeronautics

and

the City of Watertown, WI

MSA PROFESSIONAL SERVICES

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WATERTOWN MUNICIPAL AIRPORT MASTER PLAN

City of Watertown, Wisconsin

ACKNOWLEDGEMENTS

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Special thanks to those individuals who devoted their time and energy to provide comments and insight that has improved this plan.

This document is formatted for double sided printing.

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MSA PROFESSIONAL SERVICES

Since the submittal of the draft Master Plan in January 2013 and the publishing date on the cover, several changes have occurred that the reader should consider. All data referenced in this document is from 2012.

1. The property limits of the airport have expanded to include the acquisitions shown in the aerial photo below (Parcels 1023-019, 1023-020, 0941-002, and 0941-003). All the improvements on these parcels have been removed.

2. The following projects identified in the Implementation Plan have been completed:

   - Fuel System Replacement
   - Land Acquisition: Zastrow & Weider in Runway 23 Approach

3. Wisconsin Aviation is the only FBO on the Airport. Central Aviation is no longer a business on the airport and the building has been removed.

4. All images, tables, and figures generated by MSA (2012) unless otherwise noted.

WATERTOWN MUNICIPAL AIRPORT MASTER PLAN

City of Watertown, Wisconsin

This report presents the master plan for the Watertown Municipal Airport (RYV). The airport is located in the City of Watertown (pop. 23,861), in southeastern Wisconsin, approximately half way between the cities of Madison and Milwaukee. The airport is classified as a Medium General Aviation Airport by the Wisconsin Department of Transportation Bureau of Aeronautics (BOA), refer to page 13. The airport has two hard surfaced runways, a primary 4,430' long runway (5/23) and a secondary 2,800' long cross wind runway (11/29). The airport has 88 based aircraft and an estimated 58,000 annual operations. The airport is the corporate headquarters of Wisconsin Aviation, the state's largest full-service fixed-base operator (FBO) and provider of general aviation services including charter, flight training, aircraft rental, aircraft sales, maintenance, avionics, interiors, and line services.

An airport master plan is a comprehensive study of the airport describing potential short-, medium-, and long-term improvement projects that will satisfy aviation demand, while considering potential environmental and socioeconomic impacts. The master plan describes options to address future maintenance and improvement projects at the airport within the planning horizon, which is 20 years, or in this case, through the year 2032. It is the intent of the master plan to establish a cohesive vision of the airport's future considering changes in general and business aviation needs, socioeconomic, and environmental considerations.

In 2010, the BOA contracted with MSA Professional Service, Inc. to assist with the development of the master plan. Shortly thereafter a Technical Advisory Committee (TAC) was formed to work with the consultant team of engineers and planners to develop the master plan. The TAC consisted of elected officials from the City, the City Engineer, the Airport Manager, representatives from Wisconsin Aviation, and a representative each from the BOA and the Wisconsin Department of Natural Resources (WDNR).

Figure A: Watertown Municipal Airport (RYV)

This airport master plan was customized to fit the needs of Watertown Municipal Airport; however, the plan is structured to include topics recommended in the Federal Aviation Administration (FAA) Advisory Circular 150/5070-6B for preparing airport master plans. The planning process included:

- An analysis of existing conditions within and surrounding the airport (e.g. existing obstructions, land use and environmental considerations),
- Completion of a General Aviation and Corporate User Questionnaires to gather input regarding airport use, demand, and improvement needs,
- An analysis of future aviation operations, anticipated fleet mix, critical aircraft, and facility requirements,
- Developing preliminary alternatives for runway and facility improvements,
- A public information meeting to review design alternatives,
- Selection of preferred alternatives for runway and facility improvements,
- Establishing a time line and cost estimates for airport improvement projects,
- Updating the official Airport Layout Plan (ALP),
- Submittal of the draft plan to the Federal Aviation Administration (FAA) for review,
- Presentation of the final plan to the Watertown Airport Commission and City Council.

The impetus for this planning process came in-part from the desire of the airport to study the need and alternatives by which the airport could achieve a runway with a published length of 5,000 feet. This distance is significant as its relates to the ability for small business jet aircraft to utilize Watertown Municipal Airport. Due to the terms established by aviation insurance providers, this classification of airplanes are regularly restricted from using airports without a 5,000 foot runway. The concern for insurance providers is that runways of less than 5,000 feet do not provide an adequate length to safely accommodate aviation operations for these aircraft. In the simplest of terms, without a 5,000 foot published runway Watertown does not appear in a database of airports available for use by these aircraft.

The ability to support small jet aircraft has broader economic development implications for Watertown as it relates to business attraction, retention, and growth. Many businesses prefer to use general aviation airports rather than large commercial service airports as they are more time efficient in the ability to land, go off-site to complete business matters, take off and return home. Decisions regarding new business site selection or expansion of existing businesses consider, among other factors, the transportation infrastructure in a community, including those of the local airport.

During the planning process the BOA completed an Economic Impact Study for the airport (Appendix A). The results of the study indicate that in 2010 the Watertown Municipal Airport provided $13.6 million in economic output, supported 139 jobs and contributed $3.6 million in wage income to the local economy. These figures include both direct impacts (i.e. on-site sales, jobs, and wages), indirect impacts (i.e. visitor spending in the community from airport users), and induced impacts (i.e. the multiplier effects to local sales, jobs, and wages from the direct and indirect impacts). The study also indicated that in 2010 the airport generated an additional $1.8 million in sales, 43 jobs, and $1 million in payroll to the state economy. The report acknowledges that these estimates may be dampened by the national recession occurring during the time period of the study.

It is difficult to quantify the increase in direct, indirect, and induced economic benefits the availability of a 5,000 foot runway will have for Watertown. However, before a project of this nature can proceed the FAA requires the completion of a corporate user survey to gauge the level of demand for a 5,000 foot runway. The FAA requires the airport to document that at least 500 annual operations by small jet aircraft would occur if Watertown had the necessary runway facilities. A landing and subsequent take-off equals two operations. The corporate user survey completed during this project demonstrated the potential to capture approximately 1,250 annual operations, more than the required minimum of 500 operations. While this estimate is not a guaranteed or maximum figure, it does reflect the opinions of those corporate users identified as most likely to use the Airport. In addition, based on the FAA Runway

Length Advisory Circular 150/5325-4B, Watertown Municipal Airport qualifies for a maximum runway length of 5,400 feet. However, any additional runway expansion beyond the necessary 5,000 feet was not considered due to the various land use constraints.

During the planning process it was discovered that one local business has already moved its corporate board meetings from Watertown to Madison due to the inability of its jet aircraft to use the airport. In addition, during the project's public informational meeting another local business discussed their growth aspirations and how that growth will require expansion of their fleet of small jet aircraft. These are first hand accounts describing the relationship between the local businesses and the airport.

The ability to publish a runway with 5,000 feet comes with certain challenges. Watertown Municipal Airport over time has become surrounded by additional commercial, industrial and residential development. Any improvement project must consider the social and economic impacts on those existing residences, business, and supporting public infrastructure (i.e. roads, utilities, etc.). In addition, there are environmental constraints both on and surrounding the airport which must also be considered. Adding to the complexity is the fact that the topography of the area is such that portions of either runway are at lower elevations than some of the surrounding land area. This results in additional properties, structures, and vegetation obstructions within the approach surfaces of each runway than what would otherwise exist if the runways were at an elevation equal to or higher than the surrounding area.

To account for these factors a series of alternatives were developed and reviewed with the TAC (Refer to Chapter 4). The sponsor preferred alternative (Figure B and C) includes reconstructing Runway 5/23 to 5,000 feet of published runway. The existing runway includes a 570 foot stopway (i.e. overrun), which currently can not be combined with the 4,430 foot runway to meet publication requirements. However, the recommended alternative would reconstruct the 570 foot stopway to runway standards and thereby

Figure B: Sponsor Preferred Alternative Runway 5

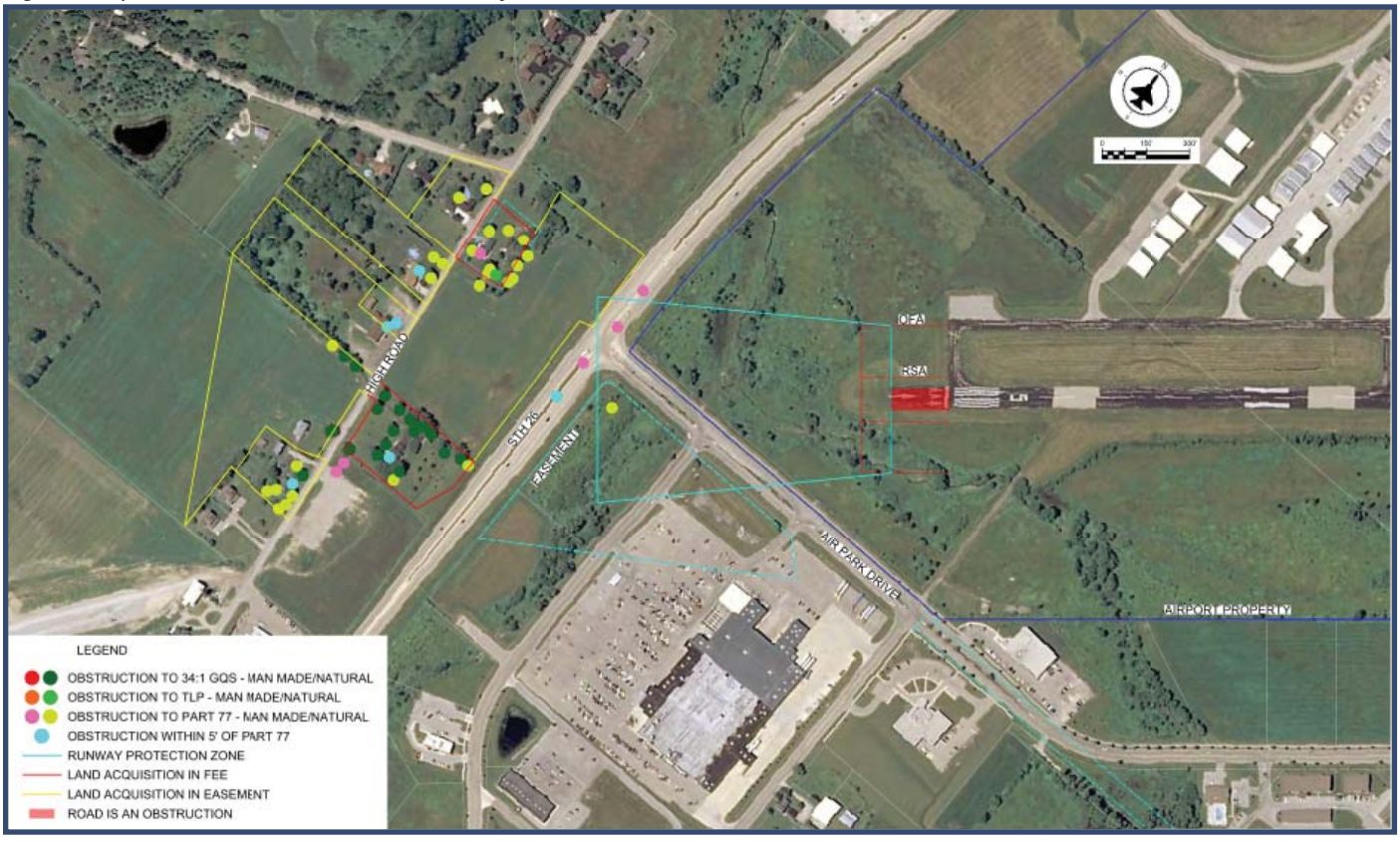
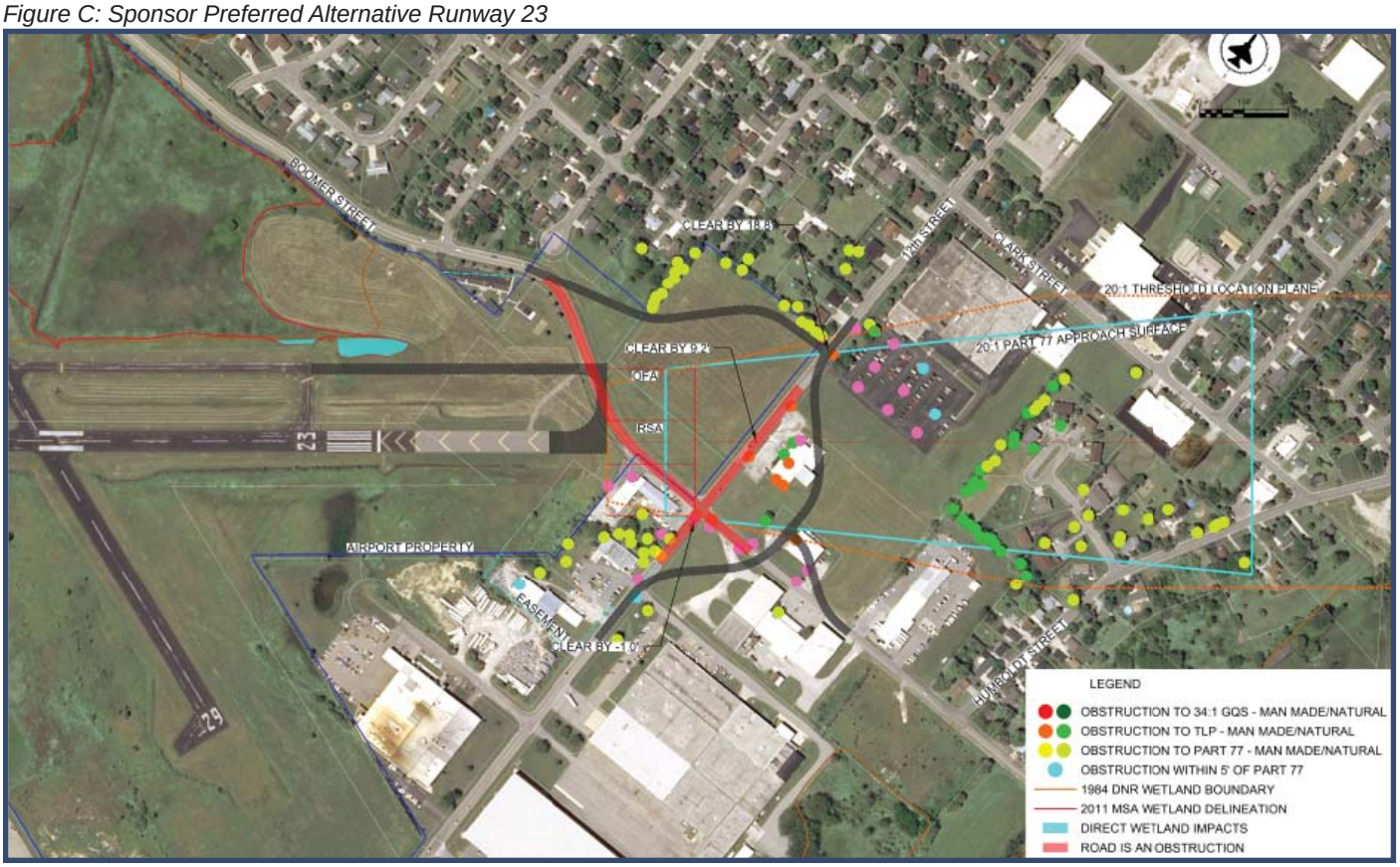


Figure C: Sponsor Preferred Alternative Runway 23



meet the 5,000 foot publication requirement. To mitigate wetland impacts, land acquisition, and infrastructure impacts, the ends of the runway would be elevated by 14.5 feet and shifted 200 feet to the northeast. In order to accommodate the required FAA safety areas and approach zones both Boomer Street and 12th Street would be realigned (refer to the conceptual layout in Figure C.)

The estimated total cost for the preferred alternative improvements is $12.6 million. However, an estimated $7.1 million can be attributed to maintenance projects which would be required to maintain the airport without obtaining a published runway length of 5,000 feet, such as pavement reconstruction, new lighting systems, and land acquisition for existing obstruction removal. This maintenance cost is due to the number of existing obstructions within the current airport environs and the eventual need to reconstruct both runway's pavement. If these projects are coordinated with the recommended alternative in mind the actual cost of the improvement project is $5.5 million. Refer to Chapter 5 for additional information regarding the preferred alternative.

Other airport improvement projects recommended in this master plan include:

- Extending the parallel taxiway on Runway 11/29
- Replacing the lighting on Runway 11/29
- Completing perimeter fencing
- Expanding the airport apron and reconstructing the existing pavement
- Establishing a Localizer Performance with Vertical Guidance (LPV) Approach
- Expansion of the airport hangar area (Figure D)

From this set of recommendations a Development Summary Plan was developed to guide the scheduling and budgeting of future airport improvement projects (Refer to Chapter 6). A summary map and table of the Development Summary Plan are shown on the following pages.

Figure D: Sponsor Preferred Hangar Area Expansion Plan

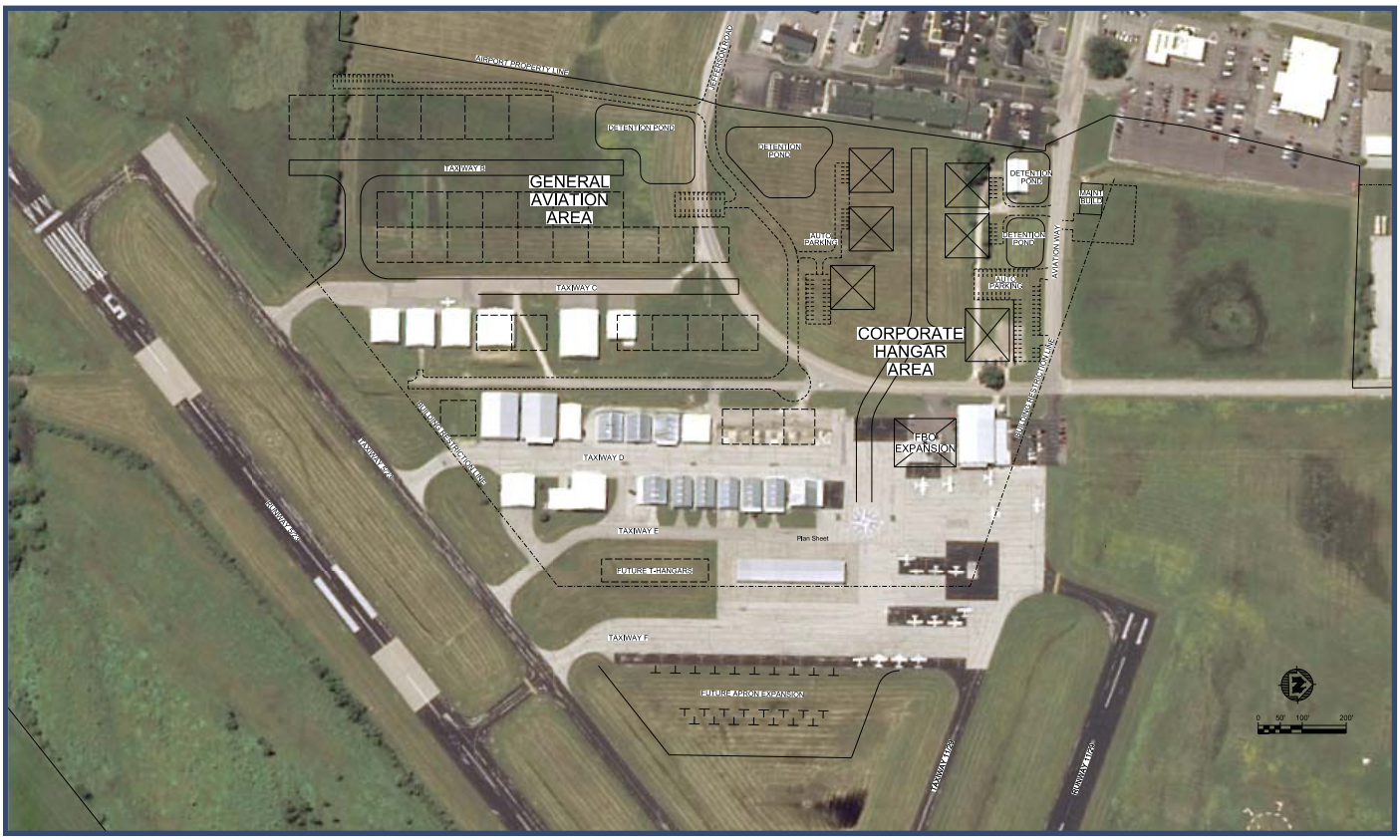


Figure E: Proposed Development Summary Plan Map

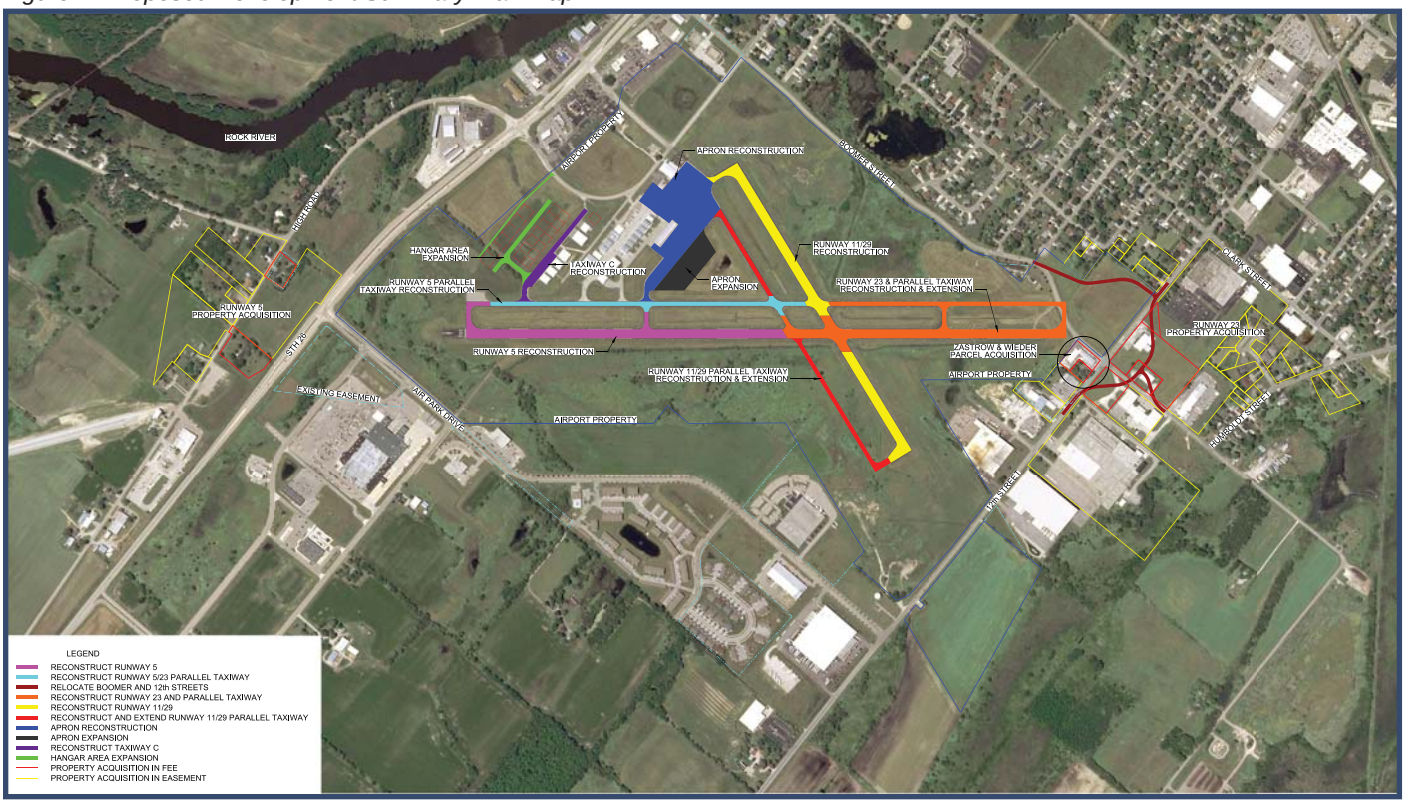


Table A: Proposed Development Summary Plan

WORKING TABLE TAC MEETING #6
MASTER PLAN PROPOSED DEVELOPMENT SUMMARY
FACILITIES IMPLEMENTATION PLAN and FINANCIAL FEASIBILITY ANALYSIS

Year		Development	Cost	Funding Rates FAA	State	Local	FAA Funding	State Funding	Local Funding
		Short Term Development (2012-2020)							
2012		AWOS Replacement	$80,000	90%	5%	5%	$72,000	$4,000	$4,000
		Total Costs for Calendar Year 2012	**$80,000**				**$72,000**	**$4,000**	**$4,000**
2013		Fuel System Replacement	$200,000	90%	5%	5%	$180,000	$10,000	$10,000
		Environmental Assessment for Runway 5/23 Upgrade	$120,000	90%	5%	5%	$108,000	$6,000	$6,000
		Land Acquisition: Zastrow & Wieder Parcels in Runway 23 Approach	$470,000	0%	80%	20%	$0	$376,000	$94,000
		Total Costs for Calendar Year 2013	**$790,000**				**$288,000**	**$392,000**	**$110,000**
2014		Preliminary Design for Runway 5/23 Improvements including Boomer & 12th Street Relocations	$200,000	90%	5%	5%	$180,000	$10,000	$10,000
		Land Acquisition in Runway 5 Approach: Fee & Easements	$750,000	90%	5%	5%	$675,000	$37,500	$37,500
		Total Costs for Calendar Year 2014	**$950,000**				**$855,000**	**$47,500**	**$47,500**
2015		Final Design for Runway 5/23 Reconstruction SW of Runway 11/29	$50,000	90%	5%	5%	$45,000	$2,500	$2,500
		AGIS for new Runway 5/23 Runway Approaches	$100,000	90%	5%	5%	$90,000	$5,000	$5,000
		Total Costs for Calendar Year 2015	**$150,000**				**$135,000**	**$7,500**	**$7,500**
2016		Reconstruct Runway 5/23 SW of Runway 11/29 includes New Lighting and Underdrains	$2,100,000	90%	5%	5%	$1,890,000	$105,000	$105,000
		Reimbursement for Zastrow and Wieder Parcels	$470,000	90%	5%	5%	$423,000	-$352,500	-$70,500
		Total Costs for Calendar Year 2016	**$2,570,000**				**$2,313,000**	**-$247,500**	**$34,500**
2017		Reconstruct Runway 5/23 Parallel Taxiway SW of Runway 11/29	$700,000	90%	5%	5%	$630,000	$25,000	$25,000
		Includes New Lighting System and Underdrains							
		Total Costs for Calendar Year 2017	**$650,000**				**$630,000**	**$25,000**	**$25,000**
2018		Land Acquisition in Runway 23 Approach: Fee & Easement	$2,200,000	90%	5%	5%	$1,980,000	$110,000	$110,000
		Final Design for Road Relocations	$50,000	90%	5%	5%	$45,000	$2,500	$2,500
		Total Costs for Calendar Year 2018	**$2,250,000**				**$2,025,000**	**$112,500**	**$112,500**
2019		Relocate Boomer and 12th Streets in Runway 23 Approach	$1,900,000	90%	5%	5%	$1,710,000	$95,000	$95,000
		Final Design for Runway 5/23 Reconstruction NE of Runway 11/29 and Safety Area	$50,000	90%	5%	5%	$45,000	$2,500	$2,500
		Total Costs for Calendar Year 2019	**$1,950,000**				**$1,755,000**	**$97,500**	**$97,500**
2020		Reconstruct Runway 5/23 NE of Runway 11/29 and Improve Safety Area	$4,000,000	90%	5%	5%	$3,600,000	$200,000	$200,000
		Includes Reconstruction of Parallel Taxiway and Extension to new Runway End							
		Includes New Lighting System, Underdrains and Wetland Mitigation							
		Total Costs for Calendar Year 2020	**$4,000,000**				**$3,600,000**	**$200,000**	**$200,000**
		Total Short Term Development (2012-2020)	**$12,920,000**				**$11,601,000**	**$638,500**	**$638,500**
		Long Term Development (2021-2032)							
2022		Reconstruct Runway 11/29 including new lighting system and underdrains	$1,700,000	90%	5%	5%	$1,530,000	$85,000	$85,000
		Total Costs for Calendar Year 2022	**$1,700,000**				**$1,530,000**	**$85,000**	**$85,000**
2023		Extend Runway 11/29 Parallel Taxiway to end of Runway 29 including MITL	$650,000	90%	5%	5%	$585,000	$32,500	$32,500
		Total Costs for Calendar Year 2023	**$650,000**				**$585,000**	**$32,500**	**$32,500**
2025		Apron Reconstruction	$1,300,000	90%	5%	5%	$1,170,000	$65,000	$65,000
		Total Costs for Calendar Year 2025	**$1,300,000**				**$1,170,000**	**$65,000**	**$65,000**
2026		Apron Expansion	$700,000	90%	5%	5%	$630,000	$35,000	$35,000
		Total Costs for Calendar Year 2026	**$700,000**				**$630,000**	**$35,000**	**$35,000**
2028		Reconstruct Taxiway C	$350,000	90%	5%	5%	$315,000	$17,500	$17,500
		Total Costs for Calendar Year 2028	**$350,000**				**$315,000**	**$17,500**	**$17,500**
2029		Environmental Assessment for Hangar Area Expansion	$100,000	90%	5%	5%	$90,000	$5,000	$5,000
		Total Costs for Calendar Year 2029	**$100,000**				**$90,000**	**$5,000**	**$5,000**
2030		Complete site preparation for Hangar Area and Construct Taxiways	$600,000	90%	5%	5%	$540,000	$30,000	$30,000
		Total Costs for Calendar Year 2030	**$600,000**				**$540,000**	**$30,000**	**$30,000**
2032		Complete 8' High Perimeter Fence	$800,000	90%	5%	5%	$720,000	$40,000	$40,000
		Total Costs for Calendar Year 2032	**$800,000**				**$720,000**	**$40,000**	**$40,000**
		Long Term Development (2021-2032)	**$6,200,000**				**$5,580,000**	**$310,000**	**$310,000**
		Total Proposed Master Plan Development	**$19,120,000**				**$17,181,000**	**$948,500**	**$948,500**

Notes:
1) Costs identified are preliminary estimates in 2012 Dollars. Additional factors beyond the scope of this planning process will determine final costs.
2) An allocation has been included for administration, engineering, professional services and contingencies, unless other specificially indentified for a project.
3) These timeframes are not mandates on the City of Watertown for the completion of particular improvements during specific years. The implemenation of specific projects could be affected by the availability of local, state and federal aid, and changes in priorities by the Airport.

The time frames shown in the table are not mandates on the City, BOA, or FAA for the completion of particular improvements during specific years. Rather the purpose is to identify the sequence of activities and projects which would be necessary in order to implement the recommended improvement projects. The costs identified are expressed in 2012 dollars and are subject to change based a number of factors including additional design considerations and the actual timing of particular projects. Funding for particular projects will come from a combination of federal, state, and local sources. Under the current Federal Transportation Act, federally funding projects require a 5% local match while state funded projects require a 20% local match. Sources of federal and state funding come from revenue generated by airport ticket taxes, user fees and aviation fuel taxes.

This master plan should not be considered a static document as amendments maybe required in the future to account for changing conditions or other unanticipated factors.

INTRODUCTION

7 - Purpose & Objectives / 8 - Planning Process

1.1 PURPOSE & OBJECTIVES

This report presents the master plan for the Watertown Municipal Airport (RYV). An airport master plan is a comprehensive study of the airport describing potential short-, medium-, and long-term improvement projects that will satisfy aviation demand, while considering potential environmental and socioeconomic impacts. The master plan describes approaches to address future maintenance and improvement projects at the airport within the planning horizon, which is 20 years, or in this case, through the year 2032. It is the intent of the master plan to establish a cohesive vision of the airport's future considering changes in general and business aviation needs, socioeconomic, and environmental considerations.

Photo 1.1

This airport master plan was customized to fit the needs of Watertown Municipal Airport; however, the plan is structured to include topics recommended in the Federal Aviation Administration (FAA) Advisory Circular 150/5070-6B for preparing airport master plans. This plan is organized based on the primary objectives of the planning process:

- *Chapter 2 Existing Conditions* - An analysis of existing conditions within and surrounding the airport (e.g. existing obstructions, land use and environmental considerations).
- *Chapter 3 Aviation Forecasts* - Completion of a General Aviation and Corporate User Questionnaires to gather input regarding airport use, demand, and improvement needs. Includes an analysis of future aviation operations, anticipated fleet mix, and critical aircraft.
- *Chapter 4 Facility Requirements* - An analysis of existing airport facilities, both airfield and landside components, to meet the forecasted activity in Chapter 3.
- *Chapter 5 Alternative Analysis* - A review of design alternatives developed during the planning process to address existing conditions, aviation forecasts, and facility requirements.
- *Chapter 6 Implementation Plan* - Establishing a time line and cost estimates for recommended airport improvement projects.

Appendix A and B includes specific reports which were either developed concurrent with this planning project (e.g. Economic Impact Report), or may be completed at some future point in time (e.g. a Wildlife Report). Information from these separate and completed studies are summarized throughout the plan and were used to inform the decision making process. It is anticipated that these separate studies maybe updated from time to time and replaced within this document. In addition, those maps which appear throughout this planning document have been consolidated in Appendix C.

One of the key outcomes of the master plan is an update of the Airport Layout Plan (ALP), refer to Appendix D. An ALP is a set of drawings that depict existing and future airport layouts in pictorial form. Once approved by the FAA, it is the official planning document for the airport. In order to implement and receive funding for a project, it must be justified and shown on an approved Airport Layout Plan (ALP).

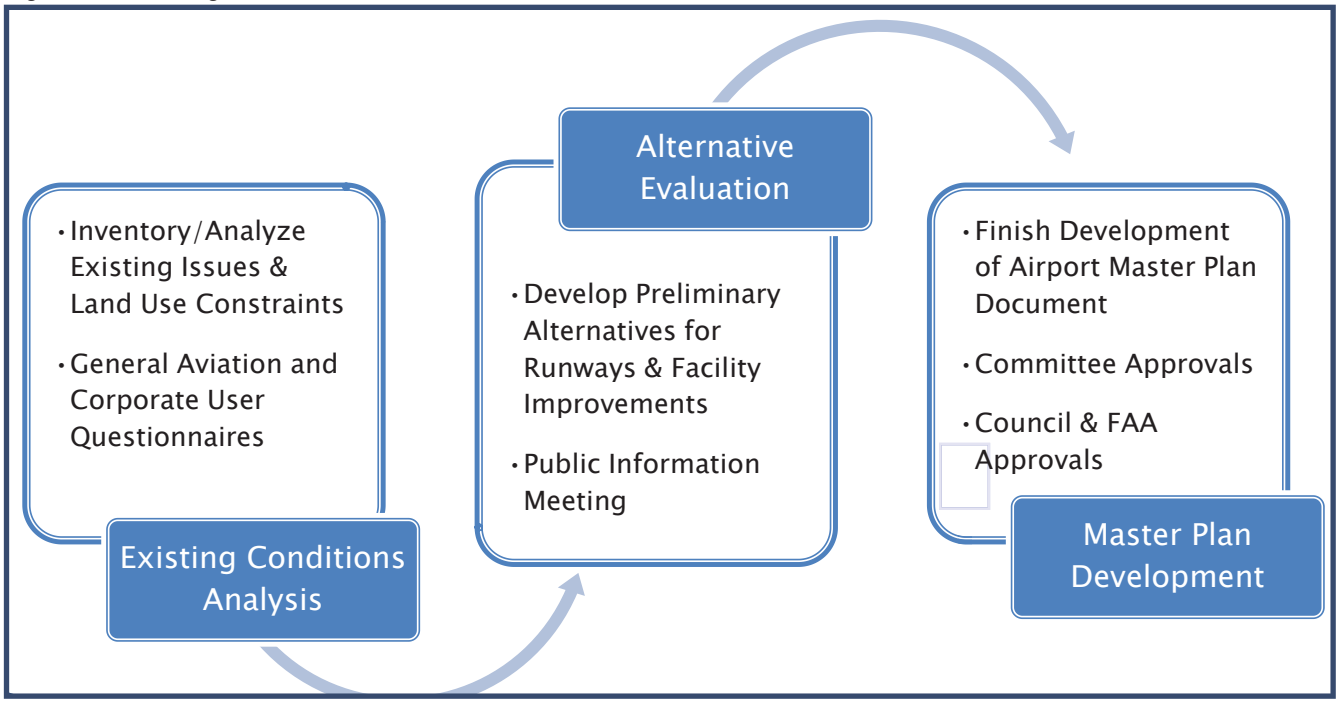
While this airport master plan is intended to serve a 20-year horizon, when dealing with the development of facilities such as airports, the actual time when all recommended projects are completed is often an even longer time line. The pace within which the recommendations of this plan are completed will depend on several factors including the availability of state or federal improvement grants, local matching funds, and market conditions. Projects recommended in this plan are not mandates on the City, the Wisconsin Bureau of Aeronautics (BOA), or the FAA for the completion of particular improvements during specific years. However, by documenting the ultimate improvements, steps can be taken to budget and plan for their completion. In addition, this master plan should not be considered a static document as amendments may be required in the future to account for changing conditions or other unanticipated factors.

1.2 PLANNING PROCESS

In 2010, the BOA contracted with MSA Professional Service, Inc. to assist with the development of the master plan. Shortly thereafter a Technical Advisory Committee (TAC) was formed to work with the consultant team of engineers and planners to develop the master plan. The TAC consisted of elected officials from the City, the City Engineer, the Airport Manager, representatives from Wisconsin Aviation, and a representative each from the BOA and the Wisconsin Department of Natural Resources (WDNR). This plan was developed over approximately eighteen months, beginning in March 2011. The process included several meetings with the members of the TAC to review preliminary study results and design alternatives.

Figure 1.1 provides an overview of the planning process which generally consisted of three phases: existing conditions analysis, alternative evaluation, and master plan development and approval. Stakeholder input was solicited during each phase of the project starting with a general aviation and corporate user survey *(Chapter 3)* to assess the condition of existing facilities and to inform aviation and aircraft forecasting. A public informational meeting (PIM) was held after a series of preliminary

Figure 1.1: Planning Process



alternatives were reviewed and refined by the TAC. The purpose of the PIM was to inform the public about the planning project and to solicit feedback on the preliminary recommendations. The PIM was noticed in the local paper and approximately 200 invitations were mailed to adjacent landowners and those landowners impacted by the preferred alternative. About 30-35 people attended the PIM. Once the draft master plan was compiled an additional public review period was commenced concurrent with FAA review and a final presentation of the plan to the City Council.

Photo 1.2

Source: October 2012, Wisconsin Aviation

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EXISTING CONDITIONS

11 - Airport Setting / 19 - Land Use / 27 - Demographics & Economic Impact

2.1 AIRPORT SETTING

Location and History

Watertown Municipal Airport (RYV) is located in the City of Watertown (pop. 23,861) in southeastern Wisconsin, approximately half way between the cities of Madison and Milwaukee. The airport is located on the south side of Watertown along Business Highway 26, seven miles north of Interstate 94, and shown on Figure 2.1.

Some of the major milestones at the Airport include:

- 1945 - The Watertown Municipal Airport was commissioned starting with two short grass strips, a few buildings, and seven aircraft.

- 1953 - Central Aviation established. Central Aviation provides aircraft refurbishing and remodeling services including painting, upholstery, interior design, repairs, modification, and installations.

- 1959 - City Council votes down a proposal to allocate $7,500 as their portion of a $30,000 project to acquire land and easements for expansion of the airport. The Director of the State Aeronautics Commission of Wisconsin subsequently charged the council had violated the state statute pertaining to the airport development and had ignored an earlier agreement by their refusal to go through with the City's part of the program.

- 1959 - First major fly-in attracts between 35-40 different planes. Pilots gave rides to visitors, for many their first airplane ride.

- 1960 - City Council considers moving forward with condemnation proceedings at the request of the State Aeronautics Commission after failing to obtain easements on two pieces of property.

- 1981 - Wisconsin Aviation established. Wisconsin Aviation is the state's largest Fixed Base Operator (FBO) providing aircraft sales and service, flight instruction, and charter services.

- 1983 - Six-year statement of project intentions formed. The statement calls for expenditures of $120,000 in fiscal year 1984 and a new parking ramp and lights, $185,000 in 1986 for two-inch overlay on the asphalt runway, a city project in 1988 of a new vehicular parking lot and $25,000 in 1989 for seal coating a runway.

- 1985 - Airport proposed expansion projects including extending both runways and construction of a new terminal building before 1992. Donohue & Associates, a Madison engineering firm, recommended the renovations as part of a five-year airport improvement program beginning in 1986 and extending through 1991. A 991-signature petition is subsequently presented to the City Clerks' office asking the issue of airport expansion be placed as a referendum on the April 1986 ballot.

- 1986 - The referendum for airport expansion passes by a nearly 2-1 margin. The State releases its 1986-91 Airport Improvement Program. The program only includes funds for land acquisition, but no funds for a new paved crosswind runway or adding 700 feet on the airport's primary runway. In addition to the land acquisition funds, the Wisconsin Department of Transportation plan does set aside $1,300,000 for reconstruction work at the Airport in 1989. The work includes: reconstructing the primary runway; expanding the apron area; improving drainage; and constructing a parallel taxiway for the primary runway.

- 1986 - A new 11,100 square foot terminal building is completed. The City borrowed $266,850 to construct the building, but the lease payments by Wisconsin Aviation will exceed the money required by the City to pay the loan.

- 1987 - Watertown officials finalized a deal acquiring 70 acres for the expansion of the

municipal airport. Ruth Funk agrees to sell to the City two parcels of land south of the airport. The State asks the City to investigate the possibility of buying 31 additional acres. The acquisitions allow for the expansion of the primary runway to 4,000 feet.

- 1991 - Runway 5/23 is constructed.
- 1993 - Runway 11/21 is constructed.
- 1999 - Transponder Landing System (TLS) established. The Airport has the potential to become the first in the nation to use a certified landing system that helps aircraft land in bad weather. The TLS system was not successful, it was abandoned and removed.
- 2000 - Two additional maintenance hangars are constructed allowing Wisconsin Aviation to accommodate increasing business demand.
- 2000 - Several thousand people attend an airport open house including the first ever aerobatic flying performance at the Airport. Swift Magic Aerobatic Team, a three-aircraft group of pilots from Tennessee that specializes in high-speed stunts, put on an afternoon show of skydiving, formation displays and mock combats during the airport's open house.
- 2009 - A 50-year old rotating beacon at the Airport is replaced with a new light. The former marker, which had stopped rotating and needed refurbishing, was replaced through budgeted funds from the Wisconsin Department of Transportation. The sale of the old light to an airfield in Mississippi financed the labor involved with the replacement.

Source: Watertown Historical Society

Today, Watertown Municipal airport encompasses approximately 322 acres and contains two paved runways. Runway 5/23 is the primary runway, is 4,430 feet in length, and has a partial parallel taxiway. It contains a 570 foot long paved safety overrun on the 23 approach. Runway 11/29 is the secondary, or crosswind runway, and is 2,800 feet in length. Runway 11/29 has a partial parallel taxiway.

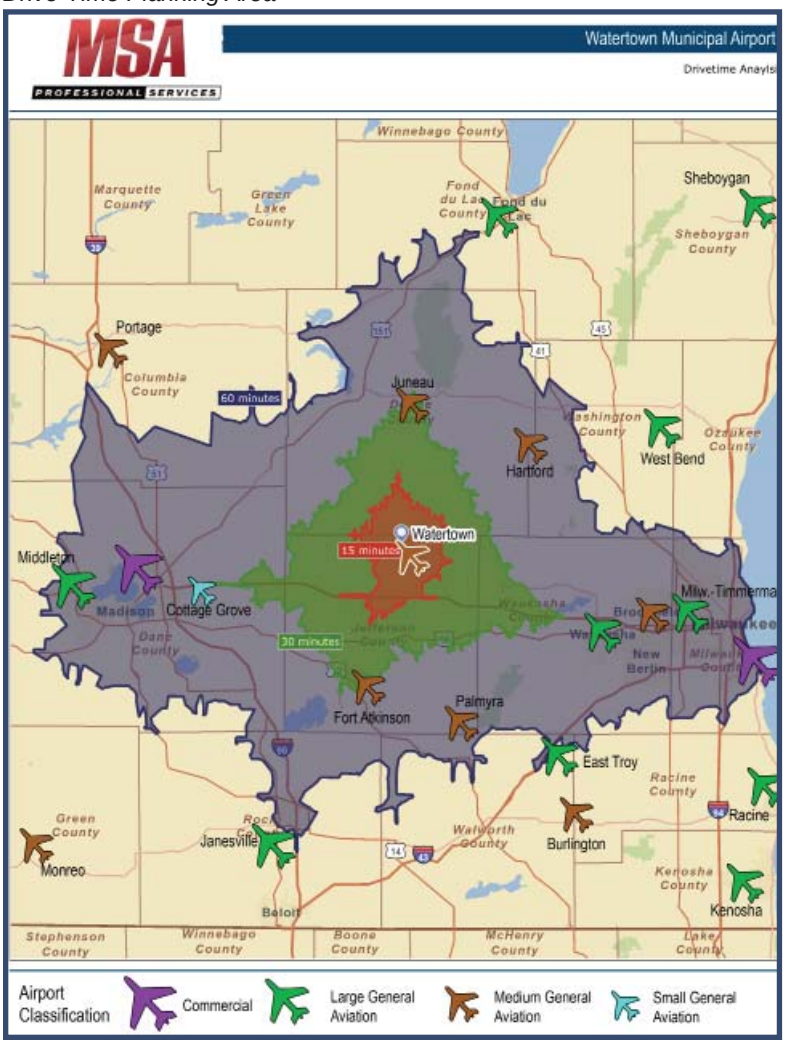
Airport Classification

Figure 2.2 and Table 2.1 provide information regarding public airports and runway facilities within the Watertown Drive-Time Planning Area (i.e. 15-,

Figure 2.1: Watertown Municipal Airport (RYV) Property

30-, and 60-minutes). In 2010, the BOA updated the system by which it classifies all public airports in the state. The purpose of the airport classification system is to identify the role each airport plays in the entire system of public airports. Under the previous five-class system, Watertown Municipal Airport was classified as a "Transport/Corporate" airport, the second highest classification and a step below "Air Carrier/Air Cargo" airports. The intended users of Transport/Corporate airports were corporate jets, some regional and/or commuter air taxi service, and all general aviation. The typical length of the primary runway is 4,500 feet or greater and the typical approach speed of the critical aircraft was between 121 and 141 knots.

Figure 2.2: Public Airports and Classifications within the Watertown Drive-Time Planning Area



Under the revised classification system Watertown Municipal Airport is classified as a "Medium General Aviation" airport. The general role of this airport group is to support most single and multi-engine general aviation aircraft, including those aircraft commonly used by businesses. These airports support regional and in-state air transportation needs. The following is a break down of the total number of airports per classification in the state:

- Commercial Service = 8
- Large General Aviation = 14
- Medium General Aviation = 42
- Small General Aviation = 34

The new classification system considers four performance categories in the rating of all airports:

- Activity (the level and types of aviation activity occurring at each airport).
- Economics (percent of itinerant operations to total operations, gross regional product, and retail sales).

Table 2.1: Public Airports and Runway Facilities within the Watertown Drive-Time Planning Area

Airport	Classification	# Runways	Paved	Primary Runway Dimensions (ft)
Madison	Commercial	3	3	9,006 x 150
Milwaukee-Mitchell	Commercial	5	5	9,690 x 200
East Troy	Large	2	1	3,900 x 75
Fond du Lac	Large	2	2	5,941 x 100
Janesville	Large	3	3	7,302 x 150
Kenosha	Large	3	3	5,499 x 100
Middleton	Large	2	1	4,000 x 100
Milwaukee-Timmerman	Large	4	2	4,103 x 75
Racine	Large	2	2	6,574 x 100
Sheboygan	Large	2	2	6,802 x 100
Waukesha	Large	2	2	5,849 x 100
West Bend	Large	2	2	4,494 x 75
Brookfield	Medium	3	1	3,010 x 44
Burlington	Medium	2	1	4,300 x 75
Fort Atkinson	Medium	1	1	3,800 x 60
Hartford	Medium	2	1	3,000 x 75
Juneau	Medium	2	2	5,070 x 100
Monroe	Medium	2	2	5,000 x 75
Palmyra	Medium	1	0	2,800 x 200
Portage	Medium	2	1	3,775 x 60
Watertown	**Medium**	**2**	**2**	**4,430 x 75**
Cottage Grove	Small	2	2	2,814 x 57

- Facilities (primary runway length and approach types - precision, non-precision, and visual).
- Accessibility (population, employment, and area within a 30-minute drive time of each airport).

Within each of these categories, defining factors were used by the BOA to evaluate each airport's role. The defining factors were applied equally to all airports, regardless of the size of the airport, annual passenger enplanements, or type of aviation services currently offered at the airports. This evaluation process provides a means to group airports by functional role based on the demand for aviation in a region, as determined based on the application of the defining factors. In addition, Geographic information system (GIS) mapping analysis evaluated data related to drive times. GIS applied a 30-minute drive time to all airports to conduct and compare system airports by their defining factors. This drive time correlates to the FAA's National Plan of Integrated Airport Systems (NPIAS) criteria of a 30-minute service area.

Table 2.2 provides the data for each performance factor for Watertown Municipal Airport as determined by the BOA in their 2010 Wisconsin State Airport System Plan, Airport Classification Review and Update. To determine each general aviation airport's current role, a mathematical process linked each performing factor to a numeric value. The process then used standard deviation, the most frequently calculated measure of distribution, to determine the role assignments. The standard deviation represents the average distance of a set of scores from the mean. The airport's score and its relation to the complete data set or range of scores determined the standard deviation for each airport. Analyzing each airport's standard deviation value as it relates to the data set allowed for break points to be determined. Table 2.3 shows the scores assigned to each airport illustrated in Figure 2.2, excluding the Commercial airports, by performance category and the break between each role category.

Watertown Municipal Airport is tied with Burlington Municipal Airport as the top rated Medium General Aviation airports in the state. Their weighted score of 11.75 fell just below the cut-off of 12 points established by the BOA for Large General Aviation Classification. The general role of this airport group

Table 2.2: Performance Category Data - Watertown Municipal Airport

Activity Factors Summary				
Based Aircraft	Based Multi-Engine Aircraft	Based Jet Aircraft	Registered Pilots	Annual Operations
60	14	1	384	58,000

Economic Factors Summary				
% of Itinerant Operations to Total Operations	GRP within a 30-minute Drive Time	Retail Sales within a 30-minute Drive Time		
28%	$ 5,619,937,143	$ 1,732,381,598		

Facilities Factors Summary			
Primary Runway Length (ft)	Approach Type	Automated Weather Observing System (AWOS)/Automated Surface Observing System (ASOS)	
4,430	Non-Precision	AWOS	

Accessibility Factors Summary				
Population within a 30-minute Drive Time	Employment (jobs) within a 30-minute Drive Time	Number of Square Miles within a 30-minute Drive Time		
155,955	83,879	1,026		

Notes:

Activity Factors - Data gathered from BOA records and FAA Form 5010s.

Itinerant Operations - operations which originate or terminate at another airport. Higher percentages of itinerant operations reflect the role the airport is playing in meeting air transportation and economic needs of the market area it serves. Itinerant operations are an important indicator because they show that users from outside of the local area, beyond a 30-minute market area, are operating at the airport.

Gross Regional Product (GRP) & Retail Sales - Data collected from Woods & Poole Economics, Inc. for the year 2005. Higher values generally equate to more demand for aviation services.

Employment (jobs - Data collected from Woods & Poole Economics, Inc. for year 2005.

Table 2.3: Performance Category Ranking Summary

Airport	Total Scores				Weighted Score	Role Assignment
	Activity	Economic	Facilities	Accessibility		
Waukesha	39	28	25	29	30.25	LGA
Milwaukee - Timmerman	21	29	11	28	22.25	LGA
Kenosha	27	17	27	13	21.00	LGA
Brookfield*	16	25	6	28	18.75	MGA
Racine	17	14	29	14	18.50	LGA
Sheboygan	15	8	27	11	15.25	LGA
East Troy	12	17	10	21	15.00	LGA
Janesville	15	9	27	9	15.00	LGA
West Bend	14	10	18	12	13.5	LGA
Fond du Lac	8	10	23	12	13.25	LGA
Middleton	13	13	10	15	12.75	LGA
Cottage Grove*	7	15	9	18	12.25	SGA
Burlington	7	10	18	12	11.75	MGA
Watertown	**11**	**7**	**18**	**11**	**11.75**	**MGA**
Juneau	7	8	19	10	11.00	MGA
Monroe	5	9	19	8	10.25	MGA
Hartford	8	9	9	10	9.00	MGA
Fort Atkinson	5	8	10	12	8.75	MGA
Portage	4	9	10	11	8.50	MGA
Palmyra	6	10	5	11	8.00	MGA

**The role designation of Large General Aviation for Cottage Grove and Brookfield is the result of the proximity of these airports to major socioeconomic centers and not their existing infrastructure or individual activity levels. In-depth analysis conducted by BOA determined that these airports would be designated as a Small General Aviation airport and Medium General Aviation airport, respectively.

is to support all general aviation aircraft that include daily operations of all types of business jets. These airports generally serve as domestic transportation centers and may support international destinations.

The Performance Category with the lowest score for Watertown was the Economic Factors. However, data for both GRP and Retail Sales data were collected at the County level, and then distributed to areas based on concentrations of people. This methodology does not provide the same level of accuracy as other Performance Categories, which come directly from FAA reporting forms or precise measurable attributes (e.g. runway length). Therefore, one could expect the highest level of reporting error to occur within the Economic Factors. For example, MSA through this planning process found the percentage of itinerant operations to total operations to be 38%, based on FAA's Terminal Area Forecasts. In addition, MSA also found the number of Based Aircraft (88) is higher than reported in Table 2.2.

Table 2.4 provides typical facility and service attributes for Medium and Large General Aviation Airports as defined by the 2010 Wisconsin State Airport System Plan, Airport Classification Review and Update. These attributes serve as a guide when creating or updating airport master plans or airport layout plans. The relationship of these typical facility and service attributes to Watertown Municipal Airport, as it exists now and in the future, is discussed in greater detail throughout this plan.

The classification of the system's airports identifies the "relative" role that each airport in Wisconsin's public airport system is currently filling. The airport classifications are broad categories that describe the typical facility and service attributes of airports. These attributes are not a requirement. Typical facility and service attributes provide guidance on what each airport should put in place to best fill its system role and meet the needs of projected users. An airport classification's associated typical facilities and services attributes do not automatically establish

Table 2.4: Typical Facility and Service Attributes - Medium & Large General Aviation Airports

Facility/Service	Typical Attribute, M.G.A.	Typical Attribute, L.G.A.
Airport Reference Code (ARC)	A or greater	B or greater
Runway Length (Primary)	3,500 feet to 5,500 feet (actual runway dimensions are determined by the airport's critical aircraft*)	5,000 feet or greater (actual runway dimensions are determined by the airport's critical aircraft*)
Runway Length (Primary)	75 feet (actual runway dimensions are determined by the airport's critical aircraft*)	100 feet (actual runway dimensions are determined by the airport's critical aircraft*)
Taxiway Type	Full Parallel	Full Parallel
Approach Capability	Visibility minimum 3/4-mile	Visibility minimum 1/2-mile
Runway/Taxiway Lighting	MIRL and Taxiway reflectors	HIRL and MITL
Visual Aids and Approach Light Configuration	MALS-F, REILS, Rotating Beacon, Wind Cone, VGSI (VASI/PAPI)	Rotating Beacon, Wind Cone, MALS-R, REILS, VGSI (VASI/PAPI)
Weather Reporting	ASOS or AWOS, desired	ASOS or AWOS
Pavement Condition	60 PCI or greater	70 PCI or greater
Hangars Space	100% of based aircraft plus 10% of transient aircraft	100% of based aircraft plus 25% of transient aircraft
Ramp Space	25% of average daily transient aircraft	50% of average daily transient aircraft
General Aviaition Terminal/Admin Bldg	Yes	Yes
Operations/Miantenance Hangar	Yes	Yes
Auto Parking	1 space per based aircraft plus 25% for employees and visitors	1 space per based aircraft plus 50% for employees and visitors
FBO	Limited Service	Full Service
Maintenance	Limited Service	Full Service
Fuel	100LL and Jet A as needed	100LL and Jet A
Terminal/Pilot's Lounge	Phone and Restrooms	Phone, Restrooms, Flight Planning/Lounge
Ground Transportation	Courtesy/loaner car	On-Site Courtesy Car
Security	Appropriate Access Restrictions and Signage	Full Perimeter Fencing, Controlled Access, Signage, Lighting
Other	Snow Removal	Timely Snow Removal

*Critical aircraft -The airport must be designed to standards, which will accommodate the most demanding airplane (critical aircraft), that is currently using or is projected to use the facility on a regular basis (defined as 500 operations per year or more). The weight, wingspan, and performance characteristics of these aircraft, in conjunction with site-specific conditions, determine an airport's geometry in terms of runway/taxiway configurations, lengths, and separations. Source: 2010 Wisconsin State Airport System Plan, Airport Classification Review and Update.

funding eligibility for those facilities. Each airport improvement must be tested against eligibility criteria to see if federal or state funds may be available to assist in funding that improvement under the facts and circumstances of that particular airport. The four airport classifications are relatively broad. A typical facility or service attribute (i.e., runway length) at one Medium Class airport may prove to be eligible for funding. However, that same facility or service attribute may not be justified at another Medium Class airport because of differing aircraft operations or other variables within the class.

The figures and tables within this section suggest that while Watertown Municipal Airport may be classified as a Medium General Aviation airport it is closer on the classification spectrum to that of the Large General Aviation airport. This assertion is also supported by the Airport's proximity to Interstate 94, midway location between Madison and Milwaukee, and lack of competition from other airports within a 30-minute drive time. Therefore, when considering potential long-term improvements at the airport, other than runway length and width, Watertown should also consider the typical facility and service attributes for Large General Aviation airports. The critical aircraft using or planned to use the airport determines runway length and width (Refer to Chapter 3).

Airport Facilities

The airport property depicted on Figure 2.1 encompasses approximately 322 acres. A summary of the existing airfield and landside facilities follows. Chapter 4 contains an in depth analysis of the capacity of theses facilities to meet both existing and future aviation demand.

- Primary Runway 5/23 4,430' x 75', paved, with a partial parallel taxiway
- Secondary Runway 4/29 2,800' x 75', paved, with partial parallel taxiway
- Medium Intensity Runway Lights (MIRL) on both runways

- Runway Approaches:
  - Non-Precision Instrument Approach to Runway 5 - RNAV-GPS
  - Non-Precision Instrument Approach to Runway 11 - RNAV-GPS
  - Non-Precision Instrument Approach to Runway 23 - RNAV-GPS
  - Non-Precision Instrument Approach to Runway 29 - RNAV-GPS
  - Non-Precision Instrument Approach to Runway 29 - VOR/DME
  - Non-Precision Instrument Approach to Runway 5 - NDB
  - Non-Precision Instrument Approach to Runway 23 - NDB
- PAPIs and REILs on Approach to Runway 5 and Runway 23
- Fuel Service Station & 42 Space Tie-down Apron
- 23 Hangars
- 1 Terminal/FBO Building (Wisconsin Aviation)
- 1 FBO Hanger (Central Aviation)
- 1 Maintenance Building
- 34 Space Paved Parking Lot
- 40 Space Overflow Gravel Parking Lot

The location of some of these facilities are illustrated in the existing Airport Layout Plan (ALP) from 1995 (Figure 2.3). An ALP is a set of drawings that depict existing and future airport layouts/facilities in pictorial form. Once approved by the FAA, it is the official planning document for the airport. In order to implement and receive funding for a project, it must be justified and shown on an approved ALP.

The existing ALP also depicts the official boundaries of the airport, areas under aviation and clear zone easements, and FAA required Runway Safety, Object Free, and Runway Protection Zones.

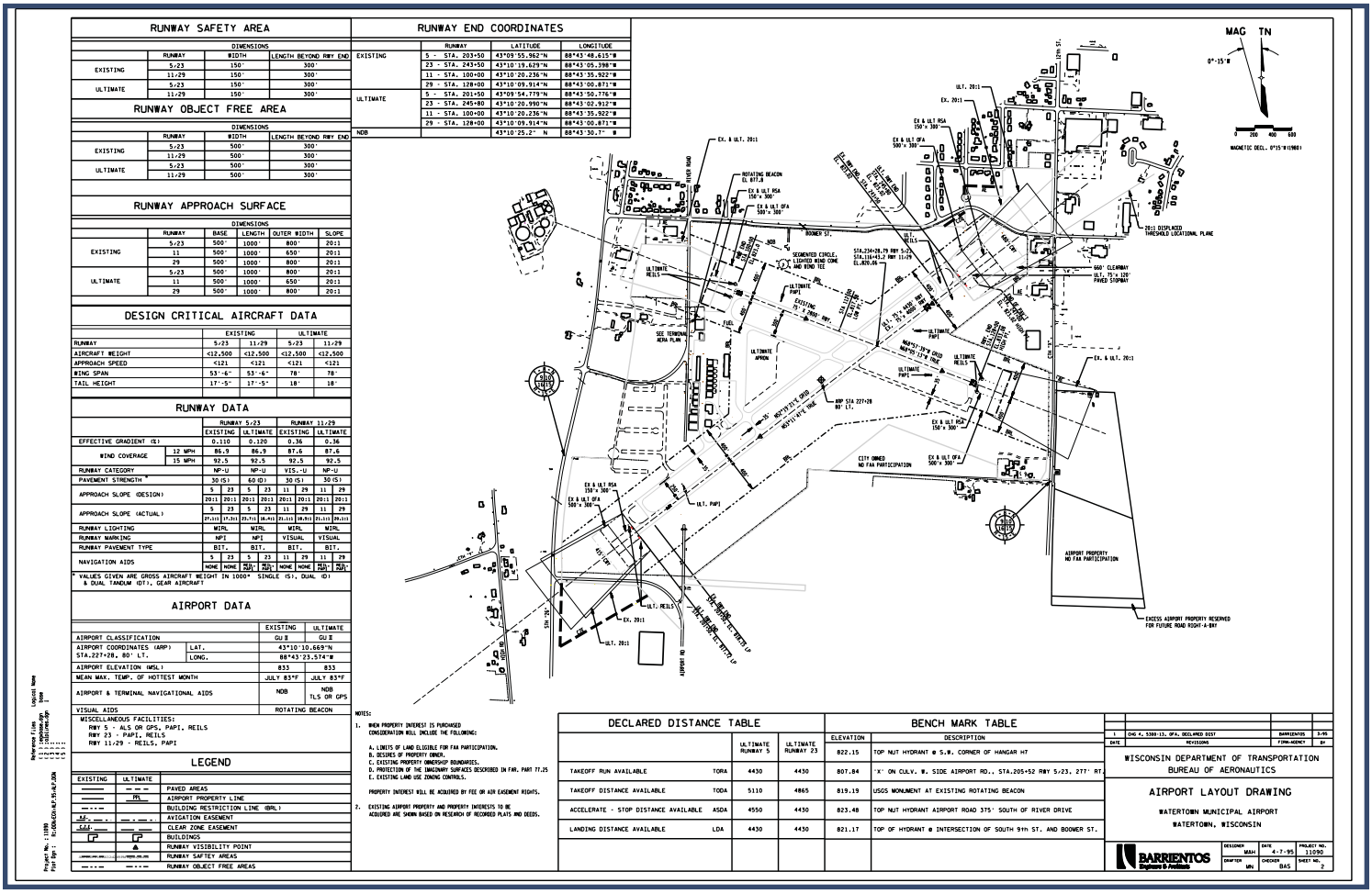
- *Runway Safety Area (RSA)* - A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the

Photo 2.1

Photo 2.2

Photo 2.3

Figure 2.3: Existing Airport Layout Plan



event of an undershoot, overshoot or excursion from the runway.

- *Runway Object Free Area (OFA)* - An area on the ground centered on a runway, taxiway or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.
- *Runway Protection Zone (RPZ)* - Formerly known as clear zones, an RPZ is a trapezoidal area centered on each runway, typically beginning 200 feet beyond the runway end. The RPZ has been established by the FAA to provide an area clear of obstructions and incompatible land uses where possible, in order to enhance the protection of approaching aircraft, as well as people and property on the ground. The dimensions of the RPZ vary according to the visibility minimums serving the runway and the type of aircraft operating on the runway. Ideally, the entire RPZ areas are located within the airport property; however, this is not the case for Watertown.

The location of the exiting RSA, OFA, and RPZ areas for Watertown Municipal Airport are displayed on many of the maps found throughout this Chapter. Additional information on both airside and landside facilities is discussed in Chapter 4.

2.2 LAND USE INVENTORY

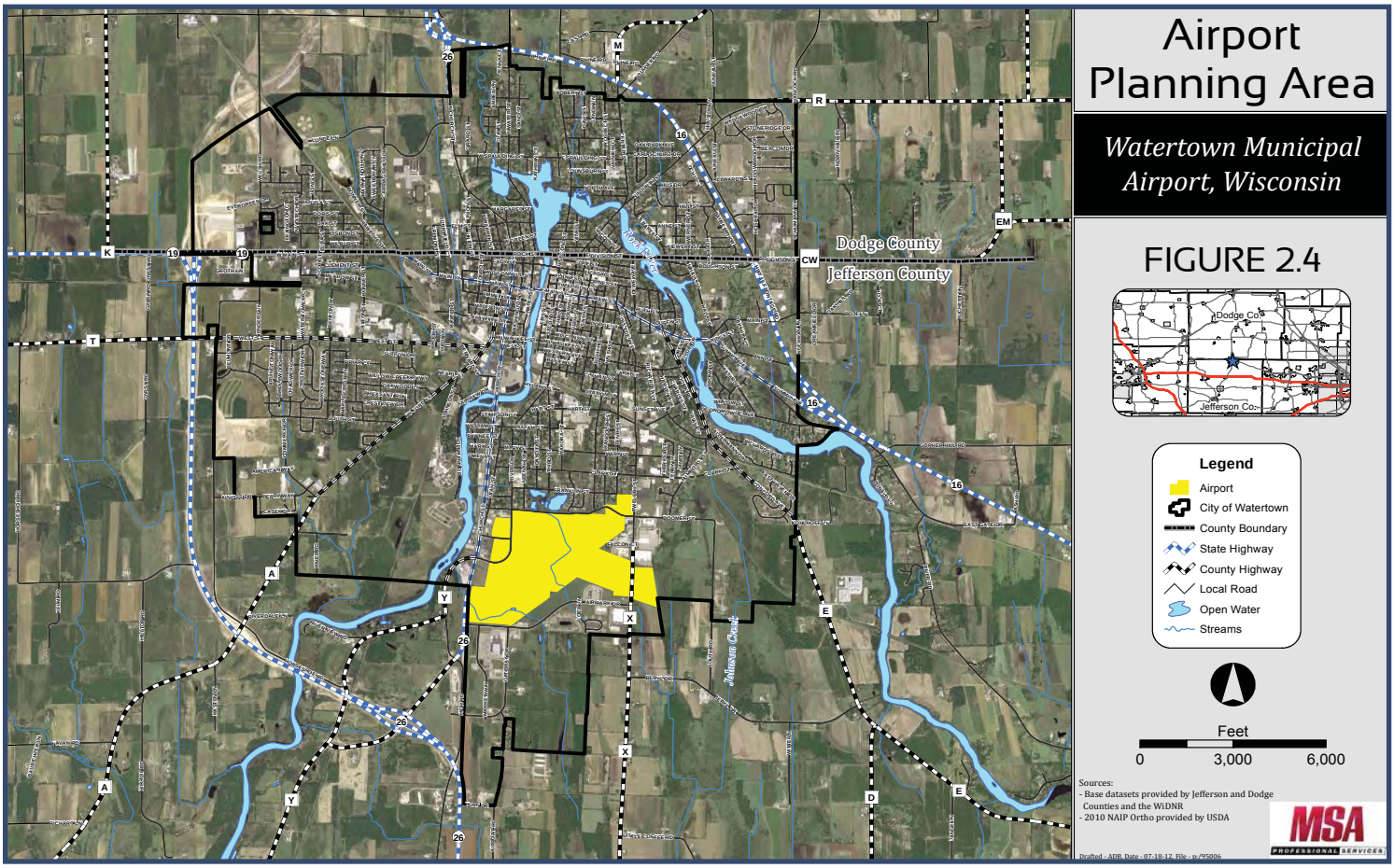
This section provides an overview of the environmental, transportation, land use, and zoning characteristics within the vicinity (i.e. generally within one-half mile) of Watertown Municipal Airport. Full size maps displayed in this chapter have been consolidated in Appendix C.

Local Context

Figure 2.4 illustrates the Airport's location on the southern boundary of the City of Watertown. The first European settlement in Watertown dates back to 1836 and the damming of the Rock River for sawmill industry and later electric power. The City has since grown to encompass 11.9 square miles (7,589 acres). Most of the City lies within Jefferson County; however, a sizeable portion also lies within Dodge County. The Airport lies between the east-west streets of Business Highway 26 (locally Church Street) and CTH X (locally 12th Street) and the north-south streets of Boomer and Air Park Drive.

WIS 26 serves as the City's main north-south connector providing access to Interstate 94 seven miles south of the City. Starting in 2008, the Wisconsin Department of Transportation (WisDOT) began an expansion project along 50 miles of WIS 26 from Janesville to WIS 60, north of Watertown. The project includes a new bypass around the west side of Watertown. The bypass was under construction during this planning project and is expected to be completed at the end of 2012. The new bypass should significantly reduce the amount of thru traffic traveling past the airport and through the City. The entire expansion project will be completed in 2015.

Figure 2.4: Local Context



Environmental Constraints

There are several environmental features within and surrounding the airport. The most noticeable is the Rock River, which flows into the City from the southwest and leaves traveling southeast. The Rock River in itself does not pose a significant environmental constraint for airport development or expansion as it is separated from the airport by Business 26. It does however present aviation safety concerns from birds and other wildlife that use the river.

There are several significant wetland and floodplain areas around the airport. Some of these wetland areas lie within the existing airport property. Since the Wisconsin Department of Natural Resources (WDNR) digital wetland data was created in 1984, MSA Professional Services completed an inventory of the wetland boundaries within the existing airport property as part of this planning project (Refer to Figure 2.6 & 2.7).

Other environmental constraints include intermittent drainage streams, most notably south of Runway 5, and topography. The Airport has a published elevation of 833 feet above mean sea level. Generally speaking, the land within the approaches of each runway is at a higher elevation than the land at the end of each runway. High Road on the southwest approach to Runway 5 is approximately 28 feet above the end of the runway. The land within the approach to Runway 23 also sits approximately 40 feet above the runway. The topography of the surrounding area exacerbates potential conflicts with obstructions, both man-made and natural, to the airport's existing or proposed flight approaches.

Figure 2.5: Environmental Constraints

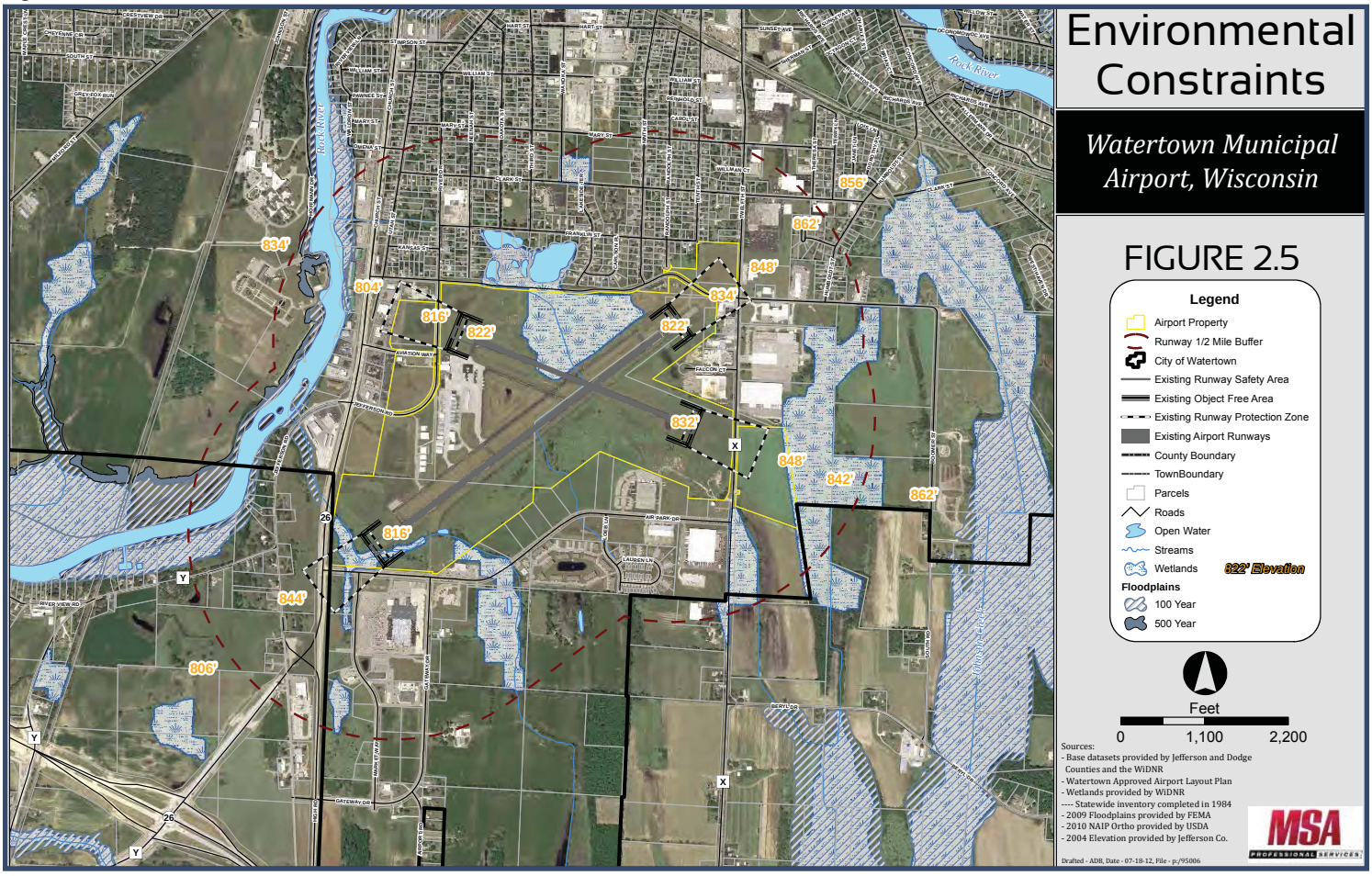
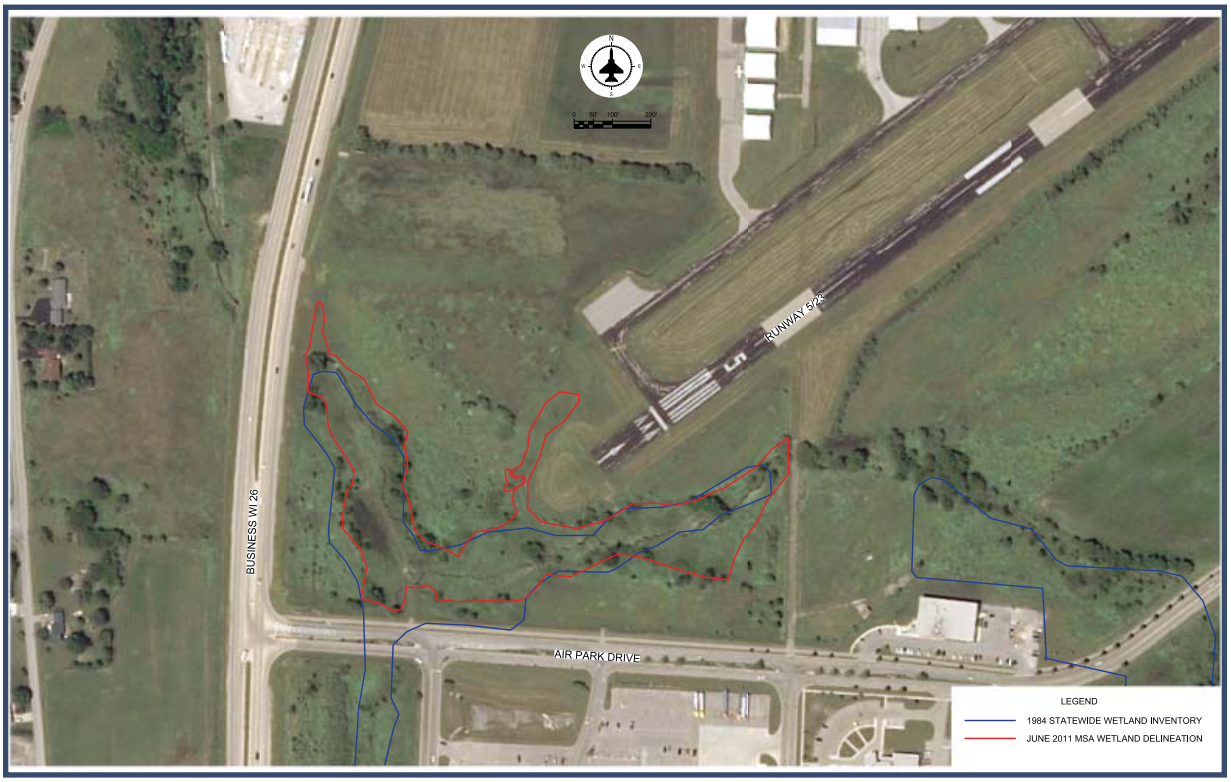


Figure 2.6: Wetland Delineation - Runway 23

Figure 2.7: Wetland Delineation - Runway 5



Existing Land Use & Zoning

Figure 2.8 displays the existing land uses near the Airport. In general the land along Business Highway 26 is in commercial use, the land along Boomer St. is in residential use, the land along CTH X is in industrial use, and the land along Air Park Drive is a mix of multi-family, commercial, and industrial.

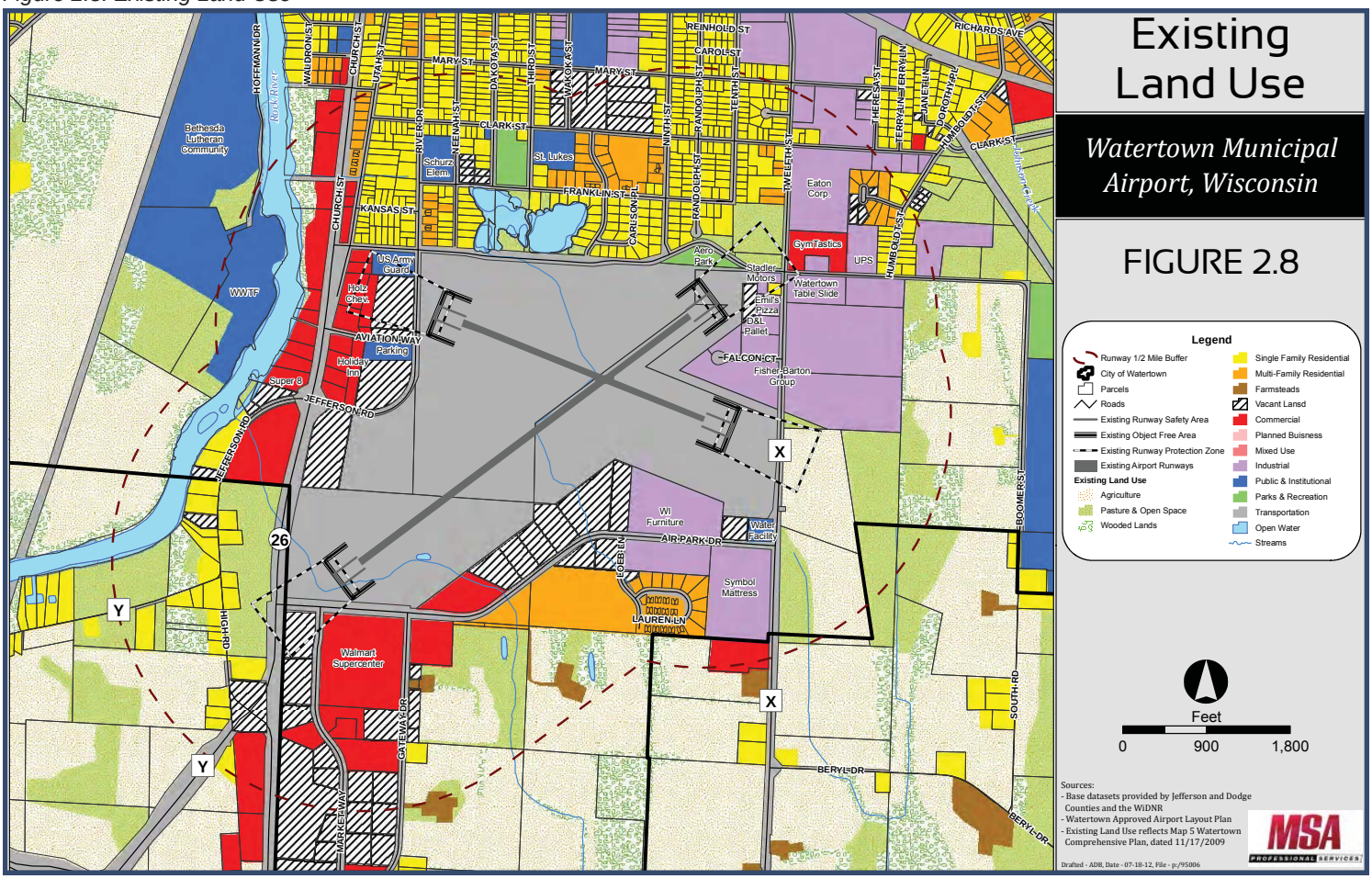
Photo 2.4

The portion of River Street, between Boomer Street and Aviation Way is closed and barricaded (as shown in Photo 2.4).

One of the primary concerns facing the aviation industry is the increasing pressure of incompatible land uses near airports. Incompatible land uses are those uses that, if allowed near airport property, could create hazards for airport operations or for the occupants of those properties. Historically, Watertown Municipal Airport was located at the outskirts of the City; however, as time has passed additional development has spread further out into what was once open space near the Airport, creating an increased risk to public safety. While ideally all areas within the vicinity of an airport would be kept in open space, this option is not realistic for Watertown. In addition, most business uses are compatible with aviation operations if located in the proper area. In some cases, certain businesses find it advantageous to be located near the Airport.

Perhaps the most critical factor in determining which areas around an airport should be protected, is the knowledge of where aircraft accidents occur. Accident probabilities increase in closer proximity to runway ends because of a greater concentration of aircraft over that area and because aircraft are flying

Figure 2.8: Existing Land Use



at lower altitudes. Data compiled by the National Transportation Safety Board (NSTB) between 1990-2000 indicate that over 50% of accidents occurred during takeoff and landing ("on airport") for general aviation aircraft, with over 75% of accidents occurring within one-mile of the airport. The most critical areas are those lands within the Runway Protection Zones and the areas within the direct flight approach of each runway. However, all areas within 1/2 to 1-mile are also a concern as aircraft turns predominantly take place between 2,000 and 5,000 feet from the runway end depending upon the aircraft type, the number of aircraft in the traffic pattern, and a pilot's flying technique.

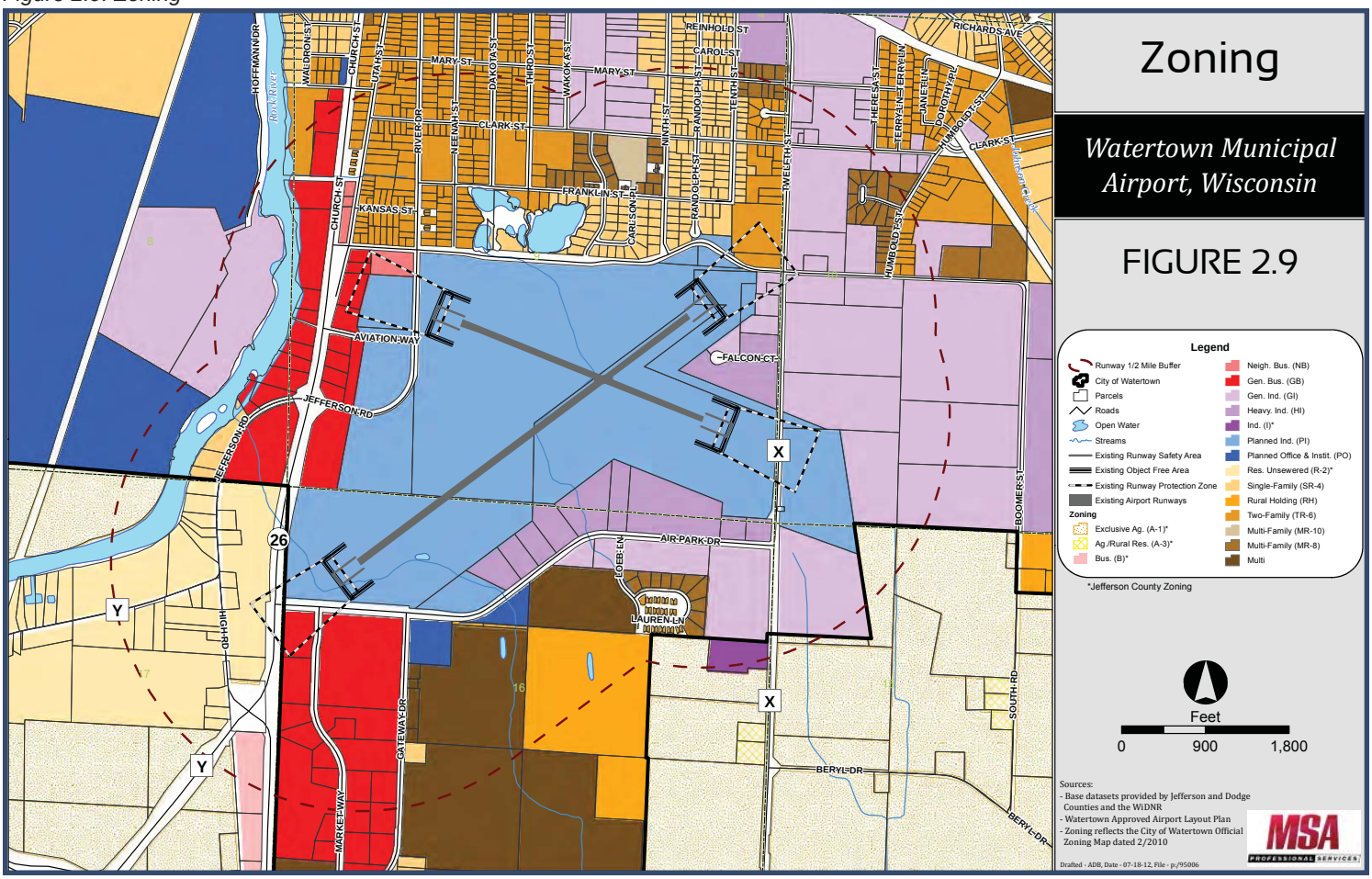
Hazards to airports, such as bright lights, cell towers, wildlife and bird attractants, and smoke and/or steam generators place a hardship not only on pilots and airport owners, but on passengers and people who live and work near the airport. The least compatible land uses around airports include multi-family housing, shopping malls, medical buildings, smokestacks, places of public assembly, and large wetlands.

Potential land use conflicts around Watertown Municipal Airport include:

- Residential development within the approaches of Runway 5/23,
- The Bethesda Lutheran Campus,
- Wetland areas, and
- Any existing building within the Runway Protection Zones

The best method for ensuring compatible land uses around an airport is for the airport to own the land, or purchase easements on property, which is of

Figure 2.9: Zoning



the highest concern. The remaining areas within proximity to the an airport can be protected through airport zoning. Figure 2.9 illustrates the zoning districts within the vicinity of the Airport. The majority of the Airport property is zoned Planned Industrial (PI). To date, the City has not developed an airport overlay zoning district to regulate incompatible lands uses within three miles of the Airport. However, the City does maintain height limitation regulations which includes the following use restrictions:

19.04 (1) ACTIVITIES. Notwithstanding Sec. 19.05, no use may be made of land in any zone in such a manner as to create electrical interference with radio communications between the airport and aircraft, or make it difficult for pilots to distinguish between airport lights and others, or result in glare in the eyes of pilots using the airport, or impair visibility, in the vicinity of the airport or otherwise endanger the landing, taking off or maneuvering of aircraft.

Section 19.04(1) provides the minimum acceptable standards as provided by the BOA model height limitations ordinance. However, both the BOA and FAA encourage airport sponsors to consider the adoption of more specific land use regulations.

Future Land Use

Figure 2.10 illustrates the future land use map from the City's Comprehensive Land Use Plan, adopted November 17, 2009. The future land use map continues the existing pattern of development with office and commercial use along Business 26 and primarily industrial development around the airport. Most of the undeveloped areas south and east of the Airport are identified as Planned Neighborhood. The City's Comprehensive Plan defines Planned Neighborhoods as:

A carefully planned mixture of predominantly single-family residential development (minimum 65% of all

Figure 2.10: Future Land Use

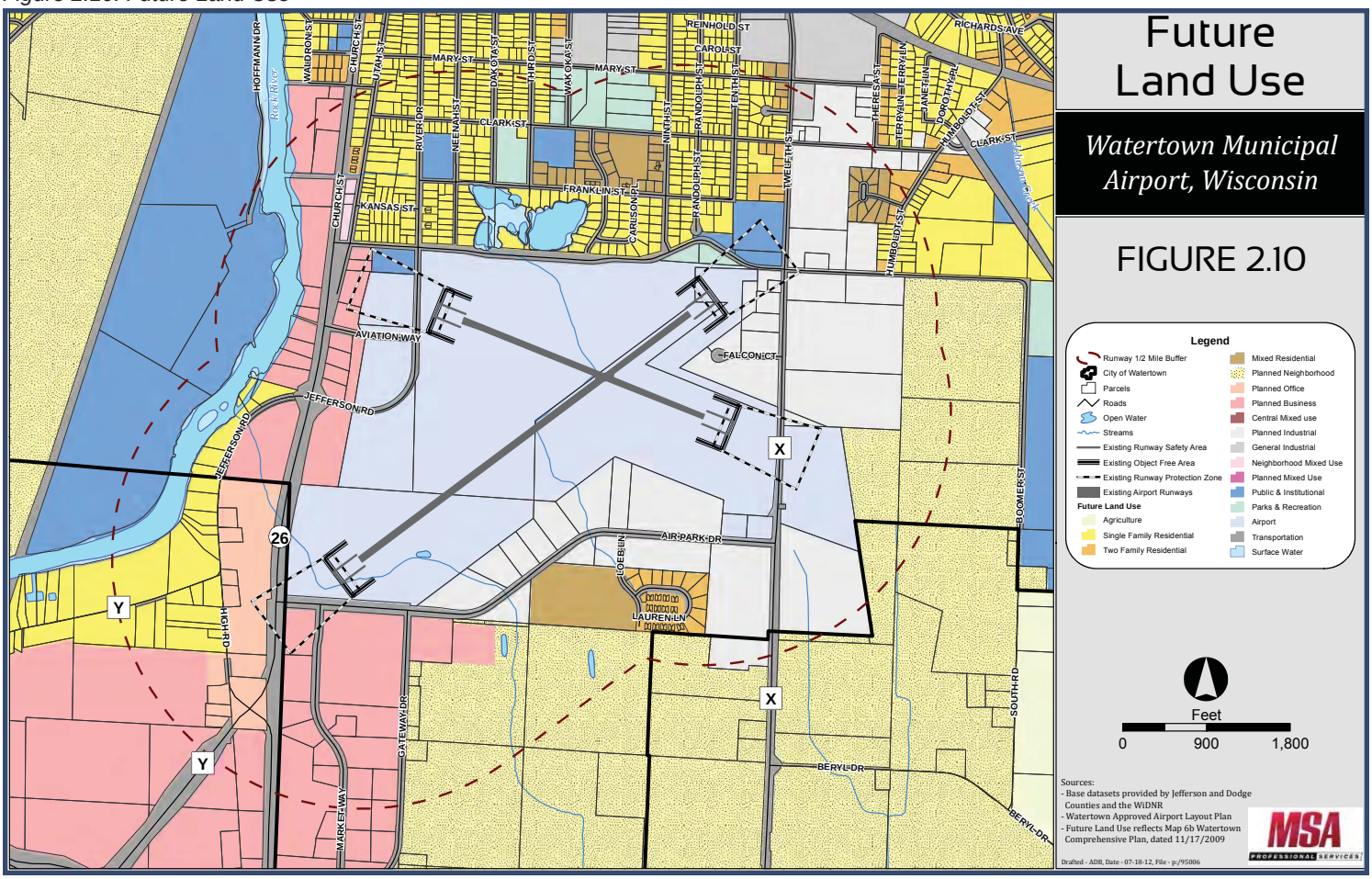
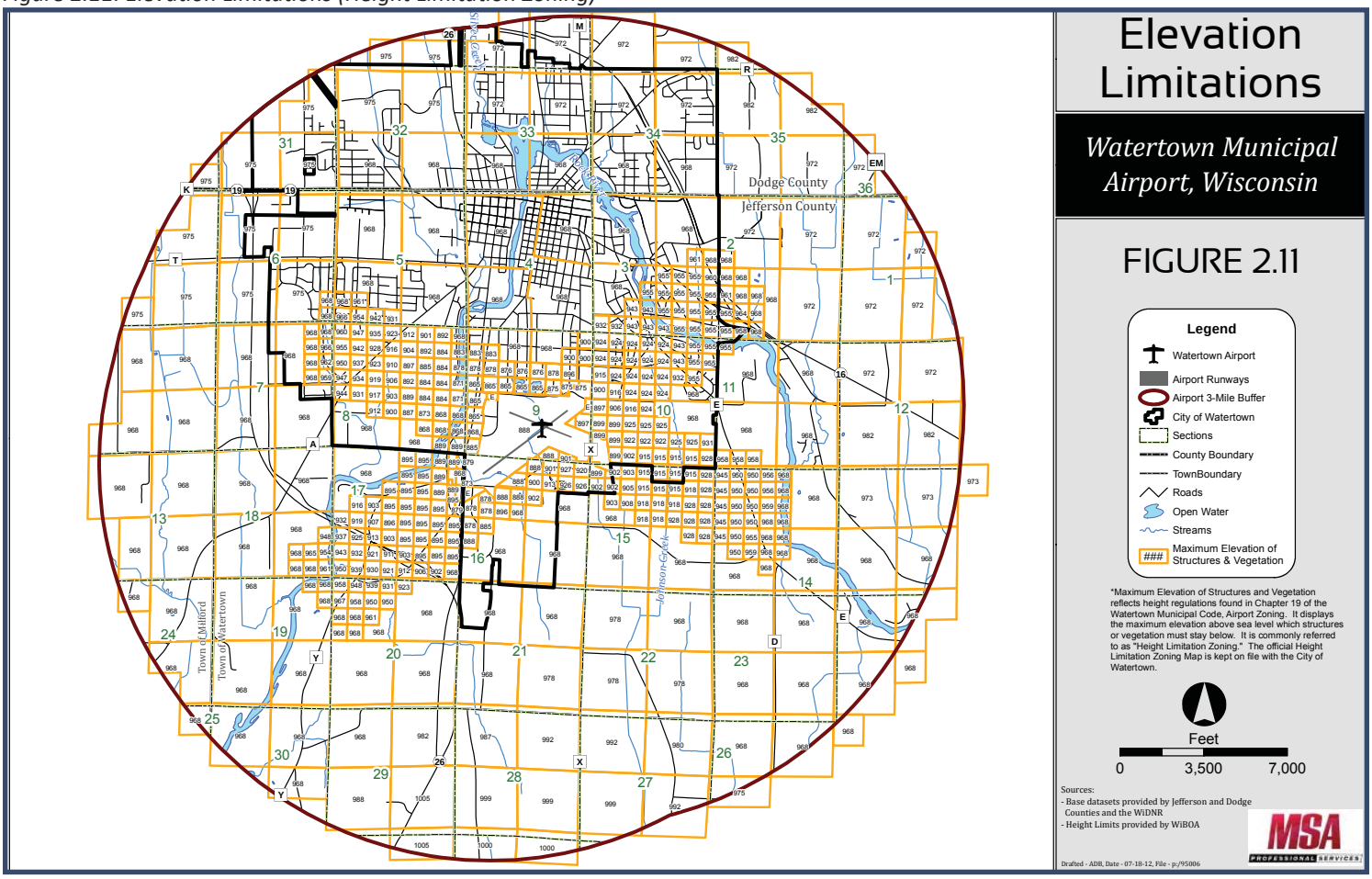


Figure 2.11: Elevation Limitations (Height Limitation Zoning)



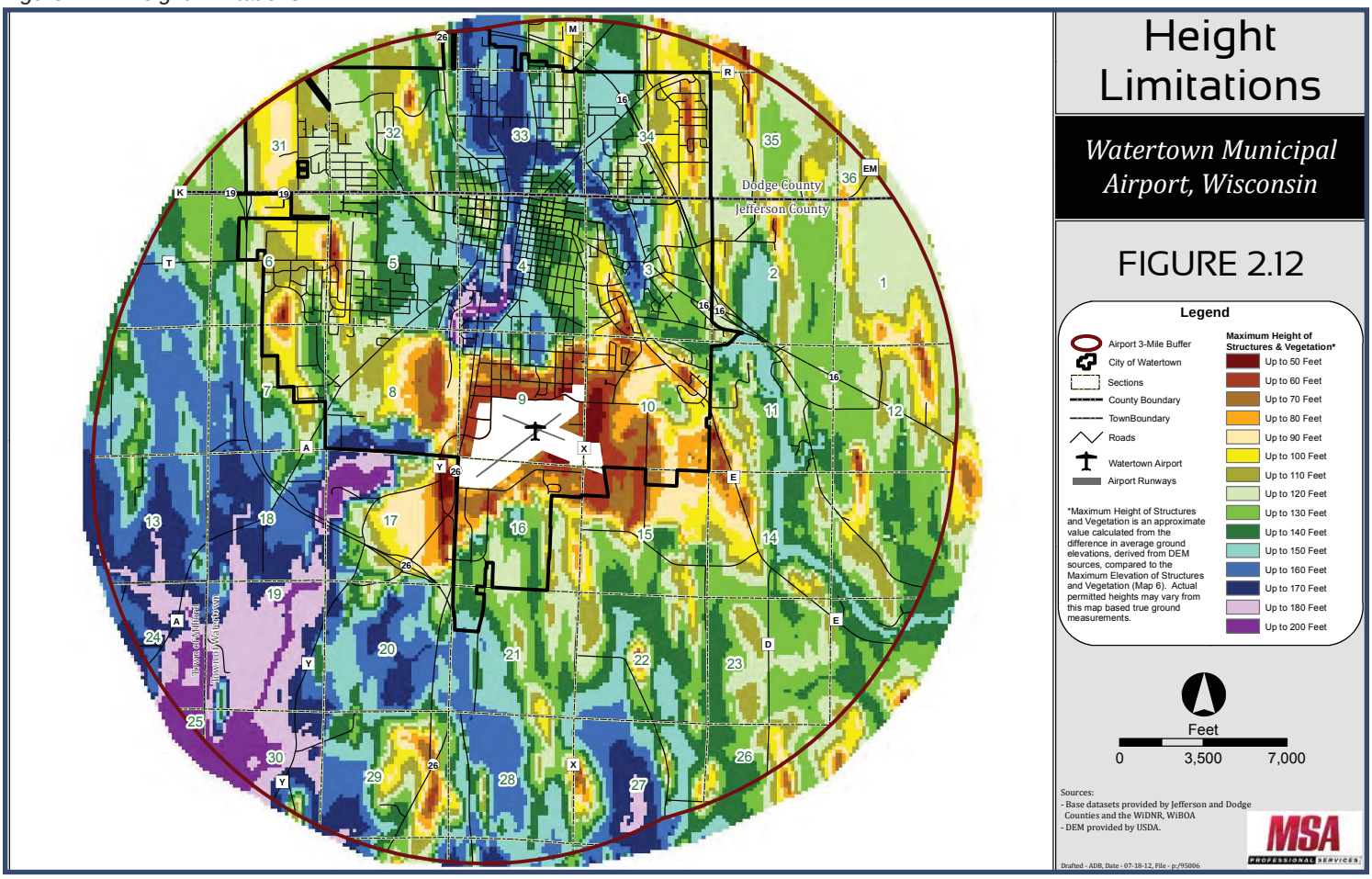
units), combined with one or more of the following land use categories: two-family residential (maximum 15% of all units), mixed residential (maximum 20% of all units), neighborhood office, neighborhood commercial, institutional, and active recreation. This category is also intended to accommodate Traditional Neighborhood Design (TND) forms of development.

The Watertown Comprehensive Plan was adopted to meet Wisconsin's "Smart Growth" planning law (s. 66.1001). The plan is a "living" document intended to guide future land use decisions in and around Watertown. The plan represents the City's best effort to address current issues and anticipate future needs.

Height Limitations

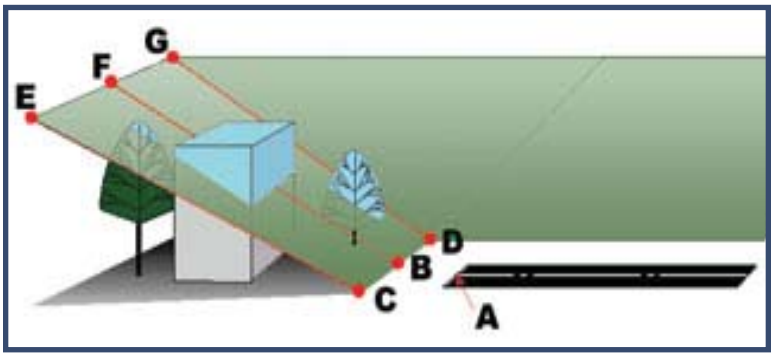
The FAA requires sponsors to protect their airspace and suggests height limitation zoning as a tool to preserve safe navigable airspace. Wisconsin Transportation Act 55 is the state legal mandate for an airport to maintina an HLZO, which must be enacted within six months of the Secretary providing a sample. Chapter 19 of the City's Municipal Code provides zoning regulations for the Airport, including height limitations within three miles of the Airport property. Figure 2.11 illustrates the official height limitations around the Airport. The numbers within each "height grid" provide the maximum elevation both structures or vegetation must stay within to prevent penetrating the area deemed for navigation. These airspace areas of concern are referred to as "imaginary surfaces". The specific elevation restrictions are defined by two FAA criteria: Federal Aviation Regulation (FAR) 77 - Objects Affecting Navigable Airspace, and FAA Advisory Circular 150/5300-13A Airport Design.

Figure 2.12: Height Limitations



While Figure 2.11 provides specific data regarding the maximum elevation of structures and vegetation it does not provide information on the specific allowable heights of structures or vegetation. In order to understand those limitations the elevation of the ground must be known. Figure 2.12 illustrates the allowable height of structures and vegetation within three miles of the airport by subtracting the maximum elevation limitations established by the HLZ map from the elevation of the ground, as provided from aerial photographs and contour data. The map is a generalization used for planning purposes and is not a substitute for property surveys which will provide accurate data regarding the ground elevation where existing or proposed structures or vegetation exist.

In summary, the height limitations are based on FAA criteria which takes into account the size and characteristics of the Airport. Chapter 19 implements the height restrictions, including provisions for granting variances.



3-D graphic illustrating man-made and natural obstructions penetrating airport height surfaces

2.3 DEMOGRAPHICS AND ECONOMIC IMPACT

This section provides an overview of the demographics of the Watertown region and the economic impact the airport provides to the local area and the State.

Demographics

Table 2.5 provides a demographic and income profile report for the Watertown region for the drive time areas displayed in Figure 2.2. Note that the 15-minute drive time includes the entire City. The 30-minute drive time includes the communities of Oconomowoc, Delafield, Fort Atkinson, Waterloo, and Juneau. The 60-minute drive time extends to include the communities of Whitewater, Janesville, Columbus, Beaver Dam, Hartford, and the Madison and Milwaukee metro areas. Note, that the figures for the number of businesses and employees occurred during the height of the nation's recession.

Table 2.5: Demographic and Income Profile

	15-Minute Drive Time		30-Minute Drive Time		60-Minute Drive Time	
Summary	2010	2016	2010	2016	2011	2016
Population	31,174	32,451	154,447	160,086	2,178,070	2,239,031
Median Age	36.6	37.1	40.3	40.8	36.1	36.6
Households	11,995	32,451	59,742	62,441	875,198	905,029
Average Household Size	2.49	2.48	2.52	2.50	2.42	2.41
Median Household Income	$50,246	$55,274	$56,790	$64,597	$51,485	$61,237
Total Businesses	1,269	NA	6,152	NA	85,343	NA
Total Employees	16,802	NA	75,441	NA	1,343,544	NA

Source: ESRI Business Analyst

Economic Impact Report

Concurrent with this planning project, the BOA completed an Economic Impact Report for the airport. The report documents the contribution of the Airport to the local and state economy. The economic impact of the Airport is the *economic output (sales), employment,* and *wage income* that can be attributed directly, indirectly, and induced to the airport.

- Direct Impacts - the impact to the local economy from the number of jobs, payroll and sales directly related to airport operations.
- Indirect Impacts - the impact of visitor spending, airport users who reside from outside the county, on lodging, meals, ground transportation, and retail purchases.
- Induced Impacts - the multiplier or induced effect represents the downstream effect of direct and indirect impacts from the airport to the local and state economy. For example, the impact from airport workers re-spending their income within the community.

Table 2.6 provides the results of the study. It should be reiterated that this study was completed at the height of the nation's recession, which resulted in slower economic growth and spending. Refer to Appendix A for the complete Economic Impact Report.

Table 2.6: Summary Economic Impact Report

	Employment (FTE Jobs)	Wage Income/ Payroll	Economic Output/ Sales
Direct	41	$1,130,000	$7,000,000
Indirect (visitor spending)	55	$988,000	$3,000,000
Induced (multiplier effect)	43	$1,440,000	$3,600,000
Total Impact - Local	139	$3,600,000	$13,600,000
Total Impact - Local	182	$4,600,000	$15,400,000

Source: BOA

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AVIATION FORECASTS

29 - General Aviation Trends / 30 - Airport Surveys / 34 - Aviation Forecasts

3.1 GENERAL AVIATION TRENDS

The following text provides an overview of national general aviation trends. The text was taken directly from the BOA's 2010 Wisconsin State Airport System Plan, Airport Classification Review and Update.

An understanding of recent and anticipated trends within the general aviation industry is important when assessing aviation demand in the State of Wisconsin. National trends can provide insight into the potential future of aviation activity and the anticipated facility needs within Wisconsin. It is important to note that some aviation trends examined in this analysis will undoubtedly have a greater effect on demand than others will. It is also possible that some anticipated general aviation trends might have little or no pronounced impact on demand in Wisconsin.

FAA defines business use as "any use of an aircraft (not for compensation or hire) by an individual for transportation required by the business in which the individual is engaged." The FAA defines corporate/executive transportation as "any use of an aircraft by a corporation, company or other organization (not for compensation or hire) for the purposes of transporting its employees and/or property, and employing professional pilots for the operation of the aircraft." Regardless of the terminology used, the business/corporate component of general aviation use is one that has experienced significant recent growth and will remain the focal point of future growth.

The number of companies using business aircraft has increased from approximately 6,600 in 1991 to nearly 10,200 in 2003. Businesses continue to express growing interest in corporate and fractional aircraft ownership and charter services to serve their air travel needs because of safety concerns and timesaving.

Additionally, companies and individuals use aircraft as a tool to improve business efficiency and productivity. Many of the nation's employers who use general aviation are members of the National Business Aircraft Association (NBAA). The NBAA's Business Aviation Fact Book 2004 indicates that approximately 80 percent of all Fortune 500 businesses operate general aviation aircraft and 92 of the Fortune 100 companies operate general aviation aircraft.

Business use of general aviation aircraft ranges from small, single-engine aircraft rentals to multiple aircraft corporate fleets supported by dedicated flight crews and mechanics. General aviation aircraft use allows the following:

- Efficient transport of personnel and/or cargo
- Opportunity to link multiple office locations
- Ability to maintain contact with existing and potential customers

The use of business aircraft by smaller companies escalated in recent years as various chartering, leasing, time-sharing, interchange agreements, partnerships, and management contracts have emerged.

Fractional ownership arrangements have also experienced rapid growth. NBAA estimated that 1,551 companies used fractional ownership arrangements in 1998; by 2003, that number had grown to 6,217 companies, representing tremendous growth in a five-year period. NBAA statistics show that the number of companies operating business aircraft increased from 6,584 in 1991 to 10,661 in 2003, an increase of more than 60 percent.

Other new, growing segments of the business fleet mix include business liners and very light jets (VLJ). Business liners are large business jets, such as the Boeing Business Jet and Airbus ACJ that are reconfigured versions of passenger aircraft flown by large commercial airlines. VLJs are a relatively new category of aircraft that includes the Adam A-700,

Eclipse 500, and HondaJet. These small, four to six seat jets designed to operate on runways as short as 3,000 feet, including many turf strips. The VLJ business model provides convenient, personal point-to-point service through non-congested airports. The anticipated impact of the VLJ market is likely to be the increase in demand for land side and terminal improvements, as well as higher service levels for fuel, catering, and other amenities at the under served, smaller markets these aircraft are targeted.

This section has identified the current socioeconomic trends in Wisconsin as well as national aviation trends within general aviation. The trends that are identified will enable the City to have a better understanding of aviation on both local and national levels. These national trends are supplemented by local information reported through the user and corporate surveys administered through this planning project.

3.2 AIRPORT SURVEYS

General User Survey

During the spring and summer of 2011 an airport user questionnaire was distributed as part of a boarder effort to obtain pilot input during the process of preparing the Airport Master Plan. The user questionnaire was mailed to every individual with an aircraft based at Watertown Municipal Airport, a total of 65. In addition, the questionnaire was also available at the front desk of the Airport Terminal Building for completion by individuals with aircraft based at another airport but visiting Watertown. The questionnaire was kept available throughout the end of July 2011, to capture input from pilots using the airport during the 2011 AirVenture Show in Oshkosh, WI. The following are the results of the questionnaire.

- Total Questionnaires Mailed = 65
- Questionnaires Returned = 17 (26%)
- Questionnaires Returned Undeliverable = 6 (9%)
- Questionnaires Completed at Airport = 18
- Total Questionnaires Completed = 35

1. ***Summary of pilot information:*** The respondents ranged from student, to recreational, to commercial pilots. Their combined flight time was over 250,778 hours, with an average flight time per person of 7,165 (slightly less than 300 continuous days of flying).
2. ***Is your primary aircraft instrument rated:*** 63% Yes, 34% No, 3% Unanswered.
3. ***Type of primary aircraft:*** 84% Single Engine Piston, 0% Multi-Engine Piston, 0% Turbo-prop, 6% Jet, 9% Unanswered.
4. ***Is the aircraft based at Watertown Airport:*** 57% Yes, 40% No. Of those responses listed as "No" 6 were from Illinois, 2 were from Ohio, and 4 were from other airports in Wisconsin.
5. ***Of those who responded "No" to Question 4, the reasons stated were:*** 12 respondents indicated it was closer to their home, 1 respondent indicated it was closer to the company headquarters, and 1 respondent indicated less expensive hangar space.
6. ***Those who responded "Yes" to Question 4, were asked if they desired additional hangar space:*** 9% Yes, 51% No, 40% Unanswered. Specific hangar types requested included 2 responses for T-Hangars and 1 response for a "Box Hangar".
7. ***What is the primary reason why you utilize Watertown Airport:***

   Responses from Based Pilots:

   1 - Good airport, pavement, FBO

   1 - Good management

   1 - Good hangar space/area

   4 - Good location and service

   5 - Good location

   Responses from Non-Based Pilots:

   1 - Business trip

   1 - Factory located in town

   1 - Training

   2 - Pleasure Flying/Fuel

   6 - Maintenance/Service/FBO

   7 - Dining at area restaurants

8. ***Total number of operations by type per year at Watertown Airport:*** 2,534 total operations per year reported. 48% Pleasure/Recreation, 27% Business, and 25% Flight Training.

9. ***What percentage of the total operations includes passengers:*** 0-25% (14 responses), 26-50% (8 responses), 51-75% (5 responses), 76-100% (8 responses). **What is the average number of passengers for these trips:** 9% zero passengers, 71% one passenger, 9% two passengers, 11% more than two passengers.

10. ***Over the next five years do you project your flight activity at Watertown Airport will:*** 51% stay the same, 37% increase, 6% decrease, 9% not sure. **If increasing or decreasing indicate by what approximate percentage and why:**

    Responses from Based Pilots:

    1 - Increasing, more time to fly

    1 - Increasing by 50-100%, just retired

    1 - Increasing by 25%

    1 - Increasing by 20%

    1 - Increasing by 150%, 350 operations, better financial situation and more time to fly

    Responses from Non-Based Pilots:

    1 - Increasing, plane getting older and will need more maintenance

    1 - Increasing by 10-15% business is getting better

    1 - Increasing by 20%, doing more flying

    1 - Increasing by 15%

    1 - Increasing by 100%, better business climate

    1 - Increasing, more flight instruction

    1 - Unsure, depends on fuel prices

    1 - Decreasing, alternative airport is closer

    1 - Decreasing, less time to fly

11. ***What improvements are needed at Watertown Airport for you to consider additional operations:*** 60% None, 9% Unanswered, 31% Other including:

    Responses from Based Pilots:

    1 - Improvements on Taxiway 11/29

    1 - Avionics tech on airport

    1 - Would like a T-Hangar

    Responses from Non-Based Pilots:

    1 - 5,000'+ runway

    1 - Need a sod runway

    1 - Maintain condition of airport

    1 - Longer runway, and if wider, would use larger aircraft as well

    1 - 5,000'+ runway, smoother and with better approaches

    1 - More hangar space, ILS, grass runway, and a longer runway

    2 - Longer runways

12. ***Is the existing runway length adequate for your requirements:*** 97% Yes, 3% No.

    Comments from Based Pilots:

    1 - Would be nice to have a longer 11/29 runway

    Comments from Non-Based Pilots:

    1 - Longer is always better as it provides more margin for error

    1 - Existing runway is barely adequate in length

    1 - Existing runway is right at the edge of our ability to use

    1 - Need more than 5,000 feet for operational and safety considerations

The Technical Advisory Committee noted that the response to question 12 was indicative of the target audience. The majority of based aircraft are single engine piston planes which can operate under the current runway lengths, otherwise they would not base their aircraft in Watertown. Question 12, 13, and 14 were asked to obtain input from both based and non-based pilots regarding runway length.

13. ***Would you consider upgrading your aircraft, or airport usage, if Watertown had a runway over 5,000 feet:*** 17% Yes, 69% No, 9% Not Sure, 6% Unanswered

14. ***Please rate airport facilities and equipment in terms of adequacy to your operations at Watertown Airport:*** (1 = inadequate, 3 = marginal, 5 = adequate).

Table 3.1: Summary Responses General User Survey Question 14

Summary	Not Applicable	1	2	3	4	5
Runway 5/23 Length	0%	0%	3%	11%	3%	83%
Runway 11/29 Length	0%	11%	0%	11%	9%	69%
Runway Pavement Condition	0%	0%	6%	11%	23%	60%
Taxiway System	0%	0%	3%	20%	31%	46%
Runway Lighting System	6%	3%	0%	9%	23%	60%
Approach Aids	3%	3%	0%	11%	31%	51%
Tiedown Availability	20%	0%	0%	0%	23%	57%
Hangar Availability	31%	3%	3%	9%	17%	37%
Terminal Building	3%	0%	0%	6%	14%	77%
Pilot Services/ Assistance	0%	0%	0%	0%	6%	94%
Fuel Service/ Availability	3%	0%	0%	0%	6%	91%
Ground Transportation	23%	0%	0%	3%	14%	60%
Automobile Parking	14%	0%	3%	3%	9%	71%

In summary, the General User Survey was distributed to pilots with based aircraft at the Airport to obtain their general input on aviation trends at Watertown, adequacy of existing facilities and services, and desired improvements. The questionnaire was also made available at the terminal building to obtain the same input from pilots who use the Airport but do not base their aircraft in Watertown. The information is intended to supplement input obtained from the Corporate User Survey, Aviation Forecasts, and input from the Technical Advisory Committee. A summary of some of the key findings include:

- 27% of the operations were classified as Business related
- 88% of the pilots indicated their flight activity would stay the same or increase during the next five years
- Overwhelming support and appreciation of the staff and services provided at the Airport
- Support for a full parallel taxiway on Runway 11/29
- Some demand for additional hangar space

Corporate User Survey

The Watertown Municipal Airport also serves corporate aircraft travel in the area. An effort was made to understand the existing and future use of the airport by business travelers through a corporate user survey.

Airport Management compiled a list of over 30 users who either currently use the airport for corporate travel or who are perspective users of the airport. The list consisted of many businesses in the City of Watertown, businesses in surrounding communities and fractional jet ownership companies who fly clients across the country. A letter was sent to each existing or potential user on the list, and follow up phone calls were conducted to maximize responses or to identify why the businesses did not reply.

The survey asked users how much they currently operate at the Airport for corporate travel, which type of aircraft they use and approximately how many operations they performed in the last year. In addition, the survey asked how often the existing or potential users would operate at the Airport in five years specifically if one of the runways were extended. This question was asked because currently the Watertown Municipal Airport's primary runway is 4,430 feet, while many companies who perform corporate travel only recognize airports who have a primary runway with a minimum of 5,000 feet while flight planning. One of the main points of the corporate user survey was to gauge operations at the Airport and if operations are occurring or will be occurring by aircraft that require a longer runway length to safely operate. It should be recognized that many of the future operations given by those who replied are based on a longer runway length and would likely not occur if the Airport's configuration does not change.

Seven formal responses were received, while the operational data of several other businesses were included in Wisconsin Aviation's submittal. Additional discussions occurred with businesses through phone conversations.

The corporate user survey attempted to contact as many users as possible, but not all users, and their subsequent operations, can be completely quantified through this process, especially for potential users. It should be recognized that this survey is not a complete compilation of all corporate travel into and out of the Watertown Municipal Airport, currently or projected into the future. Table 3-2 quantifies all of the operations received through the corporate user survey.

Table 3.2: Corporate User Survey Results

Aircraft	ARC	Estimated Current Operations	Estimated Future Operations
Piper 31 Chieftain	B-I	40	150
Cessna 414	B-I	478	550
Beech 90 King Air	B-I	100	180
Socata TBM-500	B-I	48	132
Cessna Conquest II C441	B-II	598	688
Cessna Citation V Ultra	B-II	118	230
Cessna Citation V	B-II	38	50
JetStream Super 32	B-II	0	100
Beech 400 Beechjet	B-II	0	200
Beech 1900	B-II	0	100
Cessna 650 Citation	C-II	0	40
HS25B Raytheon 800	C-II	0	30
Learjet 60	C-I	24	0
Falcon 900	B-II	0	18
Learjet 45	C-I	0	10
Piaggio P-180 Avanti	B-I	0	120
Cessna 208 Grand Caravan	B-I	120	180
Cessna Citation 500	B-II	12	50
Citation CJ2	B-II	16	30
Citation CJ2	B-II	14	20
Citation V	B-II	30	40
Citation CJ2	B-II	30	40
Cessna Conquest II C441	B-II	30	40
Beech King Air E-90	B-II	10	16
Cessna 414	B-I	4	4
Piper 31 Chieftain	B-I	2	2
Learjet 31	C-I	10	20
Citation 560	B-II	20	30
Embracer Phenom	B-II	4	10
Learjet 35	C-I	0	20
Learjet 45	C-I	0	20
Falcon 7X	C-II	0	10
Falcon 7X	C-II	0	12
Falcon 2000	C-II	0	12
Citation Mustang	B-II	0	12
Challenger 300	B-II	0	12
Challenger 604	C-II	0	12
Lear Jet	C-I	0	12
Hawker Jet	C-II	0	12
Lear Jet	C-I	0	12
Lear Jet	C-I	0	12
Citation Jet	B-II	0	12
Citation Jet	B-II	0	12
Pilatus PC-12	A-II	250	450
Learjet 45	C-I	0	120
Citation 560	B-II	0	28

One of the reasons consistently given by businesses for not currently using the Airport or being unable to use the Airport with all of their aircraft was that the runway length is too short to adequately serve the aircraft used by those businesses, or their clients, or their suppliers. These aircraft routinely travel to other airports in the area that have adequate runway length to meet their safety concerns and travel requirements. Many of these safety concerns are due to insurance requirements, which prohibit many corporate aircraft from using a runway shorter than 5,000 feet. Corporate users have stated that their data bases for travel consist of airports with a minimum 5,000 feet of runway, meaning the Watertown Municipal Airport does not even appear on their lists at this time. Many businesses contacted were clear that they would prefer to use the Watertown Municipal Airport for their corporate aviation travel needs, as it is more convenient to their location and would reduce travel times by ground transportation for meetings and site visits. All businesses that responded made it clear that if the Watertown Municipal Airport does not extend one of their runways to at least 5,000 feet most, if not all, of their future operations forecasted by aircraft currently not using the Airport would continue to be unable to use the Airport in the future

Two of the businesses responding said they plan to buy a business jet aircraft in the future to meet growing aviation travel needs. Others have aircraft or clients/suppliers with aircraft, who would, again, use the Airport if the runway length was adequate to meet their aircraft's needs.

One of the businesses that replied stated they used to hold their regular board meetings, which consist of branches from all over the country, in Watertown, but have since moved the meetings to Madison, WI. The Dane County Regional Airport provides the adequate runway length for board members flying in from across the country. They would like to return these board meetings to Watertown where their headquarters is located.

Another fractional jet ownership company stated that at the current primary runway length of 4,430 feet only a small portion of their fleet of 800 aircraft would be able to use the Airport if requested by a client. By increasing the primary runway length to at least 5,000 feet, they stated that all of their aircraft could then be utilized should a client have a need to travel to Watertown.

Through phone conversations, several businesses stated that they use Wisconsin Aviation's charter services at the Watertown Municipal Airport to complete their corporate travel. These operations were included in Wisconsin Aviation's submittal.

Other businesses contacted by phone either do not perform regular corporate travel, their parent company does not fly regularly into the area or their company policy is to fly commercially through an air carrier like Dane County or General Mitchell Airports.

3.3 AVIATION FORECASTS

Forecasts of aviation activity serve as a guideline for the timing and implementation of different airport improvements, and form the basis for the development and justification of these facilities. Activity projections are made based upon estimated growth rates, area demographics, industry trends and other indicators. Forecasts are developed over a 20-year planning period, through the year 2032. For a general aviation airport such as the Watertown Municipal Airport (RYV), forecasts of based aircraft and operations (takeoffs or landings) serve as an important component for facility planning.

The Watertown Municipal Airport is not served by an air traffic control tower. Therefore it is difficult to assess the number of existing and historical operations at the airport. A number of sources were used to provide a basis for the following forecasts including: Airport User Surveys, existing forecasts and data available from State and Federal agencies, and discussions with airport management.

Aviation activity can be affected by many influences on the local, regional and national levels, making it difficult to predict year to year fluctuations of activity over twenty years with certainty. Therefore, it is important to remember that forecasts are to serve only as guidelines, and planning must remain flexible enough to respond to a range of future developments.

Two types of aircraft operations are discussed in this study: local operations and itinerant operations. Local operations are aircraft departures or arrivals for the purpose of training, pilot currency or recreational flying within the immediate area of the local airport. These operations typically consist of touch and go operations, practice instrument approaches, flights to and within local practice areas, and recreational flights that originate and terminate at the airport. Itinerant operations are aircraft arrivals and departures other than local operations that generally originate or terminate at another airport. These types of operations are closely tied to local demographic indicators, such as local industry and business uses, and usage of the facility for recreational and tourism purposes.

Airport Reference Code

FAA Advisory Circular 150/5300-13A, Airport Design, defines the parameters to give each aircraft an Airport Reference Code (ARC). The ARC is a coding system that relates airport design criteria to the operational and physical characteristics of aircraft that are intended to operate at the airport. The first element is the Approach Category, which groups aircraft into five categories (designated letters A through E) based upon the aircraft's approach speed. The following is each category and its corresponding approach speed range:

- Category A: approach speeds less than 91 knots
- Category B: approach speeds of 91-120 knots
- Category C: approach speeds of 121-140 knots
- Category D: approach speeds of 141-165 knots
- Category E: approach speeds of 166 and greater

Approach categories A and B typically include small piston engine aircraft, turboprops and small business jets. Category C consists of larger business jets, commercial service regional jets, and other commercial jet and propeller aircraft. Categories D and E include the largest business jets, high performance smaller jets, and larger jet aircraft associated with commercial air service and military use.

The second component of the ARC is the Airplane Design Group, categorized by the wingspan and tail height of the aircraft. The design group is depicted by roman numerals. The following is each design group and its corresponding wingspan (in feet) and tail height (in feet).

- Design Group I: wingspan less than 49 feet and tail height less than 20 feet
- Design Group II: wingspan of 49 to 78 feet and tail height of 20 to 29 feet
- Design Group III: wingspan of 79 to 117 feet and tail height of 30 to 44 feet
- Design Group IV: wingspan of 118 to 170 feet and tail height of 45 to 59 feet
- Design Group V: wingspan of 171 to 213 feet and tail height of 60 to 65 feet
- Design Group VI: wingspan of 214 to 261 feet and tail height of 66 to 79 feet

Design Groups I and II are primarily small piston aircraft, business jets, turboprop aircraft and some commercial service regional jets. Design Group III includes large business jets and most regional and narrow body commercial aircraft. Design Groups IV and V include large jets utilized for commercial and military service. Design Group VI includes only the largest transport aircraft.

Figure 3.1 shows examples of the different Approach Categories and Design Groups.

Figure 3.1: Example Aircraft Approach Categories and Design Groups

Beech Baron 55
Beech Bonanza
Cessna 150
Cessna 172
Piper Archer
Piper Seneca

Lear** 25, 35, **55
Israeli Westwind
HS 125

Beech Baron 58
Beech King Air 100
Cessna 402
Cessna 421
Piper Navajo
Piper Cheyenne
Swearingen Metroliner
Cessna Citation I

***Gulfstream II**, III, IV*
Canadair 600
Canadair Regional Jet
Lockheed JetStar
Super King Air 350

Super King Air 200
Cessna 441
DHC Twin Otter

Boeing Business Jet
B 727-200
B 737-300 Series
MD-80, DC-9
Fokker 70, 100
A319, A320
Gulfstream V
Global Express

Super King Air 300
Beech 1900
Jetstream 31
Falcon 10, 20, 50
Falcon 200, 900
Citation** II, III, IV, **V
Saab 340
Embraer 120

B-757
B-767
DC-8-70
DC-10
MD-11
L1011

DHC Dash 7, 8
DC-3
Convair 580
Fairchild F-27
ATR 72
ATP

B-747 Series
B-777

Aircraft pictured is identified in bold type

Based Aircraft Fleet Mix

The current based aircraft fleet mix for the Watertown Municipal Airport was established using data from the Department of Transportation's Driver and Vehicles Division registration records provided by the BOA. These records were verified by airport management. Aircraft were separated by aircraft type: piston engine (both single and multi), turboprop and jet. Each category was divided by the total based aircraft to determine their percentage of the fleet mix, and is shown in Table 3.3.

Table 3.3: Based Aircraft Fleet Mix

Aircraft Type	Aircraft Code	Present Fleet Mix	Total
Single Engine Piston	A-I	85.3%	75
Twin-Engine Piston	A-I, B-I	10.2%	9
Turboprop	B-I, B-II	3.4%	3
Small General Aviation Jets	B-I, B-II	1.1%	1
Large General Aviation Jets	C-I, C-II	0.0%	0
Helicopters	--	0.0%	0

Forecast Based Aircraft Fleet Mix

Forecasting the based aircraft fleet mix took into consideration FAA Aerospace Forecasts and the responses to the surveys sent to based and corporate users. The responses to the corporate user survey show a definite increase in usage by business aircraft, but that survey did not ask whether these existing users or new users would base their aircraft at the Airport in the future.

The FAA Aerospace Forecasts FY 2012 – 2032 projects a decrease in piston aircraft through 2023, with a rebound forecasted through 2032. Single engine piston aircraft are projected to decrease overall at 0.1% annually while multi-engine piston aircraft decline at 0.5% annually through 2032. The majority of growth in the aircraft fleet will continue to be in turbine powered aircraft. Both turboprop and turbo jet aircraft are forecasted to grow annually through 2032 by 0.9% and 4.0%, respectively. This reflects the growth in demand for business aircraft. This growth is reflected in the corporate user survey, showing a future increase in traffic at the Airport by business users using turbine powered aircraft to achieve their corporate goals.

This information was used in determining the forecast based aircraft fleet mix through the planning year 2032 and is shown in Table 3.4.

Table 3.4: Forecast Based Aircraft Fleet Mix

Aircraft Type	Aircraft Code	2012 Present Fleet Mix	2032 Present Fleet Mix
Single Engine Piston	A-I	85.3%	82.0%
Twin-Engine Piston	A-I, B-I	10.2%	10.0%
Turboprop	B-I, B-II	3.4%	6.0%
Small General Aviation Jets	B-I, B-II	1.1%	2.0%
Large General Aviation Jets	C-I, C-II	0.0%	0.0%
Helicopters	--	0.0%	0.0%

Itinerant Aircraft Fleet Mix

Since the Watertown Municipal Airport does not have a tower, it is difficult to obtain the mix of itinerant aircraft using the airport. While the Airport has a guest log, not every user records their visit, and the Fixed Based Operator (FBO) on site can't keep track of every operation that occurs. In addition to the guest log, the user survey results were considered, but the surveys only measure a portion of the traffic using the Airport currently and into the future. To compliment the guest log and surveys, Instrument Flight Rules (IFR) flight logs were considered. IFR is a term used by pilots and controllers to indicate the type of flight plan an aircraft is flying, in this case an instrument flight, as opposed to Visual Flight Rules (VFR), which does not require a flight plan. It should be noted that IFR flight plans are filed more frequently by larger aircraft and less frequently among smaller aircraft. Utilizing all three sources of information, an estimated itinerant fleet mix is shown in Table 3.5.

Table 3.5: Itinerant Aircraft Fleet Mix

Aircraft Type	Aircraft Code	2012 Present Fleet Mix
Single Engine Piston	A-I	66.2%
Twin-Engine Piston	A-I, B-I	15.1%
Turboprop	B-I, B-II	16.6%
Small General Aviation Jets	B-I, B-II	1.6%
Large General Aviation Jets	C-I, C-II	0.5%
Helicopters	--	0.0%

Source: User Surveys, RYV Guest Log and IFR Flight Plans

Forecast Itinerant Aircraft Fleet Mix

Using the FAA Aerospace Forecasts FY 2012-2032 and the user surveys, forecasts of Itinerant Aircraft Fleet Mix was determined. The FAA Aerospace Forecast projects an overall increase in general aviation hours by 1.7 percent yearly through 2032. This rate includes a very slight decline in piston aircraft flight hours, but a significant increase in turbine hours flown: a yearly 1.1 percent turboprop and 5.3 percent turbo jet flight hours flown respectively. The corporate user study shows a significant existing use by small general aviation jets (ARC B-I and B-II). The airport's larger FBO and primary user, Wisconsin Aviation, currently operates several small jets, and while not based at Watertown Municipal Airport, these jets are used regularly at the Airport. Wisconsin Aviation projects these operations to increase in the future as demand increases for their charter services, and users require the ability to travel farther which is afforded by jet aircraft. Other existing users show an increase in both small and larger general aviation jet use. Based on the FAA Aerospace Forecast, and the corporate user survey, it is realistic that the itinerant fleet mix will increase in larger aircraft, especially small general aviation jets, through the planning year 2032. The forecast transient aircraft fleet mix is shown in Table 3.6.

Table 3.6: Forecast Itinerant Aircraft Fleet Mix

Aircraft Type	Aircraft Code	2012 Present Fleet Mix	2032 Present Fleet Mix
Single Engine Piston	A-I	66.2%	61.0%
Twin-Engine Piston	A-I, B-I	15.1%	14.0%
Turboprop	B-I, B-II	16.6%	18.0%
Small General Aviation Jets	B-I, B-II	1.6%	5.5%
Large General Aviation Jets	C-I, C-II	0.5%	1.5%
Helicopters	--	0.0%	0.0%

Based Aircraft Forecasting

The number of aircraft based at an airport is used in projecting local aircraft operations, the amount of future hangar space needed on the airport, and the available tie-down ramp parking for itinerant aircraft, among other factors.

One method of forecasting based aircraft is using a historical trend from past information about based aircraft. Unfortunately, there is limited historical information on based aircraft at the Watertown Municipal Airport. The one source of historical information available is FAA's Terminal Area Forecasts (TAF), published yearly by FAA which includes forecasts and based aircraft information for all National Plan of Integrated Airport Systems (NPIAS) airports. The TAF includes information from 1990 to 2012 and is summarized in Table 3.7.

Table 3.7: Terminal Area Forecast (TAF) Based Aircraft

Year	Number of Based Aircraft	Year	Number of Based Aircraft
1990	78	2002	90
1991	85	2003	90
1992	85	2004	90
1993	85	2005	90
1994	91	2006	90
1995	91	2007	90
1996	92	2008	63
1997	89	2009	57
1998	89	2010	57
1999	89	2011	57
2000	89	2012	57*
2001	89		

**Actual State Registered Based Aircraft = 88*

The number of based aircraft forecast by FAA increased steadily until 2008 when the number dropped from 90 to 63. This reflects FAA's attempt to accurately quantify based aircraft, since seasonal use aircraft may have been double counted at multiple airports. As was discussed earlier in Based Aircraft Fleet Mix, State registration records (corroborated by local count) show the existing based aircraft count to be 88 aircraft. This count is consistent with the TAF in 2007. The Airport updated their based aircraft count to FAA records, but this update is not yet reflected in the TAF, and likely won't be until their next update in 2013.

Another source of historical information are the NPIAS Reports. These reports are now done biannually, with the most recent report for 2011-2015. Table 3.8 presents the based aircraft count from the five previous NPIAS Reports.

Table 3.8: NPIAS Reports - Based Aircraft

NPIAS	Number of Based Aircraft
2001-05	89
2005-09	89
2007-11	90
2009-13	91
2011-15	63*

**Actual State Registered Based Aircraft = 88*

Source: FAA NPIAS Reports

The NPIAS Reports show a consistent tendency in the first four reports then falling in the last report to 63 based aircraft at the airport. Again, registration records and a local count show the existing number of based aircraft to be 88 aircraft.

A final source of information on based aircraft is the Wisconsin State Airport System Plan 2020 (SASP 2020). The SASP forecasted based aircraft in 2000, 2010 and 2020. The SASP is scheduled to be updated in the near future by the BOA. The SASP 2020 forecast is shown in Table 3.9.

Table 3.9: SASP 2020 - Forecast Based Aircraft

SASP Report	Forecast Based Aircraft
2000	81
2010	87
2020	93

Source: WI SASP 2020

Except for the sudden drop in based aircraft shown for the TAF and NPIAS Reports, the trend for based aircraft at the Watertown Municipal Airport was steadily increasing. Using the TAF data from 1990 through 2007, the based aircraft increased by 12 aircraft or approximately 0.7 aircraft per year during that time span. The information from the NPIAS reports showed an increase of 0.25 aircraft per year excluding the information from the latest report. Lastly, the SASP forecasted an increase of 12 aircraft over 20 years or approximately 0.6 aircraft per year. These records are useful in forecasting the number of future based aircraft at an airport, and are useful in determining what type of activity will occur in the future. Based on these past records, based aircraft were steadily growing at the Airport and will likely continue to grow through the 20-year planning period, especially as the United State's economy continues to rebound out of the Great Recession. Table 3.10 forecasts the number of based aircraft through 2032 based on each of the historical trends discussed previously: NPIAS Reports, SASP 2020 and FAA TAF.

The historical trends yield increases of 5, 12 and 14 based aircraft by 2032, for total based aircraft of 93, 100 and 102 respectively. Before forecasting a final number of based aircraft, population forecasting will be compared to historical trends.

Table 3.10: Based Aircraft Forecasts by Historical Trends

Year	Forecast Based Aircraft		
	NPIAS	SASP	TAF
2012*	88	88	88
2013	88	89	89
2014	89	89	89
2015	89	90	90
2016	89	90	91
2017	89	91	92
2018	90	92	92
2019	90	92	93
2020	90	93	94
2021	90	93	94
2022	91	94	95
2023	91	95	96
2024	91	95	96
2025	91	96	97
2026	92	96	98
2027	92	97	99
2028	92	98	99
2029	92	98	100
2030	93	99	101
2031	93	99	101
2032	93	100	102

Source: 2012 data based on State Registration Records and local county by RYV

The Population Forecast method considers the based aircraft at an airport and the relationship to the population around the airport. This method assumes that the percentage of people who own a based aircraft fluctuates according to changes in the population. If the population increases so do the based aircraft at the airport, while the based aircraft would decline with a corresponding decline in population.

While the Airport is located in Jefferson County, the City of Watertown is located in both Jefferson and Dodge Counties. Therefore, population data of both counties was combined to forecast based aircraft at the Watertown Municipal Airport, since it is reasonable that based users can easily travel from both counties to use the Airport. Census data from 2000 and 2010 shows that the combined populations of Jefferson and Dodge counties increased by 7.83 percent over the 10 years, from 159,918 in 2000 to 172,445 in 2010. The Wisconsin state average grew up an average of six percent during the same time space.

The airport's local count of based aircraft in 2010 was 88, corresponding to an aircraft to population ratio of 0.051%, or one based aircraft per 1,960 people. This calculation assumes that the residents of Dodge and Jefferson counties own all the based aircraft at the airport and any owner only owns one aircraft. Assuming the aircraft to population ratio remains constant and the population increases at a similar rate to the past decade through the planning period, the number of based aircraft would increase to 103 by 2032 as shown in Table 3.11.

Table 3.11: Based Aircraft Forecast by Population Trends

Year	Dodge & Jefferson Counties Total Population*	Forecast Number of Based Aircraft
2010	172,445	88
2011	173,795	89
2012	175,145	89
2013	176,495	90
2014	177,845	91
2015	179,195	91
2016	180,545	92
2017	181,895	93
2018	183,245	94
2019	184,595	94
2020	185,945	95
2021	187,295	96
2022	188,645	96
2023	189,995	97
2024	191,345	98
2025	192,695	98
2026	194,045	99
2027	195,395	100
2028	196,745	100
2029	198,095	101
2030	199,445	102
2031	200,795	102
2032	202,145	103

**Source: U.S. Census*

The methodology for forecasting annual population growth yields similar results to the decennial population projections published by the Wisconsin Department of Administration through year 2030. Both Jefferson and Dodge counties have a solid industry base and growing communities with steady local economies within the service area of the Airport. The Watertown Municipal Airport is not as affected by seasonal variations in usage, which is more common at airports in northern Wisconsin.

As illustrated in Figure 2.2, both counties are within a 60-minute drive time of the state's largest metropolitan areas, Madison and Milwaukee. These factors combine to produce a higher level of certainty regarding the projected population growth figures given the current national recession.

Every year, FAA publishes an aerospace forecast. The most recent forecast was FAA Aerospace Forecasts, FY 2012-2032. This forecast gives estimated growth rates for each generalized category of general aviation aircraft. This forecast, while valuable to the national system of over 3,000 airports, does not accurately account for the circumstances of an individual airport in the system. Therefore this method was not used to forecast based aircraft .

Both the Historical Trend and Population Forecast methods yielded similar results for based aircraft. After reviewing the results with the Technical Advisory Committee (TAC) it was agreed that an increase of 12 based aircraft through the planning period was reasonable, resulting in 100 based aircraft in 2032.

Neither the Historical Trend or Population Forecast methods separates out aircraft by type. Using the forecasted fleet mix, an estimation of the type of based aircraft in each year during the planning period was developed for the forecast based aircraft. Table 3.12 shows these results.

Table 3.12: Based Aircraft Forecast by Fleet Mix

Year	Single Engine Piston	Multi-Engine Piston	Turboprop	Turbine Jet	Total
2012	75	9	3	1	88
2013	75	9	3	1	88
2014	76	9	3	1	89
2015	76	9	3	1	89
2016	76	9	4	1	90
2017	77	9	4	1	91
2018	77	9	4	1	91
2019	77	9	4	1	91
2020	78	9	4	1	92
2021	78	9	4	1	92
2022	78	10	5	2	95
2023	79	10	5	2	96
2024	79	10	5	2	96
2025	80	10	5	2	97
2026	80	10	5	2	97
2027	80	10	5	2	97
2028	81	10	5	2	98
2029	81	10	6	2	99
2030	81	10	6	2	99
2031	82	10	6	2	100
2032	82	10	6	2	100

Aviation Operations Forecasts

Another important element in anticipating the future needs of an airport is forecasting aviation operations. With no tower at the Watertown Municipal Airport, there is no actual count of operations available. The only historical information available on operations is available through FAA's TAF. The TAF shows operations going back to 1990 and currently projects future operations out to 2032. The TAF for the Airport is shown in Table 3.13.

The TAF forecasts 58,000 operations in 2012, and that number remains flat through the 20-year planning period with no increase or change in any operational category. While no annual change in future operations is not a reasonable assumption, the TAF forecasts can serve as a baseline to forecast operations through the planning period.

Since the TAF does not provide any projection of future increase in operations, similar methods employed in forecasting based aircraft can be used

Table 3.13: FAA Terminal Area Forecasts

Year	Itinerant Operations				Local Operations			Total Operations
	Air Taxi & Commuter	GA	Military	Total	Civil	Military	Total	
1990	4,500	15,000	200	19,700	25,000	0	25,000	44,700
1991	5,000	15,000	200	20,200	30,000	0	30,000	50,200
1992	5,000	15,000	200	20,200	30,000	0	30,000	50,200
1993	5,000	15,000	200	22,220	30,000	0	30,000	50,200
1994	5,500	16,500	220	23,000	33,000	0	33,000	55,220
1995	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
1996	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
1997	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
1998	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
1999	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2000	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2001	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2002	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2003	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2004	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2005	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2006	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2007	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2008	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2009	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2010	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2011	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2012	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2013	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2014	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2015	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2016	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2017	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2018	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2019	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2020	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2021	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2022	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2023	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2024	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2025	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2026	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2027	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2028	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2029	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2030	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2031	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000
2032	5,500	16,500	1,000	23,000	35,000	0	35,000	58,000

Source: FAA Terminal Area Forecast

to forecast aviation operations. The Wisconsin SASP, published in 2000, will be updated by the BOA in the future. While it is older, and does not account for the events of 9/11 and the recent economic downturn, which both affected the aviation industry, it does provide historical operation information and forecasted the operations at the Airport for 2010 and 2020. This information is shown in Table 3.14.

Table 3.14: SASP 2020 Operations at RYV

Year	GA Operations	Military Operations	Total Operations
1995	47,100	220	47,320
2000	49,600	220	49,820
2010	53,200	220	53,420
2020	56,900	220	57,120

Source: WI SASP 2020

From 1995 to 2020, the SASP projected an increase of 9,800 operations or 392 operations per year. Using the SASP projections, and a 2012 baseline of 58,000 operations, annual forecasts for operations to year 2032 can be calculated.

Another trend analysis, which was used to forecast based aircraft operations, is the population increase of Dodge and Jefferson counties. This method assumes that as the surrounding communities grow, so will aviation activity at the Watertown Municipal Airport in an equal measure. From 2000 to 2010, the population in Dodge and Jefferson counties rose 7.83 percent per year. This method would equal a future increase of 454 operations a year through the planning period.

One additional method used to forecast total operations is per based aircraft. Assuming the Airport has 58,000 operations in 2012 and 88 based aircraft by registration data and local count would results in 659 annual operations per based aircraft. This number is consistent with data available from the Wisconsin SASP 2020 which analyzed activity rate per based aircraft for several airports. The Wisconsin SASP 2020 discusses general aviation activity per based aircraft. In the SASP 2020, Transport/Corporate Airports were estimated to have 612 operations per based aircraft, with higher totals at general aviation airports in southeastern Wisconsin. The Watertown Municipal Airport was considered a Transport/Corporate Airport in the SASP 2020, and is located close to many of these airports in southeastern Wisconsin.

Table 3.15 provides a summary of these forecasting methods. Each forecast produces a similar result in the plan year 2032. Since they are all very similar, the Operations Forecast per Based Aircraft was selected by the TAC as the forecast through the planning period.

Table 3.15: Operations Forecasts

Year	SASP 2020 Projection Total Operations	Population Projection Total Operations	Based Aircraft Projection Total Operations
2012	58,000	58000	58,000
2013	58,392	58454	58,387
2014	58,784	58908	58,783
2015	59,176	59362	59,178
2016	59,568	59816	59,574
2017	59,960	60270	59,969
2018	60,352	60724	60,364
2019	60,744	61178	60,760
2020	61,136	61632	61,155
2021	61,528	62086	61,551
2022	61,920	62540	61,946
2023	62,312	62994	62,341
2024	62,704	63448	62,737
2025	63,096	63902	63,132
2026	63,488	64356	63,528
2027	63,880	64810	63,923
2028	64,272	65264	64,318
2029	64,664	65718	64,714
2030	65,056	66172	65,109
2031	65,448	66626	65,505
2032	65,840	67080	65,900

This information was further broken down by type of aircraft using the existing and forecasted fleet mixes presented earlier in this chapter, and is shown in Table 3.16. The TAF currently breaks down local operations as 62 percent and itinerant operations at 38 percent of total operations. These percentages were assumed to continue through the planning period.

Selecting the General Aviation Critical Aircraft

The critical aircraft for a given airport is defined as the aircraft (or group of aircraft) whose dimensional and performance characteristics are the basis for selection of the facility requirements design criteria. According to FAA Advisory Circular 150/5325-4B,

Runway Length Requirements for Airport Design, the critical aircraft must be demonstrated to account for a minimum of 500 total operations, with an operation being a landing or a takeoff.

Based on the proceeding results, **the current critical aircraft using Watertown Airport is a B-II Jet** (see Figure 3.1 for examples of a B-II jet aircraft). The existing annual operations for this type of aircraft are greater than 500 operations, shown in Table 3.16, and confirmed by the results of the corporate user survey. This aircraft can be described as having a wingspan of 49 feet to 79 feet, and an approach speed of at least 91 knots, but less than 121 knots. B-II aircraft has a tail height of at least 20 feet but does not exceed 30 feet. Examples of B-II jet aircraft include a Cessna Citation CJ2 (Photo 3.1), a Citation 560 and a Falcon 900. An example of a B-II turbo prop aircraft, which are also regular users of the Airport, is a Citation 441 Conquest.

The corporate user survey identified seven B-II jet aircraft that currently use the Airport, with another B-I jet aircraft and three B-II turbo prop aircrafts based there. In addition there is the possibility for several more B-II jet and turbo prop aircraft to use the airport in the future, and possibly even to

Photo 3.1

be based there. The replies to the corporate user survey show over 850 operations currently occurring by B-II aircraft, both jet and turbo prop aircraft. The number of operations by these same aircraft and future operations are predicted to increase to over 1,600. Additionally, the IFR flight plan data from July 2010 to June 2011 documented more B-II aircraft that were not identified in the corporate user survey.

Table 3-16 breaks down operations by aircraft type for both based and itinerant aircraft operations. Aircraft type for jets is further broken down by Aircraft Reference Code Type B and C, while turbo prop operations are not. The B jet aircraft operations for based aircraft forecast in Table 3-16 are not consistent with the number of operations reported by the B jet currently based at the Airport. This aircraft

Table 3.16: Operations by Fleet Mix

Year	Based Operations						Itinerant Operations						Military Operations	Total Operations
	Single Engine	Twin Engine	Turbo Prop	B Jet	C Jet	Total	Single Engine	Twin Engine	Turbo Prop	B Jet	C Jet	Total		
2012	30,145	3,605	1,202	389	0	35,340	14,339	3,271	3,596	347	108	21,660	1,000	58,000
2013	30,209	3,666	1,283	430	0	35,588	14,375	3,280	3,638	397	121	21,812	1,000	58,400
2014	30,274	3,728	1,364	471	0	35,836	14,412	3,289	3,681	448	135	21,964	1,000	58,800
2015	30,338	3,789	1,444	512	0	36,084	14,448	3,299	3,723	498	148	22,116	1,000	59,200
2016	30,403	3,851	1,525	553	0	36,332	14,485	3,308	3,766	549	161	22,268	1,000	59,600
2017	30,467	3,913	1,606	594	0	36,580	14,521	3,317	3,808	600	174	22,420	1,000	60,000
2018	30,532	3,974	1,687	635	0	36,828	14,557	3327	3,851	650	187	22,572	1,000	60,400
2019	30,596	4,036	1,768	676	0	37,076	14,594	3,,336	3,893	701	200	22,724	1,000	60,800
2020	30,661	4,097	1,849	717	0	37,324	14,630	3,346	3,936	751	213	22,876	1,000	61,200
2021	30,725	4,159	1,930	758	0	37,572	14,667	3,355	3,978	802	226	23,028	1,000	61,600
2022	30,790	4,220	2,011	799	0	37,820	14,703	3,364	4,021	853	239	23,180	1,000	62,000
2023	30,854	4,282	2,092	840	0	38,068	14,739	3,374	4,063	903	253	23,332	1,000	62,400
2024	30,918	4,343	2,173	881	0	38,316	14,776	3,383	4,106	954	266	23,484	1,000	62,800
2025	30,983	4,405	2,254	922	0	38,564	14,812	3,392	4,148	1004	279	23,636	1,000	63,200
2026	31,047	4,467	2,335	963	0	38,812	14,849	3,402	4,191	1055	292	23,788	1,000	63,600
2027	31,112	4,528	2,416	1,004	0	39,060	14,885	3,411	4,233	1106	305	23,940	1,000	64,000
2028	31,176	4,590	2,497	1,045	0	39,308	14,921	3,421	4,276	1156	318	24,092	1,000	64,400
2029	31,241	4,651	2,578	1,086	0	39,556	14,958	3,430	4,318	1207	331	24,244	1,000	64,800
2030	31,305	4,713	2,659	1,127	0	39,804	14,994	3,439	4,361	1257	344	24,396	1,000	65,200
2031	31,370	4,774	2,740	1,168	0	40,052	15,031	3,449	4,403	1308	357	24,548	1,000	65,600
2032	31,386	4,829	2,817	1,207	0	40,238	15,044	3,453	4,439	1356	370	24,662	1,000	65,900

currently does not fly as regularly as the forecast estimates. The airport does anticipate additional B jets to be based at the Airport in the future making the future forecast number of based operations more consistent with the corporate user survey. For itinerant operations in Table 3-16 the number of existing B and C jet operations are consistent with the results of the corporate user survey with over 1,300 combined B jet operations (B-I and B-II) jets by 2032.

The future critical aircraft for the Airport is forecasted to remain at a B-II aircraft based on the number of B-II aircraft currently using the airport and the additional B-II aircraft forecasted to the use the airport in the future.

Airport Seasonal Use Determination

A seasonal fluctuation in aircraft operations can be expected at any airport. Non-towered general aviation airports, and airports located in regions that experience significant winter weather patterns, tend to have the most fluctuation in operations. Conversely, major airports with regular scheduled airline activity and commercial service, and airports in more stable climates, experience less seasonal fluctuation.

Non-towered airports generally experience a substantially higher number of operations in summer months than in winter months. With no tower at the Watertown Municipal Airport, seasonal use trends are based on other planning studies for non-towered general aviation airports. This information will be used for the purpose of computing peak usage, and the Airport's demand and capacity, and is displayed in Table 3.17.

Table 3.17: Seasonal Use Trends

Month	Similar Sized GA Airports
January	3.5%
February	4.0%
March	4.8%
April	7.55
May	11.3%
June	13.55
July	14.8%
August	13.0%
September	10.0%
October	8.0%
November	5.8%
December	3.8%

Demand Capacity Analysis

In order to arrive at a reasonable estimate of demand for the airport facilities, it is necessary to develop a method to calculate the levels of activity during peak periods. The Peak Hourly Demand is an estimate of the busiest hour on the busiest day during the month of highest volume at the airport.

Using the seasonal use information in Table 3.17, a formula was used to calculate the average daily operations in a given month (D), based on the percentage of the total annual operations for that month. The following is the formula:

$M = A (T/100)$
$D = M (12/365)$

Where M = Average monthly operations
A = Total annual operations
T = Monthly percent of use (from seasonal use trends Table 3-16)
D = Average Daily Operations in a given month

Approximately 90% of total daily operations will occur between the hours of 7:00 AM and 7:00 PM (12 hour period) at the typical general aviation airport. This means the maximum peak hourly occurrence may be 50% greater than the average of hourly operations calculated for this time period.

The Estimated Peak Hourly Demand (P) in a given month was, consequently, determined by compressing 90% of the Average Daily Operations (D) in a given month into a 12-hour peak use period. P reduces D to an hourly average for the peak use period and increases the result by 50% as follows:

$P = 1.5 (0.90D/12)$

Where D = Average Daily Operations in a given month
P = Peak Hourly Demand in a given month

These calculations were made for each month of both the base year (2012) and the forecast year (2032) operation levels, and are depicted in Table 3.18.

Table 3.18: Estimated Daily and Peak Hourly Demand

Month	Base Year 2012				Forecast Year 2032		
	"T"	"M"	"D"	"P"	"M"	"D"	"P"
January	3.5%	2,030	67	8	2,307	76	9
February	4.0%	2,320	76	9	2,636	87	10
March	4.8%	2,784	92	10	3,163	104	12
April	7.5%	4,350	143	16	4,943	162	18
May	11.3%	6,554	215	24	7,447	245	28
June	13.5%	7,830	257	29	8,897	292	33
July	14.8%	8,584	282	32	9,753	321	36
August	13.0%	7,540	248	28	8,567	282	32
September	10.0%	5,800	191	21	6,590	217	24
October	8.0%	4,640	153	17	5,272	173	19
November	5.8%	3,364	111	12	3,822	126	14
December	3.8%	2,204	72	8	2,504	82	9

Based on forecasting completed earlier in this chapter, the annual operations for the base and forecast years are 58,000 and 65,900 respectively.

For both the base year of 2012 and forecast year of 2032 the maximum Peak Hourly Demand occurs in July with 32 operations per hour in the base year, and 36 operations per hour in the forecast year.

Airport Capacity and Demand

FAA Advisory Circular 150/5060-5 Airport Capacity and Delay is the basis for computing the relationship between an airport's demand compared to the estimated capacity the airport provides both now and forecasted in the future.

Several assumptions are included in AC 150/5060-5 for general airport layouts and conditions. Combined with operational forecasts made previously in this chapter, the approximate hourly capacity of the airport in Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) conditions were calculated for comparison.

Based on fleet mixes discussed earlier in this chapter, approximately 1 percent of aircraft using the Watertown Municipal Airport have a maximum gross takeoff weight of 12,500 pounds or more, generally considered an ARC "C" aircraft by AC 150/5060-5. Other assumptions are that less than 20 percent of all operations are touch and goes (likely closer to 10 percent of operations) and the peak hour operations consist equally of arrivals and departures.

These parameters result in a hourly capacity at the Airport of 98 operations per hour during VFR conditions and 59 operations per hour during IFR conditions.

AC 150/5060-5 can also be used to compute Annual Service Volume (ASV). The ASV is a reasonable estimate of an airport's annual capacity, and is estimated based on the type of runway use, aircraft mix and weather condition during a typical year. ASV assumptions from AC 150/5060-5 include IFR weather conditions occur roughly 10 percent of the time, and roughly 80 percent of the time the airport is operating with the runway-use configuration which produces the greatest hourly capacity.

Based on the discussed guidance, the ASV for the Watertown Municipal Airport is approximately 230,000 total operations for the current configuration of the airport. The configuration of the airport is not anticipated to change during the life of this planning study.

Table 3.19 summarizes the demand/capacity relationship. The worst case scenario for demand/capacity is under IFR conditions, but based on the results capacity does not appear to be an issue throughout the life of this planning study.

Table 3.19: Demand Capacity Summary

	2012 Base Year	2032 Forecast Year
Annual Operations Peak	58,000 / 230,000 = 25.2%	66,000 / 230,000 = 28.7%
Peak Hour VFR	32 / 98 = 32.7%	36 / 98 = 36.7%
Peak Hour IFR	32 / 59 = 54.2%	36 / 59 = 61.0%

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FACILITY REQUIREMENTS

47 - Airside / 53 - Landside

This chapter evaluates existing facilities of the Watertown Municipal Airport (RYV) to identify the capacities of the overall system. Airport facilities include both airfield and landside components. Once identified, the existing capacity is compared to the forecast activity provided in Chapter 3 to determine if deficiencies currently exist or may be expected to materialize in the future. When deficiencies in a component are identified, alternatives can be developed to determine appropriate corrective measures (Refer to Chapter 5). All airport facilities are developed in accordance with FAA airport design standards and airspace criteria. The following Chapter provides an assessment of the major airport facilities, including:

- Airfield pavements (runways, taxiways and apron)
- Buildings (terminal and hangars)
- Navigational aids and instrument approaches
- Auto parking and landside accessibility

4.1 AIRSIDE FACILITY REQUIREMENTS

Airfield facilities include those that are related to arrival, departure and ground movement of aircraft. The adequacy of existing airfield facilities at the airport has been analyzed and includes:

- Design Standards
- Airport Pavement Conditions
- Runway Length
- Runway Width
- Runway Pavement Strength
- Taxiway System
- Runway Protection Zones
- FAR Part 77 Surfaces
- Runway Approach Requirements and Instrument Approaches
- Airfield Lighting, Signage, Markings and Visual Aids

Design Standards

The selection of the appropriate design standards for airfield facilities development is based primarily on the design critical aircraft, or the most demanding type of aircraft using or expected to use the airport on a regular basis. The most important characteristics of the design critical aircraft are the approach speed and the physical dimension, which are defined by the Airport Reference Codes (refer to Figure 3.1). Runway design criteria is directly related to both aircraft approach speed and the aircraft's wingspan. These criteria include runway length, width, separation standards, safety areas, object free areas and runway protection zones. Additionally, taxiway design standards are primarily based on landing gear dimensions.

As discussed in Chapter 3 Aviation Forecasting, there is currently a Citation V based at the Watertown Municipal Airport and the Fixed Based Operator (FBO) Wisconsin Aviation operates several small business jets regularly at the Airport and plan to use more in the future as demand for this type of aircraft increases. These aircraft include the following models: Citation V, Citation CJ2 and Citation V Ultra. The forecast through the planning period shows a growth of small general aviation jet aircraft of similar types. **Therefore, the critical aircraft for the Airport is considered to be a Citation CJ2 or Citation V Ultra, which are both B-II aircraft.**

Even though the overall Airport Reference Code is recommended for B-II, each runway has its own designation based upon its design limitations and the aircraft which are anticipated to be served by the runway. Based on the 1995 Airport Layout Plan (ALP), the existing ARC is B-I for both Runway 5/23 and Runway 11/29. While the ARC is shown as B-I for Runway 5/23, the runway was built to B-II standards and changes to the airport since 1995 warrant a B-II rating as the existing condition. Therefore, it is anticipated that the primary runway through the planning period will have ARC B-II, while the crosswind runway through the planning period will be considered B-I.

The FAA airfield design standards per Advisory Circular 150/5300-13A, Airport Design, and the recommended and existing Watertown Municipal Airport airfield design standards are shown in Table 4.1. Definitions of key terms appear below the table.

Table 4.1: FAA Airfield Design Standards

Airfield Component	FAA Requirements	Existing Runway Design Conditions	
		Runway 5/23	Runway 11/29
Design Aircraft/ARC	B-II (recommended)	B-II	B-I
Runway Length	5,400' (recommended)*	4,430'	2,801'
Runway Width	75'	75'	75'
RSA Dimensions	150' Wide 300' Long	150' Wide 300' Long	120' Wide 240' Long
OFA Dimensions	500' Wide 300' Long	500' Wide 300' Long	400' Wide 240' Long
OFZ Dimensions	250' Wide 200' Long	250' Wide 200' Long	250' Wide 200' Long
Runway to Taxiway Centerline Separation	240'	250'	300'
Taxiway Width	35'	35'	35'
Taxiway Safety Area	79'	79'	79'
Taxiway Object Free Area	131'	131'	131'

** Refer to Runway Length Section for discussion*

- Runway Safety Area (RSA): A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot or excursion from the runway.

- Object Free Area (OFA): An area on the ground centered on a runway, taxiway or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

- Obstacle Free Zone (OFZ): The OFZ is airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for visual Navigational Aids (NAVAIDs) that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway, and for missed approaches.

Airport Pavement Conditions

In 2010, a Pavement Condition Index (PCI) Report was completed for the Watertown Municipal Airport. The PCI is an aviation industry standard for visual assessment of pavement conditions. During evaluation, inspectors identify signs of deterioration on the pavement surface. This information then develops a composite index or PCI number that represents the overall condition of the pavement in numerical terms, ranging from 0 (failed) to 100 (excellent). Generally, pavements above a PCI of 65 are considered for preventive maintenance such as crack sealing and surface treatments. A PCI between 40 and 65 may require major rehabilitation, such as mill and overlay. If the PCI is below 40, reconstruction is usually the only viable alternative due to the significant deterioration of the pavement.

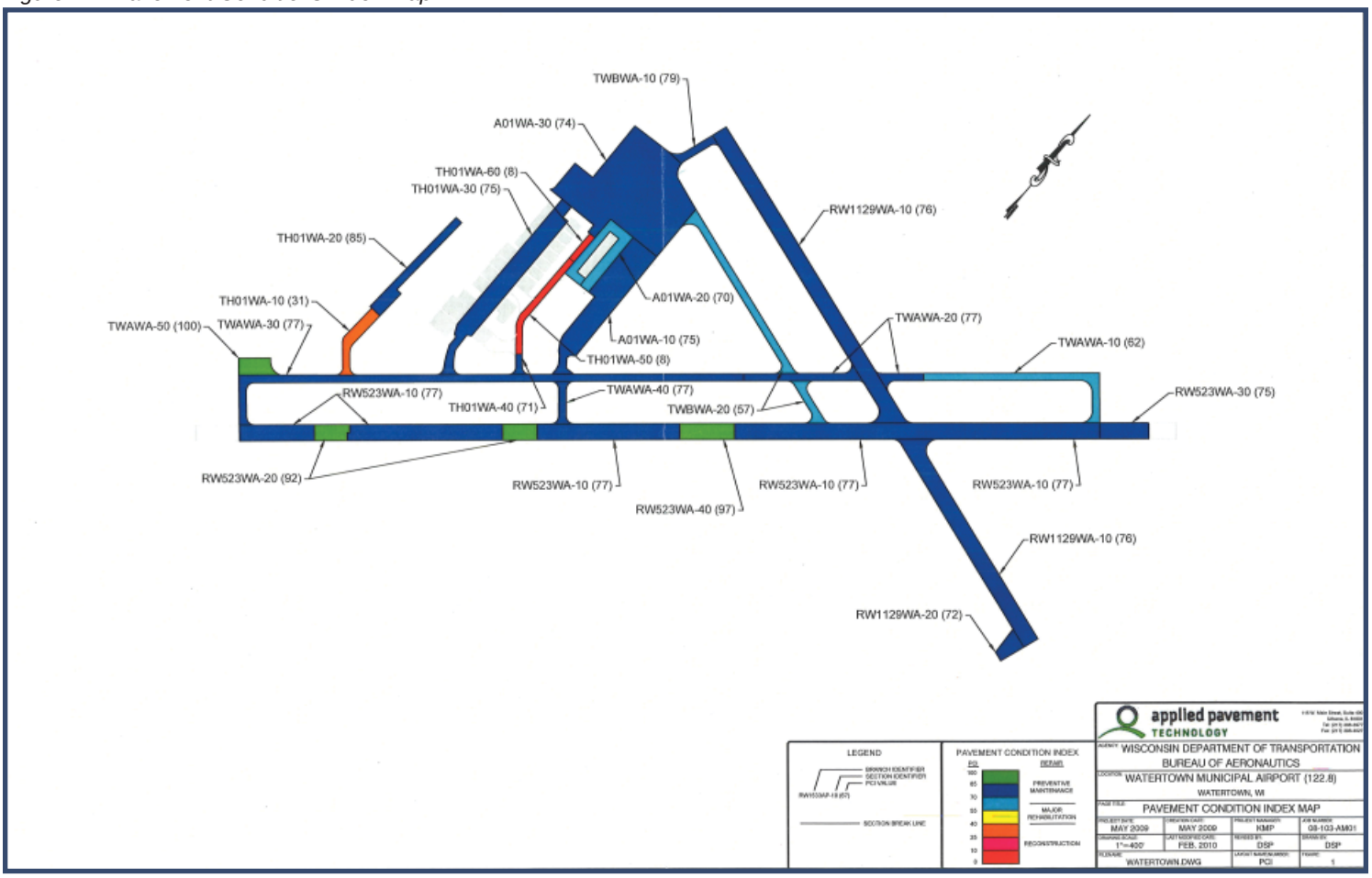
The WBOA has set a critical PCI value for different types of pavements. Above this value localized preventive maintenance activities (such as crack sealing) are recommended, while below the critical PCI major rehabilitation (such as an overlay or reconstruction) is recommended. For General Aviation airports, the critical PCI for runways is 70, and for taxiway and apron areas is 60.

From the inspection report, "the 2009 area-weighted condition of Watertown Municipal Airport is 74, with conditions ranging from 8 to 100 [on a scale of 0 (failed) to 100 (excellent)]." The runway pavements have an overall PCI of approximately 77, taxiways 72 and apron areas 74. Figure 4.1 shows the graphical results of the report as a Pavement Conditions Index Map.

Runway Length

FAA Advisory Circular 150/5325-4B, Runway Length Requirements for Airport Design provides guidelines to determine runway lengths for a selected list of critical design aircraft. One of the specific elements of this Master Plan is to determine if the Watertown Municipal Airport is eligible for an increase in runway length, and if they are, which runway would serve this need through Alternative Analysis. Several factors determine the runway length requirements for the airport:

Figure 4.1: Pavement Conditions Index Map



- Mean maximum daily temperature of the hottest month: 82 degrees in July
- Airport elevation: 833 feet above sea level
- Critical aircraft type expected to use the airport: B-II; Citation CJ2 or Citation V Ultra and similar aircraft

The future critical aircraft is categorized as an aircraft greater than 12,500 pounds, and generally are aircraft that comprise the "75 percent of the fleet of large airplanes." Other aircraft were identified in the corporate user survey that may use the Airport in the future that comprise the remaining part of the fleet to round out the "100 percent of the fleet of large airplanes," but not in sufficient number to be the design critical aircraft group.

The term useful load, for this planning purpose, refers to the difference between the maximum allowable structural gross weight and the operating empty weight of the aircraft in question. FAA guidelines require the selection of 60 percent or 90 percent useful load to be based on the length of haul and service needs of the critical design aircraft. For example, the 60 percent useful load table is to be used for those airplanes operating with no more than a 60 percent useful load factor. This planning effort assumed that most aircraft will be operating at or near the 60 percent useful load factor.

Using the information contained in AC 150/5325-4B the calculations for runway length were determined and are shown in Table 4.2. Table 4.2 considered all applicable runway length adjustments which can be applied to the 75% of large airplanes at both 60 percent and 90 percent of useful load.

Table 4.2: FAA Runway Length Requirements

Advisory Circular Criteria	Runway Length
95% of small airplanes (less than 12,500 lbs) with less than 10 passenger seats	3,200'
100% of small airplanes (less than 12,500 lbs) with less than 10 passenger seats	3,825'
Small airplanes (less than 12,500 lbs) with 10 or more passenger seats	4,175'
75% of large airplanes (less than 60,000 lbs) at 60% useful load	5,400'
75% of large airplanes (less than 60,000 lbs) at 90% useful load	7,000'
100% of large airplanes (less than 60,000 lbs) at 60% useful load	5,350'
100% of large airplanes (less than 60,000 lbs) at 90% useful load	7,900'

Per Table 4.2 the recommended runway length for 75 percent of the fleet of large airplanes at 60 percent useful load is 5,400 feet. While this is the recommendation based on the Advisory Circular's results, one of the Airport's long term goals has been to establish a 5,000 foot runway. The airport recognizes the importance of establishing a 5,000 foot runway for business use as it opens up the Airport to regular use by a variety of aircraft who cannot regularly use it now due largely to insurance restrictions, which change when a 5,000 foot runway is available. In addition, many databases used by corporate pilots when locating the nearest usable airport close to their required destination do not include airports with runways less than 5,000 feet. **Therefore, while the Watertown Municipal Airport qualifies for a 5,400' primary runway length, the Master Plan will proceed planning for a future 5,000 foot runway.** Since both Runway 5/23 and Runway 11/29 have runway lengths shorter than 5,000 feet, both will be studied to determine the best alternative to meet this facility requirement. Alternatives and recommendations for providing runway improvements at the Airport are presented in Chapter 5, Alternative Analysis.

Runway Width

According to FAA Advisory Circular 150/5300-13A, Airport Design, the minimum runway width for runways designed to B-II standards is 75 feet. Both existing Runway 5/23 and Runway 11/29 are currently designed to B-II standards and have 75 foot wide runways. **The existing runway widths meet the FAA design criteria for the design aircraft for each runway.**

Runway Pavement Strength

Both Runway 5/23 and Runway 11/29 are rated with an existing gross weight bearing capacity of 30,000 pounds single wheel loading. **According to the existing and forecast fleet mix, this pavement strength is adequate to accommodate the existing and forecast use at the airport**. Typically, a B-II runway should be at least 30,000 pounds single wheel loading.

Taxiway System

The primary function of a taxiway system is to provide access between runways and the terminal area. Some taxiways are necessary simply to provide access between the aprons and runways, while other taxiways become necessary as activity increases at an airport to provide safe and efficient use of the airfield.

Both Runway 5/23 and Runway 11/29 are served by partial parallel taxiways. The lack of full parallel taxiways on both runways may require aircraft to use the existing runways as taxiways to travel between the airside and landside facilities. The terminal area is fed by the partial parallel taxiway on Runway 11/29 and through a series of taxiways branching off of the partial parallel taxiway on Runway 5/23. The current configuration in the terminal area allows aircraft flow during busy periods.

According to FAA Advisory Circular 150/5300-13A, Airport Design, the minimum recommended runway to taxiway centerline separation for a runway with an ARC of B-II and visibility minimums greater than or equal to ¾ mile is 240 feet. The minimum recommended taxiway width is 35 feet. The partial parallel taxiway on Runway 5/23 currently has a separation of 250 feet while the partial parallel taxiway on Runway 11/29 has a separation of 300 feet, both exceeding the recommendation. **A parallel taxiway is considered essential at airports having at least 20,000 annual operations and it is recommended that both parallel taxiways be extended to the full length of their respective runways.**

The strength of the taxiway should be constructed equal to that of the associated runway pavement. All future taxiway reconstructions or extensions should be at least 30,000 pounds single wheel loading.

Runway Protection Zones

The Runway Protection Zone (RPZ) is a trapezoidal area centered on each runway, typically beginning 200 feet beyond the runway end. The RPZ has been established by the FAA to provide an area clear of obstructions and incompatible land uses where possible, in order to enhance the protection of approaching aircraft, as well as people and property on the ground. The dimensions of the RPZ vary according to the visibility minimums serving the runway and the type of aircraft operating on the runway. All runways at the Watertown Municipal Airport have existing visibility minimums of one-mile or greater.

The RPZ for Runway 29 is currently entirely on airport property or controlled by an easement except for the roadway. The other three RPZs are largely on airport property, but do have parts that are not currently owned by the airport in fee or easement and have roadways. Approximately 2.8 acres in the Runway 11 RPZ are not on airport property and include a parking lot of a car dealership and the National Guard Armory (controlled by easement). In the Runway 5 RPZ, 7.7 acres are not on airport property and include an undeveloped corner of Wal-Mart property (controlled by easement). Approximately 2.3 acres in the Runway 23 RPZ is not on airport property, including two businesses and a residence. The Airport is planning to pursue acquisition of the businesses and residence in the Runway 23 RPZ. Figure 4.2 shows the existing RPZs at the Airport. **The FAA recommends all land within an RPZ should be owned by the airport in fee or easement**.

FAR Part 77 Surfaces

Federal Aviation Regulations (FAR) Part 77, Objects Affecting Navigable Airspace, establishes standards that determine which structures pose potential

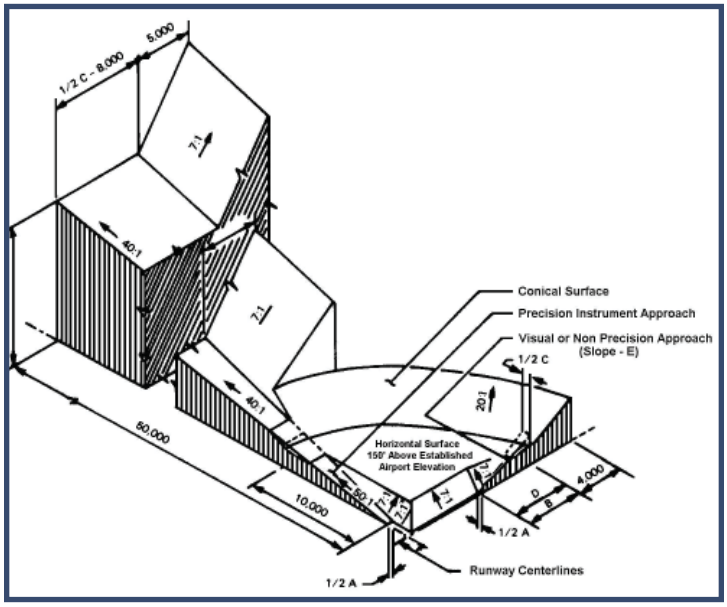
Figure 4.2: Existing Runway Protection Zones

obstructions to air navigation. FAR Part 77 defines a set of "imaginary surfaces" that surround an airport and must be considered when reviewing the existing conditions of the airport and while assessing any future development. These imaginary surfaces include:

- Primary Surface: A surface longitudinally centered on the runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond the end of each runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline. The width of the primary surface is determined by the type of runway, and the visibility minimums of its corresponding instrument or visual approach.
- 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 upon 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 the runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the approach surfaces.
- Horizontal Surface: A horizontal plane 150 feet above the established airport elevation, the perimeter of which is constructed by swinging arcs of specified radii from the center of each end of the primary surface of each runway and connecting the adjacent arcs by line tangent to those arcs. The radius of each arc is determined by the associated runway type.
- Conical Surface: A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

Each runway has existing obstructions to Part 77 surfaces. These obstructions must be removed or mitigated before any future runway reconstruction or runway development can proceed.

3-D graphic illustrating typical Part 77 Surfaces



A 3-D diagram of typical Part 77 surfaces is shown in the image above. The Part 77 surfaces will be further analyzed in the following chapter, Alternative Analysis, for potential impacts associated with any runway improvements at the Watertown Municipal Airport.

Runway Approach Requirements and Instrument Approaches

Instrument Approach Procedures (IAP) are a series of predetermined maneuvers established by the FAA, using electronic navigational aids that assist pilots in locating and landing at an airport during low visibility and cloud ceiling conditions. IAP can be broken into two categories: precision instrument or non-precision instrument approaches.

- Precision instrument approaches provide both vertical and horizontal guidance to a specific runway. A common example of this type of approach is an Instrument Landing System (ILS).
- Non-precision instrument approaches generally only have directional guidance to a specific runway. Examples of non-precision approach types are: localizer only, RNAV/GPS (area navigation/global position system), NDB (non-directional beacon) and VOR/DME (VHF omni-directional range/distance measuring equipment).

The newest type of approach that is considered non-precision is a Localizer Performance with Vertical Guidance (LPV) approach. While considered non-precision, a LPV approach provides both horizontal and vertical guidance to pilots.

A runway without a precision or non-precision approach is considered visual. These approaches only allow a pilot to land on a specific runway with visual approach guidance.

At the Watertown Municipal Airport, there are seven published instrument approach procedures, including a GPS approach to each runway end, a VOR/DME to Runway 29 and NDB approach to both ends of Runway 5/23. The approaches are approved for use by aircraft with approach speeds in Approach Categories A, B, C and D.

The capability of an instrument approach is defined by the visibility and cloud ceiling minimums associated with the approach. Visibility minimums define the horizontal distance that the pilot must be able to see to complete the approach. Cloud ceilings define the lowest level a cloud layer (defined as feet above the ground) can be situated for a pilot to complete the approach. If the observed visibility or cloud ceiling is below the minimums prescribed for the approach, the pilot cannot complete the instrument approach at that airport.

All approaches to Watertown Municipal Airport have visibility minimums equal to or greater than 1-mile. The lowest allowable cloud ceiling is 600 feet above ground level in association with the GPS approaches to Runway 5 and Runway 29, and the VOR/DME approach to Runway 29.

Currently, there are two methods to achieve visibility minimums lower than 1-mile. The first would be to obtain a LPV approach for the primary runway, lowering the visibility minimums to ¾-mile for that runway approach. This LPV would require the following on the primary runway:

- Flattens the FAR Part 77 Approach Surface slope to 34:1 (existing approaches are 20:1).
- Increase the FAR Part 77 Primary Surface width from 500 feet to 1,000 feet.
- Increase in Runway Protection Zone from 500' x 1,000' x 700' to 1,000' x 1,700' x 1,510'.
- A full parallel taxiway is required with a 300' runway to taxiway separation
- For night operations, install High Intensity Runway Lights (HIRL).

The other method to achieve visibility minimums lower than 1-mile would obtain a precision approach by establishing an Instrument Landing System (ILS). This would include a localizer, glide slope and approach lighting system (ALS). This would lower the minimums to ½-mile. The ILS approach requires:

- Flattens the FAR Part 77 Approach Surface slope to 50:1 (from 34:1 for an LPV).
- Runway Protection Zone further expands to 1,000' x 2,500' x 1,750'.
- Repaint the runway for precision approach markings.
- Off the end of the runway, an addition of a Precision Object Free Area (200' x 800') is required.

After discussing lower minimums and the associated impacts to the airport during a Technical Advisory Committee (TAC) meeting, it was determined that although lower approach minimums would increase the usability of the Airport, the associated impacts were too great to warrant this development for the small amount of additional operations it would create. The increase in the size of the primary surface alone would have adverse impacts to the airport no matter what alternatives would be developed. **Therefore, it was determined that any runway improvements would not include a reduction in minimums, but would pursue the best approach possible with 1-mile visibility minimums.** An improved approach could be achieved by obtaining a LPV approach with 1-mile visibility minimums. Based on the guidance in AC 150/5300-13A, Airport Design, a LPV approach with 1-mile visibility minimums could reduce the cloud ceiling level to 450 above ground level, which would be an improvement over all existing approaches. This objective was considered when completing Alternative Analysis in Chapter 5.

Airfield Lighting, Signage, Markings and Visual Aids

Airport lighting enhances safety during periods of inclement weather and nighttime operations by providing visual guidance to pilots in the air and on the ground. Lighting and visual aids can consist of a variety of equipment or a combination of equipment.

Runway 5/23 is equipped with Runway End Identification Lights (REILs) and two box Precision Approach Path Indicators (PAPIs) on both ends. REILs consist of two synchronized flashing lights, one on each side of the runway threshold, facing the approaching aircraft helping the pilot identify the runway. PAPIs are visual approach slope indicators with color coded lens that indicate an approaching aircraft's position on a specific runway's glide path.

Runway 11/29 does not have REILs or PAPIs, but it is recommended that both be installed in the future to aid pilots in using this runway.

Both Runway 5/23 and Runway 11/29 have medium intensity runway lights (MIRLs) and 8-light runway threshold lights configurations. All lights are staked mounted with direct buried cable. It is preferred to have the lights on both runways in base cans which are more secure and easier to access than stake mounted lights, and the edge light cables be replaced and installed in conduit. Lastly, to improve the life of any new lighting, new underdrains are recommended with positive drainage running from each base can into the underdrains keeping any lighting improvements as dry as possible. High groundwater is an issue at the Watertown Municipal Airport.

Signage for aircraft navigating to and from the runways is not completely adequate. When applicable, additional signage should be installed at appropriate locations to provide adequate guidance for taxiing aircraft.

The existing rotating beacon is located adjacent to the terminal building. The lighted wind cone and segmented circle is located northeast of Runway 11. The Automated Weather Observation System (AWOS) is located east of the terminal area, between both partial parallel taxiways. The location of the beacon, wind cone and AWOS are adequate for the existing condition, and should only be relocated in the future if their location conflicts with future improvements or changes.

Runway 5/23 is currently marked as a non-precision runway and Runway 11/29 is marked as a visual runway. All pavement markings on the airport are in good condition but are beginning to fade. The markings will need to be re-painted within several years.

State Airport System Plan Typical Airside Facility and Service Attributes

The Wisconsin Department of Transportation Bureau of Aeronautics (BOA) has developed and routinely updates a State Airport System Plan (SASP) to help guide the development of Wisconsin Airports. The SASP provides a framework for identifying the number, location and type of aviation facilities required to adequately serve the state's aviation needs. The BOA has recently began updating the SASP and started by issuing the 2010 Wisconsin State Airport System Plan – Airport Classification Review and Update. This report updates the SASP regarding how airports are classified in Wisconsin. Airports are now classified into four categories: Commercial Service Airports, Large General Aviation Airports, Medium General Aviation Airports and Small General Aviation Airports. The Watertown Municipal Airport is classified as a Medium General Aviation Airport.

Beyond reclassifying Wisconsin airports, the SASP update developed a list of typical facilities and service attributes for each classification. As stated in the document's preface, *"This portion of the State Airport System Plan (SASP) Update redefines the states airport classifications and describes the typical facility and service attributes for each of the four airport classifications. These attributes are not a requirement. Typical facility and service attributes provide guidance on what each airport should put in place to best fill its system role and meet the needs of projected users. When airport sponsors update their airport master plan or airport layout plan, they should refer to these attributes for guidance*

and provide appropriate justification for any and all projects."

Table 4.3 compares the airport's airside facilities with the typical facilities identified in the technical report. Three typical facility objectives are not currently met at the airport: taxiway type, approach capability and approach light configuration. As discussed earlier in this chapter, neither runway has a full parallel taxiway, and this improvement is recommended as part of the Alternative Analysis for runway improvements (refer to Chapter 5). The existing approach capability of 1-mile visibility minimums does not meet the recommendation of ¾-mile visibility minimums for a Medium General Aviation Airport. While reduction in visibility minimums would increase the availability of the airport during low visibility conditions, the associated impacts to the airport were judged by the TAC to not warrant the development. In addition, since the addition of a MALS-F allows for the reduction of visibility minimums, it is not needed at this time. Therefore, it is not recommended that the minimums be lowered or a MALS-F be installed during the planning period.

4.2 LANDSIDE FACILITY REQUIREMENTS

Landside facilities are those necessary for the handling of aircraft and their passengers while on the ground. These facilities provide the essential interface between the air and ground transportation modes. The capacity of various components was examined in relation to projected demand to identify future landside facility needs. These include:

- Aircraft Hangars
- Aircraft Apron Parking
- General Aviation Terminal Building
- Auto Parking and Access

Aircraft Hangar Requirements

Wisconsin is prone to severe weather in the spring and summer, and experiences regular inclement weather during the winter; therefore it is assumed that most based aircraft owners choose to hangar their aircraft to protect their investments. In addition, some transient users prefer to hangar their aircraft while visiting an airport.

Currently, the Watertown Municipal Airport has 22 individual/conventional hangars of various sizes, one T-hangar with space for 10 single engine aircraft (Photo 4.1), and two FBO hangars. Many of the conventional hangars house multiple aircraft (Photo 4.2). A small percentage of based aircraft utilize a tie-down spot. Currently all 88 based

Table 4.3: State Airport System Plan: Airside Facility Objectives

Facility/Service	Typical Objective	Existing Conditions	Existing Condition Meeting Objectives?	Future Condition to Meet Objectives?
Airport Reference Code (ARC)	A or greater	B-II	Yes	Yes
Runway Length (Primary)	3,500' to 5,500'	4,430'	Yes	Yes
Runway Width (Primary)	75'	75'	Yes	Yes
Taxiway Type	Full Parallel	Partial Parallel	No	Yes
Approach Capability	Visibility Minimum 3/4-Mile	1-Mile Minimums	No	No
Runway/Taxiway Lighting	MIRL and Taxiway Reflectors	MIRL and Taxiway Reflectors	Yes	yes
Visual Aids and Approach Light Configuration	MALS-F, REILS, Rotating Beacon, Wind Cone, VGSI (VASI/PAPI)	REILs, Beacon, Wind Cone, PAPIs	No MALS-F	No MALS-F
Weather Reporting	ASOS or AWOS, desired	AWOS	Yes	Yes
Pavement Condition	60 PCI or greater	74	Yes	Yes (if improvements are made to deteriorating pavements)

** Actual runway dimensions are determined by the airport's critical aircraft.*
Source: Wisconsin State Airport System Plan Classification Review and Update Technical Report 2010

aircraft are served by hangars and tie-downs. Based on the existing hangar layout at the airport, there exists capacity along Taxiway C for two additional conventional hangars. In addition, an old hangar structure was recently razed on Taxiway D, opening up space for new hangar development.

While these spaces are available for development, they will not provide for all the forecast based aircraft (12 additional aircraft) through the planning period. The forecasting completed in Chapter 3 identified an

Photo 4.1

Photo 4.2

increase in larger corporate aircraft doing itinerant operations, increasing the need for hangar space for these aircraft. In addition, several users who responded to the general aviation user survey desired additional T-hangar(s) at the Airport.

The 1995 ALP identified further hangar area expansion to the west of Taxiway C. This layout was updated in 1999 to show a corporate hangar area west of Taxiway C, and an airport related business area west of the terminal building. Chapter 5 includes additional alternative analysis regarding hangar area development, including the applicability of the 1999 layout plan.

Aircraft Parking Requirements

A parking apron should provide space for the small percentage of based aircraft that are not stored in hangars, itinerant aircraft and for maintenance activity (moving aircraft in and out of hangars by the FBO). The Watertown Municipal Airport has one apron area that is approximately 278,000 square feet and includes 42 aircraft tie-downs and taxiway (Photo 4.3). Currently five based aircraft use tie-down spaces, including four piston engine aircraft owned by Wisconsin Aviation. These tie-downed aircraft are 5.7% of the total based aircraft.

To estimate the number of required tie-down spaces for the planning period, the recommendation from

Photo 4.3

the guidelines in the 2010 Wisconsin State Airport System Plan, Airport Classification Review and Update was used. It recommends providing tie-down space for at least 25% of the daily itinerant operations at the Airport. As presented in Table 3.18, the daily operations in the peak month (July) in 2012 are estimated to be 282 operations. As discussed in Chapter 3 Aviation Forecasting, approximately 38 percent of the total operations (107) are itinerant operations. Therefore, 27 tie-down spaces are needed to meet current needs (0.25 X 107 operations) by itinerant aircraft. With five additional spots used by based aircraft, the airport currently needs 32 tie-downs spots to meet the peak daily demand. Toward the end of the planning period in 2032, the peak daily operations are forecast to be 321 operations. Assuming a constant 38 percent of total operations (122) are itinerant operations, the forecast need increases to 31 tie-down spots for itinerant aircraft. Assuming a similar percentage of based aircraft continue to use tie-down locations, an additional 6 tie-down locations are needed, for a total of 37 tie-downs through the planning period.

The 42 existing tie-downs meet the WBOA recommendation for both the current and future forecast needs. However, local conditions often exceed the existing number of tie-downs. The Airport is located a short distance off of Business WIS 26 at the south end of the City of Watertown, and is within walking distance to several different restaurants including Perkins, Culvers and the Steakfire Restaurant. Airport management reports that the parking apron is often filled on weekends when itinerant aircraft fly into the area to eat at a local establishments, and then depart shortly after their meal. In addition, the Watertown Municipal Airport is only about 60 miles south of Wittman Field in Oshkosh, WI and sees a large increase in itinerant operations around the Experimental Aircraft Association (EAA) Airventure. Many aircraft fly into the airport, park and shuttle up to EAA by car, or stop at the airport before making the last leg of their voyage. During this event the airport's parking apron is completely full. Many airports around Wittman Field experience this effect. Special events cause the Airport's parking apron to become completely full and temporary parking for aircraft must be created around the Airport during these times. **Therefore, while existing tie-downs meet the recommendations for average daily use, the airport apron is often at capacity for weekend and special events. The 1995 ALP includes an apron expansion, and this master plan carries forward this facility improvement as part of the Alternative Analysis.**

General Aviation Terminal Building

The existing terminal building and associated maintenance hangar at the airport was built in 1986 and is approximately 13,000 square feet (Photo 4.4). The building includes a recent expansion to the hangar facility, which added additional maintenance space at the back of the facility. Airport management estimates that the total terminal space, excluding the maintenance hangar, is 4,500 square feet. The building is home to the corporate headquarters of Wisconsin Aviation, one of the Fixed Based Operators (FBO) on the airport. Wisconsin Aviation is the state's largest FBO, and provides full management at the airport for the City of Watertown, along with maintaining a flight school and full service maintenance operations in the adjoining hangar. Central Aviation, the other FBO at the airport, maintains a hangar to the south of the terminal facility, and provides full service aircraft refurbishing and remodeling.

The methodology used in estimating general aviation terminal facility needs is based on the number of airport users expected to utilize general aviation facilities during the peak hour of demand in a given

Photo 4.4

year. General aviation space requirements are then based upon providing building space equal to 50 square feet per peak hour operations as a basic criterion. A rate of 2.5 occupants per peak hour aircraft was assumed.

Applying these criteria, the estimated minimum building space for the existing period (2012) was developed. Using the assumptions previously made the formula follows: 2.5 occupants by 50 square feet of building by 32 peak hour operations equals 4,000 square feet.

Applying these same criteria to the end of the planning period (2032) yields the following: 2.5 occupants by 50 square feet of building by 36 peak hour operations equals 4,500 square feet.

The existing 4,500 square feet terminal building currently meets the needs of the airport and will continue to be adequate in meeting the airport's needs through the planning period (2032) based on the assumptions made in this section. However, these assumptions do not factor in the space consumed by Wisconsin Aviation's staff. With their corporate headquarters located at the Watertown Municipal Airport, Wisconsin Aviation employs approximately 40 full time employees at this location. While a portion of this staff works in their adjacent maintenance hangar, the other portion utilizes office space in the terminal building. In

discussion with Wisconsin Aviation management, they have continued to grow and project they will outgrow their space in the existing terminal before the end of the planning period. Therefore, while the assumptions made in this section for planning expansion to the existing terminal facility suggest the building is adequate through the planning period, a new terminal or additional terminal space may become a priority during the next 20 years. **Based on the projected increase in operations at the airport, coupled with a growing small business in Wisconsin Aviation headquartered in the terminal building, it is recommended that during the planning period consideration be made by the airport to expand their terminal capacity and facilities.**

Auto Parking and Access

For general aviation users, the parking areas are designed to accommodate peak activity periods. A generally accepted value for computing the amount of general aviation parking space needed is 1.3 spaces per peak hour general aviation pilot/passenger. This factor takes into account airport employees and visitors as well as pilots/passengers. Again a factor of 2.5 occupants per aircraft operation during the peak hour is used.

The existing estimated automobile parking requirement is (1.3)*(2.5)*(32) or 104 spaces. This requirement is anticipated to grow to (1.3)*(2.5)*(36) or 110 spaces by the end of the planning period (2032).

A different method to determine the recommended amount of parking spaces at a "medium general aviation" airport is shown in the 2010 Wisconsin State Airport System Plan Airport Classification Review and Update. This technical report recommends one parking space per based aircraft plus 25 percent for employees and visitors. Using this recommendation the Watertown Municipal Airport should have (88 + (.25 x 88)) or 117 parking spaces currently, and (100 + (.25 x 100)) or 125 parking spaces by the end of the planning period (2032).

Currently, the Airport has two parking areas near the terminal building. The paved parking area (Photo 4.5) directly adjacent to the north entrance of the terminal has 34 parking spaces. The unpaved parking area (Photo 4.6) to the west of the terminal across Jefferson Road can accommodate approximately 40 additional vehicles, for a total of 76 existing parking spaces.

This amount of parking does not meet the recommendations for existing or future need. In addition, Wisconsin Aviation's corporate headquarters adds an additional need for parking that the estimating methodologies do not adequately consider. **Therefore, it is recommended that additional automobile parking is included in the future development of the airport.**

Photo 4.5

Photo 4.6

The airport terminal and hangar areas are currently accessed by Jefferson Road and Aviation Way, both off of Business WIS 26, west of the airport. The airport recently installed fencing around the terminal and hangar areas, and a mechanical gate with keypad access. **The airport should plan for future automobile parking in the hangar area, as there is no area currently designated.** Aircraft owners often park in or around their aircraft hangars while flying, which can compromise safety when automobiles and aircraft intermix on taxiways.

Aircraft Fueling

Jet A fuel and 100 Low-Lead Avgas are available at the airport. Full-service aircraft fueling is provided by Wisconsin Aviation. The current fueling system consists of two, 10,000 gallon steel tanks below ground installed in the late 1980's. The tanks are nearing the end of their useful life. A recent analysis of the system reported that the rest of the fuel system (pumps, control, etc) are in good condition and could be re-used if the tanks were replaced. While these parts could be re-used, the installation of new fuel tanks should consider replacement of the entire system. **Replacing the system has been identified as a priority for the airport**.

Airport Security

There is an existing 4-foot tall woven wire perimeter fence around the majority of the airport (Photo 4.7). Recently, the airport installed an 8-foot tall chain link fencing in the hangar and terminal areas to increase security (Photo 4.8). The airport occasionally has problems with wildlife on the runways, which are not deterred by the existing perimeter fencing. **Upgrading the entire perimeter fence to a 10-foot tall deer fence is recommended during the life of this planning study.** A 10-foot tall fence has been successful in keeping wildlife off of other airports. In addition, motorized gates with security provisions are recommended in the hangar and terminal areas. Improved lighting on the apron and terminal parking areas are recommended.

Photo 4.7

Photo 4.8

State Airport System Plan Typical Landside Facility and Service Attributes

Table 4.4 compares the Watertown Municipal Airport's landside facilities with the typical facilities identified for a Medium General Aviation Airport in the 2010 Wisconsin State Airport System Plan Airport Classification Review and Update. Currently, all landside facilities are provided at the Airport except sufficient automobile parking.

Table 4.4: State Airport System Plan: Landside Facility Objectives

Facility/Service	Typical Objective	Existing Conditions	Existing Condition Meeting Objectives?	Future Condition to Meet Objectives?
Hangar Space	100% of based aircraft plus 10% of transient aircraft	Yes (with 5 open hangar spaces available	Yes	Yes
Ramp Space	255 of average daily transient aircraft	42 tie-downs	Yes	Yes
General Aviation Terminal/Admin Bldg.	Yes	Yes	Yes	No
Operations/ Maintenance Hangar	Yes	Yes	Yes	Yes
Auto Parking	1 space per based aircraft plus 25% more for employees and visitors	74 spaces	No	Yes
FBO	Limited Service	Full FBO Services	Yes	Yes
Maintenance	Limited Service	Aircraft Maintenance	Yes	Yes
Fuel	100LL and Jet A as needed	100 LL and Jet A	Yes	Yes
Terminal/Pilot's Lounges	Phone and Restrooms	Phone and Restrooms	Yes	Yes
Ground Transportation	Courtesy/ Loaner Car	Courtesy Car and rentals by reservation	Yes	Yes
Security	Appropriate Access Restrictions and Signage	Appropriate Access Restrictions and Signage	Yes	Yes
Other	Snow Removal	Snow Removal	Yes	Yes

Source: Wisconsin State Airport System Plan Classification Review and Update Technical Report 2010

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ALTERNATIVE ANALYSIS

61 - Airside / 83 - Landside

The purpose of this chapter is to consider the actual physical facilities which are needed to accommodate projected demand and meet the facility requirements as defined in Chapter 4. The alternatives evaluated in this chapter are not requirements for development at the Watertown Municipal Airport, they are options that the City of Watertown should consider to meet existing and future forecasted demand.

Any development proposed by a master plan evolves from an analysis of projected needs. Though the needs were determined by the best methodology available, it cannot be assumed that future events will not change these needs. The master planning process attempts to develop a viable concept for meeting the needs determined by projecting demands through the planning period.

The development alternatives for the Watertown Municipal Airport can be categorized into two functional areas the airside (runways, navigational aids, taxiways, etc) and landside (general aviation hangars, apron and terminal area). Within each of these areas specific facilities are required or desired.

Each functional area interrelates and affects the development potential of the others. Therefore, all areas must be examined individually, and then coordinated as a whole to ensure the final plan is functional, efficient, and cost effective. The total impact of all these factors on the existing airport must be evaluated to determine if the investment in the airport will meet the needs of the community, both during and beyond the planning period.

With this information, as well as input and direction from local government, airport users and the Technical Advisory Committee (TAC), a final airport concept can evolve into a preferred development plan.

5.1 AIRSIDE DEVELOPMENT ALTERNATIVES

Runway Development Alternatives were created to achieve a longer published runway at the Watertown Municipal Airport. As discussed in Chapter 4 Facility Requirements, based on AC 150/5325-4B, Runway Length Requirements for Airport Design, the airport is eligible for up to a 5,400 foot primary runway. One of the long term goals of the airport is a 5,000 foot published primary runway; therefore all alternatives were developed to meet this goal, eschewing the additional eligible runway length.

The alternatives were developed to show the impact of the primary runway extension, and non-precision and/or visual approaches on both Runway 11/29 and Runway 5/23. Each runway was analyzed before proceeding with improvements to the baseline conditions and working toward a Sponsor Preferred Alternative. Each alternative discusses the physical changes that would need to occur on the airfield and in areas surrounding the airport.

The alternatives are compared using environmental, socioeconomic and aviation factors to determine which of the alternatives will best fulfill the local aviation needs. Many of the impacts considered include physical changes such as environmental impacts to wetlands, the physical construction of the runway, taxiway and safety area improvements, road closures or relocations, and the land acquisition associated with these changes and approach protection.

Any estimated impacts to existing wetlands off airport property are based upon mapping done by the Wisconsin Department of Natural Resources (WDNR) from a 1984 wetland survey. Any estimated impacts to existing wetlands on airport property are based upon a wetland delineation completed by MSA Professional Services in June 2011.

While the alternatives focused on runway development, each alternative discussed other airside elements associated with the runway development for that specific alternative.

All runway development alternatives were discussed with the Technical Advisory Committee (TAC). Following discussion, suggestions and revisions were incorporated into specific alternatives before a decision was made on the Sponsor Preferred Alternative by the TAC.

The following assumptions where made and used in each Runway Development Alternative:

- B-II Design Aircraft (Approach Speed: 91 to 120 knots; Wingspan: 48 to 79 feet)
- Each Alternative results in a 5,000 feet x 75 feet primary runway
- 1-mile or greater Visibility Minimums on all runway approaches
- Runways considered "Larger than Utility" for Part 77 surfaces
- Part 77 Primary Surface 500 feet wide
- Runway Safety Area (RSA): 150 feet x 300 feet
- Runway Object Free Area (OFA): 500 feet x 300 feet
- Full Parallel Taxiway with minimum 240 foot separation
- Replacement of existing runway lighting system with a new Medium Intensity Runway Lighting (MIRL) System. This lighting would include navigational aids (NAVAIDs) Precision Approach Path Indictors (PAPIs) and Runway End Identifier Lights (REILs) to both runway ends.

Airport Imaginary Surfaces and their impacts for Alternative Analysis

Each alternative includes different impacts in the form of obstructions, due to different imaginary surfaces in and around each runway approach. These imaginary surfaces are defined by specific Federal Aviation Administration (FAA) rules and guidance. Obstructions are objects that penetrate an imaginary surface and must be removed, lowered or determined not to be a hazard by the FAA. These objects can include trees, buildings, antennas, poles, roadways (appropriate clearance allowed for vehicles using the roadway) and even the ground itself. Obstructions can be hazardous to aircraft taking off from and landing onto a runway. Removing obstructions will be required to clear future runway approaches, and are additional impacts beyond the other physical changes made to achieve any future improvements.

Calculating obstructions is based upon the physical end of a runway and the runway pavement elevation. Using that information imaginary surfaces can be projected based on specific FAA standards and requirements. Each imaginary surface has its own approach slope, dimensions and starting point in relation to the physical end of the runway.

The imaginary surfaces required are based upon the type of approach to a specific runway end. The two types of approaches considered in this alternative analysis are non-precision instrument (greater than 1-mile) and visual approaches. Any runway end showing a non-precision instrument approach will assume the future development of an LPV (Localizer Precision with Vertical Guidance) approach.

Non-Precision Instrument Approach

In general, a non-precision instrument approach increases the availability of the runway in all weather conditions, and has flatter and wider imagery surfaces. In alternatives showing a non-precision instrument approach, three separate imaginary surfaces are shown. Each imaginary surface has specific requirements and impacts the lands surrounding the airport differently. The following is a brief description of each imaginary surface associated with a non-precision instrument approach with 1-mile visibility minimums for the following alternatives.

- **Glidepath Qualification Surface (GQS)**. The GQS is the graphical representation for planning purposes of a LPV approach. Advisory Circular (AC) 150/5300-13A, Airport Design, provides guidance on planning for a LPV approach, and provides further information on the size of this imaginary surface. The GQS must be clear of all obstructions to achieve LPV approach minimums.

  - Approach slope: 34 to 1 (Table 3-2 recommends 30 to 1 for planning purposes, but the eventual slope for the approach will be between 20 to 1 and 34 to 1, so 34 to 1 was used as the most restrictive scenario).
  - Approach trapezoid size: Starting at the end of the runway, 275' x 10,000' x 1,520'.
- **Part 77 Surfaces**. These surfaces were discussed previously in Chapter 4 Facility Requirements. Several of the surfaces are impacted by obstructions on and around the airport. These include the primary surface, the approach surface and the transitional surface. All obstructions to Part 77 surfaces must be removed, lowered or determined not to be a hazard by FAA.
  - Primary Surface: Rectangular surface which is parallel to the runway centerline, 250 feet on either side of the runway centerline, and extending 200 feet past both runway ends.
  - Approach Surface: The surface starts 200 feet from the end of the runway, has an approach slope of 34 to 1 and a trapezoid size of 500' x 3,400' x 1,520'.
  - Transitional Surface: Extends at a 7 to 1 slope from the sides of the primary surface and from the sides of the approach surfaces.
- **Threshold Location Plane**. This surface determines the location of the runway threshold, and all obstructions must be removed from the surface or the runway threshold must be displaced. A displaced threshold does not allow for the maximum utilization of the published runway length. The guidance for this surface is found in Table 3-2 of AC 150/5300-13A, Airport Design. The threshold location plane for an ARC "B" Aircraft expected to support instrument night operations starts 200 feet from the end of each runway, has an approach slope of 20 to 1 and a trapezoid size of 400' x 10,000' x 3,800'.

Visual Approach

A visual approach can limit the availability of the runway in some weather conditions, but has steeper and smaller imagery surfaces compared to a non-precision instrument approach. In alternatives showing a visual approach, only two imaginary surfaces are shown. Since there is no instrumentation associated with this approach, there is no need for the GQS surface associated with a LPV approach. The following is a description of each imaginary surface associated with a visual approach.

- **Part 77 Surfaces**. When there is no instrument approach to the end of the runway, it is considered visual, and Part 77 surfaces still apply. All obstructions to Part 77 surfaces must be removed, lowered or determined not to be a hazard by FAA.
  - Primary Surface: Rectangular surface which is parallel to the runway centerline, 250 feet on either side of the runway centerline, and extending 200 feet past both runway ends.
  - Approach Surface: The surface starts 200 feet from the end of the runway, has an approach slope of 20 to 1 and a trapezoid size of 500' x 2,000' x 900'.
  - Transitional Surface: Extends at a 7 to 1 slope from the sides of the primary surface and from the sides of the approach surfaces.
- **Threshold Location Plane**. Similar to the Part 77 Surfaces, a visual approach still maintains a threshold location plane, and it must be clear of all obstructions to avoid a displaced threshold. The threshold location plane for an ARC "B" Aircraft using a visual approach day or night starts at the end of the runway. The surface itself has two components: a trapezoid sized 400' x 1,500' x 1,000' then a rectangle extending another 8,500 away from the runway 1,000' wide. Both components have an approach slope of 20 to 1.

Obstructions in all alternative analysis are shown as colored dots on the following figures. Obstructions are separated into man-made (buildings, poles, etc) or natural (trees) objects. The colors shown correspond to the specific surface they penetrate, with hierarchy given to the flattest, most restrictive, imaginary surface by FAA regulations. For the purposes of this study, the hierarchy is defined as the Glidepath Qualification Surface, the Threshold Location Plane and finally the Part 77 surfaces.

Runway 11/29 Alternatives

Alternatives 1 and 2 studied extending the crosswind Runway 11/29 to 5,000 feet, making it the primary runway at the Airport. Runway 11/29 is currently 2,800 feet in length. Both alternatives assume that the existing end of Runway 11, near the terminal area, would remain in its current location due to the proximity of existing development. The 2,200 foot extension would be added to Runway 29 and the runway extended to the southeast.

The difference between Alternatives 1 and 2 is the type of approaches shown on both runway ends. Alternative 1 is shown as the "best case" scenario for LPV approaches to Runway 11/29 without reducing the visibility minimums below 1-mile.

Alternative 2 is shown as the "worst case" scenario for visual approaches to each end of Runway 11/29. The entire runway is considered "visual" meaning there are no instrument approaches to either runway end. The runway would only be available for use when weather conditions permit visual flight rules (VFR), which is a typical sunny day or a cloudy day when the cloud ceiling is very high.

The reason for showing a different level of approach in the separate alternatives is for comparison of the impacts the non-precision or visual approaches have on areas surrounding the airport. A non-precision instrument approach (Alternative 1) increases the availability of the runway in all conditions, but has flatter and wider imagery surfaces possibly increasing the amount of obstructions in each approach. A visual approach (Alternative 2) is the opposite; it limits the availability of the runway in some conditions, but has steeper and smaller imagery surfaces possibly decreasing the amount of obstructions. Visual approaches are the baseline minimum for any runway.

Runway 11/29 Alternatives 1 and 2 consider the impacts on and off the airport associated with specific runway improvements. These include environmental impacts, land acquisition and obstruction removal, the direct impacts due to the construction of runway, taxiway and safety area improvements, and road closures and relocations.

Improvements shown in Alternatives 1 and 2 assume that no improvements will be made to Runway 5/23.

Alternative 1 - Runway 11/29

Alternative 1 (Figures 5.1 and 5.2) maintains the existing end location of Runway 11 and extends Runway 29 by 2,200 feet to the southeast for a total runway length of 5,000 feet. Both runway ends include non-precision instrument approaches with 1-mile visibility minimums. The following is a summary of the imaginary approach surfaces for Alternative 1:

- LPV Approach shown as a Glide Path Qualification Surface (GQS) with a 34 to 1 slope for planning purposes: 500' x 10,000' x 1,520'
- Part 77 Approach Surface with a 34:1 slope: 500' x 3,400' x 1,520'
- Threshold Location Plane with a 20:1 slope: 500' x 10,000' x 3,800'

Additional requirements and impacts for Alternative 1:

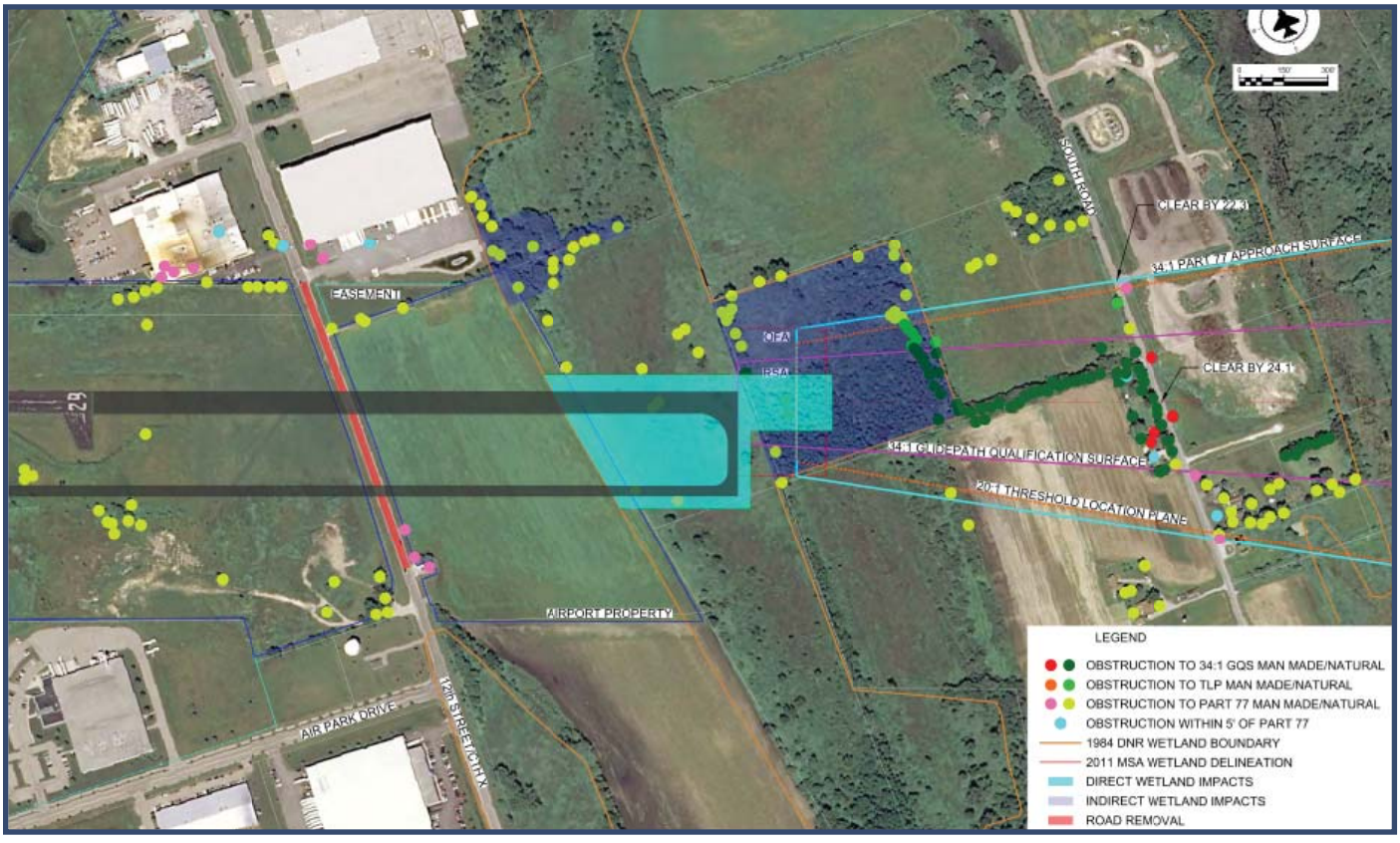
- Extend parallel taxiway to the new end of Runway 29.
- Close 12th Street/CTH X to thru traffic.
- Property Acquisition in easement in the Runway 11 approach for obstruction removal.
- Multiple property acquisitions in fee for the runway and taxiway extensions, and safety area construction on Runway 29.
- Acquisition in fee and easement in the Runway 29 approach for obstruction removal.
- Direct wetland impacts at the end of Runway 29 of approximately 7.2 acres.
- Indirect wetland impacts for tree clearing in the Runway 29 approach of approximately 10.5 acres.

Alternative 2 - Runway 11/29

Alternative 2 (Figures 5.3 and 5.4) maintains the same footprint of the runway, including safety areas, as shown in Alternative 1. The entire runway is considered visual with no instrument approaches to either runway end.

Figure 5.1: Alternative 1 - Runway 11

Figure 5.2: Alternative 1 - Runway 29



The following is a summary of the imaginary approach surfaces for Alternative 2:

- Part 77 Approach Surface with a 20 to 1 slope: 500' x 2,000' x 900'
- Threshold Location Plane with a 20 to 1 slope in two components: 400' x 1,500' x 1,000' trapezoid then a 8,500' x 1,000' rectangle.

Additional requirements and impacts for Alternative 2:

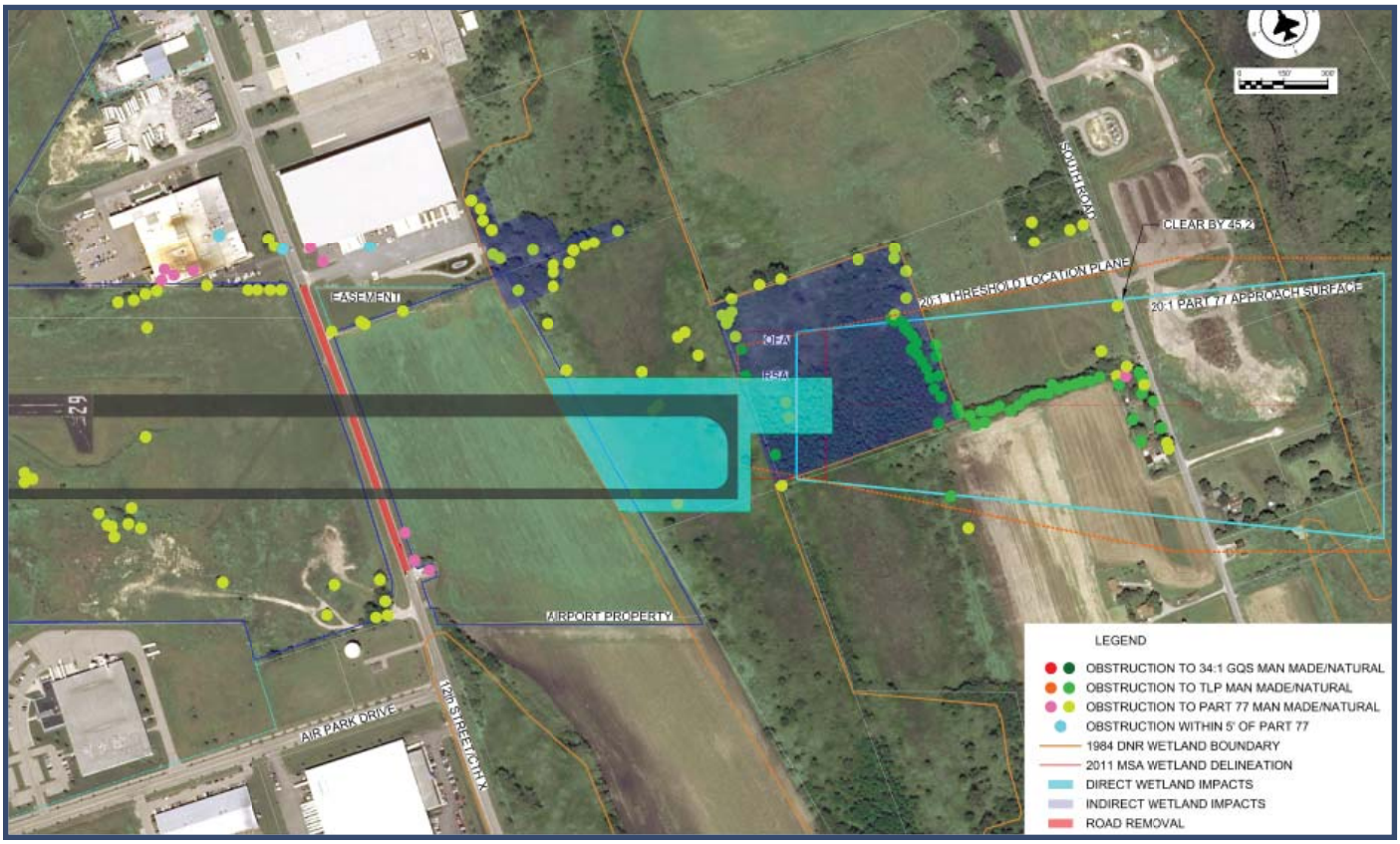
- Extend parallel taxiway to the new end of Runway 29.
- Close 12th Street/CTH X to thru traffic.
- Property Acquisition in easement in the Runway 11 approach for obstruction removal.
- Multiple property acquisitions in fee for the runway and taxiway extensions, and safety area construction on Runway 29.
- Acquisition in fee and easement in the Runway 29 approach for obstruction removal.
- Direct wetland impacts at the end of Runway 29 of approximately 7.2 acres.
- Indirect wetland impacts for tree clearing in the Runway 29 approach of approximately 10.5 acres.

Summary Alternatives 1 & 2 (Runway 11/29)

The impacts for Alternatives 1 and 2 are very similar. The primary difference is amount of obstructions related to the type of approaches shown between Alternative 1 and 2. The non-precision instrument approaches for Alternative 1 are flatter and wider, and produce a larger number of obstructions compared to the steeper and smaller approaches associated with visual approaches in Alternative 2. The approach surfaces in Alternative 1 impact 85 more obstructions or groups of obstructions (multiple trees identified as one obstruction) than are impacted in Alternative 2. In addition, approximately 10 more properties are impacted in Alternative 1 due to the larger number of obstructions on additional properties.

Figure 5.3: Alternative 2 - Runway 11

Figure 5.4: Alternative 2 - Runway 29



In both alternatives, extending Runway 29 closes 12th Street/CTH X to thru traffic. 12th Street/CTH X is a significant north/south traffic corridor on the south side of the City of Watertown. This road cannot be easily relocated since any relocation would be pushed to the east through wetlands and would not be far from South Road. Therefore, South Road, the next road to the east not impacted, would need to be improved to provide similar access to the south side of the community.

Both alternatives also have wetland impacts due to the runway extension. The WDNR has identified a wetland between 12th Street/CTH X and South Road. The runway extension and associated taxiway extension, and safety area improvements would directly impact over seven acres of wetlands. These wetlands would have to be filled in both alternatives since the runway footprint is the same in both scenarios. Additionally, other wetland areas would be indirectly impacted through tree clearing for the imaginary surfaces associated with the improvements. The indirect impacts add over ten acres where trees would be felled in the wetland impacting the existing characteristics of the ecosystem. These impacts are identical in both Alternatives, and total over 17 acres of overall wetland impacts.

Based on the wetland impacts and the closure of 12th Street/CTH X, the Technical Advisory Committee (TAC) agreed that any runway improvements to achieve a 5,000 foot runway would not occur on Runway 11/29. The over 17 acres of direct and indirect wetland impacts would be a large hurdle to cross during future environmental actions. The WDNR stated their preference to avoid Alternative 1 and 2 due to these impacts.

In addition, the City of Watertown is strongly opposed to closing any portion of 12th Street/CTH X due to its importance to the overall infrastructure of the community. This road provides a vital link to traffic entering and leaving from the south end of the City. The City of Watertown would not support any alternative that closes this road. Based on this discussion, no further analysis was completed on Runway 11/29.

Runway 5/23 Alternatives

Alternatives 3 thru 6 studied extending the existing primary Runway 5/23 to 5,000 feet. Runway 5/23 currently has a published length of 4,430 feet. The runway also includes a 570 foot paved stopway off the end of Runway 23. Stopway is defined as: *"an area beyond the takeoff runway, no less wide than the runway and centered upon the extended centerline of the runway,able to support the airplane during an aborted takeoff, without causing structural damage to the airplane, and designated by the airport authorities for use in decelerating the airplane during an aborted takeoff" (*14 CFR Part 1). The Watertown Municipal Airport built the stopway for a measure of added safety to their existing primary runway.

While not published as the usable length, the total pavement footprint of Runway 5/23 is approximately 5,000 feet. Analysis for Runway 5/23 started with the assumption that the existing total footprint would be improved to a published length of 5,000 feet to meet the facility requirements recommendation for a longer primary runway. Therefore, the existing 570 foot stopway at the end of Runway 23 would be considered a 570 foot runway extension to the northeast.

To set a baseline condition for Runway 5/23, it was assumed the runway would be reconstructed to the existing pavement elevations and these elevations are the basis for analyzing obstructions in both runway approaches.

Alternatives 3 and 4 consider the baseline condition of Runway 5/23 at 5,000 feet. The difference between Alternatives 3 and 4 is the type of approaches shown on both runway ends. Alternative 3 is shown as the "best case" scenario for LPV approaches to Runway 5/23 without reducing the visibility minimums below 1-mile.

Alternative 4 is shown as the "worst case" scenario for visual approaches to each end of Runway 5/23. The entire runway is considered "visual" meaning there are no instrument approaches to either runway end. The runway would only be available for use when weather conditions permit visual flight rules (VFR), which is a typical sunny day or a cloudy day when the cloud ceiling is very high.

The reason for showing a different level of approach in the separate alternatives is for comparison of the impacts the non-precision or visual approaches have on areas surrounding the airport. A non-precision instrument approach (Alternative 3) increases the availability of the runway in all conditions, but has flatter and wider imagery surfaces possibly increasing the amount of obstructions in each approach. A visual approach (Alternative 4) is the opposite; it limits the availability of the runway in some conditions, but has steeper and smaller imagery surfaces possibly decreasing the amount of obstructions. Visual approaches are the baseline minimum for any runway.

Runway 5/23 Alternatives 3 thru 6 consider the impacts on and off the airport associated with specific runway improvements. These include environmental impacts, land acquisition and obstruction removal, the direct impacts due to the construction of runway, taxiway and safety area improvements, and road closures and relocations.

Improvements shown in Alternatives 3 and 4 assume that no improvements will be made to Runway 11/29.

Alternative 3 - Runway 5

Alternative 3 (Figures 5.5 and 5.6) assumes the existing footprint of Runway 5/23 (published length and stopway) is brought up to FAA standards for an ultimate published runway length of 5,000 feet. The runway is assumed to be reconstructed to the existing elevations and grades. Both runway ends include non-precision instrument approaches with 1-mile visibility minimums. The following is a summary of the imaginary approach surfaces for Alternative 1:

- LPV Approach shown as a Glide Path Qualification Surface (GQS) with a 34 to 1 slope for planning purposes: 500' x 10,000' x 1,520'
- Part 77 Approach Surface with a 34 to 1 slope: 500' x 3,400' x 1,520'
- Threshold Location Plane with a 20 to 1 slope: 500' x 10,000' x 3,800'

Additional requirements and impacts for Alternative 3:

- Utilize the existing pavement footprint of Runway 5/23 (4,430 feet with a 570 foot stopway on Runway 23 for a total 5,000 feet of pavement). Use the existing pavement end elevations for analysis.
- Extend parallel taxiway to both ends of the runway.
- High Road is an obstruction to the Part 77 Approach Surface for Runway 5, and would need to be lowered or closed.
- Air Park Drive is an obstruction to the Part 77 Approach Surface for Runway 5, and would need to be lowered.
- Direct wetland impacts of 0.6 acres to provide proper safety area off the end of Runway 5. Possible impacts to the navigable waterway in the wetland.
- Miscellaneous tree clearing on airport property in the wetland off the end of Runway 5.
- Light poles along Business WIS 26 and Air Park Drive are obstructions.
- Property acquisition in fee and easement in the Runway 5 approach for obstruction removal.
- Boomer, 12th and Humboldt Streets, and Pine Ridge Court are obstructions to the Part 77 Approach Surface and would have to be closed or relocated in the Runway 23 approach. Boomer Street must also be removed from the runway safety area.
- Light and utility poles along Boomer, 12th, Humboldt and Clark Streets, and Pine Ridge Court are obstructions.
- Property acquisitions in fee for the Runway 23 safety area improvements.
- Property acquisition in fee to lower the existing ground that is an obstruction (yellow shaded area on Figure 5.6) to the Runway 23 approach.
- Significant acquisition in fee and easement in the Runway 23 approach for obstruction removal.

Figure 5.5: Alternative 3 - Runway 5

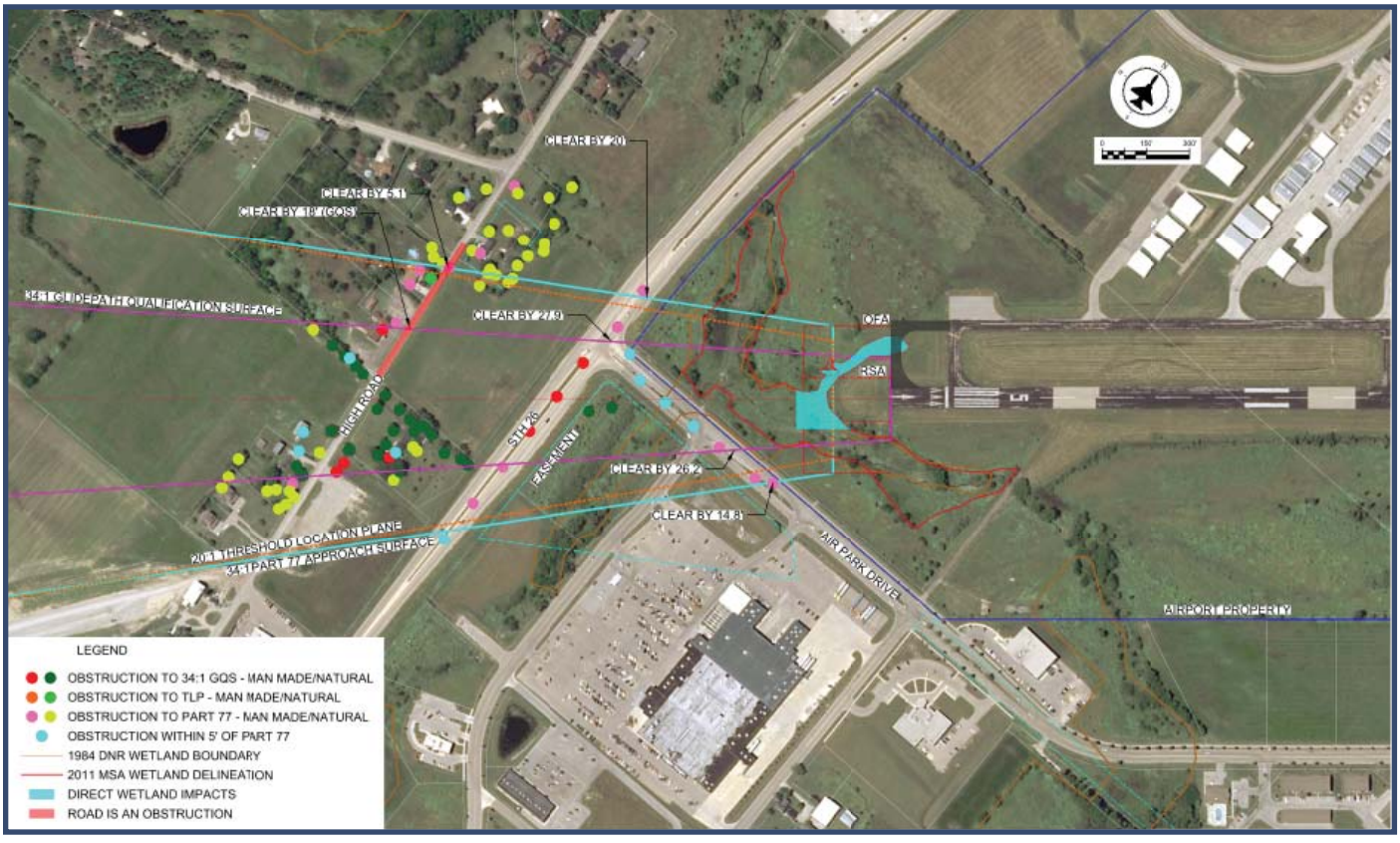
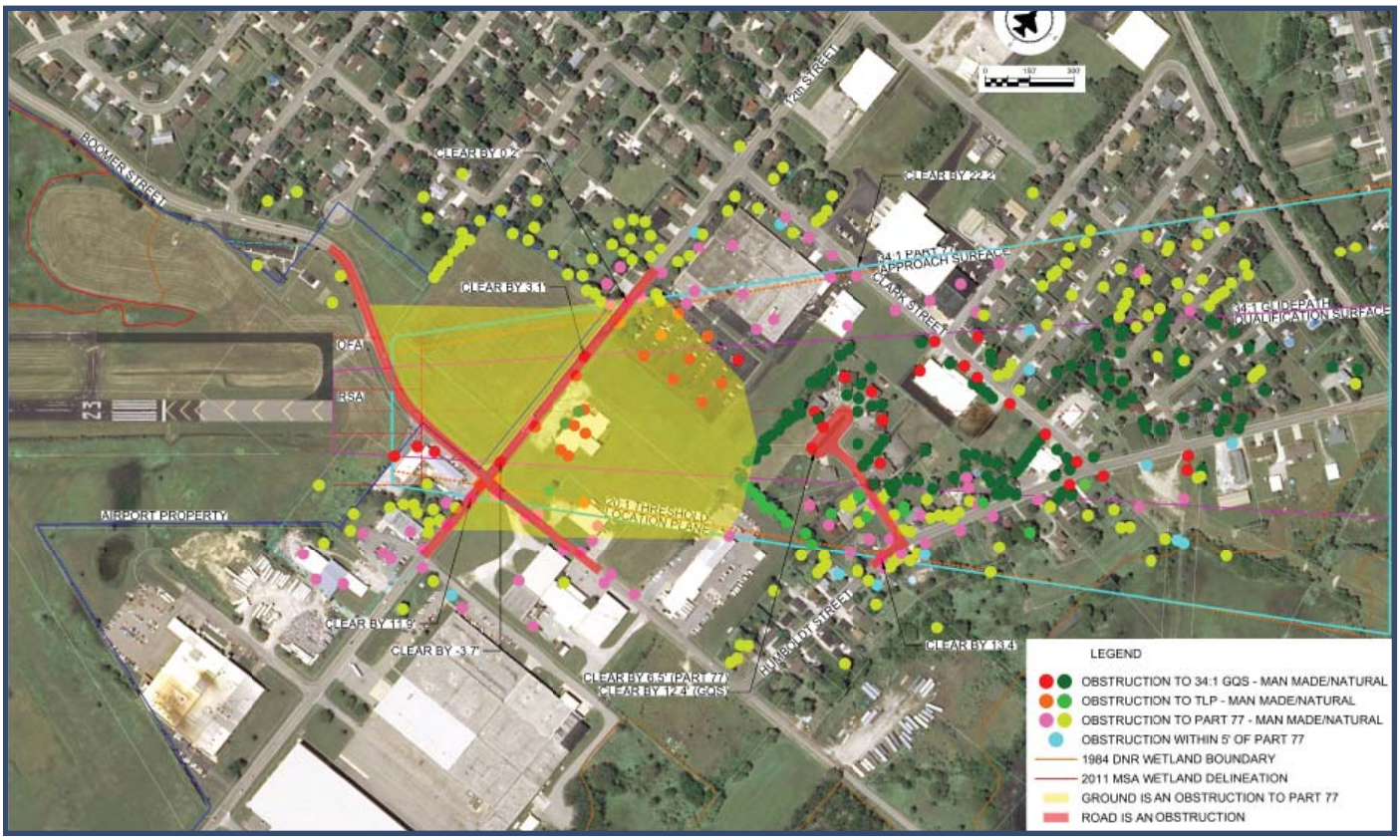


Figure 5.6: Alternative 3 - Runway 23



Alternative 4 - Runway 5

Alternative 4 (Figures 5.7 and 5.8) assumes the existing footprint of Runway 5/23 (published length and stopway) is brought up to existing FAA standards for an ultimate published runway length of 5,000 feet. The runway is assumed to be reconstructed to the existing elevations. The entire runway is considered visual with no instrument approaches to either runway end. Visual approaches are the baseline minimum for any runway. The following is a summary of the imaginary approach surfaces for Alternative 4:

- Part 77 Approach Surface with a 20 to 1 slope: 500' x 2,000' x 900'
- Threshold Location Plane with a 20 to 1 slope in two components: 400' x 1,500' x 1,000' trapezoid then a 8,500' x 1,000' rectangle.

Additional requirements and impacts for Alternative 4:

- Utilize the existing pavement footprint of Runway 5/23 (4,430 feet with a 570 foot stopway on Runway 23 for a total 5,000 feet of pavement). Use the existing pavement end elevations for analysis.
- Extend parallel taxiway to both ends of the runway.
- Direct wetland impacts of 0.6 acres to provide proper safety area off the end of Runway 5. Possible impacts to the navigable waterway in the wetland.
- Miscellaneous tree clearing on airport property in the wetland off the end of Runway 5.
- Property acquisition in easement in the Runway 5 approach for obstruction removal.
- Boomer and 12th Streets are obstructions to the Part 77 Approach Surface and would have to be closed or relocated in the Runway 23 approach. Boomer Street must also be removed from the runway safety area.

Figure 5.7: Alternative 4 - Runway 5

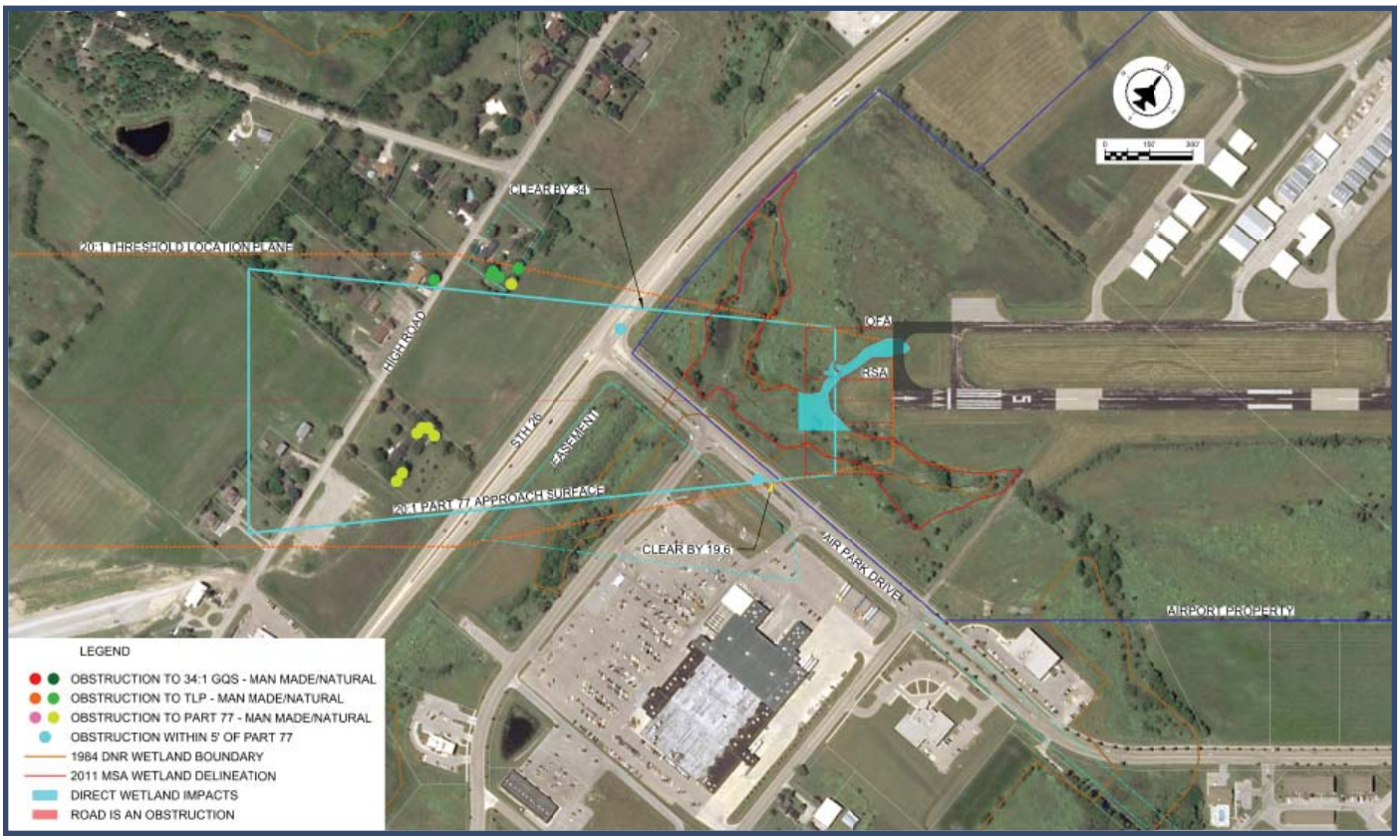
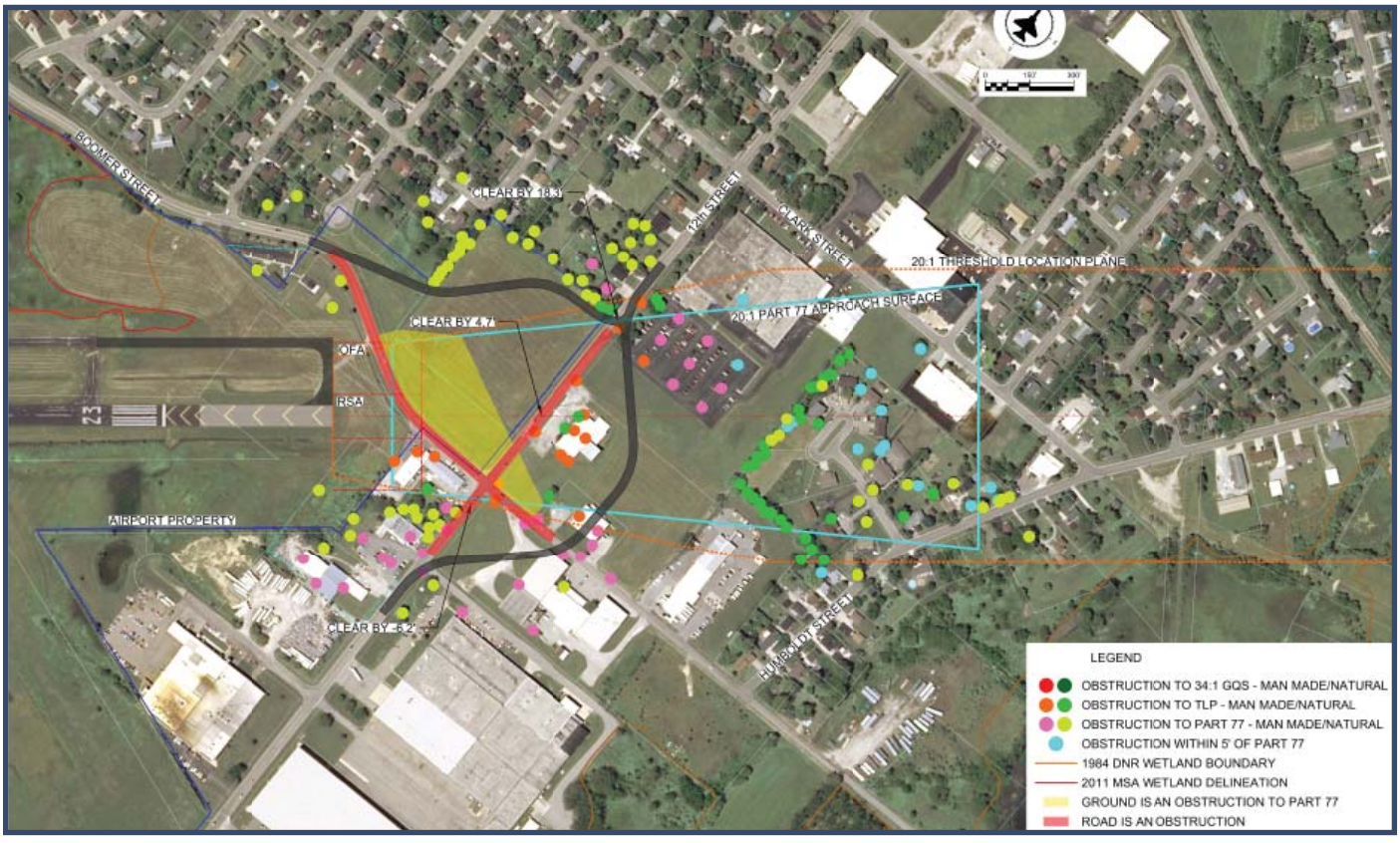


Figure 5.8: Alternative 4 - Runway 23



- Light and utility poles along Boomer and 12th Streets are obstructions.
- Property acquisitions in fee for the Runway 23 safety area improvements.
- Property acquisition in fee to lower the existing ground that is an obstruction (yellow shaded area on Figure 5.8) to the Runway 23 approach.
- Acquisition in fee and easement in the Runway 23 approach for obstruction removal.

Summary of Alternatives 3 & 4 (Runway 5/23)

Since the footprint of Runway 5/23 is the same in both Alternative 3 and 4, the impacts associated with the runway and taxiway extension, and safety area improvements are the same.

Currently, the safety area on Runway 5 does not meet FAA design criteria for ARC "B" aircraft. To bring the safety area up to standards, the wetland off the end of Runway 5 would be impacted and approximately 0.6 acres of the wetland would be filled. In addition, the WDNR and ACOE consider the small stream running through the wetland a navigable waterway, and this stream may be impacted by the safety area grading. The wetland near the end of Runway 23 would not be affected if the runway is rebuilt at its existing elevations.

By improving the end of Runway 23, and bringing the existing 5,000 foot pavement footprint up to FAA design standards, the runway safety area improvements impact Boomer Street. Closing or relocating Boomer Street would be required. The object free area also directly impacts two properties at the southwest corner of Boomer and 12th Streets. These properties would be required for acquisition in fee.

The primary difference in impacts for Alternatives 3 and 4 is amount of obstructions related to the type of approaches shown between the alternatives. The non-precision instrument approaches for Alternative 3 are flatter and wider, and produce a larger number of obstructions, compared to the steeper and smaller visual approaches in Alternative 4. Table 5.1 presents the impacts on and off the airport associated with both Alternatives 3 and 4. The visual approach surfaces in Alternative 4 greatly reduce the impacts surrounding the airport, especially in the Runway 23 approach.

Table 5.1: Impacts of Runway Development Alternatives 3 & 4

Impacts	Alternative 3		Alternative 4	
	Runway 5	Runway 23	Runway 5	Runway 23
Total Natural (Trees) Obstructions or Groups of Obstructions	63	321	12	105
Total Man-made Obstructions	21	114	0	45
Road Impacts	High Road	Boomer, 12th & Humboldt Streets, Pine Ridge Court	None	Boomer & 12th Streets
Property Acquisition in Fee	8	27	1	8
Property Acquisition in Easement	4	79	2	25
Additional Obstructions for Removal	Poles on Business WIS 26 & Air Park Drive	Poles on Boomer, 12th, Humboldt, Clark Streets & Pine Ridge Court	None	Poles on Boomer and 12th Streets
Direct Wetland Impacts	~0.8 Acres	None	~0.8 Acres	None
Tree Clearing in Wetlands	Yew	No	Yes	No

Both alternatives would require the closure or relocation of several roads. The road relocations shown in any alternative is only shown conceptually for planning purposes. While relocating those roads would be required, the exact location of any road relocation would be determined during future project design. In addition, future project design would determine the impacts to the watermain and sanitary sewer below grade infrastructure. For planning purposes and estimating, it was assumed all utilities would be replaced during road relocation.

After reviewing Alternatives 3 and 4, several conclusions and recommendations were considered by the TAC to improve the alternatives on Runway 5/23.

- Runway 23 has the largest number of obstructions and properties impacted by the runway improvements. To reduce obstructions, Runway 23 will be shown with only a visual approach.

- The runway end elevation of Runway 23 should be raised. Since the imaginary approach surfaces are laid out in relation to the location of the physical end of the runway and its end elevation, raising the runway should reduce obstructions and impacts.
- One of the recommendations in Chapter 4 Facility Requirements was to establish a better non-precision instrument approach at the Watertown Municipal Airport, including a LPV approach. Since the approach to Runway 23 will be shown as visual, Runway 5 will continue to be shown with a non-precision instrument approach based on a future LPV approach with 1-mile visibility minimums.
- The runway end elevation of Runway 5 should be raised. Similar to Runway 23 raising the runway end should reduce obstructions and impacts.
- Avoid road closures and minimize road relocations or roadway modifications.
- Following the WDNR principle on wetlands: avoid, minimize and mitigate. An attempt should be made to avoid the wetlands at the end of Runway 5, or minimize wetland impacts if that is not possible.

Based on these conclusions and recommendations, two additional Runway 5/23 Alternatives were developed.

Alternative 5 - Runway 5/23

Alternative 5 (Figures 5.9 and 5.10) assumes the existing footprint of Runway 5/23 (published length and stopway) is brought up to FAA standards for an ultimate published runway length of 5,000 feet. The 570 foot stopway is turned into a runway extension on Runway 23. Runway 5 would be raised 5.5 feet. The runway gradient would be increased to 0.22 percent from connector Taxiway F to the south end of Runway 5. The Runway 23 end would be raised by 12.5 feet. Starting at the intersection with Runway 11/29 to the end of Runway 23, the runway gradient would be increased to one percent. FAA guidance allows for a maximum longitudinal grade for the design critical aircraft (B-II) of plus or minus two percent. While the grade on the end of Runway 23 could be raised further, keeping longitudinal grades to a minimum is desirable. Therefore a one percent gradient strikes a median between the minimum and maximum grade possible.

The approach to Runway 5 includes non-precision instrument approaches with 1-mile visibility minimums. The approach to Runway 23 is considered visual with no instrument approach. The following is a summary of the imaginary approach surfaces for Runway 5:

- LPV Approach shown as a Glide Path Qualification Surface (GQS) with a 34 to 1 slope for planning purposes: 500’ x 10,000’ x 1,520’
- Part 77 Approach Surface with a 34 to 1 slope: 500’ x 3,400’ x 1,520’
- Threshold Location Plane with a 20 to 1 slope: 500’ x 10,000’ x 3,800’

The following is a summary of the imaginary approach surfaces for Runway 23:

- Part 77 Approach Surface with a 20 to 1 slope: 500’ x 2,000’ x 900’
- Threshold Location Plane with a 20 to 1 slope in two components: 400’ x 1,500’ x 1,000’ trapezoid then an 8,500’ x 1,000’ rectangle.

Additional requirements and impacts for Alternative 5:

- Extend parallel taxiway to both ends of the runway.
- Direct wetland impacts of 1.2 acres to provide proper safety area off the end of Runway 5. Possible impacts to the navigable waterway in the wetland.
- Miscellaneous tree clearing on airport property in the wetland off the end of Runway 5.
- High Road is an obstruction to the Part 77 Approach Surface for Runway 5, and would need to be lowered. Clearance over the road of 15 feet is required.
- Property Acquisition in fee (7) and easement (4) in the Runway 5 approach for obstruction removal and right-of-way for lowering High Road.

- Light poles on Business WIS 26 are obstructions.
- Direct wetland impacts of approximately 0.3 acres to extend the parallel taxiway to the new end of Runway 23.
- Boomer and 12th Streets are obstructions to the Part 77 Approach Surface and would have to be closed or relocated in the Runway 23 approach. Boomer Street must also be removed from the runway safety area.
- Property acquisitions in fee (2) for the Runway 23 safety area and object free area improvements.
- Property acquisition in fee (3) for relocation of Boomer and 12th Streets.
- Property acquisition in easement (22) in the Runway 23 approach for obstruction removal.
- Light and utility poles on Boomer and 12th Streets are obstructions. Would be remedied with road relocations.

By raising both runway ends, the amount of obstructions in both approaches is reduced compared to their respective approaches in Alternatives 3 and 4. Alternative 5 uses the same non-precision approaches on Runway 5 as in Alternative 3, but reduces the obstructions (or groups of obstructions) in the Runway 5 approach from 84 down to 68. High Road is still on obstruction to Runway 5 and would have to be lowered. While obstructions are reduced, the number of properties impacted by the Runway 5 approach remains the same as Alternative 3 at 11. Seven of those would be in fee, either for right-of-way to lower High Road or because the properties contain a man-made obstruction(s) that cannot be removed. Another four properties would have easements purchased to remove trees.

Raising the end of Runway 23 also reduced obstructions and impacts in the approach. Alternative 5 used the same visual approach on Runway 23 as in Alternative 4, but by raising the runway end it reduced the number of obstructions (or groups of obstructions) in the approach from 160 to 89. Boomer Street would still need to be relocated due to safety area improvements and because it is an obstruction.

Figure 5.9: Alternative 5 - Runway 5

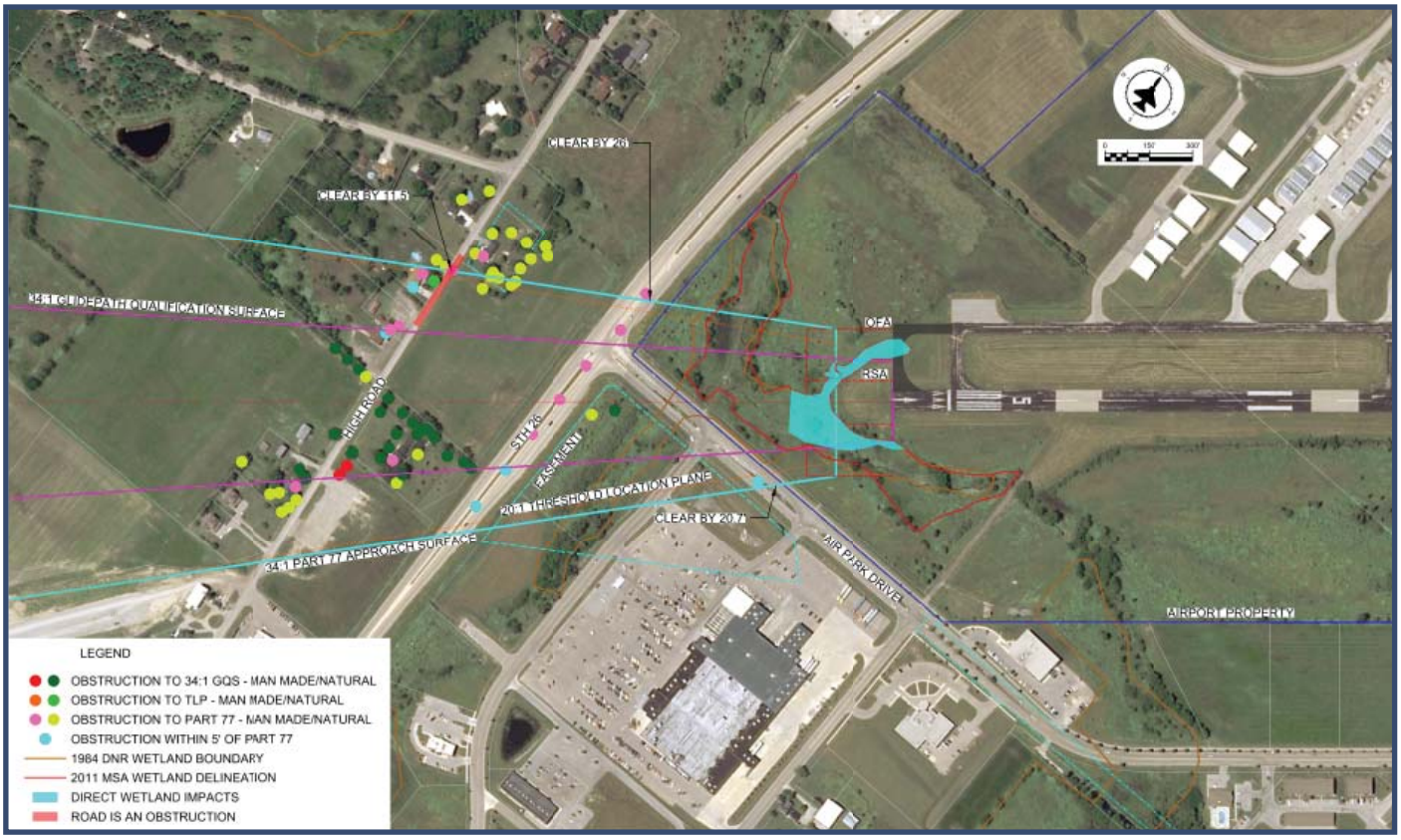
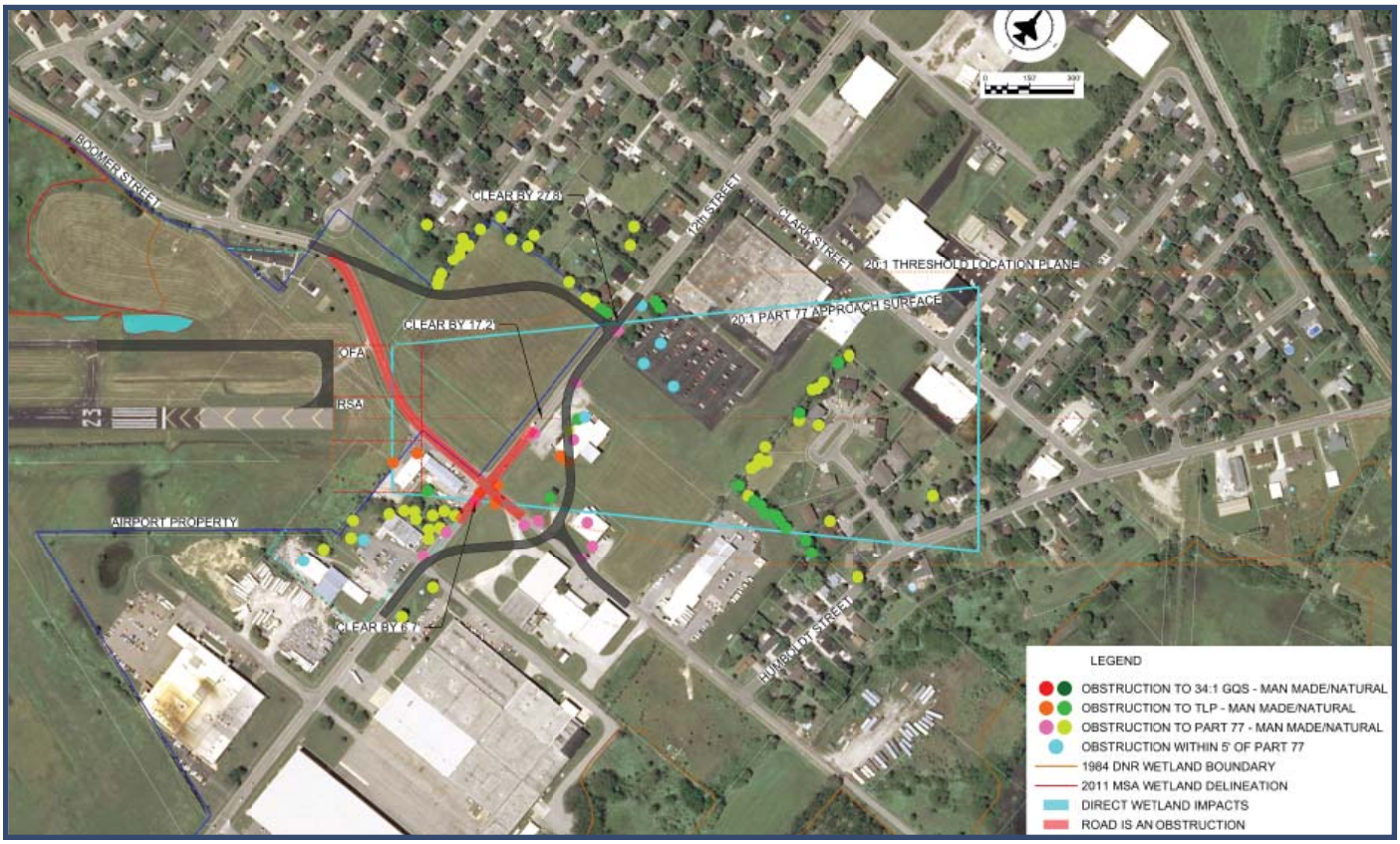


Figure 5.10: Alternative 5 - Runway 23



12th Street is still relocated for being an obstruction to the approach. The number of properties impacted would be reduced from 33 to 27. Five in fee for safety area and object free area improvements and road relocations, and 22 in easement for obstruction removal. The properties recommended for acquisition in fee and easement in both approaches are shown in Figures 5.11 and 5.12.

On the airport, two wetland areas would be directly impacted. The wetland off of Runway 5 continues to be impacted as it was in Alternative 3 and 4, but the direct wetland impacts would increase to 1.2 acres. This increase is due to raising the runway end, which requires associated runway safety area grading to extend farther into the wetland. Also, the navigable waterway through the wetland would possibly be impacted. In addition, the wetland near the end of Runway 23 would now be impacted due to the change in the runway end elevation. Raising the runway end also raises the associated parallel taxiway, and to provide proper taxiway safety area, part of the wetland adjacent to the taxiway would be directly impacted. The area impacted by the taxiway is approximately 0.3 acres. This wetland area was not impacted in any previous Runway 5/23 Alternative.

Alternative 6 - Runway 5/23

To avoid the wetland at the end of Runway 5, Alternative 6 (Figures 5.13 and 5.14) shifts 200 feet of existing runway at the south end of Runway 5 to the north end of Runway 23 for an ultimate published runway length of 5,000 feet. Including the stopway, which would be brought up to FAA design standards, the total extension on Runway 23 is 770 feet. The runway ends would continue to be raised using the same gradients in Alternative 5, but with slightly different runway end elevations. Runway 5 would be raised 5 feet. Runway 23 would be raised by 14.5 feet.

The approach to Runway 5 includes non-precision instrument approaches with 1-mile visibility minimums. The approach to Runway 23 is considered visual with no instrument approach.

Figure 5.11: Alternative 5 - Runway 5 Land Acquisition

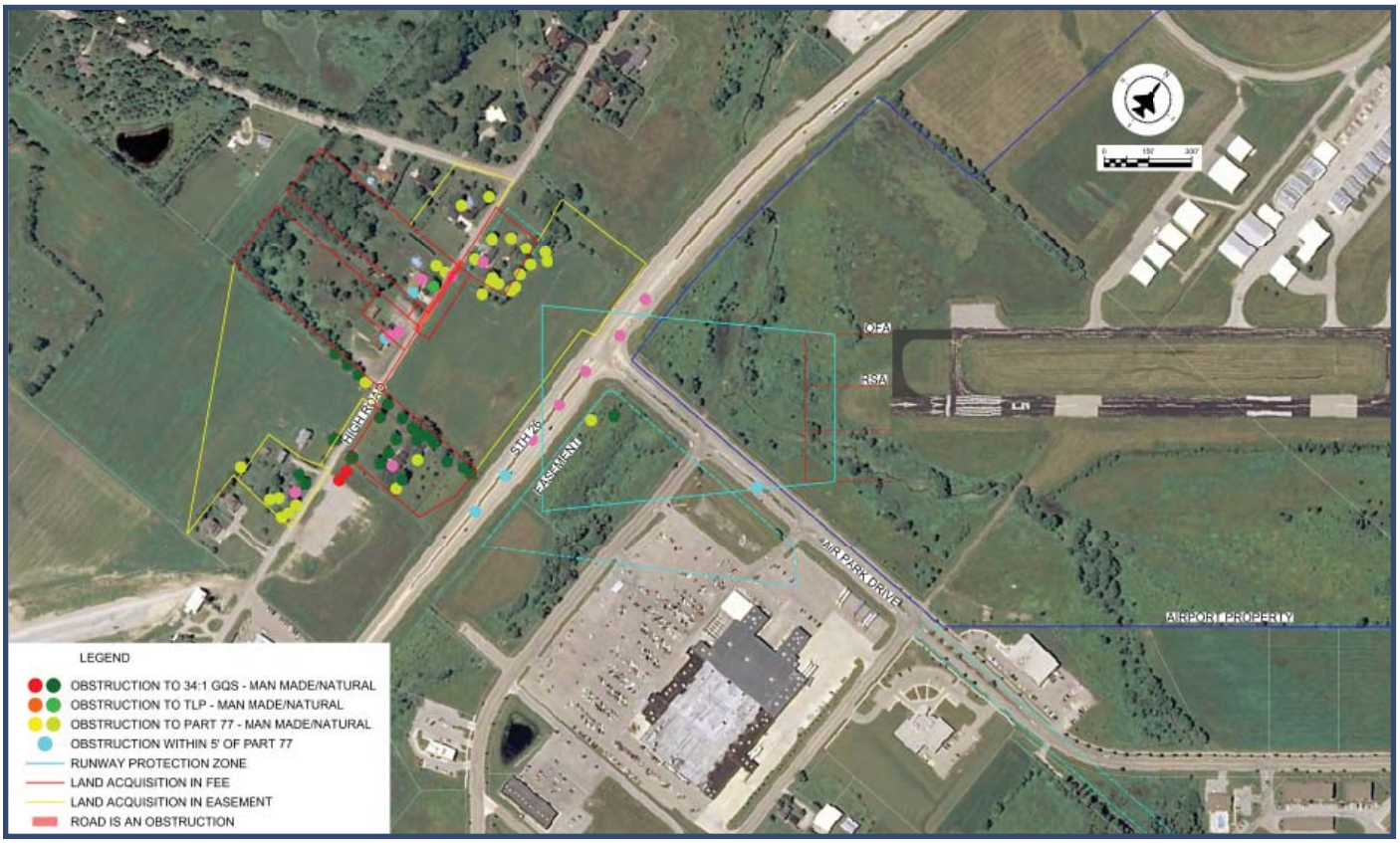
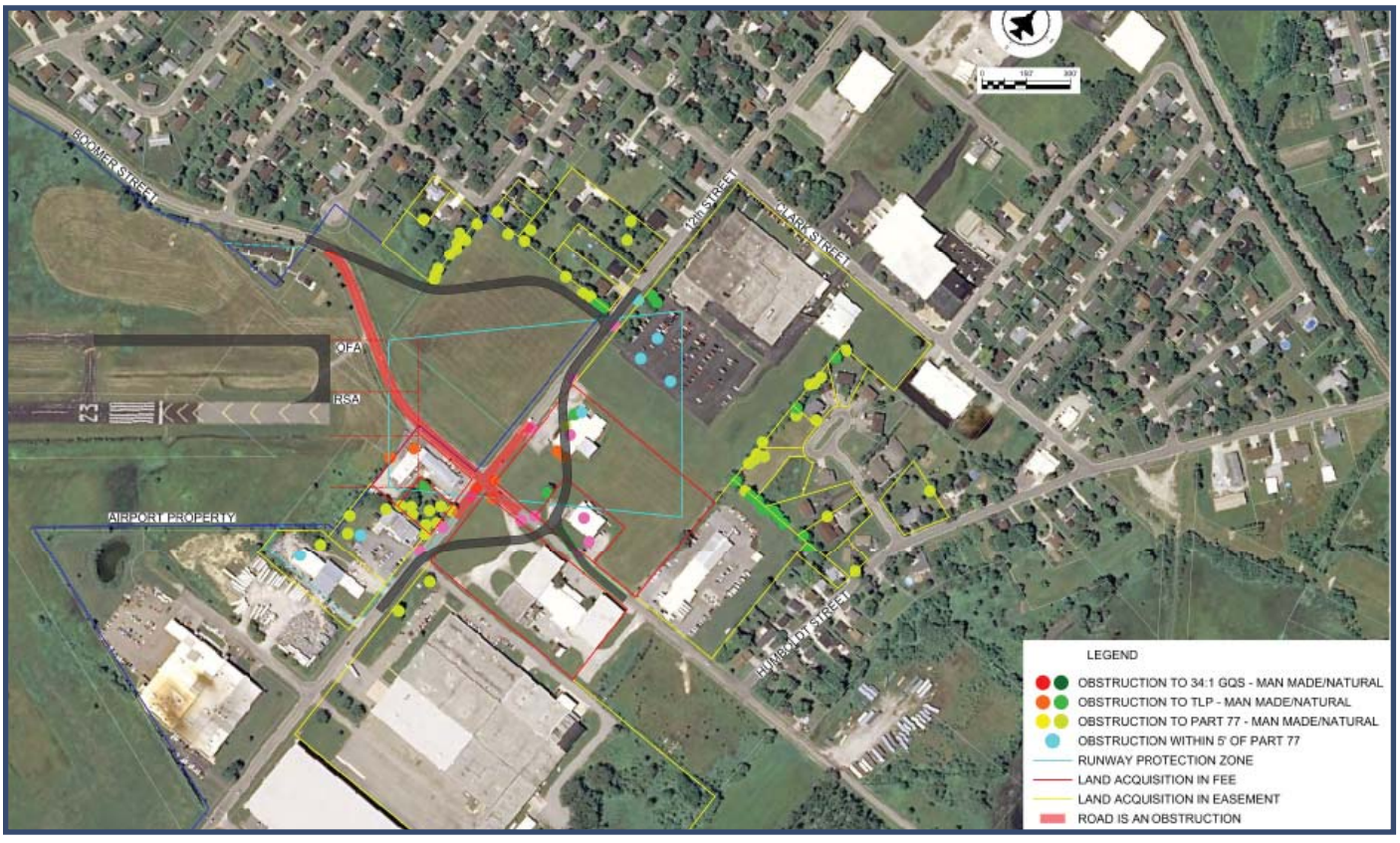


Figure 5.12: Alternative 5 - Runway 23 Land Acquisition



The following is a summary of the imaginary approach surfaces for Runway 5:

- LPV Approach shown as a Glide Path Qualification Surface (GQS) with a 34 to 1 slope for planning purposes: 500' x 10,000' x 1,520'
- Part 77 Approach Surface with a 34 to 1 slope: 500' x 3,400' x 1,520'
- Threshold Location Plan with a 20 to 1 slope: 500' x 10,000' x 3,800'

The following is a summary of the imaginary approach surfaces for Runway 23:

- Part 77 Approach Surface with a 20 to 1 slope: 500' x 2,000' x 900'
- Threshold Location Plane with a 20 to 1 slope in two components: 400' x 1,500' x 1,000' trapezoid then an 8,500' x 1,000' rectangle.

Additional requirements and impacts for Alternative 6:

- Extend parallel taxiway to both ends of the runway.
- No direct impacts to wetland off the end of Runway 5 or to the navigable waterway.
- Miscellaneous tree clearing on airport property in the wetland off the end of Runway 5.
- High Road is no longer an obstruction to the Part 77 Approach Surface for Runway 5.
- Property Acquisition in fee (2) and easement (7) in the Runway 5 approach for obstruction removal.
- Light poles on Business WIS 26 are obstructions.
- Direct wetland impacts of approximately 0.3 acres to extend the parallel taxiway to the new end of Runway 23.
- Boomer and 12th Streets are obstructions to the Part 77 Approach Surface and would have to be closed or relocated in the Runway 23 approach. Boomer Street must also be removed from the runway safety area. 12th Street must also be removed from the runway object free area.

Figure 5.13: Alternative 6 - Runway 5

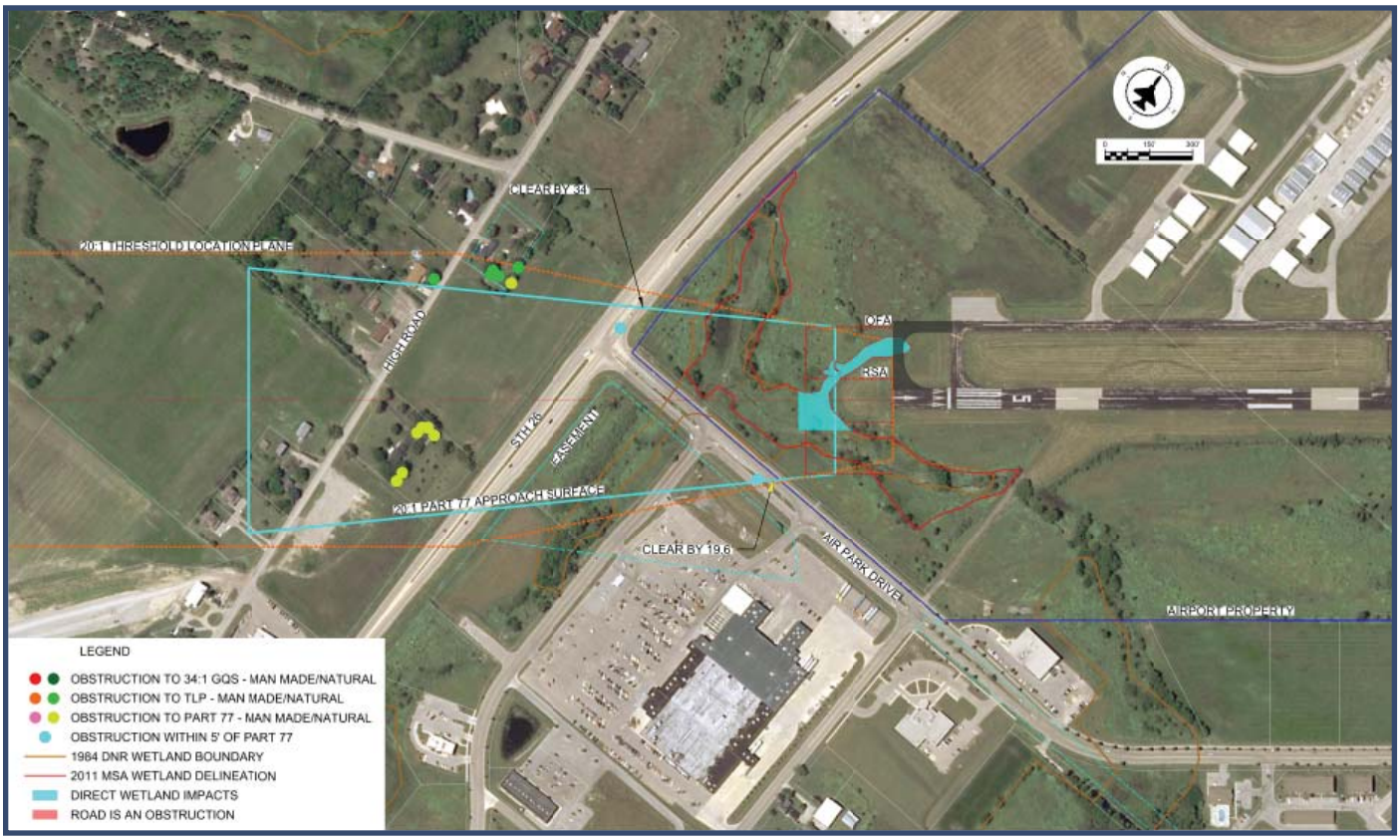
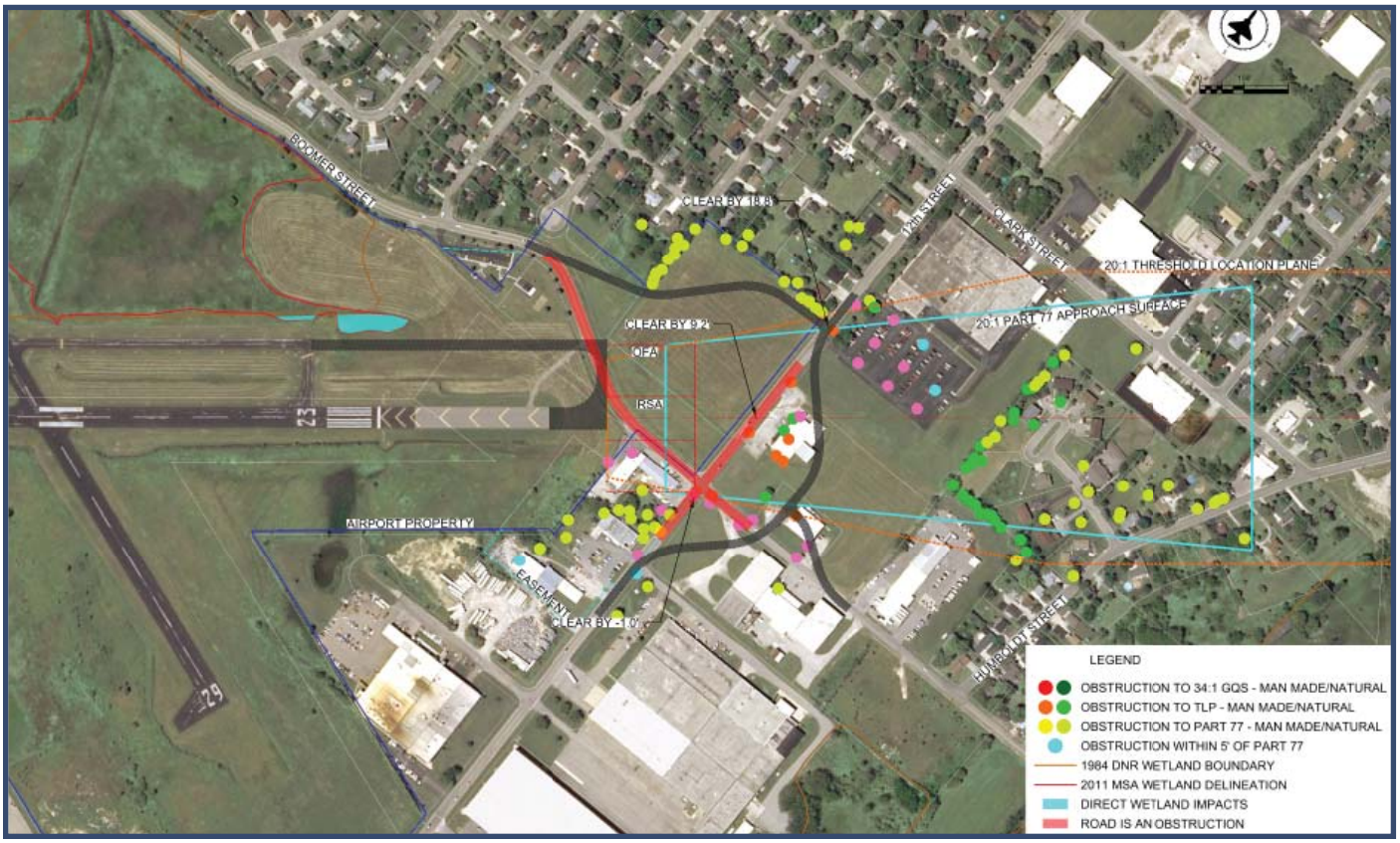


Figure 5.14: Alternative 6 - Runway 23



- Property acquisitions in fee (2) for the Runway 23 safety area and object free area improvements.
- Property acquisition in fee (4) for relocation of Boomer and 12th Streets.
- Property acquisition in easement (28) in the Runway 23 approach for obstruction removal.
- Light and utility poles on Boomer and 12th Streets are obstructions. Would be remedied with road relocations.

By moving the end of Runway 5 to the north, to avoid the wetland off the south end, and continuing to raise the runway end elevation, the obstructions and properties impacted in the approach are further reduced. Alternative 6 uses the same non-precision approaches on Runway 5 as Alternative 5, but the number of obstructions (or groups of obstructions) drops from 68 to 53. Two properties in the Runway 5 approach would be recommended for acquisition in fee due to man-made obstructions which cannot be readily removed. Seven properties would be recommended to acquire easements to remove trees.

Avoiding the wetland on the end of Runway 5 increases the impacts in the visual approach to Runway 23 since the start of the approach surfaces are shifted 200' further to the northeast into the approach. By continuing to raise the runway end, the number of obstructions is reduced compared to Alternative 4 from 160 to a total of 119, but increased from 89 to 119 compared to Alternative 5. Boomer Street would still need to be relocated due to safety area improvements and because it is an obstruction. 12th Street is still relocated due to impacts to the object free area and being an obstruction to the approach. The number of properties affected is 34; six in fee for safety area and object free area improvements, and road relocations; 28 in easement for obstruction removal. The properties recommended for acquisition in fee and easement in both approaches are shown in Figures 5.15 and 5.16.

The wetland off the end of Runway 5 would no longer be directly impacted by any runway improvements. Some trees on airport property would still need to be

removed for approach clearance. The wetland near the end of Runway 23 would have the same impacts as Alternative 5, with approximately 0.3 acres filled for the parallel taxiway improvements.

Existing Conditions on Runway 5/23

As was discussed in Chapter 4, there are existing obstructions to imaginary surfaces on Runway 5/23. These obstructions would have to be removed, lowered or determined to not be a hazard by FAA to bring Runway 5/23 up to existing standards, and to meet previous grant assurances. If no further improvements were made to Runway 5/23 as purposed in this master plan, the Watertown Municipal Airport would not be eligible for federal funding on maintenance projects related to Runway 5/23 until all obstructions were moderated. Many of these obstructions are the same as those in Alternatives 5 and 6, and are presented in Figures 5.17 and 5.18.

Before a Sponsor Preferred Airside Development Alternative was selected, the existing condition of the approaches on Runway 5/23 were discussed with the TAC and presented at a Public Information Meeting (PIM).

Figure 5.15: Alternative 6 - Runway 5 Land Acquisition

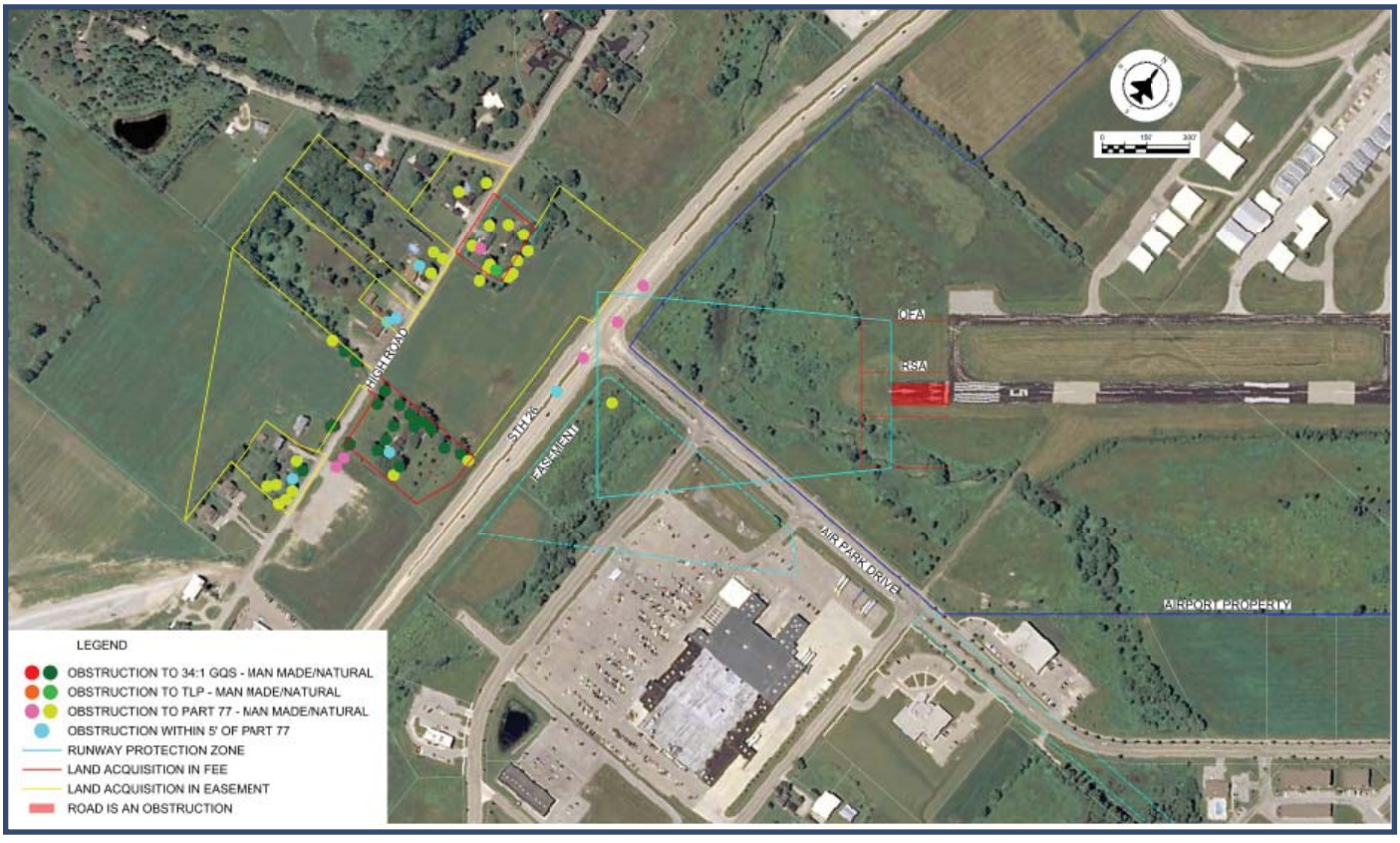


Figure 5.16: Alternative 6 - Runway 23 Land Acquisition

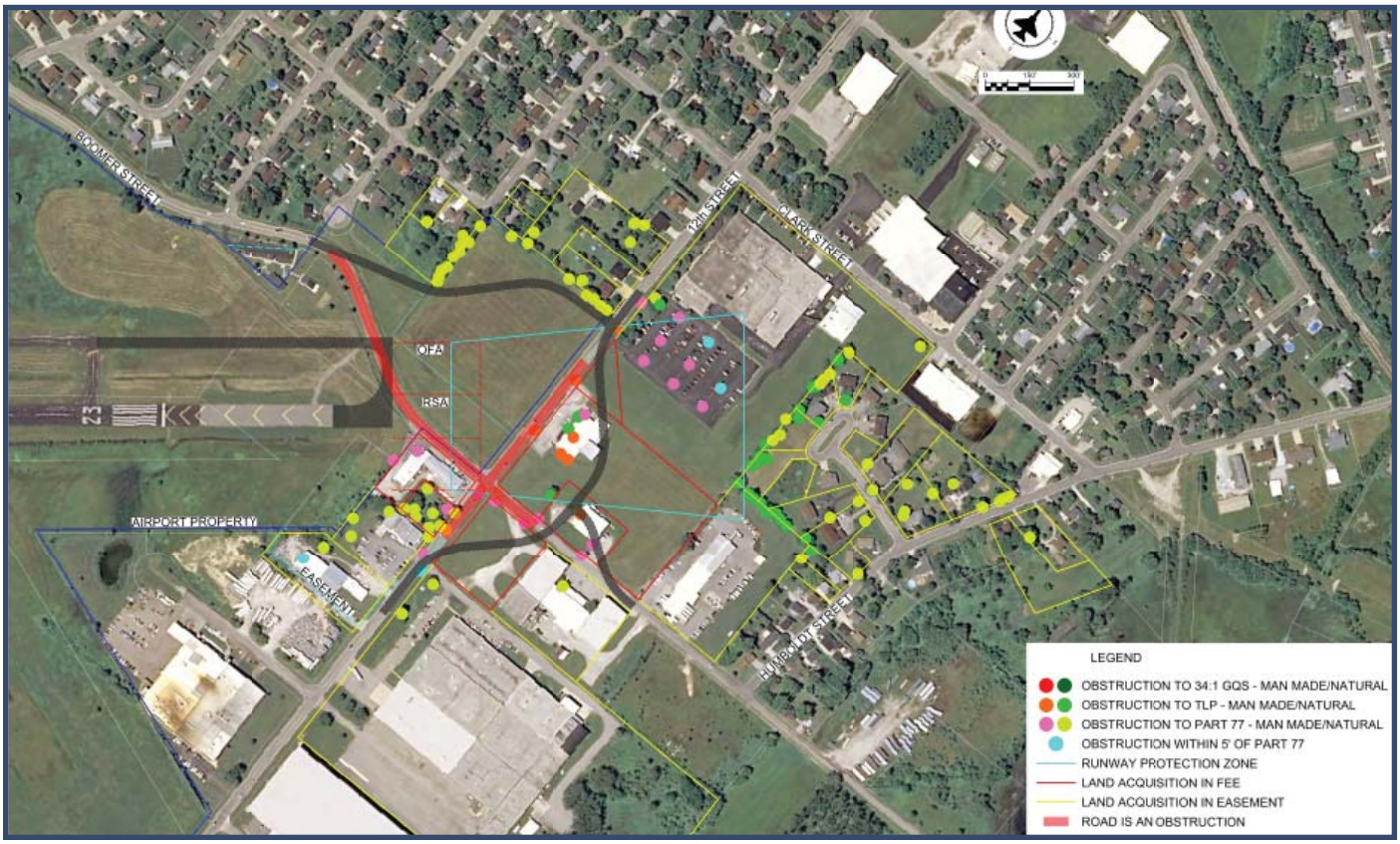


Figure 5.17: Existing Conditions to Runway 5

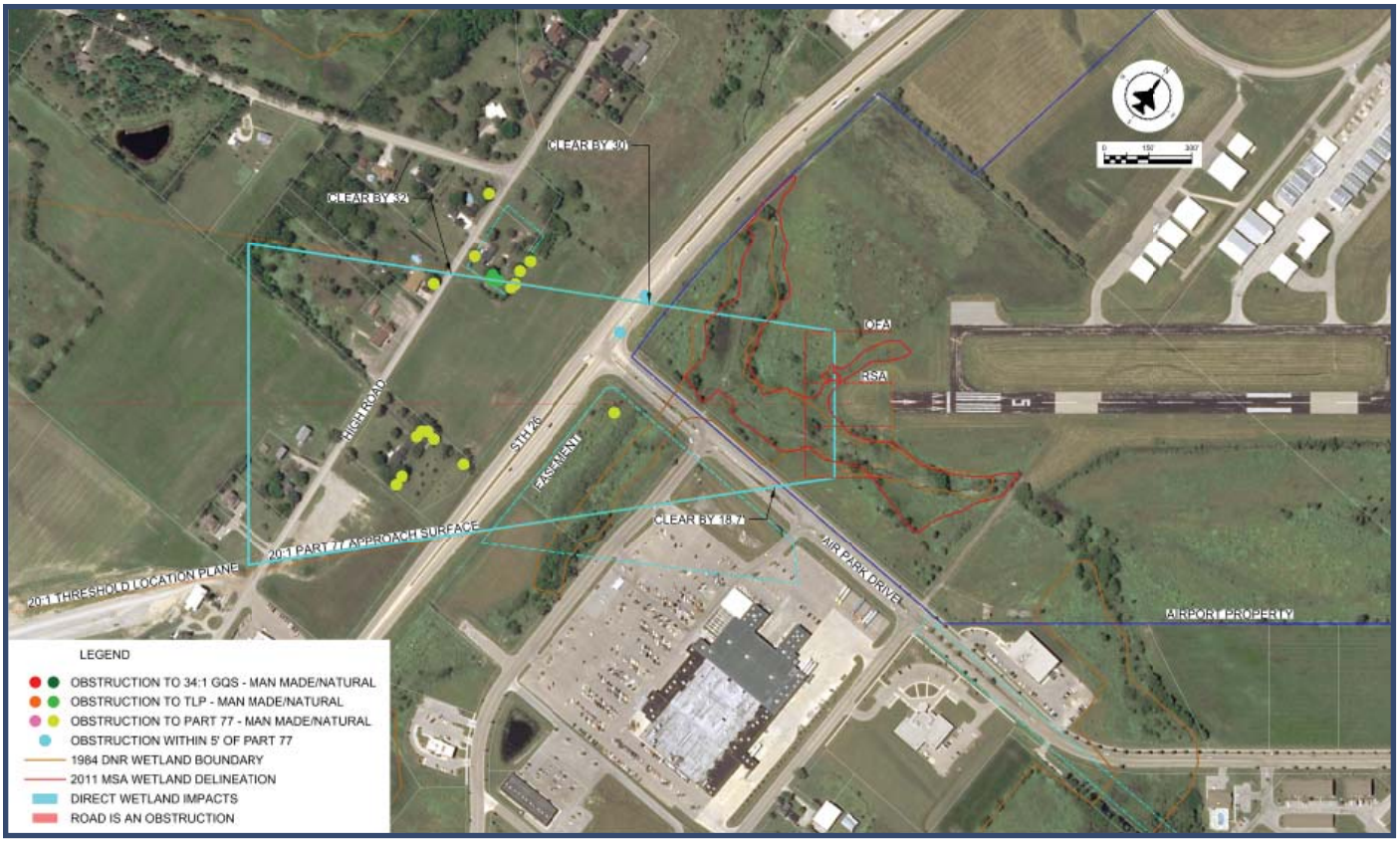
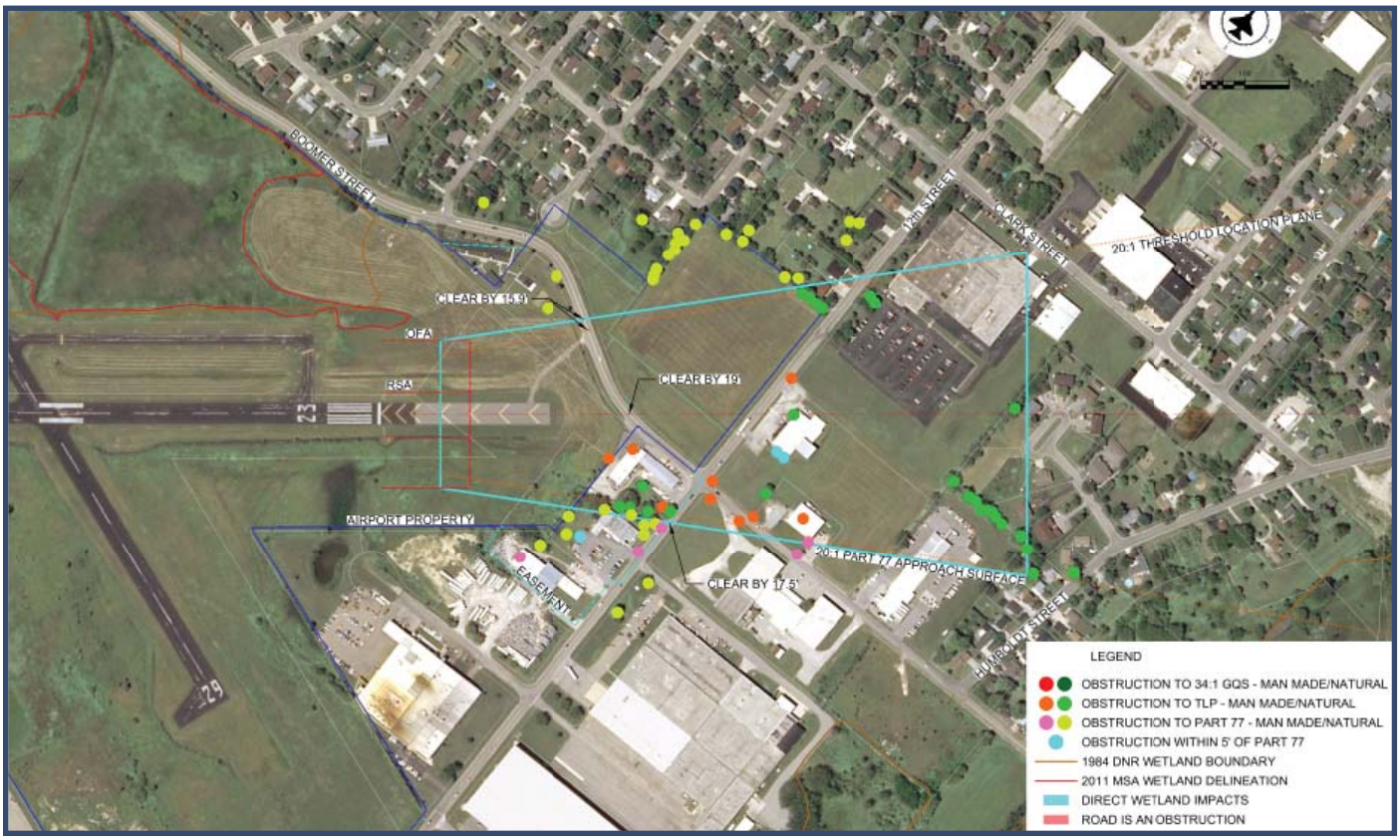


Figure 5.18: Existing Conditions to Runway 23



Sponsor Preferred Airside Development Alternative

Alternatives 1 and 2 were previously dismissed as options for runway development by the Technical Advisory Committee (TAC) because of the environmental impacts (over 17 acres of direct and indirect wetland impacts) and permanent road closure of 12th Street/CTH X. Alternatives 3 and 4 were developed as baseline conditions which were modified in Alternatives 5 and 6 to lessen impacts.

After an initial discussion of all the alternatives, the TAC asked for further analysis and more information on Alternatives 5 and 6 before selecting a Sponsor Preferred Airside Development Alternative. Table 5.2 presents the impacts on and off the airport associated with both Alternatives 5 and 6 including a preliminary estimate of excavation required to raise runway ends to reduce impacts.

Table 5.2: Impacts of Runway Development Alternatives 5 & 6

Impacts	Alternative 5		Alternative 6	
	Runway 5	Runway 23	Runway 5	Runway 23
Total Natural (Trees) Obstructions or Groups of Obstructions	53	70	47	91
Total Man-made Obstructions	15	19	6	27
Road Impacts	High Road	Boomer, &12th Streets	None	Boomer & 12th Streets
Property Acquisition in Fee	7	5	2	6
Property Acquisition in Easement	4	22	7	28
Additional Obstructions for Removal	Poles on Business WIS 26	Poles on Boomer & 12th Streets	Poles on Business WIS 26	Poles on Boomer & 12th Streets
Direct Wetland Impacts	~1.2 Acres	~0.3 Acres	None	~0.3 Acres
Tree Clearing in Wetlands	Yes	No	Yes	No
Conceptual Runway Expansion Common Excavation Estimate	260,000 CY		220,000 CY	

Overall, by shifting the runway northeast 200 feet in Alternative 6 to avoid the wetland off the end of Runway 5, the impacts in the Runway 5 approach are decreased while the impacts in the Runway 23 approach are slightly increased. Many of the impacts remain the same. In addition, the estimated cost of Alternative 6 would be less due to the smaller quantity of excavation required, and less properties recommended to be acquired in fee in the Runway 5 approach. The infrastructure costs for paving, lighting and road relocations would be very similar in both alternatives.

After further discussions with the TAC and presenting all the alternatives during the PIM, the TAC chose Alternative 6 as the Sponsor Preferred Airside Development Alternative.

Runway 11/29 Parallel Taxiway Extension

As recognized in the General Aviation User Survey, and recommended in Chapter 4 Facility Requirements, there is a need for a full length parallel taxiway on Runway 11/29. Based on the results of the Runway Development Alternative Analysis, Runway 11/29 will remain as the secondary runway. Currently, Runway 11/29 is only served by a partial parallel taxiway from the terminal area to where it intersects with Runway 5/23. A full parallel taxiway would increase safety for aircraft operations on Runway 11/29.

The current portion of parallel taxiway is built at a separation of 300 feet from the runway centerline to the taxiway centerline. The critical aircraft for Runway 11/29 as the crosswind runway at the Watertown Municipal Airport is B-I. Based on the guidance in Advisory Circular 150/5300-13A, Airport Design, the minimum separation distance is 240 feet. Therefore, the existing separation exceeds the design minimum and was selected in 1986 to increase flexibility in circulation reducing conflicts for holding aircraft at the intersection of the taxiways just west of the runway intersection.

Figure 5.19 shows the parallel taxiway extension on Runway 11/29 at both 240 foot and 300 foot separation from runway centerline to taxiway centerline. While 240 feet is the minimum separation, the preferred extension would maintain the existing separation of 300 feet. The 300 foot

Figure 5.19: Runway 11/29 Parallel Taxiway Extension

separation would provide a smooth transition at the intersection with Runway 5/23 for aircraft taxiing toward and away from the terminal area. A 240 foot separation would either require a difficult transition across Runway 5/23 or the parallel taxiway would have to transition from 240 feet to 300 feet east of Runway 5/23. The transition across Runway 5/23 is a safety concern, while the cost to transition east of Runway 5/23 could be equal to the additional pavement required at the end of Runway 29 for a 300 foot runway to taxiway centerline separation.

5.2 LANDSIDE DEVELOPMENT ALTERNATIVES

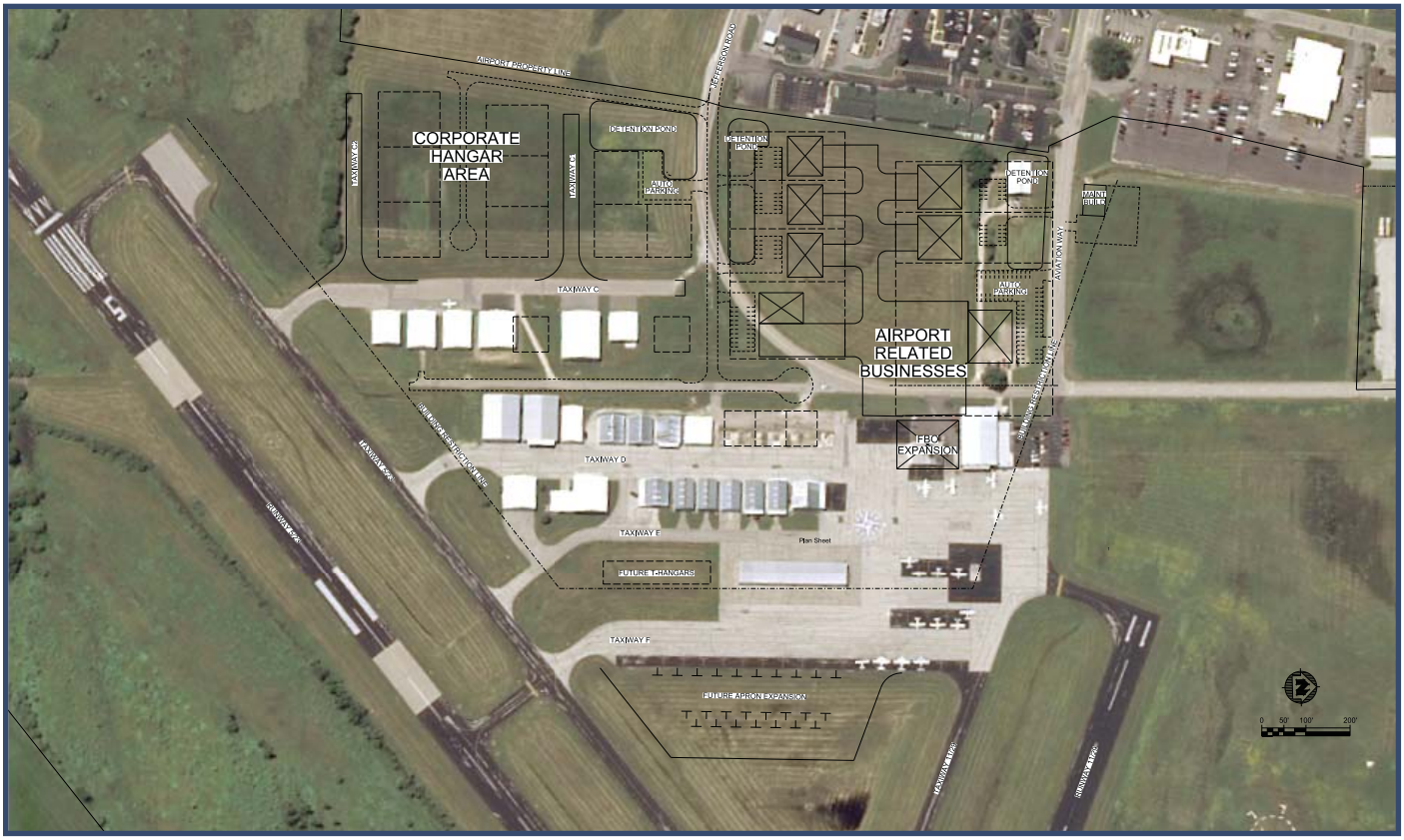
Landside facilities are another important aspect of the airport. Landside facilities serve as the interface between the community and aviation users, and the airport operating environment. The orderly development of the airport terminal and hangar areas is critical to the aviation activities on the airport.

Allowing development without regard to a functional plan could result in a haphazard array of buildings and taxiways, which will eventually preclude the most efficient use of the limited valuable space available for terminal and hangar development. The goal of the alternative analysis is to indicate development potentials to meet the long term demands of future airport growth.

Chapter 4 Facility Requirements discusses the need for landside facilities. The following were the recommendations:

- Increase available hangars through the planning period to meet the forecasted growth in based aircraft.
- Consider expanding aircraft parking on the terminal apron through the planning period.
- Consider expanding the terminal building through the planning period. This could be accomplished by increasing available Fixed Based Operator (FBO) space, as Wisconsin Aviation maintains the existing airport terminal.

Figure 5.20: 1999 Landside Development Layout



- Auto parking is currently deficient and additional auto parking for the terminal and hangar areas is recommended.

1999 Landside Development Layout

In 1999, a layout for future hangar and terminal area development (Figure 5.20) was created and approved by the Watertown Municipal Airport. This development scenario was used as a guide as new hangars were constructed and infrastructure expanded. Future expansion was broken into a corporate hangar area in the southwest corner of the development, while another area was designated for airport related businesses west of the existing terminal. FBO expansion, access to the new hangar development, additional auto parking and approximate stormwater facilities were included.

The total layout would eventually create an additional 25 hangar spaces for development. Six hangars along Taxiway C have already been constructed, leaving 19 future hangar lots.

The total build out of 1999 Hangar Area Layout meets all the recommendations from Chapter 4 Facility Requirements for landside facilities.

The TAC wanted to know if this layout was still sufficient to meet the future landside development needs of the Watertown Municipal Airport. New Hangar Area Alternatives were developed to answer this question and to analyze if a new layout would more adequately meet the future needs of terminal and hangar area development.

The 1999 Landside Development Layout includes an expansion to the aircraft parking apron, and additional T-hangar to the south of the existing T-hangar between Taxiways E and F. These improvements will remain unchanged in the following Hangar Area Layout Alternatives.

Landside Development Alternative 1

Any new alternative for hangar and terminal layout should continue to meet the future needs of the Watertown Municipal Airport, and meet the recommendations of the Facilities Requirements for landside improvements in Chapter 4.

Alternative 1 is shown in Figure 5.21. The following changes were made to the layout compared to the 1999 Landside Development Layout:

- Eliminated Taxiways C1 and C2, and replaced with Taxiway G, which would run parallel to Taxiway C and allow another row of hangars.
- The Corporate Hangar Areas is now a General Aviation Area with smaller, but more numerous, hangar lots (totaling 23).
- The Airport Related Businesses is replaced with a designated Corporate Hangar Area. The area allows for four large corporate lots, and still designates a spot for an airport related business. Also two spots for an FBO and FBO expansion are shown in the terminal area.
- The total layout allows for approximately 29 new hangars.

Similar to the 1999 Landside Development Layout, additional auto parking is shown in both the hangar and terminal areas. Estimated stormwater facilities to address runoff are shown.

Landside Development Alternative 2

Alternative 2 is shown in Figure 5.22. The following changes were made to the layout compared to the 1999 Landside Development Layout:

- Eliminated Taxiways C1 and C2, and replaced with Taxiway G, which would run parallel to Taxiway C and allow another row of hangars. Unlike Alternative 1, Taxiway G is offset farther to the west to allow an additional row of hangar lots.
- The Corporate Hangar Areas is now a General Aviation Area. Unlike Alternative 1, the area includes both smaller general aviation hangar lots and the possibility for larger corporate lots at the west edge of the hangar area.
- The Airport Related Businesses is replaced with a designated Corporate Hangar Area. The area allows for four large corporate lots, and still designates a spot for an airport related business. Also two spots for an FBO and FBO expansion are shown in the terminal area. This is the same as Alternative 1.

Figure 5.21: Landside Development Alternative 1

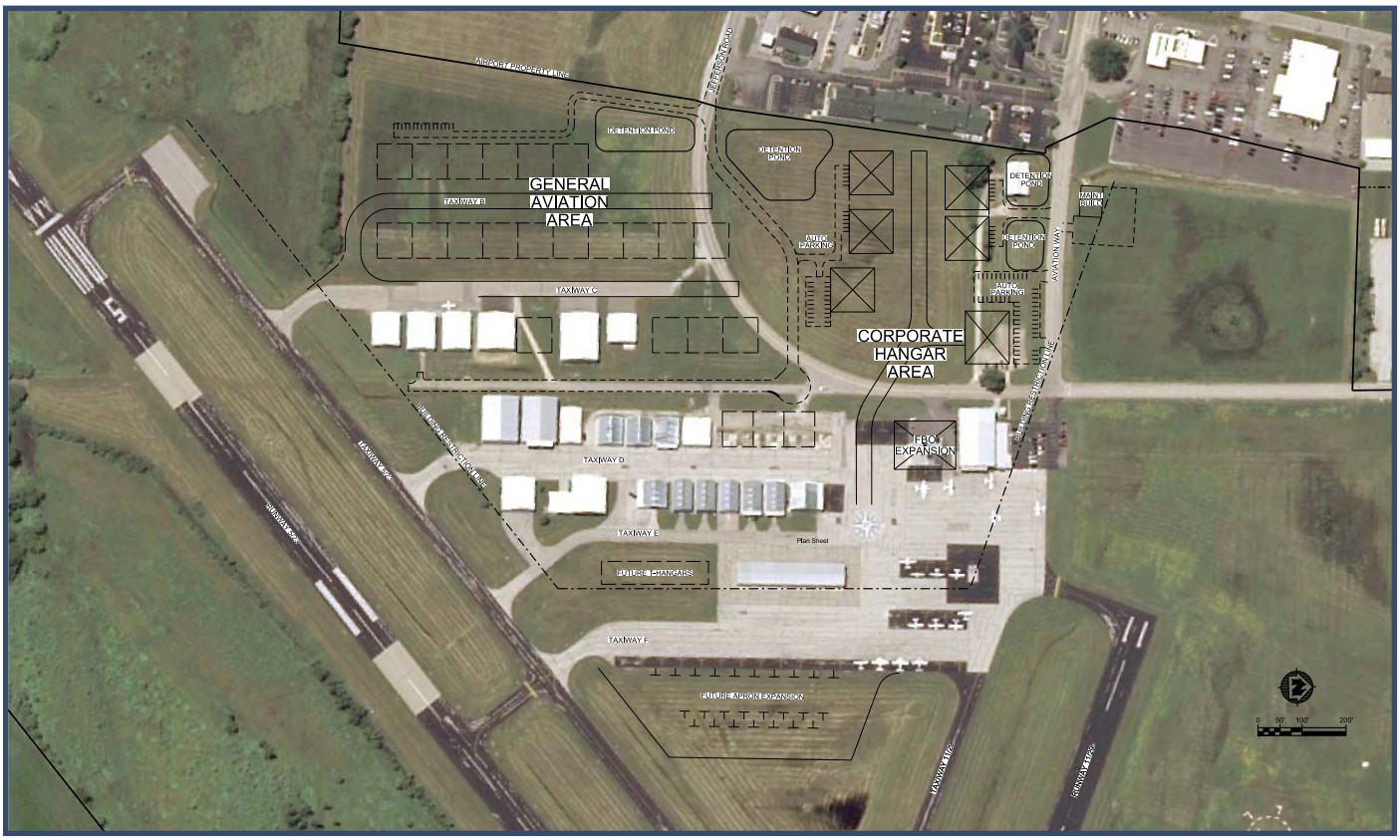
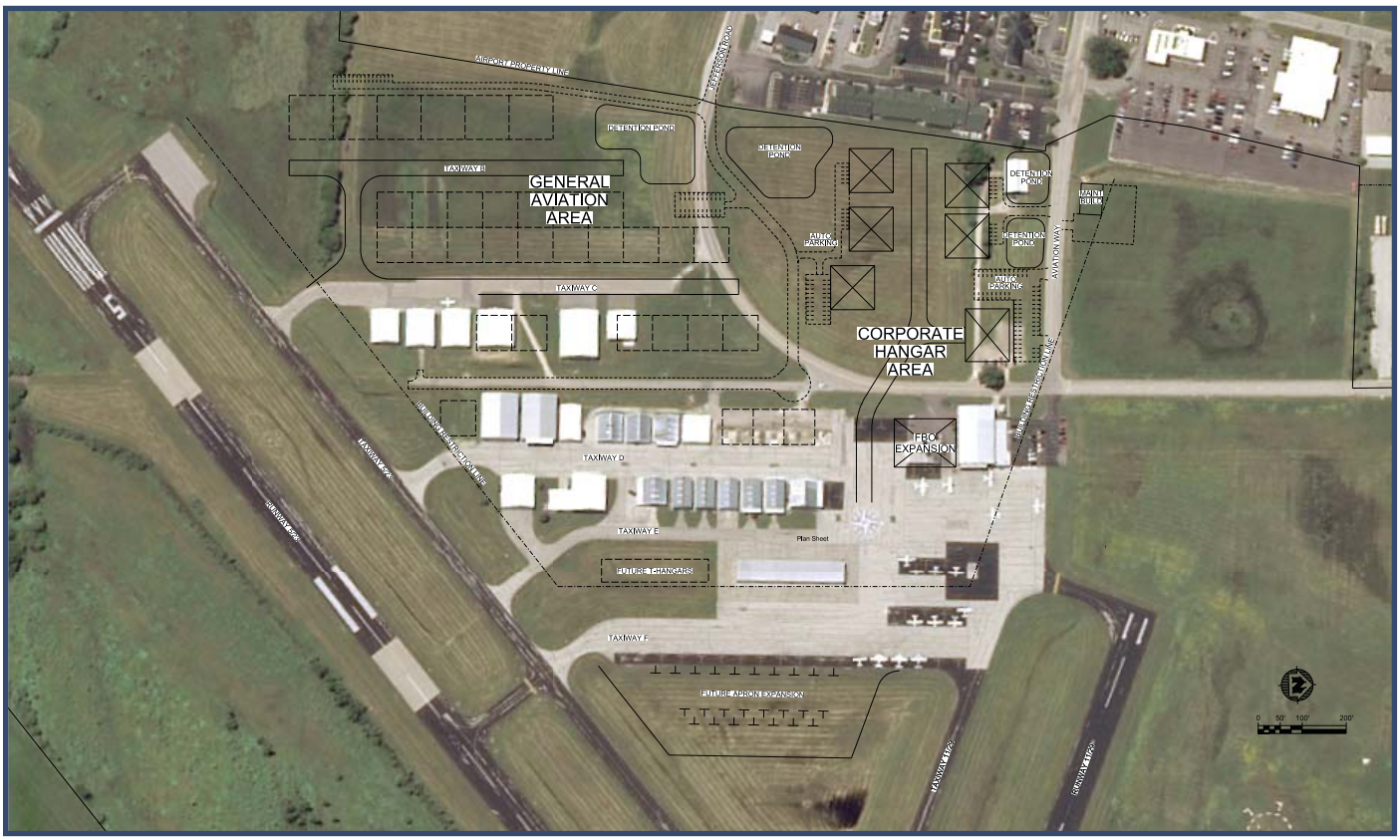


Figure 5.22: Landside Development Alternative 2



- The total layout allows for approximately 37 new hangars.

Similar to the 1999 Landside Development Layout, additional auto parking is shown in both the hangar and terminal areas. Estimated stormwater facilities to address runoff are shown.

Sponsor Preferred Landside Development

The TAC discussed the Landside Development Alternatives, and the Landside Development Alternative 2 was selected as the preferred development. This alternative meets all the recommendations of the Facility Requirements in Chapter 4. This layout will be shown on the updated Airport Layout Plan, which reflects the recommendations of this Master Plan. This layout should be reviewed in the future as the needs of the airport change.

IMPLEMENTATION PLAN

87 - Proposed Development Summary Plan

6.1 PROPOSED DEVELOPMENT SUMMARY PLAN

This chapter combines the traditional Master Plan Facilities Implementation Plan and Financial Feasibility Analysis into a Proposed Development Summary of estimated costs for future recommended airport development projects through the 20-year planning period. The Proposed Development Summary is presented in Table 6.1. Costs are separated into short-term development (through 2020) and long-term development (through 2032).

Every year each airport in the State of Wisconsin that qualifies for state and/or federal funding develops and updates their Capital Improvement Plan (CIP). The cumulative CIP's assist the Wisconsin Bureau of Aeronautics (BOA) in planning and measuring needed funding for upcoming construction projects over the next five years (BOA 5-Year Airport Improvement Program).

Funding for public-use airports is available from several sources. Airports that are included on the National Plan of Integrated Airport Systems (NPIAS) are eligible for Federal Airport Improvement Program (AIP) grants administered by the Federal Aviation Administration (FAA). Airports included in the Wisconsin State Airport System Plan (SASP) are eligible for state funding. The Watertown Municipal Airport (RYV) is part of both the NPIAS and Wisconsin SASP, and is eligible for federal and state funding. Another method of funding is a local only project, which is funded solely by the Sponsor (City of Watertown).

Currently the AIP funds 90% of eligible projects, with the remaining 10% share split evenly between the State of Wisconsin (5%) and the Sponsor (5%). This current level of funding was passed through a FAA reauthorization bill by the United States Congress in February 2012 and will continue for four years. Future changes to AIP funding could affect long term airport development projects. The next FAA reauthorization could change the federal share, and the state share accordingly for eligible projects.

The State of Wisconsin currently funds their state aid projects at 80% state and 20% sponsor, or 50% state and 50% sponsor.

Projects that are eligible for AIP funding include public use runways, taxiways, aprons, terminal buildings, airfield lighting and navigational aids (NAVAIDs). All projects included in the Proposed Development Summary are eligible for AIP and/or state funding.

All costs are estimated in 2012 dollars, with no allowance made for inflation in future years due to its unpredictably. Additional factors beyond the scope of this planning process will determine final project costs. All projects include an allocation for administration, engineering, other professional services and contingencies unless unidentified for a specific project.

The time frame included in Table 6.1 is not a mandate on the City of Watertown for the completion of any particular improvement project during a specific year. The implementation of specific projects could be affected by the availability of local, state and federal aid, and changes in priorities by the Airport and the City of Watertown.

Table 6.1 is a development summary for the Airport over the next 20-year planning period. Development projects in Table 6-1 are color coded and correspond to specific projects shown in Figure 6.1. The extents of the projects are estimated for planning purposes and the exact layout of any project will be determined during project design at a future date.

FAA Advisory Circular 150/5070-6B, Airport Master Plans, generally breaks airport development into short-, medium- and long-term segments corresponding to 5-, 10- and 20-year development horizons. Since the results of this master plan show a need for a longer primary runway at the airport, and

Table 6.1: Capital Improvement Plan

WORKING TABLE TAC MEETING #6
MASTER PLAN PROPOSED DEVELOPMENT SUMMARY
FACILITIES IMPLEMENTATION PLAN and FINANCIAL FEASIBILITY ANALYSIS

Year		Development	Cost	Funding Rates FAA	State	Local	FAA Funding	State Funding	Local Funding
		Short Term Development (2012-2020)							
2012		AWOS Replacement	$80,000	90%	5%	5%	$72,000	$4,000	$4,000
		Total Costs for Calendar Year 2012	**$80,000**				**$72,000**	**$4,000**	**$4,000**
2013		Fuel System Replacement	$200,000	90%	5%	5%	$180,000	$10,000	$10,000
		Environmental Assessment for Runway 5/23 Upgrade	$120,000	90%	5%	5%	$108,000	$6,000	$6,000
		Land Acquisition: Zastrow & Wieder Parcels in Runway 23 Approach	$470,000	0%	80%	20%	$0	$376,000	$94,000
		Total Costs for Calendar Year 2013	**$790,000**				**$288,000**	**$392,000**	**$110,000**
2014		Preliminary Design for Runway 5/23 Improvements including Boomer & 12th Street Relocations	$200,000	90%	5%	5%	$180,000	$10,000	$10,000
		Land Acquisition in Runway 5 Approach: Fee & Easements	$750,000	90%	5%	5%	$675,000	$37,500	$37,500
		Total Costs for Calendar Year 2014	**$950,000**				**$855,000**	**$47,500**	**$47,500**
2015		Final Design for Runway 5/23 Reconstruction SW of Runway 11/29	$50,000	90%	5%	5%	$45,000	$2,500	$2,500
		AGIS for new Runway 5/23 Runway Approaches	$100,000	90%	5%	5%	$90,000	$5,000	$5,000
		Total Costs for Calendar Year 2015	**$150,000**				**$135,000**	**$7,500**	**$7,500**
2016		Reconstruct Runway 5/23 SW of Runway 11/29 includes New Lighting and Underdrains	$2,100,000	90%	5%	5%	$1,890,000	$105,000	$105,000
		Reimbursement for Zastrow and Wieder Parcels	$470,000	90%	5%	5%	$423,000	-$352,500	-$70,500
		Total Costs for Calendar Year 2016	**$2,570,000**				**$2,313,000**	**-$247,500**	**$34,500**
2017		Reconstruct Runway 5/23 Parallel Taxiway SW of Runway 11/29	$700,000	90%	5%	5%	$630,000	$25,000	$25,000
		Includes New Lighting System and Underdrains							
		Total Costs for Calendar Year 2017	**$650,000**				**$630,000**	**$25,000**	**$25,000**
2018		Land Acquisition in Runway 23 Approach: Fee & Easement	$2,200,000	90%	5%	5%	$1,980,000	$110,000	$110,000
		Final Design for Road Relocations	$50,000	90%	5%	5%	$45,000	$2,500	$2,500
		Total Costs for Calendar Year 2018	**$2,250,000**				**$2,025,000**	**$112,500**	**$112,500**
2019		Relocate Boomer and 12th Streets in Runway 23 Approach	$1,900,000	90%	5%	5%	$1,710,000	$95,000	$95,000
		Final Design for Runway 5/23 Reconstruction NE of Runway 11/29 and Safety Area	$50,000	90%	5%	5%	$45,000	$2,500	$2,500
		Total Costs for Calendar Year 2019	**$1,950,000**				**$1,755,000**	**$97,500**	**$97,500**
2020		Reconstruct Runway 5/23 NE of Runway 11/29 and Improve Safety Area	$4,000,000	90%	5%	5%	$3,600,000	$200,000	$200,000
		Includes Reconstruction of Parallel Taxiway and Extension to new Runway End							
		Includes New Lighting System, Underdrains and Wetland Mitigation							
		Total Costs for Calendar Year 2020	**$4,000,000**				**$3,600,000**	**$200,000**	**$200,000**
		Total Short Term Development (2012-2020)	**$12,920,000**				**$11,601,000**	**$638,500**	**$638,500**
		Long Term Development (2021-2032)							
2022		Reconstruct Runway 11/29 including new lighting system and underdrains	$1,700,000	90%	5%	5%	$1,530,000	$85,000	$85,000
		Total Costs for Calendar Year 2022	**$1,700,000**				**$1,530,000**	**$85,000**	**$85,000**
2023		Extend Runway 11/29 Parallel Taxiway to end of Runway 29 including MITL	$650,000	90%	5%	5%	$585,000	$32,500	$32,500
		Total Costs for Calendar Year 2023	**$650,000**				**$585,000**	**$32,500**	**$32,500**
2025		Apron Reconstruction	$1,300,000	90%	5%	5%	$1,170,000	$65,000	$65,000
		Total Costs for Calendar Year 2025	**$1,300,000**				**$1,170,000**	**$65,000**	**$65,000**
2026		Apron Expansion	$700,000	90%	5%	5%	$630,000	$35,000	$35,000
		Total Costs for Calendar Year 2026	**$700,000**				**$630,000**	**$35,000**	**$35,000**
2028		Reconstruct Taxiway C	$350,000	90%	5%	5%	$315,000	$17,500	$17,500
		Total Costs for Calendar Year 2028	**$350,000**				**$315,000**	**$17,500**	**$17,500**
2029		Environmental Assessment for Hangar Area Expansion	$100,000	90%	5%	5%	$90,000	$5,000	$5,000
		Total Costs for Calendar Year 2029	**$100,000**				**$90,000**	**$5,000**	**$5,000**
2030		Complete site preparation for Hangar Area and Construct Taxiways	$600,000	90%	5%	5%	$540,000	$30,000	$30,000
		Total Costs for Calendar Year 2030	**$600,000**				**$540,000**	**$30,000**	**$30,000**
2032		Complete 8' High Perimeter Fence	$800,000	90%	5%	5%	$720,000	$40,000	$40,000
		Total Costs for Calendar Year 2032	**$800,000**				**$720,000**	**$40,000**	**$40,000**
		Long Term Development (2021-2032)	**$6,200,000**				**$5,580,000**	**$310,000**	**$310,000**
		Total Proposed Master Plan Development	**$19,120,000**				**$17,181,000**	**$948,500**	**$948,500**

Notes:
1) Costs identified are preliminary estimates in 2012 Dollars. Additional factors beyond the scope of this planning process will determine final costs.
2) An allocation has been included for administration, engineering, professional services and contingencies, unless other specificially indentified for a project.
3) These timeframes are not mandates on the City of Watertown for the completion of particular improvements during specific years. The implemenation of specific projects could be affected by the availability of local, state and federal aid, and changes in priorities by the Airport.

since this is a priority for the airport, improvements were categorized into short-term projects through 2020 to accomplish a 5,000 foot published runway length. In addition, a few other high priority projects, unrelated to a 5,000 foot published runway, were also identified.

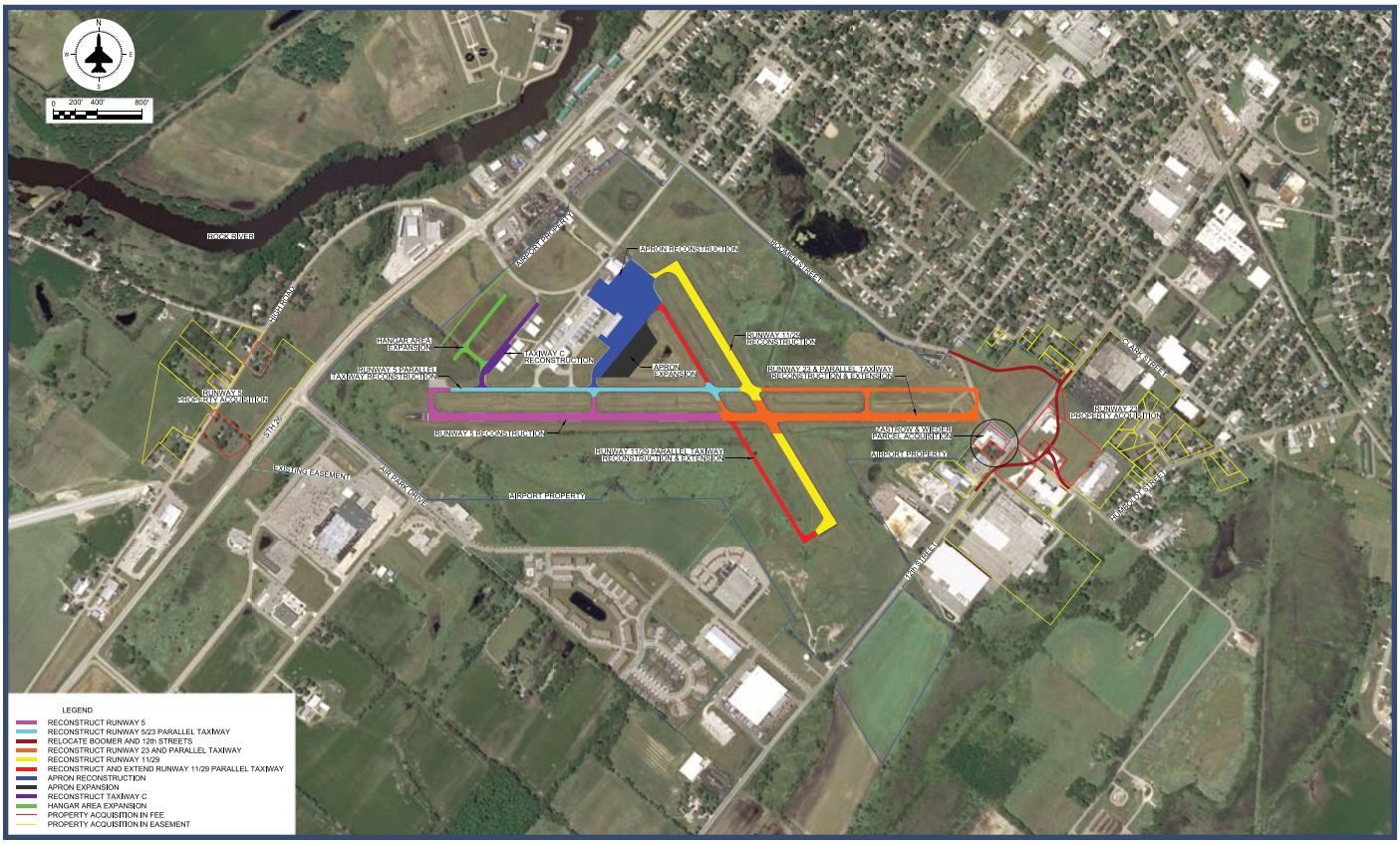
Short-term development contains several specific projects to achieve the overall goal of a 5,000 foot primary runway. Due to the limited availability of additional AIP funding for general aviation airports, and the requirement for certain projects being completed sequentially, the entire development of a 5,000 foot runway was broken in manageable pieces in a logical sequence to complete the total development. The short-term development projects should be the basis for the Airport's CIP.

Short-Term Development Plan

The following is a summary of each year of the Short-Term Development:

- **2013:** Two property owners (Zastrow & Wieder) in the existing Runway 23 Runway Protection Zone (RPZ) have expressed interest in selling to the Airport. Both properties have obstructions that penetrate the existing Part 77 approach surface

Figure 5.17: Existing Conditions to Runway 5



and threshold location plane. The properties could be purchased under the BOA's land loan program which allows the airport to purchase properties when they become available, with a small interest rate as they repay the loan. These properties would eventually need to be acquired for any Runway 5/23 improvements.

- **2013:** After the completion of this master plan, an Environmental Assessment (EA) for the Runway 5/23 improvements will begin. Also, the fuel system has aged and is in need of replacement. The fuel system has become a priority for the airport.

- **2014:** Begin preliminary design for the Runway 5/23 improvements including road relocations. Information generated from this design effort will be needed to support analysis in the EA. The project needs to be designed as a whole to determine earthwork balances between different phases and provide more accurate cost estimating. Preliminary design will provide detailed phasing to complete all Runway 5/23 improvements. Land acquisition would begin in the Runway 5 approach. Properties with obstructions to the Runway 5 approach would need to be acquired in fee or easement. Changes to the physical end of Runway 5 cannot occur until the Runway 5 approach is clear of obstructions.

- **2015:** Complete final design for improvements to the end of Runway 5 and existing pavement to the Runway 11/29 intersection. Since changes would be made to the existing ends of Runway 5, a new instrument approach would be required. New approaches through FAA are now facilitated through their Airport Geographic Information System (AGIS). This process can take 18 to 24 months to complete and requires enough lead time for the new approach to be complete by the time the runway changes are made.

- **2016:** Runway 5/23 reconstructed from the intersection with Runway 11/29 to the new end of Runway 5 (to the southwest) as shown in the Sponsor Preferred Airside Development Alternative. This project would include a new lighting system for this section of the runway, and new NAVAIDs. Due to the high water table around the Airport, new underdrains would be installed. In the short term, the length or Runway 5/23 would be reduced to 4,230 feet. The airport would be reimbursed for the property purchased in 2012.

- **2017:** The parallel taxiway to Runway 5/23 is reconstructed from its intersection with Runway 11/29 to the new end of Runway 5 (to the southwest). This includes new taxiway lighting and underdrains. This pavement is one of the oldest pieces of pavement on the airport.

- **2018:** Begin land acquisition in the Runway 23 approach. Properties with obstructions to the Runway 23 approach would need to be acquired in easement, and other properties in fee for the relocation of Boomer and 12th Streets. This land acquisition is required before both roads can be relocated and any improvements made to Runway 23. Final design for the road relocations would be completed.

- **2019:** Boomer and 12th Streets relocated and reconstructed in the Runway 23 approach. For planning purposes, replacement of underground infrastructure (sanitary sewer and watermain) was included. With the roads relocated and all obstructions removed in the approach, improvements could be made to Runway 23. Finish final design for Runway 23 improvements.

- **2020:** Runway 5/23 reconstructed from the intersection with Runway 11/29 to the new end of Runway 23 (to the northeast) as shown in the Sponsor Preferred Airside Development Alternative. The adjacent parallel taxiway would be reconstructed and extended to the new end of Runway 23. This project would include a new lighting system for this section of runway and taxiway, along with new NAVAIDs. New underdrains would be installed and wetland mitigation would be completed. After the completion of this project, the Watertown Municipal Airport would have an improved Runway 5/23 to 5,000 feet.

Other development projects were also identified through the Master Planning process and are shown as long-term development projected from 2021 through 2032.

Long-Term Development Plan

The following is a summary of each project of the Long-Term Development:

- **2022:** The pavement on Runway 11/29 is aging and will need to be a priority after Runway 5/23 is improved. The entire runway would be reconstructed with a new lighting system, NAVAIDs and underdrains.

- **2023:** One of the projects identified in the General Aviation User Survey was finishing the parallel taxiway to Runway 11/29. The taxiway would be extended from Runway 5/23 to the end of Runway 29 (see Figure 5.19). New lighting and underdrains would be installed.

- **2025:** Reconstruct the existing airport apron, including specific areas for itinerant jet parking to accommodate the weight of that class of aircraft.

- **2026:** Expand the airport apron for additional aircraft parking.

- **2028:** Reconstruct Taxiway C in the existing hangar area. Taxiway C will see increased use as the hangar area is ultimately developed.

- **2029:** Perform an environmental assessment for the Sponsor Preferred Landside Development Alternative.

- **2030:** Complete grading and site preparation for the south part of the Sponsor Preferred Landside Development Alternative, and build new taxiways off of Taxiway C. This expansion would provide room for approximately 23 new hangars to be built at the Airport.

- **2032:** Complete a 10-foot high perimeter fence around the boundary of the airport. The airport currently has a 4-foot high wooden perimeter fence and has made improvements in the terminal area with a 8-foot high chain link fence. Other sections of the perimeter fence will be completed during the improvements to Runway 5/23 in Short-Term Development.

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Appendix A

Economic Impact Study

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Economic Impact

2010

Watertown Municipal Airport (RYV)
Watertown, WI

Airports and economic development

The local general aviation airport is fast becoming the principal access route from a community to the nation and world.

As an important part of our statewide transportation network, local airports such as Watertown Municipal Airport play a critical role in fostering business growth and economic development.

Convenient access to air transportation allows businesses to quickly move goods and key personnel from one site to another, saving valuable time and increasing productivity.

The local airport can also provide facilities for emergency medical flights, law enforcement, agricultural spraying, pilot training, and many other important community services.

Communities that are readily accessible by air transportation are at a competitive advantage and may realize economic and quality of life benefits that can affect every citizen.

Watertown Municipal Airport

As an integral part of our state transportation network, Watertown Municipal Airport in Watertown plays a critical role in fostering business growth and economic development in the region.

Airport location

Watertown Municipal Airport is located in Jefferson County (southeastern Wisconsin). The city of Watertown is located in both Jefferson and Dodge counties. Easily accessible from Interstate 94, Watertown Municipal Airport is 35 miles east of Madison and 40 miles west of Milwaukee.

The airport provides a safe and convenient environment for travel, business aviation, and related business activities.

Regional profile

Jefferson and Dodge counties have a diversified economic base and workforce. Some of the products of the area include bicycle design and manufacturing, healthcare, and services for the elderly and disabled.

The area's largest non-government industry sectors are natural resources, manufacturing, trade, construction, and healthcare and social assistance.

Wisconsin Department of Transportation
Bureau of Aeronautics

Jefferson and Dodge County Profile

Area populations (2011)

City of Watertown – 23,019
Jefferson County – 83,686
Dodge County - 89,810

Employment (2008)

Jefferson County per capita income – $33,649
Jefferson County employment – $34,682

Dodge County employment - $34,545
Dodge County per capita income - $38,615

Major employers in area

- Quad/Graphics Inc.
- Department of Corrections
- UW Health Partners Watertown Hospital
- WIS-Pak
- Fort Health Inc.
- Trek Bicycle Corporation
- County of Jefferson
- Walmart Associates Inc.
- Generac Power Systems Inc.
- Watertown Unified School District

Sources: U.S. Census Bureau, U.S. Bureau of Economic Analysis, WI Departments of Administration and Workforce Development, and airport administration.

Airport services and activity

Owned and operated by the city of Watertown, the airport is a general aviation airport that is part of the National Plan of Integrated Airports and is classified as a Medium General Aviation Airport in the Wisconsin State Airport System Plan*. Medium General Aviation Airports support most single and multi-engine general aviation aircraft, including those aircraft commonly used by businesses. These airport support regional and in-state air transportation needs.*

In 2010, the airport was home to 77 based aircraft, including 62 single-engine aircraft, 13 multi-engine aircraft, one jet, and one helicopter.

The airport has two businesses located on the airport. Wisconsin Aviation is a Fixed Base Operator (FBO) and Central Aviation is a paint shop. There are 10 T-Hangars, four large hangars, 18 smaller hangars and a maintenance hangar.

Airport facilities

Watertown Municipal Airport has two paved runways.

The primary runway (05/23) is 4,429 feet long by 75 feet wide with a paved overrun. Lighting aids on this runway include two-light Precision Approach Path Indicators (PAPI), Medium Intensity Runway Lights (MIRL), and Runway End Identifier Lights (REIL).

The secondary runway (11/29) is 2,801 feet long and 75 feet wide. Lighting aids on this runway consist of MIRLs.

Instrument approaches to the airport include a Non Directional Beacon (NDB), Global Positioning System (GPS), and VHF Omni-directional radio Range (VOR) to runway 05/23, and GPS and VOR approaches to runway 11/29.

The economic impact of Watertown Municipal Airport

This report documents a recently completed study by WisDOT's Bureau of Aeronautics on the contribution of Watertown Municipal Airport

to the local and state economy. The economic impact of Watertown Municipal Airport is the *economic output (sales)*, *employment,* and *wage income* that can be attributed directly and indirectly to the airport.

Economic impacts measure the importance of an airport as a business in terms of the employment that it supports and the goods and services that it consumes.

The results of the study indicate Watertown Municipal Airport provided $15.4 million in sales, supported 182 jobs and contributed $4.6 million in wage income to the local and state economy in 2010.

The methodology used to estimate the contribution of the airport to the local and state economy is the WisDOT Airport Benefit-Cost (ABC) System.

Airport Benefit-Cost (ABC) System

WisDOT's ABC System is a Microsoft Access database application for evaluating the economic impact of airports and airport improvement projects.

The system was developed based on guidelines established by the FAA in the document "*Estimating the Regional Economic Significance of Airports," U.S. DOT, September 1992.*

WisDOT's ABC System used data from the following three primary sources to estimate the economic impact of the airport to the local and state economy:

- Airport activity and business survey data on jobs, income and sales at the airport
- Data from the *U.S. 2010 Census and 2009 Wisconsin Department of Workforce Development Jefferson County Profile*
- Regional economic multipliers obtained from the industry transaction tables in the Impact Analysis for Planning Model (IMPLAN) computer model

IMPLAN is a computer model produced for WisDOT by the Minnesota IMPLAN Group. The model estimates purchases and sales between various sectors of the Wisconsin economy.

The model produces statewide multipliers as well as multipliers for specific counties and groups of counties. IMPLAN multipliers for two sectors in the Jefferson County economy were used in the analysis.

The regional economic multipliers used in this study for the *Air Transportation Sector* are 1.3 (sales), 1.6 (employment) and 1.87 (wages.) Multipliers used for the *Retail/Hotel/Restaurant Sector* are 1.46 (sales), 1.32 (employment) and 1.46 (wages.)

The economic contribution of Watertown Municipal Airport is comprised of three types of impacts—*direct impact of the airport, direct impact of airport users, and the multiplier impact.* Each of these effects is expressed in terms of their effect on economic output (sales), employment (jobs), and wage income.

Direct impacts

The direct impact of Watertown Municipal Airport on the local economy reflects the jobs, payroll, and sales directly related to airport operations. This includes the management and operation of the airport, as well as businesses providing aircraft maintenance, fueling, storage, and leasing activities.

The direct effect of the airport on the local economy in 2010 totaled 41 employees, a payroll of $1.13 million and $7 million in economic output.

Economic Impact

2010

Watertown Municipal Airport (RYV)
Watertown, WI

Indirect impact

Visitor spending, or the direct impact of airport users, is the amount of money flowing into the local economy from air passengers who reside outside the county. These visitors spend money on lodging, meals, ground transportation and retail purchases within the county.

The $3 million of visitor spending in 2010 supported 55 additional jobs in the community with a payroll of $988,000.

Induced impacts

The multiplier, or induced effect, represents the downstream effect of airport operation and visitor spending throughout the local and state economy.

This impact includes the activity of suppliers to the businesses at the airport (including electricity, office supplies, aircraft parts, fuel for resale) and suppliers to the businesses serving visitors. It also includes the activity generated by the airport workers re-spending their income (clothes, groceries, entertainment, and other necessities).

In 2010, the multiplier impact of the airport supported 43 additional jobs, provided $1.44 million in wages and generated $3.6 million in economic output.

Employment (FTE Jobs)

Direct	**41**
Indirect (visitor spending)	**55**
Induced (multiplier effect)	**43**
Total employment impact	***139 jobs***

Wage Income/Payroll

Direct	**$1.13 million**
Indirect (visitor spending)	**$988,000**
Induced (multiplier effect)	**$1.44 million**
Total payroll impact	***$3.6 million***

Economic Output/Sales

Direct	**$7 million**
Indirect (visitor spending)	**$3 million**
Induced (multiplier effect)	**$3.6 million**
Total economic output	***$13.6 million***

Other benefits

The study also measured public revenue generated at the local and state level from airport and aviation-related fees.

In 2010, Watertown Municipal Airport generated $4,499 in revenue from fuel flowage fees.

The airport also generated $3,355 in state revenue from general aviation fuel taxes and aircraft registration fees of $8,540 for a total of $16,394 in direct local and state public revenue.

Public Revenue – Direct Impact

Jefferson County	State	Total
$4,499	***$11,895***	***$16,394***

Economic Impact

2010

Watertown Municipal Airport (RYV)
Watertown, WI

Local economic impact

The results of the study indicate that in 2010 Watertown Municipal Airport provided $13.6 million in economic output, supported 139 jobs, and contributed $3.6 million in wage income to the local economy. It should be noted that this time period was at the height of the nation's recession, which resulted in slow economic growth and building.

Contribution of Watertown Municipal Airport to the Local Economy

FTE jobs	Wage income/ payroll	Economic output/sales
139	*$3.6 million*	*$13.6 million*

Local and state economic impact

The activity at Watertown Municipal Airport in 2010 also generated an additional $1.8 million in sales, 43 jobs and $1 million in payroll to the state economy.

When combined with the local impact, the total contribution of Watertown Municipal Airport to the local and state economy, in 2010, was $15.4 million in sales, 182 jobs, and $4.6 million in wage income.

Contribution of Watertown Municipal Airport to the Local and State Economy

FTE jobs	Wage income/ payroll	Economic output/sales
182	*$4.6 million*	*$15.4 million*

Note: The results of this report are produced from a basic cost-benefit model and do not completely address all the economic nuances facing every airport.

Providing leadership to maintain and develop a safe and efficient air transportation system

http://www.dot.state.wi.us/modes/air.htm

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Appendix B

Wildlife Report

(Reserved for Future Use)

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APPENDIX C

Airport Maps

- **Figure 2.1: Watertown Municipal Airport (RYV) Property**
- **Figure 2.2: Public Airports and Classifications within the Watertown Drive-Time Planning Area**
- **Figure 2.3: 1995 Airport Layout Drawing**
- **Figure 2.4: Airport Planning Area**
- **Figure 2.5: Environmental Constraints**
- **Figure 2.6: Runway 23 Wetland Delineation**
- **Figure 2.7: Runway 5 Wetland Delineation**
- **Figure 2.8: Existing Land Use**
- **Figure 2.9: Zoning**
- **Figure 2.10: Future Land Use**
- **Figure 2.11: Elevation Limitations**
- **Figure 2.12: Height Limitations**
- **Figure 4.1: Pavement Conditions Index**
- **Figure 4.2: Existing Runway Protection Zones**
- **Figure 5.1: Alternative 1, Runway 11**
- **Figure 5.2: Alternative 1, Runway 29**
- **Figure 5.3: Alternative 2, Runway 11**
- **Figure 5.4: Alternative 2, Runway 29**
- **Figure 5.5: Alternative 3, Runway 5**
- **Figure 5.6: Alternative 3, Runway 23**
- **Figure 5.7: Alternative 4, Runway 5**
- **Figure 5.8: Alternative 4, Runway 23**
- **Figure 5.9: Alternative 5, Runway 5**
- **Figure 5.10: Alternative 5, Runway 23**
- **Figure 5.11: Alternative 5, Runway 5, Land**
- **Figure 5.12: Alternative 5, Runway 23, Land**
- **Figure 5.13: Alternative 6, Runway 5**
- **Figure 5.14: Alternative 6, Runway 23**
- **Figure 5.15: Alternative 6, Runway 5, Land**
- **Figure 5.16: Alternative 6, Runway 23, Land**
- **Figure 5.17: Existing Conditions, Runway 5**
- **Figure 5.18: Existing Conditions, Runway 23**
- **Figure 5.19: Taxiway Extension Separation, Runway 11/29**
- **Figure 5.20: 1999 Landside Development Layout**
- **Figure 5.21: Landside Development Alternative 1**
- **Figure 5.22: Landside Development Alternative 2**
- **Figure 6.1: Facilities Implementation and Financial Feasibility Analysis**
- **Table 6.1: Capital Improvement Plan**

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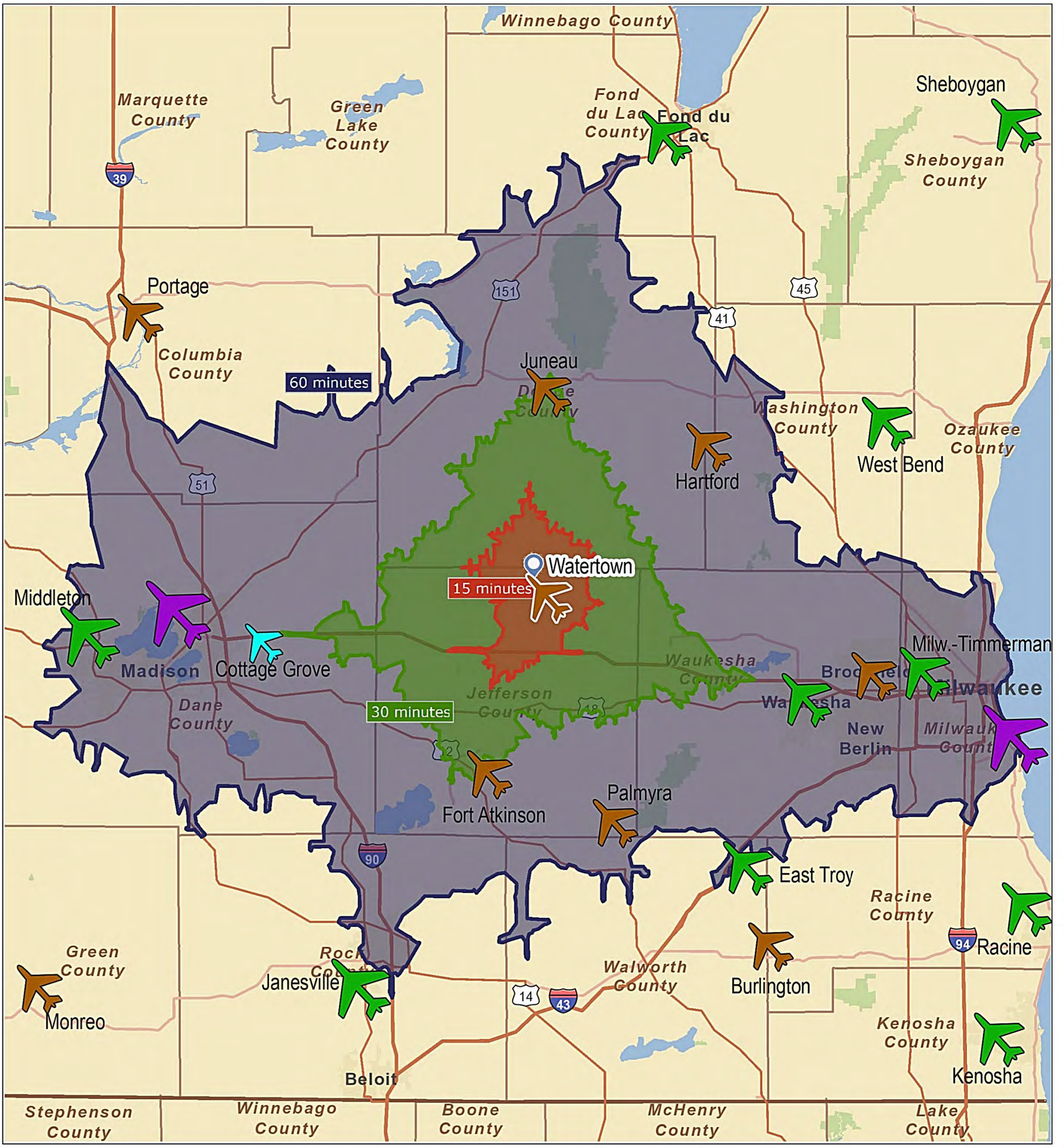
Boomer Street
Rock River
Aviation Way
Terminal
2,800' x 75' Runway 11/29
23
29
Business-26-(S.-Church-Street)
4,430' x 75' Runway 5/23
Airport Property
Air Park Drive
CTH-X-(12th-Street)

MSA PROFESSIONAL SERVICES

Watertown Municipal Airport

Drivetime Anaylsis



Airport Classification

- Commercial
- Large General Aviation
- Medium General Aviation
- Small General Aviation

RUNWAY SAFETY AREA

	RUNWAY	WIDTH	LENGTH BEYOND RWY END
		DIMENSIONS	
EXISTING	5/23	150'	300'
	11/29	150'	300'
ULTIMATE	5/23	150'	300'
	11/29	150'	300'

RUNWAY OBJECT FREE AREA

	RUNWAY	WIDTH	LENGTH BEYOND RWY END
		DIMENSIONS	
EXISTING	5/23	500'	300'
	11/29	500'	300'
ULTIMATE	5/23	500'	300'
	11/29	500'	300'

RUNWAY APPROACH SURFACE

	RUNWAY	BASE	LENGTH	OUTER WIDTH	SLOPE
		DIMENSIONS			
EXISTING	5/23	500'	1000'	800'	20:1
	11	500'	1000'	650'	20:1
	29	500'	1000'	800'	20:1
ULTIMATE	5/23	500'	1000'	800'	20:1
	11	500'	1000'	650'	20:1
	29	500'	1000'	800'	20:1

DESIGN CRITICAL AIRCRAFT DATA

	EXISTING		ULTIMATE	
RUNWAY	5/23	11/29	5/23	11/29
AIRCRAFT WEIGHT	<12,500	<12,500	<12,500	<12,500
APPROACH SPEED	<121	<121	<121	<121
WING SPAN	53'-6"	53'-6"	78'	78'
TAIL HEIGHT	17'-5"	17'-5"	18'	18'

RUNWAY DATA

		RUNWAY 5/23		RUNWAY 11/29	
		EXISTING	ULTIMATE	EXISTING	ULTIMATE
EFFECTIVE GRADIENT (%)		0.110	0.120	0.36	0.36
WIND COVERAGE	12 MPH	86.9	86.9	87.6	87.6
	15 MPH	92.5	92.5	92.5	92.5
RUNWAY CATEGORY		NP-U	NP-U	VIS.-U	NP-U
PAVEMENT STRENGTH *		30 (S)	60 (D)	30 (S)	30 (S)
APPROACH SLOPE (DESIGN)		5 / 23	5 / 23	11 / 29	11 / 29
		20:1 / 20:1	20:1 / 20:1	20:1 / 20:1	20:1 / 20:1
APPROACH SLOPE (ACTUAL)		5 / 23	5 / 23	11 / 29	11 / 29
		27.1:1 / 17.3:1	23.7:1 / 16.4:1	21.1:1 / 18.9:1	21.1:1 / 20.1:1
RUNWAY LIGHTING		MIRL	MIRL	MIRL	MIRL
RUNWAY MARKING		NPI	NPI	VISUAL	VISUAL
RUNWAY PAVEMENT TYPE		BIT.	BIT.	BIT.	BIT.
NAVIGATION AIDS		5 / 23	5 / 23	11 / 29	11 / 29
		NONE / NONE	REIL. PAPI / REIL. PAPI	NONE / NONE	REIL. PAPI / REIL. PAPI

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

RUNWAY END COORDINATES

	RUNWAY	LATITUDE	LONGITUDE
EXISTING	5 - STA. 203+50	43°09'55.962"N	88°43'48.615"W
	23 - STA. 243+50	43°10'19.629"N	88°43'05.398"W
	11 - STA. 100+00	43°10'20.236"N	88°43'35.922"W
	29 - STA. 128+00	43°10'09.914"N	88°43'00.871"W
ULTIMATE	5 - STA. 201+50	43°09'54.779"N	88°43'50.776"W
	23 - STA. 245+80	43°10'20.990"N	88°43'02.912"W
	11 - STA. 100+00	43°10'20.236"N	88°43'35.922"W
	29 - STA. 128+00	43°10'09.914"N	88°43'00.871"W
NDB		43°10'25.2" N	88°43'30.7" W

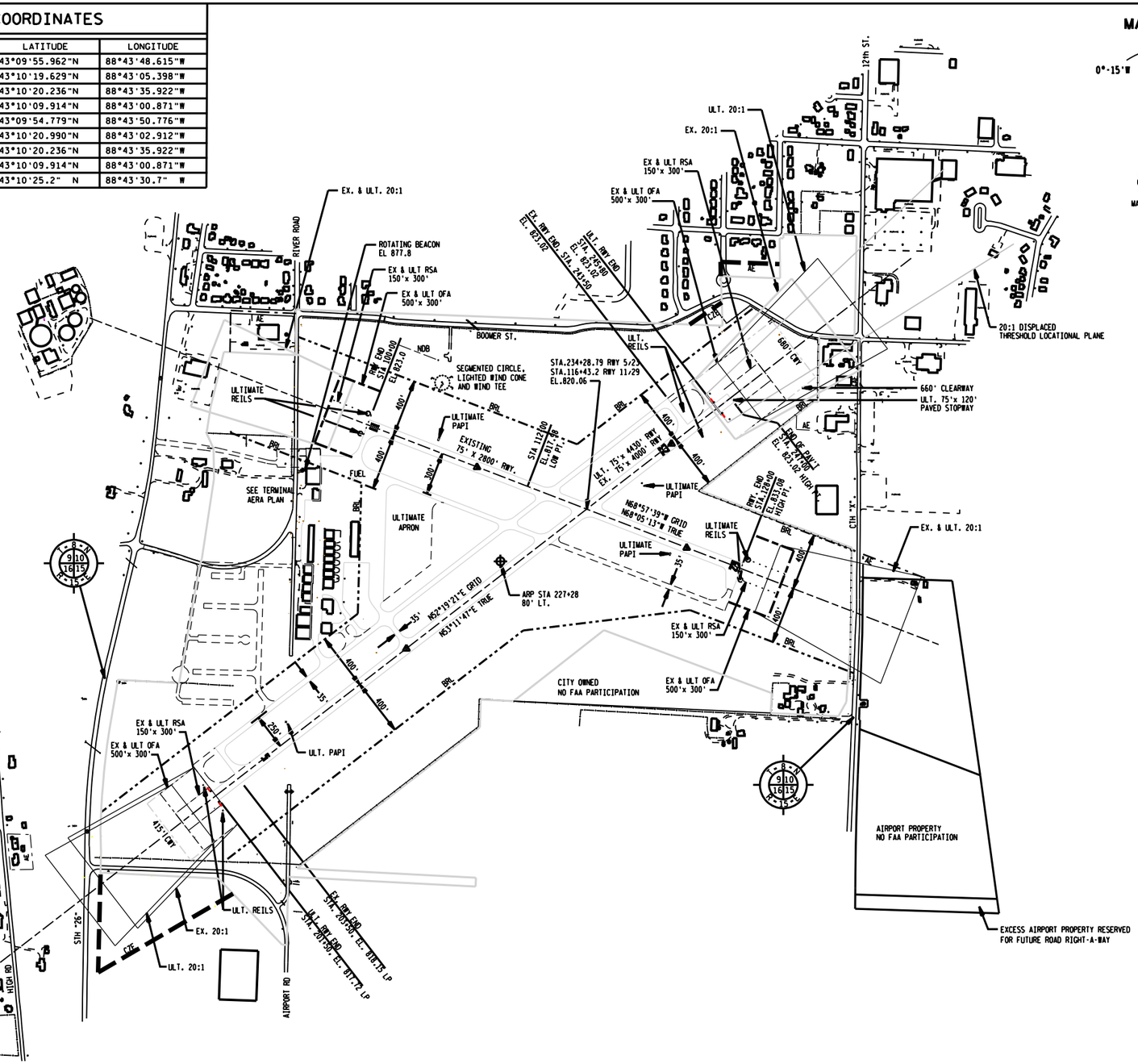
AIRPORT DATA

		EXISTING	ULTIMATE
AIRPORT CLASSIFICATION		GU II	GU II
AIRPORT COORDINATES (ARP) STA.227+28, 80' LT.	LAT.	43°10'10.669"N	
	LONG.	88°43'23.574"W	
AIRPORT ELEVATION (MSL)		833	833
MEAN MAX. TEMP. OF HOTTEST MONTH		JULY 83°F	JULY 83°F
AIRPORT & TERMINAL NAVIGATIONAL AIDS		NDB	NDB TLS OR GPS
VISUAL AIDS		ROTATING BEACON	

MISCELLANEOUS FACILITIES:
RWY 5 - ALS OR GPS, PAPI, REILS
RWY 23 - PAPI, REILS
RWY 11/29 - REILS, PAPI

LEGEND

EXISTING	ULTIMATE	
———	— — —	PAVED AREAS
———	PPL	AIRPORT PROPERTY LINE
— - —		BUILDING RESTRICTION LINE (BRL)
A.E.		AVIGATION EASEMENT
C.Z.E.		CLEAR ZONE EASEMENT
		BUILDINGS
		RUNWAY VISIBILITY POINT
		RUNWAY SAFTEY AREAS
— - — - —	— - — - —	RUNWAY OBJECT FREE AREAS



NOTES:

1. WHEN PROPERTY INTEREST IS PURCHASED CONSIDERATION WILL INCLUDE THE FOLLOWING:

   A. LIMITS OF LAND ELIGIBLE FOR FAA PARTICIPATION.
   B. DESIRES OF PROPERTY OWNER.
   C. EXISTING PROPERTY OWNERSHIP BOUNDARIES.
   D. PROTECTION OF THE IMAGINARY SURFACES DESCRIBED IN FAR. PART 77.25
   E. EXISTING LAND USE ZONING CONTROLS.

   PROPERTY INTEREST WILL BE ACQUIRED BY FEE OR AIR EASEMENT RIGHTS.

2. EXISTING AIRPORT PROPERTY AND PROPERTY INTERESTS TO BE ACQUIRED ARE SHOWN BASED ON RESEARCH OF RECORDED PLATS AND DEEDS.

DECLARED DISTANCE TABLE

		ULTIMATE RUNWAY 5	ULTIMATE RUNWAY 23
TAKEOFF RUN AVAILABLE	TORA	4430	4430
TAKEOFF DISTANCE AVAILABLE	TODA	5110	4865
ACCELERATE - STOP DISTANCE AVAILABLE	ASDA	4550	4430
LANDING DISTANCE AVAILABLE	LDA	4430	4430

BENCH MARK TABLE

ELEVATION	DESCRIPTION
822.15	TOP NUT HYDRANT @ S.W. CORNER OF HANGAR H7
807.84	'X' ON CULV. W. SIDE AIRPORT RD., STA.205+52 RWY 5/23, 277' RT.
819.19	USGS MONUMENT AT EXISTING ROTATING BEACON
823.48	TOP NUT HYDRANT AIRPORT ROAD 375' SOUTH OF RIVER DRIVE
821.17	TOP OF HYDRANT @ INTERSECTION OF SOUTH 9th ST. AND BOOMER ST.

DATE	REVISIONS	FIRM/AGENCY	BY
1	CHG 4, 5300-13, OFA, DECLARED DIST	BARRIENTOS	3/95

WISCONSIN DEPARTMENT OF TRANSPORTATION
BUREAU OF AERONAUTICS

AIRPORT LAYOUT DRAWING

WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WISCONSIN

BARRIENTOS Engineers & Architects

DESIGNER	DATE	PROJECT NO.
MAH	4-7-95	11090
DRAFTER	CHECKER	SHEET NO.
MN	BAS	2

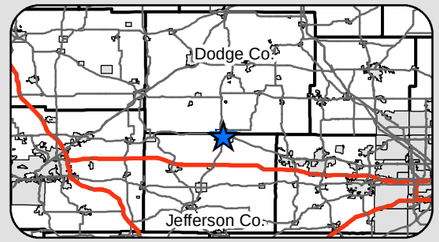
Reference Files Logical Name
(1) : \epwbase.dgn base
(2) : \dblines.dgn 1
(3) : : : :
(4) : : : :
(5) : : : :

Project No. : 11090
Plot Dgn : R:/DGN/EGV/ALP-95/ALP.DGN

Airport Planning Area

Watertown Municipal Airport, Wisconsin

FIGURE 2.4



Legend

- Airport
- City of Watertown
- County Boundary
- State Highway
- County Highway
- Local Road
- Open Water
- Streams

Feet

0 3,000 6,000

Sources:
- Base datasets provided by Jefferson and Dodge Counties and the WiDNR
- 2010 NAIP Ortho provided by USDA

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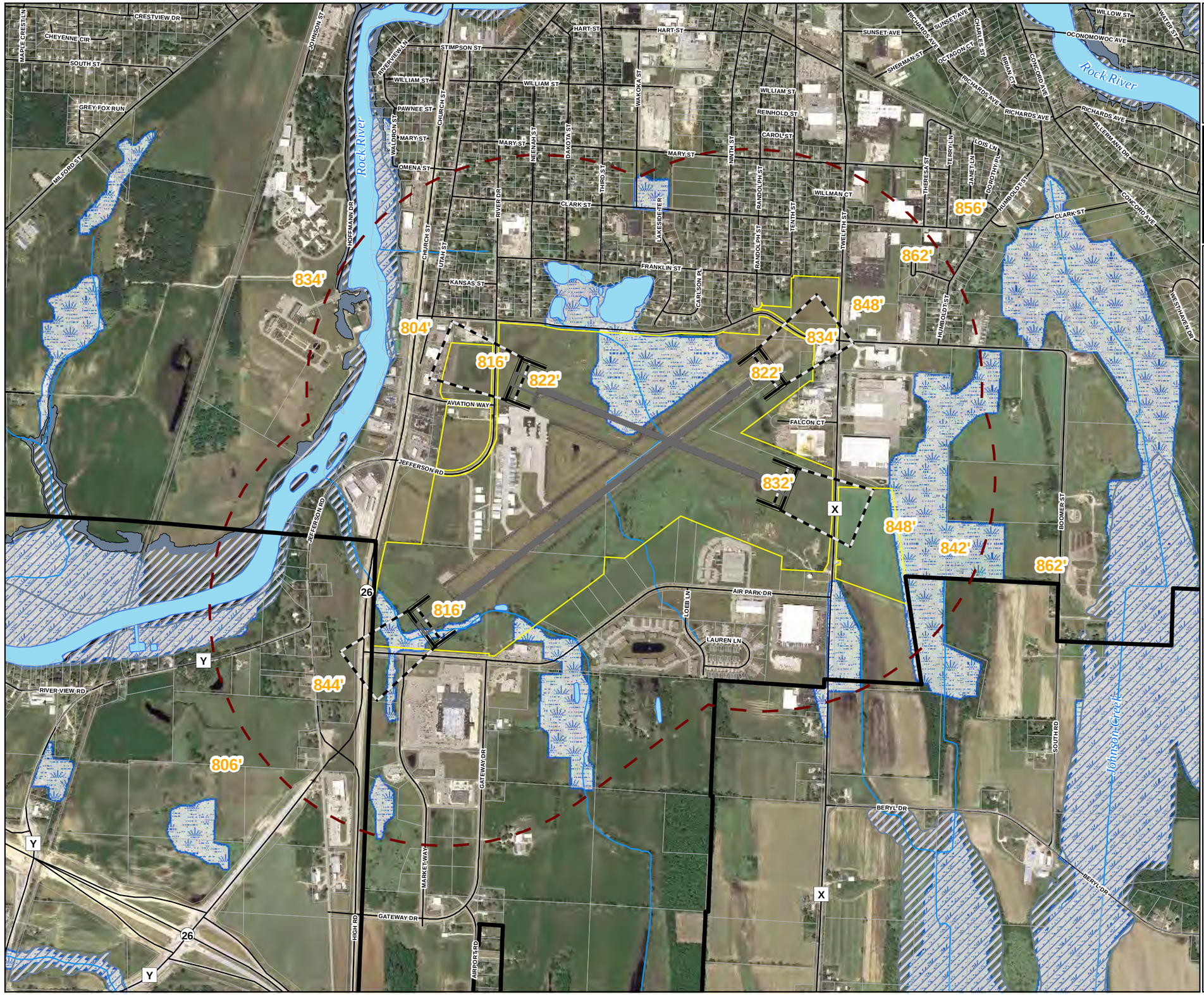
Environmental Constraints

Watertown Municipal Airport, Wisconsin

FIGURE 2.5



Legend

- Airport Property
- Runway 1/2 Mile Buffer
- City of Watertown
- Existing Runway Safety Area
- Existing Object Free Area
- Existing Runway Protection Zone
- Existing Airport Runways
- County Boundary
- TownBoundary
- Parcels
- Roads
- Open Water
- Streams
- Wetlands — *822' Elevation*

Floodplains

- 100 Year
- 500 Year

Feet

0 1,100 2,200

Sources:
- Base datasets provided by Jefferson and Dodge Counties and the WiDNR
- Watertown Approved Airport Layout Plan
- Wetlands provided by WiDNR
---- Statewide inventory completed in 1984
- 2009 Floodplains provided by FEMA
- 2010 NAIP Ortho provided by USDA
- 2004 Elevation provided by Jefferson Co.

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PROJECT NO.: R00095006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
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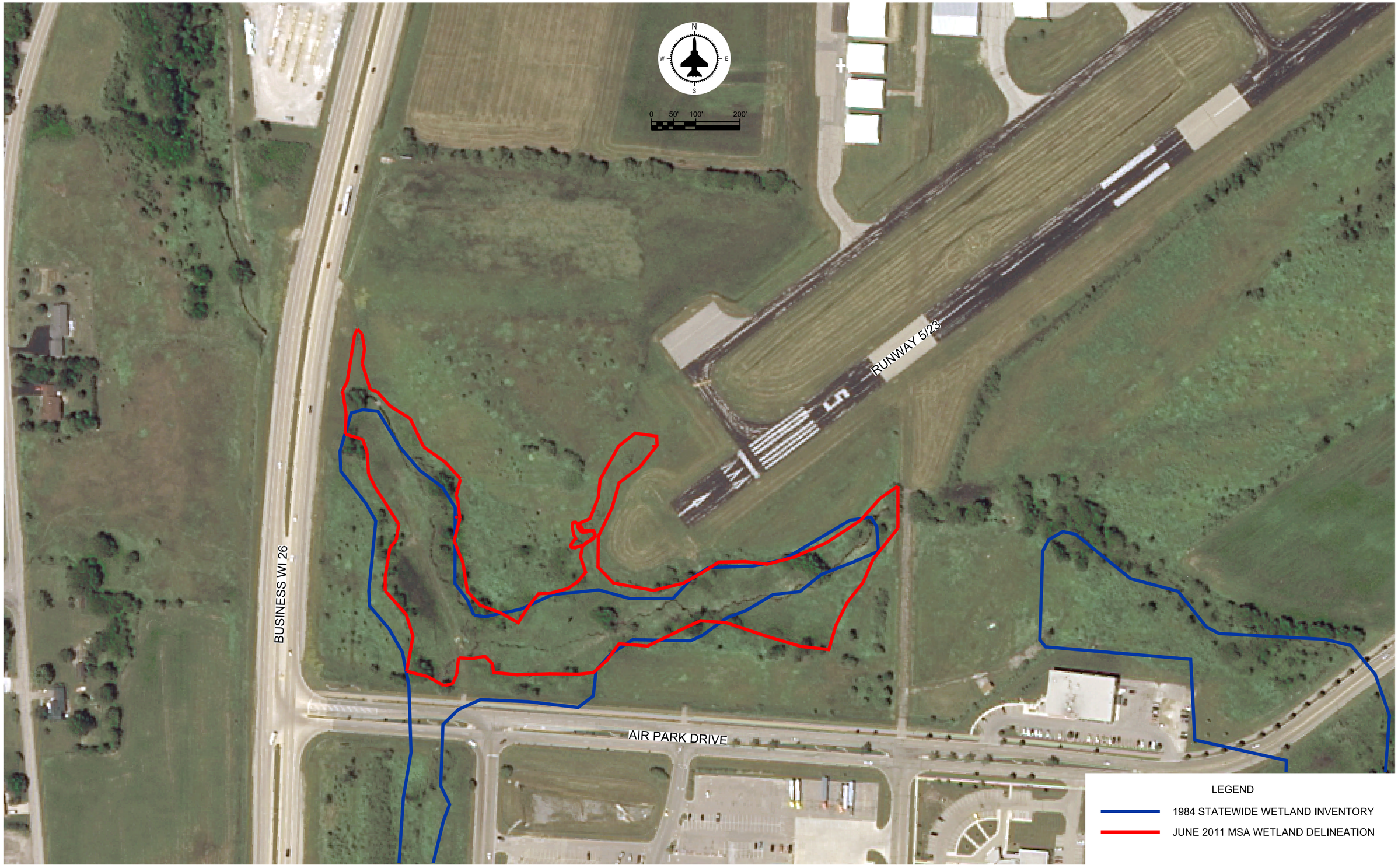
FIGURE 2.6 WETLAND DELINEATION - NORTH

Watertown Municipal Airport Master Plan
Watertown Municipal Airport
Watertown, WI

FILE NO.
R00095006
SHEET



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CHECKED BY:					
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FIGURE 2.7 WETLAND DELINEATION - SOUTH

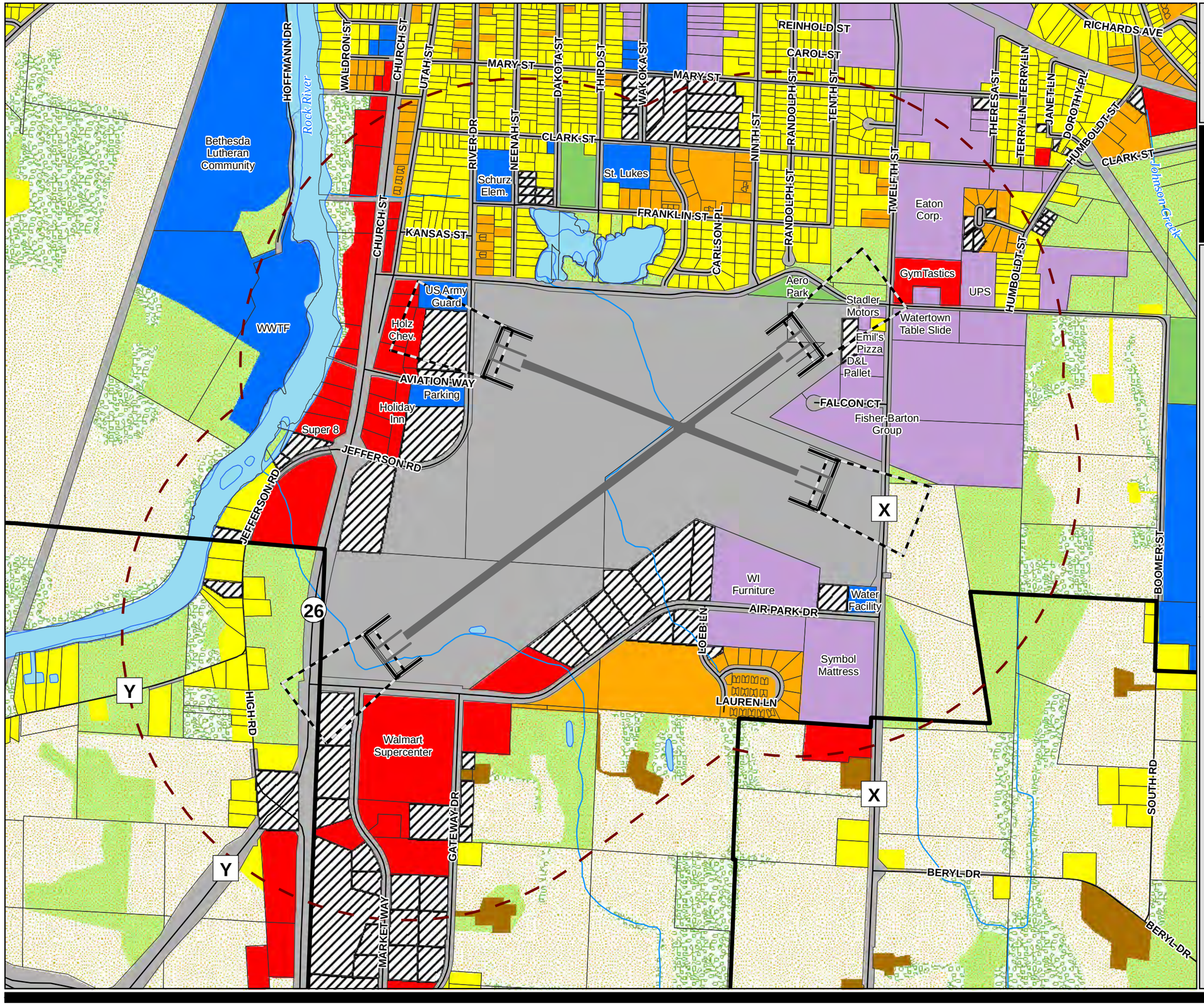
Watertown Municipal Airport Master Plan
Watertown Municipal Airport
Watertown, WI

FILE NO.
R00095006
SHEET

Existing Land Use

Watertown Municipal Airport, Wisconsin

FIGURE 2.8



Legend

- Runway 1/2 Mile Buffer
- City of Watertown
- Parcels
- Roads
- Existing Runway Safety Area
- Existing Object Free Area
- Existing Runway Protection Zone
- Existing Airport Runways

Existing Land Use

- Agriculture
- Pasture & Open Space
- Wooded Lands
- Single Family Residential
- Multi-Family Residential
- Farmsteads
- Vacant Lansd
- Commercial
- Planned Buisness
- Mixed Use
- Industrial
- Public & Institutional
- Parks & Recreation
- Transportation
- Open Water
- Streams

Feet

0 900 1,800

Sources:
- Base datasets provided by Jefferson and Dodge Counties and the WiDNR
- Watertown Approved Airport Layout Plan
- Existing Land Use reflects Map 5 Watertown Comprehensive Plan, dated 11/17/2009

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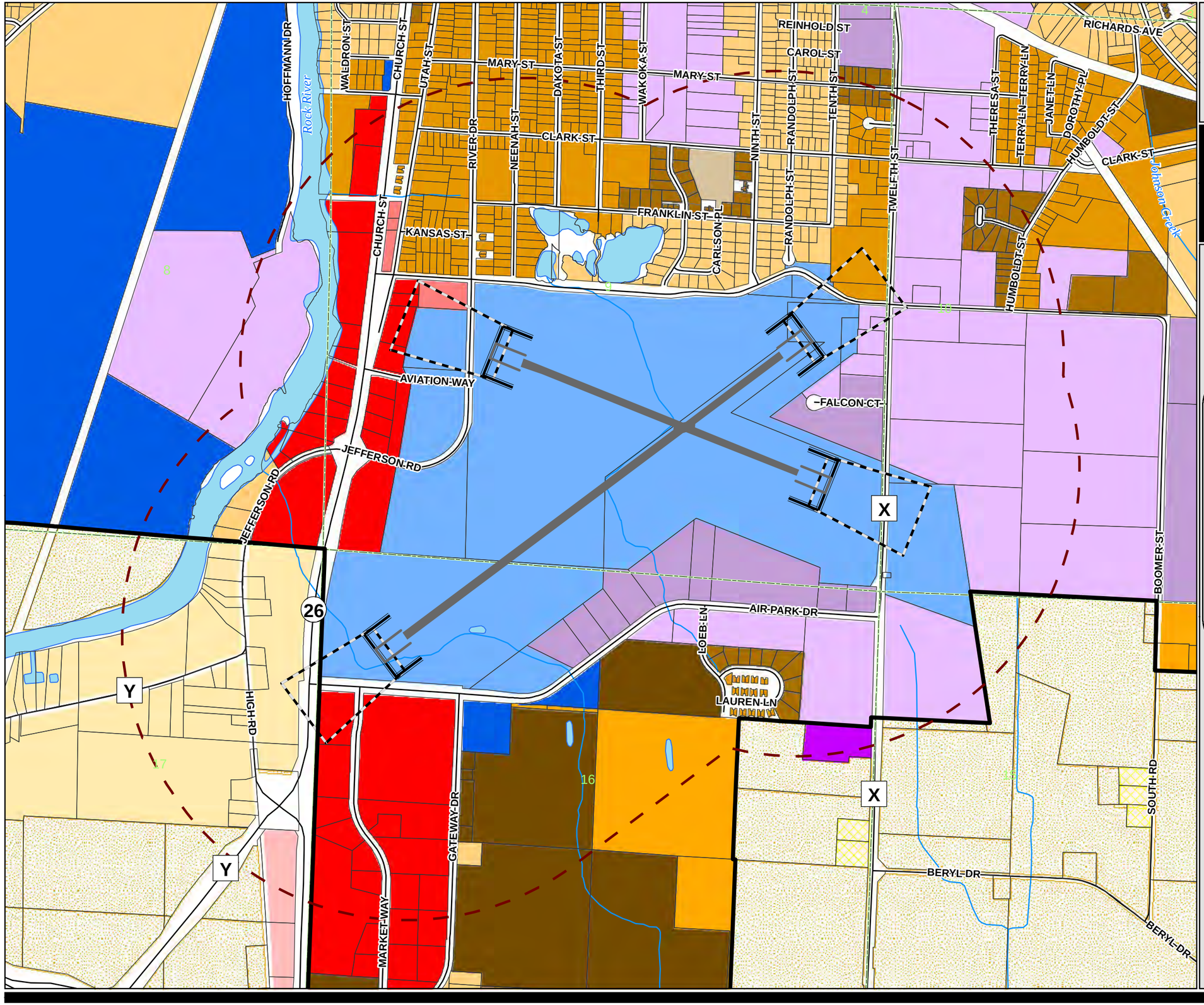
Zoning

Watertown Municipal Airport, Wisconsin

FIGURE 2.9



Legend

- Runway 1/2 Mile Buffer
- City of Watertown
- Parcels
- Roads
- Open Water
- Streams
- Existing Runway Safety Area
- Existing Object Free Area
- Existing Runway Protection Zone
- Existing Airport Runways

Zoning

- Exclusive Ag. (A-1)*
- Ag./Rural Res. (A-3)*
- Bus. (B)*
- Neigh. Bus. (NB)
- Gen. Bus. (GB)
- Gen. Ind. (GI)
- Heavy. Ind. (HI)
- Ind. (I)*
- Planned Ind. (PI)
- Planned Office & Instit. (PO)
- Res. Unsewered (R-2)*
- Single-Family (SR-4)
- Rural Holding (RH)
- Two-Family (TR-6)
- Multi-Family (MR-10)
- Multi-Family (MR-8)
- Multi

*Jefferson County Zoning

Feet

0 900 1,800

Sources:
- Base datasets provided by Jefferson and Dodge Counties and the WiDNR
- Watertown Approved Airport Layout Plan
- Zoning reflects the City of Watertown Official Zoning Map dated 2/2010

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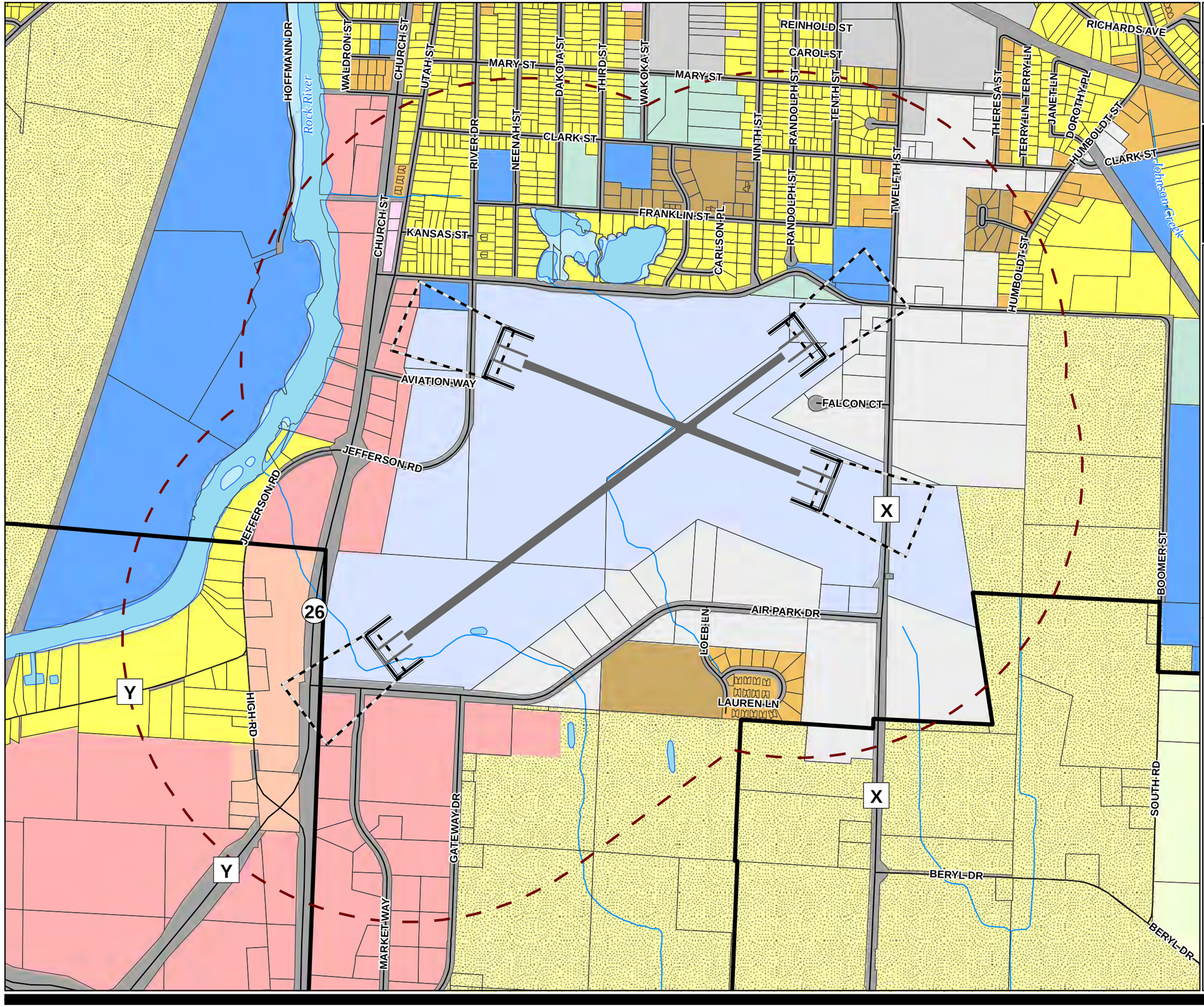
Future Land Use

Watertown Municipal Airport, Wisconsin

FIGURE 2.10



Legend

- Runway 1/2 Mile Buffer
- City of Watertown
- Parcels
- Roads
- Open Water
- Streams
- Existing Runway Safety Area
- Existing Object Free Area
- Existing Runway Protection Zone
- Existing Airport Runways

Future Land Use

- Agriculture
- Single Family Residential
- Two Family Residential
- Mixed Residential
- Planned Neighborhood
- Planned Office
- Planned Business
- Central Mixed use
- Planned Industrial
- General Industrial
- Neighborhood Mixed Use
- Planned Mixed Use
- Public & Institutional
- Parks & Recreation
- Airport
- Transportation
- Surface Water

Feet

0 900 1,800

Sources:
- Base datasets provided by Jefferson and Dodge Counties and the WiDNR
- Watertown Approved Airport Layout Plan
- Future Land Use reflects Map 6b Watertown Comprehensive Plan, dated 11/17/2009

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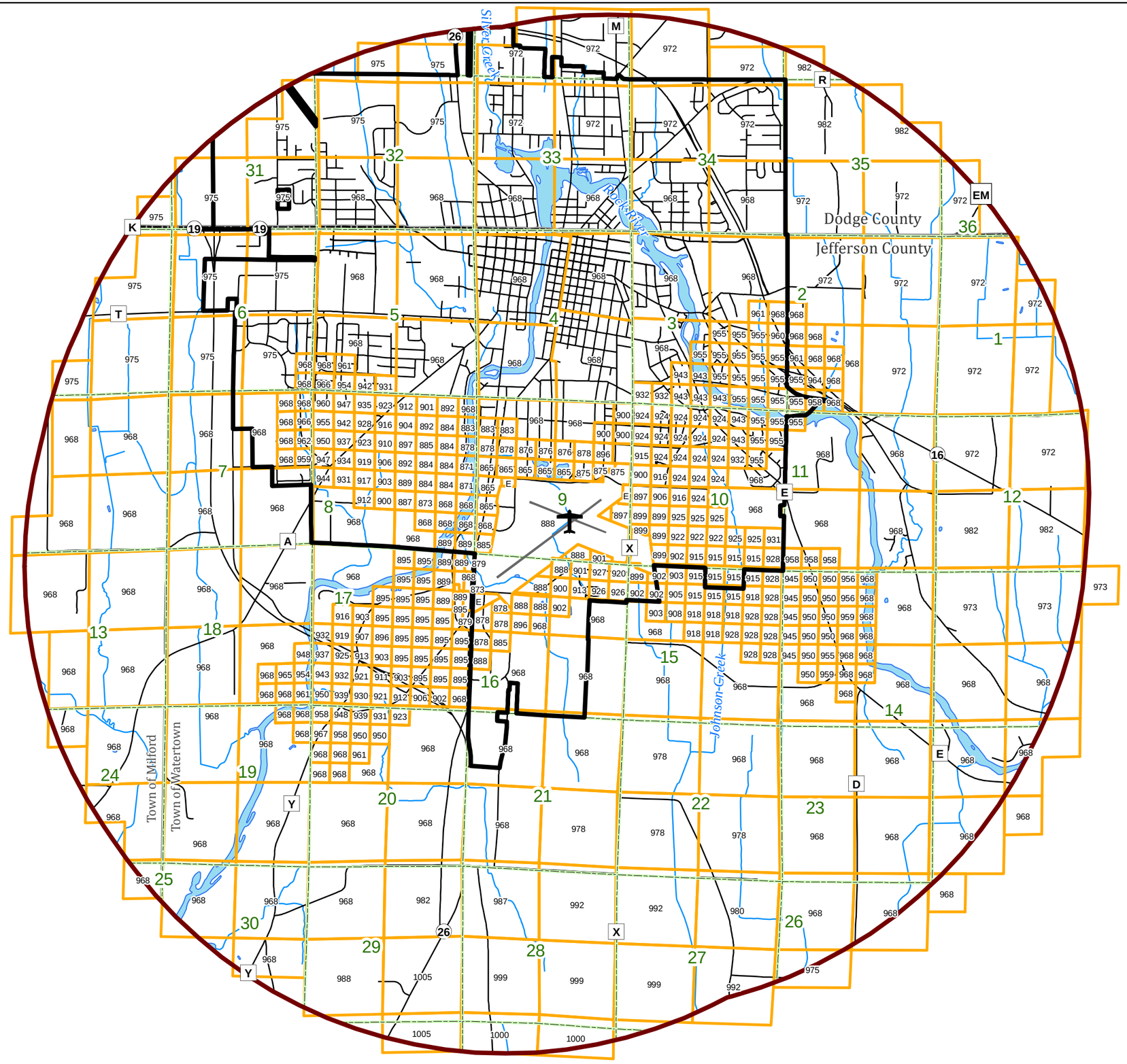
Elevation Limitations

Watertown Municipal Airport, Wisconsin

FIGURE 2.11



Legend

- Watertown Airport
- Airport Runways
- Airport 3-Mile Buffer
- City of Watertown
- Sections
- County Boundary
- TownBoundary
- Roads
- Open Water
- Streams
- ### Maximum Elevation of Structures & Vegetation

*Maximum Elevation of Structures and Vegetation reflects height regulations found in Chapter 19 of the Watertown Municipal Code, Airport Zoning. It displays the maximum elevation above sea level which structures or vegetation must stay below. It is commonly referred to as "Height Limitation Zoning." The official Height Limitation Zoning Map is kept on file with the City of Watertown.

Feet

0 3,500 7,000

Sources:
- Base datasets provided by Jefferson and Dodge Counties and the WiDNR
- Height Limits provided by WiBOA

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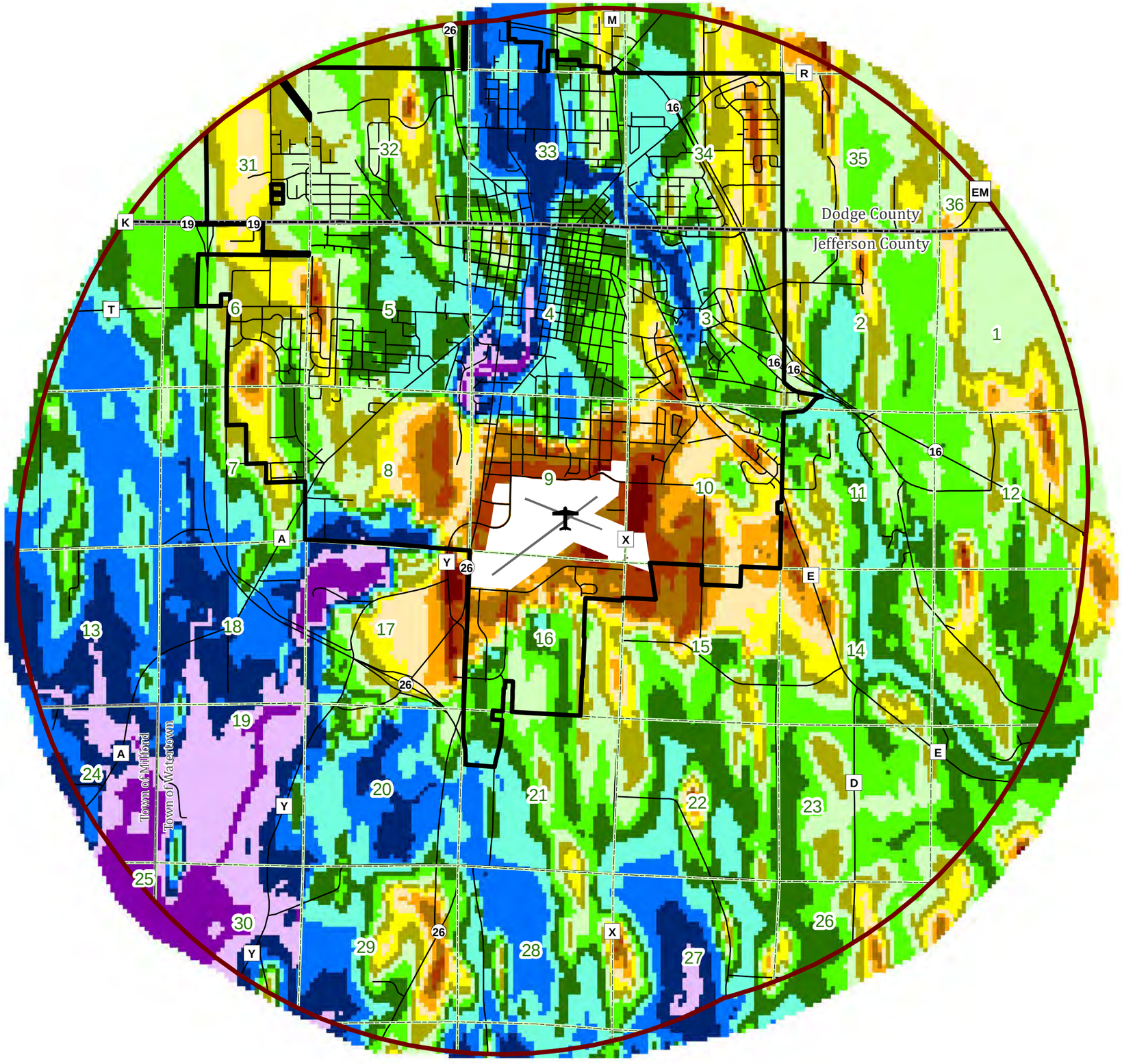
Height Limitations

Watertown Municipal Airport, Wisconsin

FIGURE 2.12



Legend

- Airport 3-Mile Buffer
- City of Watertown
- Sections
- County Boundary
- TownBoundary
- Roads
- Watertown Airport
- Airport Runways

Maximum Height of Structures & Vegetation*

- Up to 50 Feet
- Up to 60 Feet
- Up to 70 Feet
- Up to 80 Feet
- Up to 90 Feet
- Up to 100 Feet
- Up to 110 Feet
- Up to 120 Feet
- Up to 130 Feet
- Up to 140 Feet
- Up to 150 Feet
- Up to 160 Feet
- Up to 170 Feet
- Up to 180 Feet
- Up to 200 Feet

*Maximum Height of Structures and Vegetation is an approximate value calculated from the difference in average ground elevations, derived from DEM sources, compared to the Maximum Elevation of Structures and Vegetation (Map 6). Actual permitted heights may vary from this map based true ground measurements.

Feet

0 3,500 7,000

Sources:
- Base datasets provided by Jefferson and Dodge Counties and the WiDNR, WiBOA
- DEM provided by USDA.

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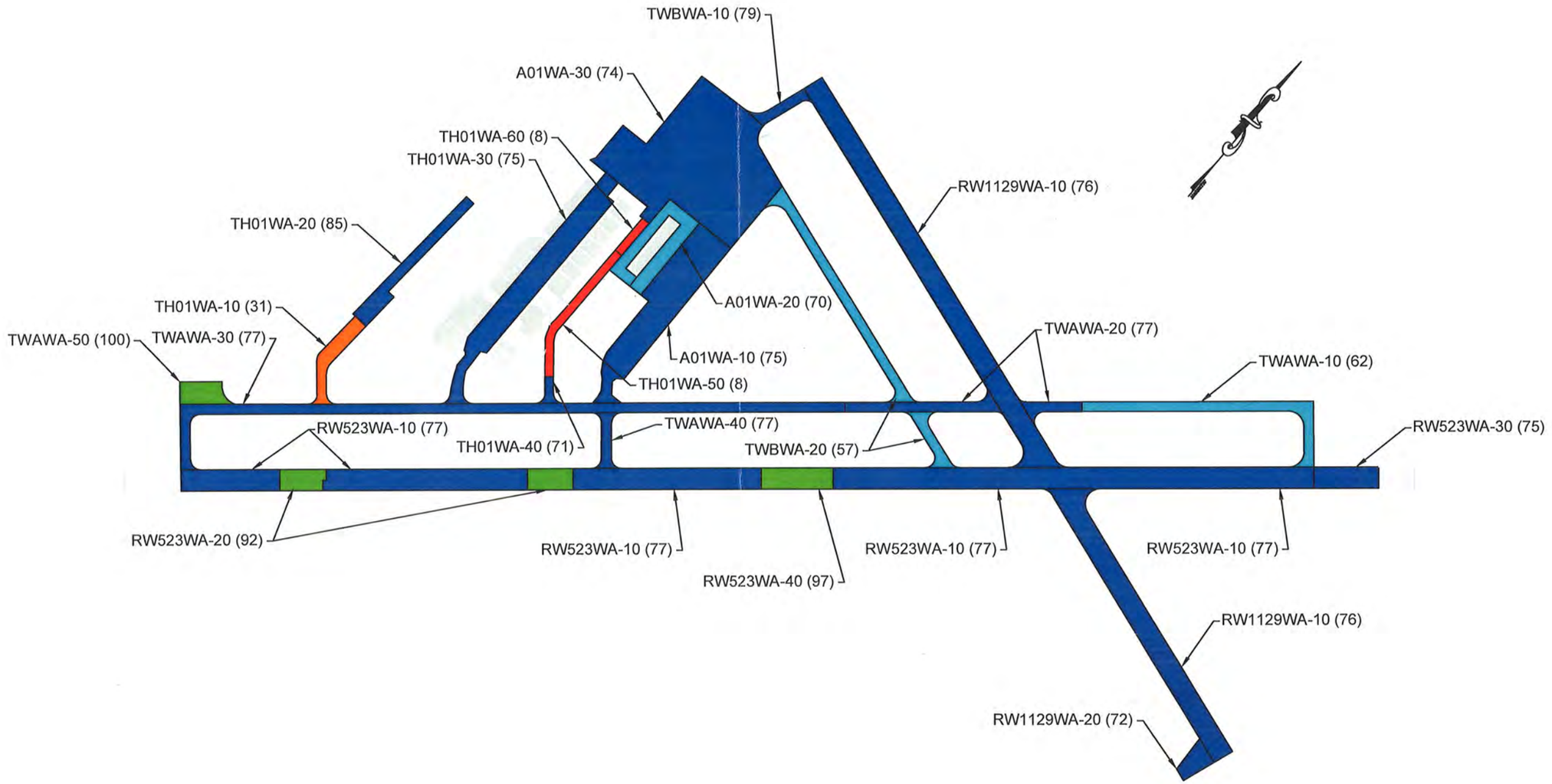

LEGEND

BRANCH IDENTIFIER
SECTION IDENTIFIER
PCI VALUE

RW1533AP-10 (67)

SECTION BREAK LINE

PAVEMENT CONDITION INDEX

PCI	REPAIR
100	
85	PREVENTIVE MAINTENANCE
70	
55	MAJOR REHABILITATION
40	
25	RECONSTRUCTION
10	
0	

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LOCATION: WATERTOWN MUNICIPAL AIRPORT (122.8)
WATERTOWN, WI

PAGE TITLE: PAVEMENT CONDITION INDEX MAP

PROJECT DATE:	CREATION DATE:	PROJECT MANAGER:	JOB NUMBER:
MAY 2009	MAY 2009	KMP	08-103-AM01
DRAWING SCALE:	LAST MODIFIED DATE:	REVISED BY:	DRAWN BY:
1" = 400'	FEB. 2010	DSP	DSP
FILENAME:		LAYOUT NAME/NUMBER:	FIGURE:
WATERTOWN.DWG		PCI	1

PROJECT NO.: 95006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: 8/3/12	DRAWN BY: MAG				
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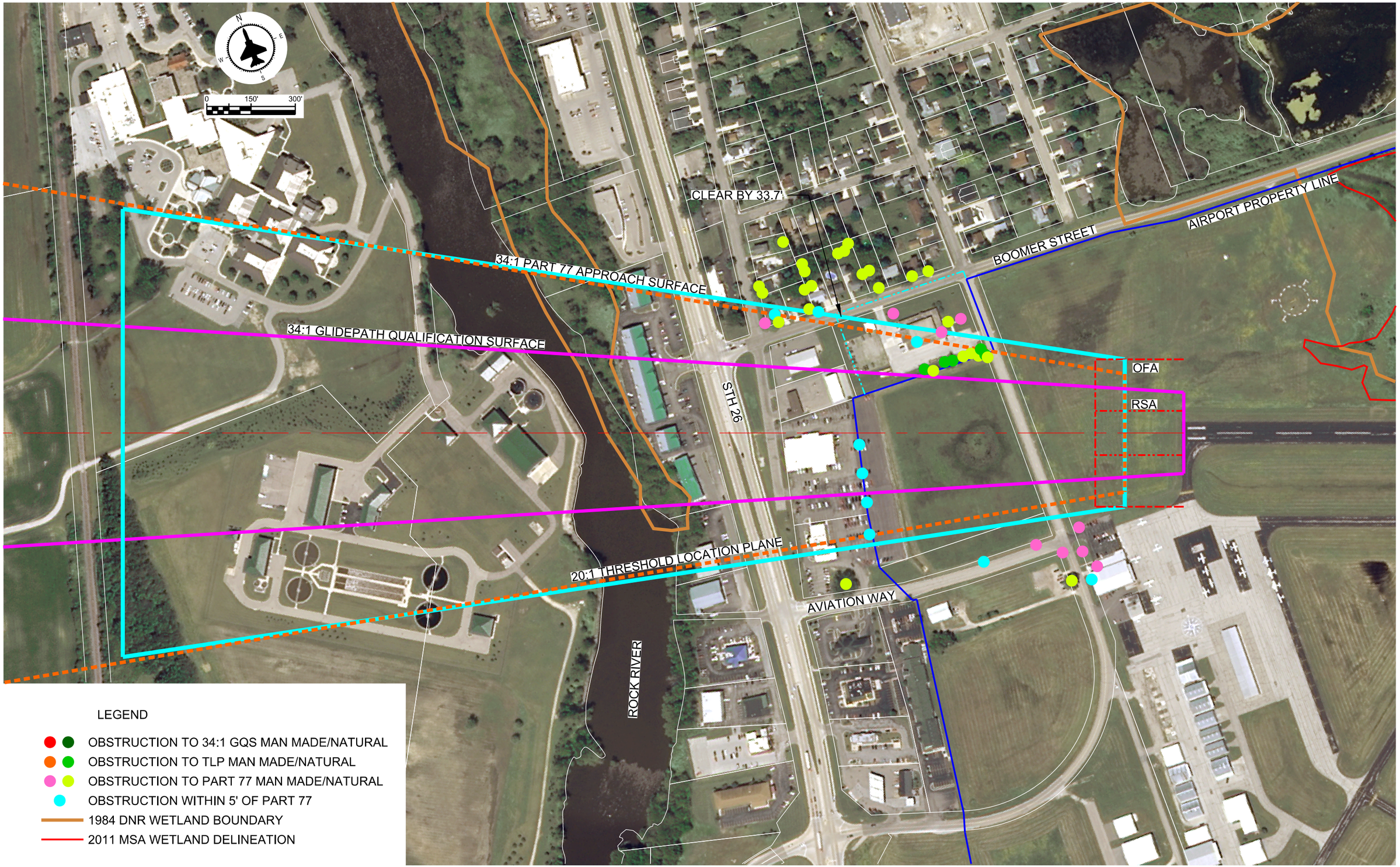
FIGURE 4.2
EXISTING RUNWAY PROTECTION ZONES

AIRPORT MASTER PLAN
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO. 95006
SHEET



LEGEND

- OBSTRUCTION TO 34:1 GQS MAN MADE/NATURAL
- OBSTRUCTION TO TLP MAN MADE/NATURAL
- OBSTRUCTION TO PART 77 MAN MADE/NATURAL
- OBSTRUCTION WITHIN 5' OF PART 77
- 1984 DNR WETLAND BOUNDARY
- 2011 MSA WETLAND DELINEATION

PROJECT NO.: 95006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: 8/3/12	DRAWN BY: MAG				
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PLOT DATE: Figure 5.1 - Alternative 1 - Rwy 11.dgn 2/11/2013 8:23:28 AM mgraczykowski					

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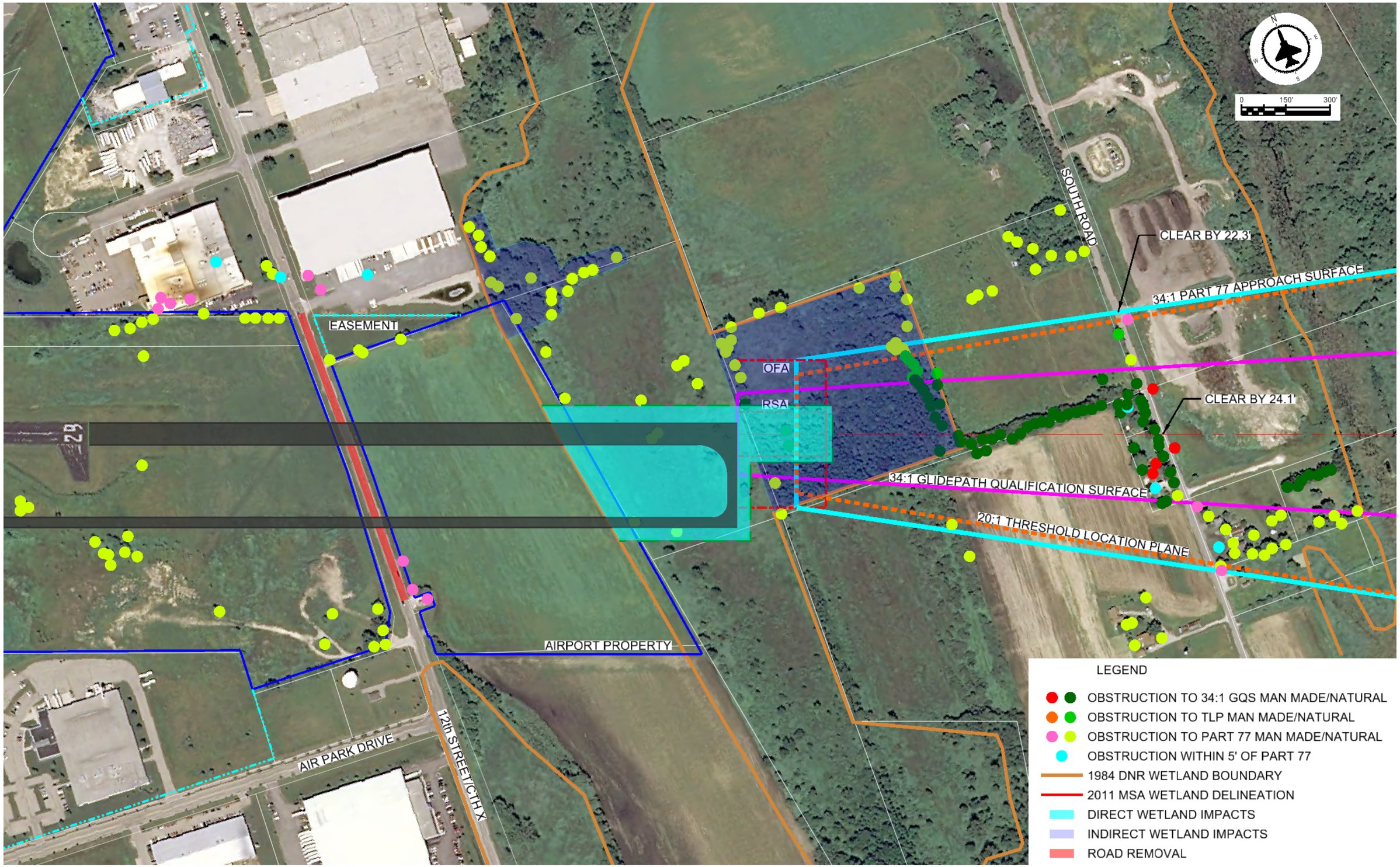
FIGURE 5.1
ALTERNATIVE 1 - RUNWAY 11

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO. 95006
SHEET



PROJECT NO.: 95006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: 8/3/12	DRAWN BY: MAG				
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PLOT DATE: Figure 5.2 - Alternative 1 - Rwy 29.dgn 2/11/2013 8:25:49 AM mgraczykowski					

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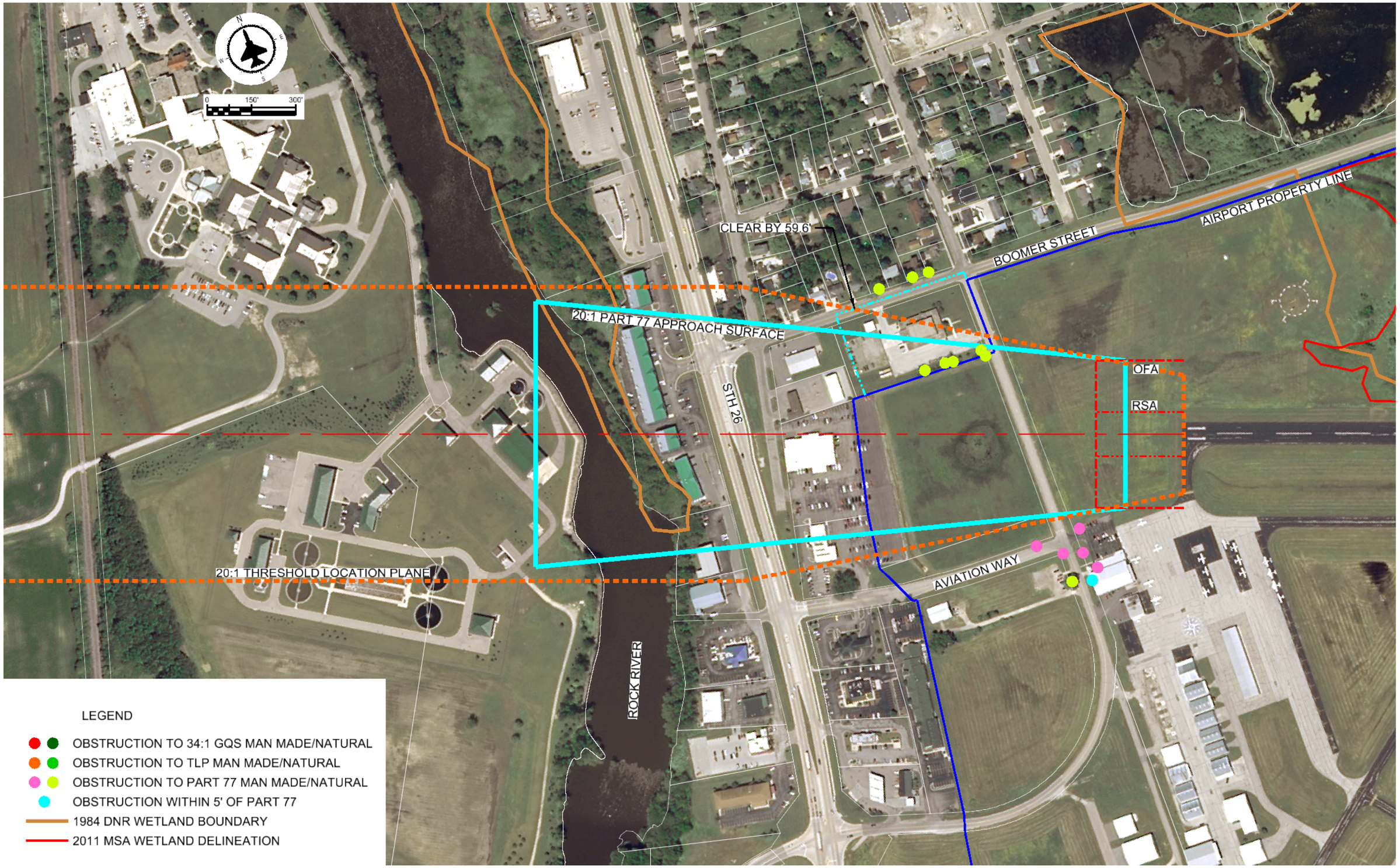
FIGURE 5.2
ALTERNATIVE 1 - RUNWAY 29

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO.
95006



PROJECT NO.: 95006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
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PLOT DATE: Figure 5.3 - Alternative 2 - Rwy 11.dgn 2/11/2013 8:29:56 AM mgraczykowski					

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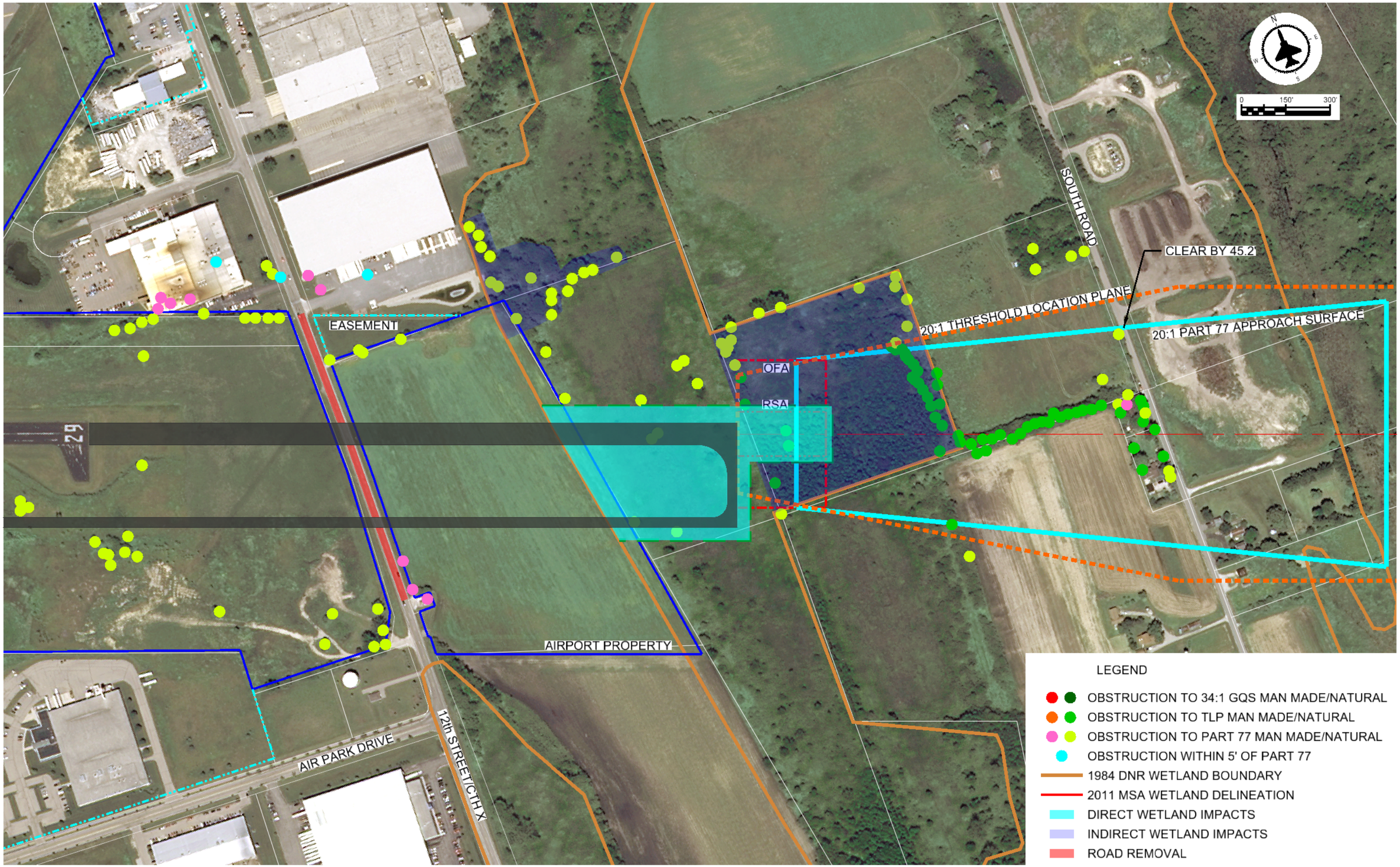
FIGURE 5.3
ALTERNATIVE 2 - RUNWAY 11

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO.
95006
SHEET



PROJECT NO.: 95006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY	
PROJECT DATE: 8/3/12	DRAWN BY: MAG					
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PLOT DATE: Figure 5.4 - Alternative 2 - Rwy 29.dgn 2/11/2013 8:30:59 AM mgraczykowski						

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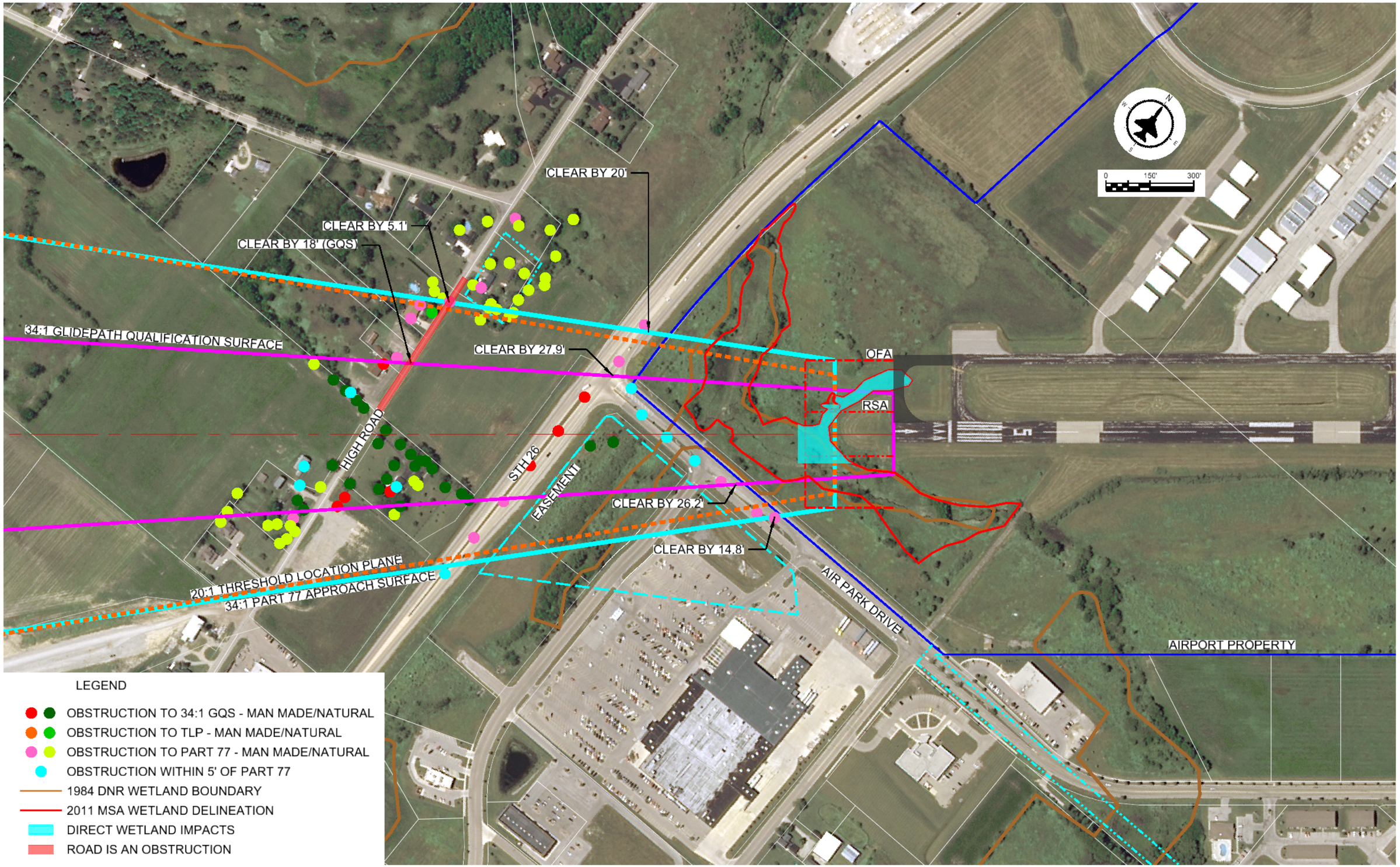
FIGURE 5.4
ALTERNATIVE 2 - RUNWAY 29

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO. 95006
SHEET



PROJECT NO.: 95006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
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PLOT DATE: Figure 5.5 - Alternative 3 - Rwy 5.dgn 2/11/2013 8:31:54 AM mgraczykowski					

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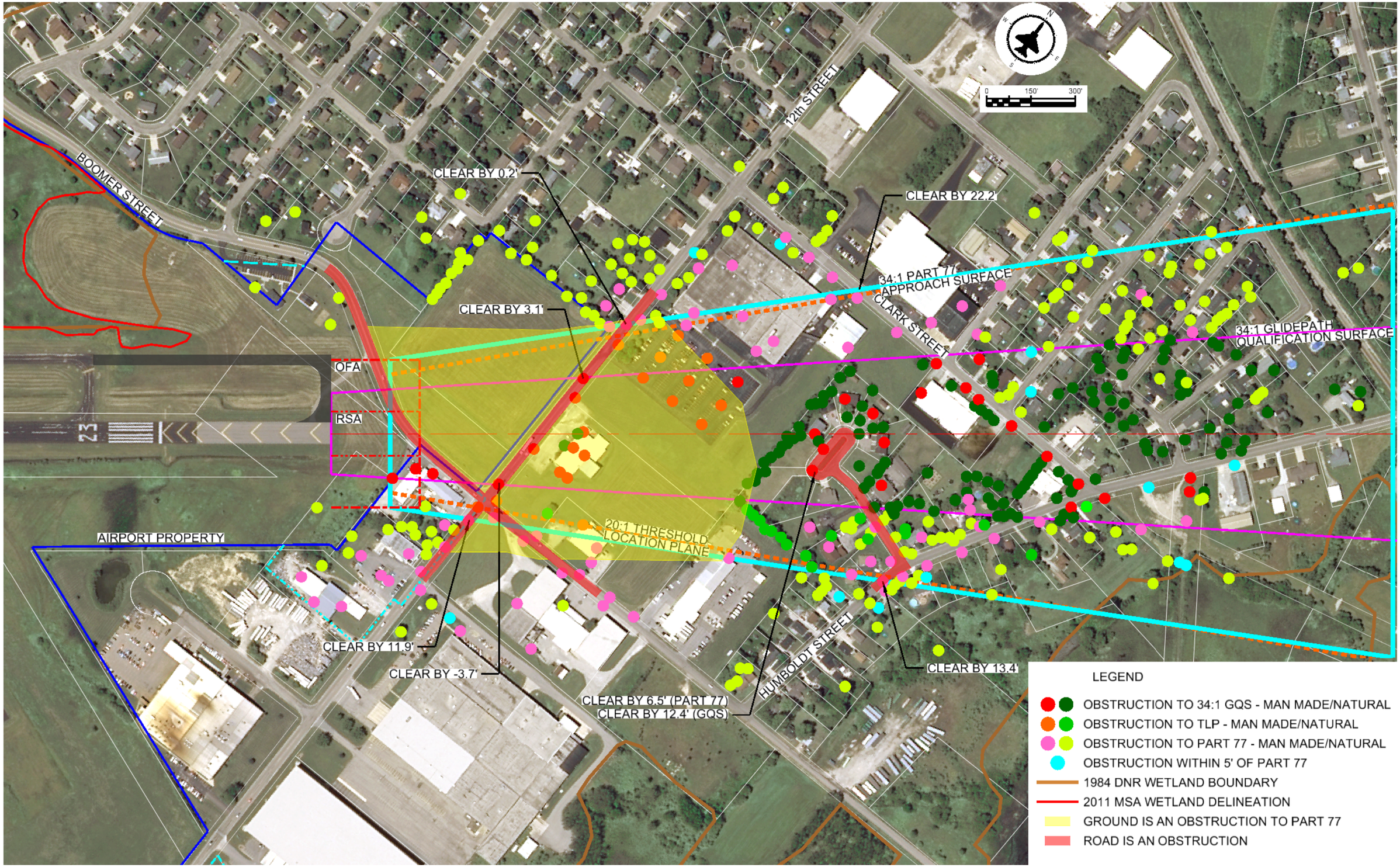
FIGURE 5.5
ALTERNATIVE 3 - RUNWAY 5

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO.: 95006



PROJECT NO.: 95006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: 8/3/12	DRAWN BY: MAG				
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PLOT DATE: Figure 5.6 - Alternative 3 - Rwy 23.dgn 2/11/2013 8:32:35 AM mgraczykowski					

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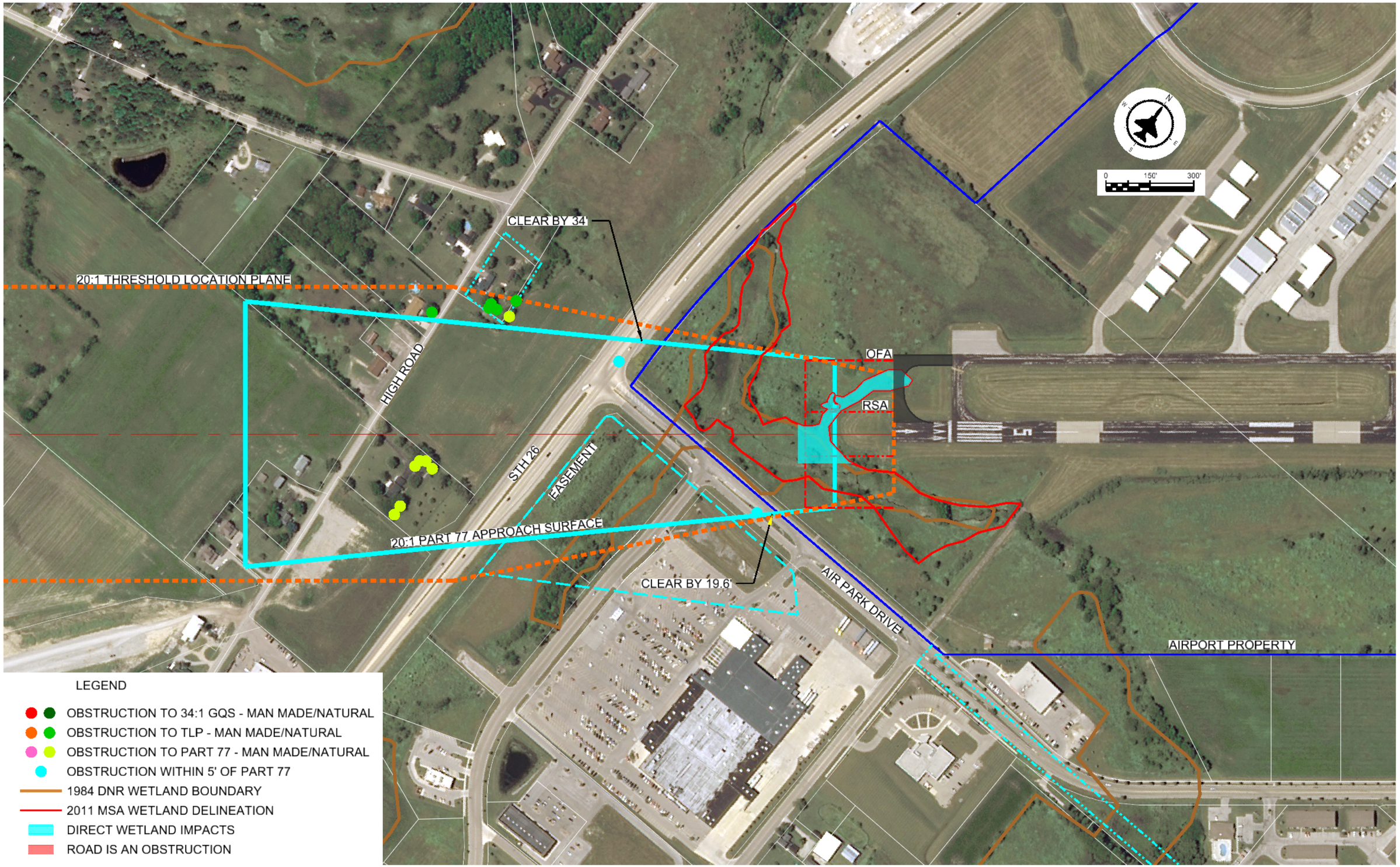
FIGURE 5.6
ALTERNATIVE 3 - RUNWAY 23

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO.
95006



PROJECT NO.: 95006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: 8/3/12	DRAWN BY: MAG				
CHECKED BY: MAH					
PLOT DATE: Figure 5.7 - Alternative 4 - Rwy 5.dgn 2/11/2013 8:33:44 AM mgraczykowski					

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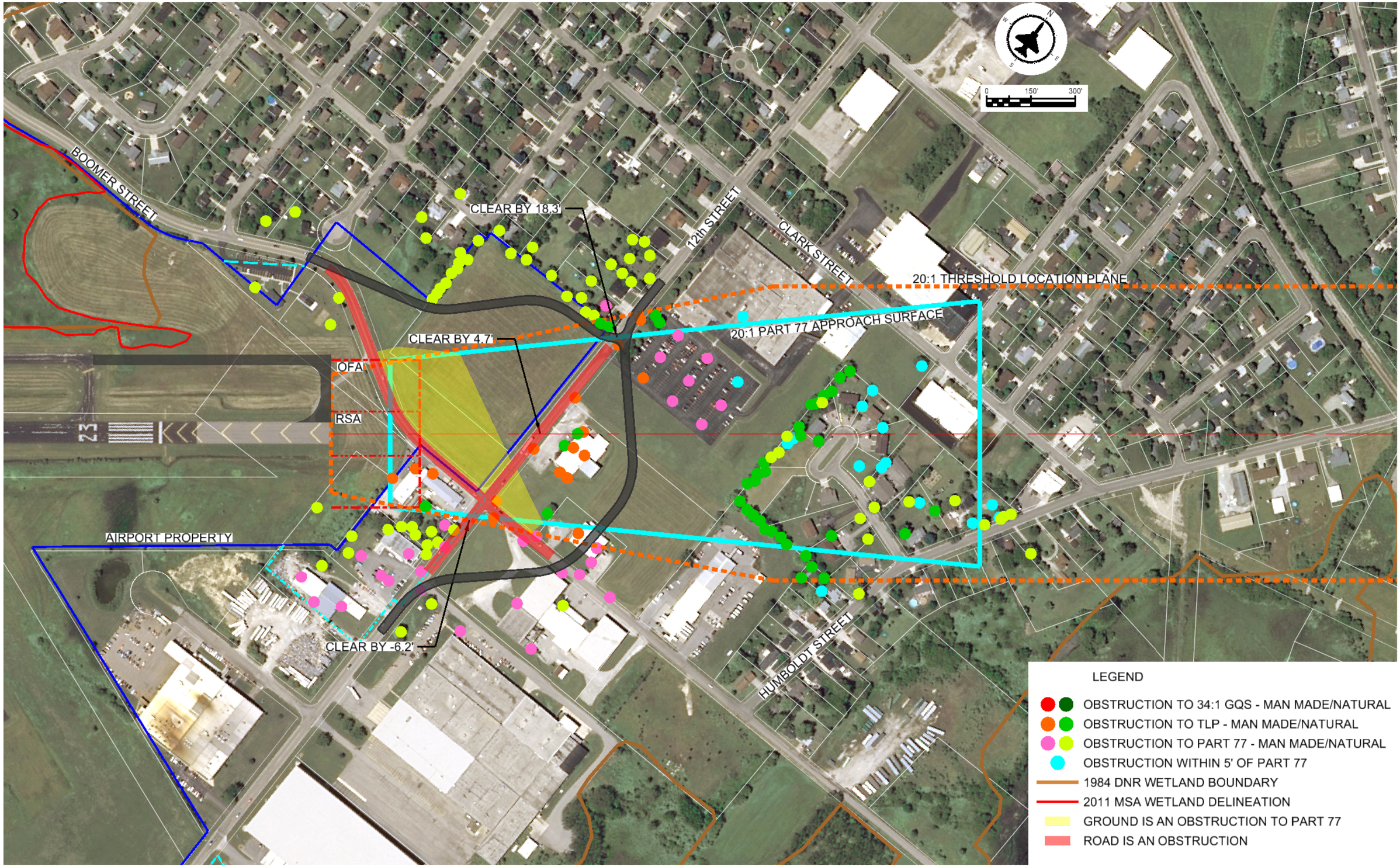
FIGURE 5.7
ALTERNATIVE 4 - RUNWAY 5

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO.: 95006
SHEET



PROJECT NO.: 95006 | SCALE: AS SHOWN | NO. | DATE | REVISION | BY
PROJECT DATE: 8/3/12 | DRAWN BY: MAG
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PLOT DATE: Figures 5.8 - Alternative 4 - Rwy 23.dgn 2/11/2013 8:39:41 AM mgoczykowski

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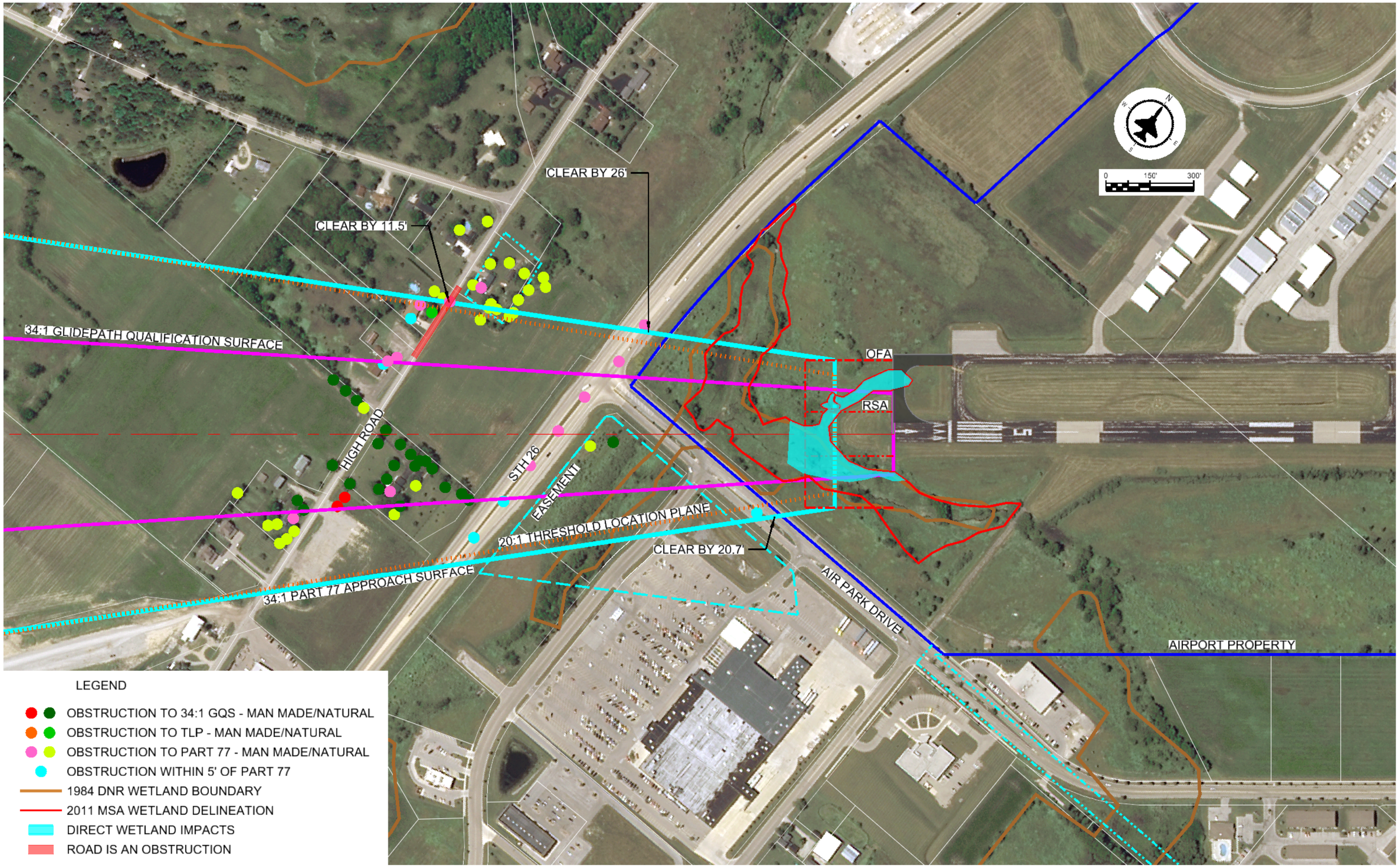
FIGURE 5.8
ALTERNATIVE 4 - RUNWAY 23

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

95006



PROJECT NO.: 95006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
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PLOT DATE: Figure 5.9 - Alternative 5 - Rwy 5.dgn 2/11/2013 8:36:21 AM mgraczykowski					

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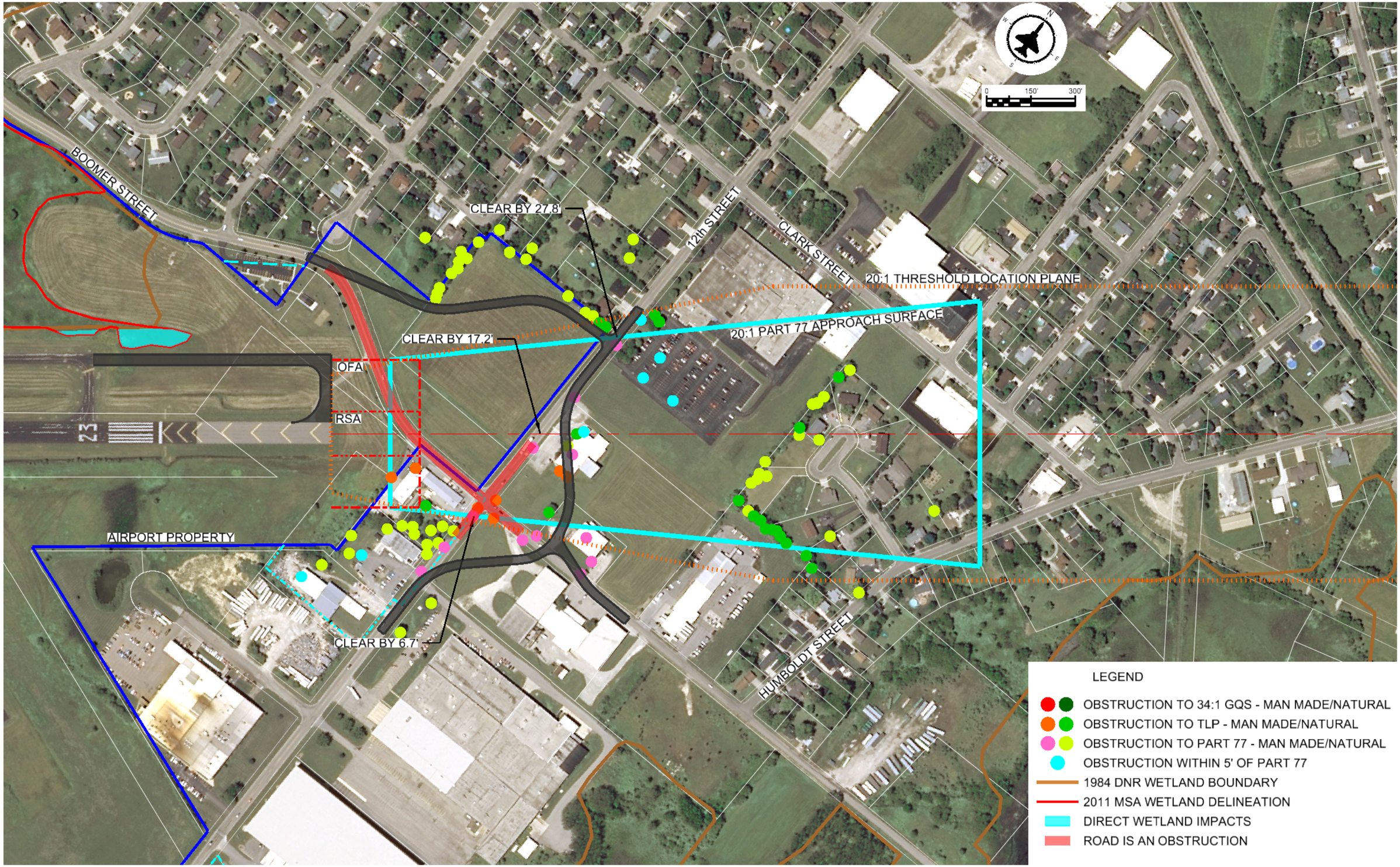
FIGURE 5.9
ALTERNATIVE 5 - RUNWAY 5

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO.: 95006



PROJECT NO: 95006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: 8/3/12	DRAWN BY: MAG				
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PLOT DATE: Figure 5.10 - Alternative 5 - Rwy 23.dgn 2/11/2013 8:39:05 AM mgoczykowski					

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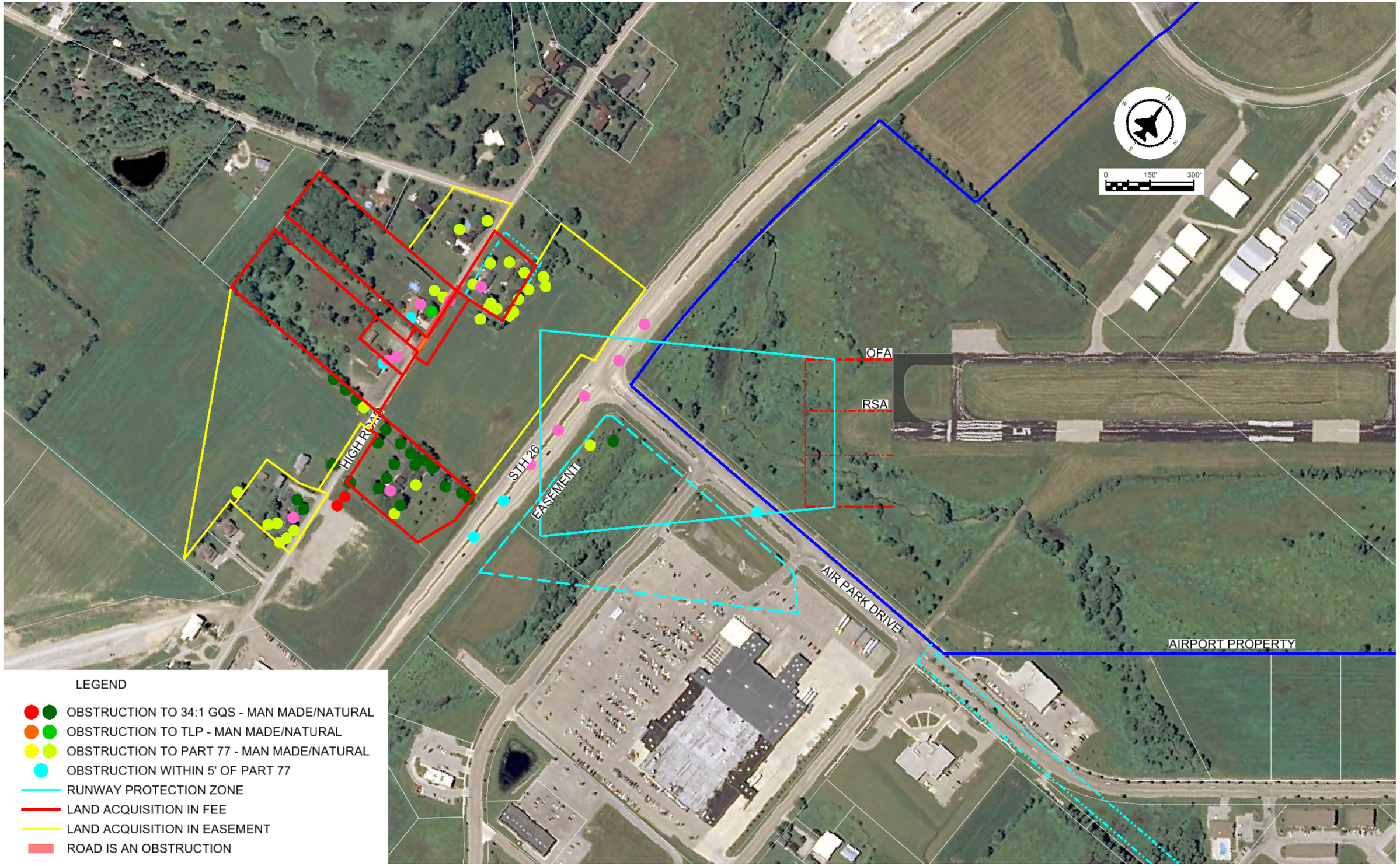
FIGURE 5.10
ALTERNATIVE 5 - RUNWAY 23

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO: 95006
SHEET



PROJECT NO. 95006	SCALE AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE 8/3/12	DRAWN BY: MAG				
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PLOT DATE Figure 5.11 - Alternative 5 - Rwy 5 LAND.dgn 2/11/2013 8:40:55 AM mgraczykowski					

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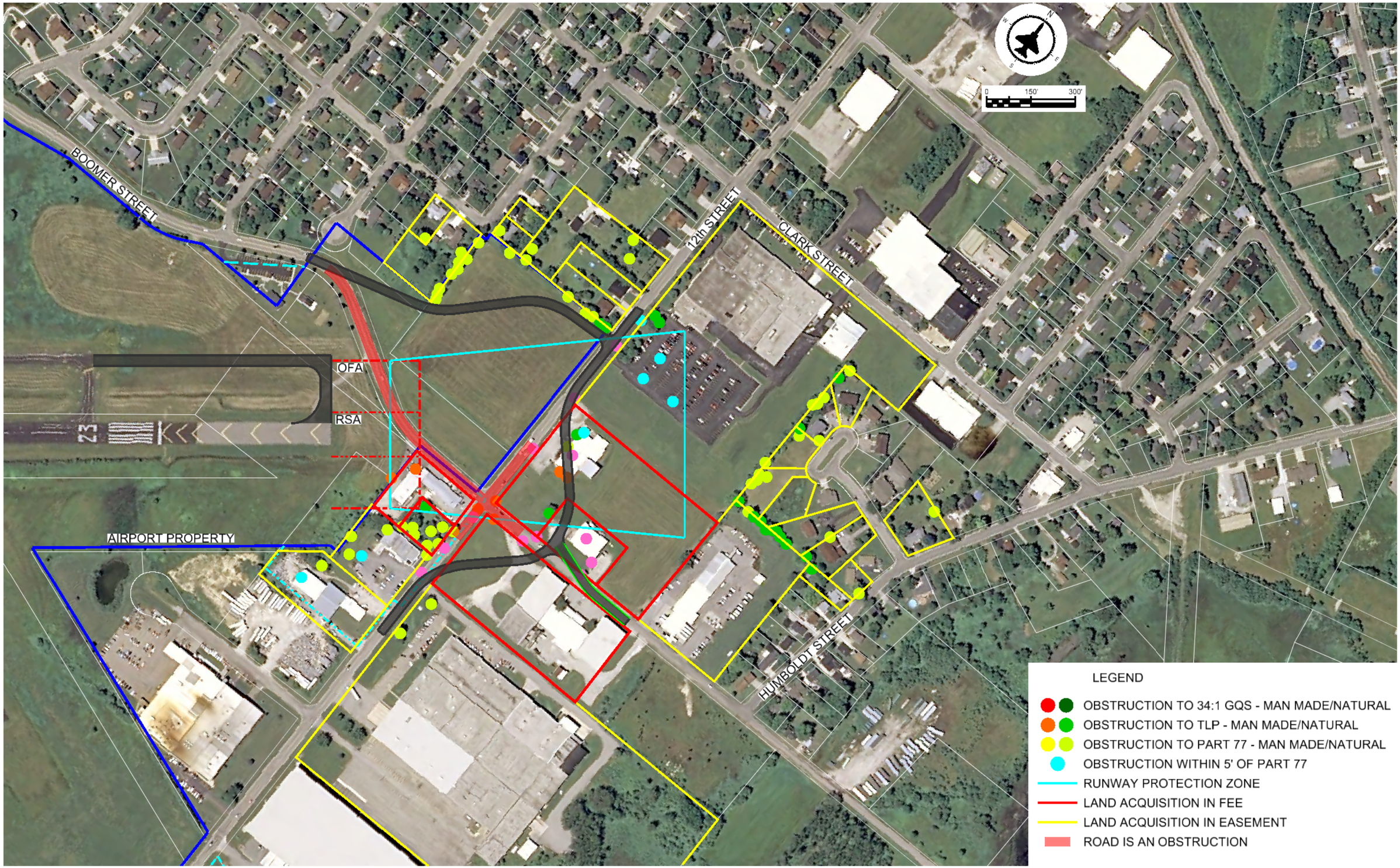
FIGURE 5.11
ALTERNATIVE 5 - RUNWAY 5 LAND

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO. 95006
SHEET



PROJECT NO: 95006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
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PLOT DATE: Figure 5.12 - Alternative 5 - Rwy 23 LAND.dgn 2/11/2013 8:41:36 AM mgracyk					

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FIGURE 5.12
ALTERNATIVE 5 - RUNWAY 23 LAND

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO. 95006
SHEET

CLEAR BY 31'

CLEAR BY 15.8'

34:1 GLIDEPATH QUALIFICATION SURFACE

HIGH ROAD

OFA

RSA

5

STH 26

EASEMENT

CLEAR BY 24.9'

20:1 THRESHOLD LOCATION PLANE

34:1 PART 77 APPROACH SURFACE

AIR PARK DRIVE

AIRPORT PROPERTY

0 150' 300'

LEGEND

- OBSTRUCTION TO 34:1 GQS - MAN MADE/NATURAL
- OBSTRUCTION TO TLP - MAN MADE/NATURAL
- OBSTRUCTION TO PART 77 - MAN MADE/NATURAL
- OBSTRUCTION WITHIN 5' OF PART 77
- 1984 DNR WETLAND BOUNDARY
- 2011 MSA WETLAND DELINEATION
- DIRECT WETLAND IMPACTS
- ROAD IS AN OBSTRUCTION

PROJECT NO: 95006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
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PLOT DATE: Figure 5.13 - Alternative 6 - Rwy 5.dgn 2/11/2013 8:42:43 AM mgraczykowski					

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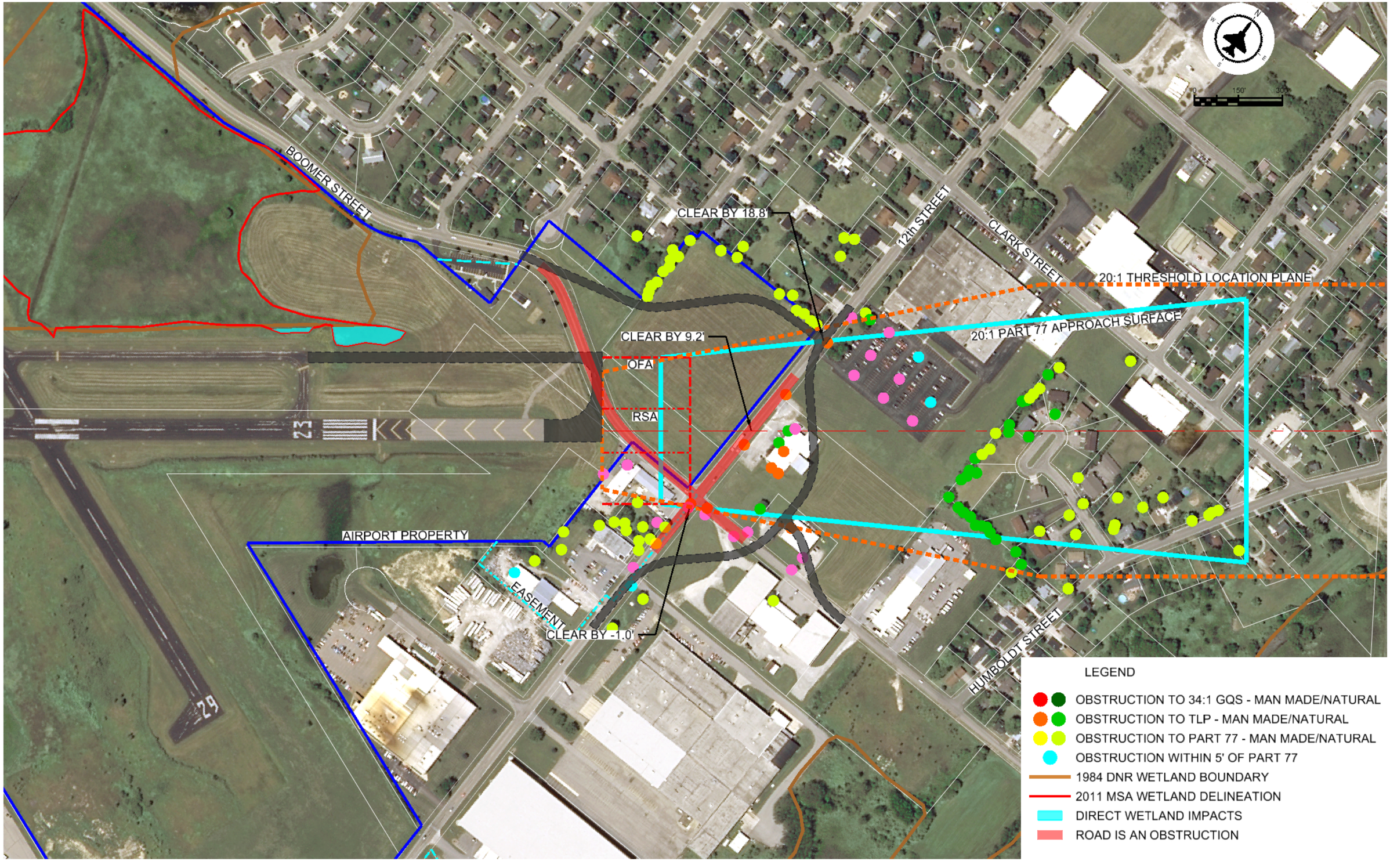
FIGURE 5.13
ALTERNATIVE 6 - RUNWAY 5

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO. 95006



PROJECT NO.: 95006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: 8/3/12	DRAWN BY: MAG				
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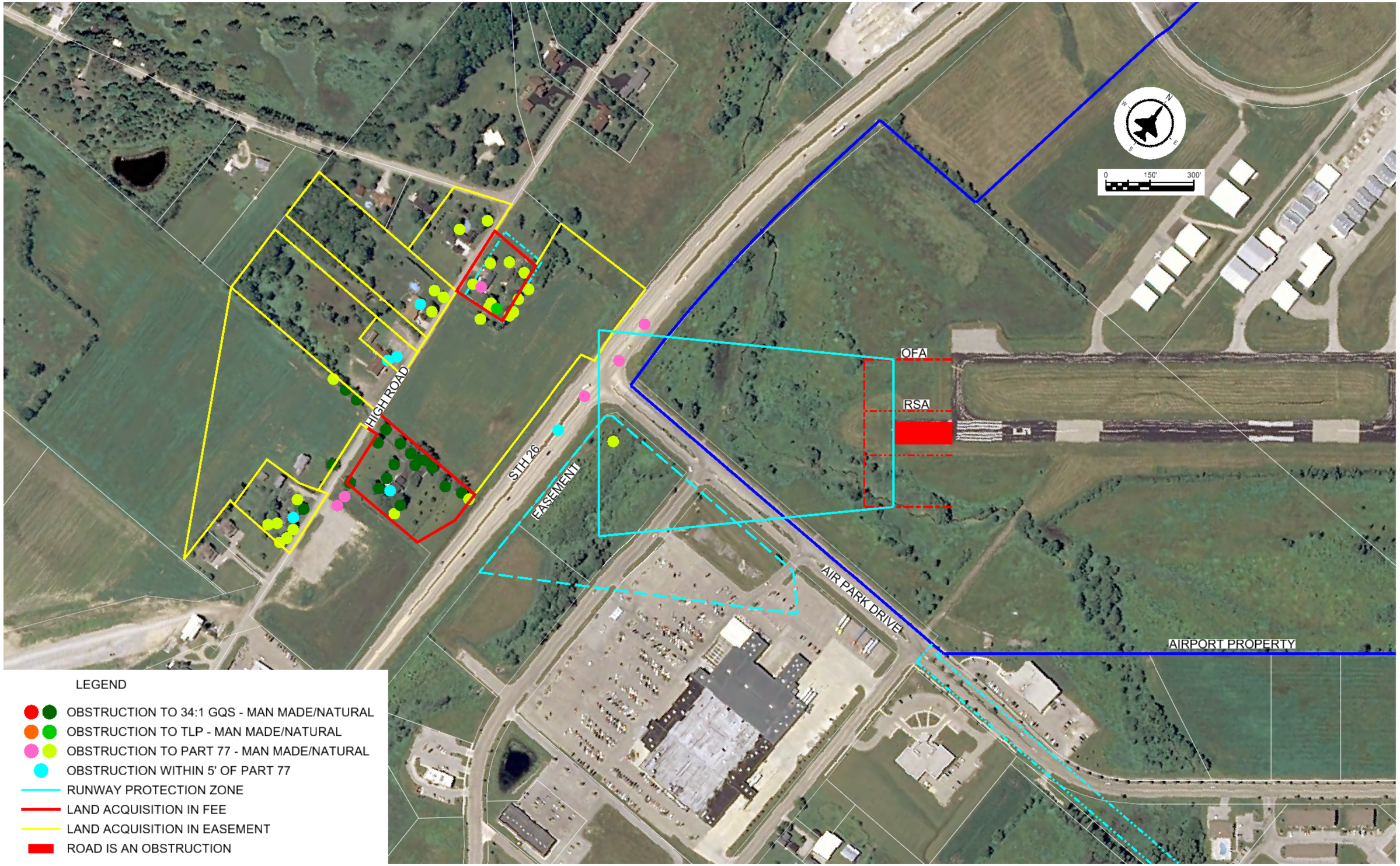
FIGURE 5.14
ALTERNATIVE 6 - RUNWAY 23

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO.: 95006
SHEET



PROJECT NO. 95006	SCALE AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE 8/3/12	DRAWN BY: MAG				
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PLOT DATE Figure 5.15 - Alternative 6 - Rwy 5 LAND.dgn 2/11/2013 8:45:37 AM mgraczykowski					

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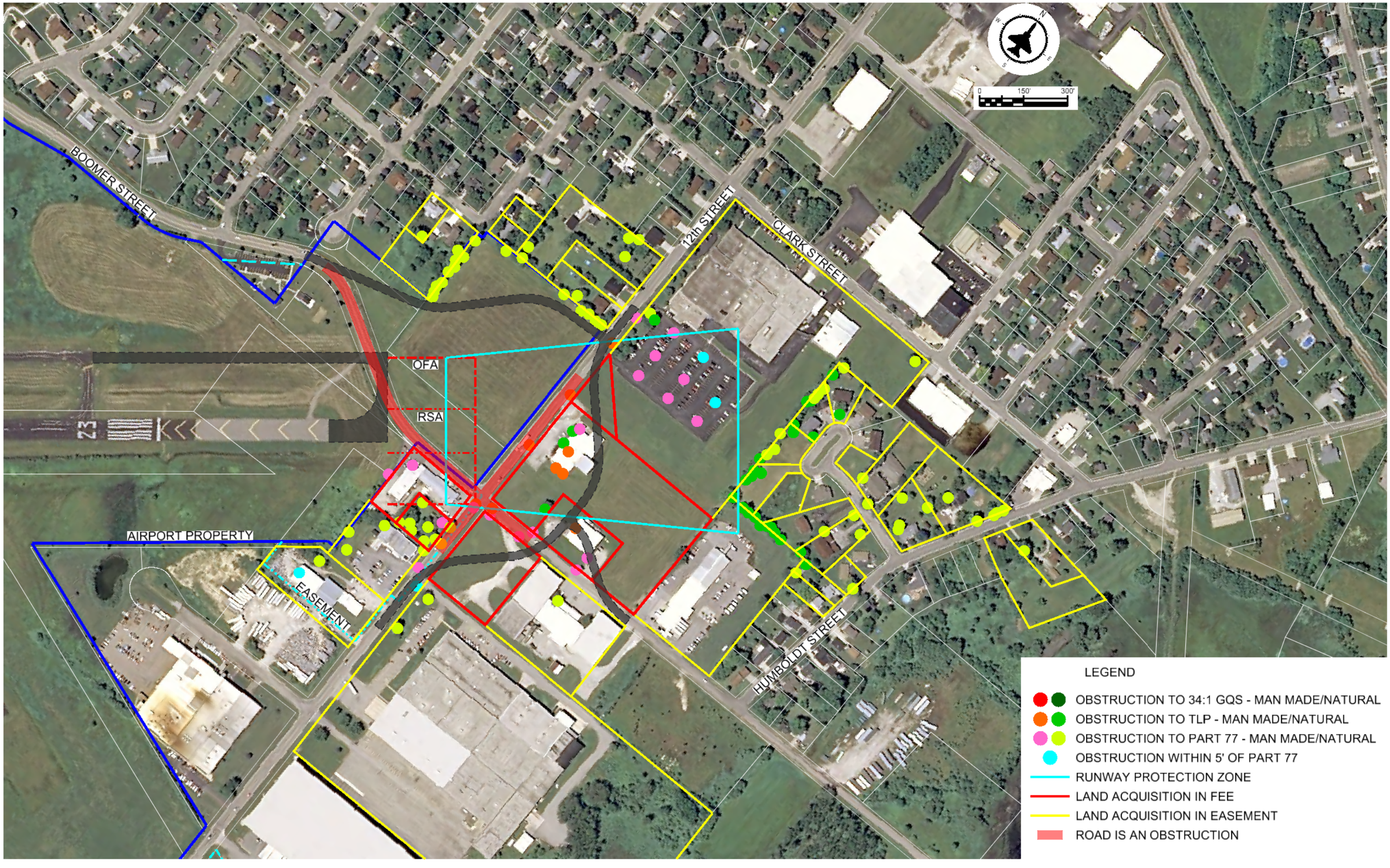
FIGURE 5.15
ALTERNATIVE 6 - RUNWAY 5 LAND

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO. 95006
SHEET



PROJECT NO.: 95006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: 8/3/12	DRAWN BY: MAG				
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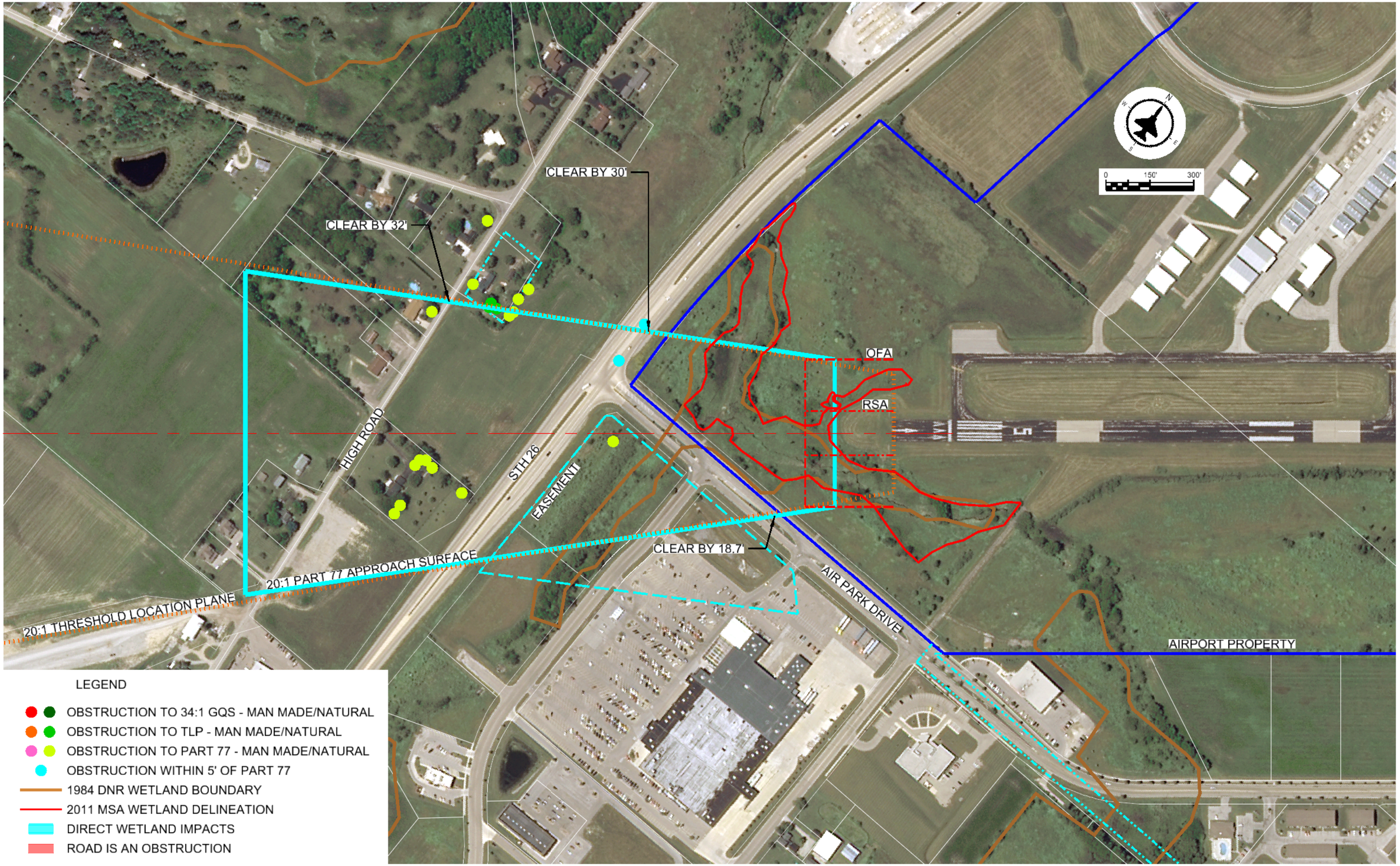
FIGURE 5.16
ALTERNATIVE 6 - RUNWAY 23 LAND

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO. 95006
SHEET



PROJECT NO. 95006	SCALE AS SHOWN	NO.	DATE	REVISION	BY
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PLOT DATE Figure 5.17 - Existing Conditions - Rwy 5.dgn 2/11/2013 8:47:30 AM mgraczykowski					

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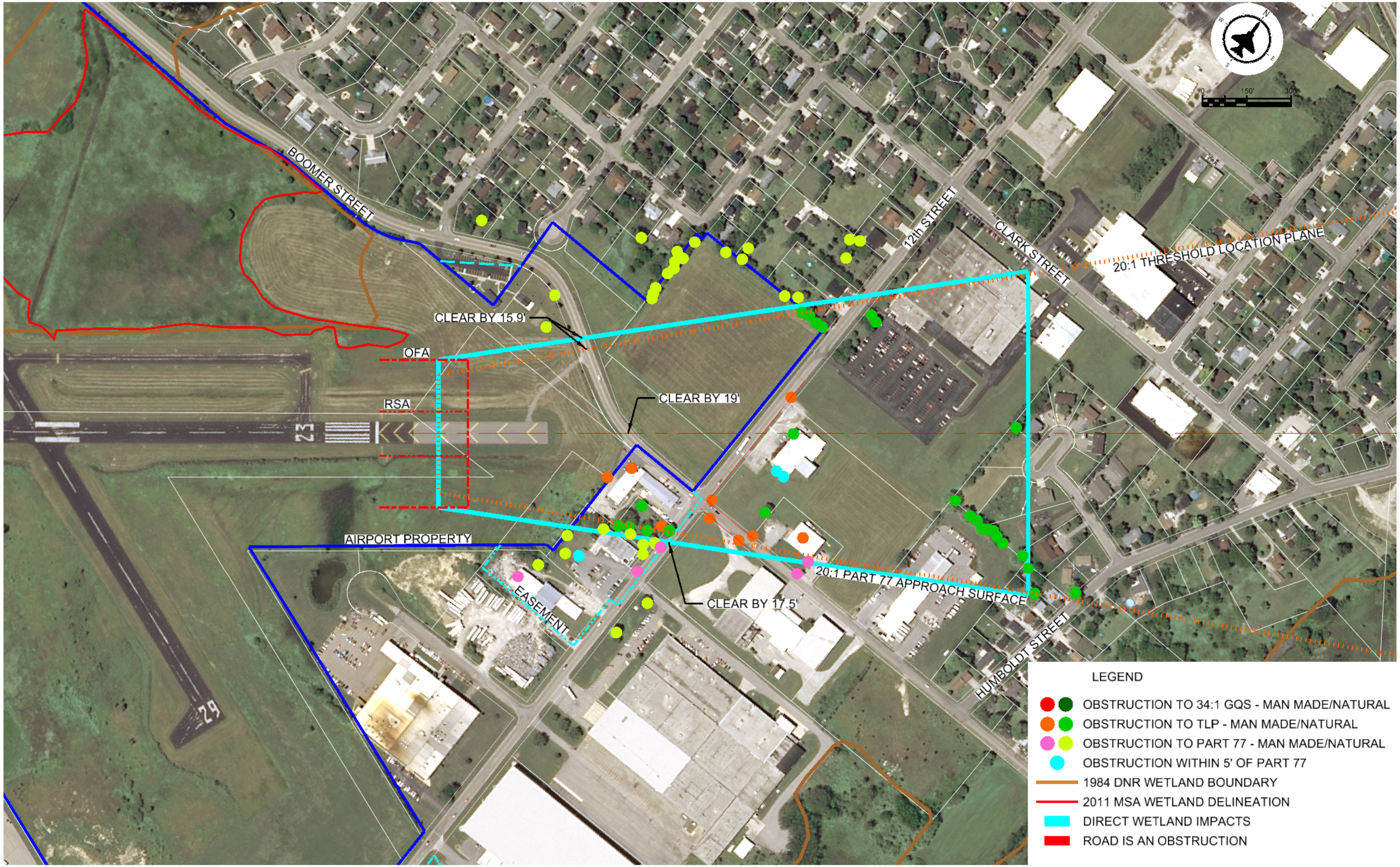
FIGURE 5.17
EXISTING CONDITIONS - RUNWAY 5

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO. 95006
SHEET



PROJECT NO.: 95006	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: 8/3/12	DRAWN BY: MAG				
CHECKED BY: MAH					
PLOT DATE: Figure 5.18 - Existing Conditions - Rwy 23.dgn 2/11/2013 8:48:18 AM mgroczykowski					

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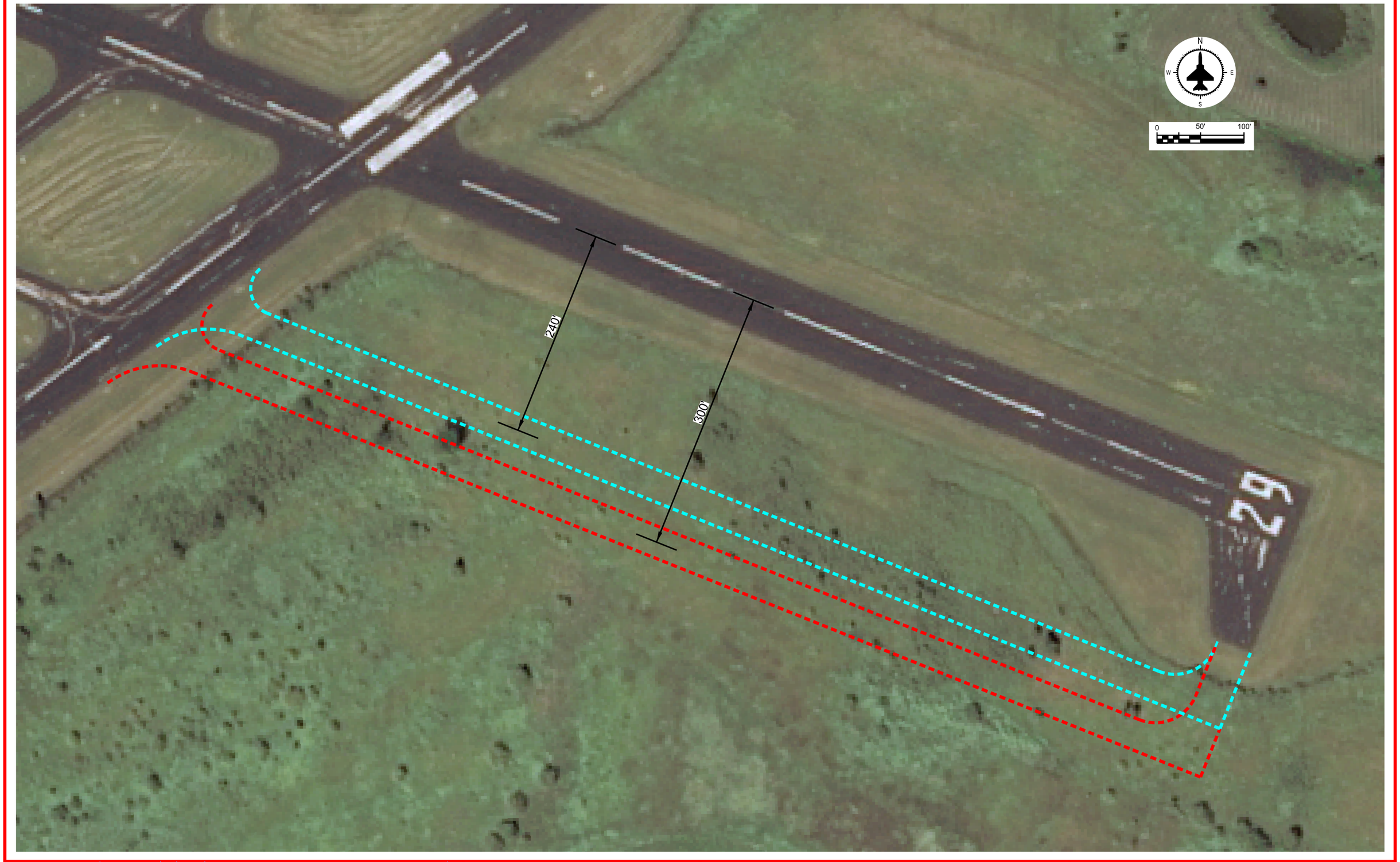
FIGURE 5.18
EXISTING CONDITIONS - RUNWAY 23

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO.: 95006
SHEET 1 OF 1



PROJECT NO.: XXXXXX	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: XX/XX/XXXX	DRAWN BY: XXX				
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PLOT DATE: Runway 11-29 Parallel Taxiway.dgn 1/24/2013 12:39:19 PM mgraczykowski					

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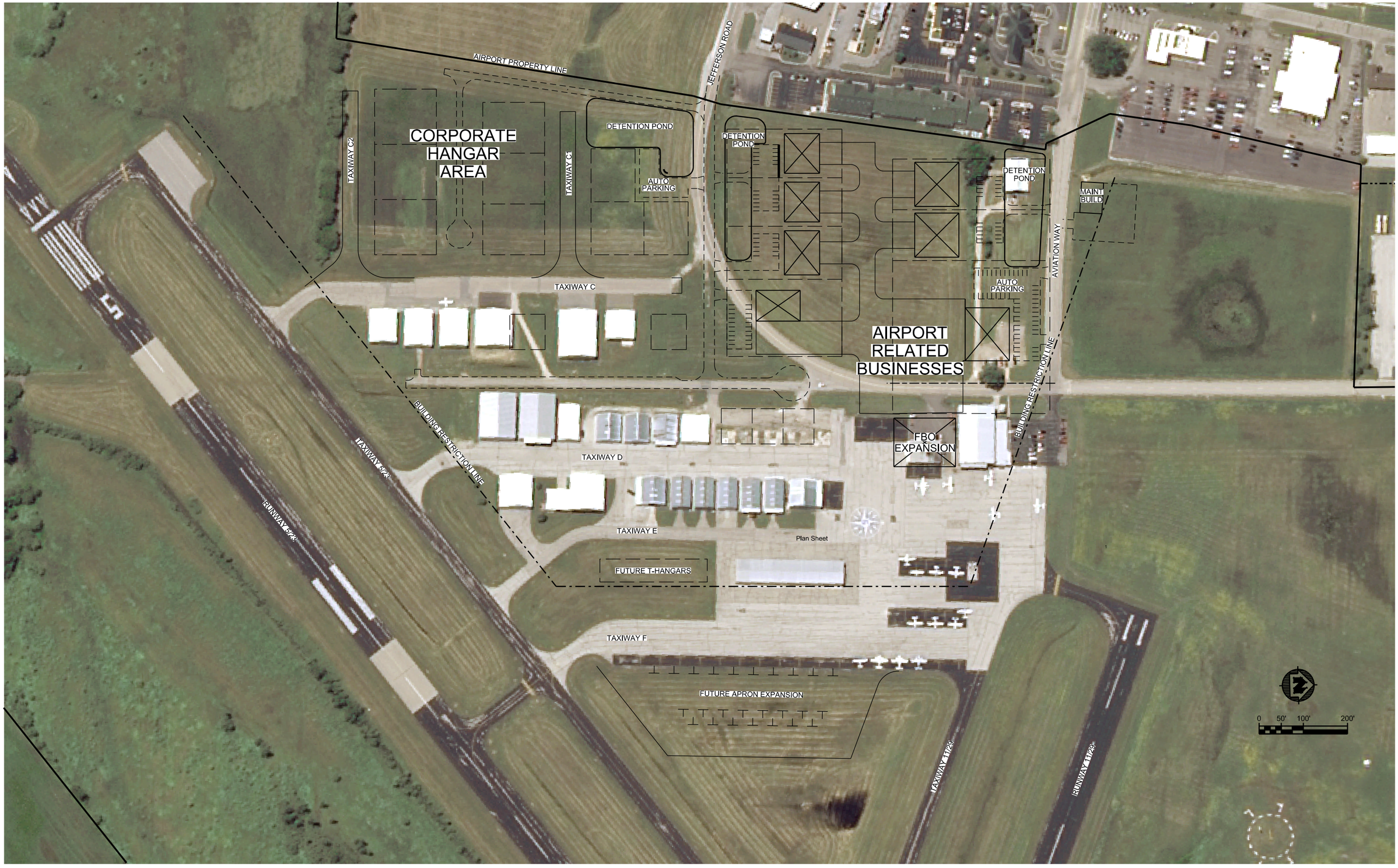
FIGURE 5.19 - RUNWAY 11/29 TAXIWAY EXTENSION SEPARATION

AIRPORT MASTER PLAN
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO.
95006
SHEET



PROJECT NO.: XXXXXX	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
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FIGURE 5.20
1999 LANDSIDE DEVELOPMENT LAYOUT

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WISCONSIN

FILE NO. 00095006
SHEET

AIRPORT PROPERTY LINE
JEFFERSON ROAD
DETENTION POND
DETENTION POND
DETENTION POND
DETENTION POND
MAINT BUILD
GENERAL AVIATION AREA
TAXIWAY B
AUTO PARKING
AVIATION WAY
TAXIWAY C
AUTO PARKING
CORPORATE HANGAR AREA
BUILDING RESTRICTION LINE
BUILDING RESTRICTION LINE
TAXIWAY D
FBO EXPANSION
TAXIWAY E
Plan Sheet
FUTURE T-HANGARS
TAXIWAY F
FUTURE APRON EXPANSION
TAXIWAY A1/A2
RUNWAY 5/23
RUNWAY 5/23
TAXIWAY A1/A2
RUNWAY 14/32
0 50' 100' 200'

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CHECKED BY: XXX					
PLOT DATE: fig2_Layout forMasterPlan.dgn 1/22/2013 9:59:04 AM mgraczykowski					

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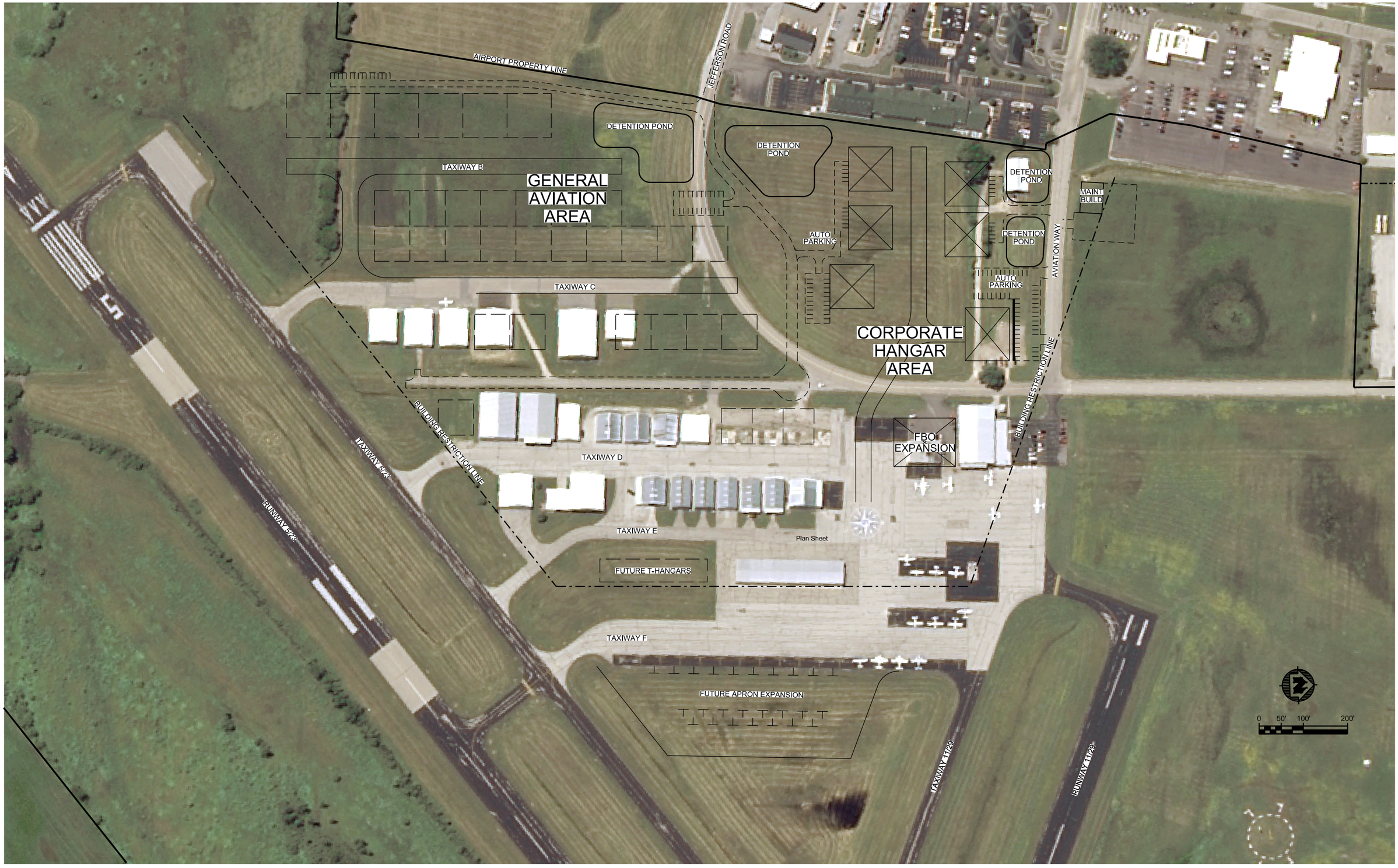
FIGURE 5.21
LANDSIDE DEVELOPMENT ALTERNATIVE 1

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WISCONSIN

FILE NO. 00095006
SHEET



PROJECT NO.: XXXXXX	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
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FIGURE 5.22
LANDSIDE DEVELOPMENT ALTERNATIVE 2

AIRPORT MASTER PLAN - ALTERNATIVE ANALYSIS
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WISCONSIN

FILE NO. 00095006
SHEET

N
W
E
S
0 200' 400' 800'

ROCK RIVER
HIGH ROAD
AIRPORT PROPERTY
APRON RECONSTRUCTION
BOOMER STREET
HANGAR AREA EXPANSION
TAXIWAY C RECONSTRUCTION
RUNWAY 11/29 RECONSTRUCTION
CLARK STREET
RUNWAY 5 PARALLEL TAXIWAY RECONSTRUCTION
APRON EXPANSION
RUNWAY 23 & PARALLEL TAXIWAY RECONSTRUCTION & EXTENSION
RUNWAY 5 PROPERTY ACQUISITION
RUNWAY 23 PROPERTY ACQUISITION
STH 26
RUNWAY 5 RECONSTRUCTION
ZASTROW & WIEDER PARCEL ACQUISITION
RUNWAY 11/29 PARALLEL TAXIWAY RECONSTRUCTION & EXTENSION
AIRPORT PROPERTY
EXISTING EASEMENT
AIR PARK DRIVE
HUMBOLDT STREET
AIRPORT PROPERTY
12th STREET

LEGEND

- RECONSTRUCT RUNWAY 5
- RECONSTRUCT RUNWAY 5/23 PARALLEL TAXIWAY
- RELOCATE BOOMER AND 12th STREETS
- RECONSTRUCT RUNWAY 23 AND PARALLEL TAXIWAY
- RECONSTRUCT RUNWAY 11/29
- RECONSTRUCT AND EXTEND RUNWAY 11/29 PARALLEL TAXIWAY
- APRON RECONSTRUCTION
- APRON EXPANSION
- RECONSTRUCT TAXIWAY C
- HANGAR AREA EXPANSION
- PROPERTY ACQUISITION IN FEE
- PROPERTY ACQUISITION IN EASEMENT

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FIGURE 6.1
FACILITIES IMPLEMENTATION AND FINANCIAL FEASIBILITY ANALYSIS

AIRPORT MASTER PLAN
WATERTOWN MUNICIPAL AIRPORT
WATERTOWN, WI

FILE NO. 95006
SHEET

WORKING TABLE TAC MEETING #6
MASTER PLAN PROPOSED DEVELOPMENT SUMMARY
FACILITIES IMPLEMENTATION PLAN and FINANCIAL FEASIBILITY ANALYSIS

Year		Development	Cost	Funding Rates			FAA Funding	State Funding	Local Funding
				FAA	State	Local			
		Short Term Development (2012-2020)							
2012		AWOS Replacement	$80,000	90%	5%	5%	$72,000	$4,000	$4,000
		Total Costs for Calendar Year 2012	**$80,000**				**$72,000**	**$4,000**	**$4,000**
2013		Fuel System Replacement	$200,000	90%	5%	5%	$180,000	$10,000	$10,000
		Environmental Assessment for Runway 5/23 Upgrade	$120,000	90%	5%	5%	$108,000	$6,000	$6,000
		Land Acquisition: Zastrow & Wieder Parcels in Runway 23 Approach	$470,000	0%	80%	20%	$0	$376,000	$94,000
		Total Costs for Calendar Year 2013	**$790,000**				**$288,000**	**$392,000**	**$110,000**
2014		Preliminary Design for Runway 5/23 Improvements including Boomer & 12th Street Relocations	$200,000	90%	5%	5%	$180,000	$10,000	$10,000
		Land Acquisition in Runway 5 Approach: Fee & Easements	$750,000	90%	5%	5%	$675,000	$37,500	$37,500
		Total Costs for Calendar Year 2014	**$950,000**				**$855,000**	**$47,500**	**$47,500**
2015		Final Design for Runway 5/23 Reconstruction SW of Runway 11/29	$50,000	90%	5%	5%	$45,000	$2,500	$2,500
		AGIS for new Runway 5/23 Runway Approaches	$100,000	90%	5%	5%	$90,000	$5,000	$5,000
		Total Costs for Calendar Year 2015	**$150,000**				**$135,000**	**$7,500**	**$7,500**
2016		Reconstruct Runway 5/23 SW of Runway 11/29 includes New Lighting and Underdrains	$2,100,000	90%	5%	5%	$1,890,000	$105,000	$105,000
		Reimbursement for Zastrow and Wieder Parcels	$470,000	90%	5%	5%	$423,000	-$352,500	-$70,500
		Total Costs for Calendar Year 2016	**$2,570,000**				**$2,313,000**	**-$247,500**	**$34,500**
2017		Reconstruct Runway 5/23 Parallel Taxiway SW of Runway 11/29	$700,000	90%	5%	5%	$630,000	$25,000	$25,000
		Includes New Lighting System and Underdrains							
		Total Costs for Calendar Year 2017	**$650,000**				**$630,000**	**$25,000**	**$25,000**
2018		Land Acquisition in Runway 23 Approach: Fee & Easement	$2,200,000	90%	5%	5%	$1,980,000	$110,000	$110,000
		Final Design for Road Relocations	$50,000	90%	5%	5%	$45,000	$2,500	$2,500
		Total Costs for Calendar Year 2018	**$2,250,000**				**$2,025,000**	**$112,500**	**$112,500**
2019		Relocate Boomer and 12th Streets in Runway 23 Approach	$1,900,000	90%	5%	5%	$1,710,000	$95,000	$95,000
		Final Design for Runway 5/23 Reconstruction NE of Runway 11/29 and Safety Area	$50,000	90%	5%	5%	$45,000	$2,500	$2,500
		Total Costs for Calendar Year 2019	**$1,950,000**				**$1,755,000**	**$97,500**	**$97,500**
2020		Reconstruct Runway 5/23 NE of Runway 11/29 and Improve Safety Area	$4,000,000	90%	5%	5%	$3,600,000	$200,000	$200,000
		Includes Reconstruction of Parallel Taxiway and Extension to new Runway End							
		Includes New Lighting System, Underdrains and Wetland Mitigation							
		Total Costs for Calendar Year 2020	**$4,000,000**				**$3,600,000**	**$200,000**	**$200,000**
		Total Short Term Development (2012-2020)	**$12,920,000**				**$11,601,000**	**$638,500**	**$638,500**
		Long Term Development (2021-2032)							
2022		Reconstruct Runway 11/29 including new lighting system and underdrains	$1,700,000	90%	5%	5%	$1,530,000	$85,000	$85,000
		Total Costs for Calendar Year 2022	**$1,700,000**				**$1,530,000**	**$85,000**	**$85,000**
2023		Extend Runway 11/29 Parallel Taxiway to end of Runway 29 including MITL	$650,000	90%	5%	5%	$585,000	$32,500	$32,500
		Total Costs for Calendar Year 2023	**$650,000**				**$585,000**	**$32,500**	**$32,500**
2025		Apron Reconstruction	$1,300,000	90%	5%	5%	$1,170,000	$65,000	$65,000
		Total Costs for Calendar Year 2025	**$1,300,000**				**$1,170,000**	**$65,000**	**$65,000**
2026		Apron Expansion	$700,000	90%	5%	5%	$630,000	$35,000	$35,000
		Total Costs for Calendar Year 2026	**$700,000**				**$630,000**	**$35,000**	**$35,000**
2028		Reconstruct Taxiway C	$350,000	90%	5%	5%	$315,000	$17,500	$17,500
		Total Costs for Calendar Year 2028	**$350,000**				**$315,000**	**$17,500**	**$17,500**
2029		Environmental Assessment for Hangar Area Expansion	$100,000	90%	5%	5%	$90,000	$5,000	$5,000
		Total Costs for Calendar Year 2029	**$100,000**				**$90,000**	**$5,000**	**$5,000**
2030		Complete site preparation for Hangar Area and Construct Taxiways	$600,000	90%	5%	5%	$540,000	$30,000	$30,000
		Total Costs for Calendar Year 2030	**$600,000**				**$540,000**	**$30,000**	**$30,000**
2032		Complete 8' High Perimeter Fence	$800,000	90%	5%	5%	$720,000	$40,000	$40,000
		Total Costs for Calendar Year 2032	**$800,000**				**$720,000**	**$40,000**	**$40,000**
		Long Term Development (2021-2032)	**$6,200,000**				**$5,580,000**	**$310,000**	**$310,000**
		Total Proposed Master Plan Development	**$19,120,000**				**$17,181,000**	**$948,500**	**$948,500**

Notes:
1) Costs identified are preliminary estimates in 2012 Dollars. Additional factors beyond the scope of this planning process will determine final costs.
2) An allocation has been included for administration, engineering, professional services and contingencies, unless other specificially indentified for a project.
3) These timeframes are not mandates on the City of Watertown for the completion of particular improvements during specific years. The implemenation of specific projects could be affected by the availability of local, state and federal aid, and changes in priorities by the Airport.

Appendix D

Airport Layout Plan

(To be completed after Environmental Assessment)

WATERTOWN MUNICIPAL AIRPORT (RYV)

AIRPORT MASTER PLAN
2013-2033

MSA PROFESSIONAL SERVICES