West Michigan Airport Authority

Regular Meeting Agenda

November 12, 2018

11:30am – 1:00pm

Airport Business Center, 60 Geurink Boulevard, Main Conference Room (Holland)

1. Public Comment
2. Consideration of October 8, 2018 meeting minutes. (Action Requested)
3. Renewal of Hangar 3 Partners Ground Lease. (Action Requested)
4. Proposed Improvements to Airport Business Center. (Action Requested)
5. Report on October 22 Michigan Airport Planning meeting.
6. Discussion on Strategic Plan Preparation.
7. FBO report.
8. Communications Update.
9. Financial Reports. (Accept as information.)
10. Other Business:
    A. Runway painting & crack sealing.
    B. Restaurant analysis & development activities.
    C. Emergency training.
    D. Webcam.
    E. Gate card readers.
11. Next meeting: December 10, 2018, 11:30am, at the Airport Business Center.
12. Adjourn.

If you are not able to attend the meeting, please contact Greg Robinson (g.robinson@wmairportauthority.com) or Aaron Thelenwood (a.thelenwood@cityofholland.com). We must have at least one of the three representatives of each unit of government present at the meeting to attain a quorum. Thank you.

West Michigan Airport Authority

MEETING MINUTES

October 8th, 2018

11:30am – 1:00pm

Airport Business Center, 60 Geurink Blvd. Holland, MI.

PRESENT: Storey, Blanton, Sylte, Haverdink, Matthysse, Bos, Keeter, Hoogland, Corbin, Hoekstra

ABSENT: Klynstra

Others Present: Authority Manager Robinson, Communications Coordinator Scholten, Boer (FBO),

Board Member Sylte called the meeting to order at 11:30 a.m.

18.10.01 Public Comments.

No Public Comments

18.10.02 Consideration of September 10th, 2018 Meeting Minutes.

Klynstra made a motion, supported by Hoogland to approve the September 10th Meeting Minutes as presented and was approved unanimously.

18.10.03 Bids for Taxiway Crack Sealing.

On September 25, 2018 Airport Authority Staff solicited bids for crack sealing work on the airport taxiway. For past crack sealing projects, the airport solicited a quote directly from MDOT's designated pavement crack sealing contractor, with the assurance that we would receive the same price/foot awarded by MDOT. Due to the nature of a significant portion of the cracks on the taxiway, the process used to seal them is not be the same as that bid by MDOT and, therefore, staff opted to open the bid for this work to several contractors.

In summary, the taxiway has two categories of cracks which need to be addressed:

- **Over-band cracks**: *14,500 ft.* (typically bid by MDOT)
- **Expansion Joint cracks:** *7,350 ft.* (not bid by MDOT)

Although the total length for expansion joint cracks is approximately half the total length of the over-band cracks, the cost to repair them is significantly higher. This project was bid with two potential options designed to mitigate overall impact on airport users:

- a) completing the project in phases, during normal business hours, to avoid completely shutting down the taxiway, or
- b) completing the project overnight, during non-peak hours, and completely shutting down the taxiway.

With either option, the contractor is required to provide four (4) days' notice before work begins so notice of the project can be sent to airport users and tenants. In summary, bids received were as follows:

OPTION A (Phased)

Scodeller Construction:

- Over-band: $00.89/foot
- Expansion Joint: $17.00/foot
- Mobilization Cost: $2,000
- **Project Total: *$139,855.00***

Fahrner Asphalt Sealers, LLC:

- Over-band: $00.96/foot
- Expansion Joint: $4.71/foot
- Mobilization Cost: $6,000.00
- **Project Total: *$54,538.50***

OPTION B (Overnight)

Scodeller Construction:

- Over-band: $00.85/foot
- Expansion Joint: $15.00/foot
- Mobilization Cost: $2,000.00
- **Project Total: *$124,575.00***

Fahrner Asphalt Sealers, LLC:

- Over-band: **NO BID**
- Expansion Joint: **NO BID**
- Mobilization Cost: **NO BID**
- **Project Total: NO BID**

Staff recommended the Board approve the bids as presented and award the project contract to Fahrner Asphalt Sealers, LLC as the lowest qualified bidder.

Hoekstra made a motion, supported by Bos to accept the Bids for Taxiway Crack Sealing as presented and award the contract to Fahrner Asphalt, LLC as the lowest qualified bidder. The motion was approved unanimously.

18.10.04 Selection of Airport Engineering/Planning Consultant.

To be eligible for funding through the Michigan Department of Transportation Aeronautics Division (MDOT-AERO), and the Federal Aviation Administration (FAA), the West Michigan Regional Airport is required to perform Engineering/Planning Consultant searches and interviews every five (5) years. The process stipulated by MDOT is a qualifications-based assessment and is intended to ensure that consultant contracts are reviewed on a regular basis and executed in an open and transparent process based solely on the consultant's qualifications – fees are not considered. The last time the WMAA completed this process was in 2013 and it is now time to complete this review again.

The Airport Authority's Building & development Committee served as the Search Committee during this process; in line with past practice. The committee was comprised of an odd number of members (in-line with MDOT protocol) and was determined to have the appropriate level of expertise necessary to make a recommendation to the Authority Board.

The Airport Authority posted an advertisement for Engineering & Planning services on July 6th – August 7th. The Airport Authority received statements of qualifications (SOQ) from two consultants: Mead & Hunt and Prein & Newhof. After reviewing the SOQ's from each consultant, interviews were held on September 11th, 2018. After an extensive interview, and after performing reference checks for each prospective consultant, the Search Committee reconvened Wednesday, October 3rd, 2018 with the intent to propose a recommended candidate to the Airport Authority Board. During the initial interviews, Committee members were able to ask questions related to the background, expertise, and general familiarity with the West Michigan regional Airport of each consultant. Each consultant was rated by individual committee member based on key criteria related to the functions of the work they would be completing. The scores assigned by each committee member were tallied up to assign a final score for each consultant.

Following the final review, the Search Committee proposed recommending Mead & Hunt for approval by the Airport Authority Board as the Engineering/Planning Consultant. If approved by the Board, the Authority would next enter into contract negotiations with Mead & Hunt, facilitated by MDOT-AERO.

Staff recommended the following to the authority board: (1) the Airport Authority Board approve Mead & Hunt as the selected Airport Engineering/Planning Consultant and authorize staff to enter into contract negotiations; & (2) authorize Board Chair Sylte to sign a final contract, subject to final approval by the Authority's Attorney, and contingent on the terms of the contract not being substantially different from the terms of the Authority's current agreement with Mead & Hunt.

18.10.05 Renewal of Hangar 3 Partners Lease.

Hangar 3 Partners (H3P) has had a ground lease at the airport since 1988. This is a 30-year lease with the Option to Renew for another 30 years, subject to certain conditions. The H3P hangar is the first hangar as one enters the main airport entrance road (Geurink Blvd.).

Although the Board could simply extend the lease for another 30 years, much has changed at the airport over the past 30 years and the current lease includes provisions that are no longer relevant. So, a new lease has been prepared that blends the provisions of the current lease with revised language contained in the newest lease at the airport (Gentex). In addition, we have had the leased area surveyed to determine exactly where the current boundaries are.

The revised lease will have the following key provisions:

1. The lease is for a 30-year term with the option to renew for an additional 30 years.
2. The leased square footage is 41,000 and includes some parking spaces in the entranceway parking lot.
3. The lease rate is 20 cents per square foot in year one with annual adjustments according to the Consumer Price Index. 20 cents/sq.ft. is close to the current year lease rate with a slight adjustment.
4. All references to Tulip City Airport have been changed to West Michigan Regional Airport.
5. A section regarding fencing has been revised since fencing has been installed.
6. Language has been added regarding maintenance of the building.
7. Language has been included noting non-exclusive use of the driveway.
8. Insurance levels have been revised to $1,000,000.

18.10.08 Monthly Budget and Investment Report

Authority Manager Robinson presented monthly budget & investment reports to the board, indicating current good standing of the Airport Authority finances.

Klynstra made a motion, supported by Matthysse to accept the Monthly Budget & Investment Report as information. Motion was approved unanimously.

18.10.10 Other Business

Meeting Adjourn – 1:00PM

Minutes Approved:_____ (Secretary)

Date:_____

West Michigan Airport Authority
60 Geurink Boulevard, Holland, MI 49423
P (616) 510-2332
Comprising City of Zeeland, Park Township and City of Holland

November 12, 2018 **Report 3**

To: West Michigan Airport Authority Board.

From: Greg Robinson, Authority Manager.

Subject: **Renewal of Hangar 3 Partners Lease.**

Hangar 3 Partners (H3P) has had a ground lease at the airport since 1988. This is a 30-year lease with the Option to Renew for another 30 years, subject to certain conditions. The H3P hangar is the first hangar as one enters the main airport entrance road (Geurink Blvd.).

Although the Board could simply extend the lease for another 30 years, much has changed at the airport over the past 30 years and the current lease includes provisions that are no longer relevant. So, a new lease has been prepared that blends the provisions of the current lease with revised language contained in the newest lease at the airport (Gentex). In addition, we have had the leased area surveyed to determine exactly where the current boundaries are.

The revised lease has the following key provisions:

1. The lease is for a 30-year term with the option to renew for an additional 30 years. (Sections 2 and 3)
2. The leased square footage is 41,000 and includes a portion of the current entranceway parking lot. (Section 1 and Exhibit A)
3. The lease rate is 20 cents per square foot in year one with annual adjustments according to the Consumer Price Index. 20 cents/sq.ft. is close to the current year lease rate with a slight adjustment. (Section 4)
4. All references to Tulip City Airport have been changed to West Michigan Regional Airport.
5. Language has been added regarding maintenance of the building. (Sections 8 G & H)
6. Language has been included noting non-exclusive use of the driveway. (Section 10)
7. Insurance levels have been revised to $1,000,000. (Section 12)

Recommendation

The terms of the lease have been agreed to by all parties and it is recommended that the Airport Authority Board approve the land lease with Hangar 3 Partners as presented.

Final: 10-17-2018

GROUND LEASE
between
WEST MICHIGAN AIRPORT AUTHORITY
and
HANGAR THREE LEASING, LLC

This Ground Lease ("Lease") is made as of this _____day of _____, 2018, between the **WEST MICHIGAN AIRPORT AUTHORITY**, a Michigan Community Airport Authority formed in accordance with Act 206 of the Public Acts of 1957, as amended, MCL 259.621 ("**Lessor**"), and **HANGAR THREE LEASING, LLC**, a Michigan limited liability company ("**Lessee**"), with reference to the following:

Background

A. Lessor holds an interest in the Property described in this Lease, pursuant to the terms of a ground lease dated March 26, 2012 (the "Master Lease") between the City of Holland (the holder of fee title to the Property) and Lessor as the ground lessee. The Master Lease grants Lessor the right to enter into land leases for the operation of the West Michigan Regional Airport and to receive revenues derived from those land leases.

B. Lessee previously entered into a Land Lease with the City of Holland dated November 1, 1988, expiring October 31, 2018 ("Prior Lease"). The Prior Lease was assigned to the Lessor. The execution of this Lease shall terminate the terms and conditions of the Prior Lease in its entirety.

Agreement

In consideration of their mutual covenants, the parties agree as follows:

1. **Premises Leased.** The Lessor hereby leases to the Lessee the following described premises, being a part of the West Michigan Regional Airport (the "Airport"), located

in the County of Allegan, State of Michigan, which is legally described and surveyed on the attached **Exhibit A** (the "Demised Premises"), consisting of 41,000 square feet. The Lessor warrants that it is the holder of the leasehold rights as ground lessee under the Master Lease and that it possesses the legal authority to lease the Demised Premises in the manner provided herein. Lessee agrees that its interest in the Demised Premises shall be subordinate at all times to the Master Lease.

2. **Term**. The Lessee shall have and hold the Demised Premises for a term beginning on November 1, 2018 (the "Commencement Date") and expiring on the 31st day of October, 2048, inclusive (unless the term shall be sooner terminated as hereinafter provided, pursuant to Sections 18 and 19), upon the terms, covenants and conditions hereinafter contained.

The Lessee shall have the privilege of using, for the term of this Lease and any extensions thereof, in common with others and the public, the public flying field of the Airport, subject to the charges, rules and regulations governing such field issued by the Federal and State Aeronautical Agencies and by the Lessor, it being expressly understood that this privilege covers the entire period of the Lease and extensions thereof as hereinafter set forth.

3. **Option to Renew**. The term of this Lease may be extended for one (1) additional term of thirty (30) years under the following terms:

A. Notice of the exercise of this option must be given by Lessee to Lessor not less than 180 days prior to the expiration of the initial term;

B. Lessee shall not be permitted to renew this Lease if, at the time of exercise, Lessee shall be in default of any term, condition, or agreement set forth in this Lease beyond any applicable cure period;

C. The renewal of this Lease shall be subject to negotiations between Lessor and Lessee regarding the rental to be paid by Lessee to Lessor during the renewal term (however, in no event shall the rent to be paid during the renewal term be less than the amount paid at the end of the initial term);

D. Lessee shall have removed, replaced or restored the hangar facilities and buildings incidentally related thereto located on the Demised Premises (however, this condition may be waived by Lessor, in Lessor's sole judgment and determination, based upon an application and supporting documentation submitted by the Lessee requesting to waive this condition); and such other terms, conditions, and agreements necessitated by the extension of the Lease term.

4. **Rental**. For the initial period beginning on the Commencement Date, and ending on October 31, 2019, the Lessee shall pay to the Lessor as annual rental for the Demised Premises the sum of Eight Thousand Two Hundred Dollars ($8,200), prorated on a daily basis for any partial year, with the first such annual rental payment to be made on the Commencement Date and subsequent annual rental payments to be made on October 31 in each successive year of the initial period.

It is understood and agreed that the above-stated annual rental payment is based upon a total rentable area of 41,000 square feet at the initial rate of $.20 per square foot.

The annual rent shall be adjusted each year as of October 31, 2019, and as of each and every October 31 thereafter in accordance with the increase in the Consumer Price Index ("CPI") applying the published CPI rate immediately prior to the October 31 adjustment date and for each subsequent October 31 adjustment date thereafter. The annual rent shall be adjusted to an amount equal to the product obtained by multiplying the annual rent in effect for the immediately

preceding 12-month period by a fraction, the numerator of which is the CPI for the year to be adjusted, and the denominator of which is the CPI for the prior 12th month period. If the CPI has not increased for the annual adjustment period, the annual rent for the next year of the Lease shall remain the same as the prior year's annual rent.

For the purpose of this Lease, the CPI means the Index for "All Items," for Urban Wage Earners and Clerical Workers Commodity Groups for the Detroit area as determined by the United States Department of Labor, Bureau of Statistics. Should the United States Government revise its price index at any time, the parties will follow such suggestions as the government may issue for making an arithmetical changeover from one index to another. Should the price index be wholly discontinued, then its successor or the most nearly comparable successor index thereto shall be used.

5. **Sublease.** Lessee may sublet, subject to the consent of the Lessor, all or any portion of the Demised Premises at any time and from to time to any other entity so long as the subtenant complies with the provisions of this Lease (to the extent they apply to the subtenant). Lessee acknowledges that it will notify any subtenant of the terms, conditions, and agreements of this Lease and shall incorporate by reference all requirements of this Lease in any agreement executed between Lessee and any subtenant. Lessee shall ensure that none of its subtenants uses the Demised Premises in a manner which would constitute a violation of any of the provisions of this Lease or any other lease or contract to which the Lessor is a party or the field rules and regulations of the Lessor.

6. **Purposes for Which Demised Premises to be Used**. The Demised Premises are to be used by the Lessee for the following purposes only:

A. As the site for an airplane hangar or hangars. The Lessee shall have the right to sublease any part of the hangar placed on the Demised Premises. However, the Lessee shall ensure that none of its subtenants uses the Demised Premises in a manner which would constitute a violation of any of the provisions of this Lease or any other lease or contract to which the Lessor is a party (and Lessor represents that Lessor is not aware of any other lease or contract that would interfere with the use of the Demised Premises for hangar purposes), or the field rules and regulations of the Lessor.

B. Maintenance and servicing for only those aircraft owned by the Lessee and stored in the Lessee's hangar.

C. Any other uses for which the Lessor gives its written approval in its sole discretion.

7. **Prohibited Uses of the Demised Premises**. The Demised Premises shall not be used by the Lessee for any of the following purposes.

A. Passenger service and commercial operations.

B. Sale of aircraft and accessories.

C. Engaging in the business of aviation instruction.

D. Maintenance and servicing of aircraft, except as permitted pursuant to Section 6(B).

E. The sales or storage of aviation fuels or petroleum products.

F. Tie-down of aircraft which may hinder or obstruct in any manner whatsoever the safe landing, taxiing or take-off of aircraft from public landing area of the West Michigan Regional Airport, which may interfere with the proper use of the field by others, or which may be objectionable to the Lessor. Further violations, after notice and expiration of the cure period

described in Section 18 of this Lease, shall be considered a breach of the conditions of this Lease by the Lessee, at the election of the Lessor.

G. Any form of fixed based operation.

8. **Conduct of Operations on Demised Premises**. In its use of the Demised Premises the Lessee will comply with the following requirements and regulations:

A. The Lessee shall not consent to any unlawful use of the Demised Premises, nor permit any such unlawful use thereof.

B. The Lessee further agrees that all Federal, State and local laws will be observed, including the rules and regulations of the Federal and State Aeronautical authorities and the local governing authority.

C. The operations of the Lessee, its employees, invitees and those doing business with it shall be conducted in an orderly and proper manner and so as not to annoy, disturb or be offensive to others at the West Michigan Regional Airport. The Lessor shall have the right to complain to the Lessee as to the demeanor and conduct of the Lessee's employees, invitees and those doing business with it, whereupon the Lessee will take all steps necessary to remove the cause of the complaint.

D. All rules and regulations of the State Fire Marshall shall be complied with by the Lessee in the conduct of its operations on the Demised Premises.

E. The Lessee agrees to pay all taxes, assessments, license fees or other charges levied or assessed on the buildings, structures or their contents during the term of this Lease or any renewal thereof.

F. The Lessee shall pay for water, gas, sewer charges and electrical current, telephone service and other utilities utilized or consumed on the Demised Premises.

G. The Lessee agrees at all times to keep the Demised Premises in a neat, clean and orderly condition, free of weeds, rubbish or any unsightly accumulations of any nature whatsoever.

H. The Lessee shall maintain the building and other improvements on the Demised Premises in an attractive, well-maintained condition and repair which favorably reflects on the conditions and operations of the Airport. Lessee acknowledges that its building and improvements are the first visual improvement seen from the roadway entering the Airport and its condition, maintenance, and repair is significant to the image of the Airport. The Lessor acknowledges, as of the date of this Lease, that the building and other improvements on the Demised Premises are currently in an attractive and well-maintained condition, and no immediate changes or repairs are required. Photographs of the existing condition of the buildings and other improvements are attached as **Exhibit B**.

I. Lessee acknowledges that Lessor has entered into a Fixed Base Operator Agreement ("Agreement") for the operation of the airport. Pursuant to the terms of the Agreement, the Fixed Base Operator ("Operator") is required to provide snowplowing on the Airport, and is authorized to charge third parties for such services pursuant to the terms of the Agreement. Lessee agrees to pay all charges, fees, and costs incurred by the Operator relating to the snowplowing for areas leased to Lessee pursuant to this Lease.

9. **Building**. The Lessee may, at its own expense, with the prior written consent of the Lessor, make alterations, additions and improvements to the Demised Premises, including the demolition of all existing structures on the Demised Premises and the construction of one or more new buildings on the Demised Premises. Lessor shall grant its written consent to all alterations, additions, demolitions and improvements to the Demised Premises which meet the

standards set forth in the Airport Building Standards, now existing or hereafter amended, promulgated by Lessor ("Building Standards"). All such alterations, buildings, hangars or improvements shall be and remain the personal property of the Lessee throughout the term of this Agreement, or any extension thereof.

The Lessee shall have the privilege of removing any or all of the buildings, alterations, additions, hangars or improvements placed on the Demised Premises, at any time prior to the expiration of this Lease, or any extension thereof, provided that on such removal the Lessee shall restore the Demised Premises to a graded and level condition and neat appearance. No building, hangar, or other improvements may be removed by the Lessee, unless replaced, until all rents due have been paid to date. If the Lessee does not intend to remove the aforesaid alterations, additions, hangars, buildings or improvements prior to the end of the term of this Lease, it shall give written notice of this fact to the Lessor at least sixty (60) days prior to such termination, in which case the Lessor may, at its discretion, order the Lessee to remove any or all such alterations, additions, hangars, buildings, or improvements. Failure on the part of the Lessee to comply with such order to remove shall entitle the Lessor to cause to have any or all said alterations, additions, hangars, buildings, or improvements removed, and the cost of such removal shall become the obligation and the responsibility of the Lessee, or at the discretion of the Lessor, the alterations, additions, hangars, buildings, or improvements may be allowed to remain in place and shall thereupon become the property of the Lessor; however, notwithstanding the foregoing, if Lessee constructs a new hangar on the Demised Premises in accordance with the Building Standards during the initial term of this Lease, then Lessor shall not have the right to require Lessee to remove that hangar structure at the end of the initial term (October 31, 2048) as long as the hangar structure is maintained in accordance with the building

standards of the Lessor and the terms and conditions of this Lease. Upon surrendering the Demised Premises, the Lessee shall surrender possession to the Lessor free and clear of any encumbrances, excepting those placed thereon by the Lessor.

10. **Access Roads, Taxiways, and Ramp Areas.**

A. Lessor and Lessee hereby acknowledge that a portion of the Demised Premises includes Lessee's access road to the main service road and Lessee's taxiways and ramp areas. Lessee hereby agrees that it shall be responsible for all maintenance, upkeep, and repair of its access roads, taxiways, and ramp areas for all portions located inside the Demised Premises. All maintenance, upkeep, and repair shall be in accordance with any federal, state, or local requirements. In the event Lessee should fail to comply with the provisions of this paragraph, Lessor may enter on the access roads, taxiways, and ramp areas to perform necessary maintenance, upkeep, and repair and assess Lessee the cost therefor.

B. Lessee agrees that the employees, contractors, agents, invitees, and other lessees of the Lessor, and the Operator shall have the right to use the access entrance area, as shown on the attached Exhibit A (the "Entrance Area") for ingress and egress to the undeveloped Airport property that is located to the West and Southwest of the Demised Premises (the "Expansion Area"). If in the future, the Lessor and/or its lessee develops the Expansion Area for public and/or private use, then the Lessor and/or its lessee shall have the right to use the parking area, as designated on the attached Exhibit A (the "Parking Area") for ingress and egress to the Expansion Area; provided, however, that the Lessor and the Lessee shall negotiate whether this lease should be amended to the satisfaction of both the Lessor and Lessee with respect to the following conditions: 1) whether there should be a change in the annual rent hereunder as a result of the shared use of the Parking Area and increased use of the Entrance Area; 2) whether

there should be a change in the responsibility for the upkeep, maintenance, and repair of the Parking Area and Entrance Area as a result of the shared use of those areas; 3) whether a shared replacement parking area for the Demised Premises should be constructed and the cost allocation of such improvement; and 4) such other terms, conditions, and agreements necessitated by the development of the Expansion Area.

11. **Compliance with Rules and Regulations**. The Lessee shall construct all buildings and all improvements on the Demised Premises in accordance with all applicable state and city ordinances, and regulations adopted for the operation of West Michigan Regional Airport, including regulations of the Michigan Fire Marshal and any other applicable state, county, and local laws, ordinances, and regulations.

At any time during the term of the Lease, the Demised Premises, buildings, and improvements located thereon, shall be subject to the inspection, upon reasonable prior written notice, and approval of the Michigan State Fire Marshal and the Lessor, and any other representatives of interested State, county, or local governments as specified above.

The Lessee agrees, during the term of the Lease, to comply with all laws, local, State, and Federal, including all building codes, pertaining to sanitation, health, police and fire protection relating to Lessee's activities on the Demised Premises. In the event it is necessary for Lessee to connect to water and sewer facilities or connections for electrical or gas service, or for the cost of extending said utilities, the Lessee shall be responsible for the cost of the connection and utility installations.

The Lessee shall be responsible for the cost of connections to existing facilities, including storm and sanitary sewers, electrical lines, water and gas, and for the cost of extending the

utilities from their present termination point outside the Demised Premises to any building or buildings upon the Demised Premises.

12. **Insurance**. Insurance for loss by fire and extended coverage shall be kept and maintained on all buildings and improvements located on the Demised Premises by the Lessee in such amount as Lessee determines to be appropriate, and with such insurance company or companies as are approved by the Michigan Insurance Bureau. In the event of loss by fire, hail, or windstorm, the proceeds from such insurance shall be used by the Lessee to repair or replace such loss, or the Lessee shall demolish the building and improvements so damaged and restore the Demised Premises to a graded level and neat appearance.

Further, the Lessee shall procure, keep and maintain during the term of this Lease, and any renewal thereof, insurance policies providing public liability and property damage insurance of not less than $1,000,000.00 each occurrence/$1,000,000 aggregate for property damage and of not less than $1,000,000.00 each occurrence/$1,000,000.00 aggregate for comprehensive general liability. The policies shall cover losses caused by the acts and omissions of the Lessee, its agents and employees, or by the operation of vehicles or other equipment owned or operated by the Lessee, its agents or employees. The Certificate of Insurance of Lessee shall name the Lessor, its officers, agents, and employees as additional insureds for required coverage for public liability, and a Certificate of Insurance shall be filed with the Lessor upon the commencement of this Lease. The Certificate of Insurance shall waive subrogation against Lessor. As to all insurance requirement under this clause, the Lessee shall give the Lessor sufficient evidence in writing that each and every such coverage has been issued by an insurance company or companies as are approved by the Michigan Insurance Bureau. The Lessee agrees to defend and hold the Lessor harmless from any claim, suit, or processes of any nature, including attorney fees

and costs, whatsoever arising out of this Lease. The agreement to defend and hold harmless shall be in effect even though the Lessee has obtained the various insurance policies hereinabove stated. During the term of this Agreement, the amounts and levels of insurance may be increased by Lessor based upon revised insurance requirements and specifications which shall apply to all entities subject to a ground lease at the Airport.

13. **Compliance with Federal Agreements**. This Lease shall be subordinate to the provisions of any existing or future agreement between the Lessor and the United States relative to the operation or maintenance of the Airport, the execution of which has been or may be required as a condition precedent to the expenditure of Federal funds for the development of the Airport, provided, however, that any right, title, and interest of the Lessee in the Demised Premises (including any improvements made by Lessee to the Demised Premises) shall not be taken without just compensation therefor being first made.

A. This Lease shall be subordinate to the provisions of any existing or future agreement between the Lessor and the United States, relative to the operation or maintenance of the airport, the execution of which has been or may be required as a condition precedent to the expenditure of Federal funds for the development of the airport.

B. The Lessor reserves the right to further develop or improve the landing area of the airport as it sees fit regardless of the desires or views of the Lessee, so long as the changes do not interfere with access to the Demised Premises from the landing area of the airport as determined by Lessor.

C. The Lessor reserves the right to take any action it considers necessary to protect the aerial approaches of the Airport against obstruction, together with the right to prevent the Lessee from erecting or permitting to be erected any building or other structure on the Airport

which, in the reasonable opinion of the Lessor, would limit the usefulness of the Airport or constitutes a hazard to aircraft.

14. **Right-of-Way for Ingress and Egress, Parking, Fencing.**

A. The Lessee, its agents, licensees, invitees, sub-tenants and employees to Lessee shall have the non-exclusive use of any roads or service drives on West Michigan Regional Airport for purposes of ingress and egress to the Demised Premises.

B. The Lessee shall provide parking facilities upon the Demised Premises with the Lessee being responsible for all maintenance, all snow removal, and repair relating to such parking facilities.

C. In case it shall become necessary to construct any fences for the protection of the public using the West Michigan Regional Airport as a public facility, or the construction is deemed necessary by the Lessor to preserve substantial uniformity of appearance of all buildings at West Michigan Regional Airport, or to provide privacy to the Lessee at the Demised Premises, or if Federal authorities require the construction thereof, such fence shall be erected at the Lessee's expense, and only after approval and consent is had from the Lessor as to location and type of fencing. Any fencing shall be consistent with the Airport Building Standards. Upon the giving of notice by the Lessor to the Lessee, in writing, requesting that fencing be erected on the Demised Premises. The Lessee shall erect such fencing as soon as possible and maintain the same in good repair and condition at all times in accordance with the request made by the Lessor. If the Lessor, pursuant to the terms of this clause, requests the Lessee to construct fencing and subsequent thereto requests the same of a tenant or lessee of land contiguous to the Demised Premises, the Lessor agrees to order such latter tenant or lessee to reimburse the Lessee herein

1/2 of the cost of such portion of fencing erected by the Lessee which is utilized by such latter tenant or lessee in complying with the request of the Lessor.

15. **Signs**. The Lessee shall have the right to erect a building identification sign, consistent with the Building Standards, upon the exterior of the buildings on the Demised Premises or in the front yard area thereof. No other signs or advertising matter shall be painted, posted or displayed upon any portion of the Demised Premises, including upon the buildings and structures placed thereon, without the written consent of the Lessor, which consent shall not be unreasonably withheld.

16. **Mortgage by Lessee.** The Lessee may place a mortgage upon any and all buildings located on the Demised Premises or Lessee's leasehold interest under this Lease for the purposes of securing a loan or loans, and the Lessee shall notify the Lessor in writing of the name and address of the mortgagee prior to the placement thereof. Any mortgage placed on the Demised Premises shall be subordinate to the interest of the Lessor and Lessor, in its sole discretion, may require the Lender to execute and deliver a subordination agreement to the interest of Lessor. Any notice of default in the terms of the Lease served upon the Lessee by the Lessor shall also be served upon the mortgagee, and the mortgagee shall have a like opportunity to cure such defect as the Lessee may have.

17. **Late Rental Payments**. If, during the term of this Lease, the Lessee shall be late in making rental payments or any other payments as provided herein, the Lessee shall pay, and the Lessor shall receive, a service charge of one and one half percent (1.5%) per month of the late rental payment until the amount is paid. This shall be in addition to any other rights reserved to the Lessor or existing in the Lessor by virtue of the laws of the State of Michigan.

18. **Default and Termination**. The Lessor and the Lessee agree that this Lease shall terminate at the expiration of the term herein specified. Further, upon the breach by the Lessee of any of the terms and conditions herein, the Lessor shall give written notice to the Lessee and a period of thirty (30) days from the date of the notice to cure such breach. If the breach constitutes an emergency condition as determined by Lessor, the period to cure shall be five (5) business days from the date of the notice to cure. If the breach is not cured by the Lessee within thirty days of the date such notice is received by the Lessee (or if the breach cannot be cured within the thirty (30) day period, if Lessee does not commence curing the default within the thirty (30) day period and thereafter diligently prosecute it to completion), this Lease may be deemed forfeited by the Lessee and cancelled by the Lessor, upon the receipt by the Lessee of an additional notice in writing of such cancellation from the Lessor. Lessee shall pay reasonable costs and attorney fees incurred by Lessor in connection with the termination, cancellation, and forfeiture of the Lease.

19. **Notice of Termination – Lessor**. In addition to the provisions of this Agreement relating to termination as are set forth in paragraph 18 hereof, the Lessor may terminate and cancel this Lease if it is unable to operate West Michigan Regional Airport, and is required to reimburse the United States of America, the State of Michigan, or such other federal or state entities or agencies for monies received or accepted for the acquisition of West Michigan Regional Airport. Notice of termination shall be sent at least 180 days prior to the effective date of the cancellation to Lessee. Upon expiration of the notification, the rental amount paid during the final year of the Lease shall be prorated and the balance reimbursed to the Lessee. Lessor shall incur no further liability to Lessee, and this Agreement shall be null and void. Upon termination pursuant to this Paragraph, the Lessor grants to Lessee the right to purchase the

Demised Premises, including a non-exclusive right of ingress and egress to the Demised Premises at the fair market value as determined by Lessor and Lessee. The purchase by Lessee from Lessor shall be permitted only if all of the following conditions are met:

A. Lessee shall not be in default (beyond any applicable cure period) pursuant to any of the terms, conditions, and agreements of this Lease;

B. The right to purchase is determined to be valid and permitted pursuant to the rules and regulations of the Federal Aviation Administration ("FAA"), Michigan Aeronautics Commission ("MAC"), or any other federal, state, or local agency empowered to administer and regulate West Michigan Regional Airport;

C. Notice must be given by Lessee to Lessor at least 90 days before the termination of the lease term;

D. The purchase by Lessee from Lessor must, in all respects, comply with the rules and regulations of the FAA, MAC, or any other federal, state, or local agency empowered to administer and regulate West Michigan Regional Airport.

20. **Time of the Essence**. It is further understood and agreed that time is of the essence of this Lease.

21. **Eminent Domain**. If all of any portion of the Demised Premises shall be taken by any governmental authority under power of eminent domain:

A. All damages awarded as compensation for the taking or diminution in value to the buildings or improvements on the Demised Premises constructed by the Lessee shall belong to and be the property of the Lessee and any mortgagee thereof. The Lessee assumes full responsibility for taking whatever action it deems necessary to protect its interests in any proceeding for the condemnation of any part of his leasehold estate herein.

B. If only a part of the Demised Premises shall be so taken or condemned, the Lessee shall at its expense proceed to make a complete architectural unit of the remainder of the buildings on the Demised Premises; and, there shall be an abatement of the rental thereafter to be paid hereunder, corresponding with the proportion which the value of the portion of the Demised Premises so taken may bear to the value of the entire Demised Premises at the time of such taking.

C. If more than fifty percent (50%) of the Demised Premises shall be so taken, the Lessee may at its option terminate this Lease and all obligations hereunder.

22. **Quiet Enjoyment**. The Lessor covenants that the Lessee, upon paying the aforementioned rentals and performing all the covenants on its part to be performed hereunder, shall and may peacefully and quietly have, hold, and enjoy the Demised Premises for the term hereof.

23. **Assignment of Lessee Interest**. Lessee shall not assign or transfer this Lease, including the buildings or improvements thereon (except in conjunction with the sale of all of the Lessee's assets located on the Demised Premises), without the written consent of the Lessor, which shall not be unreasonably withheld.

24. **Memorandum of Lease**. The Lessor and the Lessee shall execute a memorandum of this Lease for purposes of public record. The Lessee shall bear all costs with respect to preparing and recording the memorandum.

25. **Successors and Assigns**. The covenants, conditions, and agreements made and entered into by the parties are binding upon the successors and assigns of the Lessor and upon the successors and assigns of the Lessee.

26. **Arbitration**. All claims or disputes arising out of or relating to this Lease shall be settled by arbitration in accordance with the commercial arbitration rules of the American Arbitration Society then applying. Notice of demand for arbitration shall be filed in writing with the other party to the agreement and with the American Arbitration Association, and shall be made within a reasonable time after the claim or dispute has arisen. The award rendered by the arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereon.

Except as written by consent of the person or entity sough to be joined, no arbitration arising out of or relating to the Lease shall include, by consolidation, joinder, or in any other manner, any person or entity not a party to the Lease, unless it is shown at the time the demand for arbitration is filed that:

A. Such person or entity is substantially involved in a common question of fact or law;

B. The presence of such person or entity is required if complete relief is to be accorded in the arbitration; and

C. The interest or responsibility of such person or entity in the matter is not insubstantial.

The agreement of the parties to arbitrate claims and disputes shall be specifically enforceable under the prevailing arbitration law. Pending final decision of the arbitrator or arbitrators, the parties shall proceed diligently with the performance of their obligations under this Lease.

27. **Entire Agreement**. This Lease constitutes the entire understanding between the parties, and supersedes all prior independent agreements between the parties covering the subject

matter thereof, including the Original Lease. Any change or modification hereof must be in writing, signed by both parties.

28. **Severability**. If a provision hereof shall be finally declared void or illegal by any court or administrative agency having jurisdiction, the entire Lease shall not be void, but the remaining provisions shall continue in effect as nearly as possible in accordance with the original intent of the parties.

29. **Notice**. Any notice given by one party to the other in connection with this Lease shall be in writing and shall be hand-delivered or sent by registered mail, return receipt requested, with postage prepaid, or sent by national overnight courier service, to:

West Michigan Airport Authority
ATTN: Airport Manager
60 Geurink Boulevard
Holland, MI 49423

Hangar Three Leasing, LLC
ATTN: Kevin McDowell
235 Central Avenue
Holland, MI 49423

With a copy to:
Ronald Ludema
6325 143rd
Holland, MI 49423

Notice shall be deemed to have been given upon delivery if hand-delivered; two (2) business days following mailing, if sent by certified mail; and on the next business day, if sent by national overnight courier.

30. **Headings**. The headings used on this Lease are intended for convenience of reference only, and do not define or limit the scope or meaning of any provision of this Lease.

31. **Governing Law**. This Lease is to be construed and governed in accordance with the laws of the State of Michigan.

IN WITNESS WHEREOF, the Lessor and the Lessee have signed this Lease the day and year first above written.

LESSOR:

WEST MICHIGAN AIRPORT AUTHORITY

By: _____

Title: _____

APPROVED AS TO FORM:
WEST MICHIGAN AIRPORT AUTHORITY

BY: _____
Andrew J. Mulder, Attorney
DATE: November 1, 2018

LESSEE:

HANGAR THREE LEASING, LLC

By Its Member, Entity Partners, L.L.C.

_____
Ronald Ludema
Title: Member

Personal Guaranty

The undersigned personally guarantee payment and performance of all of the terms, conditions, and agreements of Hangar Three Leasing, LLC under the terms of this Lease with the West Michigan Airport Authority dated _____, 2018.

Dated: _____, 2018

_____
Ronald Ludema

Dated: _____, 2018

_____
Ken Dannenberg

Dated: _____, 2018

_____
Ronald Griffith

EXHIBIT A

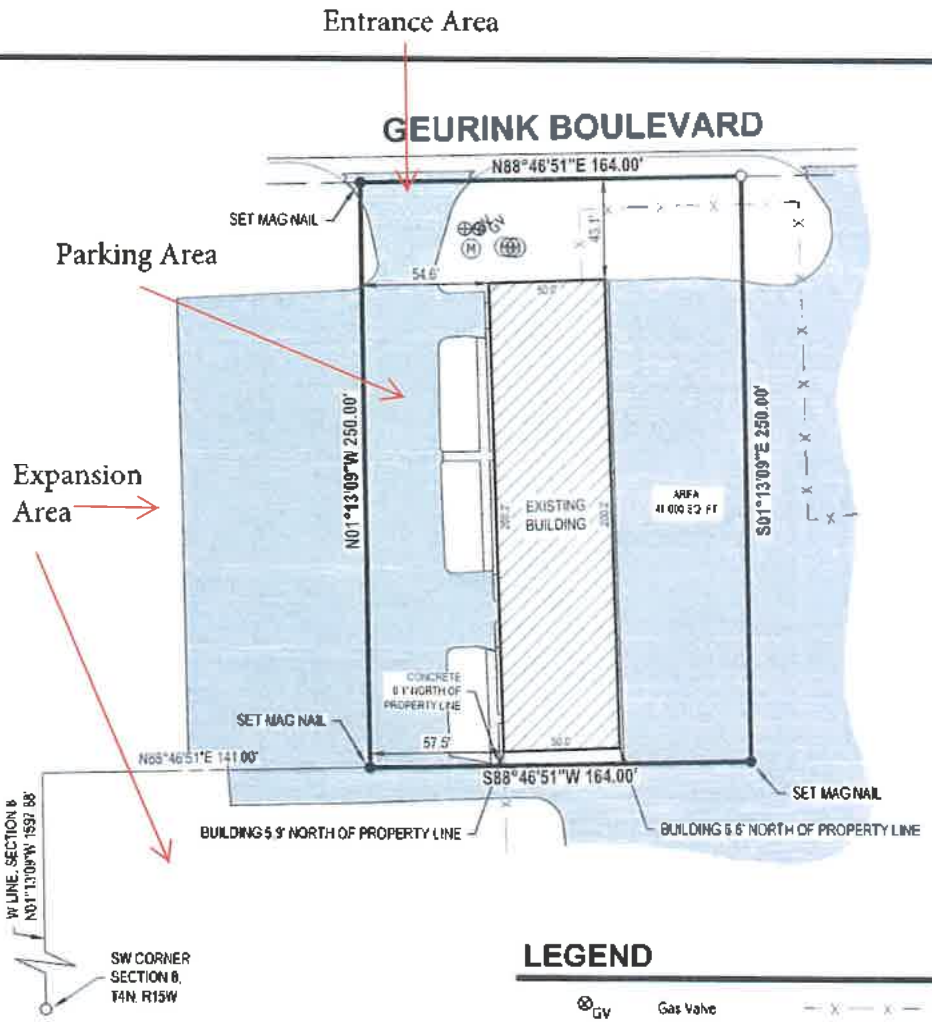
Legal Description of Demised Premises

Please see attached.

EXHIBIT A

Demised Premises

West Michigan Airport Authority/Hangar Three Leasing, LLC



DESCRIPTION

That part of the Southwest 1/4 of Section 8, Town 4 North, Range 15 West, City of Holland, County of Allegan, State of Michigan, described as beginning at a point being North 01 degree 13 minutes 09 seconds West 1597.88 feet as measured on the West line of Section 8 and North and North 88 degrees 46 minutes 51 seconds East 141.00 feet from the Southwest corner of Section 8; thence proceeding North 01 degree 13 minutes 09 seconds West 250.00 feet; thence North 88 degrees 46 minutes 51 seconds East 164.00 feet; thence South 01 degree 13 minutes 09 seconds East 250.00 feet; thence South 88 degrees 46 minutes 51 seconds West 164.00 feet to the point of beginning, containing 41,000.00 square feet.

(Provided by Client)

LEGEND

⊗GV	Gas Valve	— X — X —	Fence
Ⓜ	Manhole		Asphalt
●	Iron - Set		Concrete
○	Iron - Found		Building

We hereby certify that we have examined the premises herein described, that the improvements are located entirely thereon as shown and that they do not encroach except as shown hereon.

This survey was made from the legal description shown above. The description should be compared with the Abstract of Title or Title Policy for accuracy, easements and exceptions.

By Scott A Hendges

Scott A. Hendges, Licensed Professional Surveyor No. 47953

SCALE: 1" = 60' 0' 30' 60' NORTH

West Michigan Airport Authority
Greg Robinson
60 Geurink Blvd
Holland, MI 49423

West Michigan Regional Airport
Geurink Boulevard

DRAWN BY: JV DATE: 03-08-2016 PRJ #: 16201262
REV BY REV DATE
REV 1 OF 1

NEDERVELD
www.nederveld.com • 800.222.1868
Holland
347 Hoover Blvd
Holland, MI 49423

EXHIBIT B

Photographs of Buildings and Improvements at Lease Commencement

Please see attached.

West Michigan Airport Authority
60 Geurink Boulevard, Holland, MI 49423
P (616) 510-2332
Comprising City of Zeeland, Park Township and City of Holland

November 12, 2018 **Report 4**

To: West Michigan Airport Authority Board.

From: Greg Robinson, Authority Manager.

Subject: **Proposed Improvements to Airport Business Center..**

The Building & Development Committee has been discussing the need to improve the restroom facilities in the Airport Business Center. There currently are two units within each restroom and there are times when additional units would better meet the needs of those departing from aircraft.

If we were constructing this portion of the building over and money was not an objective, we would have ideally provided four units in each restroom. However, the Committee and Board were working with limited funds for construction of the building and providing the additional units was not made a priority at that time.

The architect for the Business Center, Progressive AE, has designed five concepts for the Committee's consideration to accommodate three or four units. To provide an additional two units in each restroom, the restrooms would either have to be expanded into the lobby or an expansion constructed to the north wall of the building. The cost estimates for these expansions range from $68,200 (interior expansion) to $117,000 (exterior expansion). An additional unit could be installed in each restroom (three units total in each restroom) for an estimated cost of $29,000.

The Building & Development Committee does not recommend that the restrooms be expanded further into the lobby area. The preferred concept for expanding the restrooms to the north is estimated to cost $117,000. This would provide four units in each restroom as opposed to the two units currently provided. An additional unit could be provided in each restroom (for a total of three in each) for an estimated $29,000. As a result, the Committee was not able to rationalize spending, in essence, an additional $88,000 for two extra units ($117,000-$29,000).

West Michigan Airport Authority
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Recommendation

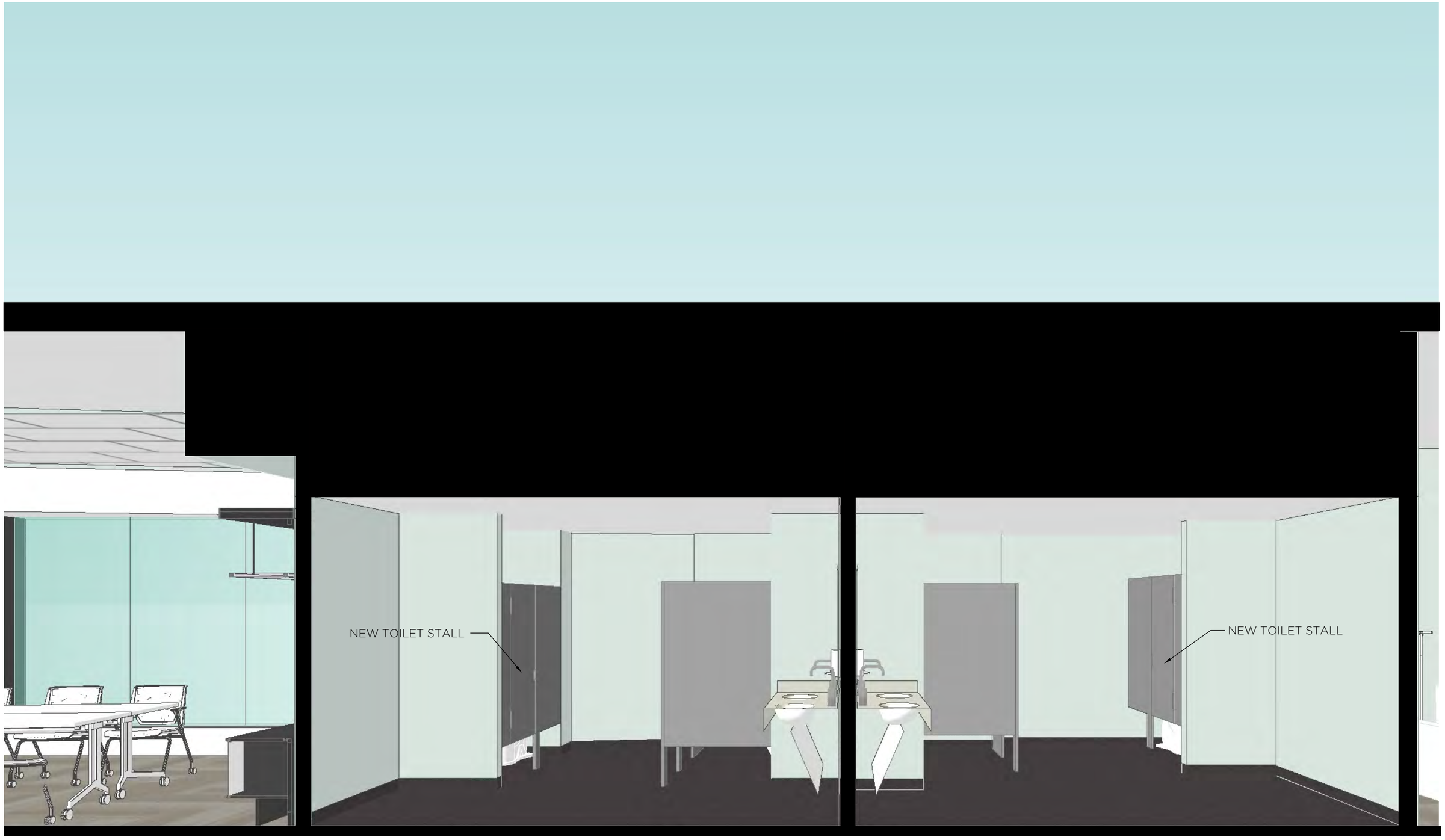
The Building & Development Committee recommends that the Airport Authority Board approve moving forward with design specifications and bidding for adding an additional unit in each of the restrooms at the Airport Business Center.

PARTIAL FLOOR PLAN

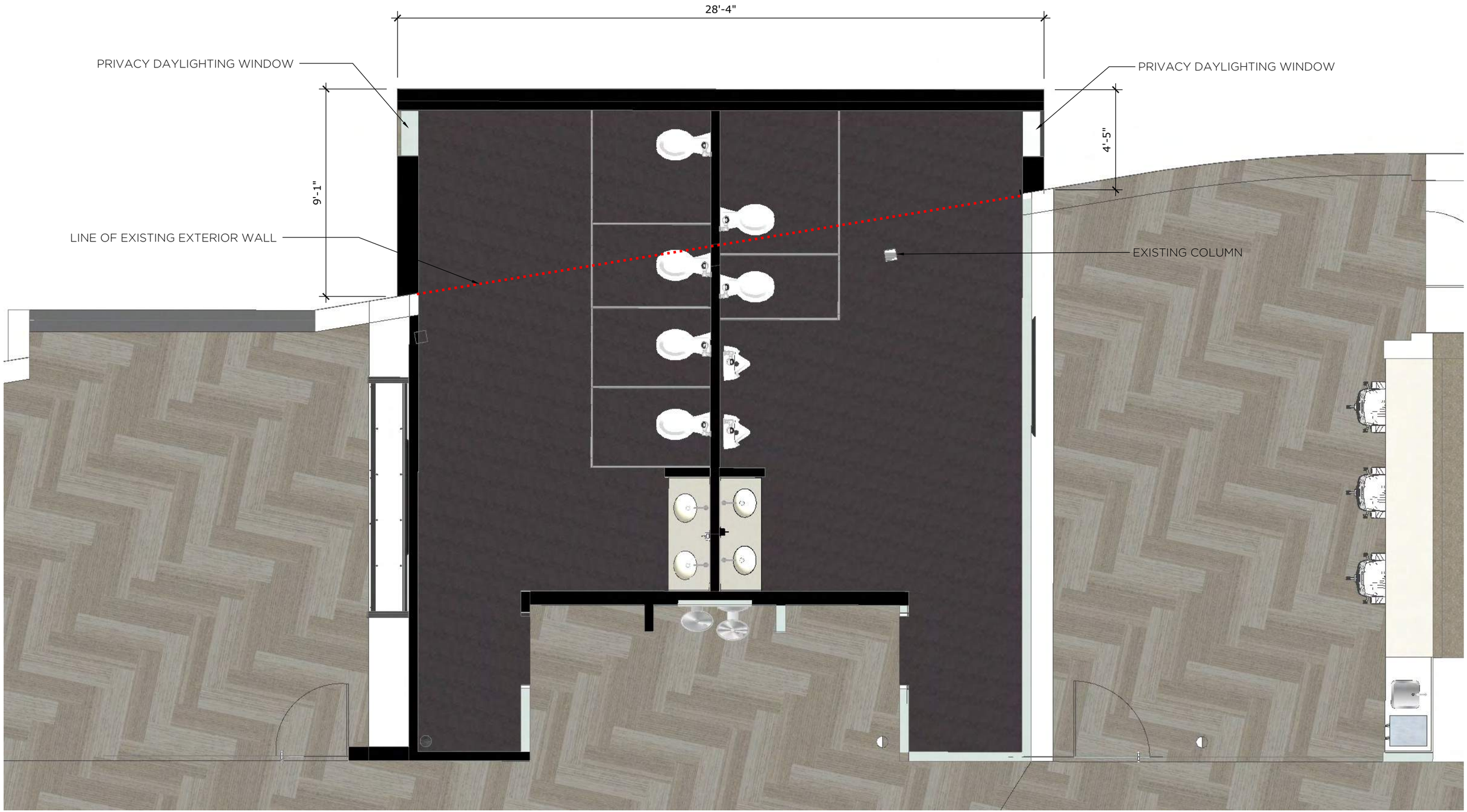
drawing scale : 1/4" = 1'-0"

PARTIAL FLOOR PLAN PERSPECTIVE

drawing scale : NONE

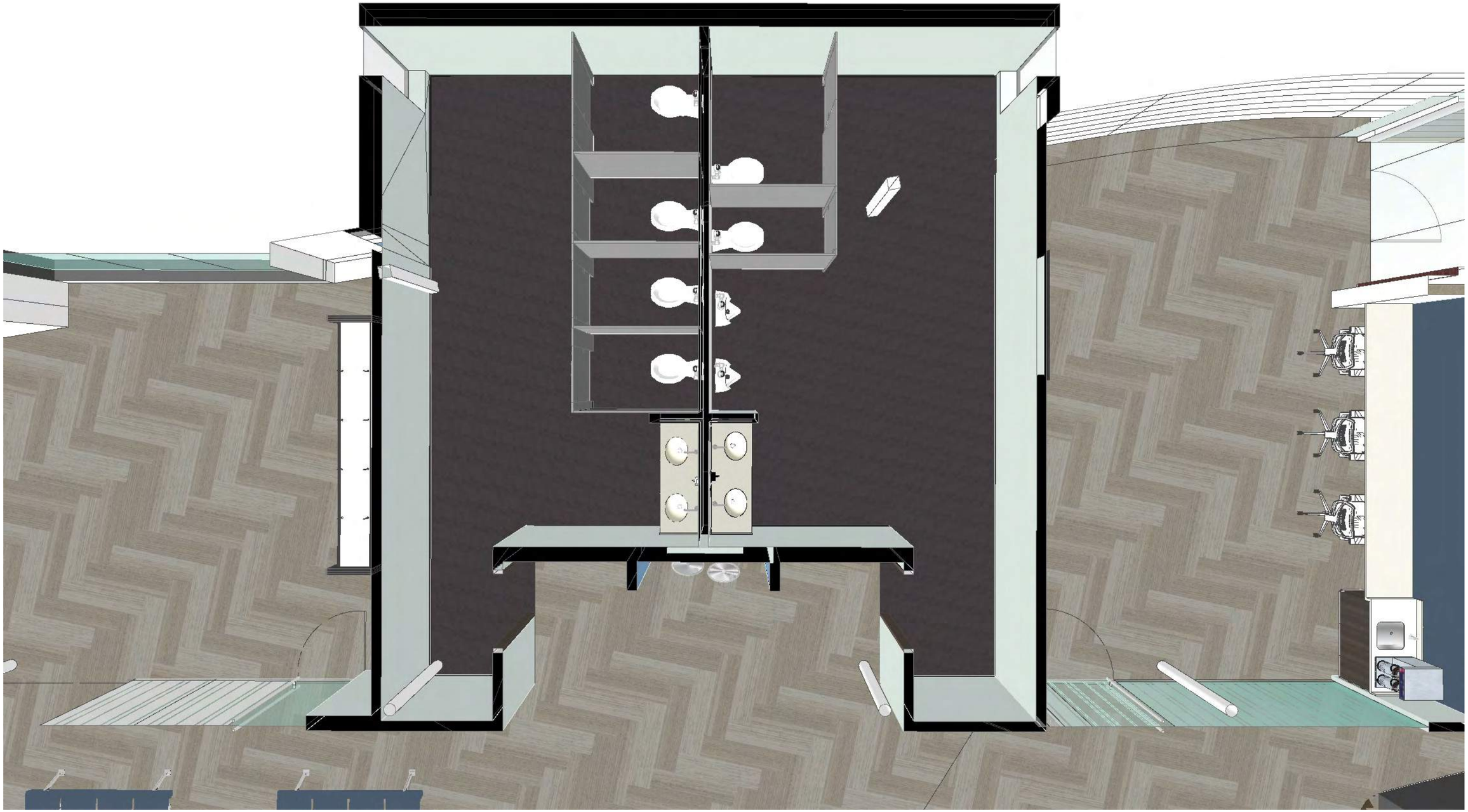


WOMEN'S & MEN'S ROOM



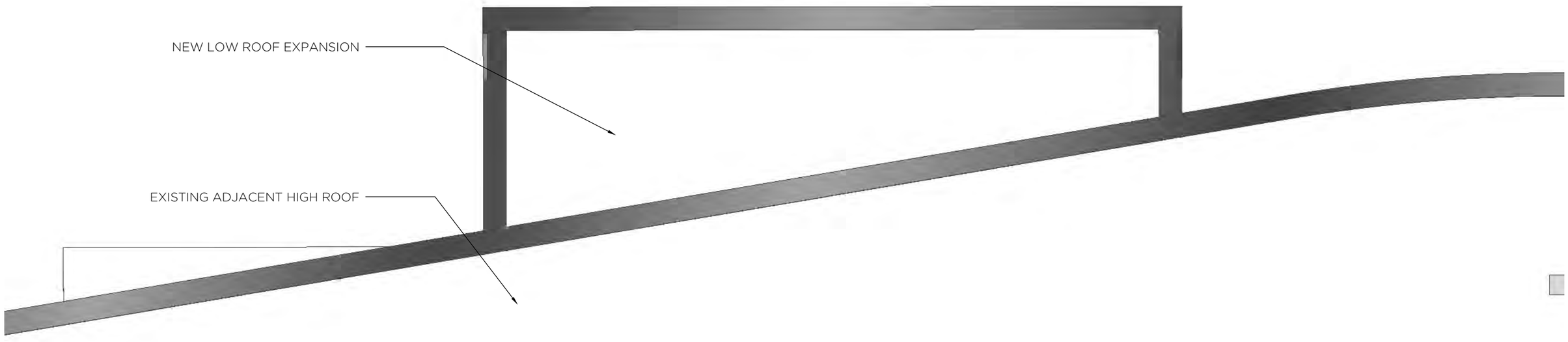
PARTIAL FLOOR PLAN

drawing scale : 1/4" = 1'-0"



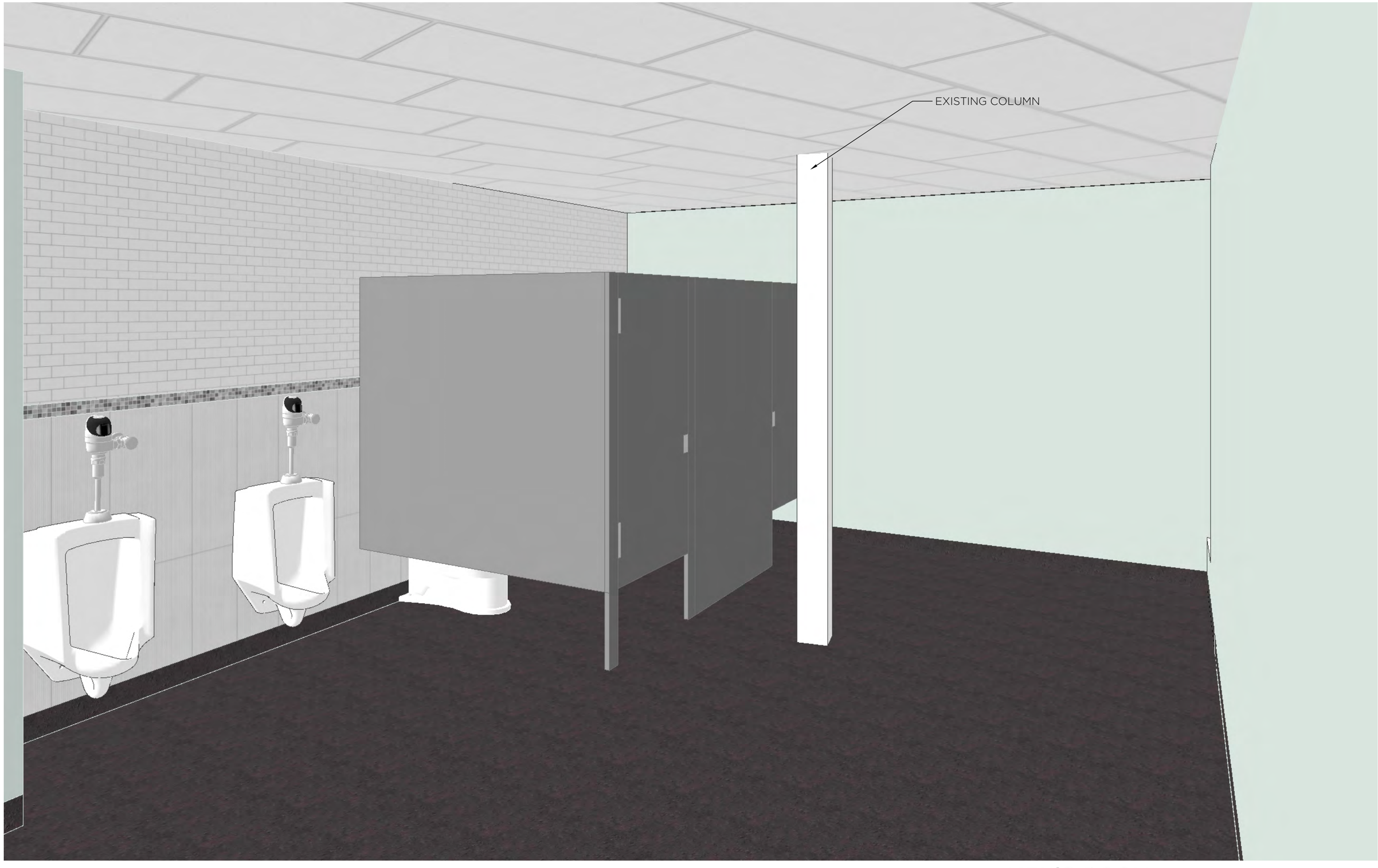
PARTIAL FLOOR PLAN PERSPECTIVE

drawing scale : NONE

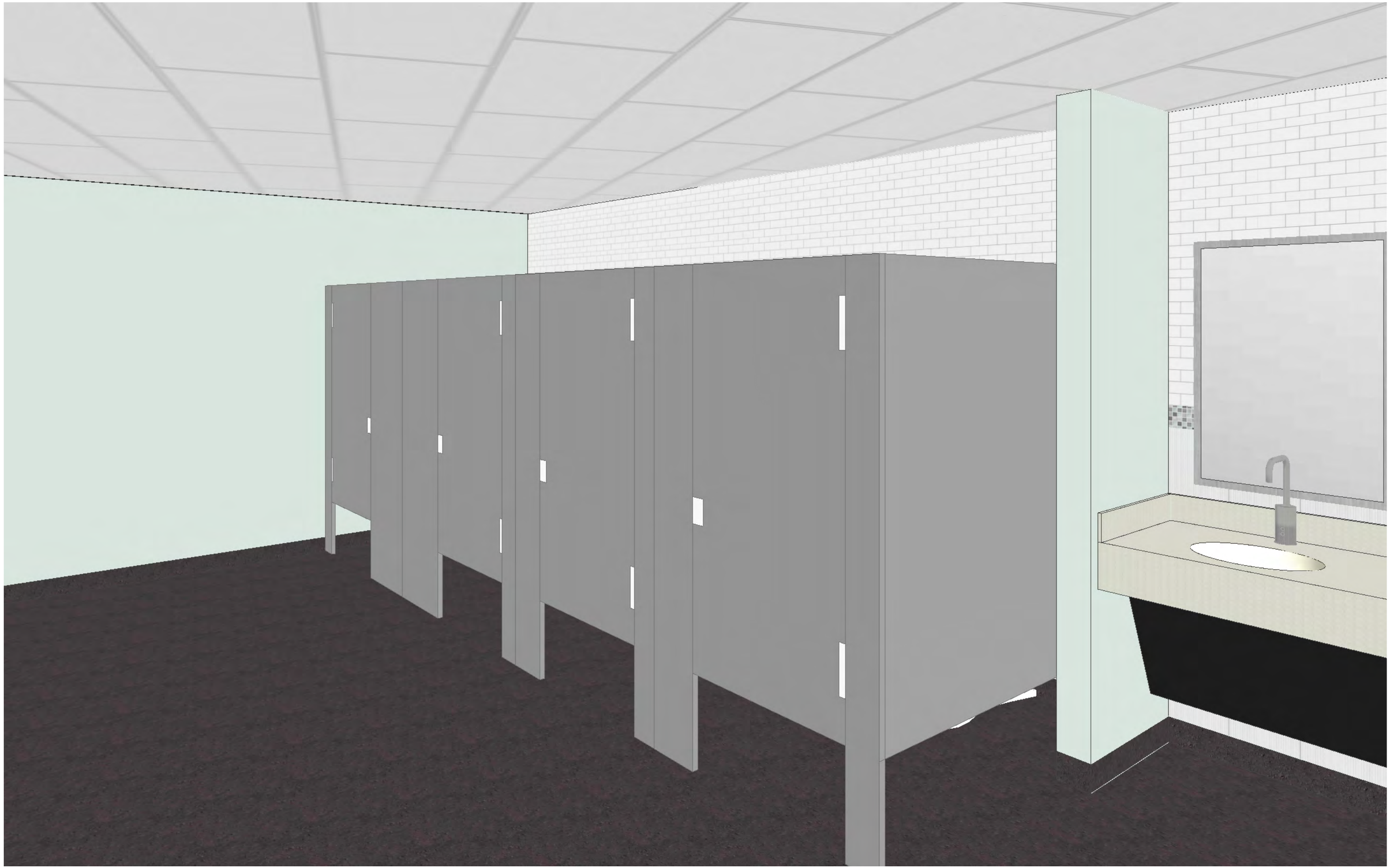


PARTIAL ROOF PLAN

drawing scale : 1/4" = 1'-0"



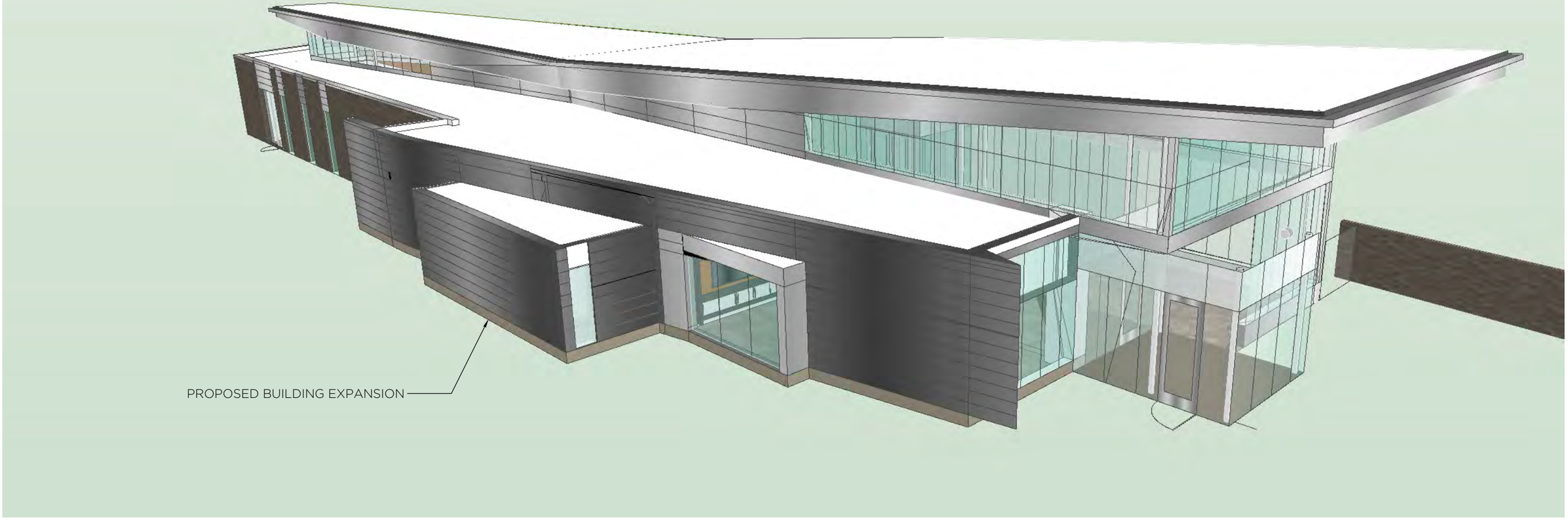
MEN'S ROOM



WOMEN'S ROOM

MEN'S ROOM

WOMEN'S ROOM


PROPOSED BUILDING EXPANSION


PROPOSED BUILDING EXPANSION


PROPOSED BUILDING EXPANSION

West Michigan Airport Authority
60 Geurink Boulevard, Holland, MI 49423
P (616) 510-2332
Comprising City of Zeeland, Park Township and City of Holland

November 12, 2018 **Report 6**

To: West Michigan Airport Authority Board.

From: Greg Robinson, Authority Manager.

Subject: **Strategic Plan.**

At the October 2018 Authority Board meeting, a member suggested that the Board prepare a Strategic Plan. We did not discuss what exactly was meant by "Strategic Plan" but decided to discuss this at the November 2018 Board meeting.

Enclosed with this report are the following documents that have served as the guides for the Board and staff as we consider present and future development of the airport.

- 2013 Master Plan for West Michigan Regional Airport.
- Airport Layout Plan (drawings located at the end of Chapter 6 of the Master Plan).
- 2017 Site Development Evaluation for West Michigan Regional Airport.

The **2013 Master Plan** was an extensive effort, funded in part by the FAA, that was developed by a Work Team of 10 members comprised of Authority representatives and representatives of Gentex, Metal Flow, JCI, Haworth, Tiara Yachts and the City of Holland Planning Commission. It is a comprehensive document that covers a wide-range of airport related interests.

The **Airport Layout Plan (ALP)** guides the use of airport property and any projects to be funded with FAA participation must be shown on this plan. As a result, this ALP is updated periodically to reflect changes at the airport.

The **2017 Site Development Evaluation** identifies all airport properties that are vacant or underutilized. This evaluation provides a summary of how each parcel is intended to be used.

West Michigan Airport Authority
60 Geurink Boulevard, Holland, MI 49423
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The Authority's **Building & Development Committee** has been discussing concepts for future public and private hangars. The Committee has also discussed the merits of a crosswind runway. The Committee is nearing completion of this work and a presentation could be ready for the December 2018 Board meeting.

Recommendation

It is recommended that the Board review the enclosed documents and discuss at the November Board meeting whether these constitute a "Strategic Plan" or if there are other elements that need to be included as well.

WEST MICHIGAN
REGIONAL AIRPORT

West Michigan Regional Airport

Master Plan 2013

The preparation of this document was financed in part through an Airport Improvement Program grant from the Federal Aviation Administration (Project Number 3-19-0000-15-2009) as provided under Section 505 of the Airport and Airway Improvement Act of 1982, as amended. The contents do not necessarily reflect official views or the policy of the DOT or the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein not does it indicate the proposed development is environmentally acceptable in accordance with appropriate public laws.

Prepared By:
Mead & Hunt, Inc.
2605 Port Lansing Road
Lansing, MI 48906

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Chapter 6 – Environmental Overview

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(no tables)

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(no tables)

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1

Inventory of Existing Conditions

To provide a framework to guide future Airport development, master plans are created to address short, medium, and long term needs. The goal is to provide a document that outlines a cost-effective strategy that allows an airport to meet anticipated user needs. Master plans document the conditions of existing infrastructure and services, address anticipated issues, evaluate alternatives to address these issues and recommend a course of action. Master plans also identify, evaluate, and address environmental issues or constraints that may impact future development.

This master planning effort initiated in 2010 provides the West Michigan Airport Authority (WMAA), operators of the Airport, with information to assist in the management of the Airport in the future. A number of elements including forecasts, review of alternatives, recommendations and an environmental overview are addressed in this document. As outlined in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, the initial step in the airport master planning process is the collection and evaluation of information about an airport and the area it serves. The inventory task for West Michigan Regional Airport, also referred to as the Airport, was accomplished through physical inspection of the facilities, review of previous Airport studies, review of various Airport management records, and conversations with local sources such as the airport manager.

A large volume of data was collected, reviewed and analyzed during the inventory effort for this study. Many of the previously developed reports contain an extensive amount of information which supports the development of this document and can be consulted for historical reference and additional detail. Much of the detailed information is presented in subsequent chapters of this report, as appropriate, to support the various technical analyses required as part of this project. This chapter presents an overall summary of the Airport facilities and the community it serves, organized into the following sections:

1.1 General Airport Description and Location

West Michigan Regional Airport is a general aviation airport serving the City of Holland and a number of the West Michigan lakeshore communities. A general aviation (GA) airport is defined as an airport that does not have scheduled commercial airline service. The Airport is identified by the FAA in the National Plan of Integrated Airport Systems (NPIAS) as being a necessary component in the national aviation system. The Airport is defined as a Tier I airport, the highest classification, within the 2008 Michigan Aviation System Plan, further demonstrating the importance of the Airport to the aviation transportation system within the State of Michigan.

The Airport is physically located in Allegan County within the city limits of Holland. It is situated approximately two miles south of downtown Holland near the intersection of Interstate 196 (I-196) and US Highway 31 (US-31) (**Figure 1-1**). It is also located near a major CSX railroad freight line and an Amtrak passenger railroad line which is due east of the Airport. The Airport is bordered by Geurink Avenue to the north, Lincoln Avenue to the east, 64th Street to the south and 58th Avenue/Washington Avenue to the west. Washington Avenue, also known locally as the Blue Star Highway, passes through the west side of the Airport through a tunnel under the airfield (**Figure 1-2**) which was constructed in 2004 as part of an airport expansion project.

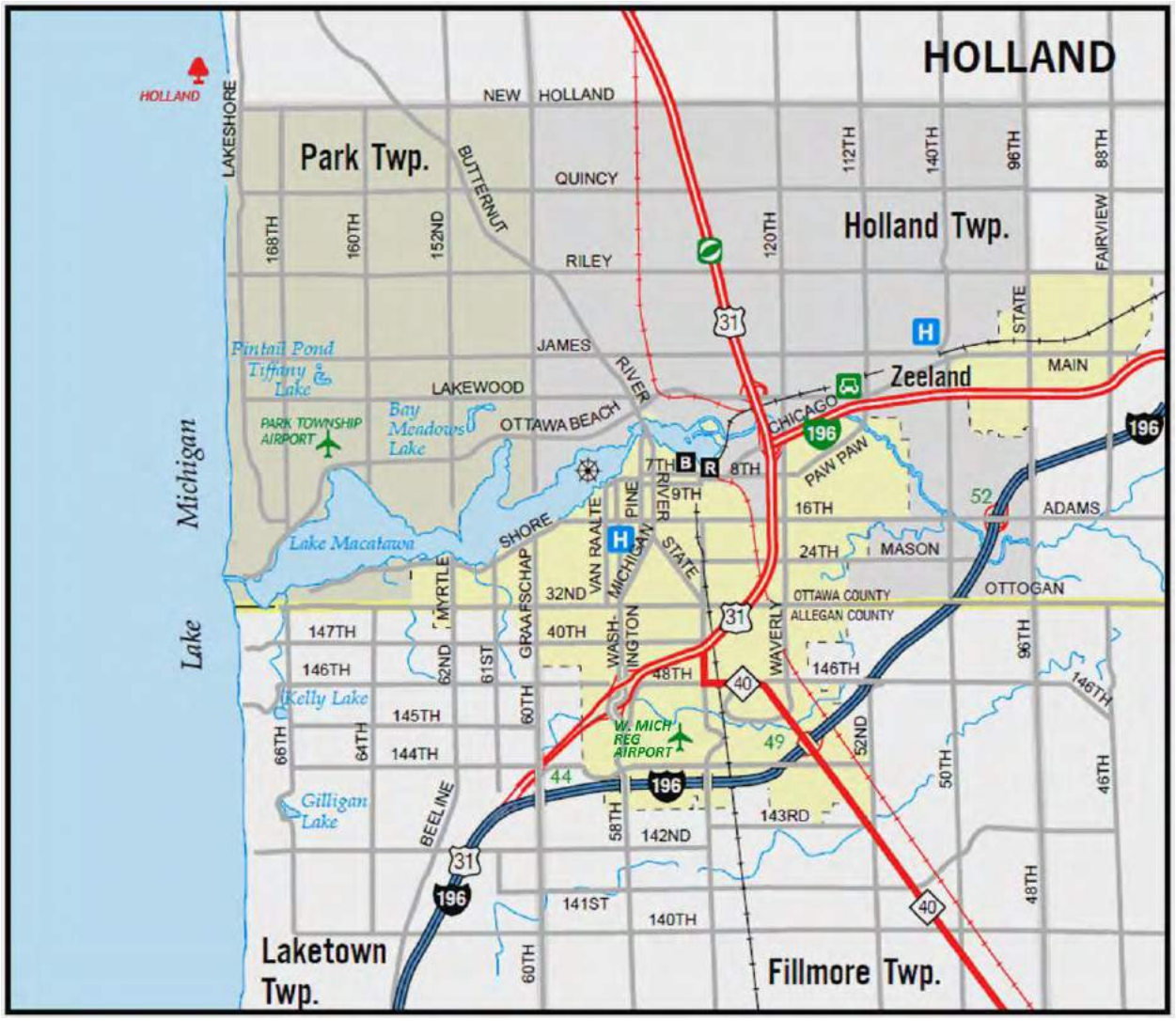
The Holland area is a prominent leisure and business community in West Michigan, located approximately 25 miles southwest of Grand Rapids along the eastern shore of Lake Michigan. The Holland region encompasses the counties of Allegan and Ottawa and visitors to the area are often attracted to the region's proximity to Lake Michigan and many shopping and entertainment options. Many visitors also travel to the area in the spring for the popular Tulip Time Festival. Communities within the area include Holland, Zeeland, Saugatuck, and Hudsonville.

The Holland area is home to a very diverse economic community. Many prominent businesses located in the area rely on the Airport to meet their transportation needs. The success of companies based in the area including Herman Miller, Haworth, Johnson Controls, Inc. and Gentex are dependent upon the transportation link the Airport provides. With this vital link, these and many other businesses are able to maintain their status as leaders in international business.

1.2 Airport History

The Airport began as a privately owned aviation facility in 1947 and has held a prominent role in the aviation history of the Holland area. The Airport facility became publicly owned by the City of Holland in 1986. In 2008, voters approved the creation of the West Michigan Airport Authority (WMAA) to oversee the operation of the Airport and approved tax levies to assist in the development of the facility. A major expansion project recently involved the extension of Runway 8/26 from 5,000 feet to 6,002 feet with fully compliant runway safety areas, which the former 5,000 foot runway did not possess. Planning for the project began in 2000, and involved the construction of a tunnel to carry Washington Avenue traffic under the extended Runway 8/26. The tunnel project was completed in 2004 and the extended runway was opened in late 2005.

Figure 1-1
Holland, Michigan Area



Source: Michigan Department of Transportation

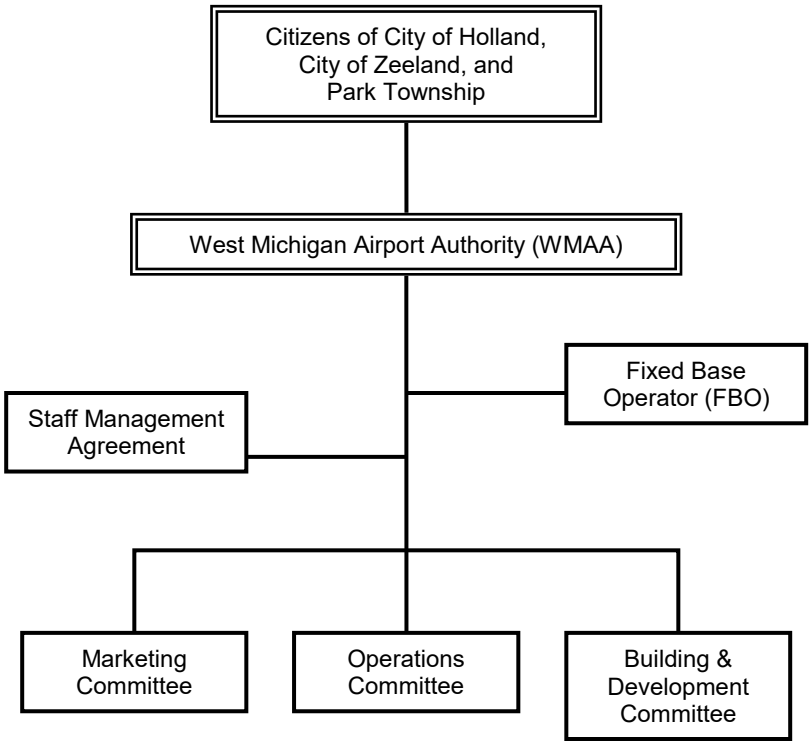
1.3 Facilities Management

West Michigan Regional Airport is owned by the City of Holland but is now managed by the WMAA which was established in 2008. The WMAA consists of three representatives from the three governmental units which are members of the Authority: the City of Holland, the City of Zeeland and Park Township. Tulip City Air Service, the Airport's Fixed Base Operator (FBO), oversees the day-to-day operation of the Airport. Three committees established by WMAA, staffed by local residents representing a diverse group of elected officials, businesses, and aviation interests, provide input and oversight on marketing, operations, and building/development. **Figure 1-3** illustrates the Airport's organizational management chart.

Figure 1-2
West Michigan Regional Airport Location

Source: MapQuest.com

Figure 1-3
Airport Organizational Management Chart



Source: West Michigan Airport Authority, 2010

1.4 Airport Environment

The meteorological climate of an Airport's environment can factor in its capacity, or ability to process a given volume or air traffic demand within a specified time period. Weather conditions determine if aircraft can operate using visual flight rules (VFR) or instrument flight rules (IFR). VFR conditions have a set of regulations and procedures for flying aircraft based on the pilot being able to navigate his aircraft visually. IFR conditions call for a separate set of regulations and procedures for flying aircraft based on the pilot navigating his or her aircraft solely using the instrument data in the cockpit. Using IFR, a pilot does not have to be able to see out the cockpit windows, making it possible for an aircraft to fly during low visibility situations, including fog, snow and low cloud ceiling heights. Weather conditions determine which flight rules are in effect. If the cloud ceiling is 1,000 feet above ground level (AGL) or greater and the visibility is three miles or greater, a pilot may operate his or her aircraft under VFR or IFR. If the cloud ceiling is less than 1,000 feet AGL and the visibility is less than three miles, instrument meteorological conditions (IMC) exist and a pilot must operate his or her aircraft using IFR only. The pilot must be licensed or rated to operate an aircraft in IFR conditions, based upon FAA licensing criteria.

1.4.a Precipitation and Snowfall

Proximity to Lake Michigan plays a major role in the weather affecting the Airport. According to the Michigan State University (MSU) Climatologist's Office, the region receives a significant amount of snowfall during the winter season totaling an annual average of approximately 78 inches. Based on a study of a 30-year summary of monthly values for Holland between 1971 and 2000, by the MSU Climatologist Office, the average January temperature for the region is 24 degrees Fahrenheit. Based on the same study, the average July maximum temperature is 82 degrees Fahrenheit. The Airport receives, on average, 36 inches of rain a year, which equates to a total of more than 114 inches of precipitation in a year when rain and snow are combined. This is significant since the runway pavement is considered to be "contaminated" when wet or snowy conditions are present which may limit an aircraft's performance during landing and takeoff. This decrease in performance can often affect the runway length needs and is then a critical factor for airport users.

1.4.b Wind Coverage

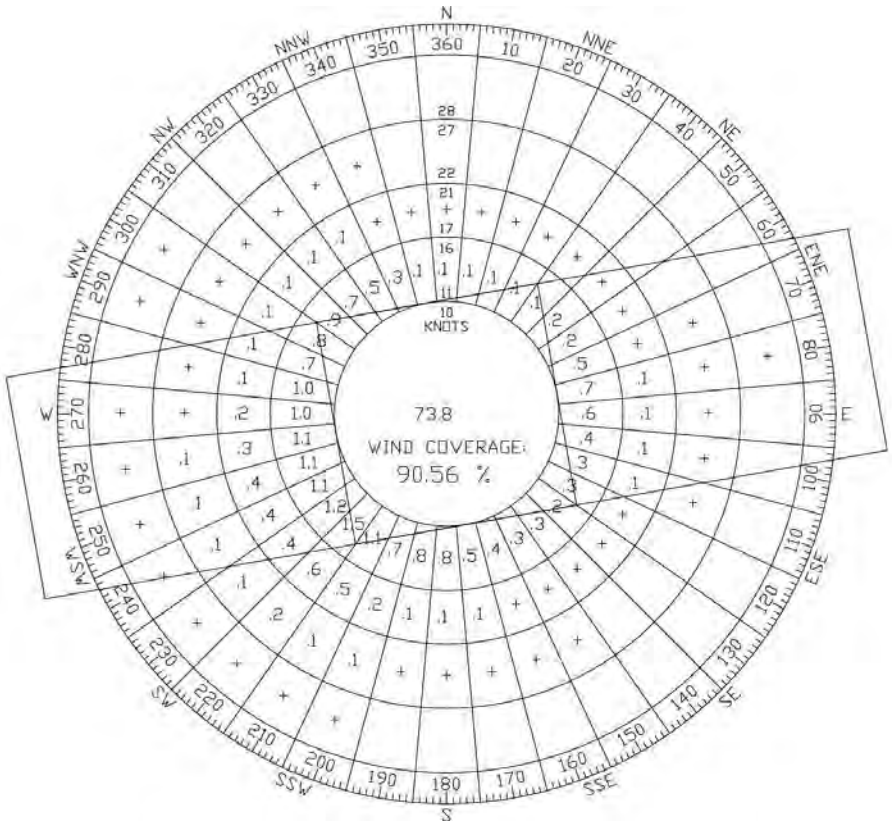
Wind is another important environmental element that may affect the operation of an airport. Since aircraft land and take off into the wind, it is important to analyze an Airport's wind coverage, or ability of the configuration of runways to be oriented in the direction of prevailing local winds. The FAA recommends that airports have a runway or orientation of runways that attain minimum wind coverage of 95 percent (95%). An airport's ability to meet this 95 percent (95%) desired wind coverage is important as smaller aircraft are more affected by crosswinds, which are winds that blow perpendicular to an aircraft's path of travel.

The reason for the evaluation of wind coverage is that different sizes of aircraft are able to withstand different levels of crosswinds. Smaller aircraft, for example, are more susceptible to crosswind conditions and may not be able to land or take off from a runway if crosswind conditions are excessive. Given the

size of aircraft that typically operate at an airport, another runway may need to be constructed to allow for operation in excessive crosswind conditions. Because the Airport has a single runway, excessive crosswind conditions can limit operational capability.

Wind data provided by the National Climatic Data Center was analyzed utilizing FAA airport design software. Results of the analysis found that the alignment of Runway 8/26 provides 90.56 percent (90.56%) wind coverage during all weather conditions (see **Figure 1-4**). Consequently, the Airport does not reach the 95 percent (95%) wind coverage that is recommended by the FAA for the single runway configuration. This coverage is based upon a 10.5 knot crosswind component which is appropriate for the smaller aircraft based at the Airport. The larger aircraft using the Airport can operate with a stronger crosswind which is why a 13 knot and 16 knot component are also listed (see **Table 1-1**).

Figure 1-4
Runway 8/26 Windrose



Source: National Climatic Data Center
Software: FAA Airport Design Version 4.2, Michigan Bureau of Aeronautics - 1994
Station: Holland, Michigan
Period of Record: 1999-2008
Number of Observations: 72,539

Table 1-1
Runway 8/26 Wind Coverage

WEATHER CONDITION	10.5 KNOTS	13.0 KNOTS	16.0 KNOTS
Instrument Flight Rules	90.52%	95.10%	98.65%
All Weather Conditions	90.56%	95.16%	98.71%

Note: Data highlighted in grey does not meet 95% or greater standard set by FAA
Source: National Climatic Data Center
Software: FAA Airport Design Version 4.2, Michigan Bureau of Aeronautics - 1994
Period of Record: 1999-2008
Number of Observations: 72,539

1.5 Land Use

Existing land uses around the Airport include commercial, industrial and undeveloped land. Most of the Airport is surrounded by industrial development including the Johnson Controls campus located on the northwest corner of the property and the Haworth campus to the northeast. North of the Airport, various businesses and an undeveloped wooded area are located just beyond the limits of the Airport property. More developed property lies along 64th Street, south of the Airport property, where commercial and industrial businesses are located along with agricultural property.

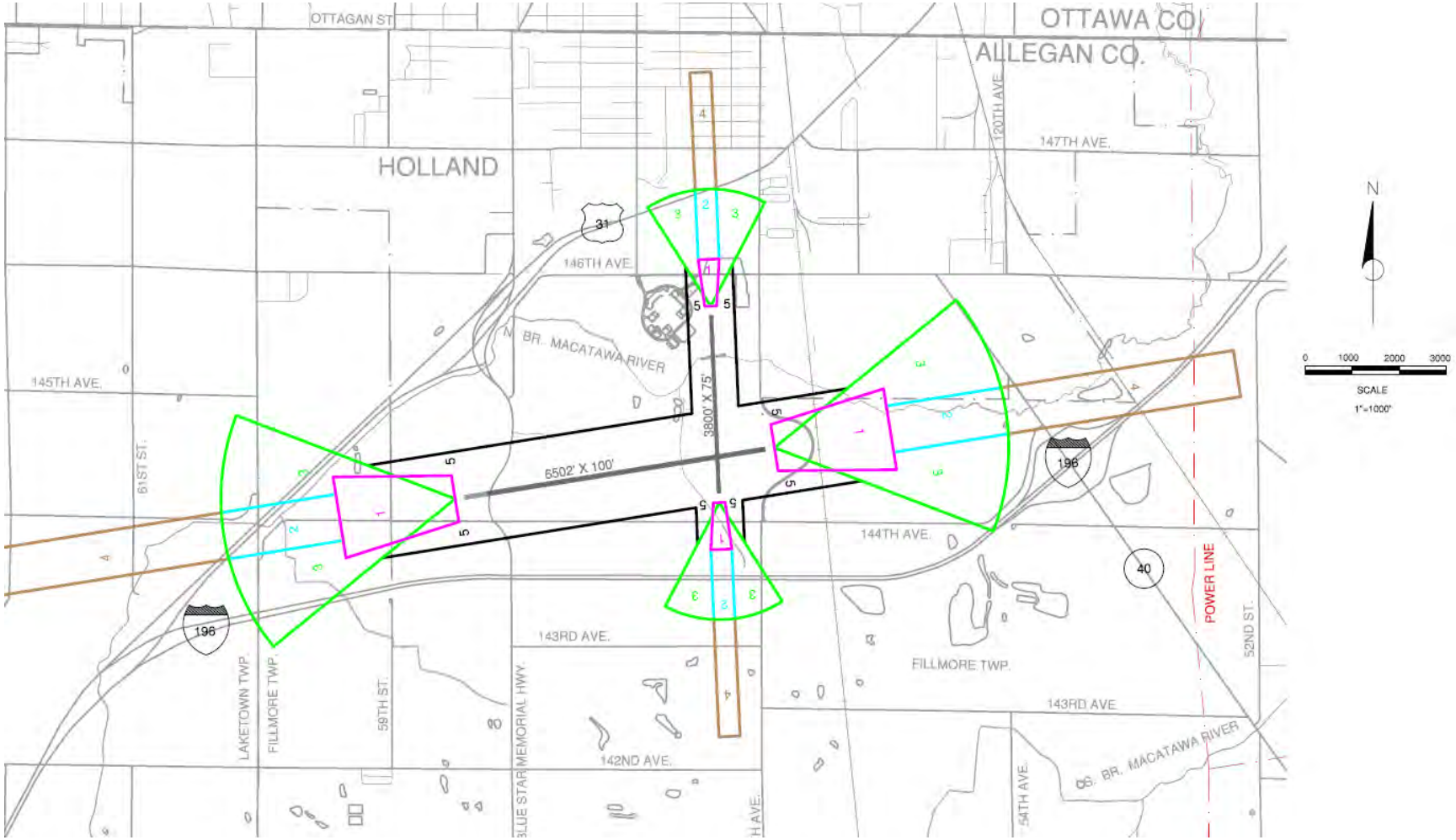
Land uses surrounding the Airport have a direct impact on its operational feasibility and future development opportunities. To assist airports in protecting the airspace and land use around their facilities, the Aeronautics Code of the State of Michigan grants the Michigan Aeronautics Commission the ability to adopt an Airport Approach Plan (AAP) for licensed public use airports. The Michigan Zoning Act of 2006 requires local zoning officials to address the area designated in the AAP when adopting standards for local zoning ordinances. In 2007, the Michigan Aeronautics Commission through the Michigan Department of Transportation – Bureau of Aeronautics (MDOT AERO) approved an AAP for the Airport that is illustrated in **Figure 1-5**. **Figure 1-6** defines the dimensions of the zones in the AAP.

The existing AAP for the Airport identifies several areas, especially to the west, where future growth and development should be limited. The AAP also identifies a potential crosswind runway. MDOT AERO policy is to illustrate proposed crosswind runways in AAPs to protect airspace and land use for future runway construction. Though a crosswind runway may or may not be considered in short- or long-term development, protection of the associated approach areas allows flexibility in planning should future demand necessitate the construction of this infrastructure.

1.6 Population Data

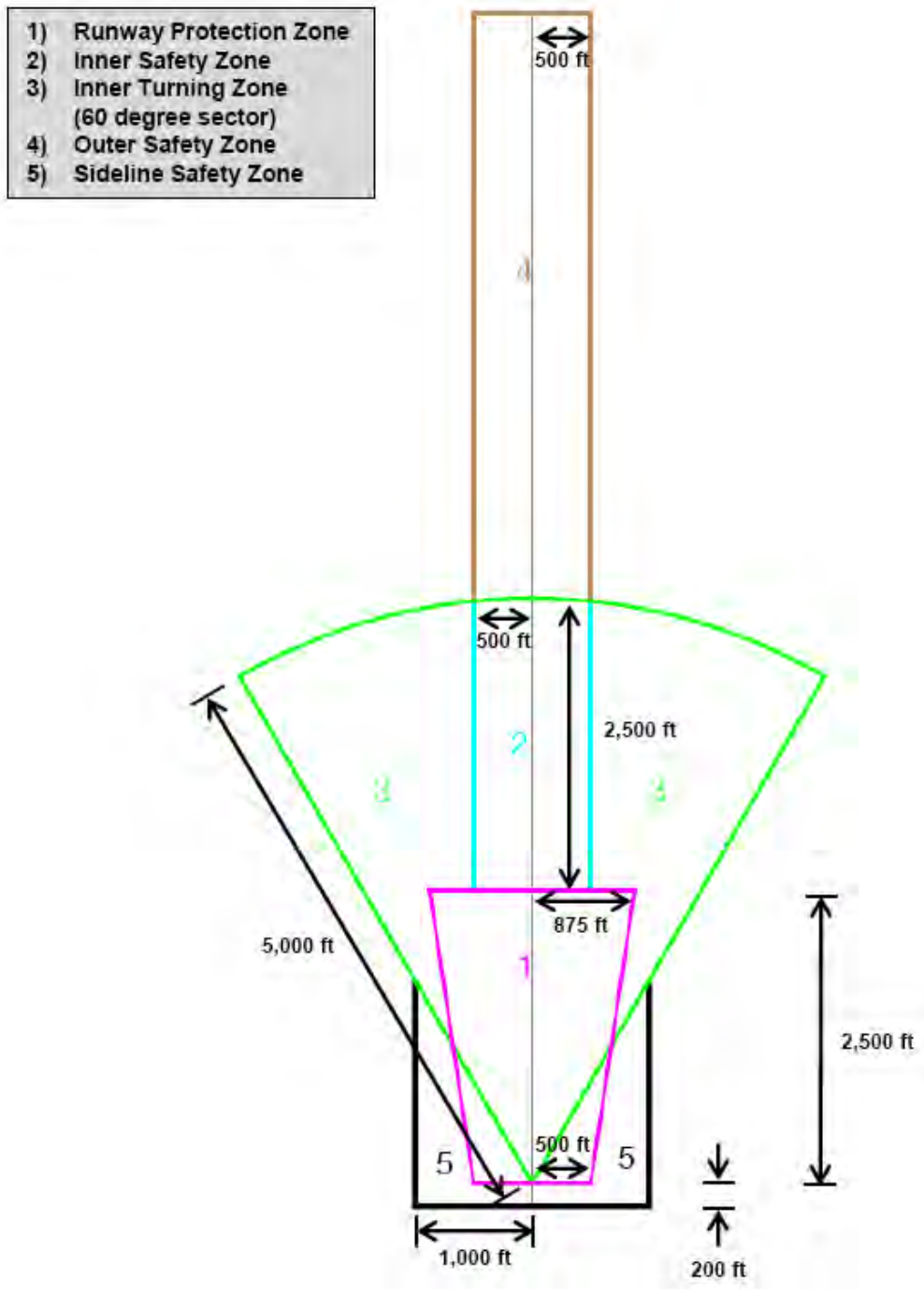
Understanding the development patterns of the local area, including population data, helps establish the basis for future potential growth and use of the Airport. The City of Holland is located in parts of both Allegan and Ottawa counties. As a result, it is important to not only analyze the socioeconomic data of the City of Holland, but also of these two counties. City and county data released from the 2010 U.S. Census were used as a baseline in evaluating the population trends of these three geographic areas.

Figure 1-5
Airport Approach Plan



Zones: 1) Runway Protection Zone, 2) Inner Safety Zone, 3) Inner Turning Zone, 4) Outer Safety Zone, 5) Sideline Safety Zone
Source: Michigan Department of Transportation, Bureau of Aeronautics, 2007

Figure 1-6
Airport Approach Plan Zone Dimensions



Source: Michigan Department of Transportation Airport Approach Plan Guidelines
Illustration: Mead & Hunt, Inc.

The population of the City of Holland from the 2010 US Census is 33,051 **(Table 1-2)**. This is a decrease of five and seven-tenths percent (-5.7%) from the population of 35,048 that resided in the city in 2000. Within Holland, the age of the population is evenly distributed with 24.0 percent (24.0%) under the age of 18, 16.7 percent (16.7%) aged 18 to 24, 13.3 percent (13.3%) aged 25 to 34, 17.3 percent (17.3%) aged 35 to 49, 15.0 percent (15.0%) aged 50 to 64, and 13.7 percent (13.7%) 65 years of age or older.

Ottawa County, in which a majority of Holland is situated, has a population of 263,801 as counted by the 2010 U.S. Census. This is a ten and seven-tenths percent (10.7%) increase from the 2000 population of 238,314. The age distribution of the population is spread out in the county as follows: 26.1 percent (26.1%) under the age of 18, 12.8 percent (12.8%) aged 18 to 24, 11.7 percent (11.7%) aged 25 to 34, 19.8 percent (19.8%) aged 35 to 49, 17.9 percent (17.9%) aged 50 to 64, and 11.8 percent (11.8%) 65 years of age or older.

Allegan County, in which the Airport is located, has a population of 111,408 as counted by the 2010 U.S. Census. This is a five and four-tenths percent (5.4%) increase in population from the 2000 population of 105,665. The age distribution of the population is spread out with 26.2 percent (26.2%) under the age of 18, 7.7 percent (7.7%) aged 18 to 24, eleven percent (11.0%) aged 25 to 34, 21.3 percent (21.3%) aged 35 to 49, 20.8 percent (20.8%) aged 50 to 64, and 13.0 percent (13.0%) over the age of 65.

Table 1-2
2000-2010 Population Data

Area	2000 Population	2010 Population	Percent Change
City of Holland	**35,048**	**33,051**	**-5.7%**
Ottawa County	**238,314**	**263,801**	**10.7%**
Allegan County	**105,665**	**111,408**	**5.4%**
TOTAL (Ottawa & Allegan Counties)	**379,027**	**408,260**	**7.7%**

Source: 2000 U.S. Census, 2010 U.S. Census

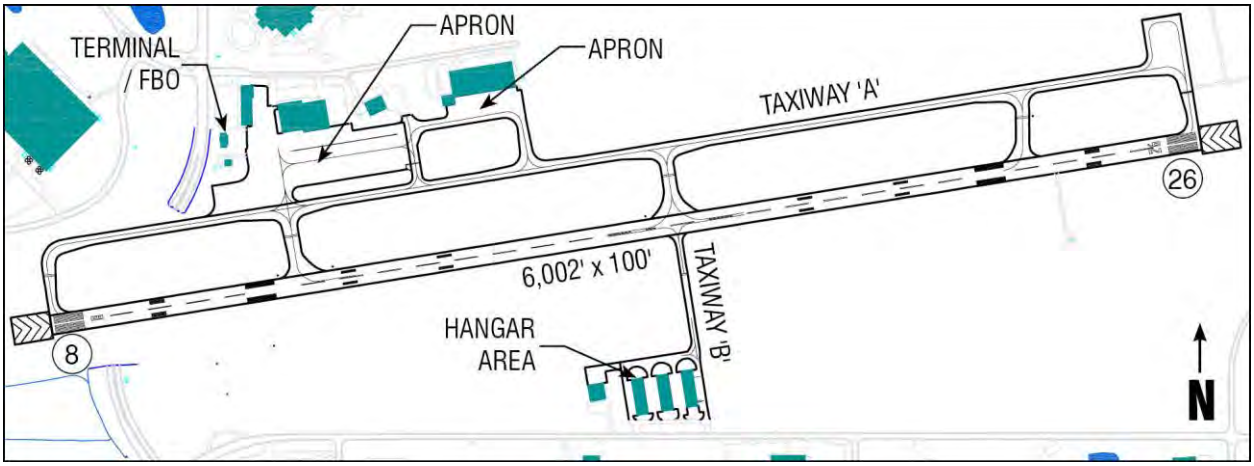
Given the current decreasing population in Michigan, the growth of Allegan and Ottawa counties is seen as a positive trend towards future development in the region. Population growth in both counties can be attributed to urbanization with their proximity to Grand Rapids, as well as Kalamazoo, Grand Haven, and Muskegon. Although the population within the city of Holland has experienced a slight reduction, any future increase may be attributed to the city being named one of Money Magazine's best places to retire in 2006. With Allegan and Ottawa Counties both bordering Lake Michigan and providing many tourist destinations, along with growth of many manufacturing and technology companies located in the two counties, continued population growth may continue in the area, likely resulting in increased use and demand for aviation services.

1.7 Existing Airport Facilities

West Michigan Regional Airport encompasses 432 acres of land, located entirely inside the Holland city limits. The property lies within Allegan County and the elevation is 698 feet above mean sea level (698 MSL). The Airport includes both airside facilities such as runways, taxiways, and landside facilities such

as aircraft storage hangars. Existing facilities at the Airport are evaluated in several separate categories such as runways, navigational aids and hangars. Understanding the existing facilities and their capabilities is important in determining whether these facilities can accommodate future aviation needs. **Figure 1-7** illustrates an aerial view of the general airport layout. **Table 1-3** illustrates the operational profile of the Airport and provides data such as location, services, and runway information.

Figure 1-7
Runway, Taxiway, and Apron Layout



Source: Mead & Hunt

Table 1-3
West Michigan Regional Airport Operational Profile

Airport Location	Runway Information
FAA Identifier: BIV Elevation: 698 ft. MSL Airport Latitude: 42-44-34N Airport Longitude: 086-06-28W Distance From City: 2 miles south of Holland ZIP Code: 49423	Runway 8/26 • 6,002 feet long x 100 feet wide • Full parallel taxiway • Asphalt, grooved, in good condition • Weight bearing capacity: Single wheel – 75,000 lbs. Double wheel – 160,000 lbs. Double tandem – 175,000 lbs. • High intensity runway edge lights (HIRL) • High intensity taxiway edge lights (HITL) • Precision markings • Precision Approach Path Indicator (PAPI) & Runway End Identifier Lights (REIL) on both runway ends • Instrument Landing System (ILS) & Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) on Runway 26
Airport Operations	
• Public use airport • Non-towered airport • Lighted wind indicator • Segmented circle • Rotating beacon	
Airport Services	**Airport Operational Statistics**
• 100LL & Jet-A fuel available • Major airframe repair capability available • Major powerplant repair capability available	Aircraft based on field: 51 Single engine airplanes: 33 Multi engine airplanes: 8 Jet airplanes: 10 Helicopters: 0

Source: FAA 5010 Data, 2011

1.7.a Runways

The Airport has an east/west runway (Runway 8/26) that is 6,002 feet long by 100 feet wide, paved in asphalt with a grooved surface and considered to be in "good" condition by the FAA as of 2011. As a part of the effort to update the statewide Airport Pavement Management System (APMS) database in 2007, MDOT AERO inspected the condition of the runway and assigned it a pavement condition index (PCI) rating of 82 on a scale to 100 with pavements in optimal condition assigned a score of 100. Recent pavement rehabilitation work on the western 1,100 feet of runway, however, is anticipated to increase its overall PCI rating during the next regularly scheduled pavement inspection. The pavement strength rating of the runway is based on the distribution of the maximum takeoff weight of an aircraft through its landing gear configuration. Landing gear configurations are determined by the number of wheels on each strut of the main landing gear. For Runway 8/26, the weight bearing capacities are: 75,000 pounds for single wheel main gears, 160,000 pounds for double wheel main gears and 175,000 pounds for double tandem, or four wheel, main gears.

1.7.b Taxiways

The movement of aircraft to and from the runway from aircraft parking and hangar areas is accomplished with a taxiway system. At the Airport, Taxiway A is the main taxiway parallel to Runway 8/26, which allows aircraft to taxi to or from either end of the runway. The parallel taxiway is on the north side of the runway and is connected to the main runway by five connector taxiways that allow aircraft to enter and exit the runway at various locations. Taxiway A is the same length as Runway 8/26 at 6,002 feet and is 50 feet in width which exceeds the FAA standard of 35 feet. The five connector taxiways are 325 feet long and have widths of 70 feet to meet the turning radii requirements of aircraft that enter and exit from Runway 8/26 and the parallel taxiway. Taxiway B on the south side of the airfield is 35 feet wide and allows aircraft access to various aircraft hangars along 64th Street.

1.7.c Aprons

Aprons, also known as ramps or aircraft parking areas, are hard surface areas that provide for aircraft parking. At the Airport, a large apron on the northwest side of the airfield supports the operations of Tulip City Air Service and transient or itinerant aircraft of various corporate hangars. Smaller ramps on the south side of the airfield accomplish the same task for one corporate hangar and three smaller private T-hangars. The large apron at the northwest side offers approximately 282,000 square feet of space while the corporate apron to the east offers approximately 40,000 square feet of space. To the south, approximately 37,500 square feet of apron space is available for T-hangar tenants while approximately 4,500 square feet of apron space is available for the corporate hangar.

1.7.d Terminal Building

The existing terminal building is a one-story building on the northwest corner of the airfield, near the intersection of Geurink and Washington Avenues. The terminal building is approximately 2,000 square feet in area and includes offices for Tulip City Air Service, a car rental counter, restrooms, a pilot's lounge,

a flight planning area and a small kitchenette. Adjacent to the terminal building is a parking lot with approximately 45 parking spots which are utilized by employees, passengers and rental car operations.

In September 2005, a report titled *Tulip City Airport Global Welcome Center Concept and Budget Report* was prepared which summarized the future construction of a new terminal building. This study, conducted by Mead & Hunt, provided observations of the existing terminal building and stated the vision for a new terminal. The report acknowledged the vital transportation link the Airport provides to the region. It found the area to be one of Michigan's prime tourist and growth areas for manufacturing and technology, and recognized the important role a new terminal would play in representing the community. Existing conditions and specific deficiencies were addressed for the existing terminal building. A proposed site, design, and cost estimate for a new terminal was provided along with statistical information on the floor area of the building facilities.

As a follow up to the 2005 study, WMAA has commissioned a separate study to address the terminal building needs. In February 2010, an update to the 2005 study was undertaken to address additional needs and updated options that reflect the current economic climate. . The goal of the updated study is to review the recommended terminal site, update estimated costs and offer an updated conceptual layout plan and profile of the building. Recommendations from this study will be addressed in Chapter 3 and Chapter 4 of this document.

1.7.e Fixed Base Operator (FBO)

FBOs are businesses located at an airport that provide aviation services for based and transient aircraft. These services can range from aircraft fueling and maintenance, aircraft rental, pilot training, aircraft storage and parking, and car rentals. FBOs also often provide areas for GA passengers to wait for arriving and departing flights, lounges for pilots to rest and resources such as computers for pilots to check weather information.

The Airport's FBO, Tulip City Air Service, is the only FBO on the airfield and provides a full range of professionally staffed aviation services. In addition to providing 100 low lead (100LL) and Jet-A aircraft fuel, and airframe and power plant maintenance and repair, Tulip City Air Services also offers aircraft charters with a fleet of five aircraft and a flight training school. Tulip City Air Service oversees the day-to-day operation of the Airport including snow removal and mowing of the airfield grass surfaces. The FBO operates from the terminal building and has several adjacent aircraft hangars.

1.7.f Hangars

The Airport has a number of privately owned hangars on the airfield including corporate facilities and smaller GA structures. Most of the corporate hangars are located at the northwest corner of the airfield near the terminal building; however, a single corporate hangar is located on the south side of the field with access to 64th Street. Also located on the south side of the airfield are three buildings that house 22 single-engine GA aircraft in T-hangar style units.

1.7.g Navigational Aids

Various navigational aids (NAVAIDs) are used to assist pilots on takeoff or landing. A navigational aid can be in the form of a light, sign or marking. Navigational aids provide information to a pilot such as location, distance, wind direction or proper descent slope. NAVAIDs can also be in the form of radio or satellite signals. When decoded with proper equipment installed on an aircraft, these signals can give pilots navigational information that is useful in conditions when visibility is limited.

Visual NAVAIDs at the Airport include several different types of facilities and elements. Located near the approach end of Runway 8 on the south side of the airfield, a lighted wind indicator (also known as a lighted wind cone), along with a segmented circle, assists pilots with identifying current wind conditions on the field. A rotating beacon to assist pilots in locating the Airport at night or during times of reduced visibility is found on the north side of the airfield, east of the hangars and terminal ramp at the end of Geurink Avenue. High intensity runway edge lights (HIRL) situated along the sides of Runway 8/26 distinguishes the runway for pilots during nighttime operations and in low visibility weather. The taxiway is illuminated with High Intensity Taxiway Lighting (HITL) to support taxiing of aircraft in reduced visibility.

Runway 8 has a Precision Approach Path Indicator (PAPI) which is a lighting system designed to assist pilots in descending at the proper rate and slope when landing. Runway 8 also has Runway End Identifier Lights (REIL) located just off the threshold of the runway. These lights flash in an effort to distinguish where the runway pavement begins.

Runway 26, like Runway 8, has a PAPI lighting system along with a REIL to assist pilots on approach for landing. Runway 26 also has an Instrument Landing System (ILS) with Distance Measuring Equipment (DME) that provides a precision guidance system to pilots when operating properly equipped aircraft. An ILS and DME are navigational aids that transmit radio signals. They provide navigational information to pilots that, when decoded by equipment installed on an aircraft, assists with the horizontal and vertical location of an aircraft when landing on the runway. This landing system is an important navigational component as it can be utilized in low visibility and inclement weather situations when a pilot is operating under IFR conditions. Runway 26 is equipped with a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) to assist pilots in locating the beginning of the runway at night, in times of low visibility and in inclement weather. The MALSR approach navigational lighting

system also includes Sequenced Flashing (SF) lights that assist pilots in lining up and locating the start of usable runway pavement.

Approach procedures for pilots landing at the Airport are based on several different navigational aids at or in the vicinity of the Airport. Approach procedures for runways using an ILS, as described above, are common. Area Navigation (RNAV) is a method of navigation that utilizes signals transmitted from global positioning system (GPS) satellites that allow pilots to determine their location and follow flight paths established by the FAA. Localizer Performance with Vertical Guidance (LPV) is another GPS-based approach method that offers vertical guidance utilizing the Wide Area Augmentation System (WAAS). Very high frequency omni-directional radio range ground stations, otherwise known as VORs, also provide a radio signal based NAVAID for pilots. Radio signals transmitted from VOR ground stations provide location and distance information to pilots that also can be utilized when navigating flight paths published by the FAA.

Pilots are aided when landing at the Airport through the use of various navigational aids. These NAVAIDs support approach procedures established by the FAA and are designed to assist pilots when executing landing maneuvers. The following list details the existing approach procedures specifically created by the FAA for the Airport as of June 2011.

- ILS or Localizer/DME approach to Runway 26 **(See Figure 1-8)**
- RNAV (GPS) approach to Runway 8 **(See Figure 1-9)**
- RNAV (GPS) approach to Runway 26 **(See Figure 1-10)**
- VOR-A approach to the Airport **(See Figure 1-11)**

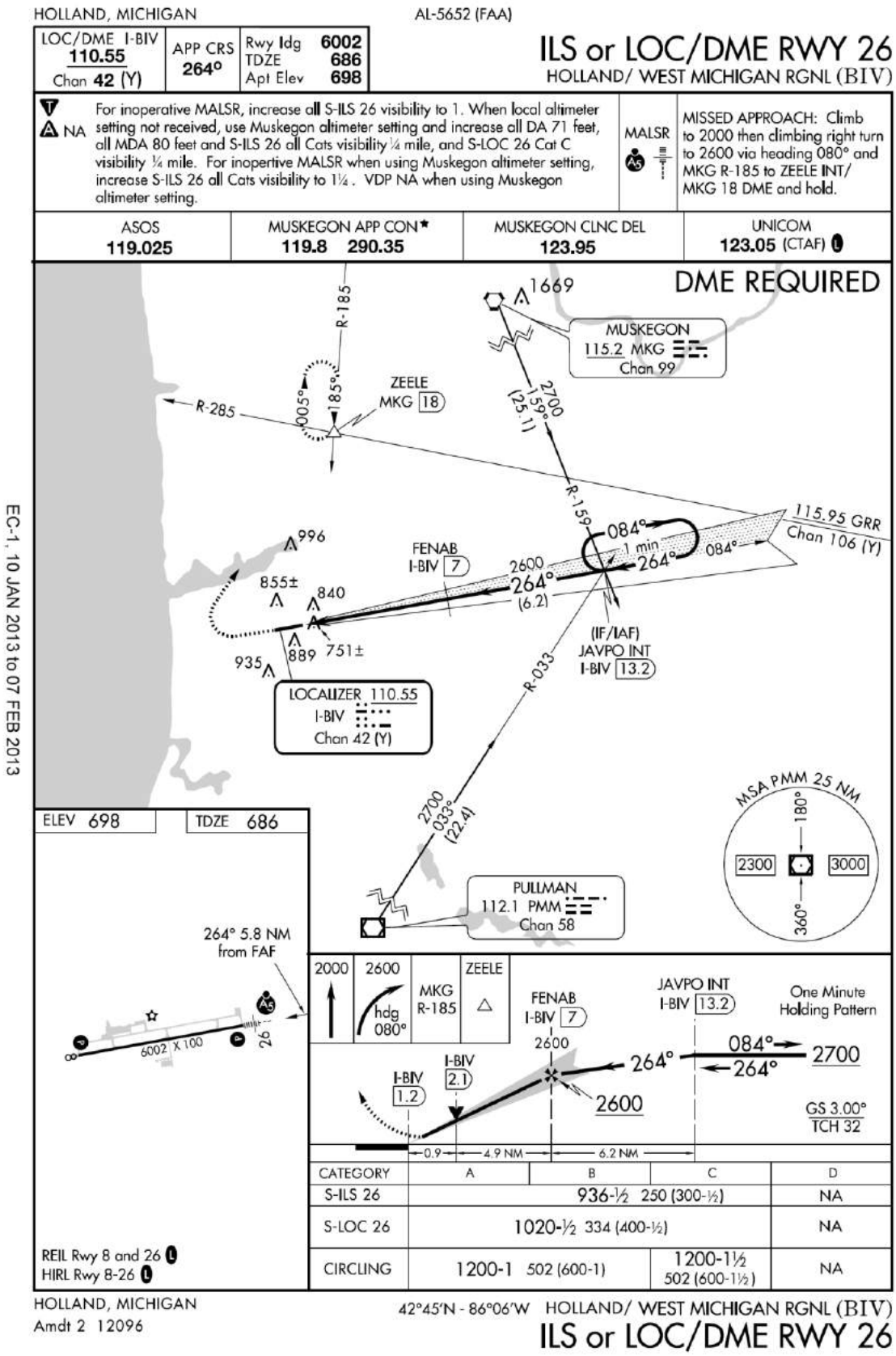
1.8 Airport Tenants

Airport tenants play an important role in the operation of the Airport, since they contribute to the economic viability of the facility. Tenants at the Airport are a combination of aviation related businesses, corporate users and private individuals.

Corporate Tenants – Several corporate hangars are located on the airfield. These hangars house aircraft which support numerous businesses in the West Michigan area by providing them with access to the world.

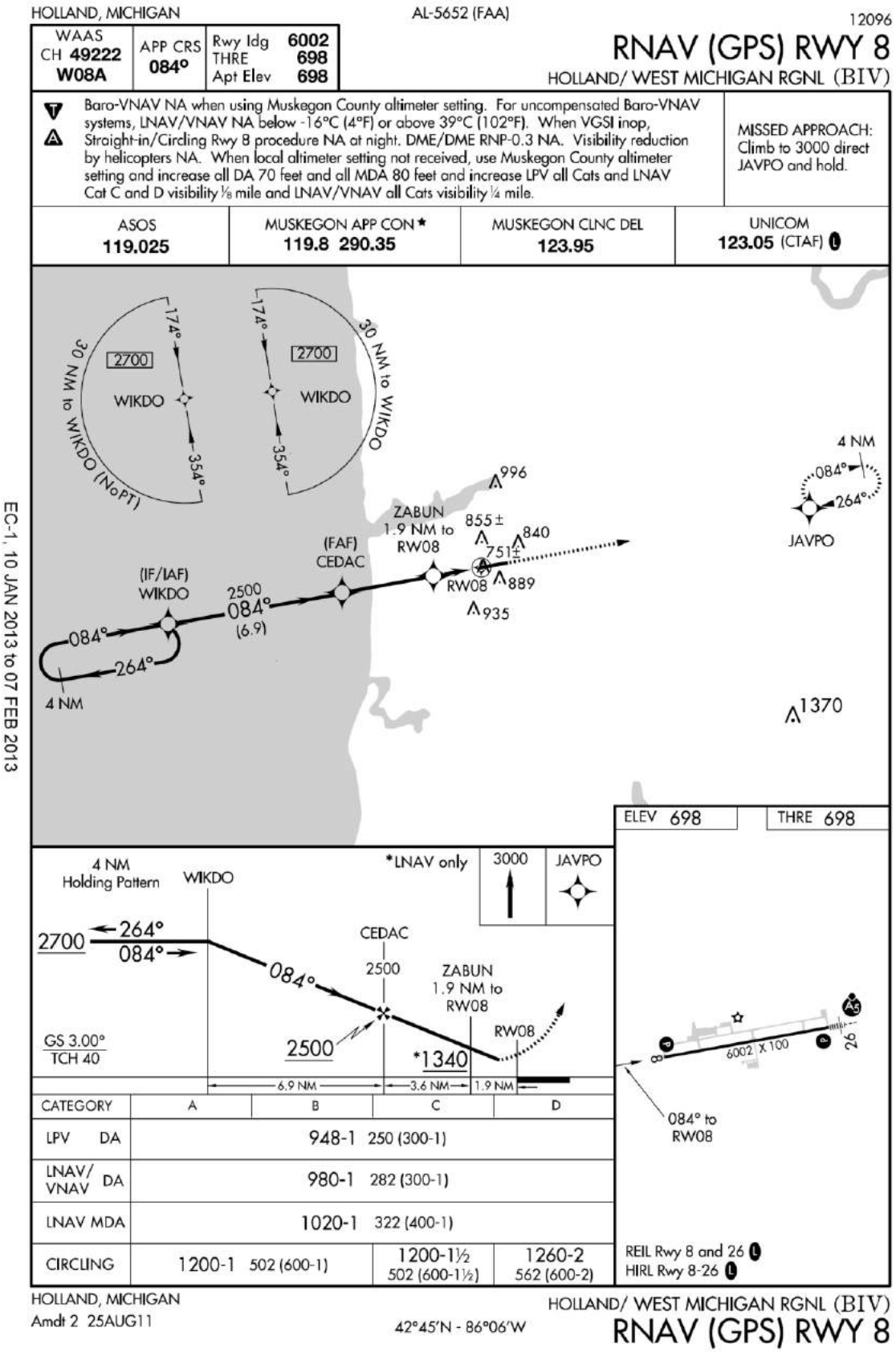
T-Hangar Tenants – The Airport is also home to a thriving base of GA pilots who operate smaller, single- and twin-engine aircraft for both business and private use from the Airport. These tenants are predominately located in the T-hangar buildings situated on the south side of the airfield and include individuals who operate aircraft for personal use, a flying club and several smaller businesses.

Figure 1-8
ILS or Localizer/DME Approach to Runway 26



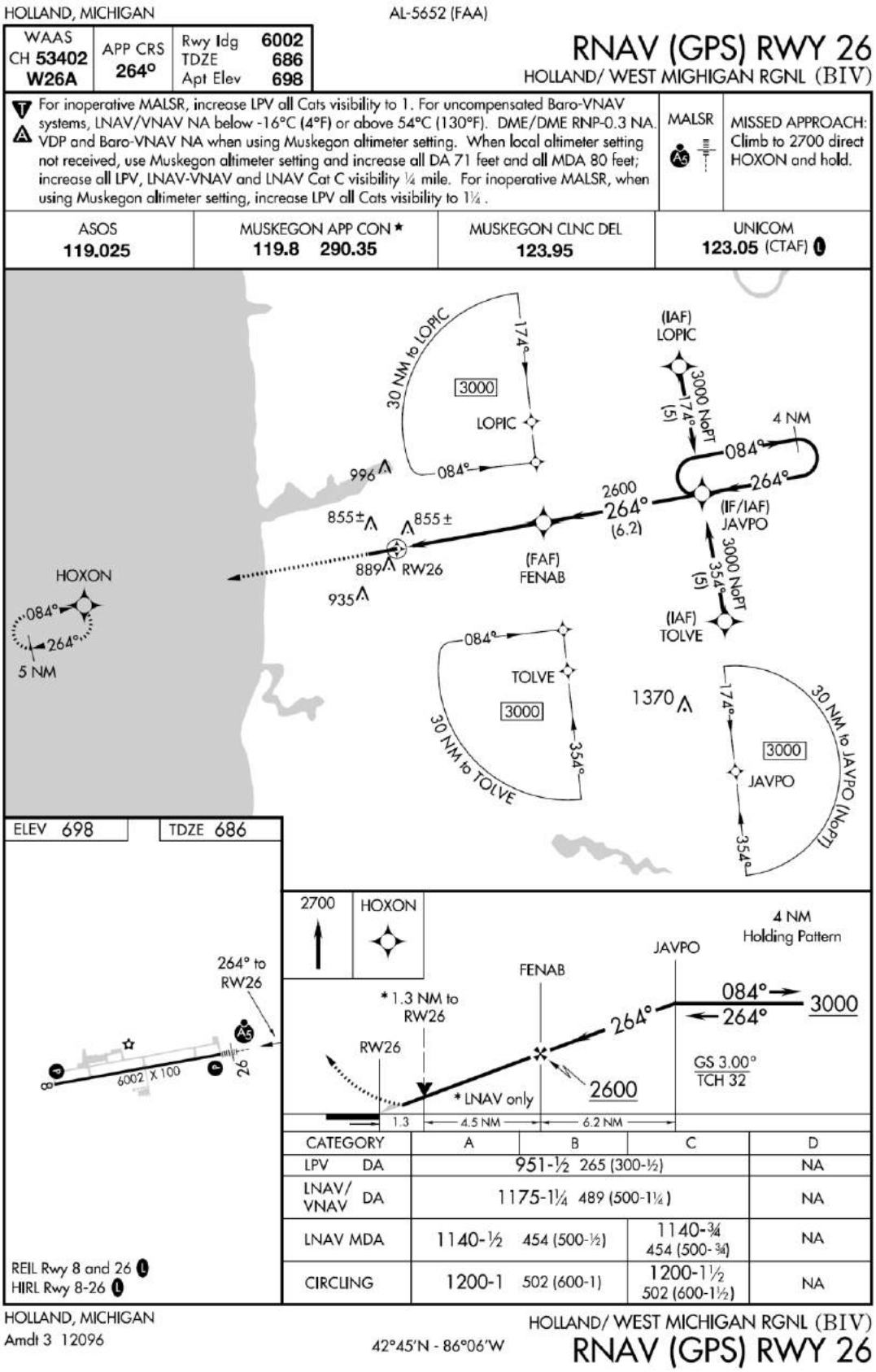
Source: Federal Aviation Administration, January 2013

Figure 1-9
RNAV (GPS) Approach to Runway 8



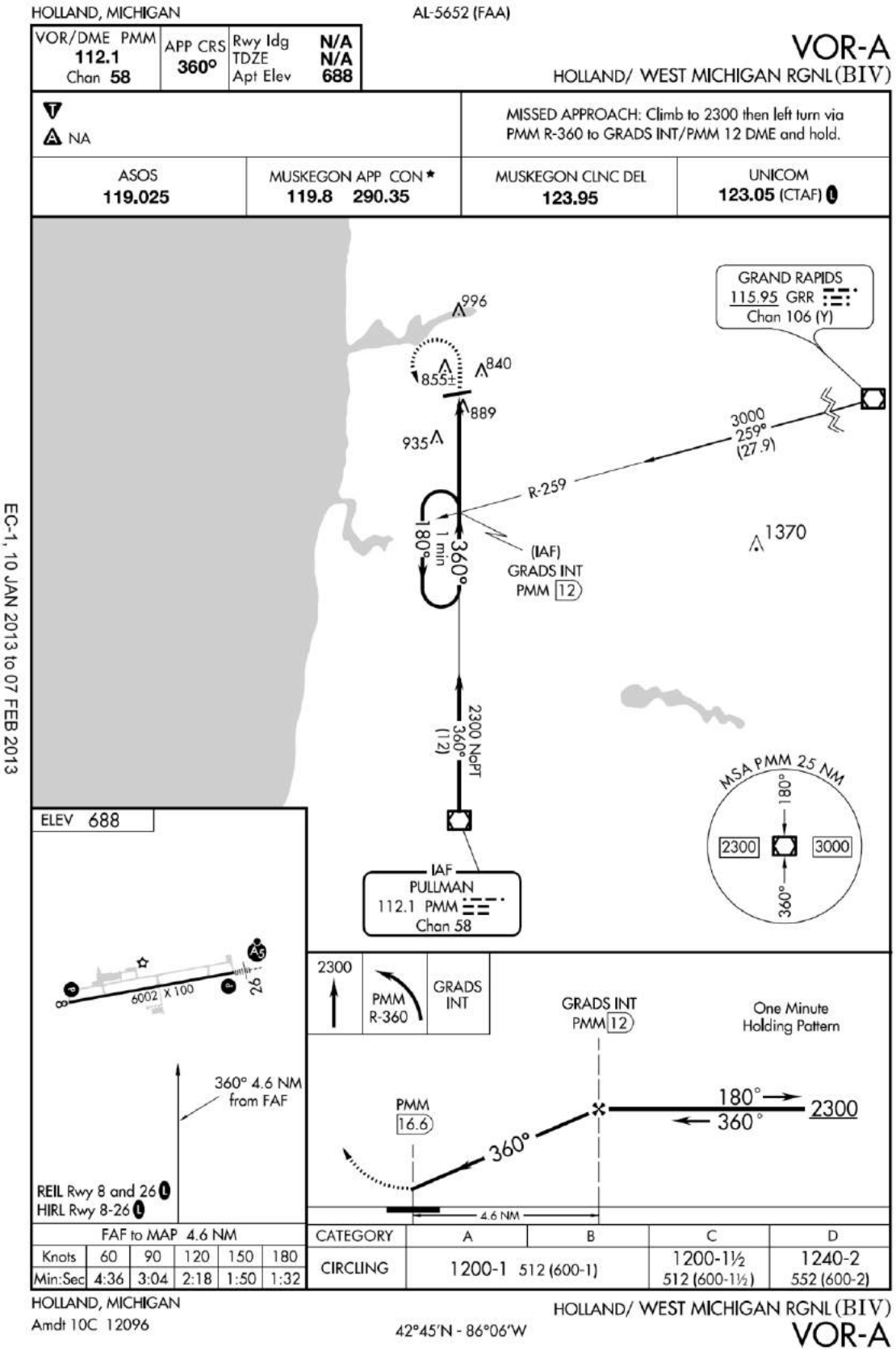
Source: Federal Aviation Administration, January 2013

Figure 1-10
RNAV (GPS) Approach to Runway 26



Source: Federal Aviation Administration, January 2013

Figure 1-11
VOR-A Approach to Airport

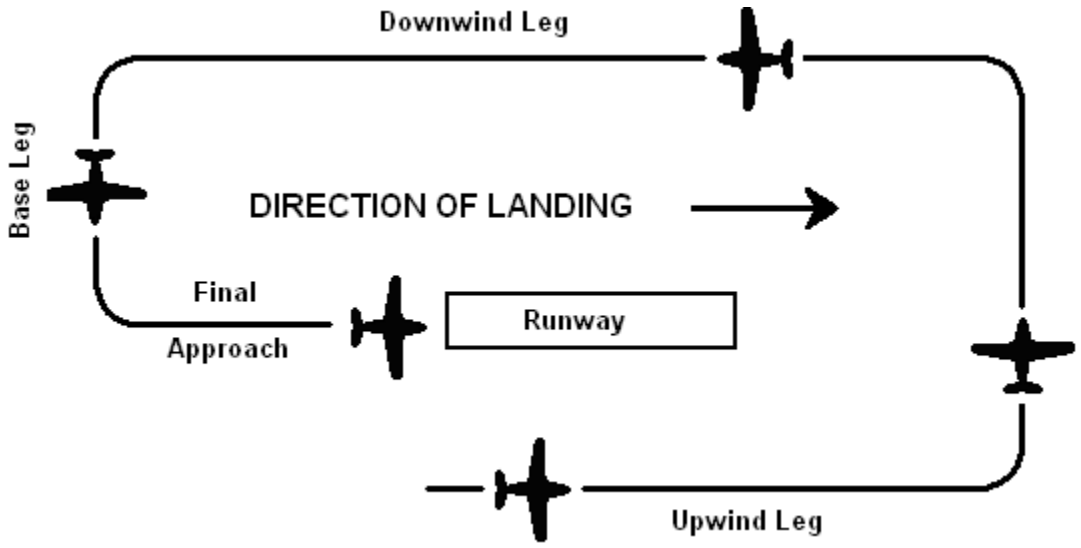


Source: Federal Aviation Administration, January 2013

1.9 Airspace and Air Traffic Control

West Michigan Regional Airport is a non-towered facility which means there is no air traffic control tower (ATCT) on site. For air traffic management, pilots must use a Common Traffic Advisory Frequency (CTAF) which is a common use radio frequency also known as a UNICOM. The CTAF at the Airport is assigned a radio frequency of 123.050 megahertz (123.05 MHz). At a non-towered airport with a CTAF frequency, pilots are responsible for reporting the location of their aircraft in relation to the Airport while operating in the traffic pattern during landing, takeoff and ground movements. In an airport traffic pattern, a circuit is followed by aircraft. The direction of this circuit is based upon right- or left-hand turns, left to the discretion of the pilot or as a published procedure by the FAA. Typically a left hand, or counterclockwise, traffic pattern is utilized. Aircraft entering this circuit announce their location and intentions on the CTAF frequency and coordinate maneuvers with other aircraft in the pattern. **Figure 1-12** illustrates a typical airfield traffic pattern for the Airport.

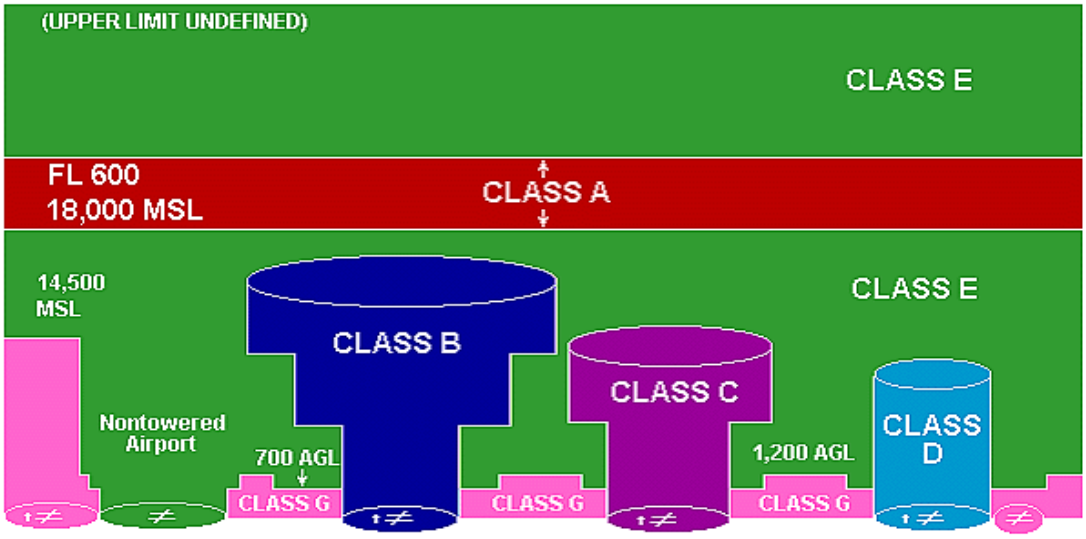
Figure 1-12
Airfield Traffic Pattern



Source: Federal Aviation Administration, Office of Runway Safety

To help preserve the safe separation of aircraft and to manage air traffic in the skies, the FAA has classified and designed areas of airspace throughout the country. Each area of airspace has its own rules, regulations and operating procedures and is assigned to different classifications of airports. These areas of airspace are designated on published charts that identify the boundaries of the assigned areas. **Figure 1-13** graphically depicts the different airspace classes assigned by the FAA.

Figure 1-13
Airspace Classes



Source: Federal Aviation Administration

Class A – Class A airspace is found between the altitudes of 18,000 feet to 60,000 feet above mean sea level (MSL). Operation in this class of airspace requires an aircraft to file a flight plan, operate under Instrument Flight Rules (IFR) and be in contact with air traffic control.

Class B – Class B airspace is found from ground level up to 10,000 feet MSL. This airspace is generally assigned around the airports with the most air traffic such as Detroit Metropolitan, Chicago O'Hare and Los Angeles International. The dimension of this airspace is designed specifically to meet the needs of the particular airport. Radio contact with air traffic control must be established to enter this airspace.

Class C – Class C airspace can be found from ground level to 4,000 feet MSL above an airport's elevation. This airspace is assigned to airports with an operational air traffic control tower, radar approach control and a certain number of IFR operations. Like Class B, the dimension of this airspace is tailored to the needs of an individual airport. Typically, dimensions of this airspace has an inner radius of five (5) nautical miles and an outer radius of ten (10) nautical miles found from 1,200 feet to 4,000 feet above the airport elevation. Radio contact with the air traffic control tower must be established to enter Class C airspace.

Class D – Class D airspace is found at airports with only an operational air traffic control tower and is found from ground level to 2,500 feet MSL above an airport's elevation. The dimension of this airspace varies on the needs of the airport. Radio contact with the air traffic control tower must be established to enter Class D airspace.

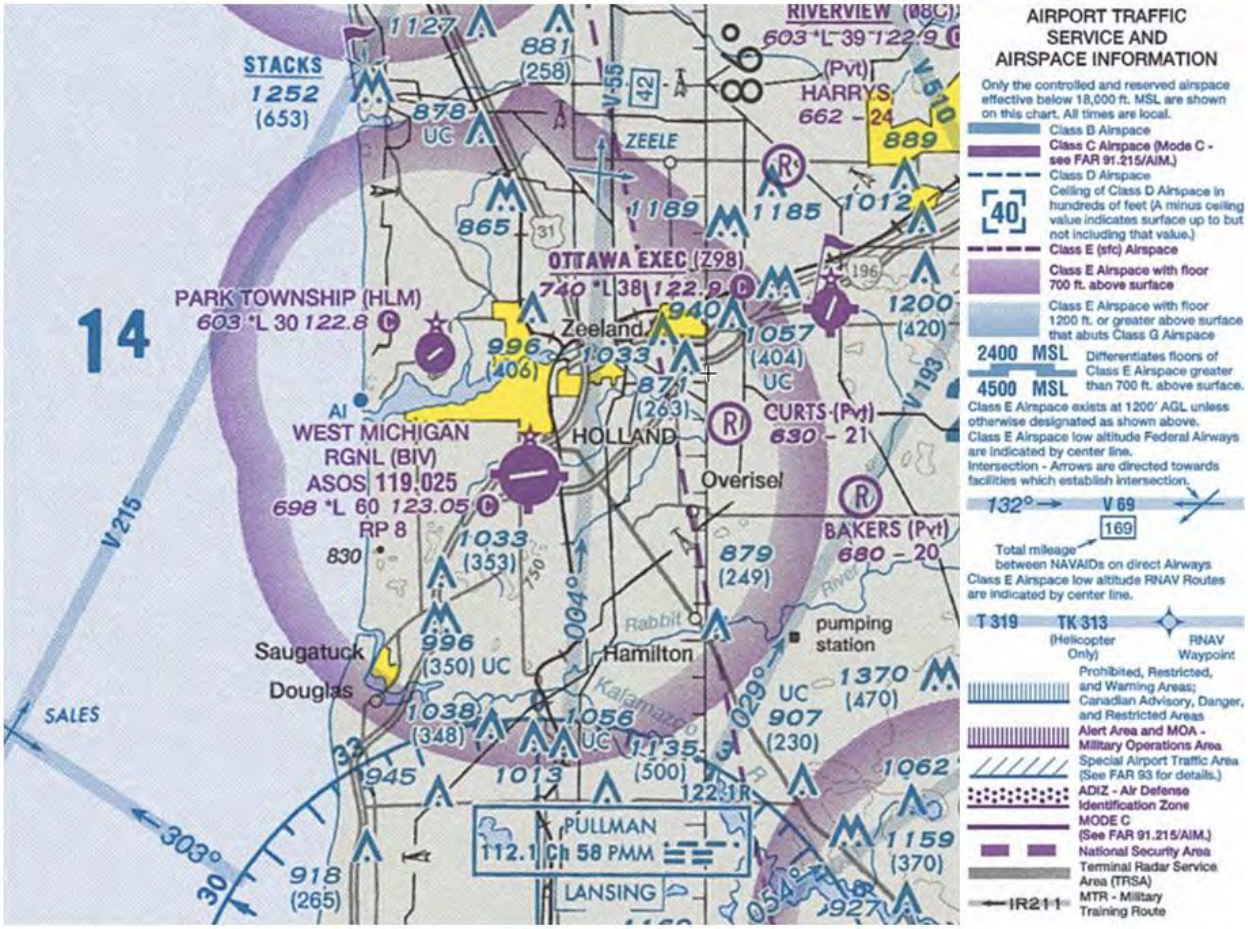
Class E – Class E airspace is all airspace that is not designated Class A, B, C, D, or G and found between ground level and 18,000 feet. Radio contact with air traffic control must be made with aircraft operating under IFR to enter this airspace, but is not required for aircraft operating under visual flight rules (VFR). Class E airspace also includes uncontrolled airports that do not have an air traffic control tower.

Class G – Class G airspace is uncontrolled airspace and does not require radio contact with air traffic control. Only aircraft operating under VFR can operate in Class G airspace.

Since the Airport is uncontrolled and does not have an air traffic control tower, it lies within Class E airspace. **Figure 1-14** displays the sectional chart showing the classification of airspace around the Airport.

It should be noted that on the airspace sectional chart, a small airport located approximately four and one-half miles (4.5 miles) northwest of the Airport is shown. This airport is Park Township Airport, which is a general aviation airfield with a 2,999 foot paved runway and a 2,245 foot turf crosswind runway. Also shown in the sectional chart is another small airport located approximately ten (10) miles northeast of West Michigan Regional Airport. This airport, Ottawa Executive, is also a general aviation airport located near Zeeland, with a 3,800 foot paved runway.

Figure 1-14
Airspace Sectional Chart



Source: SkyVector.com Aeronautical Charts, February 2013

1.10 Design Standards

As part of its mission to insure airport safety, the FAA has established standards and recommendations for airport design published in FAA Advisory Circular (AC) 150/5300-13, *Airport Design*. Through this AC, a coding system known as the Airport Reference Code (ARC) was developed based on aircraft approach speeds and aircraft wingspans. These elements are separated into two groupings: Aircraft Approach Category (AAC) and Airplane Design Group (ADG). A combination of these two elements determines the design characteristics for each individual surface on an airport. **Table 1-4** and **Table 1-5** illustrate the categories of approach speeds used in the Aircraft Approach Category and the grouping of wingspans used in the airplane design group that are applied to the ARC. More discussion of the ARC classifications can be found in Chapter 3 of this report.

Table 1-4
Aircraft Approach Category (AAC)

Approach Category	Approach Speed In Knots
A	Less than 91
B	91-120
C	121-140
D	141-165
E	166 or greater

Source: FAA AC 150/5300-13, *Airport Design*

Table 1-5
Airplane Design Groups (ADG)

Group Number	Wingspan (In Feet)
I	Less than 49
II	49-78
III	79-117
IV	118-170
V	171-213
VI	214-261

Source: FAA AC 150/5300-13, *Airport Design*

1.10.a Runway and Taxiway Design

Runway 8/26 has been designated as a D-II runway through the use of the ARC. A D-II runway classification means that Runway 8/26 is designed to handle aircraft with approach speeds of up to 166 knots and wingspans of up to 78 feet. Examples of aircraft that meet this criterion include single- and twin-engine aircraft and turbine or jet engine aircraft including the Gulfstream V. The D-II designation of the runway reflects the use by business jet traffic that frequent the Airport.

The width and design of the primary taxiways at the Airport reflect a larger design characteristic with the width of parallel Taxiway A at 50 feet and the width of the five connector taxiways at 70 feet. The width of these taxiways meets the turning and wheelbase width requirements for a number of larger aircraft that frequent the Airport but provides less than 500 annual operations which is the threshold for moving to the next larger ARC. The southern connector, Taxiway B is 35 feet wide which is the D-II standard.

1.10.b Runway Safety Areas, Protection Zones, and Object Free Areas

The runway safety area, object free area, and runway protection zones are runway design elements designated in FAA AC 150/5300-13, *Airport Design*, that protect aircraft from objects in the event of an unintended excursion from the prepared runway surface. Implementation of these design elements is required to meet certain Federal Aviation Regulation (FAR) requirements. These areas are based upon the ARC as previously defined.

Runway Safety Areas – Runway safety areas (RSAs) are designated areas surrounding a runway that enhance the safety of aircraft that undershoot, overrun or veer off the paved surface of a runway. RSAs also provide access for Aircraft Rescue and Fire Fighting (ARFF) equipment during emergencies. An RSA must be free of obstructions, properly graded to allow for water drainage, and be able to support the weight of aircraft and other vehicles such as fire trucks and snow removal equipment expected to use the area. RSAs are based on the ARC and vary in size.

The width of the safety area for Runway 8/26, based on the D-II ARC designation, is 500 feet wide (250 feet either side of the runway centerline) and runs the entire length of the runway, including 1,000 feet beyond each end of the runway. See **Figure 1-15** and **Table 1-6**.

Object Free Areas – Object free areas (OFAs) are designed to keep objects from protruding above the edges of the RSA. Equipment deemed necessary for air navigation, such as airfield lighting, and taxiing aircraft are permitted in an OFA. All other objects, including parked aircraft, are not to be placed in an OFA.

The OFA for Runway 8/26 is 800 feet wide (400 feet either side of the centerline) and 1,000 feet beyond each end of the runway, including the entire length of the runway. See **Figure 1-15** and **Table 1-6**.

Runway Protection Zones – Runway protection zones (RPZs) are located beyond each end of the runway and are established to provide protection to people on the ground and aircraft approaching or departing the runway. RPZs are trapezoidal in shape and are sized based on specific approach minimums (see **Figure 1-15** and **Table 1-7**). The FAA recommends airports own or control, in some manner, all activity within a RPZ to protect people on the ground and in aircraft.

The RPZs on paved runways begin 200 feet from the end of the runway threshold and are centered on the extended runway centerline. The dimensions of the RPZ for Runway 8 are:

- 1,700 feet long
- 1,000 feet wide (inner width)
- 1,510 feet wide (outer width)

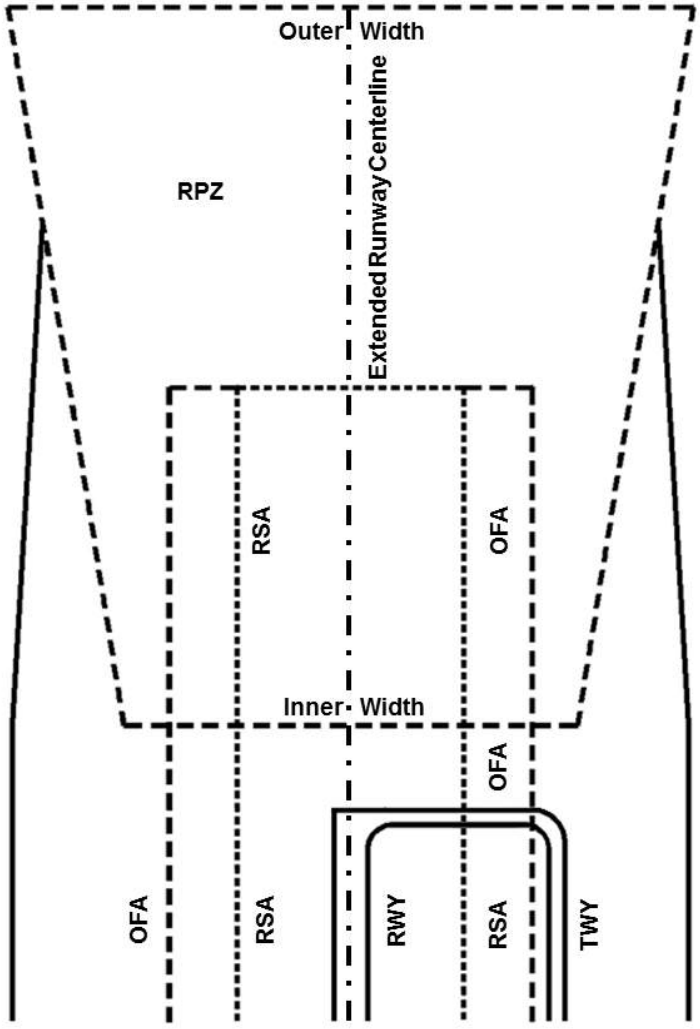
As mentioned, the visibility approach minimums play a factor in the dimensions of the RPZ. The RPZ for Runway 8 is based on an approach minimum of one (1) mile visibility.

The dimensions for the RPZ of Runway 26 are:

- 2,500 feet long
- 1,000 feet wide (inner width)
- 1,750 feet wide (outer width)

The increase in dimensions of the RPZ for Runway 26 is due to a lower approach visibility minimum than Runway 8. Runway 26 has an approach visibility minimum of one-half (1/2) mile due to the existence of the precision instrument approach (PIA) provided by the ILS, as noted in Section 1.7.g.

Figure 1-15
RSA, OFA, and RPZ Surfaces



Source: Mead & Hunt

Table 1-6
Runway 8/26 RSA, OFA, and RPZ Dimensions

	Runway Safety Area (RSA)	Object Free Area (OFA)	Runway Protection Zone (RPZ)
Runway 8			
Width	500 feet	800 feet	Inner – 1,000 feet Outer – 1510 feet
Length Beyond Rwy End	1,000 feet	1,000 feet	1,700 feet *
Runway 26			
Width	500 feet	800 feet	Inner – 1,000 feet Outer – 1,750 feet
Length Beyond Rwy End	1,000 feet	1,000 feet	2,500 feet *

***** Runway protection zone begins 200 feet off runway end
Source: FAA AC 150/5300-13, *Airport Design*

Table 1-7
Runway Protection Zone Dimensions

Approach Visibility Minimums 1	Facilities Expected to Serve	Dimensions			
		Length **L** feet (meters)	Inner Width **W_1** feet (meters)	Outer Width **W_2** feet (meters)	RPZ acres
Visual and not lower than 1-Mile (1,600m)	Small aircraft exclusively	1,000 (300)	250 (75)	450 (135)	8.035
	Aircraft Approach Categories A & B	1,000 (300)	500 (150)	700 (210)	13.770
	Aircraft Approach Categories C & D	1,700 (510)	500 (150)	1,010 (303)	29.465
Not lower than ¾-mile (1.200m)	All Aircraft	1,700 (510)	1,000 (300)	1,510 (453)	48.978
Lower than ¾-mile (1,200 m)	All Aircraft	2,500 (750)	1,000 (300)	1,750 (525)	78.914

1 The RPZ dimensional standards are for the runway end with the specified approach visibility minimums. The departure RPZ dimensional standards are equal to or less than the approach RPZ dimensional standards. When an RPZ begins other than 200 feet (60m) beyond the runway end, separate approach and departure RPZs should be provided. Refer to FAA AC 150/5300-13, Appendix 14 for approach and departure RPZs.

Source: FAA AC 150/5300-13, *Airport Design*

1.10.c Federal Aviation Regulation (FAR) Part 77 Surfaces

Federal Aviation Regulation (FAR) Part 77, *Objects Affecting Navigable Airspace*, provides guidance for land use around airports to determine natural and man-made obstructions that may interfere with the flight path of aircraft. Although the FAA is able to determine what may be a hazard to air navigation, they are unable to regulate land use through FAR Part 77. FAR Part 77 describes five three-dimensional surfaces that extend from an airport that define flight paths needed for aircraft on arrival or departure. **Figure 1-16** provides a three dimensional view of the five FAR Part 77 surfaces while **Figure 1-17** illustrates a plan view. **Table 1-8** illustrates the dimensions of these surfaces while **Table 1-9** summarizes the dimensions of the surfaces as they apply to West Michigan Regional Airport. The size

and length of these surfaces is dependent upon the type of aircraft that use the runway. The following sections describe the five surfaces.

Primary Surface – The primary surface is an area centered longitudinally on a runway. The primary surface is on the same horizontal plane as the surface of the runway. The width varies between 250 and 1,000 feet depending on the type of runway and instrument approach. The length of the primary surface is the length of the runway plus 200 feet beyond each end of the runway with a prepared hard surface. If the runway does not have a prepared hard surface, the primary surface is the length of the runway.

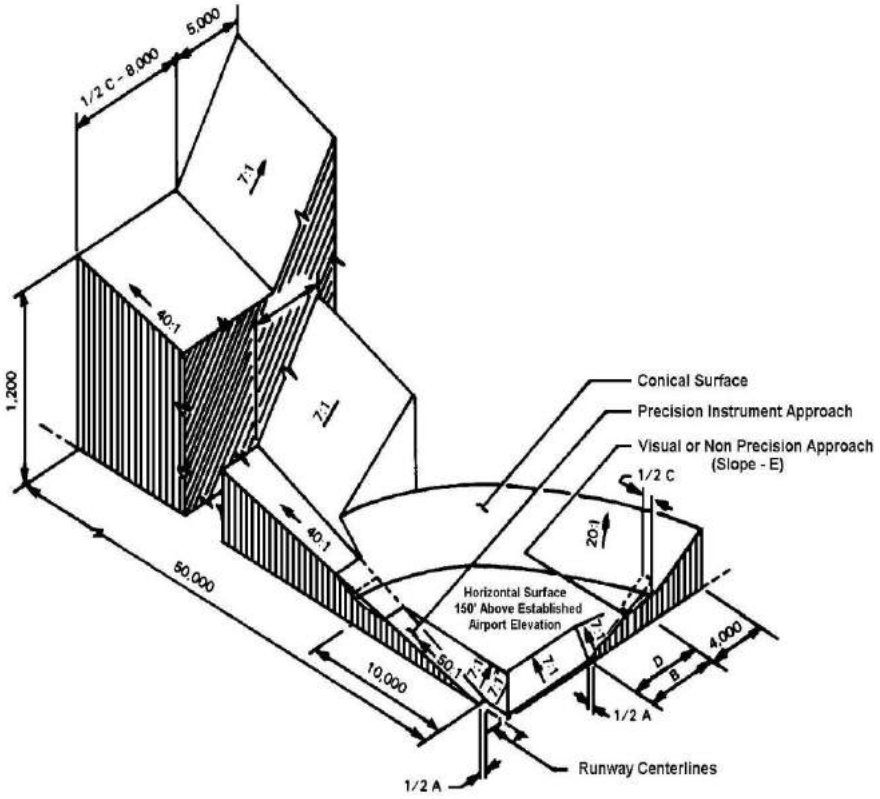
Approach Surface – The approach surface is centered longitudinally on the runway centerline and extends upwards at a defined slope from each end of the primary surface. A specific approach surface is applied to each end of the runway and the slope is determined based upon the type of approach. The width of the approach surface begins at the same width of the primary surface and expands uniformly to a width of between 1,250 feet and 16,000 feet depending on the type of runway approach. The distance and the slope of the approach surface are dependent on the type of approach planned for the runway. The use of this surface is intended to provide a clear approach and departure area for aircraft.

Horizontal Surface – The horizontal surface is a plane located 150 feet above the Airport's elevation, based upon the airport reference point measured from the ground level. The perimeter of the surface is constructed by swinging arcs of specified radii at the end of the primary surface of each runway on the extended runway centerline and connecting the adjacent arcs by tangent lines to those arcs. The radius of each arc is 5,000 feet for all runways designated utility or visual and 10,000 feet for all other runways. It is intended to limit the height of structures under the approach and departure path of aircraft that may be a hazard to air navigation within two miles of the airfield.

Conical Surface – The conical surface extends outward and upward from the outer edge of the horizontal surface at a 20 to 1 (20:1) slope for a horizontal distance of 4,000 feet. It is intended to protect the Airport from tall structures which may be in the outer perimeter to the Airport where aircraft may maneuver during takeoff and landing.

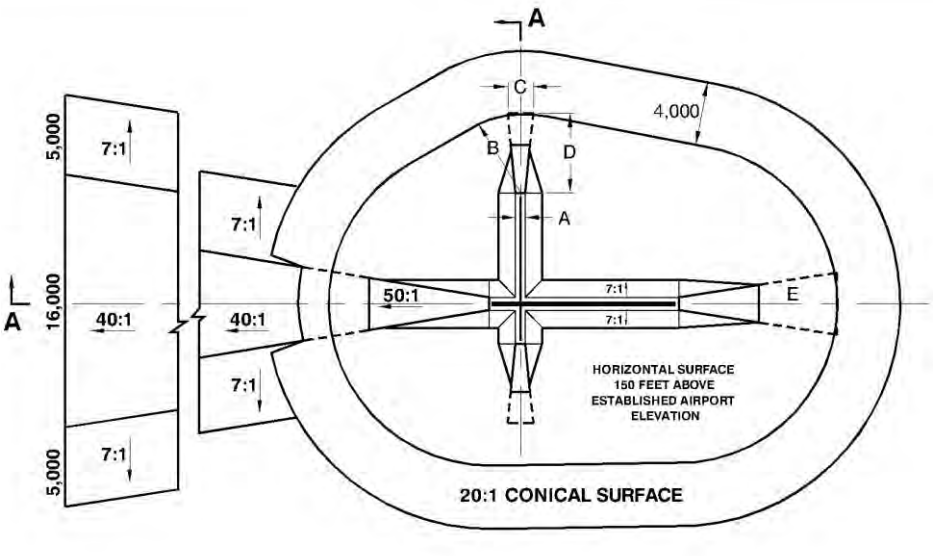
Transitional Surface – The transitional surface extends outward and upward at right angles from the runway centerline at a slope of 7 to 1 (7:1) from the primary and approach surfaces to a height that intersects the horizontal surface. The intent of this surface is to provide clear airspace near the edge of the runway and the primary surface. For precision approach runways, an extended 5,000 feet measured horizontally from the edge of the approach surface is added for those portions that extend through and beyond the limits of the conical surface.

Figure 1-16
FAR Part 77 Surfaces



Source: FAR Part 77

Figure 1-17
FAR Part 77 Surfaces – Plan View



Source: FAR Part 77

Table 1-8
FAR Part 77 Surface Dimensions

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

Notes: A – Utility Runways B – Runways Larger Than Utility
C – Visibility Minimums Greater Than 3/4 Mile D – Visibility Minimums as Low as 3/4 Mile
* – Precision Instrument Approach Slope is 50:1 for Inner 10,000 feet and 40:1 for an additional 40,000 feet

Source: FAR Part 77

Table 1-9
FAR Part 77 Surfaces Dimensions for Runway 8/26

Item	Dimension		
Primary surface	**Width:**		1,000 feet
	Length:		6,402 feet
Approach surface	**Inner width:**	**Runway 8**	1,000 feet
		Runway 26	1,000 feet
	Outer width:	**Runway 8**	3,500 feet
		Runway 26	16,000 feet
	Slope / horizontal distance:	**Runway 8**	34:1 for 10,000 feet
		Runway 26	50:1 for 10,000 feet 40:1 for additional 40,000 feet
Transitional surface	**Slope:**		7:1
	Horizontal distance:		5,000 feet
Horizontal surface	**Vertical distance:**		150 feet above ARP
	Radius of arcs:		10,000 feet
Conical surface	**Slope:**		20:1
	Horizontal distance:		4,000 feet

1.11 Summary

The Airport plays an important role in the economic prosperity of the West Michigan region. By providing an important transportation link, West Michigan Regional Airport is able to support the transportation needs of worldwide businesses that call this area home. The existing facilities provide a solid foundation for serving user needs. The assessment of additional facilities to continue to meet these needs will be addressed in subsequent chapters. The existing ARC category D-II runway affords business aircraft and recreational users alike efficient access to the West Michigan region.

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2

Projections of Aviation Demand

This chapter of the West Michigan Regional Airport Master Plan provides projections of future aviation demand at the Airport. Projections of short-, intermediate-, and long-term activity are based on future forecasts for the years 2015, 2020, 2025, and 2030 with 2010 serving as the base year for the forecasts. Along with projecting the future number of aircraft operations, this chapter also seeks to determine how the existing airport infrastructure will meet the anticipated demand and what improvements will be necessary.

The forecasts in this chapter are based on data from the 2010 Federal Aviation Administration (FAA) Terminal Area Forecast (TAF).This was the most recent year historical and forecasting data was available. Projections in this chapter have been prepared using forecasting methodologies recommended by the FAA and have been reviewed with FAA forecasts to maintain a level of consistency between forecasts when projecting future activity at the Airport. The projections, methods and baselines used in forecasting these projections are detailed in this chapter within the following sections:

2.1 Role of the Airport

Before projecting aviation demand, it is important to understand the role of the Airport in not only serving the West Michigan region, but also within the State of Michigan and the National Airspace System (NAS). Understanding the role of the Airport and how it supports the air transportation network on national, state and regional levels provides insight on the aviation activity levels that can be anticipated throughout the forecasting period.

2.1.a Regional Role

The Airport serves the West Michigan region as a general aviation (GA) airport for corporate and recreational GA aircraft. The Airport is an important asset to the many businesses located in the greater Holland area that rely on it to conduct business through the Midwest, the nation, and across the world due

to its existing infrastructure. The Airport also allows recreational GA traffic to conveniently access the Holland region.

2.1.b State of Michigan Role

The 2008 Michigan Airport System Plan (MASP) classified the Airport as an Airport Reference Code (ARC) D-II, Tier I facility, designed to serve aircraft with tail heights less than 79 feet in height and approach speeds equal to or less than 166 knots. The Tier I also designates that the Airport meets essential and critical state airport systems goals including a complete primary runway with a full parallel taxiway, airfield pavement rated in "good" condition, runway edge lighting systems and a current airport approach plan. This designation stresses the integral role the Airport plays within the aviation system of Michigan and highlights the importance of facility development to appropriately respond to the aviation demand projections presented in this chapter.

2.1.c National Plan of Integrated Airport Systems (NPIAS) Role

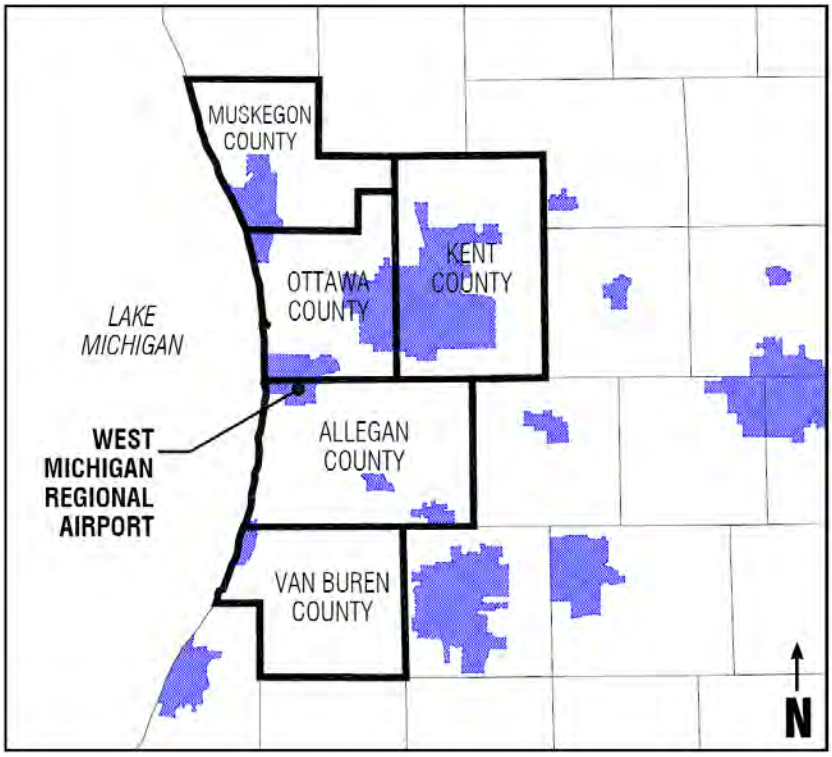
The National Plan of Integrated Airport Systems (NPIAS) identifies airports that are significant to the national air transportation system and are eligible to receive Federal grants under the Airport Improvement Program (AIP). The Airport is designated a general aviation (GA) facility in the 2011-2015 NPIAS and is expected to remain in that role through the next five years. As a GA facility, the Airport plays an important role in serving the needs of general aviation. The Airport allows air traffic to reach Holland and the West Michigan area and helps to alleviate air traffic congestion at commercial service airports, most notably Gerald R. Ford International Airport in Grand Rapids. The Airport's inclusion in the NPIAS demonstrates its importance in supporting the aviation needs of both West Michigan and national air transportation network.

It is important to note that the Airport serves a significant geographic area. Although not able to be documented as well as a commercial service airport which can collect data by enplaning passengers, the service area can be determined by reviewing the locations of businesses and general aviation users that use and/or are based at the Airport. While most corporate and recreational general aviation users are located in Allegan and Ottawa counties, the service area also includes portions of Kent, Van Buren, and Muskegon counties. **Figure 2-1** identifies the Airport's service area.

2.2 Industry Trends

Understanding historical and anticipated trends in aviation plays a role in forecasting future activity at an airport. The *FAA Aerospace Forecast* reviews recent historical activity and provides insight on how new trends and technologies are expected to impact the industry. The information is used to assist the industry and airports in remaining proactive in their development planning efforts. The most recently published edition of the forecast for Fiscal Years 2011-2031 provides information on trends from previous years and adjusted forecasts from the Fiscal Years 2010-2030 edition to reflect recent industry conditions.

Figure 2-1
West Michigan Regional Airport Service Area



Source: Mead & Hunt, Inc. based upon airport user information, 2011

Demand for air travel grew slowly in 2010 following the sharp decrease in activity that occurred in 2008 and 2009. The 2009 decrease was due to rising fuel costs that, in turn, raised aircraft operating costs. This came after the 2008 global economic downturn that saw consumers cut or limit budgets for air travel. Though demand for commercial air travel increased slightly in 2010, the market for GA products and services continued a three year decline since 2008. Slowly rebounding national and world economies suggest demand for general aviation will increase, though uncertainty in European markets is expected to impact the level of this growth. With declining demand for aviation, it is easy to feel that infrastructure improvements are not necessary until demand increases. However, planning decisions made during slow activity phases allow an airport to be well positioned to meet the demands of aviation customers when activity increases.

As an airport supporting general aviation exclusively, it is important to analyze trends affecting the GA segment of the industry, defined as all activity that is not military or commercial service (airlines). This definition includes a broad range of GA activity from private pilots who fly aircraft recreationally a few times a year to large jet engine cargo aircraft. For the purposes of this master plan, general aviation will be broken down into two categories: business and recreational.

2.2.a Business Aviation

Business aviation can be describe as aviation used to conduct or facilitate business operations, sales or services and includes the transportation of company officials to a meeting, clients for a sale or shipping and receiving freight vital to production processes. As the Airport has a significant client base of business aviation users, it is important to review the growth predicted for this segment of aviation. The *FAA Aerospace Forecast Fiscal Years 2011-2031* estimates that despite the decrease in demand experienced over the past few years, robust long-term growth is anticipated in business aviation. As this segment of general aviation typically involves more expensive and sophisticated turbine-powered aircraft, it is projected that the entire national fleet will grow at an average of 3.0 percent (3.0%) a year over the forecast period with the turbine jet fleet increasing at 4.2 percent (4.2%) through 2031.

A subsection of business aviation that received significant attention over the past few years was the market of Very Light Jets (VLJs). VLJs are relatively inexpensive twin jet engine aircraft with a seating capacity of approximately four to eight people. This segment of aviation was expected to grow rapidly, potentially changing the way business aviation operates. It was expected that these aircraft would provide on-demand air charter services at a relatively low cost, thus opening the business aviation market to users who previously did not find it feasible to own and operate an aircraft. Previous forecasts anticipated 400 to 500 aircraft a year could be added to the GA fleet, altering the way business is conducted in this segment of aviation. The global economic events of 2008 and the demise and bankruptcy of VLJ manufactures and operators, however, greatly reduced expectations for this segment of aviation. Though much less aggressive growth is anticipated for this market of business aviation, VLJs have the potential to impact the type and level of operations found at the Airport.

2.2.b Recreational Aviation

Recreational GA aircraft are traditionally equipped with a single-engine and are capable of seating two to six passengers. The global downturn of the world's economy in 2008 had a dramatic impact on recreational aviation as rising fuel costs made flying more expensive in combination with reduced money for discretionary spending. The *FAA Aerospace Forecasts Fiscal Years 2011-2031* projects the number of piston-powered aircraft in the national GA fleet to decrease through 2018, then increase to 168,140 aircraft by 2031. Overall, piston-powered aircraft are projected to grow at an annual rate of 0.2 percent (0.2%) through the forecasting period with single-engine aircraft projected to grow at 0.3 percent (0.3%) annually while multi-engine aircraft are expected to decrease at 0.9 percent (0.9%) annually, resulting in a total fleet of 168,140 aircraft by the year 2031.

Reasons for the slow increase in single-engine aircraft and decrease of multi-engine aircraft are a combination of impacts from future industry trends. The slow increase in single-engine aircraft can be attributed not only to economic conditions, but also to the increase of pilots in a new segment of general aviation classified as light sport aircraft (LSA). The LSA category of aircraft was created in 2005 and was

designed for pilots who accumulate a few hours of recreational flying a year. LSAs seat two to four people and require pilots to have fewer hours of training compared to those licensed to fly traditional single-engine aircraft. Compared to traditional pilots, LSA operators are subject to more flight restrictions such as increased cloud ceiling heights and greater visibility minimums necessary to fly. Nevertheless, this new segment of aviation has proven quite popular with recreational pilots as the cost to fly is much less than traditional piston-powered aircraft. The FAA Aerospace Forecast estimates that the fleet of LSA will increase at 450 aircraft a year until 2013, and then taper off to approximately 300 aircraft a year through 2031. The anticipated increase in this new segment of aviation will reduce the number of conventional single-engine aircraft in the national fleet.

The forecasted decrease in the multi-engine aircraft can be attributed to global and national economies, but also to advances in jet aircraft technology and cost of operation. As previously noted, the VLJ segment of the industry was expected to dramatically alter the business aviation landscape. Although multi-engine aircraft allow users to operate at airfields with shorter runways and offer the convenience of flying for a reduced cost, VLJs offer smoother rides, faster speeds and longer operational distances. These jet aircraft characteristics sought after by business aviation users is projected to increase the demand of VLJs by those who traditionally would have considered multi-engine aircraft.

2.2.c Industry Trend Summary

The following short-term and long-term growth assumptions can be made after analyzing the anticipated trends for the different segments of general aviation:

- Short-term, the GA industry overall expects low to modest growth that can be attributed to rebounding global and national economies. While economic conditions gradually improve, it is expected that both business and recreation demand for general aviation will be low due to the cost associated with aviation operations.

- Long-term, through 2030, the demand for general aviation is expected to increase. As economies stabilize and experience continued growth, the demand for general aviation is expected to climb. Growth of businesses to accommodate increased consumer demand will factor in the increased need for business aviation. Recreational flying also is expected to benefit from long-term economic growth. Greater discretionary spending is expected to increase opportunities for recreational pilots to fly, thus resulting in a growth of aircraft and activity focused on leisure flight.

2.3 Forecasting Approach

There are a number of FAA recommended forecasting techniques available for use in projecting aviation activity. Mathematical formulas using historical data provide the best forecasting approach as patterns can be found to produce a line or curve that can be used to predict future growth. Because these different formulas produce similar but not identical results, it is an accepted practice to select a method that provides the most realistic approach when forecasting future aviation activity. The following explains the various methodologies used in developing future aviation activity forecasts for the Airport.

2.3.a FAA Terminal Area Forecast (TAF) Summary

The FAA Terminal Area Forecast (TAF) is the official forecast of aviation activity generated by the FAA. Used to meet the budget and planning needs of the FAA, the TAF is also used by state, regional, and local authorities for planning purposes along with the aviation industry and the public. The TAF provides aviation activity and based aircraft forecasts for towered (those with an air traffic control tower) and non-towered public use airports. Detailed forecasts are provided for major airports in the National Aviation System such as large air carriers and busy GA and military facilities. The FAA TAF is updated on an annual basis and is considered an important tool when forecasting aviation activity.

2.3.b Trend Line Analysis

A trend line analysis uses historical data to create a linear extrapolation of forecasted activity or number of based aircraft. A time-series pattern is calculated assuming the same factors that have influenced historical demand will continue to affect future demand linearly with time. This method of forecasting is one of the most widely used and, often provides a reliable benchmark for comparing the results of other analyses.

2.3.c Growth Rate Analysis

Growth rate methodology, also known as exponential extrapolation, forecasts future activity based on long term trends which have increased or decreased by an annual average percentage. This methodology assumes the historical annual growth rate will continue in the future. Projections utilizing this technique tend to be more accurate when a large data set is used, such as many years of historical aircraft operations, since less variation is found in the percentage of growth from year to year.

2.3.d Operations per Based Aircraft (OPBA) Methodology

The operations per based aircraft (OPBA) forecasting approach is a mathematical methodology that projects annual aircraft operations in correlation with the number of based aircraft. This is an FAA recognized forecasting method since it projects operations using a known variable. The OPBA method assumes the historical number of operations conducted per based aircraft remains relatively constant throughout the forecasting period.

2.3.e Market Share Methodology

Market share methodology projects the share of the total national traffic captured at a particular airport. It is the most common forecasting technique used in the aviation industry to determine future activity levels on a local level. Historical data of an airport's annual operations count is examined compared to the total number of nationwide operations to determine the ratio of local traffic to national traffic. This same methodology can also be used to forecast an airport's annual based aircraft count.

2.3.f Socio-Economic Methodology – Income Variable

Socio-economic methodology examines the relationship between aviation and one or more socio-economic indicators such as population and income projections. In the case of this master plan study, socio-economic methodology was used to analyze the relationship between based aircraft and the average per capita income of the populations of Ottawa and Allegan counties. Also known as a correlation analysis, this methodology plots two sets of historical data and finds a linear relationship between them. The relationship between these two sets of data are then used in developing projections for based aircraft using an average of the projected per capita income of Ottawa and Allegan counties. In order to plot these two variables, socio-economic data was obtained from Woods & Poole Economics, Inc. for the two counties.

2.4 Projections of Demand

Projections of future demand at GA airports such as West Michigan Regional Airport focuses on aircraft operations and based aircraft. The forecasts presented in this section are based on 5 year increments (2015, 2020, 2025, and 2030) with 2010 as the base year as it was the most recent year that recorded data was available at the time of this master plan study was conducted.

2.4.a Projections of Aviation Activity

Forecasting aviation activity at non-towered airports such as West Michigan Regional Airport using mathematical models is difficult than for towered airports due to a lack of accurate historical traffic counts that can be applied to the mathematical forecasting models. Historical traffic counts estimated from the FAA TAF were used because they provide the most accurate record of aviation activity at the Airport. FAA TAF traffic counts are based on several approaches including a model developed by the FAA titled *Model for Estimating General Aviation Operations at Non-Towered Airports Using Towered and Non-Towered Airport Data.* The model was based on previous research conducted by the FAA's Office of Policy and Plans, Statistics, and Forecast Branch and integrates several variables such as number of based aircraft, population, airport regional prominence, and location of a flight school. Other approaches include estimates filed with FAA Airports District Offices on FAA 5010 Forms and traditional counting methods such as human observation, video review, and pneumatic, electromagnetic or acoustical machine counts.

Based on historical FAA TAF information, the following Trend Line, Growth Rate, OPBA, and Market Share methodologies were developed to forecast future aircraft operations at the Airport. Notably, the FAA's TAF forecasts traditionally use a flat line approach based on the most recent record of current activity to forecast future operations at the Airport. This is primarily due to a lack of verifiable data. These flat-line forecasts at non-towered airports are less useful in planning for future activity at an airport, making the forecasts conducted by the other methodologies comparatively more useful.

Using the FAA TAF summary, a constant flat line rate of 52,520 total GA operations is forecasted to occur through 2030. The other methodologies forecast small growth rates based on historical trends that are consistent with the future activity outlook provided by the FAA Aerospace Forecast. These forecasts range from a 0.18 percent (0.18%) compounded annual growth rate (CAGR) forecasted by the trend line methodology to a 1.46 percent (1.46%) CAGR forecasted by the growth rate methodology.

Activity forecasts generated for the FAA Aerospace Forecast at airports with air traffic control towers, where precise historical data is available on the number and types of aircraft operations, project general aviation activity will increase at an average of 1.0 percent (1.0%) a year through 2030. Assuming this same trend occurs at airports without an air traffic control tower, the 0.96 percent (0.96%) CAGR projected by the market share methodology seems logical as the preferred activity forecast considering the potential for increased future traffic with the advent of LSAs and VLJs. **Table 2-1** and **Figure 2-2** illustrate the projections of aircraft operations through 2030 that were developed using the five methodologies previously cited.

Assuming operations continue at 2010 levels throughout the forecasting period, itinerant GA operations at the Airport are projected to grow at 0.98 percent (0.98%) annually while local operations will increase 0.96 percent (0.96%) annually. Itinerant air taxi operations, or those that provide on-demand charter services, are projected to grow at a 0.84 percent (0.84%) annual compounded growth rate. These projected growth rates for itinerant and local aircraft operations are consistent with the 1.0 percent (1.0%) overall annual growth forecasted for total aircraft operations and reflect the potential for growth as a result of new aircraft types and increased business activity in the region. **Table 2-2** illustrates the itinerant and local GA operations projections as well as the forecast for itinerant air taxi activity.

Table 2-1
Airport Operations Projections

Year	FAA TAF Summary Total Operations	Trend Line Total Operations	Growth Rate Total Operations	Growth Rate Growth Rate	Operations Per Based Aircraft Methodology Based Aircraft	Operations per Based Aircraft	Total Operations	*Preferred Methodology* Market Share Methodology Total Operations	Total U.S. Operations	Market Share
Historical:										
1998	44,120	44,120	44,120		55	802	44,120	44,120	117,486,678	0.0376%
1999	54,820	54,820	54,820	24.25%	57	962	54,820	54,820	119,536,942	0.0459%
2000	54,820	54,820	54,820	0.00%	57	962	54,820	54,820	122,017,520	0.0449%
2001	58,720	58,720	58,720	7.11%	60	979	58,720	58,720	120,530,332	0.0487%
2002	53,420	53,420	53,420	-9.03%	59	905	53,420	53,420	118,904,734	0.0449%
2003	58,720	58,720	58,720	9.92%	58	1,012	58,720	58,720	116,824,208	0.0503%
2004	58,720	58,720	58,720	0.00%	58	1,012	58,720	58,720	116,987,852	0.0502%
2005	53,727	53,727	53,727	-8.50%	59	911	53,727	53,727	115,542,147	0.0465%
2006	52,520	52,520	52,520	-2.25%	56	938	52,520	52,520	113,548,083	0.0463%
2007	52,520	52,520	52,520	0.00%	56	938	52,520	52,520	113,692,164	0.0462%
2008	52,520	52,520	52,520	0.00%	55	955	52,520	52,520	110,829,381	0.0474%
2009	52,520	52,520	52,520	0.00%	51	1,030	52,520	52,520	104,222,787	0.0504%
2010 [1]	52,520	52,520	52,520	0.00%	51	1,030	52,520	52,520	102,286,018	0.0513%
			CAGR 1998-2010	*1.46%*						
Projected:										
2015	52,520	54,081	56,476	*1.46%*	51	1,030	52,520	54,629	106,393,029	0.0513%
2020	52,520	54,199	60,729	*1.46%*	52	1,030	53,550	57,330	111,654,283	0.0513%
2025	52,520	54,318	65,303	*1.46%*	53	1,030	54,580	60,286	117,411,596	0.0513%
2030	52,520	54,436	70,222	*1.46%*	53	1,030	54,580	63,558	123,784,058	0.0513%
CAGR 2015-2030	*0.00%*	*0.18%*	*1.46%*		*0.19%*		*0.19%*	*0.96%*	*0.96%*	

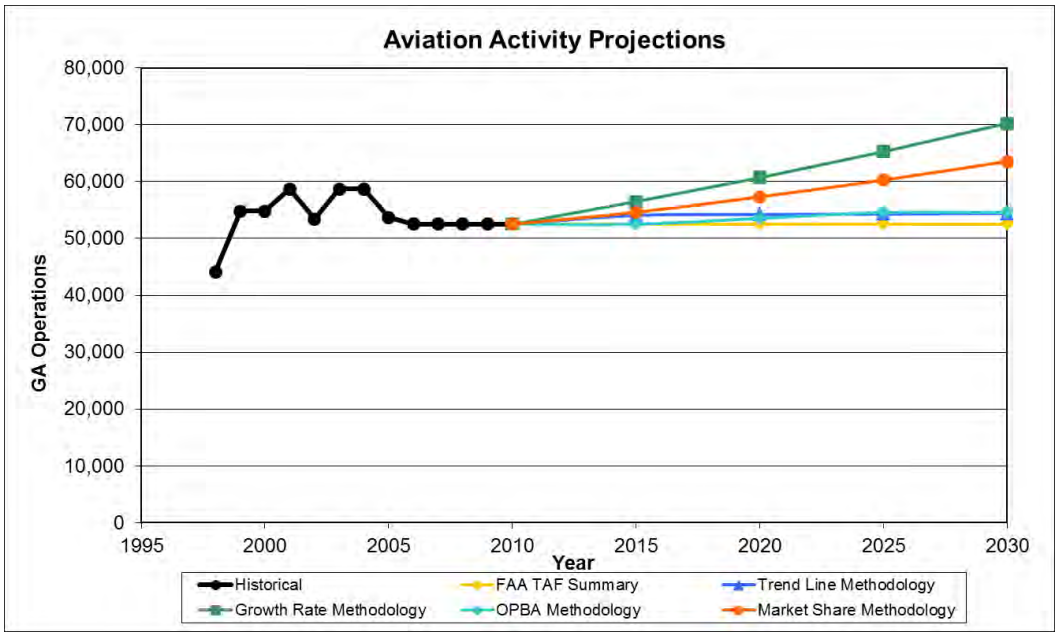
Notes: CAGR = Compounded Annual Growth Rate

[1] Projection, 2010 FAA Terminal Area Forecast

Sources: Historical Total Operations - FAA Terminal Area Forecast

Projections - Mead & Hunt, Inc., except FAA TAF Summary which are from the FAA Terminal Area Forecast

Figure 2-2
Operations Projections



Source: Mead & Hunt, Inc.

Table 2-2
Itinerant and Local Operations Summary

Year	Total GA Operations	Itinerant GA Operations	% Itinerant	Itinerant Air Taxi Operations	% Local	Local GA Operations	% Local
Historical:							
1998	44,100	16,000	36%	4,200	10%	23,900	54%
1999	54,800	20,000	36%	4,300	8%	30,500	56%
2000	54,800	20,000	36%	4,300	8%	30,500	56%
2001	58,700	21,400	36%	4,300	7%	33,000	56%
2002	53,400	19,300	36%	4,300	8%	29,800	56%
2003	58,700	21,400	36%	4,300	7%	33,000	56%
2004	58,700	21,400	36%	4,300	7%	33,000	56%
2005	53,707	19,763	37%	4,300	8%	29,644	55%
2006	52,500	21,940	42%	4,300	8%	26,260	50%
2007	52,500	21,940	42%	4,300	8%	26,260	50%
2008	52,500	21,940	42%	4,300	8%	26,260	50%
2009	52,500	21,940	42%	4,300	8%	26,260	50%
2010 [1]	52,500	21,940	42%	4,300	8%	26,260	50%
Projected:							
2015	54,609	22,936	42%	4,369	8%	27,304	50%
2020	57,310	24,070	42%	4,585	8%	28,655	50%
2025	60,266	25,312	42%	4,821	8%	30,133	50%
2030	63,538	26,686	42%	5,083	8%	31,769	50%
CAGR 2015-2030	*0.96%*	*0.98%*		*0.84%*		*0.96%*	

Notes: CAGR = Compounded Annual Growth Rate.
[1] Projection, 2010 FAA Terminal Area Forecast
Sources: Historical General Aviation Operations - FAA Terminal Area Forecast
Projected Total GA Operations - Mead & Hunt, Market Share Methodology
Operations Projections - Mead & Hunt, Inc.

2.4.b Projections of Military Operations

Few military operations are conducted at the Airport due to the lack of an instillation or base located on the airfield; however, activity from small transport aircraft on official business does occur. Military activity accounts for less than 0.05 percent (0.05%) of all Airport operations annually. Forecasting military operations is difficult as a result of the unpredictability of military activities. The six methodologies project military operations will continue at a flat line approach throughout the forecasting period and is the preferred forecasting methodology for projecting military operations. **Table 2-3** illustrates the projections for local and itinerant military projections at the Airport through 2030.

Table 2-3
Military Operations Projections

Year	Itinerant	%	Local	%	Total
Historical:					
1998	20	100%	0	0%	20
1999	20	100%	0	0%	20
2000	20	100%	0	0%	20
2001	20	100%	0	0%	20
2002	20	100%	0	0%	20
2003	20	100%	0	0%	20
2004	20	100%	0	0%	20
2005	20	100%	0	0%	20
2006	20	100%	0	0%	20
2007	20	100%	0	0%	20
2008	20	100%	0	0%	20
2009	20	100%	0	0%	20
2010 [1]	20	100%	0	0%	20
Average 1998-2010	*100%*	*Average 1998-2010*	*0%*	*Average 1998-2010*	*20*
Projected:					
2015	20	100%	0	0%	20
2020	20	100%	0	0%	20
2025	20	100%	0	0%	20
2030	20	100%	0	0%	20

Sources: [1] Projection, 2010 FAA Terminal Area Forecast
Sources: Historical Military Operations - FAA Terminal Area Forecast
Projections - FAA Terminal Area Forecast

2.4.c Projections of Based Aircraft

Since 1998, the number of based aircraft at the Airport has remained fairly consistent without any significant fluctuations from a low of 51 based aircraft reported in 2009 to a high of 60 based aircraft reported in 2001. Since 2001, a decline has occurred in the number of based aircraft, most notably in the loss of four business aircraft in 2009, which may be attributed to the collapse of national and world

economies that occurred in 2008. The decrease of based aircraft in 2009 also closely follows the national trend of the total U.S. GA fleet that declined from 228,668 aircraft in 2008 to 223,920 aircraft in 2009. The impacts of rebounding national and world economies followed by the introduction of newer, more cost efficient aircraft are reflected by optimistic growth forecasted in the national fleet. Overall, the FAA Aerospace Forecast projects the total GA fleet will grow at 0.9 percent (0.9%) annually through the forecasting period, with jet aircraft increasing at an annual rate of 4.2 percent (4.2%). Evaluation of projections using the five forecasting methodologies in consideration of the outlook projected by the FAA Aerospace Forecast suggest the market share methodology is the preferred model to project future based aircraft at the Airport. The 1.51 percent (1.51%) annual growth rate projected by the market share methodology is supported by the fact that business aviation accounts for a significant portion of the Airport's operations. **Table 2-4** illustrates the based aircraft projections from the five methodologies developed for the Airport.

2.4.d Based Aircraft Fleet Mix

Though vitality of the Airport can be contributed to corporate aviation, a majority of activity and business conducted is related to recreational general aviation. This statement holds true when reviewing the based aircraft fleet mix projections. Since 1998, the number and overall percentage of single-engine aircraft has remained in the majority over all other based aircraft types ranging from 66 percent (66%) of the fleet mix in 2005 to 55 percent (55%) of the fleet mix in 1998. The number of based jet aircraft, traditionally attributed to corporate aviation, has also risen from a low of eight (8) jets based in 1998 to 14 jets based in 2002. In recent years, the numbers of based aircraft types has been decreasing from a total of 59 based aircraft in 2005 to 51 based aircraft in 2009. Keeping in stride with the historic national trend during the same time period, the number of multi-engine aircraft has declined from 17 aircraft in 1998 to 8 aircraft in 2008.

Forecasts for the based aircraft fleet mix were developed utilizing the average annual percentage of the based aircraft types with the based aircraft projections developed by the market share methodology. It should be noted that short term industry trends are not accounted for in the based aircraft fleet mix mathematical models. Based single-engine aircraft are projected to increase from 31 aircraft in 2010 to 42 aircraft in 2030 while multi-engine and jet aircraft are forecasted to increase from 11 to 13 aircraft, as illustrated in **Table 2-5**. As noted, this mathematical model does not account for short-term industry trends or local economic factors that contribute to aviation activity. As businesses continue to grow and settle in the region, potential exists for an increase in the demand for corporate aviation that may lead to additional aircraft based at the Airport. The Airport should continually be in a position to accommodate an increase in based aircraft demand, including the development of additional hangars and expansion of services such as repair, maintenance and fueling.

Table 2-4
Based Aircraft Projections

Year	FAA TAF Summary	Trend Line	Growth Rate		*Preferred Methodology* Market Share Methodology			Socio-Economic Methodology - Income Variable		
	Total Based Aircraft	Total Based Aircraft	Total Based Aircraft	Growth Rate	Based Aircraft	Total U.S. Based Aircraft	Market Share	Based Aircraft	Allegan & Ottawa Counties (Avg.) Per Capita Income	Based Aircraft Per $1 Income
Historical:										
1998	55	55	55	-	55	204,710	0.027%	55	-	-
1999	57	57	57	3.64%	57	219,464	0.026%	57	-	-
2000	57	57	57	0.00%	57	217,533	0.026%	57	$27,150	0.00210
2001	60	60	60	5.26%	60	211,447	0.028%	60	$27,434	0.00219
2002	59	59	59	-1.67%	59	211,244	0.028%	59	$27,033	0.00218
2003	58	58	58	-1.69%	58	209,606	0.028%	58	$27,721	0.00209
2004	58	58	58	0.00%	58	219,426	0.026%	58	$28,433	0.00204
2005	59	59	59	1.72%	59	224,350	0.026%	59	$30,055	0.00196
2006	56	56	56	-5.08%	56	221,939	0.025%	56	$31,124	0.00180
2007	56	56	56	0.00%	56	231,606	0.024%	56	$32,001	0.00175
2008	55	55	55	-1.79%	55	228,668	0.024%	55	$33,082	0.00166
2009	51	51	51	-7.27%	51	223,920	0.023%	51	$34,289	0.00149
2010 [1]	51	51	51	0.00%	51	224,172	0.023%	51	$35,606	0.00143
			CAGR 1999-2010	*-0.58%*		*Average 1998-2010*	*0.026%*		*Average 2000-2010*	*0.00188*
Projected:										
2015	51	52	50	*-0.58%*	59	229,140	0.026%	83	$43,864	0.00188
2020	52	49	48	*-0.58%*	61	237,795	0.026%	104	$55,214	0.00188
2025	53	47	47	*-0.58%*	65	250,560	0.026%	133	$70,790	0.00188
2030	53	45	45	*-0.58%*	69	267,055	0.026%	173	$91,769	0.00188
CAGR 2015-2030	*0.19%*	*-0.62%*	*-0.58%*		*1.51%*	*0.88%*		*6.29%*	*4.85%*	

Notes: CAGR = Compounded Annual Growth Rate

[1] Projection, 2010 FAA Terminal Area Forecast

Sources: Historical Based Aircraft - FAA Terminal Area Forecasts

Historical & Projected Total Based Aircraft - FAA Aerospace Forecasts

Historical & Projected Per Capita Income - Woods & Poole Economics, Inc.

Projected Based Aircraft - Mead & Hunt, Inc., except FAA TAF Summary which are from the FAA Terminal Area Forecast

Table 2-5
Based Aircraft Fleet Mix Projections

Year	Single Engine	%	Multi Engine	%	Jet	%	Helicopter	%	Other	%	Total
Historical:											
1998	30	55%	17	31%	8	15%	0	0%	0	0%	55
1999	33	58%	15	26%	9	16%	0	0%	0	0%	57
2000	33	58%	15	26%	9	16%	0	0%	0	0%	57
2001	34	57%	15	25%	11	18%	0	0%	0	0%	60
2002	34	58%	11	19%	14	24%	0	0%	0	0%	59
2003	34	59%	10	17%	14	24%	0	0%	0	0%	58
2004	37	64%	8	14%	13	22%	0	0%	0	0%	58
2005	39	66%	9	15%	11	19%	0	0%	0	0%	59
2006	36	64%	7	13%	11	20%	0	0%	2	4%	56
2007	36	64%	8	14%	11	20%	0	0%	1	2%	56
2008	35	64%	8	15%	10	18%	1	2%	1	2%	55
2009	31	61%	9	18%	10	20%	1	2%	0	0%	51
2010 [1]	31	61%	9	18%	10	20%	1	2%	0	0%	51
Average 1998-2010		*61%*		*19%*		*19%*		*0%*		*1%*	
Projected:											
2015	36	61%	11	19%	11	19%	0	0%	0	1%	59
2020	37	61%	12	19%	12	19%	0	0%	0	1%	61
2025	39	61%	12	19%	12	19%	0	0%	0	1%	65
2030	42	61%	13	19%	13	19%	0	0%	0	1%	69
									CAGR 2015-2030		*1.51%*

Notes: CAGR = Compounded Annual Growth Rate.
[1] Projection, 2010 FAA Terminal Area Forecast
Sources: Historical Based Aircraft - FAA Terminal Area Forecasts
Projected Fleet Mix - Mead & Hunt, Inc. using Market Share Methodology & average percentage of based aircraft types

2.5 Critical Aircraft

Critical aircraft are defined based on the FAA's Airport Reference Code (ARC) as the most demanding type designed to use a particular airport surface such as a runway or taxiway. This aircraft type is also anticipated to regularly operate at the Airport and conduct at least 500 annual operations. Aircraft are classified by the ARC based on a combination of approach speeds and wingspan lengths as illustrated in **Table 2-6**.

ARC classified D-II aircraft are expected to remain the Airport's critical aircraft type throughout the remainder of the planning period. Aircraft categorized by this classification, such as the Gulfstream IV, are likely to remain popular with corporate users for the foreseeable future. As aeronautical engineers apply advances in technology in the future design of aircraft, lesser approach speeds are anticipated with future aircraft types then those classified in the Aircraft Approach Category (AAC) "D" category. Recent corporate aircraft such as the Gulfstream 550, Embraer Legacy series, Dassault Falcon series, and the Bombardier Challenger series are classified in a lesser AAC category due to their reduced approach speeds. The Airport's D-II facilities are sufficient to support the operational needs of these recent

corporate aircraft and are expected to adequately meet the performance needs of next generation aircraft.

Table 2-6
Airport Reference Code

Aircraft Approach Category (AAC)	
Category A	Aircraft approach speed less than 91 knots
Category B	Aircraft approach speed 91 knots or greater but less than 121 knots
Category C	Aircraft approach speed 121 knots or greater but less than 141 knots
Category D	Aircraft approach speed 141 knots or greater but less than 166 knots
Category E	Aircraft approach speed 166 knots or more
Airplane Design Group (ADG)	
Group I	Wingspan less than 49 feet
Group II	Wingspan 49 feet or greater but less than 79 feet
Group III	Wingspan 79 feet or greater but less than 118 feet
Group IV	Wingspan 118 feet or greater but less than 171 feet
Group V	Wingspan 171 feet or greater but less than 214 feet
Group VI	Wingspan greater than 214 feet

Source: FAA AC 150/5300, *Airport Design*

2.6 Projections Summary

This chapter reviewed industry trends and projected future aviation demand at the Airport in an effort to help determine future improvements that may be needed at the Airport for the next twenty years. The following notes summarize the highlights of the chapter including anticipated trends and forecast projections. A summary of the projections developed for based aircraft and operations are presented in **Figure 2-3**.

- The role of the Airport is expected to remain a GA facility that serves the needs of both corporate and recreational GA users. The Airport is expected to remain in the NPIAS throughout the forecasting period and remain classified as a D-II, Tier I facility within the Michigan Aviation System Plan.

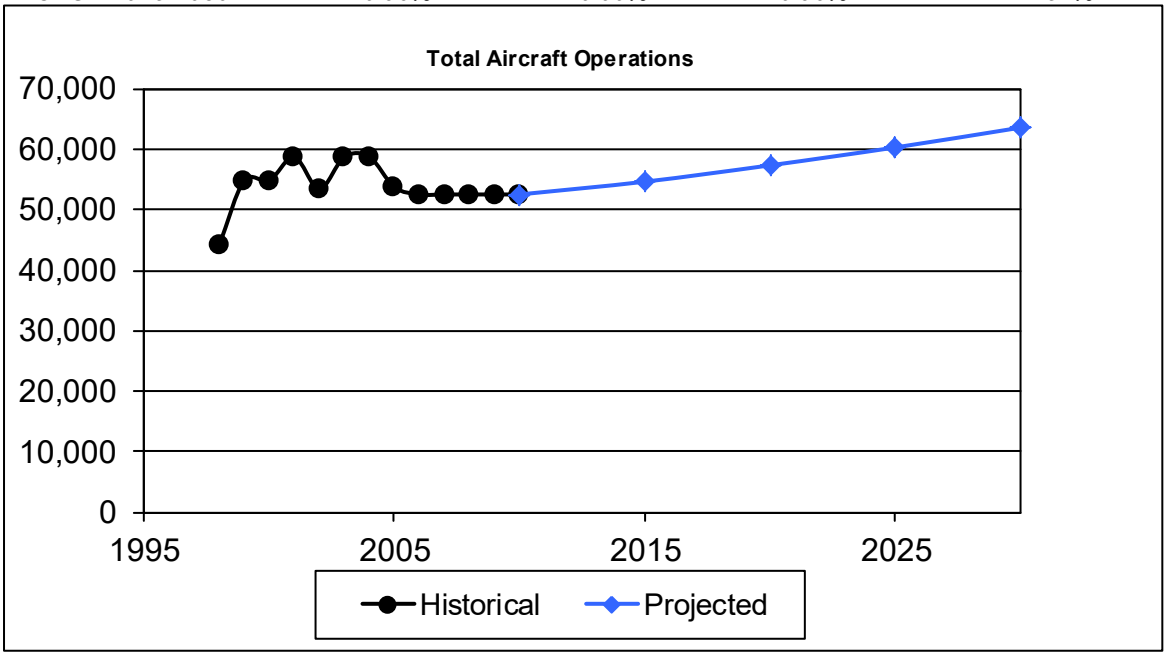
- Using a market share methodology, operations are projected to increase at the Airport at an annual CAGR of 0.96 percent (0.96%) from 52,520 operations in 2010 to 63,558 operations in 2030.

- Based aircraft are projected to grow at a CAGR of 1.51 percent (1.51%) through 2030, increasing the number of aircraft from 51 in 2010 to 69 in 2030. Based single-engine and jet aircraft are projected to increase through the study period while based multi-engine aircraft are likely to experience a relatively flat line growth.

- ARC D-II aircraft are expected to remain the critical aircraft throughout the study period. In this case, the Airport will not be required to increase the ARC of its existing facilities.

Figure 2-3
Summary of Projections

Year	Operations			Based Aircraft
	General Aviation	Military	Total	
Historical				
1998	44,100	20	44,120	55
1999	54,800	20	54,820	57
2000	54,800	20	54,820	57
2001	58,700	20	58,720	60
2002	53,400	20	53,420	59
2003	58,700	20	58,720	58
2004	58,700	20	58,720	58
2005	53,707	20	53,727	59
2006	52,500	20	52,520	56
2007	52,500	20	52,520	56
2008	52,500	20	52,520	55
2009	52,500	20	52,520	51
2010 [1]	52,500	20	52,520	51
Projected				
2010	52,500	20	52,520	51
2015	54,609	20	54,629	59
2020	57,310	20	57,330	61
2025	60,266	20	60,286	65
2030	63,538	20	63,558	69
CAGR 2015-2030	*0.96%*	*0.00%*	*0.96%*	*1.51%*



Note: [1] Projection, 2010 FAA Terminal Area Forecast
Source: Historical Operations and Based Aircraft - FAA Terminal Area Forecast
Projections - Mead & Hunt, Market Share Methodology

3

Airfield Capacity and Facility Requirements

An important aspect in an airport master plan study is determining future needs in order to effectively plan for future development. Through this assessment, recommendations can be developed to formulate how an airport can meet the future demands of its users. This chapter compares existing conditions at the Airport (Chapter 1) with projected future needs based on the forecast activity (Chapter 2) to identify future potential improvements to the airfield infrastructure. This process, sometimes called a gap analysis, helps the Airport plan effectively for future capital improvements. After future needs are identified, recommendations are then developed to formulate how an airport can meet the future demands of its users. Specifically addressed in this chapter are the following airfield design elements:

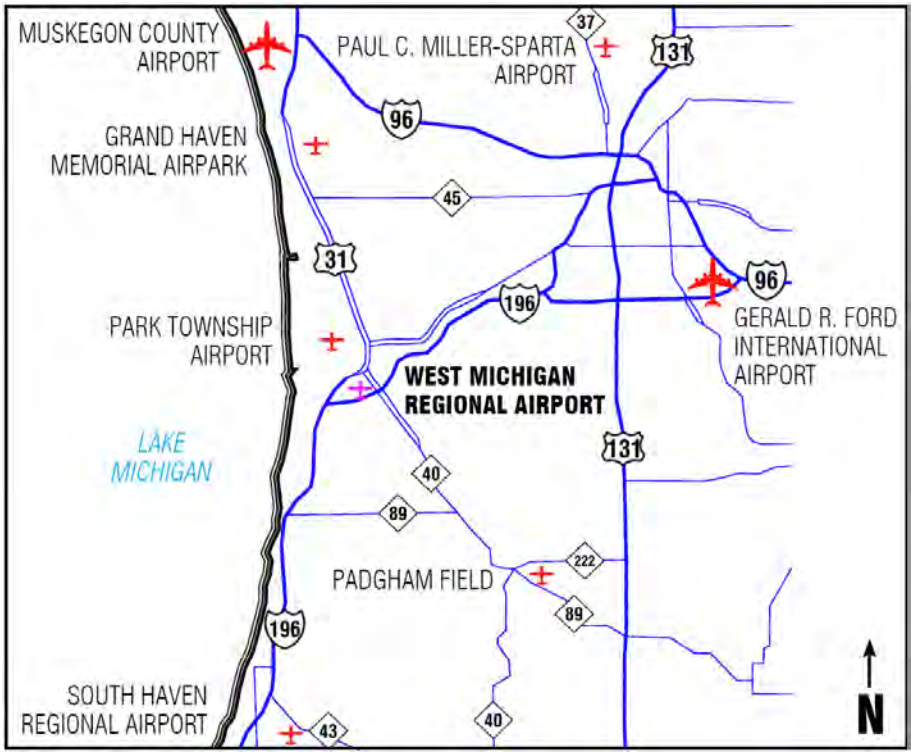
3.1 General Survey Results

Two surveys were conducted as part of this master plan study effort to determine demand capacity and facility requirements. The first survey targeted itinerant users and was distributed to nearly 400 corporations, private individuals, community associations, local businesses and other public institutions. The second survey was provided for users based at the Airport and distributed to 34 based tenants. Both surveys were designed to collect information regarding existing and future use of the Airport. This chapter focuses on the results of the two surveys, as well as a general assessment regarding how existing facilities meet current demand and what future development will be needed to meet future demands.

As shown in **Figure 3-1**, there are other GA airports in proximity to West Michigan Regional Airport including Park Township Airport4.5 miles to the northwest and Ottawa Executive Airport 10 miles to the northeast. Three additional GA airports are located within a 20 mile radius: Grand Haven Memorial Airpark in Grand Haven to the northwest, Riverview Airport in Jenison to the northeast and Padgham Field in Allegan to the southeast. The Gerald R. Ford International Airport in Grand Rapids, 40 miles to the east, and Muskegon County Airport, 30 miles to the north, serve as the commercial service airports for the West Michigan region.

Though other airports are located in proximity, it is anticipated that West Michigan Regional Airport will continue to serve the majority of the corporate and private aviation activity in the area due to its airport infrastructure. Greater than 93 percent (93%) of respondents from the itinerant and based user surveys expected their use of aviation to continue in the future. Additionally, greater than 82 percent (82%) of survey respondents stated that they use West Michigan Regional Airport the most to reach the greater Holland area. Additional survey results regarding individual airfield facilities will be noted throughout the chapter.

Figure 3-1
Airports in Proximity to West Michigan Regional Airport



Source: Mead & Hunt, Inc.

3.2 Basic Airport Design Factors

As previously mentioned in Chapter 1, the Federal Aviation Administration (FAA) provides guidance for airport design standards in Advisory Circular (AC) 150/5300-13, *Airport Design*. This AC establishes

standards and recommendations for airport design to maintain conformity throughout the national airspace system. Airfield design is also based upon numerous other FAA ACs that address specific topics such as airfield markings, lighting and signage, pavement design, and surface drainage design. Various Federal Aviation Regulations (FARs) also govern airport design.

3.2.a Airport Reference Code Classifications

Airport design is based upon the Airport Reference Code (ARC) which is a coding system for aircraft found in AC 150/5300-13, *Airport Design.* The ARC is based upon the approach speeds and wingspans of different categories of aircraft. The design of all airfield surfaces is based upon the ARC for the types of aircraft expected to use the surface.

As discussed in Chapter 1, the two components of the ARC, the Aircraft Approach Category (AAC) and the Airplane Design Group (ADG), separate the approach speed, vertical tail height, and wingspan categories into a letter and Roman numeral coding system. The AAC designates "A" for lower approach speeds increasing to "E" for the highest approach speeds. The same concept applies to the Roman-numeral designations for the ADG as smaller wingspans and tail heights are designated "I" and the longest wingspans and tallest heights designated a "VI". See **Table 3-1** for a listing of the ARC classifications.

Table 3-1
Airport Reference Code

Aircraft Approach Category		Airplane Design Group		
Category	**Approach Speed**	**Group**	**Tail Height**	**Wingspan**
A	Less than 91 knots	I	Less than 20 feet	Less than 49 feet
B	91 – 120 knots	II	20 – 29 feet	49 – 78 feet
C	121 – 140 knots	III	30 – 44 feet	79 – 117 feet
D	141 – 165 knots	IV	45 – 59 feet	118 – 170 feet
E	166 knots or more	V	60 – 65 feet	171 – 213 feet
Source: FAA AC 150/5300-13		VI	66 – 80 feet	214 – 262 feet

3.2.b Aircraft Fleet

The assigned D-II designation of the Airport as justified in Chapter 1 and noted in the 2008 Michigan Department of Transportation State Aviation System Plan reflects the corporate aircraft activity that occurs at the Airport. Many of the corporate and private aircraft in the active fleet today, that utilize West Michigan Regional Airport, fall within this range of aircraft. The following provides some common examples of aircraft from the different ARC categories that operate at the Airport.

A-I Aircraft – A-I aircraft are generally single-engine, propeller driven or a smaller twin-engine, propeller driven aircraft. A-I designated aircraft are typically private aircraft that have a maximum gross takeoff weight of less than 12,500 pounds and that seat four to six people. This category of aircraft can be

commonly found in hangars on the south side of the airfield. **Figure 3-2** illustrates examples of A-I aircraft.

Figure 3-2
Examples of Category A-I Aircraft

Cessna 172

Source: Cessna

Beech Bonanza

Source: Hawker Beechcraft

B-I Aircraft – Aircraft in category B-I are primarily small, twin-engine types that have a maximum gross takeoff weight of less than 12,500 pounds and often seat six to eight people. **Figure 3-3** illustrates examples of B-I aircraft.

Figure 3-3
Examples of Category B-I Aircraft

Mitsubishi MU-2

Source: Mitsubishi Heavy Industries America

Beech Baron

Source: Hawker Beechcraft

B-II Aircraft – Aircraft in category B-II range from twin-engine, propeller driven aircraft to mid-sized corporate jets. The aircraft in this category typically have a maximum gross takeoff weight of 12,500 pounds or more. This category of aircraft often seats between eight to ten people. **Figure 3-4** illustrates examples of B-II aircraft.

Figure 3-4
Examples of Category B-II Aircraft

Dassault Falcon 2000

Source: Dassault Falcon

Cessna Citation II

Source: Cessna

C-I and D-I Aircraft – C-I and D-I category aircraft are generally small corporate jets that have faster approach speeds relative to similar sized aircraft. These aircraft are frequent users of the Airport. Examples of C-I and D-I aircraft are shown in **Figure 3-5**.

Figure 3-5
Examples of Category C-I & D-I Aircraft

Learjet 40

Source: Bombardier

Learjet 60

Source: Mead & Hunt

D-II Aircraft – D-II aircraft are popular with corporate users since they typically offer longer flight ranges and greater seating capacities. West Michigan Regional Airport is specifically designed to serve the aircraft in this category and must be capable of continually accommodating the operating demands of this type as it popularity among business aviation users continues to increase. **Figure 3-6** illustrates examples of D-II aircraft.

Figure 3-6
Examples of Category D-II Aircraft

Gulfstream III

Source: Executive Controller

Gulfstream IV

Source: Executive Controller

D-III Aircraft – West Michigan Regional Airport occasionally experiences operations from D-III aircraft, however, it is infrequent enough that they do not meet the threshold of 500 operations to make this type the critical aircraft for the Airport. D-III aircraft are typically larger jets as illustrated in **Figure 3-7** that are equipped for long distance flight. Most aircraft in this classification conduct operations at the Airport as charters or corporate shuttles.

Figure 3-7
Examples of Category D-III Aircraft

Global Express

Source: Bombardier

Boeing Business Jet

Source: Boeing

Based on the results of the itinerant and based user surveys, 81 percent (81%) of respondents were utilizing private or corporate aircraft which meet D-II criteria. Just over 87 percent (87%) of these same respondents reported using these aircraft for business travel. Based on these results, the Airport can expect small recreational and business aircraft ranging up to the D-II category in its fleet mix on a continuing basis.

3.3 Wind Coverage

A primary factor in the design of an airport involves wind coverage. Since aircraft operate best by landing and taking off into the wind, it is important for an airport to understand the local winds at its location. Ideally, an airport should have its runway or runways oriented to allow for departing and arriving aircraft to operate in the direction of prevailing winds in the area. As addressed in AC 150/5300-13, *Airport Design*, it is desirable for an airport to have runways aligned to allow for 95 percent (95%) wind coverage based on the total number of wind observations taken.

As discussed in Chapter 1, the current orientation of Runway 8/26 provides just over 90 percent (90%) wind coverage during all weather conditions. This is less than the 95 percent (95%) coverage standard established by the FAA in AC 150/5300-13, *Airport Design*. This means that significant crosswind conditions can affect the operational capability of the Airport, especially for smaller aircraft that are less able to accommodate crosswinds.

The majority of the operations at the Airport are larger aircraft that are more adept at operating with crosswinds. Responses from the itinerant and based user surveys reflected this with limited support for a crosswind runway. Just over 79 percent (79%) of respondents stated they did not have to limit their use of the Airport due to a lack of a crosswind runway. When asked if additional use of the Airport would occur with construction of a crosswind runway, just over 63 percent (63%) of respondents stated they would have no increase in use. A crosswind runway may be warranted by the strict interpretation of the FAA standards, but operationally, current users indicate a lesser need. Consequently, a crosswind is recommended for consideration on the Airport Layout Plan (ALP) drawing set to preserve the opportunity should the need increase in the future. However, the timing of construction should be triggered by operational need by users.

3.4 Instrument Approach Procedures

Instrument approach procedures are developed by the FAA to provide guidance to pilots when landing at an airport. Instrument approach procedures are designed to give pilots guidance when landing in night time, low visibility, and inclement weather situations. Chapter 1 details the four published approach procedures for the Airport along with the associated visibility criteria. At this time, only Runway 26 is equipped with a precision approach.

To analyze the effectiveness of the existing approaches and navigational equipment at the Airport, questions were presented in both itinerant and based user surveys. Respondents were asked to gauge to what extent the lack of a precision instrument approach to Runway 8 impacted capacity at the Airport. An analysis of the responses found that 80 percent (80%) of itinerant users (20 responses) and 70% of based user responses (9 respondents) were not affected by the lack of precision approach to Runway 8.

The installation of an ILS or GPS-based precision approach on Runway 8 would allow the Airport a higher capacity for traffic in inclement weather when winds are out of the east and Runway 8 is used as the

primary approach. At this time, survey responses do not indicate a need for a precision approach to Runway 8. As traffic levels increase in the future, this addition should be considered again.

3.5 Airfield Capacity

Airfield capacity is the rate at which aircraft movements occur on a runway or taxiway. In describing airfield capacity, two terms are used: throughput capacity and practical capacity. Throughput capacity is the rate at which aircraft can operate into and out of the airfield without any regard to delay. Practical capacity is the rate at which aircraft can operate into and out of an airfield that can be expressed in terms relating to the maximum acceptable rate before a delay occurs. In other terms, throughput capacity is the capacity in theory and practical capacity is the capacity in relation to current conditions. As demand approaches the throughput capacity, the practical capacity is affected, resulting in lengthier delays. It is due to this that performing an airfield capacity analysis evaluates the level of delay at a facility and determines what future development is necessary to increase capacity.

Existing capacity at the Airport is such that during times of increased aircraft operations, throughput and practical capacity are not impacted by the increase in traffic. Guidelines established in FAA AC 150/5060-5, *Airport Capacity and Delay*, and Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, recommend an airport begin planning for airfield improvements to accommodate additional capacity when 60 percent (60%) of its total annual capacity is achieved. Forecasts prepared for this study project operations will increase to 63,558 annually in 2030. This is well under the 60% threshold to justify planning for airfield improvements. As a result, no changes to the configuration of the airfield are recommended for the Airport to meet future acceptable throughput and practical capacities. The addition of a crosswind runway would allow the Airport to increase its practical capacity during strong crosswinds for smaller aircraft; however, an additional runway is not needed to increase throughput capacity.

3.6 Navigable Airspace

As discussed in Chapter 1, Federal Aviation Regulation Part 77, *Objects Affecting Navigable Airspace,* establishes standards for determining obstructions affecting navigable airspace. Although it is a federal regulation, FAR Part 77 does not give the FAA authority to regulate land use surrounding an airport in order to keep obstructions clear; the FAA is charged with assessing the likelihood of a structure as an obstruction or hazard but has no power to preclude its construction. Instead, local communities are charged with the authority to enforce compatible land uses and control height obstructions that could be hazards to arriving and departing aircraft. Airport managers are encouraged to work with local governmental and zoning officials to enacting zoning to protect navigable airspace.

As listed on the FAA Form 5010, *Airport Master Record,* existing obstructions to navigable airspace are found in the approach surfaces to Runway 26. Trees, 43 feet in height, are found 1,662 feet from the approach end of Runway 26, located 275 feet north off the extended runway centerline requiring a 34 to 1 (34:1) approach slope to clear the obstructions. It is recommended that the trees creating the obstructions be removed or reduced in height to protect the 50 to 1 (50:1) approach slope to the runway. Also listed in the remarks section of the Airport's completed Form 5010 is a note that a height clearance is necessary for aircraft to clear the CSX railroad line located 1,100 feet east of Runway 8/26. Since a 23 foot traverse way height clearance is necessary for railroads and considering the railroad elevation is three (3) feet less than the elevation of the runway, a 20 foot height clearance is necessary for aircraft to clear the railroad. To clear the railroad at this height, a 45 to 1 (45:1) approach slope is necessary. It is recommended that a solution be developed to protect the 50 to 1 (50:1) approach slope for Runway 26 that allows the traverse way height standard over the railroad to be met.

3.7 Runway Components

In addition to length, width, and pavement strength features, runways are also comprised of several design surfaces such as runway safety areas (RSAs), obstacle free areas (OFAs), object free zones (OFZs) and runway protection zones (RPZs). This section analyzes the physical infrastructure and safety design components of Runway 8/26.

3.7.a Runway Length and Width

The length and width of a runway is based on the ARC of the most demanding category of aircraft anticipated to operate at the Airport on a regular basis. Chapter 1 and Section 3.2.a of this chapter explains in more detail the ARC for the different categories of aircraft. In accordance with FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design,* the recommended length of a runway should accommodate the performance characteristics of the critical design aircraft, operating at maximum gross takeoff weight (MTOW), in average high temperature conditions during the warmest month of the year.

Surrounding physical constraints also factor into the length of a runway. These physical objects may limit the ability of an Airport to provide a runway length at the recommended distance based upon FAA criteria. Airports with constraints may compensate by providing a runway length that fits within the limitation experienced, especially if they may lead to economic or environmental impacts.

The critical design aircraft of West Michigan Regional Airport is the Gulfstream G450. The manufacture indicates that this aircraft requires 5,600 feet of runway for takeoff when operating at MTOW in international standard atmosphere (ISA) at sea level. At West Michigan Regional Airport, when the MTOW performance characteristics of the aircraft are adjusted to the Airport's elevation of 698 feet at

ISA, during the average annual high temperature of 58 degrees Fahrenheit, the G450 requires 5,917 feet of runway for takeoff. However, at the average July high temperature of 82 degrees Fahrenheit, the aircraft requires 6,622 feet of runway for takeoff at MTOW. Though operations of the Gulfstream G450 often are conducted on a daily basis at the Airport, the level of operations conducted at MTOW in combination with the number of days the temperature is 82 degrees or greater makes it difficult to justify the need for additional runway length at this time.

Considering the number of physical constraints surrounding the Airport that would require mitigation for additional runway length, the existing 6,002 feet length of Runway 8/26 satisfies the majority of the takeoff distance requirements of the critical design aircraft operating at MTOW during most temperature conditions. Responses from the user surveys support the existing runway length for takeoff distance requirements of aircraft operating at the Airport. Just over 35 percent (35%) of respondents required 3,000 to 4,000 feet of runway while approximately 28 percent (28%) of respondents required 5,000 to 6,000 feet of runway length. With all survey respondents requiring no greater than 6,000 feet of runway to operate their aircraft, a need for additional runway length was not demonstrated at this time. However, in the event a critical design aircraft is preparing for a departure from the Airport during high temperature conditions, concessions in fuel, cargo, and/or passenger loads may be needed. If the number of critical design aircraft operations increase, the frequency of the average high temperature increases, or a change in the design aircraft is experienced, consideration should be made towards extending the distance of Runway 8/26.

3.7.b Runway Strength

The strength of a runway is based upon the MTOW of the greatest classification of aircraft expected to use it. A 20 year lifetime expectation, the number of annual departures, and landing gear configurations of aircraft expected to use the surface are also part of the equation. AC 150/5320-6D *Airport Pavement Design and Evaluation* provides in-depth guidance on how to determine pavement strength.

The pavement strength of Runway 8/26 is rated for the weight of D-II category aircraft designed to use the runway and any airport maintenance and snow removal equipment. Based on the MTOW of an aircraft and its landing gear configuration, the weight bearing capacity of the runway includes:

- Single wheel main gear configuration: 75,000 pounds
- Double wheel main gear configuration: 160,000 pounds
- Double tandem main gear configuration: 175,000 pounds

3.7.c Runway Safety Area

As defined in Chapter 1, a runway safety area (RSA) is a designated area surrounding a runway to support aircraft in case an aircraft overshoots, undershoots, or veers off a runway. For D-II category

runways, the ARC design standards for a RSA are 500 feet wide centered on the runway centerline and extending 1,000 feet beyond each end of the runway. An RSA must be free of obstructions, properly graded to allow for water drainage and be able to support the weight of aircraft and other vehicles such as fire trucks and snow removal equipment expected to use the area. At the Airport, the RSA meets these conditions within the required safety area, so no additional improvements are necessary.

3.7.d Object Free Area

The OFA is an area encompassing the runway that keeps protruding objects free from the edges of the safety area as noted in Chapter 1. The OFA for Runway 8/26 has a width of 800 feet and extends 1,000 feet beyond the end of each runway for a total dimension of 800 feet wide by 8,002 feet long. Equipment deemed necessary for air navigation, such as airfield lighting and taxiing aircraft are permitted in an OFA. All other objects, including parked aircraft, are not to be placed in an OFA. The Airport's OFA meets the standards within the area required by D-II design standards so no additional improvements are necessary.

3.7.e Obstacle Free Zone

As explained in Chapter 1, the OFZ is a three dimensional volume of airspace surrounding a runway up to a height of 150 feet that provides clearance for aircraft from obstructions on the ground during landing, taking off or when executing a missed approach. The following four elements are included in an OFZ:

Runway OFZ – The runway OFZ is centered on the runway centerline extending 200 feet beyond each end of the runway. The width is based on the size of aircraft.

- For runways serving small airplanes:
    i. 300 feet for runways with lower than 3/4 statute mile approach visibility minimums
    ii. 250 feet for other runways serving small airplanes with approach speeds of 50 knots or more
    iii. 120 feet for other runways serving small airplanes with approach speeds of less than 50 knots
- For runways serving large aircraft, the width is 400 feet

Runway 8/26 OFZ is centered on the runway centerline and extends 200 feet beyond each runway end for a total of 6,402 feet in length. The width of the Runway OFZ is 400 feet.

Inner-approach OFZ – The inner-approach OFZ is centered on the approach end of a runway. It applies only to runways that have an approach lighting system and encompasses the entire lighting system. Its dimensions extend 200 feet from the runway threshold to 200 beyond the last light in the runway lighting system. The width of the inner-approach OFZ is the same as the criteria for the width of the runway OFZ

The inner-approach OFZ only applies to the approach end of Runway 26 as it is equipped with an approach lighting system. It is located 200 feet from the runway threshold and extends 200 feet beyond

the last light unit for a total of 2,400 feet in length. The inner-approach OFZ is 400 feet in width and rises at a slope of 50 to 1 (50:1) from the threshold of the runway.

Inner-transitional OFZ – The inner-transitional OFZ is a sloping three dimensional surface along the sides of a runway OFZ that applies to runways with lower than 3/4 statute miles approach visibility minimums. The dimensions of the inner-transitional OFZ are based on the size of aircraft designed to use the runway and on the category of instrument landing system installed on the runway.

The inner-transitional OFZ only applies to the approach end of Runway 26 as it has approach visibility minimums less than 3/4 statute miles. It is located along the sides of the Runway OFZ and inner-approach OFZ and rises vertically for a height of approximately 52 feet, then slopes at a 6 to 1 (6:1) ratio out to a height of 150 feet.

Precision OFZ – The POFZ is a volume of airspace 200 feet long and 800 feet wide at the beginning of a runway threshold that is only in effect when all of the following operational conditions are met:

- An aircraft is on a vertically guided approach
- The ceiling is below 250 feet and/or the visibility is less than 3/4 statue mile (or Runway Visual Range (RVR) is below 4,000 feet)
- The approaching aircraft is within two miles of the runway threshold

When this criterion is met for a POFZ to be active, an aircraft on a taxiway cannot have its fuselage or tail penetrating this zone.

The POFZ is applicable on the approach end of Runway 26 beginning at the runway threshold centered on the runway centerline 200 feet long and 800 feet wide. The POFZ is in effect when aircraft are on a vertically guided approach within two (2) miles of the runway threshold when the ceiling is below 250 feet and/or the visibility is less than 3/4 statute miles.

3.7.f Runway Protection Zone

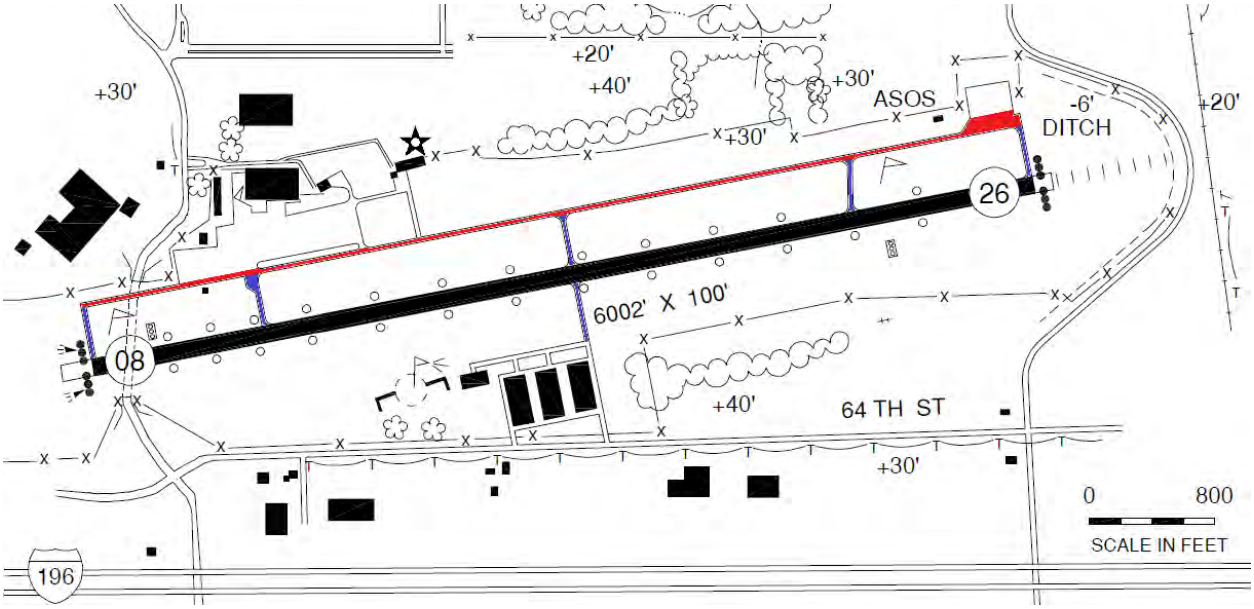
As defined in Chapter 1, the RPZ is a trapezoidal-shaped area extending from each runway end that is designed to enhance the protection of people and property on the ground.

The approach visibility minimums are partially determined based on the type of navigational equipment installed for the approach of the runway. For Runway 8, the dimensions of the RPZ are 1,000 feet on the inner width of the trapezoidal shape and 1,510 feet on the outer width. The RPZ begins 200 feet off the approach end of Runway 8 and extends to a length of 1,700 feet. Due to the lower approach visibility minimums of Runway 26, the size of the RPZ is larger. For Runway 26, the inner width of the trapezoidal shape is 1,000 feet and 1,750 feet at the outer width. The length, which begins 200 feet past the approach end of Runway 26, is 2,500 feet. The RPZ dimensions for Runway 8 and Runway 26 are in accordance with design specifications for D-II runway approaches as identified in AC 150/5300-13, *Airport Design*.

3.8 Taxiway Components

The taxiway system at an airport is designed to safely and efficiently move aircraft to and from a runway. Careful planning should be taken into consideration when designing a taxiway system to promote this safety and efficiency. There are two types of taxiways found at the Airport; parallel and connector taxiways. A parallel taxiway runs parallel to a runway, and provides for movement of aircraft from one end of the runway to the other. A connector taxiway is usually a short taxiway that usually leads to a parallel or main taxiway and is used by aircraft turning onto and off of a runway. Designed for aircraft to taxi at speeds of 20 miles per hour, the taxiways are strategically placed to efficiently move aircraft around an airfield. **Figure 3-8** illustrates the connector and parallel taxiways at the Airport.

Figure 3-8
Taxiways at West Michigan Regional Airport



Legend:
= Parallel Taxiway
= Connector Taxiway
Source: Michigan Department of Transportation

The taxiway system at the Airport includes five connector taxiways which join Runway 8/26 with the parallel taxiway and one connector taxiway that joins that south hangar area with the runway. The width of the five connector taxiways at 70 feet and the 50 foot wide parallel taxiway exceed the taxiway standards for D-II category aircraft (35 feet) as designated in FAA AC 150/5300-13, *Airport Design*.

3.8.a Taxiway Safety Area

Taxiway safety areas are similar to runway safety areas as they are centered on the taxiway centerline and should be graded, drained, capable of supporting aircraft and snow and fire equipment and free of

objects. The width of the taxiway safety area is based on the design of the critical aircraft expected to use the surface. Since the Airport is designated a D-II facility, all taxiway safety areas at the Airport meet the 79 feet width specification as identified in FAA AC 150/5300-13, *Airport Design*.

3.8.b Taxiway Object Free Area (OFA)

Taxiway OFAs are similar to runway OFAs as they are also centered on the taxiway centerline and prohibit vehicle roads, parked aircraft and above ground objects except those needed for air navigation. The width of these areas is based on the most demanding aircraft expected to use the surface. All taxiway OFAs at the Airport are 131 feet in width which meets the design standards of ADG category II aircraft as specified in FAA AC 150/5300-13, *Airport Design*.

3.9 Airfield Air Traffic Control

At the present time, no air traffic control tower exists at the Airport, which places the responsibility for the separation of aircraft on the pilots. Through the use of a Common Traffic Advisory Frequency (CTAF), pilots communicate with each other by reporting their position in relation to the traffic pattern and their intentions. At the Airport, the CTAF frequency is 123.05 megahertz (MHz).

The use of a CTAF frequency is common at many general aviation airports. However, as the amount air traffic increases, especially the operation of large D-II and D-III category aircraft, consideration may be given to the installation of an air traffic control tower. If an FAA staffed control tower is not justifiable at the Airport, a private air traffic control tower may be considered through the U.S. Contract Tower Association (USCTA). Further analysis of forecasted traffic levels should be conducted to determine if the installation of a control tower is warranted as operations may increase.

3.10 Airfield Lighting and Signage

Airfield lighting and signage are important tools used by pilots and ground vehicles to navigate around an airfield. The primary goal of airfield lighting is to outline and identify the surfaces on an airfield. The following sections explain and provide recommendations for the airfield lighting and signage at the Airport.

3.10.a Airfield Lighting

Airfield lighting is utilized during night time, low visibility, and in inclement weather situations. The color of airfield lighting is used to distinguish a runway from a taxiway along with outlining these surfaces. Airfield lighting is also used on runways to assists pilots in determining the distance remaining when taking off or landing. The following explains the airfield lighting at the Airport.

Runway 8/26 – Runway 8/26 is equipped with High Intensity Runway Lighting (HIRL). HIRL has different lighting intensities that a pilot can change remotely by rapidly keying the microphone on the CTAF frequency. This change of intensity may be done depending upon the need for greater visibility of the

lighting system. White colored runway lights on Runway 8/26 designate the surface as a runway. The last 2,000 feet of Runway 26 is designated with amber colored lights to notify the pilot of the distance remaining on the runway since this is a runway with precision approach minimums and pilots may be operating on the runway during reduced visibility conditions. Lighting color is critical when operating in night time or low visibility situations. HIRL is the preferred type of runway lighting, therefore no changes are needed.

Taxiways – Taxiways are designated with blue lighting, as mandated by the FAA, to inform users that the surface is a taxiway. All taxiways at the Airport are illuminated with blue taxiway lights. There are no improvements required for the taxiway lighting. However, the airport should include regular maintenance activities in budgeting and management decisions.

3.10.b Airfield Signage

Multiple types of airfield signage are mandated by the FAA to relay different types of information to pilots and vehicles including:

- Instruction Signs
- Location Signs
- Boundary Signs
- Direction Signs
- Destination Signs
- Information Signs
- Roadway Signs
- Runway Distance Remaining Signs

The following sections describe and provide examples of these signs that are found on the airfield.

Mandatory Instruction Signs – Mandatory instruction signs have white lettering on a red background. These signs designate important airfield locations such as taxiway/runway intersections, runway/runway intersections, ILS critical areas, POFZ boundaries, runway approach areas, and no entry areas. These signs require the pilot or ground vehicle operator to stop and communicate his or her intentions before proceeding. These signs are found on connector taxiways prior to their intersection of Runway 8/26.

Location Signs – Location signs have yellow lettering on a black background. These signs inform the pilot or vehicle operator of the surface they are on. Location signs are found on the airfield at the intersections of the parallel taxiway and connector taxiways.

Boundary Signs – Boundary signs have a black lettering or an identification symbol on a yellow background. These signs are used to inform a pilot or ground vehicle operator when they are clear of an important area such as an RSA, OFZ, or ILS critical area. These signs are located at the intersections of the connector taxiways and Runway 8/26 when exiting the runway.

Direction Signs – Direction signs have black lettering on a yellow background and always contain arrows. These signs

indicate the direction of a taxiway at an intersection and are also found on Runway 8/26 to designate the locations of the connector taxiways. Direction signs also can be used to identify the location of an airfield destination such as the end of a runway or a terminal or parking apron.

Runway Distance Remaining Signs – Runway distance remaining signs have white numbering on a black background. These signs are found on Runway 8/26, placed at thousand foot increments, to designate the distance remaining on the runway.

No airfield signage improvements other than continual maintenance and service are necessary as all signs and associated components were found to be in a good operating condition.

3.11 Navigational Aids

The following sections evaluate the current NAVAIDs found at the Airport and assess potential improvements to help increase capacity, especially during conditions when a pilot is limited in his or her ability to visually navigate an aircraft.

3.11.a Wind Indicator

West Michigan Regional Airport has three lighted wind indicators on the airfield. A wind indicator is situated near both ends of Runway 8/26 along with another wind indicator located inside the segmented circle on the south side of the airfield. The locations of these wind indicators meet FAA standards.

3.11.b Segmented Circle

Segmented circles with traffic pattern indicators are used as a visual navigational aid by pilots to identify the direction of the Airport traffic pattern. The Airport has a segmented circle surrounding the wind indicator on the south side of the airfield. No changes are needed since Tulip City Air Service maintains the segmented circle in good condition.

3.11.c Rotating Beacon

A 360 degree rotating beacon is located on the north side of the airfield, east of the terminal apron. This visual navigational aid is used to identify the location and type of airport. Civil airports are designated by an alternating green and white signal from the beacon; therefore a green flash and a white flash are emitted from the Airport's rotating beacon. No changes to the beacon are needed since it is able to be seen from the air unobstructed from objects on the ground and is kept in good operating condition.

3.11.d Runway 8 Navigational Aids

Runway 8 has two navigational aids; one assists pilots in determining the correct approach slope and the other signals the location of the beginning of the runway. A four light Precision Approach Path Indicator (PAPI) located 1,000 feet down the left side of the runway uses red and white lights, at slightly different angles, to indicate to the pilot the correct approach slope for landing.

Runway End Identifier Lights (REILs) are located on either side at the beginning of the runway. These high intensity lights flash rapidly to identify the beginning of the runway. This navigational aid is very useful when locating the beginning of a runway in low visibility situations.

Due to a forecasted increase in the number of corporate jets and other instrument approach equipped aircraft, consideration should be given to the installation of precision approach equipment. The installation of precision approach equipment to support future satellite navigation for Runway 8 would enhance the functionality of the Airport.

Results from the itinerant and based user surveys illustrate limited support currently for installation of a precision instrument approach to Runway 8. More than 76 percent (76%) of respondents did not have to limit their use of the Airport due to a lack of precision instrument approach to Runway 8 with those affected reporting a low frequency of impact ranging from two (2) to five (5) times per year. Those affected (53%) used an alternate airport while almost 24 percent (24%) delayed their flight. Approximately 18 percent (18%) of respondents reported canceling their flight due to weather conditions. While limited need was identified at this time, it should be noted that 66 percent (66%) of respondents indicated an ILS or a GPS-based approach offering vertical guidance to Runway 8 would provide a benefit to their use.

3.11.e Runway 26 Navigational Aids

Runway 26 has four types of navigational aids: PAPI, REIL, Instrument Landing System (ILS), and Medium Intensity Approach Lighting System with Runway Alignment Indicator Lighting (MALSR). The PAPI and REIL for Runway 26 are the same as Runway 8 with the PAPI located 1,000 feet down the runway on the left side and the REIL at the beginning of the runway pavement. Runway 26, unlike Runway 8, is equipment with an ILS and a MALSR. The ILS is composed of a glide slope and a localizer both of which emit signals to direct aircraft on the proper decent slope and alignment to the runway. The MALSR is a system of lights at the approach end of the runway indicating that the beginning of the runway is near. These lights guide pilots to the runway when following the ILS signal in low visibility situations. Touchdown zone markings painted on the runway 1,000 feet from the beginning also provide guidance to pilots when landing. The two solid white rectangular markings are located next to the PAPI and glide slope antenna and identify the point on the runway the pilot should be aiming for when following the ILS signal and or PAPI upon landing.

The installation of Automatic Dependent Surveillance – Broadcast (ADS-B) system antenna towers to help augment Global Positioning System (GPS) signals will allow the FAA to develop precision approaches on a more cost effective basis. With nearly half (47%) of survey respondents considering installation within two (2) years of such navigational equipment to take advantage of this system, consideration should be given to utilize this navigational aid. The installation of this piece of infrastructure would allow precision instrument approaches to be developed for Runway 8 and provides backup navigational support for maintaining a precision approach to Runway 26 in the event of an ILS equipment failure.

3.12 Terminal Facility

A terminal adequate to service the passengers of private recreational and business aviation aircraft is needed for the size and type of operations at the Airport. The existing terminal building lies on the northwest corner of the airfield, west of the terminal apron. It is a one-story building with approximately 2,000 square feet of space. The terminal houses offices for Tulip City Air Service, along with a car rental area, restrooms, pilot's lounge, flight planning area, and a small kitchen. Adjacent to the terminal building is a small parking lot with approximately 45 parking spots.

Many existing deficiencies in the current terminal building suggest a need for a new terminal building. The small size, and visually unattractive exterior, of the current terminal building creates a small passenger waiting area, undersized administrative area, and small restrooms. An increase in airport traffic levels in the future may call for the replacement of the building. A September 2005 report by Mead & Hunt titled *Tulip City Airport Global Welcome Center Concept and Budget Report* highlights the deficiencies of the current terminal, addresses the needs for a new terminal, and identifies the location, planning, and budget of such facility. An update to the document in 2011 highlights the deficiencies and provides for new floor plan ideas and site layouts. This document should be referred to and updated as necessary.

The proposed location of a new terminal building is east of the current hangar facilities at the end of Geurink Avenue. Approximately eleven (11) acres of land would need to be acquired to build a new terminal at this location. Planning for the possible construction of a new terminal at this site should be considered for land use purposes. Ensuring that the land is available will eliminate difficulties if or when the decision is made to build a new terminal. Although this document supports the recommendations of the two previous terminal planning documents for a new terminal as future aircraft operations increase, it should not be used as the sole reference for when and/or where a new terminal should be constructed.

When asked if itinerant and based users felt a new terminal building was needed, more than half of the respondents (54%) agreed. Of the respondents, 95 percent (95%) were not adverse to a new terminal building serving multiple functions such as offices for non-aviation businesses. Respondents indicated that the passenger waiting area, rental car facility, and a restaurant/vending area were the most sought after amenities in the proposed terminal building.

3.13 General Aviation (GA) Facilities

Ensuring the Airport has facilities that continue to meet the needs of users is important when planning for future development. The following sections focus on the current state of the facilities and identify areas for future improvement based on aviation projections.

3.13.a Fixed Base Operator

The current fixed base operator (FBO) at the Airport is Tulip City Air Service. Tulip City Air Service has been the only FBO at the Airport since 1967. Providing a wide range of services, the FBO offers a wide range of service including: fuel, aircraft maintenance, rental cars, private aircraft charters, and a flight school. Historically, Tulip City Air Service has expanded and grown to match the growth and development of the Airport. Tulip City Air Service continues to be well poised to meet the future demands of the Airport.

3.13.b Aprons

There are three aprons at the Airport, two on the north side of the airfield and one on the south. The two on the north side of the airfield handle traffic for the terminal building and the FBO, while the other provides ramp space in front of a large corporate hangar located east of the main terminal ramp. The apron on the south end of the airfield allows room for small single engine aircraft to maneuver when entering or exiting the private T-hangars.

As operations at the Airport continue to increase, additional apron space will be needed to accommodate the growth in traffic. A recommended location for a new apron is in the front of the proposed terminal building. In this scenario, the new apron would be utilized by aircraft enplaning and deplaning passengers at the new terminal while the apron in front of the current terminal could be used to provide additional aircraft parking for Tulip City Air Service. Expansion of the apron on the south side of the airfield to increase maneuvering space for small GA aircraft entering and exiting the T-hangar area may be necessary if additional hangars are constructed in order to meet future demand. Specific sizes for the expansion are not identified since it is dependent upon the actual growth of the Airport.

3.13.c Hangars

Hangars for several sizes of GA aircraft can be found at the Airport. Large box style hangars for corporate aviation aircraft are located on the north side of the airfield while smaller T-hangars are located on the south side of the airfield. The tenants of these hangars include individuals, corporations, and the FBO.

Given the estimated increase in corporate aviation traffic, planning for additional corporate aircraft hangars is recommended. The future economic environment of the Holland region will play a large role in determining hangar development at the Airport. As businesses grow and the economic climate of the Holland region strengthens, demand for hangars to house corporate aviation aircraft will likely increase.

Likewise, increased economic activity will increase the amount of discretionary spending in the GA community which may lead to an increase in the demand of private hangars. For these reasons, land should be set aside for hangar development to provide space when demand requires it.

3.14 Federal Aviation Regulation (FAR) Part 77 Components

Federal Aviation Regulation (FAR) Part 77 establishes standards for determining obstructions to navigable airspace. Five three-dimensional civil airport imaginary surfaces are established in the regulation. The five surfaces, defined as horizontal surface, conical surface, primary surface, approach surface, and transitional surface, are explained in greater detail in Chapter 1. This section defines the exact dimensions of these surfaces in relation to Runway 8/26, lists obstructions to navigation found penetrating these surfaces, and recommends solutions to remove or prevent these obstructions from interfering with aircraft operations. **Table 3-2** lists the dimensions of the FAR Part 77 surfaces for Runway 8/26 while three-dimensional and plan view illustrations can be found in Section 1.10.c of Chapter 1.

Objects that penetrate the FAR Part 77 surfaces are considered obstructions to navigation. Land use underneath the approaches to Runways 8 and 26 are such that most objects which could penetrate these surfaces, such as buildings and trees, are not present. The approach to Runway 8, for example, is free of any obstructions as the majority of the area is relatively flat, undeveloped agricultural land.

Table 3-2
FAR Part 77 Surfaces Dimensions for Runway 8/26

Item	Dimension		
Primary surface	**Width:**		1,000 feet
	Length:		6,402 feet
Approach surface	**Inner width:**	**Runway 8**	1,000 feet
		Runway 26	1,000 feet
	Outer width:	**Runway 8**	3,500 feet
		Runway 26	16,000 feet
	Slope / horizontal distance:	**Runway 8**	34:1 for 10,000 feet
		Runway 26	50:1 for 10,000 feet 40:1 for additional 40,000 feet
Transitional surface	**Slope:**		7:1
	Horizontal distance:		5,000 feet
Horizontal surface	**Vertical distance:**		150 feet above ARP
	Radius of arcs:		10,000 feet
Conical surface	**Slope:**		20:1
	Horizontal distance:		4,000 feet

Source: FAR Part 77

The approach to Runway 26, however, has a small pocket of trees that are considered obstructions to navigation. At a height of 43 feet, the trees are located approximately 275 feet from the right of the centerline at a distance of 1,660 feet from the beginning of the runway. According to published information, a 34 to 1 (34:1) slope is recommended to clear the trees. Since Runway 26 has an ILS

approach, a 50:1 slope has been established for the approach surface. With a 50 to 1 (50:1) slope, the trees penetrate the approach surface and are considered an obstruction to navigation. Obstruction clearing scheduled to occur in the late summer or fall of 2011 will mitigate these obstructions, preserving the 50 to 1 (50:1) approach slope.

An additional obstruction on the approach to Runway 26 is the CSX railroad line to the east of the Airport. The railroad, located 1,100 feet from the end of the runway, is considered a traverse way as defined in FAR Part 77. To clear a railroad traverse way, a height of 23 feet is imposed using standards defined in FAR Part 77. Using the 50 to 1 (50:1) slope, the maximum height an object can be at the location of the railroad tracks without penetrating the approach surface is 18 feet; therefore the railroad is considered an obstruction to navigation.

3.15 Recommendations Summary

Since the Airport plays an important role in the economic and transportation systems of the Holland area and surrounding lakeshore communities, it is important to ensure the Airport continues to meet the current and future needs of the community. Although nearly three-fourths (72%) of survey respondents were generally pleased by the facilities offered today, continual planning must take place to ensure facilities and services continue to meet user needs. Through the review of the existing facilities and conditions, a summary of recommendations is provided below for future Airport planning purposes:

- **Land Use.** The use of land around the Airport should be monitored and controlled to keep the designated FAR Part 77 surfaces free of obstructions that may be hazardous to aircraft. Monitoring the land use around the Airport will not only protect aircraft but also people and objects on the ground near the Airport.

- **FAR Part 77 Obstructions.** It is recommended that the obstructions to Runway 26 be removed to eliminate a hazard to navigating aircraft, and to pave the way for development of future approach procedures using satellite based navigation.

- **Apron Space.** Since long term aviation activity forecasts predict increased traffic levels at the Airport, the provision of additional apron space will be necessary to accommodate the growth in aircraft, especially to accommodate increased numbers of corporate jets with large wingspans. As more D-II aircraft begin to utilize the Airport, additional ramp space will be needed to park these relatively large aircraft and accommodate their large footprint.

- **Navigational Aids.** The ILS approach to Runway 26 provides the Airport with an instrument approach for aircraft to land in low visibility and inclement weather situations. Although data collected from user surveys indicated limited support for a precision approach to Runway 8 at this time, the addition of an ILS to Runway 8 would increase the capacity of the Airport and the flexibility to accept landing traffic when instrument flight conditions exist. An alternative to installing an ILS to Runway 8 is to prepare the Airport for the future of satellite based navigation. After the establishment of a nationwide, satellite-based system, infrastructure will be in place for

the FAA to develop GPS instrument approach procedures that offer greater navigational precision.

- **Terminal Building.** The development of a new terminal building will enhance not only the facility itself, but also the traveling public's perception of the Airport and the community. Since the terminal building at an airport is sometimes the first and last impression a visitor will have of a community, it is important for it to portray the region's natural beauty, strong economy, and friendly hospitality. Responses collected from itinerant and based user surveys indicated over half of respondents (54%) felt that a new terminal building is needed at the Airport.

- **Air Traffic Control Tower.** Although current traffic levels do not warrant the installation of an air traffic control tower at this time, consideration should be given if future traffic levels at the Airport rise significantly. Given the number of corporate jets that utilize the Airport and the forecasted increase in air traffic, a tower would help monitor the safe separation and operation of aircraft. If the installation of an FAA air traffic control tower is still not warranted with increased traffic levels, partnership through the USCTA may provide an economical alternative should the West Michigan Airport Authority wish to pursue the issue.

- **Hangar Development.** Hangars must be available to store, service and maintain aircraft. As corporate aviation traffic increases, the demand for general aviation hangars will also increase. Planning for the development of additional hangars will prepare the Airport to support this additional demand. Locations at both the north and south sides of the Airport are available to support development.

4

Alternatives Analysis

This Chapter seeks to formulate development alternatives based on the review of existing conditions, demand for capacity, and forecasts identified in Chapters 1 through 3. The alternatives presented in this Chapter demonstrate possible solutions for future development needs. An analysis is included for each alternative which weighs the pros and cons of each potential solution. The goal of this Chapter is to narrow down the most prudent and economical proposed development alternatives that will adequately serve the existing and future needs of Airport users. This Chapter is broken down into the following sections:

4.1 Constraints to Development
4.2 Development Alternatives
4.3 Summary

Each section is separated into subsections that look at proposed alternatives for specific components of the Airport's infrastructure. These subsections review proposed alternative developments on a component specific level to addresses how to best meet the anticipated user needs.

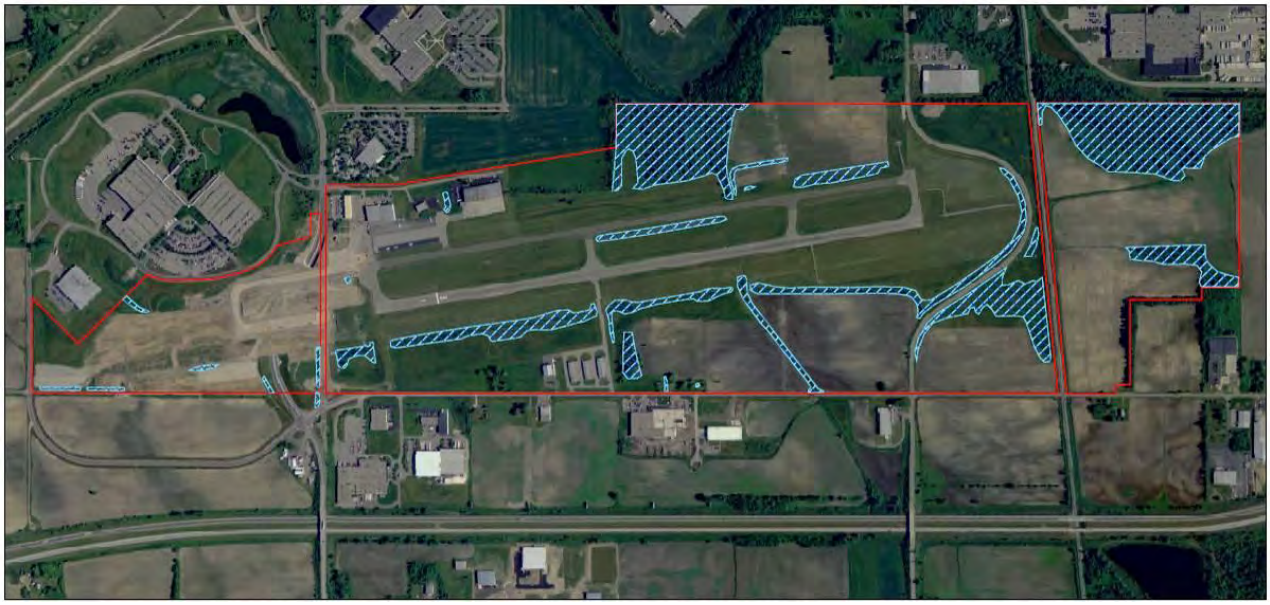
4.1 Constraints to Development

Before reviewing development alternatives it is important to note the constraints found in vicinity of the Airport. These constraints limit the options available for improving Airport infrastructure. Evaluating the constraints around the Airport also provides an initial review of the feasibility to overcome these obstacles.

4.1.a Wetland Constraints

Various identified wetland areas surround the Airport, as explained in the *Regulatory Wetland Delineation Report* prepared by JFNew after a September 2009 visit to the Airport (see **Figure 4-1**). These areas constrain development since wetlands are to be avoided to the greatest extent possible if practical alternatives exist for construction projects. The locations of these wetlands affect the alternatives that can be developed when planning for airport improvements.

Figure 4-1
Identified Wetland Areas within Existing Airport Property



Legend
Approximate Property Boundaries
Approximate Wetland Locations
Source: Regulatory Wetland Delineation Report, JFNew, 2009

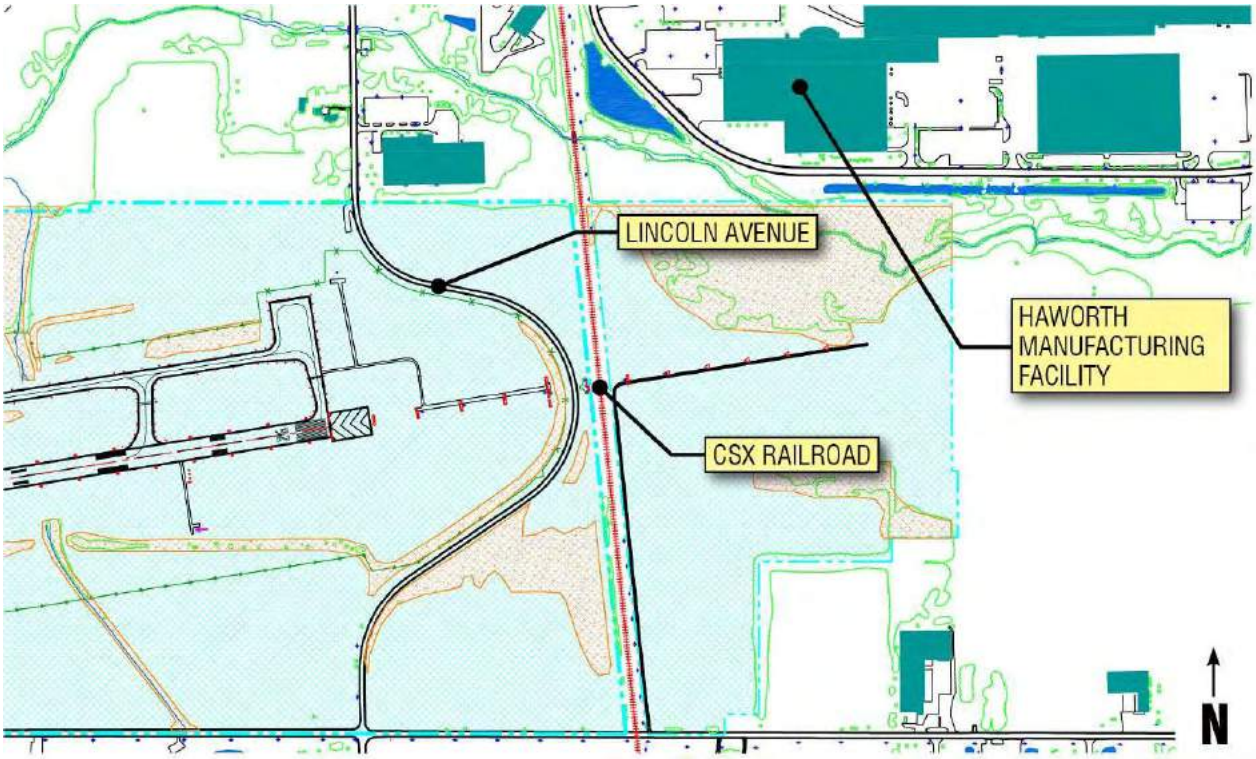
The wetland areas found on existing Airport property, most notably impact the development of alternatives for a new terminal building. An identified wetland area north of the midfield area constrains buildable area on the north side of the airfield that could be used for a terminal building or hangar development. Wetland areas found parallel to the north and south of Runway 8/26 may impact alternatives for development of a crosswind runway. Wetlands on the east side of the Airport may also impact alternatives to develop this property for aeronautical or non-aeronautical use. Additionally, wetlands located north of the existing airport property, within the area identified for a possible crosswind runway, were not defined as part of this report because they are located on private property. Impacts within this area are expected should development in that area be considered.

4.1.b Runway 8/26 Constraints

Several infrastructure related constraints are found around Runway 8/26 which limit alternatives for future expansion as illustrated in **Figure 4-2**. A CSX rail line east of Lincoln Avenue hinders runway expansion to the east, since the coordination required to realign or lower the railroad grade make eastward expansion very costly. Proximity to I-196 and industrial development north of the existing airport property significantly limits relocation options for the rail line. Lincoln Avenue also constrains alternatives for eastward expansion of the runway as relocation or closure of this road may be necessary. Furthermore, the location of the Haworth headquarters and manufacturing facility to the northeast presents a challenge as it must remain outside of the Runway Protection Zone (RPZ) for Runway 26.

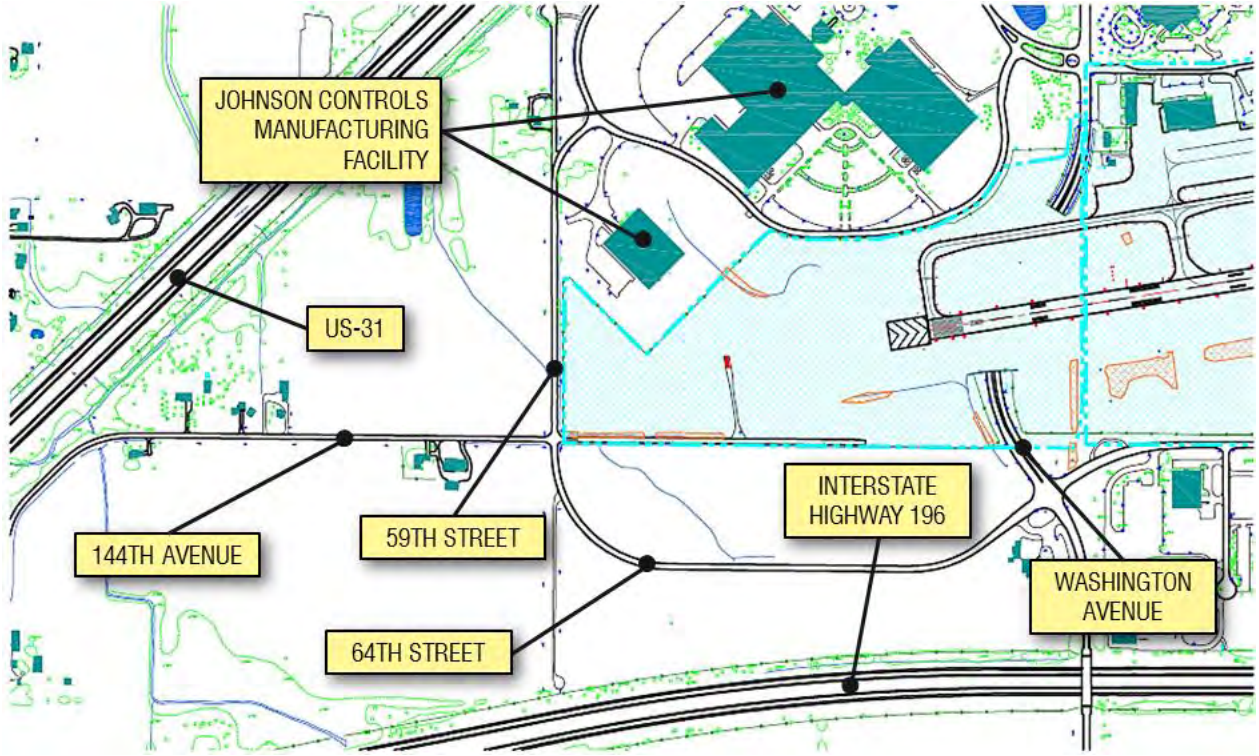
Additional infrastructure related constraints found on the west side of the Airport impact development alternatives for westward expansion of Runway 8/26 as shown in **Figure 4-3**. The location of 59th Street limits the development of alternatives as relocation or closure of this road may be necessary, and if necessary will be costly. A portion of the campus of the Johnson Controls manufacturing facility also constrains alternatives for westward runway expansion, as it would likely fall into the Runway 8 RPZ. Further westward, U.S. Highway 31 and Interstate Highway 196 (I-196) hinder expansion alternatives for Runway 8.

Figure 4-2
Runway 8/26 Constraints - East



Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Source: Mead & Hunt

Figure 4-3
Runway 8/26 Constraints – West



Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Source: Mead & Hunt

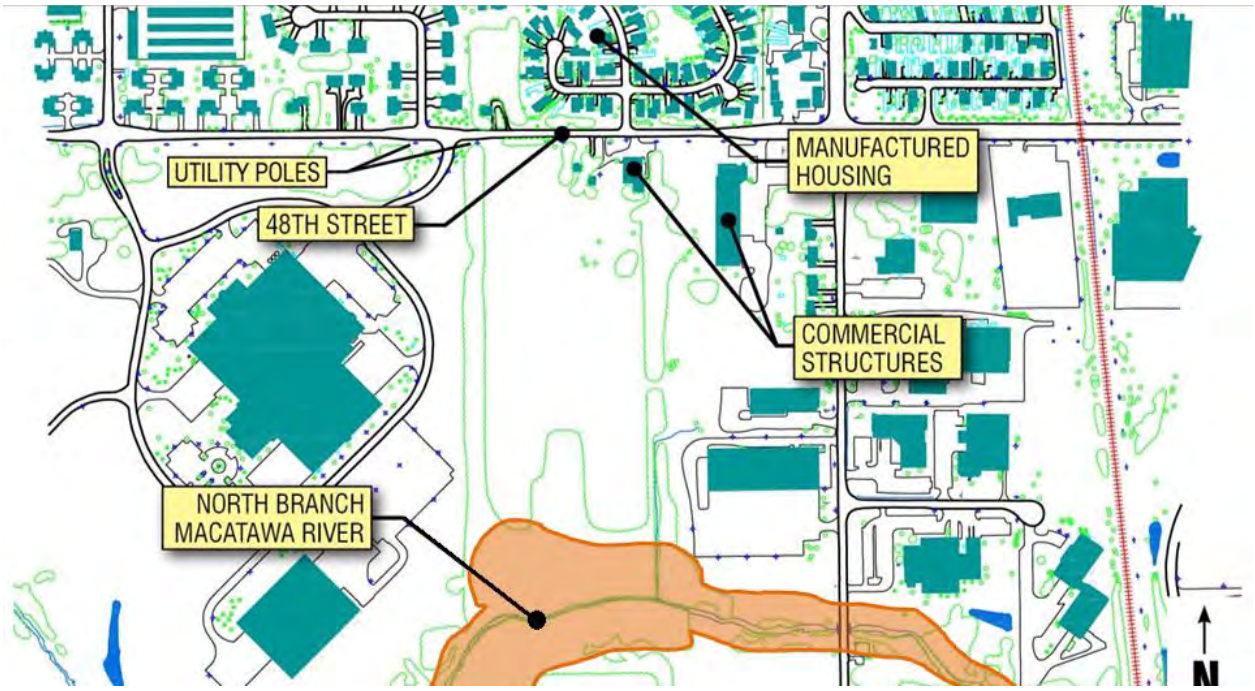
4.1.c Crosswind Runway Constraints

Constraints found surrounding the Airport on the north and south side may impact the future development of a crosswind runway. The location of the North Branch Macatawa River, a small drainage ditch, and wetlands hinder alternatives for crosswind runway development to the north. Impacts to these environmentally sensitive areas are to be avoided if practicable alternatives exist. However, due to existing land uses, the only area that offers a viable option would impact these areas.

The location of 48th Street and a manufactured housing community north of 48th Street may also constrain development alternatives for a crosswind runway since the RPZ must remain clear of incompatible land uses and height obstructions for the approach slope. In addition to these structures, potential height obstructions such as trees, power line poles and the ground elevation may also impact alternatives for crosswind runway development. **Figure 4-4** identifies several constraints on the north side of the Airport.

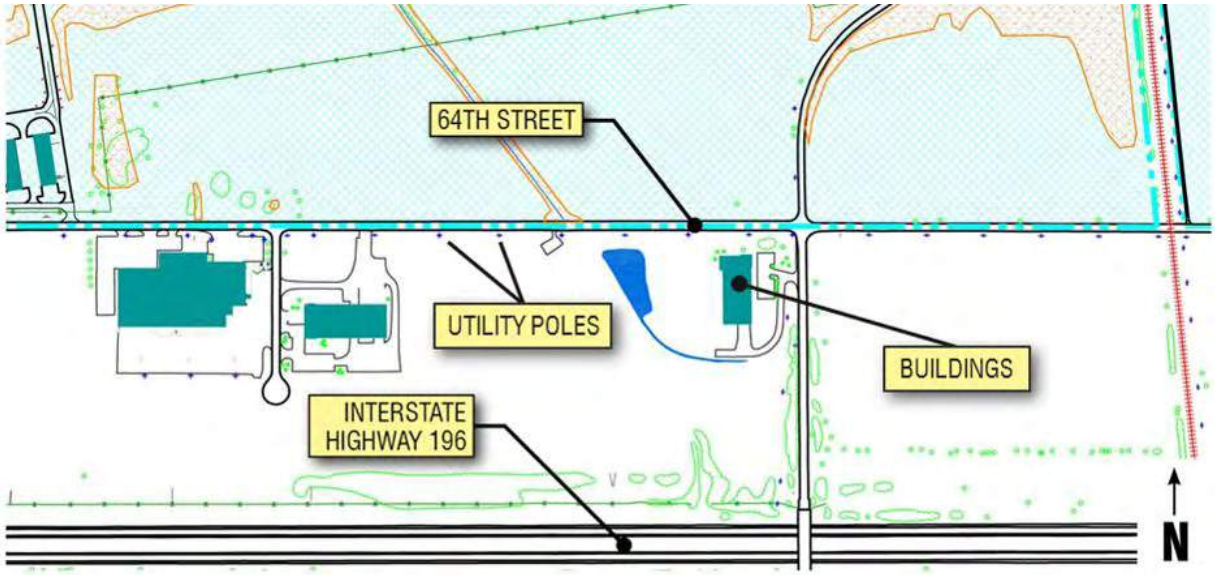
South of the Airport, the location of 64th Street and I-196 impacts the location of the southern end of a crosswind runway (see **Figure 4-5**).

Figure 4-4
Crosswind Runway Constraints - North



Legend
Potential Wetland Area – National Wetlands Inventory
Note: On-site survey needed to delineate wetland boundaries
Source: Mead & Hunt

Figure 4-5
Crosswind Runway Constraints – South

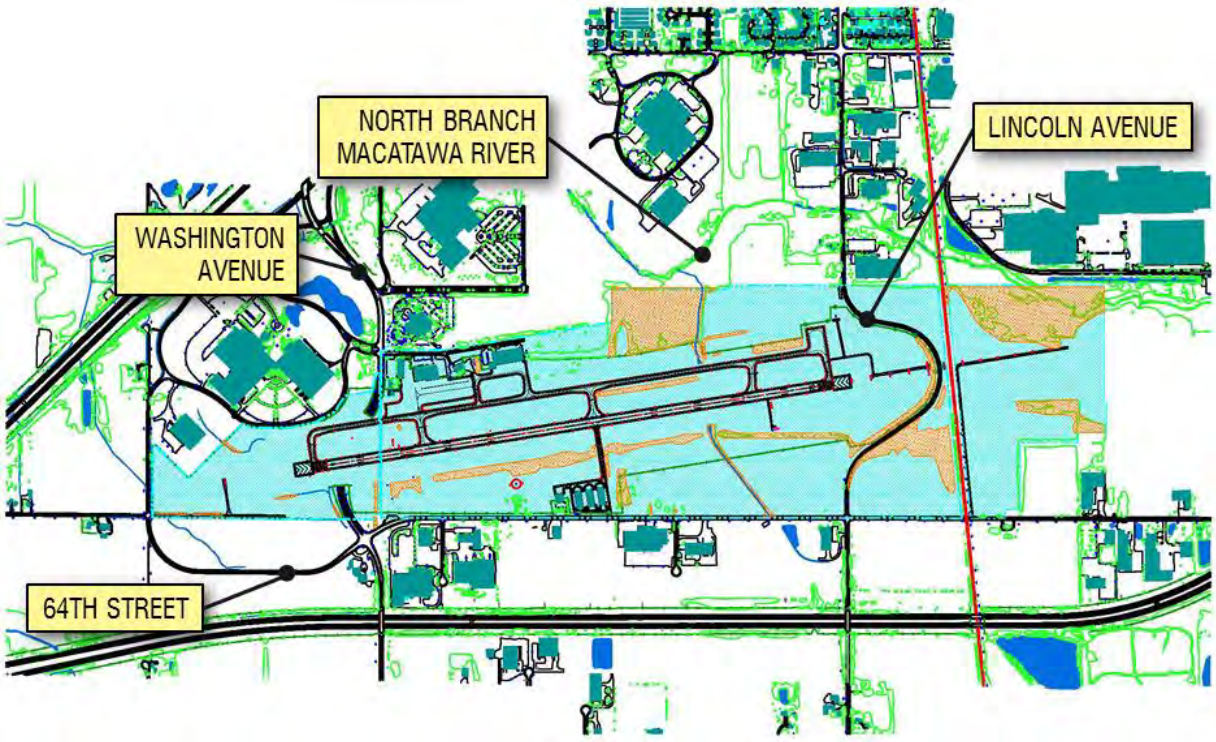


Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Source: Mead & Hunt

4.1.d Terminal Building Constraints

Constraints surrounding the Airport that limit the acquisition of available property for development such as 64th Street to the south, the North Branch of the Macatawa River to the north, Washington Avenue to the west and Lincoln Avenue to the east limit available areas for building development. **Figure 4-6** illustrates constraints which hinder the development a new terminal building and hangar areas.

Figure 4-6
Terminal Building Constraints



Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Source: Mead & Hunt

4.1.e Other Development Areas

Constraints that impact alternatives previously discussed in this chapter may also impact other development opportunities at the Airport. The locations of wetland areas to the north and east and the location of 64th Street may impact opportunities for the Airport to expand on the south side of the airfield. East of the Airport, the location and existing alignment of Lincoln Avenue and the CSX railroad may impact Airport property use while the location of Washington Avenue, 59th Street, and the Johnson Controls campus constrain development opportunities to the west.

4.2 Development Alternatives

This section identifies development alternatives for the following components of airfield infrastructure:

- Runway 8/26
- Proposed Crosswind Runway
- Taxiways
- Aprons
- Terminal Building
- General Aviation Facilities
- Hangar Development
- Navigational Aids
- Other Development

4.2.a Runway 8/26

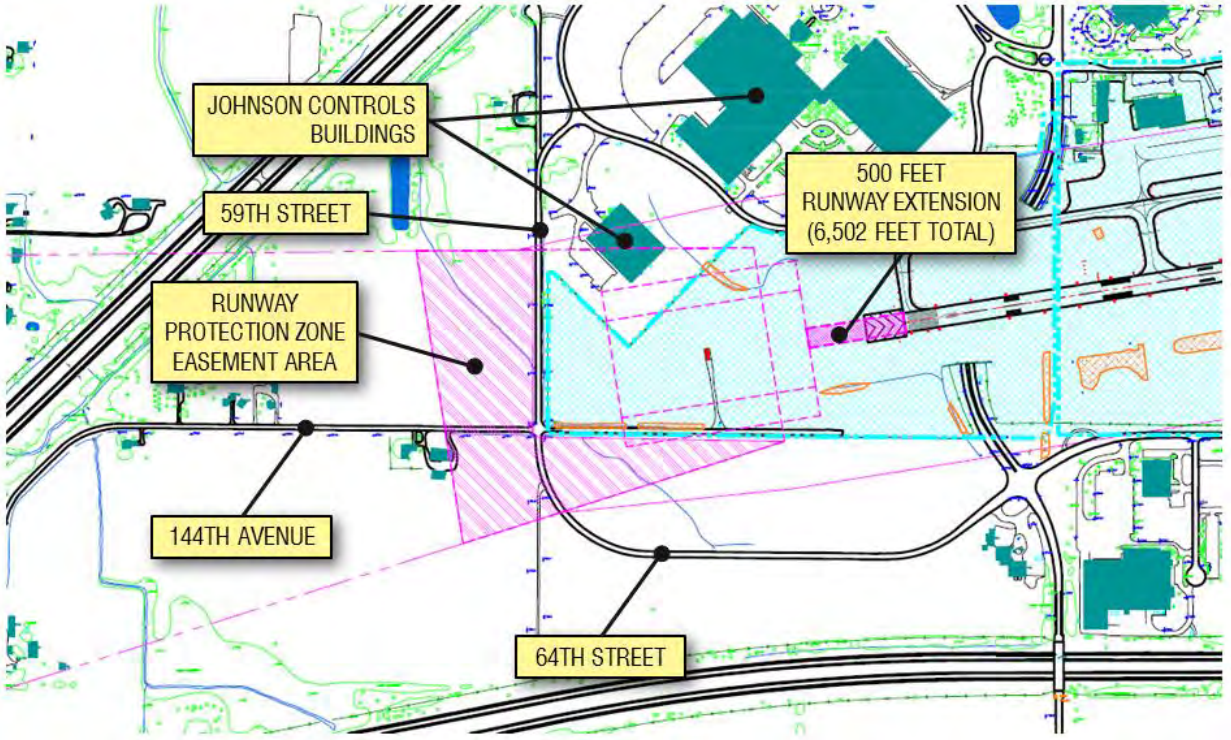
Runway 8/26, with a length of 6,002 feet and a width of 100 feet, is the only runway at the Airport. The runway was lengthened in 2005 from 5,000 feet to its current length to meet the runway length needs of its users. Designated a D-II runway, it is designed for aircraft ranging from single engine propeller-driven to larger corporate jets. Though the runway currently meets the takeoff and landing distance requirements of the existing users, it is important that alternatives be developed to lengthen the runway should future demand warrant an extension. Planning for future runway length will allow the Airport to preserve land on airport property and protect airspace surrounding it to be well positioned for a potential expansion should a need be justified.

Based on the constraints outlined in Section 4.1.a and Section 4.1.b, only one alternative exists for a future extension of Runway 8/26 based on cost. The one realistic option focuses development to the west, away from Lincoln Avenue, the CSX railroad and the Hayworth Campus. Since no demonstrated need currently exists to extend the runway, only a moderate extension is proposed for planning purposes. This alternative would extend Runway 8/26 to the west for a total length of 6,502 feet (see **Figure 4-7**). Extension of the runway to the west would take advantage of existing Airport-owned land and minimally impact surrounding land uses. Extension of the runway 502 feet to the west would shift the Runway Protection Zone (RPZ) for Runway 8 and result in a need to acquire easements for approximately 16.5 acres of land west of 59th Street and south of 144th Avenue. The location of a Johnson Controls building northwest of Runway 8 would also be impacted by the shifted RPZ and may require relocation. The location of a service road to access Runway 8 and the airport perimeter fence would also need to be relocated due to the shift in the Runway Safety Area (RSA) and the Object Free Area (OFA). Finally, the relocation of 59th Street may be necessary to meet height requirements as identified in Federal Aviation Regulation (FAR) Part 77 over public roadways.

4.2.b Crosswind Runway

Consideration should be given for the construction of a crosswind runway in the future. Several alternatives were evaluated as part of this study to provide adequate crosswind coverage for the smaller GA aircraft that are most susceptible to crosswind components.

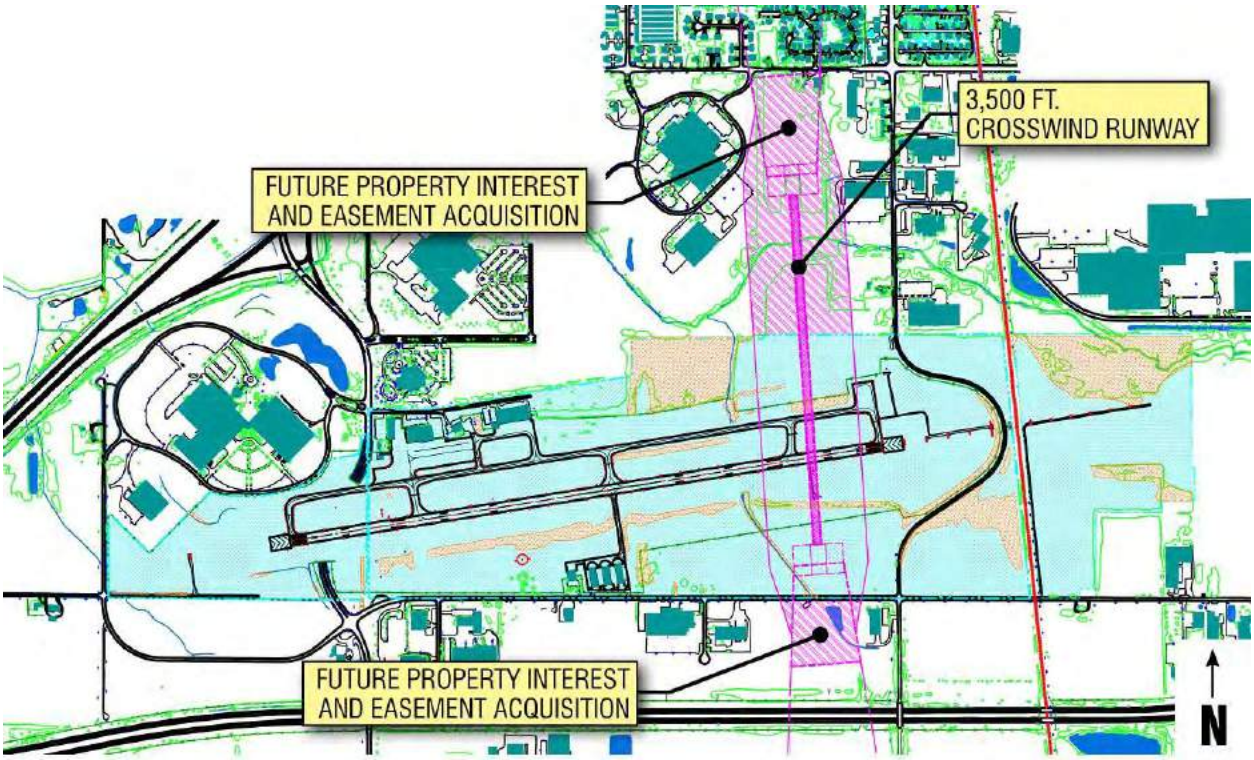
Figure 4-7
Runway 8/26 500 Feet Extension



Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Runway Protection Zone Easement Area
Source: Mead & Hunt

Runway 18/36 – 3,500 Feet Length – One proposed alternative calls for a 3,500 feet long, 75 feet wide runway designated Runway 18/36, that would be located on the eastern end of existing Airport property (see **Figure 4-8**). The length of this runway is determined by the level of impact to land uses north and south of existing Airport property. Placement of the runway is limited due to the locations of 64th Street and I-196, so the proposed crosswind runway would be to the north. The acquisition of approximately 53.8 acres of land would be required. The 3,500 foot proposed length of this runway is the longest runway possible without the associated RSA, OFA, and RPZ impacting manufactured homes north of 48th Street. South of 48th Street, removal of trees, relocation of power lines, earthwork and relocation of a commercial building would be necessary for the RPZ of Runway 18 to meet FAA airport design standards. Impact would occur to the North Branch of the Macatawa River that would require a relocation of the river or construction of a culvert. Additional impacts to the wetlands associated with the river would also be a consideration in the construction. The Runway 26 glide slope antenna would also require relocation as the associated RSA and OFA for the crosswind runway would lie within the critical area of the existing glide slope. Any relocation of the glide slope antenna may alter the instrument landing system (ILS) for Runway 26 and must be coordinated with the FAA.

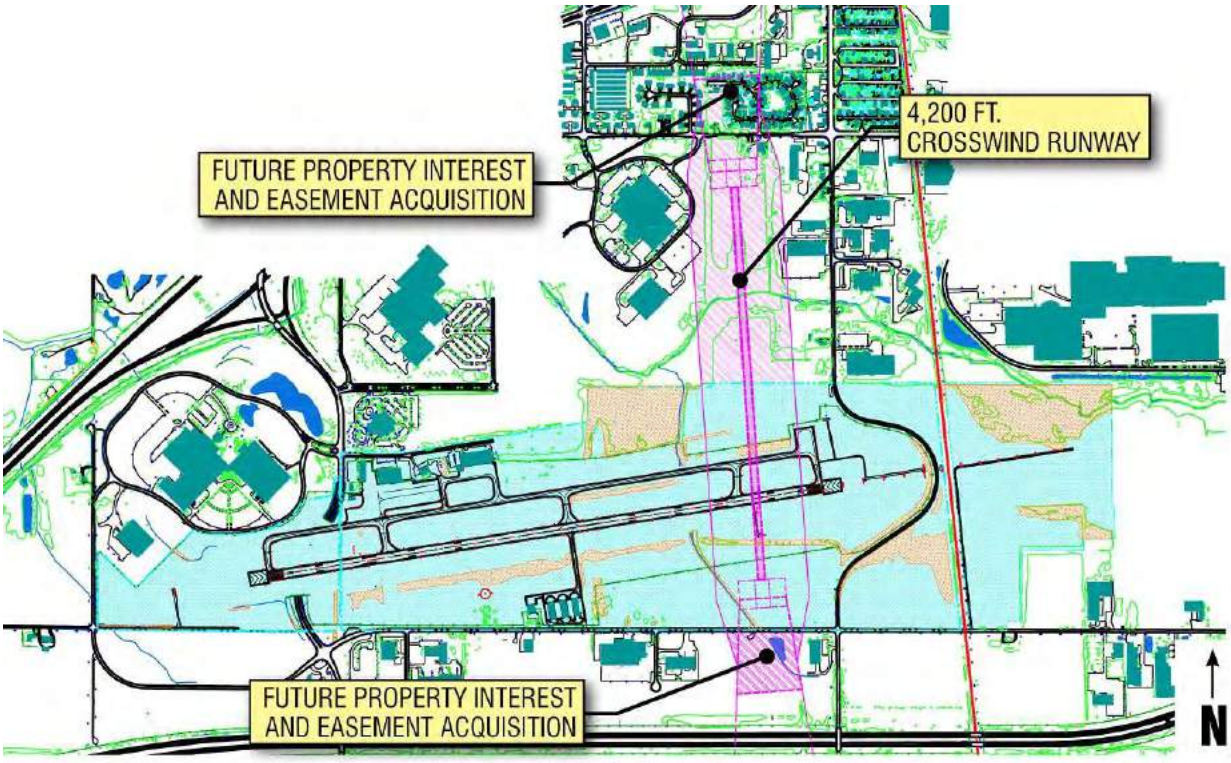
Figure 4-8
3,500 Feet Crosswind Runway



Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Future Property Interest and Easement Acquisition Area
Source: Mead & Hunt

Runway 18/36 – 4,000 Feet Length – This crosswind runway alternative proposes a 4,200 foot long and 75 foot wide runway designated Runway 18/36 that would be placed in the same location as the previous alternative (see **Figure 4-9**). The additional 700 feet of runway length would extend to the north of the footprint of the 3,500 foot alternative. The 4,200 foot length is the maximum length that can be constructed without relocating or closing 48th Street to the north or 64th Street to the south. With this proposal, several impacts would occur to property to the north. Along with the required acquisition of approximately 70 acres, the removal of trees, relocation of power lines, earthwork, and relocation of a commercial building, a relocation of residents north of 48th Street would be necessary in order to keep the RPZ for this runway clear of incompatible land uses. 48th Street could also be impacted by the RPZ and it may need to be relocated, closed, or lowered in elevation in order for the road to meet FAR Part 77 height standards for roadways. An impact would also occur to the North Branch of the Macatawa River that would require a relocation of the river or construction of a culvert over the river, as well as impacts to the associated wetland areas. Due to the complexity of the project as a whole, added costs and construction delays may occur to the project budget and schedule if this alternative is selected.

Figure 4-9
4,200 Feet Crosswind Runway



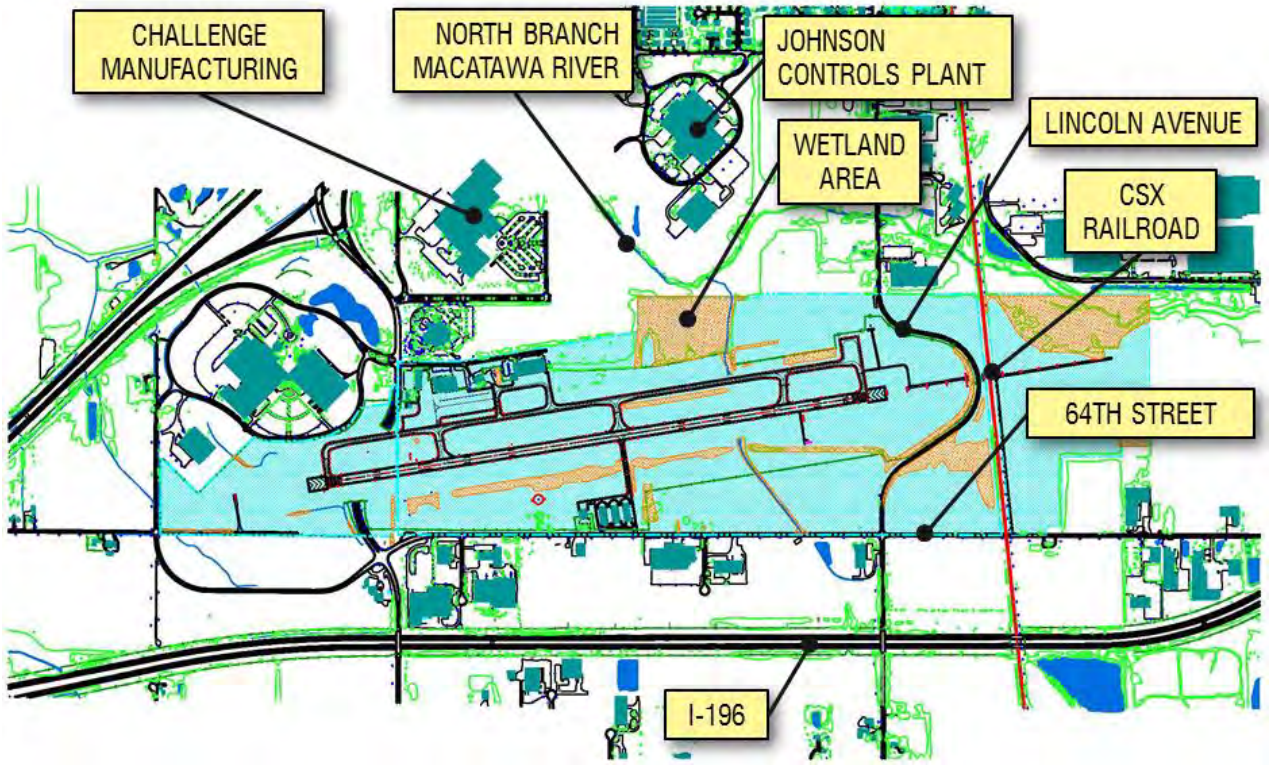
Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Future Property Interest and Easement Acquisition Area
Source: Mead & Hunt

Runway 16/34 – 3,500 Feet Length – An additional alternative proposes the construction of Runway 16/34, a 3,500 feet crosswind runway oriented from northwest to southeast that would provide a runway that would be most beneficial during the winter season when winds are experienced out of the northwest. Though this runway orientation may help increase the throughput capacity of the Airport during the winter, a number of physical constraints, as illustrated in **Figure 4-10,** limit the feasibility of this alternative. The location of the North Branch of the Macatawa River impacts the practicality of this alternative as the river's course to the northwest aligns closely with the orientation of the proposed crosswind runway's centerline. As a result, a relocation of several hundred feet of the river may be required. A wetland area associated with the river is also an environmental concern that impacts construction feasibility since several acres may require mitigation.

Airport design standards also factor into this alternative's feasibility. Surrounding land uses limit the area available for runway development. Surfaces associated with the runway such as safety areas, object free areas, building restriction lines (BRL), and approach surfaces are required to be free of obstructions, buildings and activities which would be difficult to accomplish. The locations of Challenge Manufacturing to the northwest and Johnson Controls to the north limit the lateral placement of the runway. In addition, the location of 64th Street, Lincoln Avenue, I-196 and the CSX Railroad affect the placement of the

runway's centerline in order for the approaches to clear height standards over these ground transportation surfaces. FAR Part 77 requires approach surfaces to achieve at least 15 feet of clearance over roads such as 64th Street and Lincoln Avenue to the southeast, 17 feet of clearance over highways such as I-196 to the southeast, and 23 feet of clearance over railroads such as the CSX line to the east. The practicality of relocating or closing these roads, highways or the railroad to achieve FAR Part 77 approach surface clearance heights would be costly and are a significant factor to consider in evaluating this alternative.

Figure 4-10
Crosswind Runway 16/34 Physical Constraints



Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Source: Mead & Hunt

4.2.c Taxiways

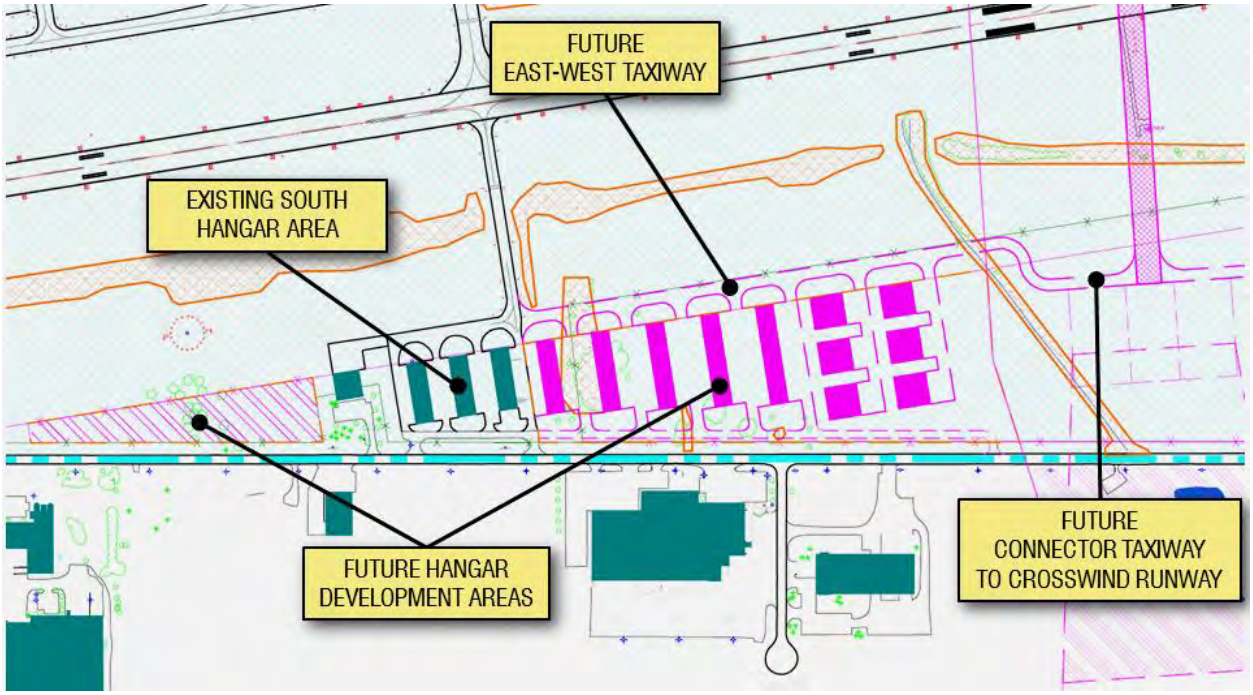
The existing taxiway system at the Airport is comprised of a single parallel taxiway with five connector taxiways. Any plan to extend Runway 8/26 should also include an extension of the parallel taxiway. Development of an additional connector taxiway to join the extended runway and taxiway ends should also be considered.

If a crosswind runway is constructed, the development of a corresponding parallel taxiway should be planned. The number of operations expected on the crosswind runway will determine the need for a

parallel taxiway. Location of this taxiway should be west of the crosswind runway as this will minimize the number of potential runway crossings by aircraft taxiing to their desired airfield destination. Both of the most likely destinations, the terminal area or the south hangar area, will be west of the crosswind runway.

An additional taxiway development is suggested near the private T-hangars on the south side of the airfield (see **Figure 4-11**). Development of an east-west taxiway north of the existing hangars, utilizing an existing taxistreet would allow for access to additional hangar development areas to the east and west of the existing 35 feet connector taxiway. This taxiway could also be connected to a future crosswind runway to limit the number of crossings by aircraft across Runway 8/26 when taxiing from the south hangar area.

Figure 4-11
South Hangar Taxiway Development



Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Future Property Interest and Easement Acquisition Area
Source: Mead & Hunt

Construction of taxiways must follow design standards set forth by FAA Advisory Circular (AC) 150/5300-13. Standards for taxiway widths, turn radius, fillet dimensions and spacing from other airport surfaces are addressed in the AC. Even though the D-II ARC indicates a 35 foot taxiway width, larger turning-radii and in some places actual width may be needed to accommodate specific aircraft and their operational needs. Though small areas of wetlands may be impacted with taxiway development, no significant environmental impacts are anticipated. Coordination with the proper local, state, and federal officials to obtain the necessary environmental permits must occur.

4.2.d Aprons

Aprons are important infrastructure elements to consider when reviewing alternatives for future development. Sufficiently sized aprons not only allow for the safe and efficient loading and unloading of passengers, they also provide parking for itinerant aircraft and a place for aircraft services to be performed such as fueling and maintenance. Currently, a large apron at the Airport near the terminal building on the north side of the airfield supports activities at the terminal, Tulip City Air Service, and corporate hangars, while smaller aprons on the south side of the airfield support corporate and private hangars.

Future alternatives for the terminal building apron are pending based on the location of a new terminal building as described in the next section. Should construction of a new terminal building occur on the north side of the airfield, location of a new apron would be north of the parallel taxiway for Runway 8/26 and east of existing hangars at the end of Geurink Avenue. The size of this apron should be based on anticipated user demand as part of the planning design for the new terminal building. The existing apron at the west side of the airfield could continue to be utilized by Tulip City Air Service for aircraft parking and servicing with additional apron space made available by the removal of the existing terminal building.

Alternatives for aprons to serve corporate and private general aviation tenants should also be considered for future development. Adequately sized aprons should be planned for any hangar development that occurs as discussed in a later section of this Chapter. Additional apron space may be needed on the north side of the Airport on an individual basis to serve new hangars. Additional hangar construction on the south side of the airfield along 64th Street may also require additional apron space to safely and efficiently service, park, and position aircraft when accessing these buildings.

4.2.e Terminal Building

As addressed in a September 2005 concept and budget report for a new terminal building prepared by Mead & Hunt and the 2011 study completed by URS, many deficiencies are found in the existing terminal building. Deficiencies such as an undersized waiting area, undersized administrative areas, limited space for crew rest areas and rental car operations, undersized restroom areas and outdated finishes and décor all signal the need to develop a new terminal building. Results from Airport user surveys conducted as part of this project found that over half (54%) of all respondents feel a new terminal building is needed. Based on the responses from the user surveys, the research from the concept budget report and public opinion, the need for a new terminal building has been justified.

Possible locations to develop a new terminal building are limited due to the constraints discussed previously in Section 4.1. Four sites, identified in **Figure 4-12,** are available that appear to have some feasibility for development.

Existing Terminal Site – This site is the location of the existing terminal building near the intersection of Washington and Geurink Avenues. Though conveniently located adjacent to Washington Avenue, limited

room exists for building development as a result of surrounding constraints such as the roadways to the north and west and aprons to the east and south.

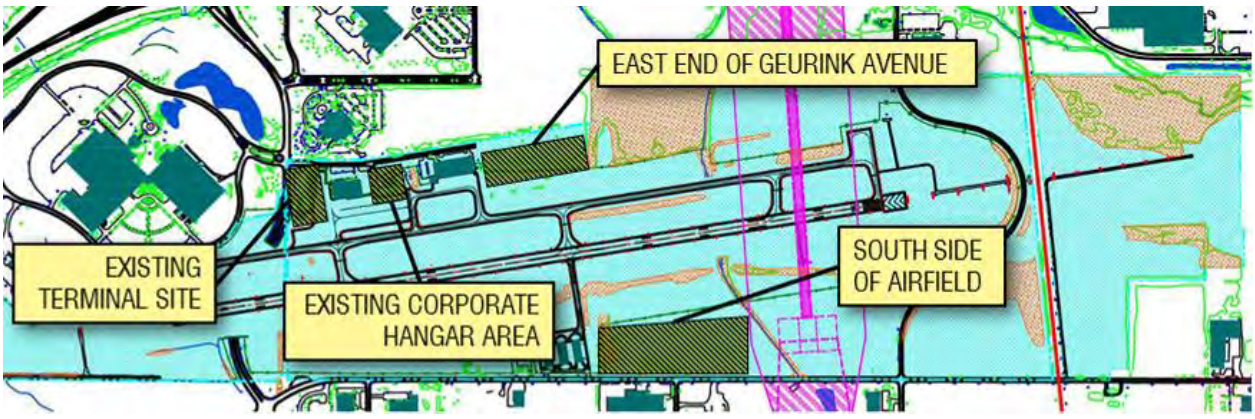
Existing Corporate Hangar Area – A second site for the location of a new terminal building is within the corporate hangar area east of Tulip City Air Service. This site, though conveniently located near Washington Avenue, is also limited in room for building development due to its proximity to existing corporate hangars to the east and Tulip City Air Service to the west.

East End of Geurink Avenue – An 18 acre area on existing property at the end of Geurink Avenue is proposed as the site of a future terminal building in this alternative. This location has sufficient room for development and has access to both the airfield and Geurink Avenue, making it a prime building location.

South Side of Airfield – This alternative proposes a location on the south side of the airfield adjacent to 64th Street, east of the existing T-hangar area. Although adequate land exists for construction of a terminal building and necessary infrastructure such as a ramp area, parking lot and vehicle access roads, the location on the airfield increases the risk of a runway incursion due to the necessary crossing of Runway 8/26 by aircraft taxiing to and from the terminal. Placement of a terminal building in this location also limits available opportunities for hangar development.

The 2011 study indicates that the east end of Geurink Avenue is the most feasible location to meet the long term goals of the Airport. Depending upon the final size and layout of the new terminal building, there may be limited space for development within the existing corporate hangar area. Available area on the south side of the airfield proposed for a new terminal may be utilized for corporate and private recreational hangars should plans at the Geurink Avenue site limit development opportunities to the north.

Figure 4-12
Terminal Building Development Locations



Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Future Property Interest and Easement Acquisition Area
Source: Mead & Hunt

4.2.f Hangar Development

Forecasts from Chapter 2 show varying trends for based aircraft at the Airport. While the FAA Terminal Area Forecast (TAF), Market Share, and Socio-Economic methodologies predict an increasing trend in based aircraft, the Trend Line and Growth Rate methodologies (based on mathematical models of historic based aircraft count) predict a decreasing trend in based aircraft. Regardless of the projection, it is important to plan for future hangar development to be prepared to respond to user needs when demand warrants.

Areas for possible hangar development are limited due to a lack of available space on Airport property and limited room for expansion due to constraints by surrounding land uses outside of airport property. One possible location for hangar development is on the south side of the airfield, north of 64th Street, east of the existing T-hangars. This area provides approximately 14 acres of buildable land for hangar buildings and necessary infrastructure with minimal wetland impacts. In addition, approximately 3 acres are available for hangar development to the west of the existing T-hangars on the south side of the airfield along 64th Street.

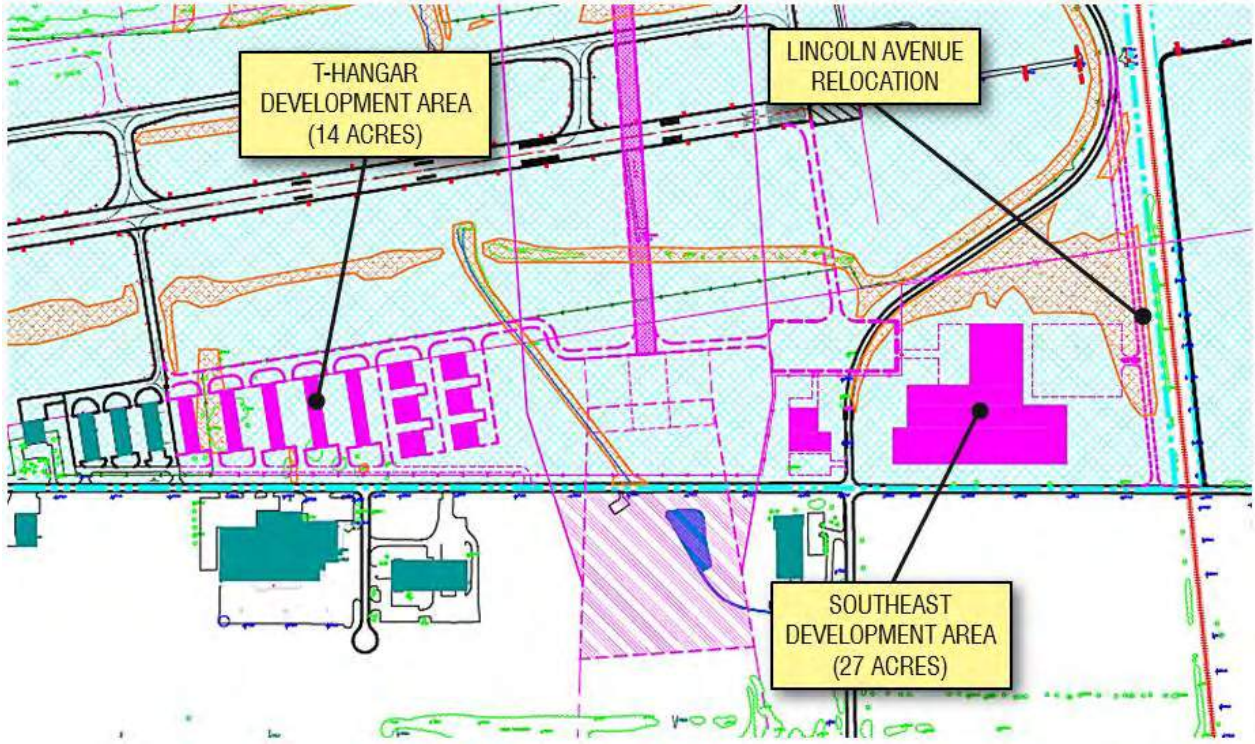
4.2.g Other Development

In addition to consideration of existing infrastructure, areas with the potential for future development should be explored. Of particular focus is approximately 27 acres property on the southeast corner of the Airport located north of 64th Street and east of Lincoln Avenue. This property is currently farmed through an agreement with the Airport and is maintained for agricultural purposes. Since this property is not contiguous with the remainder of the Airport because of the location of Lincoln Avenue, limited airside development operations have been previously identified.

Relocating Lincoln Avenue parallel to the CSX railroad east of the Airport between 48th Street and 64th Street would open up this land for development. The cost to relocate Lincoln Avenue along the CSX railroad for hangar development limits the feasibility of this alternative. **Figure 4-13** illustrates the potential hangar development locations on Airport property. An alternative option is to retain this existing property for development opportunities without airport access should future need arise. Retaining this property allows the Airport to control land use in the area, preventing the development of incompatible uses.

Consideration should also be given to the land south of Runway 8/26 identified for the southern end of a crosswind runway. Should a decision be made to not construct a crosswind runway, this land could be made available for aeronautical and non-aeronautical development purposes.

Figure 4-13
Hangar Development Locations



Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Future Property Interest and Easement Acquisition Area
Source: Mead & Hunt

4.2.h Navigational Aids

When considering future airport development, it is important to plan for improvements to navigational aids (NAVAIDs) on the airfield. Improvements to or the addition of NAVAIDs can increase capacity and operation at an Airport. NAVAIDs also allow an airport to attract aeronautical business by providing an alternative landing location for aircraft during inclement weather conditions. The addition of NAVAIDs promotes increased productivity and efficiency by allowing aircraft to operate in times of both favorable and inclement weather conditions.

One option is to develop navigational approach procedures utilizing Wide Area Augmentation System (WAAS) though the Global Positioning System (GPS). Approach procedures utilizing WAAS/GPS provide vertical and horizontal guidance to properly equipped aircraft, but require the installation of minimal equipment on the airfield such as an Automatic Dependent Surveillance – Broadcast (ADS-B) tower. Only the installation of an ADS-B is necessary to further augment the satellite signals to ensure precision accuracy for aircraft as they approach the Airport.

In 2010, an ADS-B tower to augment GPS approaches was installed at the Airport north of the rotating beacon at the east end of Geurink Avenue adjacent to the WestShore Aviation hangar. Installation of this tower offers an alternative to the installation of more costly ground based NAVAIDs and allows other precision approaches to be developed utilizing GPS.

In addition to WAAS/GPS approaches, consideration should be given to a location for the future installation of an ILS to Runway 8 to increase the precision of instrument landing guidance for arriving aircraft. An ILS emits signals that provide greater vertical guidance and horizontal alignment accuracy to properly equipped aircraft, allowing them to land during low visibility, low cloud ceiling heights, and inclement weather situations. Currently, an ILS is installed on the approach to Runway 26, which is the runway most utilized since prevailing wind direction is from the west. Installation of an ILS on Runway 8 would equip the Airport with precision approaches to both runway ends, allowing instrument operations to continue when wind direction changes and, ultimately, reduce aircraft delays and flight cancellations. Having the capability to offer a precision instrument approach to both runway ends would also help increase the throughput capacity of the Airport during instrument flight rules (IFR) weather conditions which are frequently experienced during the winter season.

Should a crosswind runway be construction, consideration should be given to NAVAIDs on that runway should a crosswind runway be constructed. Based on user needs, it is anticipated that the crosswind runway would be designed for a non-precision approach on either end; therefore installation of Precision Approach Path Indicators (PAPIs), Runway End Identifier Lights (REILs), or other forms of visual navigational aids may be necessary. If demand is high enough for a precision approach, such as an ILS or WAAS/GPS, a review of potential environmental impacts and additional land acquisition to provide a clear approach path for aircraft would likely be required.

4.3 Summary

This Chapter presented several alternatives to address the current and future needs of Airport users, which were identified through user surveys and aviation forecasts. The goal of this Chapter is to provide multiple solutions for infrastructure improvement at the Airport, so that the most feasible development option addressing anticipated demand is chosen. Chapter 5 addresses specific recommendations for future development at the West Michigan Regional Airport for the following items:

- Extension of Runway 8/26
- Development of a crosswind runway
- Improvements to the airfield taxiway system
- Additional apron space needed to support future development
- Location of a new terminal building
- Locations for hangar areas
- Installation of NAVAID equipment, particularly to equip Runway 8 with a precision approach
- Use of existing property on the southeast corner of the Airport

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5

Recommended Plans

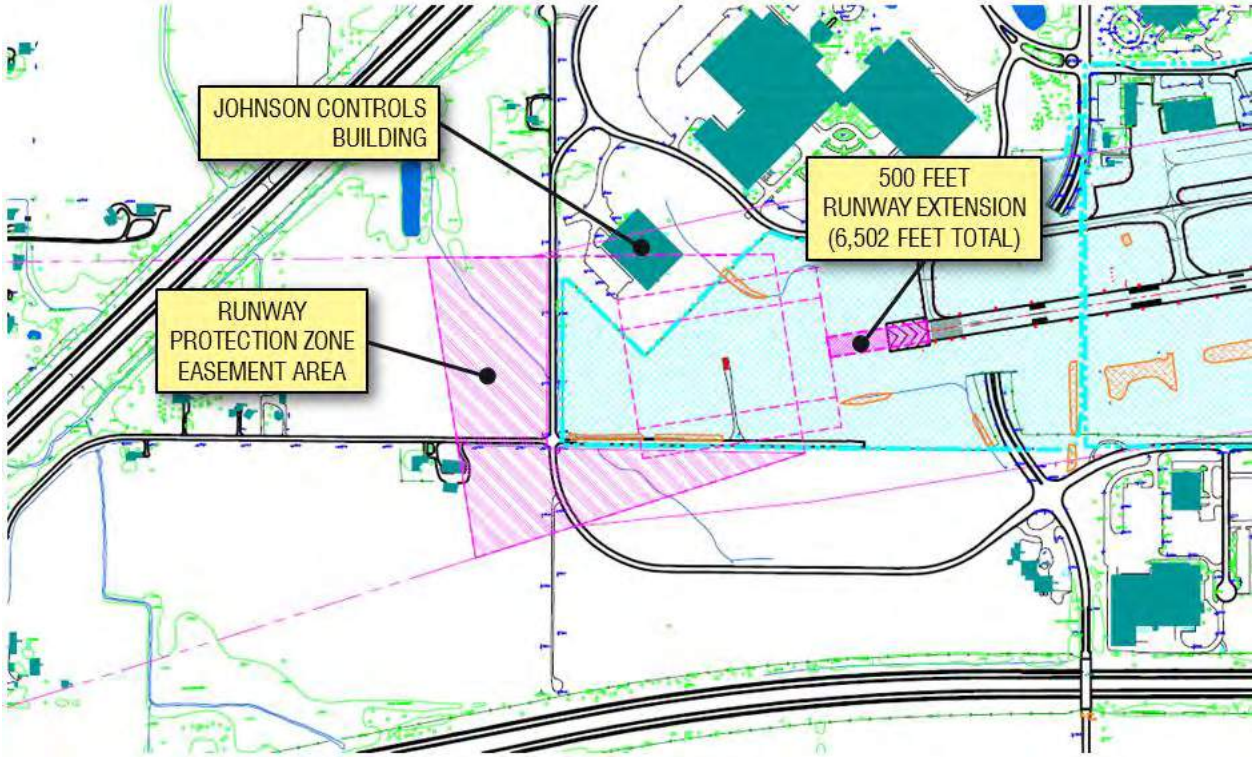
This Chapter provides a set of recommended alternatives based upon the alternatives analysis presented in Chapter 4. Recommendations identified in this Chapter take into consideration economic feasibility, user need, and the impact to the surrounding community. The West Michigan Regional Airport Master Plan Work Team, a group comprised of Airport officials, tenants, based and itinerant users, and members of the community provided input and guidance throughout the master plan process including the development of these recommended alternatives. This Chapter is divided into the following sections which identify infrastructure needs addressed in Chapter 4:

5.1 Runway 8/26
5.2 Crosswind Runway
5.3 Taxiways
5.4 Aprons
5.5 Terminal Building
5.6 Hangar Development
5.7 Other Development
5.8 Navigational Aids
5.9 Summary

5.1 Runway 8/26

As identified through user surveys, the existing 6,002 foot length meets the runway length needs of most of the existing users, therefore it is recommended that the Airport maintain the existing 6,002 foot length of Runway 8/26 (see **Figure 5-1**). Although the existing and projected demand does not warrant extension of the runway at this time, it is recommended that the 500 foot extension be illustrated on the future ALP to protect the airspace from development and to allow the project to become eligible for federal and state funding, should it be needed in the future. The westward extension would minimize potential impacts to surrounding land uses and environmentally sensitive areas.

Figure 5-1
Runway 8/26 Extension



Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Runway Protection Zone Easement Area
Source: Mead & Hunt

5.2 Crosswind Runway

Federal Aviation Administration (FAA) standards state that airports should have runways oriented to meet 95 percent (95%) local wind coverage during all weather conditions. Since the Airport only meets this criterion during July and August, a need is illustrated for a crosswind runway, to achieve 95% coverage year round.

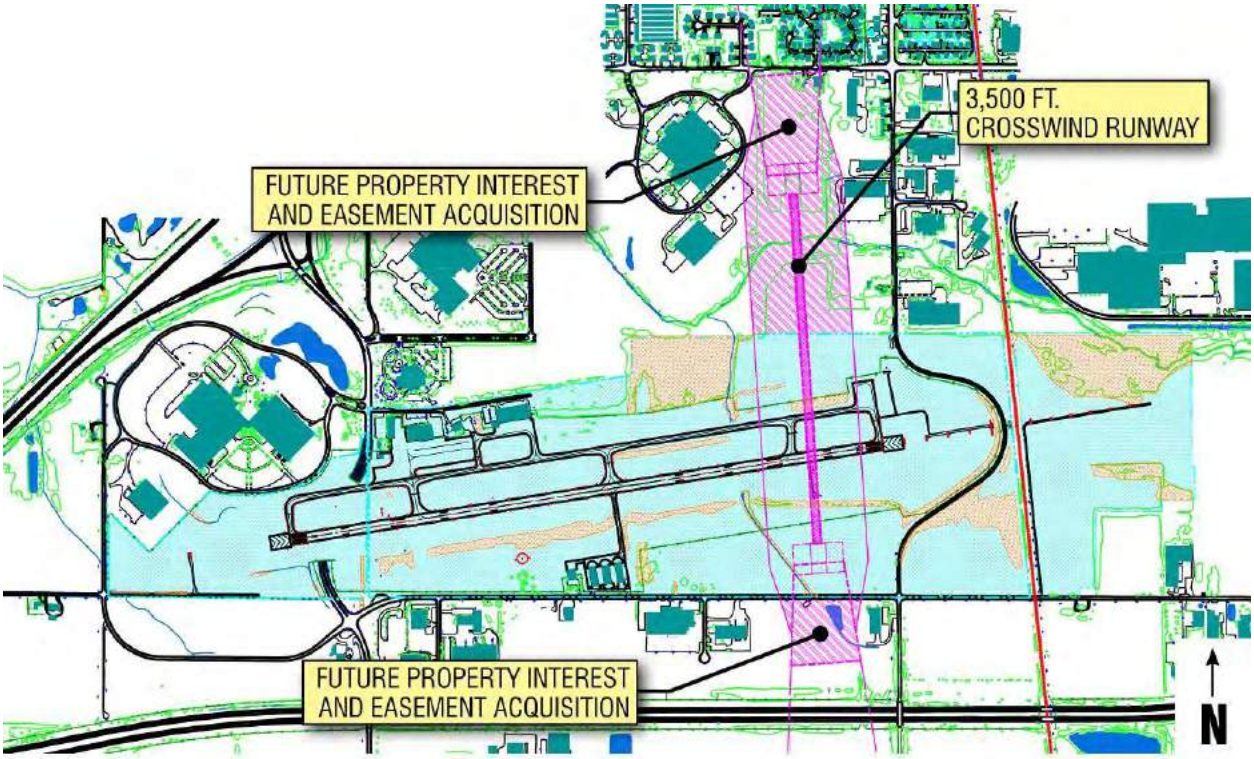
Although the orientation of the Airport's runway does not meet wind coverage standards set forth by the FAA, justification for federal and state funding may prove difficult since user demand for a crosswind runway is low at this time. One challenge to justifying a crosswind runway is the Airport's current fleet mix as the majority of traffic at the Airport is larger aircraft which are less susceptible to crosswinds. As a result, the coverage provided by Runway 8/26 appears to be adequate at this time.

Another challenge to justifying a crosswind runway comes from the existing constraints discussed in Chapter 4 including:

- Property acquisition totaling approximately 64 to 80 acres depending on the length of runway
- Obtaining a permit from the Michigan Department of Environmental Quality (DEQ) for mitigation of impacts to the North Branch of the Macatawa River as well as environmental impacts to wetland areas
- Possible relocation of a manufactured housing community and commercial structures depending upon the length of the runway
- Relocation or removal of trees, power poles, and other objects of significant height to maintain a clear approach to the runway

Based on the evaluation of user needs, forecasts, constraints, feasibility and other information provided as part of the development of alternatives, it is recommended that the Airport illustrate a 3,500 foot crosswind runway on its future ALP (see **Figure 5-2**). A greater user demand in the future will be necessary to justify the development of a crosswind runway. Illustration of a crosswind runway on the ALP shows an anticipated need for this project, and makes the project eligible for federal and state funding. In addition, it protects the airspace surrounding the location of the potential runway, which will be critical at the time of development. Continued planning for this crosswind runway prepares the Airport for its development when the need arises.

Figure 5-2
3,500 Feet Crosswind Runway



Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Future Property Interest and Easement Acquisition
Source: Mead & Hunt

5.3 Taxiways

The current airfield configuration allows for the safe and efficient movement of aircraft and vehicles. However, development of the southern taxiway to support construction of additional hangars in this area is recommended in the near future. Also, any extension of Runway 8/26 should include extension of the parallel taxiway with connector taxiways as needed. Should a crosswind runway be developed, consideration should be given to the construction of a corresponding parallel taxiway. Taxiway construction should also be considered should other development occur such as a new terminal building to the north to connect all areas on the airfield.

5.4 Aprons

Apron construction should coincide with terminal and hangar developments as addressed later in this chapter. A new apron is recommended to coincide with the development of the new terminal building. This apron should be large enough to provide safe loading and unloading of passengers, aircraft servicing, parking, and aircraft movement. It is recommended that the existing terminal apron continue to be maintained to provide additional aircraft parking and service areas for the FBO, Tulip City Air Service. Expanding the existing terminal apron to the west, utilizing space created by the relocation of the terminal building, should also be considered based upon demand.

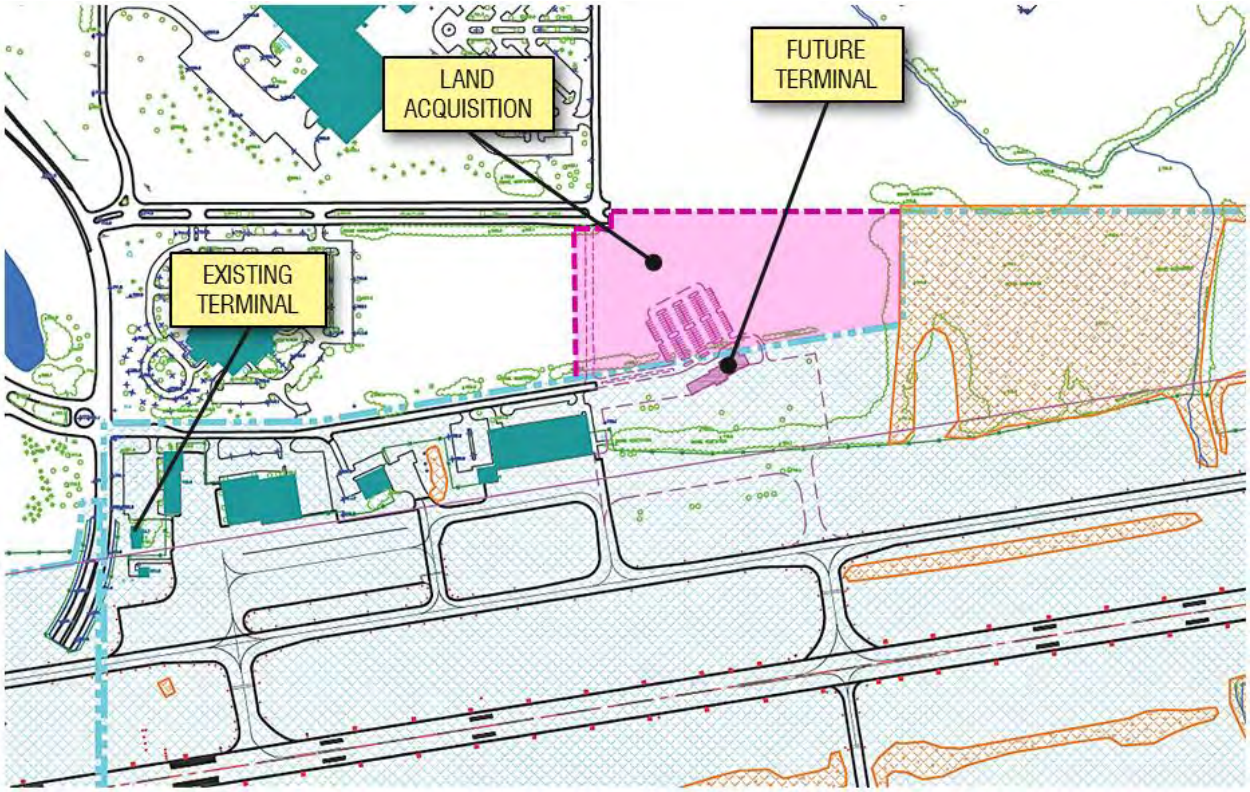
Additional apron areas are also recommended to support any future hangar development on the north, northeast, and/or south side of the airfield.

5.5 Terminal Building

The Airport is in the beginning stages of developing a new terminal building to meet user needs. The construction of a new terminal building has been a proposed concept since 2005. The process of building a new terminal began in 2010 with the selection of an architecture firm to develop a more refined concept and some preliminary designs. At this time, the location for this building is proposed at the east end of Geurink Avenue (**Figure 5-3**).

Placement of the new terminal at this location provides additional area for development and adequate space for necessary infrastructure, as well as clearance for Runway Safety Areas (RSAs) and Object Free Areas (OFAs). Since Geurink Avenue provides direct access to Washington Avenue, ground transportation can easily reach this location. In addition, this location can be easily reached by aircraft given the existing layout of the airfield which supports airfield capacity. Though adequate land also exists on the south side of the Airport, this location may incur additional delays as aircraft would need to cross Runway 8/26 after landing or taxiing for takeoff. Locating the terminal on the north side of the airfield with direct access to the parallel taxiway provides a safe and efficient taxi route for aircraft.

Figure 5-3
Future Terminal Building Location



Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Land Acquisition for Terminal Area
Source: Mead & Hunt

5.6 Hangar Development

After review of the existing constraints at the Airport, it is recommended that future hangar development occur on the south side of the Airport off 64th Street, east and west of the existing hangars (see **Figure 5-4**). Though adequate land exists on the north side of the airfield near the east end of Geurink Avenue, development in this area may limit or infringe on space available for terminal building development. Developing hangars on the south side of the Airport allows existing infrastructure such as taxistreets and secure Airport access gates to be utilized.

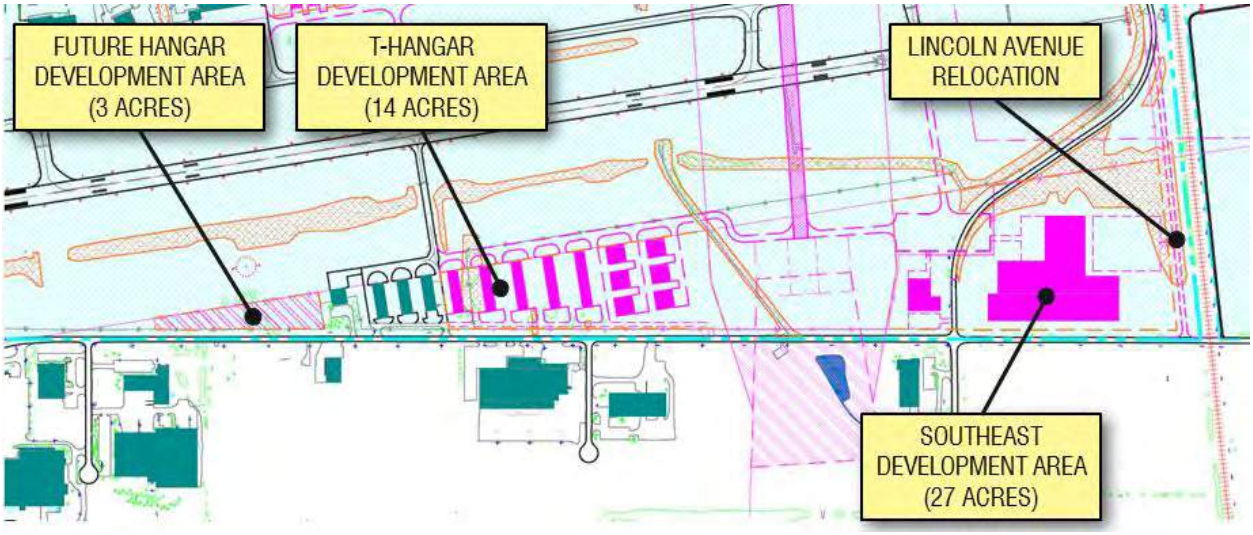
5.7 Other Development

Property located at the southeast corner of the Airport at the intersection of Lincoln Avenue and 64th Street has two options. One would be to continue to use it for non-aeronautical use because it is not adjacent to the airfield. Should demand warrant, Lincoln Avenue could be relocated to the east along the CSX railroad and the property could then be contiguous with the airfield making it available for

aeronautical purposes. This later alternative is recommended to optimize potential aeronautical operations for the Airport.

Figure 5-4 illustrates various development locations on the south side of the Airport.

Figure 5-4
Hangar and Other Development Locations



Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Future Property Interest and Easement Acquisition
Source: Mead & Hunt

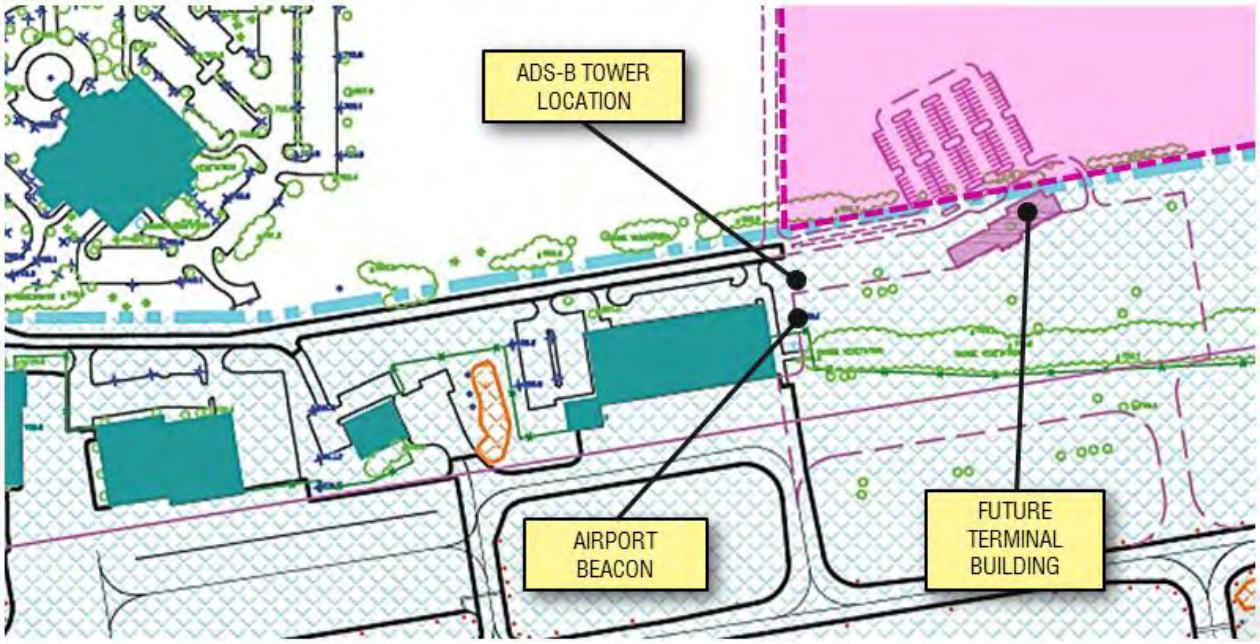
5.8 Navigational Aids

After consideration of various NAVAID options presented in Chapter 4, it is recommended that the Airport continue to plan for the adaptation of the Global Positioning System (GPS) to provide instrument approaches and navigational procedures for arriving and departing aircraft. Since the FAA requires operational and weather condition justification prior to funding a ground based precision approach system such as an ILS, GPS signals augmented by the installation of an Automatic Dependent Surveillance – Broadcast (ADS-B) tower allows precision approaches to be developed without the installation of costly ground equipment. Furthermore, an ADS-B tower also provides a cost effective way for precision and non-precision approaches to be developed if a crosswind runway is constructed in the future.

In 2010, an ADS-B tower was installed north of the Airport beacon, at the east end of Geurink Avenue (**Figure 5-5**) providing a necessary component for the FAA to develop Approach Procedures with Vertical Guidance (APV) for the Airport. In addition to the tower's installation, and its compliance with other airport design requirements set forth in FAA Advisory Circular (AC) 150/5300-13, *Airport Design*, clear runway approaches must be maintained for the Airport to be eligible to receive GPS-based, APV instrument approach procedures. It is recommended the Airport maintain clear approaches to Runway

8/26 and preserve the airspace around the planned crosswind runway in anticipation of the development of future GPS-based instrument approach procedures providing horizontal and vertical guidance. Procedures developed utilizing this cost-effective navigational aid offer an opportunity for the Airport to increase its throughput capacity, most notably during instrument flight rule (IFR) conditions that are commonly present in the greater Holland area.

Figure 5-5
ADS-B Tower Location



Legend
Airport Property
Delineated Wetland Area Inside Existing Airport Property
Land Acquisition for Terminal Area
Source: Mead & Hunt

5.9 Summary

The Airport infrastructure currently meets the majority of current user needs. Alternatives presented in Chapter 4 were evaluated to address how to best develop additional Airport infrastructure to meet future user needs. Consideration was given to existing and anticipated user demands, constraints to development surrounding the Airport and project construction feasibility. Based on this analysis, recommendations for infrastructure items were developed as summarized below:

- **Runway 8/26 –** No extension of the runway is needed to meet immediate demands. However, a 500 foot extension of the runway to the west should be planned and shown on the future ALP to protect the land and airspace from development.

- **Crosswind Runway –** No immediate development of a crosswind runway is necessary according to existing or future needs. However, illustration of a 3,500 foot crosswind runway should be shown on the future ALP to protect the land and airspace from development.

- **Taxiways –** Extension of a taxistreet on the south side of the airfield is recommended to facilitate the development of additional hangars. Any extension of Runway 8/26 should include an equal extension of the parallel taxiway. Development of a crosswind runway should also consider inclusion of a parallel taxiway.

- **Terminal Building –** It is recommended that the Airport construct a new terminal building along with a new auto parking lot at a new eastern location along Geurink Avenue.

- **Hangar Development –** The area on the south side of the airfield north of 64th Street should be reserved for hangar development.

- **Other Development –** It is recommended that the Airport plan for relocation of Lincoln Avenue to allow the property at the southeast corner of the Airport to be used for aeronautical purposes.

6

Environmental Overview

The purpose of this Chapter is to provide an overview of environmental concerns at the West Michigan Regional Airport (Airport). It is not intended to meet or satisfy requirements as addressed in Federal Aviation Administration (FAA) Order 5050.4B*, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*. Instead, the purpose is to address environmental issues and provide data that can be utilized when developing a future NEPA compliant document such as a Categorical Exclusion (CatEx), or an Environmental Assessment (EA). This Chapter will not determine any specific environmental concerns; rather it will focus on assessments of different categories of environmental issues and summarize early coordination efforts.

This Chapter is based on FAA Order 5050.4B and is divided into the following sections:

Some of the determinations of impact in this Chapter are based on the July 2002 Environmental Assessment (EA) for the Airport that was completed for the runway extension/runway safety area compliance project. Other determinations of impact are based on responses from various federal, state and local agencies to early coordination letters that were sent as part of the Master Plan Update project.

6.1 Noise

Aircraft noise can often be a controversial issue for the aviation community. Since the responsibility to reduce noise at an airport rests on the airport operator and airport users, steps must be taken to analyze the effects of aircraft noise and develop solutions to reduce the impact on those affected.

To determine the level of noise impact, a noise analysis is conducted using the Day Night Average Sound Level (DNL). DNL is the loudest average sound level in decibels (dB) from an airport's average 24-hour operational day. A 10 dB noise penalty is added to each aircraft operation that occurs between 10 p.m. and 7 a.m. to account for the heightened sensitivity of noise during nighttime hours. The dB levels of aircraft noise are then mapped out beyond each runway end using contours to represent the level of noise impact on the surrounding community. Using 14 Code of Federal Regulations (CFR) Part 150, areas of land that are designated as being impacted inside the 65 DNL contour are deemed incompatible. Although the 65 DNL contour is the recognized threshold in determining those areas impacted by noise, lower local noise standards less than 65 DNL may also apply. These lower local noise standards can be attributed when areas such as historical sites, national parks and wildlife refuges are impacted.

The FAA must conduct a noise analysis when:

- General aviation airports have more than 90,000 annual piston-powered aircraft operations within approach categories A through D
- General aviation airports have more than 700 annual jet operations
- A new airport, new runway, major runway extension or runway strengthening project occurs that would:
    i. Serve airplane design groups I and II
    ii. Serve airplane design groups III through VI
    iii. Be highly controversial because of noise
    iv. Would serve special aircraft that would fly over noise sensitive areas
- Forecasted helicopter operations exceed 10 operations per day and hover times exceed 2 minutes

Currently, existing operations at the Airport do not meet the criteria listed above for piston engine aircraft since forecasted operations are just over 50,000, which is well below the 90,000 threshold. Jet aircraft

operations may be more than 700 annual operations since there are 10 jet aircraft based on the field; therefore a noise analysis will likely be necessary as part of any future projects.

6.2 Compatible Land Use

Compatible land use planning at an airport completes two objectives; the first being the protection of aircraft, people and property, and the second being the improvement of quality of life for those living and working around an airport. Land use planning associated with environmental issues is generally focused on the impacts of aircraft noise and attractants to wildlife.

The impact of aircraft noise not only affects those who live and work near an airport, it also affects the ability of the airport to plan for future development. Land use compatibility planning attempts to provide acceptable levels of aircraft noise to those in close proximity of the airport, identify land necessary for airport expansion and relocation projects, and attempts to keep these areas clear of obstructions. Land use compatibility planning also focuses on the proximity of landfills, water treatment plants, wetlands and other incompatible land uses that attract wildlife. Limiting these types of uses near airports helps reduce wildlife hazards for both existing operations and future development.

It is preferred that airports own or control appropriate land surrounding an airport to maintain compatible land use. The FAA, however, recognizes that airports do not have land use control authority and encourages airports to promote compatible land uses by working cooperatively with local authorities to impose airport-compatible zoning near airports.

The Airport is currently bordered on three sides by roadways which restrict physical growth; however, property beyond the roads presents opportunities for development which could be incompatible if not managed effectively. Currently, a mix of agricultural and industrial land surrounds the Airport. Conversion of the agricultural lands off both ends of Runway 8/26 into developed areas and the associated encroachment of new businesses would drastically change the compatibility between the Airport and the adjacent development. Construction of a crosswind runway will also affect compatibility since a manufactured housing community north of the Airport along 48th Street may be impacted. Before any future development such as the new terminal, the runway extension or the crosswind runway occurs, a more in-depth analysis of land use compatibility will be required through the NEPA process. Regardless of future plans, it is important that the Airport continue to participate in the land use decision-making process as it relates to surrounding properties to maintain compatibility between existing operations and future development.

6.3 Social Impacts

As part of the NEPA review process, the FAA must evaluate if proposed airport development could create social impacts that involve the relocation of homes or businesses, division or disruption of established communities, changes in surface transportation patterns, disruption of planning development or a noticeable change in employment. Social impacts also include socio-economic impacts and effects on

the health and safety of children. Determination is made with FAA evaluation on how social impacts can be mitigated or an environmental impact statement is prepared explaining why they cannot be avoided.

An analysis should be conducted before any future development occurs outside the existing Airport footprint to determine social impacts such as the crosswind runway, which may have impacts to the north of 48th Street. The relocation of the CSX railroad would also be considered a social impact and would require a review.

6.4 Induced Socio-economic Impacts

Socio-economic impacts due to airport development actions are those that are caused by an airport improvement project, either directly or through a chain of events. For example, actions that require a land purchase could displace a number of residents to a location outside a community. This lowers the tax base of the community which in turn decreases funds for fire or police protection. The loss in population may also reduce the number of educational and business opportunities in the community, leading to increased unemployment. This chain of events is an example of how a proposed action can induce socio-economic impacts on the surrounding community. In determining impacts, the proposed development is analyzed to see how it will affect population movement and growth, public service demands and changes in business and economic activities. Determinations are then made regarding the extent of the impact and how proposed mitigation will reduce or eliminate socio-economic effects.

Currently, development at the Airport does not impose any induced socio-economic impacts on the surrounding community; however, any future development should be analyzed to determine potential impacts. The development of a crosswind runway, for example, may impose an induced socio-economic impact on people living north of the Airport who may have to be relocated. Care should be taken in project development to mitigate potential negative impacts on affected properties.

6.5 Air Quality

Air quality analyses are performed when an airport development project, under the NEPA and Clean Air Acts, has the potential to affect established air quality standards due to its size, scope or location based on thresholds established in the respective legislative provisions. To regulate air quality, the US Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide. Air quality standards set forth by the NAAQS establish emissions levels of air pollutants that are safe for human health, the public welfare and the environment. The NAAQS also requires states to develop EPA-approved State Implementation Plans (SIPs) and designate areas that are classified as attainment, nonattainment, or maintenance for each of the six pollutants listed above. These three areas categorize the levels of pollutants emitted into the air into safe, above standard, and improved geographic areas.

At general aviation facilities like the West Michigan Regional Airport, a proposed action is required to have an air quality analysis if 180,000 or more general aviation and air taxi operations occur annually. Since the annual total of aircraft operations at the Airport is significantly less than 180,000, and not more than 53,000 operations are projected to occur annually through 2030, air quality analyses are not anticipated, nor are significant air quality impacts expected with future development.

6.6 Water Quality

Actions that impact water quality can have severe environmental and legal consequences. The Clean Water Floodplains and Floodways Act of 1977, also known as the Clean Water Act (CWA), mandates development of comprehensive solutions to prevent, reduce or remove pollution in US waters. Several other regulations exist to protect water quality including those that offer special protection to drinking water supplies and those that require establishment of spill response plans. In addition, consultation may be needed with the Fish and Wildlife Service when bodies of water are controlled, altered, diverted, or drained. Several activities conducted at airports have the potential to impact water quality such as construction, aircraft and runway anti-icing/deicing and fuel/hydraulic spills. If not properly controlled, runoff from these activities can impact the water quality of drainage waterways from the Airport.

Currently, no significant impacts to water quality exist at the Airport. Careful planning and analysis will be needed before future development is conducted to determine water quality impacts created by construction of the proposed development. As mentioned by the Michigan Department of Environmental Quality (DEQ) in response to a September 2009 early coordination letter for the Master Plan Update project, a National Pollution Discharge Elimination Systems (NPDES) permit will be required for storm water discharges associated with construction activities of the proposed development. Additional permits may also need to be required from other federal, state, and local agencies.

6.7 Wetlands

Another sensitive environmental issue with airport development is the impact of the project on wetlands. Wetlands are defined by the US DOT Order 5660.1A, *Preservation of the Nation's Wetlands*, as:

> …lowlands covered with shallow and sometimes temporary or intermittent waters. This includes, but is not limited to, swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, tidal overflows, estuarine areas, and shallow lakes and ponds with emergent vegetation. Areas covered with water for such a short time that there is no effect on moist-soil vegetation are not included in the definition, nor are the permanent waters of streams, reservoirs, and deep lakes. The wetlands ecosystem includes those areas which affect or are affected by the wetland area itself; e.g., adjacent uplands or regions up and down stream.

Development projects are required to avoid wetlands to the greatest extent possible unless practicable alternatives do not exist. In general, actions that include building structures in a designated wetland;

dredging, filling, draining, channelizing, creating a dike, or impounding a wetland; disturbance of a water table in an area of a wetland; or indirect impacts that affect an area upstream or downstream from the development site are considered impacts to wetlands.

As addressed in a Michigan DEQ response to a September 2009 early coordination letter for the Master Plan Update project, wetlands in undeveloped areas north of the Airport have the potential to be impacted by future proposed construction of a new terminal building and crosswind runway. For any project north of the runway, an environmental assessment will likely be needed to determine the level of impact, if any, to these wetland areas. If it is determined that wetlands would be affected, a permit under Part 303 of the Natural Resources and Environmental Protection Act of 1994 will be required for development to begin. Also, to achieve a "no net loss" of wetlands in accordance with Executive Order 11990, a mitigation ratio of 1.5 to 1 is required for the creation of wetlands off Airport property. The goal is to reintroduce a wetland habitat into the environment that does not pose a safety hazard to aircraft.

6.8 Wild and Scenic Rivers

Wild and scenic rivers are those designated as having remarkable scenic, recreational, geologic, fish, wildlife or historic or cultural values. The National Wild and Scenic Rivers System (WSRS) was created by Congress to preserve these rivers for the enjoyment of present and future generations. The primary purpose of the WSRS is to protect the free-flowing characteristics of these rivers by preventing federal agencies from allowing activities to impact them. As no designated wild and scenic rivers exist in proximity of the Airport, no impacts are expected from future development. The proximity to the North Branch of the Macatawa River is not addressed in this section since the river is not defined as a wild and scenic river.

6.9 Floodplains

Floodplains are lowlands and relatively flat areas that are prone to a 100-year flood, meaning there is a one percent chance of the area flooding in any given year. Floodplains that adjoin inland or coastal waters can be affected by heavy rainfall, snow melt and violent storms. Floodplains are determined by a Flood Insurance Rate Map (FIRM) developed by the Federal Emergency Management Agency (FEMA) with assistance from other federal and state agencies. Executive Order 11988, *Floodplains,* and US Department of Transportation (DOT) Order 5650.2, *Floodplain Management and Protection*, require airports to avoid development on floodplains unless no practicable alternative exists. If development is approved in a floodplain, it must be designed to minimize impact and be able to protect human life and property.

Although adjacent to the North Branch of the Macatawa River and its tributaries, FEMA has determined that the Airport does not lie in a floodplain. The vicinity of the Den Bleyker Drain and the flat terrain surrounding the Airport helps to prevent flooding. As mentioned by the Michigan DEQ in a September 2009 early coordination letter for the Master Plan Update project, the North Branch of the Macatawa River would be impacted and the Den Bleyker Drain could also be potentially impacted by construction of a crosswind runway. In order to determine the level of potential impact, an environmental assessment will likely be necessary. If an impact is determined, a permit under Part 301, Inland Lakes and Streams, of the NREPA, 1994 PA 451 is required. A permit will also be required if impacts are found under the State's Floodplain Regulatory Authority found in Part 31 of the NREPA. A hydraulic analysis would be required to show proposed impacts do not cause harmful interference as defined in Part 31.

6.10 Farmlands

The Natural Resource Conservation Service (NRCS) has authority in designating and protecting farmlands to minimize the impact of their conversion to nonagricultural uses. Farmlands are grouped into three different categories and include pasturelands, croplands and forests. Farmland categorized as "prime" has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed and other agricultural crops with minimal use of fuel, fertilizer, pesticides or other treatment products. Farmland categorized as "unique" has a special combination of soil quality, location, growing season and moisture to produce high quality crops. Finally, farmland designated as "statewide and locally important" has been identified as such by a state or local.

Coordination must be made with the local NRCS field office when airport development projects require converting important farmland to a developed use. In this case, a United States Department of Agriculture (USDA) Farmland Conversion Impact Rating Form AD-1006 must be submitted along with a map showing the land needed for the proposed development along with a list of reasonable alternatives. The NRCS then reviews the information and assigns scores based on the value of the farmland proposed for conversion and determines whether to apply provisions set forth in the Farmland Protection Policy Act (FPPA). In the NRCS scoring system, farmland assigned a low score does not need further analysis while farmland assigned a high score has the potential to be adversely affected. Alternative measures, such as reducing the acreage of important farmland being converted or using land with a lower relative value, are required for development on farmland that is assigned a high score when feasible.

Based on the July 2002 EA and a August 2009 response to an early coordination letter for the Master Plan Update project, most of the area where the Airport was constructed contained farmland that is identified as being "prime" or "unique" by the NRCS. Therefore, a Farmland Conversion Impact Rating (AD1006) form will need to be completed to rate the areas where construction is proposed.

6.11 Coastal Zone Management

Coastal zones are defined as waters and their bordering areas in states along the coastlines of the Atlantic Ocean, Pacific Ocean, Gulf of Mexico and the Great Lakes. Included in the definition of a coastal zone are islands, beaches, transitional areas, intertidal areas and salt marshes. The Coastal Zone Management Act (CZMA) of 1972 applies to projects that would directly affect coastal resources, even if the project is not within a designated coastal zone. States like Michigan that have coastal zones also have a Coastal Zone Management Program (CZMP) that must be approved by the National Oceanic and Atmospheric Administration (NOAA). Each state's CZMP is responsible for minimizing effects on its coastal zones through objectives, policies and standards. The location of the Airport, while close to Lake Michigan, is outside of this boundary and is not under jurisdiction of Michigan's CZMP.

6.12 Coastal Barriers

Coastal barriers are islands that are geologically unstable formations that cannot support development. These islands, though, protect mainland areas by buffering storm or hurricane-driven winds or waves and protect fish, wildlife, human life and property along coasts and shorelines. The Department of the Interior develops and maintains maps of the Coastal Barrier Resource System (CBRS) designating coastal barriers found in the United States. The Coastal Barrier Resources Act of 1982 discourages development in the CBRS by banning federal agencies from providing financial support to almost all actions affecting the CBRS. Although coastal barriers are found in the Great Lakes, none are in proximity to the Airport; consequently, no future development is expected to impact coastal barriers.

6.13 Solid Waste

Solid waste generated from airport-related construction projects and operation may result in a negative environmental effect. Without careful planning and management, solid waste may present a danger to human health and the environment. Solid waste is defined as any material resulting from industrial, commercial, mining, agricultural, or community activities. When proposed development could cause or change a solid waste stream, an environmental review is typically created to discuss how it will be handled to minimize environmental impacts. The environmental document discusses the amount of waste that will be generated by construction and operation and how it will be handled and disposed of properly to minimize environmental impacts. Strategies and solutions are then developed to reduce the amount of waste created.

Another consideration for analyzing solid waste is the proximity of waste sites to the airport. Waste sites, also known as landfills, attract birds and create wildlife hazards for aircraft. FAA AC 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports,* addresses separation standards between landfills and

airports. For airports serving piston-powered aircraft, 5,000 feet of separation is needed between a landfill and an airport while 10,000 feet of separation is needed for airports serving turbine-powered aircraft.

At the Airport, the amount of solid waste currently generated does not significantly impact the environment. The Airport serves turbine-powered aircraft, however no existing or planned waste disposal facilities are within 10,000 feet. The impact of solid waste generated during construction and operation will need to be analyzed before any future development occurs.

6.14 Hazardous Materials

Hazardous materials such as aircraft and motor fuels, lubricants, and hydraulic fluids are found at airports and it is important that future development does not disrupt areas that have already been contaminated by these materials. Several environmental regulations exist to govern hazardous materials including the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), and the Community Environmental Response Facilitation Act (CERFA). These regulations are designed to define hazardous substances, establish clean up responsibility, and regulate the production, use and disposal of these materials. Before future Airport development begins, an analysis must be completed to identify and evaluate sites, facilities or properties for hazardous materials.

No underground storage tanks or known hazardous material sites are currently located at the Airport. Before future development occurs, an analysis should be conducted to verify that no hazardous materials are present on the proposed project's site.

6.15 Historic Properties

The National Historic Preservation Act (NHPA) of 1966 is the primary federal law that protects nationally recognized historic properties. Section 106 of the NHPA requires federal agencies to take into account the effects of federally funded activities on historic properties. A historic property includes any historic or prehistoric district, site, building, structure or object included in the National Register of Historic Places (NRHP), and any site of religious or cultural importance to Native Americans or Native Hawaiians. Since the FAA cannot award a grant until a review of impact on historic properties is complete, this should be conducted early in the environmental review for any proposed development. After the review is complete, a determination is made on whether the proposed development would or would not impact historic properties.

Future development at the Airport is not anticipated to impact any historic property afforded protection by the NHPA of 1966. If any artifacts of historical importance are found during construction of a project, development should be halted until the State Historic Preservation Office (SHPO) of the Bureau of Michigan History is contacted and archaeologists determine the historical importance of the site. As requested per the State Historic Preservation Office (SHPO) through an August 2009 early coordination letter for the Master Plan update, a mandatory application form needs to be submitted for projects under

review. Also, should Native American artifacts be found during construction, the appropriate Indian Tribes' Tribal Historic Preservation Officers (THPOs) should be notified. Site reference forms may also need to be filed per a discovery.

6.16 Department of Transportation Act of 1966, Section 4(f)

Section 4(f) of the Department of Transportation Act of 1966 is concerned about properties such as recreational parks, wildlife refuges or historical sites being lost to development activities. The Act states that the Secretary of Transportation may approve a transportation project requiring the use of publicly-owned land of a park, recreational area, or wildlife and waterfowl refuge of national, state, or local significance or land of a historic site of national, state, or local significance, if there is no prudent and feasible alternative that would avoid using those resources and the project includes all possible planning to minimize harm to the site. Since none of these land designations are located in proximity of the Airport, future development is not expected to result in any impact.

6.17 Biotic Resources

In this instance, the term biotic resources refers to various types of plants, fish, birds, reptiles, amphibians, marine mammals, coral reefs and other similar resources in a particular area. It also refers to rivers, lakes, wetlands, forests, and other habitat types supporting plants and aquatic animals. When a federally approved or financed action could affect a stream or water body, the responsible federal agency must consult with the US Fish and Wildlife Service to assess the effects of the actions on aquatic areas. Also, consultation must be made with state wildlife agencies having jurisdiction over the affected biotic resource. Examples of actions that may cause biotic resources impacts include new or expanded terminals or hangar facilities; new or extended runways or taxiways; installation or expansion of NAVAIDs; new or relocated access roadways; and parking facilities. Permits may be needed if it is determined the proposed actions affect migratory birds, fish or marine mammals or if dredging or filling of navigable waters or wetlands is required.

The level of analysis depends on whether the proposed development occurs on previously disturbed airport property or undisturbed wildlife habitats. Development on previously disturbed airport property, along with farmland or populated areas, will generally require a minimal and straightforward analysis. More in depth analyses are required if the proposed development affects undisturbed wildlife habitats.

Due to the farmland and populated areas that surround the Airport, no significant impact on biotic resources is expected to occur with future development. Very limited habitat exists around the Airport to support biotic communities; however, the area around the North Branch of the Macatawa River may support vegetation and wildlife commonly found in these environments. An evaluation of potential impacts, if any, may be required should any development occur in close proximity to the river.

6.18 Federally-listed Endangered or Threatened Species

Endangered and threatened species are protected through various federal and state regulations that safeguard the species themselves and any supportive habitat. With civil penalties and fines used to enforce these regulations, it is important that an analysis of these species and supporting habitats be conducted to determine what impact any future development may have on them.

To determine the impact of future development, the FAA will review federal and state lists of endangered or threatened species. If none of these species or habitats is found in the area of the proposed development, a prepared environmental document will state this and planning for construction may begin. If the proposed development may affect an endangered or threatened species or habitat, the US Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS) will be notified of the proposed development and provided a list of species or habitats thought to be impacted.

As part of the July 2002 EA conducted for the extension and safety area improvements to Runway 8/26, no species that were listed on any of the federal or state inventory lists or habitats to support or attract any rare animal species were found to be on or in the vicinity of the Airport. Additionally, coordination with the USDA Wildlife Services, the Michigan DEQ, the Michigan Department of Natural Resources (DNR) and US FWS in 2009 for the Master Plan Update noted that any future development would not significantly impact any endangered or threatened species. However, as federal and state protected species lists change, it will be important that an updated assessment of species and habitats on or in the vicinity of the Airport be conducted before any future development occurs.

6.19 Energy Supplies, Natural Resources, and Sustainable Design

Airports have the potential to use significant quantities of energy supplies and consumable natural resources. To comply with regulations set forth by the Council on Environmental Quality (CEQ), the FAA must evaluate any airport development project subject to FAA approval or funding and determine its impact on energy supplies and natural resources. In evaluating an airport development project, the FAA studies how an airport plans to conserve resources, limit pollution, minimize aesthetic effects and address public concerns. To encourage sustainable design, FAA policy supports airport developments that display environmental sustainability.

Existing operations at the Airport are at a level that does not strain energy supplies or natural resources due to the relatively small amount consumed. Before future development occurs at the Airport, measures should be taken to implement sustainable design for the Airport to reduce the amount of energy supplies and natural resources consumed where feasible and practical.

6.20 Light Emissions and Visual Effects

Light emissions and visual effects created by airport-related lighting, such as flashing high intensity strobe lighting, can visually affect areas surrounding the Airport. Due to the subjectivity of those affected, efforts

should be made to prevent light emissions and any associated visual effects. When determining impact, airports should speak with residents who may be affected, along with local jurisdictions and other federal, state or local agencies. Architectural and landscaping solutions can reduce impact, along with the installation of visors and reduced-wattage bulbs on equipment.

Due to the lack of residential development in proximity of the Airport, existing lighting systems do not create adverse impacts. An analysis will be needed if it is determined that lighting from future development such as the crosswind runway could create adverse light emissions and visual effects.

6.21 Construction Impacts

Construction at airports can affect a variety of environmental resources. Emissions, storm water runoff and noise are just some of the impacts to the environment that can be created during airport construction projects. It is important that all construction projects are analyzed for compliance with all federal, state, and local environmental regulations. Air and water quality are closely regulated with standards set forth in the NEPA process, the Clean Air Act, and the National Pollutant Discharge Elimination System (NPDES) permitting program. Standards set forth by these regulations must be followed not only to protect the environment, but to also avoid civil penalties or fines for environmental damage. To assist in meeting these standards, it is important that the Airport obtain any necessary permits before construction begins.

If and when construction begins, standards set forth in FAA Advisory Circular (AC) 150/5370-10C, *Standards for Specifying Construction of Airports,* must be followed along with using best management practices (BMPs) to minimize environmental impacts caused by construction activities. It will be important that a proper construction impact analysis is conducted before any construction activity begins. Also, as addressed by the Michigan DEQ in response to a September 2009 early coordination letter for the Master Plan Update project, a permit will be required under Part 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act (NREPA) for erosion and sediment control during construction of the proposed projects.

6.22 Environmental Justice

An environmental justice analysis considers the effects of development actions on low-income or minority populations and is designed to prevent negative environmental effects resulting from development projects. To properly apply environmental justice requirements, determination must be made of the vicinity of low-income or minority populations relative to the Airport. Potential impacts are then analyzed and any adverse effects are identified. Contact is then made through public meetings, community leaders and other public forums to determine needs and address concerns upon which mitigation practices and solutions are then developed for the project.

A further analysis of environmental justice may be needed if a crosswind runway is constructed since a manufactured housing community is located to the north and rural residential areas are located to the

south in Fillmore Township. A proper analysis of the different races and levels of income that make up the population in these areas will determine the applicability of environmental justice.

6.23 Cumulative Impacts

Cumulative impacts are those that affect a particular resource when combined with impacts to that resource due to past, present and reasonably foreseeable actions within a defined time and geographic area. An affected resource could be any of the 22 sections previously described in this chapter. For example, cumulative impacts to wetlands located on Airport property would be the total amount of wetlands affected over a period of time due to multiple projects. A cumulative impact analysis is conducted as part of an environmental study in which the FAA will determine if a proposed project causes a significant impact.

No foreseeable cumulative impacts are expected to any of the 22 resources listed previously in this Chapter. Although some potential exists for commercial and industrial development to occur in the immediate area surrounding the Airport, no significant cumulative impacts are anticipated. Although construction of a proposed crosswind runway could have wetland impacts, potential cumulative impacts are expected to be minimal due to the limited nature of any other foreseeable development.

6.24 Summary

As mentioned at the beginning of this Chapter, this environmental overview is not intended to meet or satisfy requirements as addressed in *FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions,* or the National Environmental Policy Act of 1969. Instead, the purpose is to address environmental issues and provide data that can be used when developing future NEPA compliance statements for airport projects.

Below is a summary of the anticipated impacts that future airport development will have on the environment based on the categories that were previously described:

- **Noise** – Existing operations at the Airport do not result in significant noise impacts to the surrounding community. The construction of a crosswind runway will require a noise analysis to determine the level of impact on areas to the north and south of the Airport.
- **Compatible Land Use** – With the Airport's growth potential being severely restricted by surrounding land use, involvement with land use planning is important. Land use compatibility will also be an issue with development and construction of a crosswind runway. Active participation and communication with jurisdictions surrounding the Airport is important in planning for compatible land use.
- **Induced Socio-economic Impacts** – Future development will have to be analyzed to determine if the surrounding community will be impacted.
- **Water Quality** – An analysis will need to be conducted before any future development occurs to determine impacts on water quality due to construction or operation. A NPDES permit will

be required for storm water discharges associated with construction activities of the proposed projects.

- **Wetlands** – Any future development will need to be analyzed to determine potential wetland impact. A permit under Part 303, Wetlands Protection, of the NREPA will be required for development to occur if impacts to wetland areas are found.
- **Floodplains** – Although the Airport is not located in a floodplain, impacts to the North Branch of the Macatawa River and the Den Bleyker Drain must be considered when planning for future Airport development. A permit under Part 301, Inland Lakes and Streams, of the 1994 NREPA will be required if these waterways are impacted. A permit and hydraulic analysis under Part 31 of the NREPA will be required for any impact to the drainage area of the North Branch Macatawa River.
- **Farmlands** – Since most of the land at the Airport was designated "prime" or "unique" by the NRCS, a Farmland Conversion Impact Rating (AD1006) form will need to be completed to rate the areas of land where construction is proposed.
- **Solid Waste** – An analysis will need to be conducted to determine if solid waste generated during construction and operation of future development will impact the environment.
- **Historic Properties** – A mandatory application form will need to be submitted to the SHPO for projects that need to be reviewed. Native American artifacts discovered during construction will require notification to the appropriate THPO and may require the submittal of a site reference form.
- **Federally-listed Endangered or Threatened Species** – None of the species that are currently listed on any of the federal or state inventory lists or habitats currently exist at the Airport; however it will be important that an updated assessment of species or habitats be conducted before any future development occurs.
- **Energy Supplies, Natural Resources and Sustainable Design** – The existing operations do not provide a strain on energy supplies or natural resources. However, measures should be taken for future development to limit energy supplies and natural resources consumed and implementation of sustainable design where feasible and practical.
- **Construction Impacts** – Standards set forth in FAA Advisory Circular 150/5370-10C, *Standards for Specifying Construction of Airports,* must be followed along with using best management practices (BMPs) to minimize environmental impacts during future Airport construction. A permit for soil erosion and sediment control during construction will also be required under Part 91, Soil Erosion and Sedimentation Control, of the NREPA.
- **Environmental Justice** – Analysis of the socio-economic characteristics of the residents around the Airport will be needed before future development occurs. Environmental justice requirements are in place to verify that disadvantaged populations are provided a reasonable opportunity for input and are not disproportionately impacted by development decisions.

Prepared By:
Mead & Hunt, Inc.
2605 Port Lansing Road
Lansing, MI 48906

RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

KIRK T. STEUDLE
DIRECTOR

March 19, 2013

Mr. Ron Ludema, Airport Manager
West Michigan Regional Airport
1581 S. Washington Avenue
Holland, Michigan 49423

Dear Mr. Ludema:

Subject: West Michigan Regional Airport; Holland, Michigan
Airport Layout Plan (ALP) Airspace Approval
Airspace Case No. 2012-AGL-4857-NRA

Enclosed is a conditionally approved copy of the West Michigan Regional Airport, Airport Layout Plan (ALP), dated May 2012. This letter cancels or supersedes all prior ALP approvals. The ALP approval is based on recognition of and adherence to the following:

1. The approval is not to be considered a commitment of Federal funding for the proposed development. The FAA has concurred with the proposed development for planning purposes only based on current safety, utility, and efficiency standards. Actual development should comply with approved standards applicable at the time of construction. The airport will need to provide the FAA justification of need before seeking FAA financial participation in the following projects:

   - The location for the new Terminal Building and associated land acquisition, east of the current FBO office and hangar area.
   - The future crosswind Runway 18/36 and associated components i.e. land acquisition, safety areas, runway approaches
   - A 500'x100' extension to existing Runway 8/26 including installation of a MALSR system for Runway 8.
   - Additional hangar and taxiway development, east of the existing southern hangar area.
   - Various development area opportunities including a possible viewing area west of the southern hangar area and commercial development.

   If any of the design critical aircraft or aircraft groups changes, the ALP must be re-evaluated by the FAA.

2. Our approval does not infer or imply that the land in the airport vicinity is considered compatible with airport operations. Federal requirements stipulate:

   a. All development programs should be reasonably consistent with the plans of local and state planning agencies for the development in the airport vicinity.
   b. That fair consideration has been given to the interest of communities in or near the airport.
   c. That development programs provide for the protection and enhancement of the environment.

Aeronautics Building – 2700 Port Lansing Road, Lansing, Michigan 48906
www.michigan.gov • (517) 335-9283

LH-LAN-0 (01/11)

Mr. Ron Ludema, Airport Manager
March 19, 2013
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3. The FAA offers no objections to the proposed [illegible] airspace utilization as depicted on the ALP based on considerations of safe and efficient use of airspace. The ALP has the status of "Plan on File" for the purpose of 14 CFR 77, Obstruction Evaluations, and 14 CFR 152, Airport Aid Program. A review of the airside landing area development was conducted according to the following 14 CFR's: -77, -152, and -157; Notice of Construction, Alteration, Activation, and Deactivation of Airports (reference Aeronautical Study Number 2012-AGL-4857-NRA). It should be noted that FAA cannot prevent erection of any structure near an airport. Airport environs can only be protected through state and local zoning ordinances, building regulations, and like requirements. Please refer to the FAA Airspace Approval letter dated November 19, 2012, for additional detailed information.

4. All development depicted on this ALP must comply with the National Environmental Policy Act (NEPA) of 1969. FAA environmental approval is required for all airport development actions depicted on this ALP. This would apply to development projects, even if there were no FAA funding involved in the project. Additional requirements concerning FAA NEPA approval can be found in FAA Order 5050.4B. "National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions."

5. To avoid conflicts with future development, we recommend you utilize the ALP when preparing leases. We further recommend you provide copies to the local and state planning zoning boards and county and city officials and encourage them to adopt compatible land use criteria in and around the airport. Copies should also be distributed to the Fixed Base Operators (FBO's) and airport users.

6. The Airport and Airway Improvement Act (49 USC 47107 (a) (16) (D)) requires the sponsor to eliminate any adverse effects on Federal facilities, or bear all costs to relocate those facilities, that are a result of an airport change. However, if AIP eligible construction/development items adversely affect FAA facilities, the cost of relocating the facilities may be eligible under AIP. If the proposed development requires any displaced or relocated FAA facility, the construction will have to be coordinated with the FAA in order to establish reimbursable funding for the engineering and relocation.

7. This approval does not include a detailed evaluation of actual construction. Prior to constructing any development on the airport, notice (FAA Form 7460-1) consistent with 14 CFR 77 must be filed with this office. This approval does not include approval for temporary construction equipment which may be used during actual construction, e.g., cranes, equipment staging areas, site access routes, etc. A separate construction safety phasing plan for any project should be reviewed by the FAA no less than 60 days prior to beginning any project. The airport must take all measures necessary during construction to ensure there are no runway incursions.

8. If development is planned with or without aviation trust fund investments that will change the status or geometrics of runways, taxiways, aprons, or other operating airport surfaces, notice (FAA Form 7480-1) must be filed with this office consistent with 14 CFR 157. The airport should work with the State of Michigan to update the airport master record, FAA Form 5010-1, to reflect new runway data and updated runway changes.

9. Any development that requires relocation or installation of FAA facilities will require a signed and executed reimbursable agreement with the FAA. After the FAA concurs with any proposed development and the environmental review is complete, the sponsor will need to request a reimbursable agreement from the FAA. A preliminary agreement between the FAA and the airport sponsor should be executed upon receipt of airport's letter so that the FAA can begin

Mr. Ron Ludema, Airport Manager
March 19, 2013
Page 3 of 3

providing engineering services. FAA will then develop the final reimbursable agreement. On average, 18 months are required from the time the preliminary agreement is signed to the time the final reimbursable agreement if signed.

10. The FAA Flight Procedures Office (FPO) must be notified at least 5 days prior to any temporary displacement and/or relocation of the thresholds. The latitude/longitude and elevation of the displaced/new threshold locations, as well as any new Touch Down Zone elevation information, must be provided. The notification time is necessary for issuance of NOTAMs. The airport manager is responsible for issuing all required local NOTAMs.

11. The planned runway developments will require new FAA flight procedures. If the FAA concurs with these developments there will need to be close coordination with different FAA offices. Development on new approaches will not begin until environmental approvals have been given and the sponsor requests the FAA FPO to initiate design of new approaches. Publication of revised Instrument Approach Procedures (IAP's) could take from 18 months to two years, after runway data is submitted. Review of this ALP does not constitute an automatic request for amended procedures

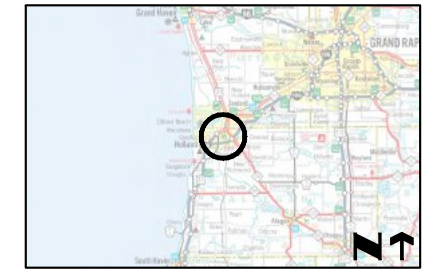
We trust this letter provides a clear explanation of the conditions and terms of our approval. If you desire further clarification, please contact Linn Smith at 517-335-9949.

Sincerely,

David L. Baker, PE
AIP Programs Manager
Office of Aeronautics

cc: AJW- 3I7E
AJW-C15A
ASW [illegible]
DET-ADO
FAA SMO
S. Ward, Mead & Hunt

AIRPORT LOCATION MAP NO SCALE



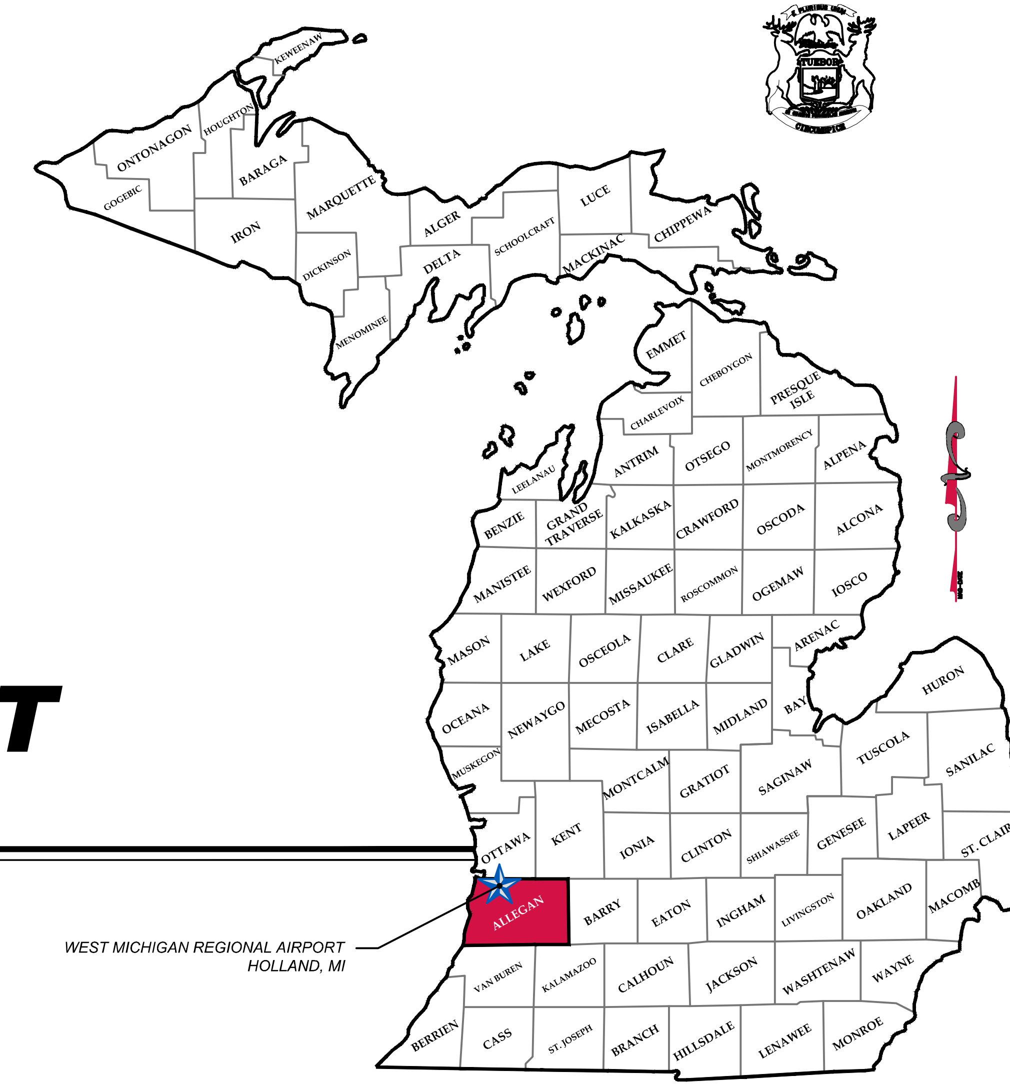
Source: Michigan Department of Transportation

AIRPORT VICINITY MAP NO SCALE

Source: MapQuest

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
OFFICE OF AERONAUTICS

LANSING



WEST MICHIGAN REGIONAL AIRPORT

HOLLAND, MI

AIRPORT LAYOUT PLAN - MAY 2012

WEST MICHIGAN AIRPORT AUTHORITY

APPROVED: ______________________ DATE
KURT DYKSTRA
CHAIRPERSON, WEST MICHIGAN AIRPORT AUTHORITY

APPROVED: ______________________ DATE
RON LUDEMA
AIRPORT MANAGER

MICHIGAN AERONAUTICS COMMISSION

APPROVED: ______________________ DATE
DAVID L. BAKER, P.E.
MANAGAR, AIP PROGRAMS SECTION

APPROVED: ______________________ DATE
RICHARD E. HAMMOND
MANAGER, AIRPORTS SERVICES DIVISION

CERTIFICATION

ON BEHALF OF ***MEAD & HUNT, INC.*** I CERTIFY THAT THE ALP PREPARED FOR WEST MICHIGAN REGIONAL AIRPORT WAS PREPARED ACCORDING TO THE APPLICABLE ADVISORY CIRCULARS, THE CURRENT VERSION OF THE GREAT LAKES REGION ALP CHECKLIST, AND ACCURATELY DEPICTS THE PROPOSED USE OF AIRSPACE AT THE TIME OF SUBMITTAL. THE ALP CONFORMS WITH FAA DESIGN STANDARDS, EXCEPT AS NOTED:

THE AIRPORT IS CLASSIFIED AS AN AIRPLANE DESIGN GROUP II; HOWEVER, SEVERAL TAXIWAYS ARE CONSTRUCTED USING AIRPLANE DESIGN GROUP III STANDARDS.

APPROVED: ______________________ DATE
STEPHANIE A. D. WARD, SENIOR PLANNER
A.I.C.P. #014419

Mead & Hunt

MEAD & HUNT, INC.
2605 PORT LANSING ROAD
LANSING, MI 48906
phone: 517.321.8334
fax: 517.321.5932

APPROVED: ______________________ DATE
RON J. ENGEL
P.E. #030528

INDEX SHEETS

SHEET NUMBERS	SHEET NAME	REVISION DATE	SHEET NUMBERS	SHEET NAME	REVISION DATE
1	TITLE SHEET		13	FUTURE RUNWAY 36 APPROACH	
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FILE NUMBER: **03-07**

AIP GRANT NUMBER: B-26-0045-3006

DESIGNED	SADW	5/11
DRAWN	AEF	5/11
CHECKED	SADW	5/11

March 22, 2013 - BIV_03-07_Tulip City Airport ALP.dwg

IF PAPER SIZE IS 24"x36" USE SCALE SHOWN. ALL OTHER PAPER SIZES ARE NOT TO SCALE.

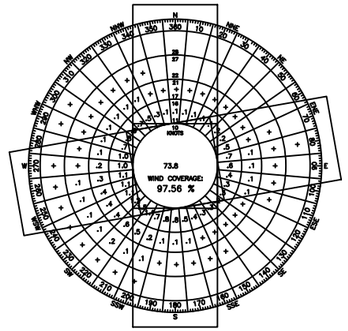
AIRPORT DATA TABLE

ITEM	EXISTING	FUTURE
AIRPORT REFERENCE POINT - LATITUDE	42° 44' 34.02"	42° 44' 38.17"
AIRPORT REFERENCE POINT - LONGITUDE	86° 06' 28.18"	86° 06' 20.06"
AIRPORT ELEVATION	698'	698'
AIRPORT & TERMINAL AIDS	ROTATING BEACON, ASOS, WIND CONE	ROTATING BEACON, ASOS, WIND CONE
SERVICE LEVEL	GENERAL UTILITY	GENERAL UTILITY
AIRPORT ROLE	GENERAL UTILITY	GENERAL UTILITY
AIRPORT REFERENCE CODE	D-II	D-II

COUNTY	ALLEGAN
TOWNSHIP	FILLMORE
MEAN MAX TEMPERATURE	85.8° F
TOWN	4N
RANGE	15W

RUNWAY DATA

	EXISTING 8	FUTURE 8	EXISTING 26	FUTURE 26	FUTURE 18	FUTURE 36
RUNWAY LENGTH	6,002'	6,502'	6,002'	6,502'	3,500'	3,500'
DISPLACED THRESHOLD	n/a	n/a	n/a	n/a	n/a	n/a
EFFECTIVE LANDING LENGTH	6,002'	6,502'	6,002'	6,502'	3,500'	3,500'
RUNWAY WIDTH	100'	100'	100'	100'	75'	75'
PAVEMENT TYPE	ASPHALT	ASPHALT	ASPHALT	ASPHALT	ASPHALT	ASPHALT
PAVEMENT STRENGTH(1)	SW - 75,000 LBS DW - 160,000 LBS DT - 175,000 LBS	SW - 75,000 LBS DW - 160,000 LBS DT - 175,000 LBS	SW - 75,000 LBS DW - 160,000 LBS DT - 175,000 LBS	SW - 75,000 LBS DW - 160,000 LBS DT - 175,000 LBS	SW - 12,500 LBS	SW - 12,500 LBS
RUNWAY LIGHTING	HIRL	HIRL	HIRL	HIRL	MIRL	MIRL
RUNWAY MARKING	PRECISION	PRECISION	PRECISION	PRECISION	VISUAL	VISUAL
NAVIGATIONAL AIDS	PAPI, REIL	PAPI, ILS, MALSR	PAPI, ILS, MALSR	PAPI, ILS, MALSR	PAPI, REIL	PAPI, REIL
RUNWAY APPROACH CATEGORY	D	D	D	D	B	B
RUNWAY DESIGN CRITERIA	II	II	II	II	II	II
APPROACH LIGHTING	PAPI, REIL	ILS, MALSR, PAPI	ILS, MALSR, PAPI	ILS, MALSR, PAPI	PAPI, REIL	PAPI, REIL
CRITICAL AIRCRAFT(2)	GULFSTREAM G450	GULFSTREAM G450	GULFSTREAM G450	GULFSTREAM G450	DASSAULT FALCON FAN JET	DASSAULT FALCON FAN JET
RUNWAY APPROACH SLOPE RATIO	34:1	50:1	50:1	50:1	20:1	20:1
RUNWAY SAFETY AREA (RSA)	1,000 x 500'	1,000' x 500'	1,000 x 500'	1,000 x 500'	300' x 150'	300' x 150'
OBJECT FREE AREA (OFA)	1,000' x 800'	1,000' x 800'	1,000' x 800'	1,000' x 800'	300' x 500'	300' x 500'
OBSTACLE FREE ZONE (OFZ)	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 250'	200' x 250'
RUNWAY PROTECTION ZONE (RPZ)	500' x 1,010 x 1,700'	1,000' x 1,750' x 2,500'	1,000' x 1,750' x 2,500'	1,000' x 1,750' x 2,500'	500' x 700' x 1,000'	500' x 700' x 1,000'
APPROACH SURFACE	1,000' x 3,500' x 10,000'(4)	1,000' x 16,000' x 50,000'	1,000' x 16,000' x 50,000'	1,000' x 16,000' x 50,000'	500' x 1,500' x 5,000'	500' x 1,500' x 5,000'
APPROACH TYPE	NON-PRECISION	PRECISION	PRECISION	PRECISION	VISUAL	VISUAL
APPROACH VISIBILITY MINIMUMS	250' (300') AGL - 1 MI. GPS (LPV)	TBD(3) GPS	250' (300') AGL - ½ MI. ILS OR GPS	250' (300') AGL - ½ MI. ILS OR GPS	TBD(3)	TBD(3)
RUNWAY END ELEVATIONS(5)	698'	698'	686'	686'	672'	672'
RUNWAY GRADIENT(6)	0.0020	0.0018	0.0020	0.0018	0.0000	0.0000
RWY. END COORDINATE (LATITUDE)(7)	42° 44' 28.73" N	42° 44' 27.84" N	42° 44' 39.31" N	42° 44' 39.31" N	42° 45' 03.92" N	42° 44' 29.48" N
RWY. END COORDINATE (LONGITUDE)(7)	86° 07' 07.75" W	86° 07' 14.34" W	86° 05' 48.61" W	86° 05' 48.61" W	86° 06' 00.97" W	86° 05' 56.77" W
TAIL HEIGHT	20 - <30 FT.	20 - <30 FT.	20 - <30 FT.	20 - <30 FT.	20 - <30 FT.	20 - <30 FT.
TAXIWAY SAFETY AREA WIDTH	79'	79'	79'	79'	79'	79'
TAXIWAY LIGHTING	YES	YES	YES	YES	YES	YES



WIND COVERAGE TABLE - ALL WEATHER

CROSSWIND COMPONENT - KNOTS

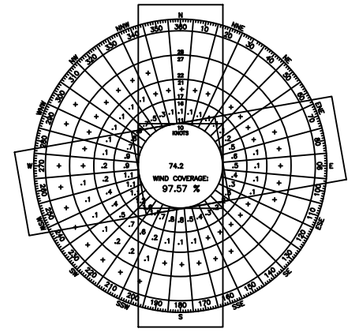
RUNWAY	10.5	13.0	16.0	20.0
8-26	90.56	95.16	98.71	99.72
18-36	85.30	91.55	97.20	
8-26 AND 18-36	97.56	99.39	99.87	

SOURCE:
NATIONAL CLIMATIC DATA CENTER;
FAA AIRPORT DESIGN VERSION 4.2
MDOT BUREAU OF AERONAUTICS

NUMBER OF OBSERVATIONS:
72,539

PERIOD OF RECORD:
1999 - 2008

STATION:
HOLLAND, MI
STATION NUMBER: 72539



WIND COVERAGE TABLE - IFR

CROSSWIND COMPONENT - KNOTS

RUNWAY	10.5	13.0	16.0	20.0
8-26	90.52	95.10	98.65	99.69
18-36				
8-26 AND 18-36				

SOURCE:
NATIONAL CLIMATIC DATA CENTER;
FAA AIRPORT DESIGN VERSION 4.2
MDOT BUREAU OF AERONAUTICS

NUMBER OF OBSERVATIONS:
72,539

PERIOD OF RECORD:
1999 - 2008

STATION:
HOLLAND, MI
STATION NUMBER: 72539

GENERAL NOTES:

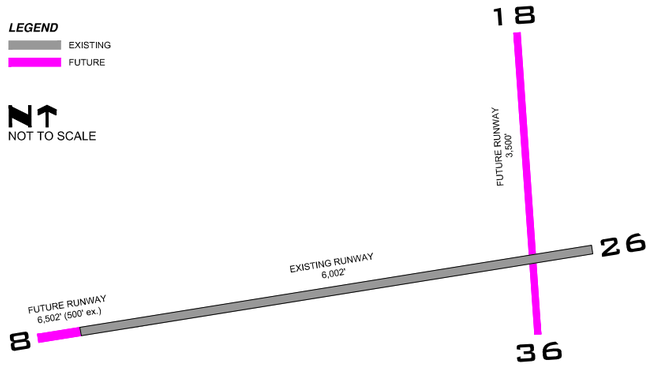
(THE NOTES BELOW CORRESPOND TO THE NUMBERS ABOVE)

1. EXISTING PAVEMENT STRENGTH SHOWN TAKES INTO CONSIDERATION WEIGHT OF MAINTENANCE EQUIPMENT AS WELL AS CRITICAL AIRCRAFT WEIGHT.
2. CRITICAL AIRCRAFT FOR FUTURE AND ULTIMATE RUNWAY DEVELOPMENT TO BE DETERMINED AT TIME OF CONSTRUCTION, OR AS FLEET MIX CHANGES.
3. FUTURE AND ULTIMATE APPROACH VISIBILITY MINIMUMS TO BE DETERMINED AFTER COMPLETION OF FUTURE RUNWAY CONSTRUCTION.
4. THE EXISTING RWY 8 APPROACH SURFACE INNER WIDTH DIMENSION CORRESPONDS TO THE WIDTH OF THE PRIMARY SURFACE WHICH IS REGULATED BY THE RWY 26 APPROACH SURFACE FUTURE RUNWAY END ELEVATIONS ESTIMATED UNTIL TIME OF CONSTRUCTION.
5. FUTURE EFFECTIVE RUNWAY GRADIENT ESTIMATED UNTIL TIME OF CONSTRUCTION.
6. EXISTING RUNWAY END COORDINATE INFORMATION TAKEN FROM AIRPORT DATA (5010) AND BASED IN NAD83. (CURRENT AS OF 05/05/11)
7. THE EXISTING RWY 17 APPROACH SURFACE INNER WIDTH DIMENSION CORRESPONDS TO THE WIDTH OF THE PRIMARY SURFACE WHICH IS REGULATED BY THE RWY 35 APPROACH SURFACE.

ADDITIONAL NOTES:

- CONSTRUCTION OF RUNWAY DEVELOPMENT TO BE DETERMINED AS FLEET MIX CHANGE AND JUSTIFICATION WARRANTS.
- THE WIDTHS OF THE RUNWAY SAFETY AREA, OBJECT FREE AREA AND OBSTACLE FREE ZONE ARE CENTERED ON THE RUNWAY AND EXTEND THE ENTIRE LENGTH OF THE RUNWAY.
- THE HORIZONTAL DATUM IS NAD83 WHILE THE VERTICAL DATUM IS NAVD88.

AIRPORT RUNWAY DIAGRAM



REVISIONS				
NO.	DATE	REMARKS	BY	CHK
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WEST MICHIGAN REGIONAL AIRPORT
HOLLAND, MI

AIRPORT LAYOUT PLAN
DATA SHEET

Mead & Hunt
2805 PORT LANSING ROAD
LANSING, MICHIGAN 48906
517.321.8334 - 517.321.5932 FAX

STATE ID. NO.	M&H PROJECT NO. —	08199-00-09601	DESIGNED	SADW	5/11
03-07	FEDERAL CONTRACT NO. —	n/a	DRAWN	AEF	5/11
	STATE CONTRACT NO. —	B-26-0045-3006	CHECKED	SADW	5/11

SHEET: 2 OF 14

March 22, 2013 - dtfy_03x07_Talb City Airport ALP.dwg

IF PAPER SIZE IS 24"x36" USE SCALE SHOWN. ALL OTHER PAPER SIZES ARE NOT TO SCALE

DIMENSIONAL INFORMATION

	EXISTING 8	EXISTING 26
RUNWAY LENGTH	6,002'	6,002'
RUNWAY WIDTH	100'	100'
RUNWAY SHOULDER WIDTH	0'	0'
TAXIWAY WIDTH	VARIES	VARIES
TAXIWAY EDGE SAFETY MARGIN	7.5'	7.5'
TAXIWAY SHOULDER WIDTH	0'	0'
TAXIWAY SAFETY AREA WIDTH	79'	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'	131'
RUNWAY CENTERLINE TO TAXIWAY HOLD LINE	250'	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE LENGTH	400'	400'
RUNWAY CENTERLINE TO BUILDING RESTRICTION LINE LENGTH	745'	745'

BUILDING DATA TABLE

STRUCTURE	DESCRIPTION	HEIGHT - AGL	TOP ELEVATION - MSL
Ⓐ	TUNNEL CONTROL	15.5'	698'
Ⓑ	TERMINAL / FBO	18'	701'
Ⓒ	CORPORATE HANGAR	24.5'	706'
Ⓓ	FBO MAINTENANCE HANGAR	29'	709'
Ⓔ	TENANT COMMUNITY HANGAR	23'	702'
Ⓕ	TENANT OFFICE BUILDING	16'	694'
Ⓖ	TENANT COMMUNITY HANGAR	40.5'	718'
Ⓗ	ELECTRICAL VAULT	10'	686'
Ⓘ	BOX HANGAR	30'	706'
Ⓙ	T-HANGARS (8 UNIT)	18.5'	693'
Ⓚ	T-HANGARS (8 UNIT)	18.5'	692'
Ⓛ	T-HANGARS (8 UNIT)	18.5'	692'

NOTE:
AGL = ABOVE GROUND LEVEL / MSL = MEAN SEA LEVEL

RUNWAY SAFETY AREA

	EXISTING 8	EXISTING 26
RUNWAY PROTECTION ZONE (RPZ)	500' x 1,010 x 1,700'	1,000' x 1,750' x 2,500'
FAR PART-77 APPROACH SURFACE	1,000' x 3,500' x 10,000'	1,000' x 16,000' x 50,000
RUNWAY SAFETY AREA (RSA)	1,000 x 500'	1,000 x 500'
OBJECT FREE AREA (OFA)	1,000' x 800'	1,000' x 800'
OBSTACLE FREE ZONE (OFZ)	200' x 400'	200' x 400'
PRECISION OBSTACLE FREE ZONE* (POFZ)	200' x 800'	200' x 800'

NOTE:
1. THE PRECISION OBSTACLE FREE ZONE IS IN EFFECT ONLY WHEN ALL OF THE FOLLOWING OPERATIONAL CONDITIONS ARE MET:
A. VERTICAL GUIDED APPROACH
B. REPORTED CEILING BELOW 250 FEET AND/OR VISIBILITY LESS THAN 3/4 STATUTE MILE (OR RVR BELOW 4,000 FEET)
C. AN AIRCRAFT ON FINAL APPROACH WITHIN TWO MILES OF THE RUNWAY THRESHOLD.

1. THE EXISTING RWY 8 APPROACH SURFACE INNER WIDTH DIMENSION CORRESPONDS TO THE WIDTH OF THE PRIMARY SURFACE WHICH IS REGULATED BY THE RWY 26 APPROACH SURFACE FUTURE RUNWAY END ELEVATIONS ESTIMATED UNTIL TIME OF CONSTRUCTION.

RUNWAY DATA

	EXISTING 8	EXISTING 26
LATITUDE (LAT.)	42° 44' 28.73" N	42° 44' 39.31" N
LONGITUDE (LONG.)	86° 07' 07.75" W	86° 05' 48.61" W
ELEVATION (EL.)	698'	686'
STATION (STA.)	62+02	02+00
BEARING	N 79° 42' 18.36" E	N 79° 42' 18.36" E
APPROACH TYPE	NON-PRECISION	PRECISION
TOUCHDOWN ZONE LATITUDE (LAT.)	42° 44' 28.73" N	42° 44' 39.31" N
TOUCHDOWN ZONE LONGITUDE (LONG.)	86° 07' 07.75" W	86° 05' 48.61" W
TOUCHDOWN ZONE ELEVATION (EL.)	698'	686'

APRON DATA

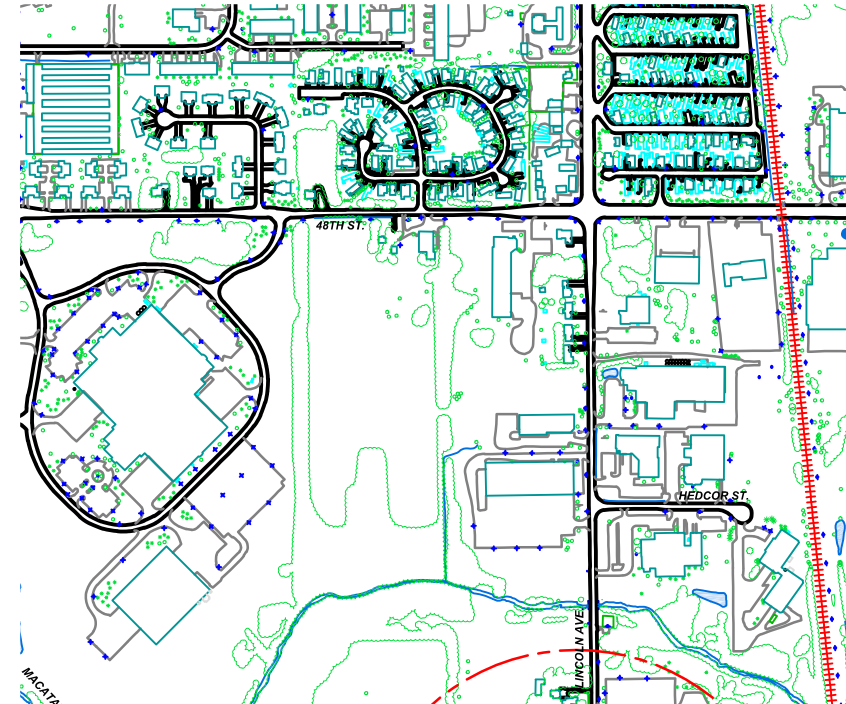
	EXISTING 1	EXISTING 2	EXISTING 3
DESCRIPTION	HOLD APRON	HANGAR APRON	HANGAR APRON
SIZE	260' x 270'	876' x 278'	350' x 148'

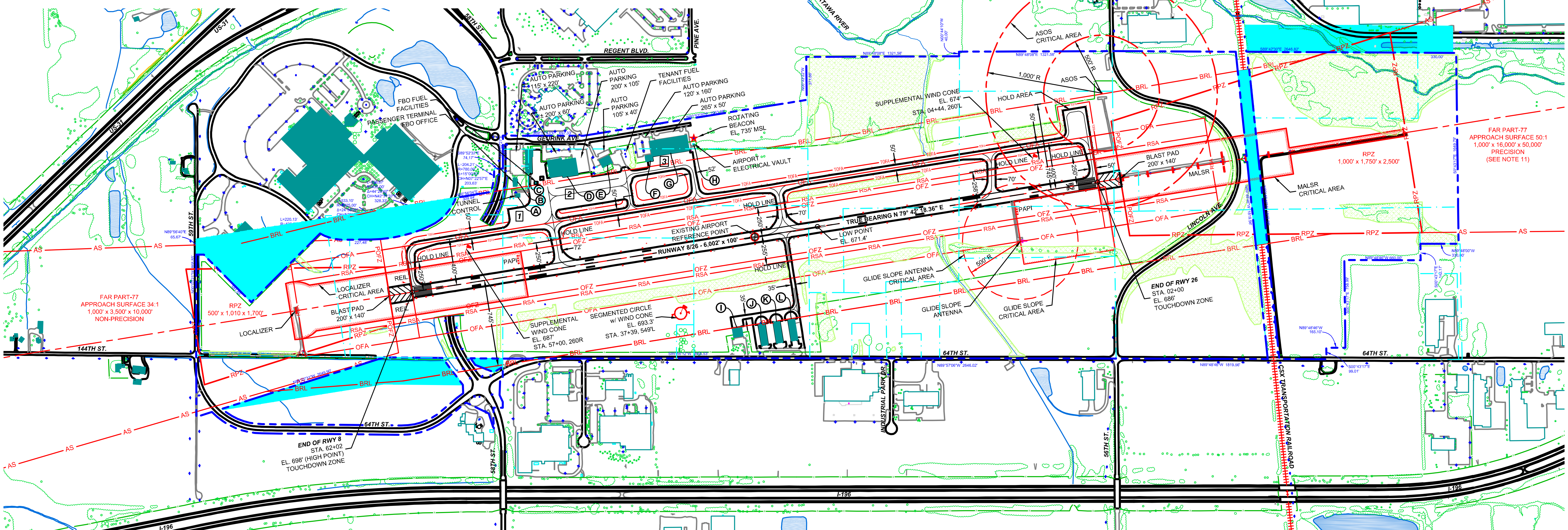
LEGEND

EXISTING	ITEM
	BUILDINGS
	TREES AND TREE LINES
	FENCE LINES
	ROADS
	RAILROAD
	WETLANDS
	RIVERS, LAKES, COUNTY DRAINS
	GROUND CONTOURS
	WIND CONE
	ROTATING BEACON
	RUNWAY / TAXIWAY LIGHTING
	POWER POLE
	AIRPORT PROPERTY LINE
	PROPERTY PARCELS
	SECTION LINES
	AVIGATION EASEMENT
	RUNWAYS, TAXIWAYS, PARKING
	RUNWAY MARKINGS
	CENTERLINES
RPZ	RUNWAY PROTECTION ZONE
RSA	RUNWAY SAFETY AREA
OFA	OBJECT FREE AREA
OFZ	OBSTACLE FREE ZONE
BRL	BUILDING RESTRICTION LINE
AS	APPROACH SURFACE
TOFA	TAXIWAY OBJECT FREE AREA

GENERAL NOTES:

1. AIRPORT PROPERTY IS LOCATED WITHIN SECTIONS 7, 8, 9, 16, 17, and 18 OF FILLMORE TOWNSHIP, ALLEGAN COUNTY, MICHIGAN (T.4N-R.15W) WITHIN THE CITY OF HOLLAND POLITICAL JURISDICTION.
2. AERIAL PHOTOGRAPHY AND BASE INFORMATION PROVIDED BY **WOOLPERT, LLP**. DATE OF PHOTOGRAPHY: 5/5/09.
3. AN AIRPORT PROPERTY LINE SURVEY PROVIDED BY **NEDERVELD, INC.** DATE OF SURVEY: 5/27/09.
4. THE NORTH MAGNETIC DECLINATION WAS CALCULATED USING INFORMATION FOUND ON **WWW.NGDC.NOAA.GOV/SEG/GEOMAG/DECLINATION**. THESE CALCULATED FIGURES ARE BASED ON THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD MODEL, VERSION 10 (2005-2010). DECLINATION AND VARIANCE CALCULATED: 05/26/11.
5. THE AIRPORT IS CLASSIFIED AS AN AIRPLANE DESIGN GROUP II; HOWEVER, SEVERAL TAXIWAYS ARE CONSTRUCTED USING AIRPLANE DESIGN GROUP III STANDARDS.
6. CONTACT "MISS DIG" PRIOR TO ANY CONSTRUCTION TO DETERMINE THE LOCATION OF BELOW GROUND UTILITIES.
7. MORE DETAILED EXISTING BUILDING INFORMATION IS SHOWN ON BUILDING AREA PLAN, PAGE 6.
8. HEIGHT OF PERIMETER FENCE VARIES AND SHOULD BE CONFIRMED WITH AIRPORT SPONSOR REGARDING HEIGHTS AT SPECIFIC LOCATIONS.
9. THE SYMBOLS SHOWN ARE SMALL DUE TO SCALE; HOWEVER, THEY ARE LEGIBLE IN THE ELECTRONIC FILE
10. THE EXISTING RWY 8 APPROACH SURFACE INNER WIDTH DIMENSION CORRESPONDS TO THE WIDTH OF THE PRIMARY SURFACE WHICH IS REGULATED BY THE RWY 26 APPROACH SURFACE DIMENSIONS.
11. THE RUNWAY 26 APPROACH SURFACE SLOPE IS 50:1 FOR THE FIRST 10,000 FT. AND THEN 40:1 FOR THE FINAL 40,000 FT.





AIRPORT REFERENCE POINT

	EXISTING
LATITUDE (LAT.)	42° 44' 34.02"
LONGITUDE (LONG.)	86° 06' 28.18"
ELEVATION (EL.)	698'
STATION (STA.)	32+01
OFFSET FROM RUNWAY 8/26	0'

1 INCH = 400 FEET
0 200 400 800

MAGNETIC DECLINATION:
5° 0' W, 0° 4' W
PER YEAR AS OF 05/26/11

REVISIONS

NO.	DATE	REMARKS	BY	CHK
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WEST MICHIGAN REGIONAL AIRPORT
HOLLAND, MI

AIRPORT LAYOUT PLAN
EXISTING AIRPORT LAYOUT PLAN

Mead & Hunt
2605 PORT LANSING ROAD
LANSING, MICHIGAN 48906
517.321.8334 - 517.321.5932 FAX

STATE ID. NO.	M&H PROJECT NO. — 08199-00-09001	DESIGNED	SADW	5/11
03-07	FEDERAL CONTRACT NO. — n/a	DRAWN	AEF	5/11
	STATE CONTRACT NO. — B-26-0045-3006	CHECKED	SADW	5/11

SHEET: 3 OF 14

IF PAPER SIZE IS 24"x36" USE SCALE SHOWN. ALL OTHER PAPER SIZES ARE NOT TO SCALE.

RUNWAY SAFETY AREA

	FUTURE 8	FUTURE 26	FUTURE 18	FUTURE 36
RUNWAY PROTECTION ZONE (RPZ)	1,000' x 1,750' x 2,500'	1,000' x 1,750' x 2,500'	500' x 700' x 1,000'	500' x 700' x 1,000'
FAR PART-77 APPROACH SURFACE	1,000' x 16,000' x 50,000'	1,000' x 16,000' x 50,000'	500' x 1,500' x 5,000'	500' x 1,500' x 5,000'
RUNWAY SAFETY AREA (RSA)	1,000' x 500'	1,000 x 500'	300' x 150'	300' x 150'
OBJECT FREE AREA (OFA)	1,000' x 800'	1,000' x 800'	300' x 500'	300' x 500'
OBSTACLE FREE ZONE (OFZ)	200' x 400'	200' x 400'	200' x 250'	200' x 250'
PRECISION OBSTACLE FREE ZONE* (POFZ)	200' x 800'	200' x 800'	N/A	N/A

NOTE:
*THE PRECISION OBSTACLE FREE ZONE IS IN EFFECT ONLY WHEN ALL OF THE FOLLOWING OPERATIONAL CONDITIONS ARE MET:
1. VERTICAL GUIDED APPROACH
2. REPORTED CEILING BELOW 250 FEET AND/OR VISIBILITY LESS THAN 3/4 STATUTE MILE (OR RVR BELOW 4,000 FEET)
3. AN AIRCRAFT ON FINAL APPROACH WITHIN TWO MILES OF THE RUNWAY THRESHOLD

RUNWAY DATA

	FUTURE 8	FUTURE 26	FUTURE 18	FUTURE 36
LATITUDE (LAT.)	42° 44' 27.84" N	42° 44' 39.31" N	42° 45' 03.92" N	42° 44' 29.48" N
LONGITUDE (LONG.)	86° 07' 14.34" W	86° 05' 48.61" W	86° 06' 00.97" W	86° 05' 56.77" W
ELEVATION (EL.)	698'	686'	672'	672'
STATION (STA.)	67+02	02+00	100+00	135+00
BEARING	N 79° 42' 18.36" E	N 79° 42' 18.36" E	N 174° 51' 36" E	N 174° 51' 36" E
APPROACH TYPE	PRECISION	PRECISION	VISUAL	VISUAL
TOUCHDOWN ZONE LATITUDE (LAT.)	42° 44' 27.84" N	42° 44' 39.31" N	42° 45' 03.92" N	42° 44' 29.48" N
TOUCHDOWN ZONE LONGITUDE (LONG.)	86° 07' 14.34" W	86° 05' 48.61" W	86° 06' 00.97" W	86° 05' 56.77" W
TOUCHDOWN ZONE ELEVATION (EL.)	698'	686'	672'	672'

APRON DATA

	EXISTING 1	EXISTING 2	EXISTING 3	FUTURE 4
DESCRIPTION	HOLD APRON	HANGAR APRON	HANGAR APRON	TERMINAL APRON
SIZE	260' x 270'	876' x 278'	350' x 148'	775' x 370'

DIMENSIONAL INFORMATION

	FUTURE 8	FUTURE 26	FUTURE 18	FUTURE 36
RUNWAY LENGTH	6,502'	6,502'	3,500'	3,500'
RUNWAY WIDTH	100'	100'	75'	75'
RUNWAY SHOULDER WIDTH	0'	0'	0'	0'
TAXIWAY WIDTH	VARIES	VARIES	VARIES	VARIES
TAXIWAY EDGE SAFETY MARGIN	7.5'	7.5'	7.5'	7.5'
TAXIWAY SHOULDER WIDTH	0'	0'	0'	0'
TAXIWAY SAFETY AREA WIDTH	79'	79'	79'	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'	131'	131'	131'
RUNWAY CENTERLINE TO TAXIWAY HOLD LINE	250'	250'	250'	250'
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE LENGTH	400'	400'	300'	300'
RUNWAY CENTERLINE TO BUILDING RESTRICTION LINE LENGTH	745'	745'	495	495

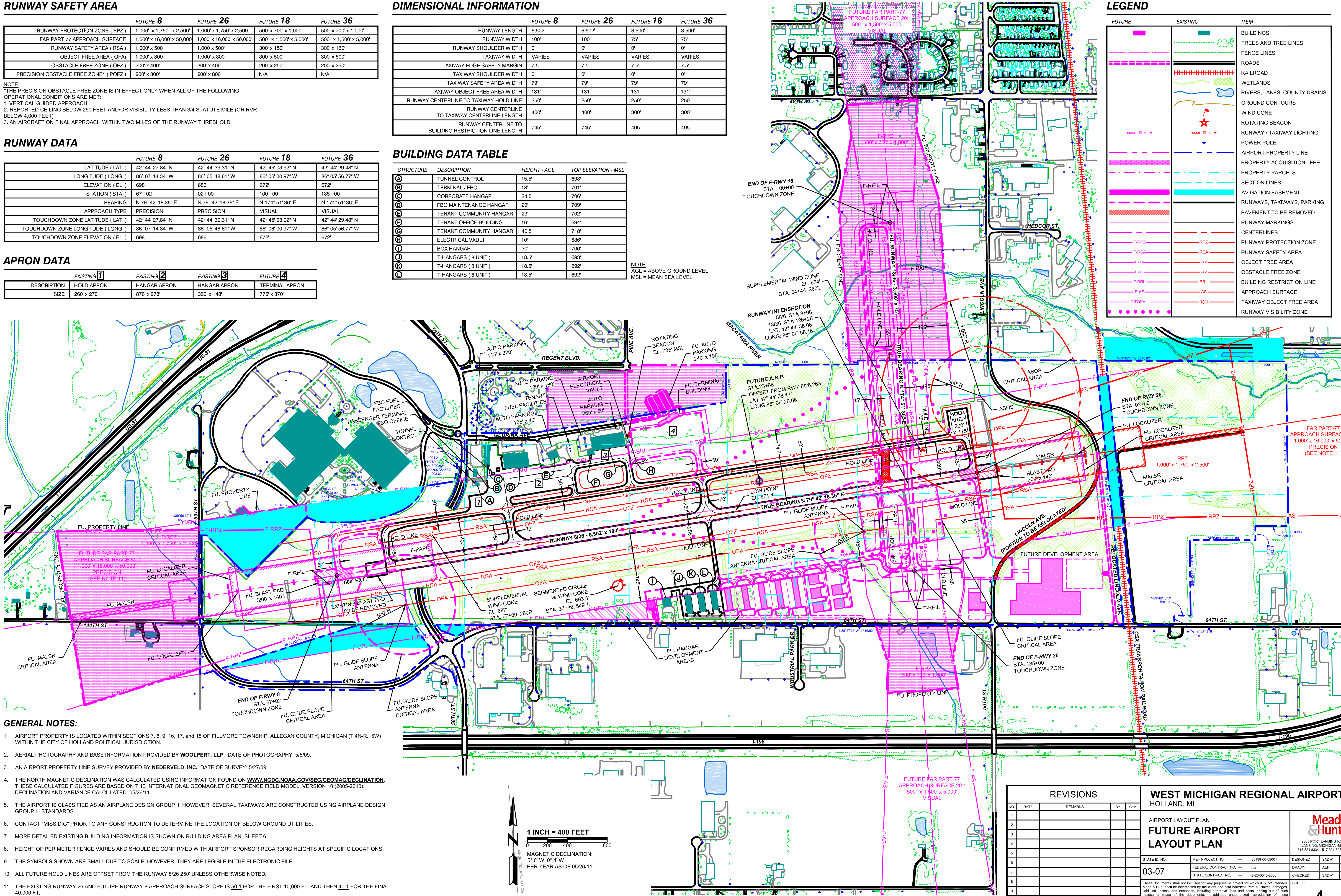
BUILDING DATA TABLE

STRUCTURE	DESCRIPTION	HEIGHT - AGL	TOP ELEVATION - MSL
(A)	TUNNEL CONTROL	15.5'	698'
(B)	TERMINAL / FBO	18'	701'
(C)	CORPORATE HANGAR	24.5'	706'
(D)	FBO MAINTENANCE HANGAR	29'	709'
(E)	TENANT COMMUNITY HANGAR	23'	702'
(F)	TENANT OFFICE BUILDING	16'	694'
(G)	TENANT COMMUNITY HANGAR	40.5'	718'
(H)	ELECTRICAL VAULT	10'	686'
(I)	BOX HANGAR	30'	706'
(J)	T-HANGARS (8 UNIT)	18.5'	693'
(K)	T-HANGARS (8 UNIT)	18.5'	692'
(L)	T-HANGARS (8 UNIT)	18.5'	692'

NOTE:
AGL = ABOVE GROUND LEVEL
MSL = MEAN SEA LEVEL

LEGEND

FUTURE	EXISTING	ITEM
		BUILDINGS
		TREES AND TREE LINES
		FENCE LINES
		ROADS
		RAILROAD
		WETLANDS
		RIVERS, LAKES, COUNTY DRAINS
		GROUND CONTOURS
		WIND CONE
		ROTATING BEACON
		RUNWAY / TAXIWAY LIGHTING
		POWER POLE
		AIRPORT PROPERTY LINE
		PROPERTY ACQUISITION - FEE
		PROPERTY PARCELS
		SECTION LINES
		AVIGATION EASEMENT
		RUNWAYS, TAXIWAYS, PARKING
		PAVEMENT TO BE REMOVED
		RUNWAY MARKINGS
		CENTERLINES
F-RPZ	RPZ	RUNWAY PROTECTION ZONE
F-RSA	RSA	RUNWAY SAFETY AREA
F-OFA	OFA	OBJECT FREE AREA
F-OFZ	OFZ	OBSTACLE FREE ZONE
F-BRL	BRL	BUILDING RESTRICTION LINE
F-AS	AS	APPROACH SURFACE
F-TOFA	TOFA	TAXIWAY OBJECT FREE AREA
		RUNWAY VISIBILITY ZONE



GENERAL NOTES:

1. AIRPORT PROPERTY IS LOCATED WITHIN SECTIONS 7, 8, 9, 16, 17, and 18 OF FILLMORE TOWNSHIP, ALLEGAN COUNTY, MICHIGAN (T.4N-R.15W) WITHIN THE CITY OF HOLLAND POLITICAL JURISDICTION.
2. AERIAL PHOTOGRAPHY AND BASE INFORMATION PROVIDED BY **WOOLPERT, LLP.** DATE OF PHOTOGRAPHY: 5/5/09.
3. AN AIRPORT PROPERTY LINE SURVEY PROVIDED BY **NEDERVELD, INC.** DATE OF SURVEY: 5/27/09.
4. THE NORTH MAGNETIC DECLINATION WAS CALCULATED USING INFORMATION FOUND ON **WWW.NGDC.NOAA.GOV/SEG/GEOMAG/DECLINATION**. THESE CALCULATED FIGURES ARE BASED ON THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD MODEL, VERSION 10 (2005-2010). DECLINATION AND VARIANCE CALCULATED: 05/26/11.
5. THE AIRPORT IS CLASSIFIED AS AN AIRPLANE DESIGN GROUP II; HOWEVER, SEVERAL TAXIWAYS ARE CONSTRUCTED USING AIRPLANE DESIGN GROUP III STANDARDS.
6. CONTACT "MISS DIG" PRIOR TO ANY CONSTRUCTION TO DETERMINE THE LOCATION OF BELOW GROUND UTILITIES.
7. MORE DETAILED EXISTING BUILDING INFORMATION IS SHOWN ON BUILDING AREA PLAN, SHEET 6.
8. HEIGHT OF PERIMETER FENCE VARIES AND SHOULD BE CONFIRMED WITH AIRPORT SPONSOR REGARDING HEIGHTS AT SPECIFIC LOCATIONS.
9. THE SYMBOLS SHOWN ARE SMALL DUE TO SCALE; HOWEVER, THEY ARE LEGIBLE IN THE ELECTRONIC FILE.
10. ALL FUTURE HOLD LINES ARE OFFSET FROM THE RUNWAY 8/26 250' UNLESS OTHERWISE NOTED.
11. THE EXISTING RUNWAY 26 AND FUTURE RUNWAY 8 APPROACH SURFACE SLOPE IS 50:1 FOR THE FIRST 10,000 FT. AND THEN 40:1 FOR THE FINAL 40,000 FT.

March 22, 2013 - BIV_03-07_Tulip City Airport ALP.dwg

IF PAPER SIZE IS 24"x36" USE SCALE SHOWN. ALL OTHER PAPER SIZES ARE NOT TO SCALE.

REVISIONS

NO.	DATE	REMARKS	BY	CHK
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WEST MICHIGAN REGIONAL AIRPORT
HOLLAND, MI

AIRPORT LAYOUT PLAN
FUTURE AIRPORT LAYOUT PLAN

Mead & Hunt
2605 PORT LANSING ROAD
LANSING, MICHIGAN 48906
517.321.8334 - 517.321.5932 FAX

STATE ID. NO.			DESIGNED	SADW	5/11
03-07	M&H PROJECT NO. —	08199-00-09001			
	FEDERAL CONTRACT NO. —	n/a	DRAWN	AEF	5/11
	STATE CONTRACT NO. —	B-26-0045-3006	CHECKED	SADW	5/11

GENERAL NOTES:

1. AIRPORT PROPERTY IS LOCATED WITHIN SECTIONS 7, 8, 9, 16, 17, and 18 OF FILLMORE TOWNSHIP, ALLEGAN COUNTY, MICHIGAN (T.4N-R.15W) WITHIN THE CITY OF HOLLAND POLITICAL JURISDICTION.
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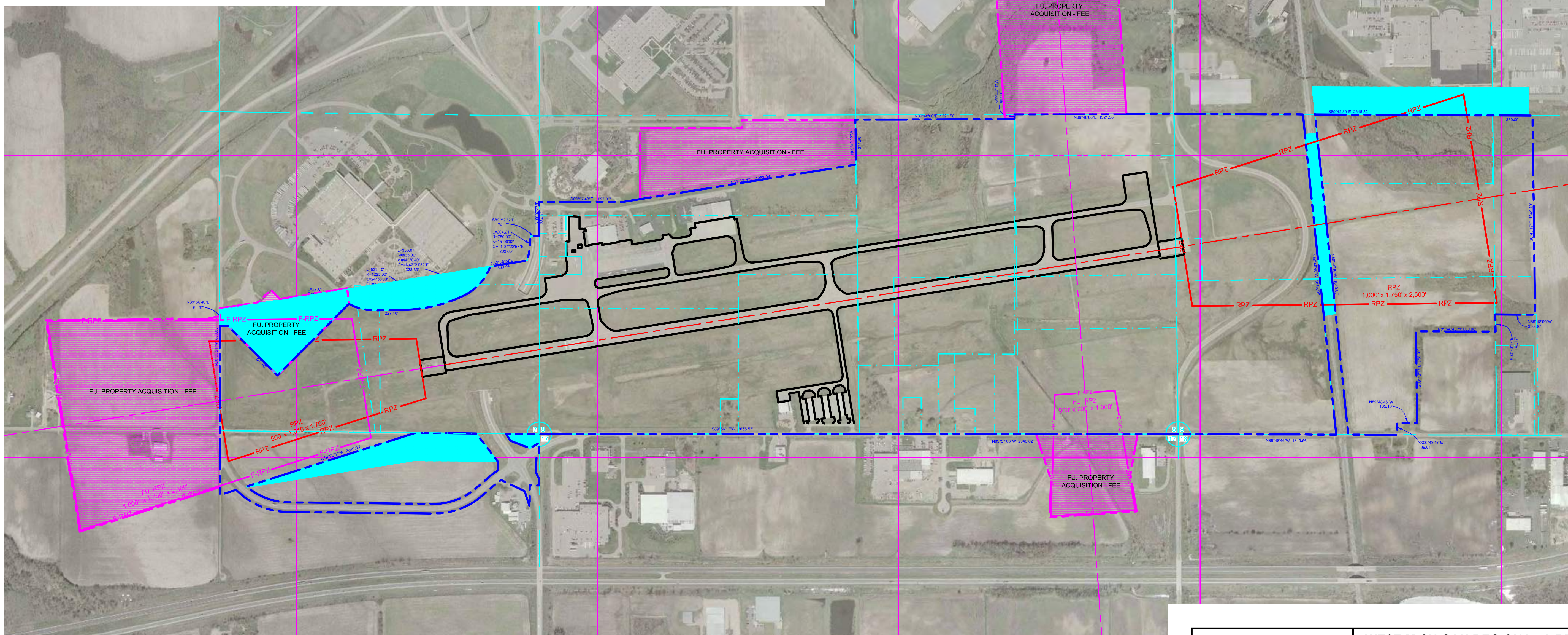
LEGEND

FUTURE	EXISTING	ITEM
		AIRPORT PROPERTY LINE
		PROPERTY PARCELS
		SECTION LINES
		PROPERTY ACQUISITION - FEE
		AVIGATION EASEMENT
		RUNWAYS, TAXIWAYS, PARKING
		CENTERLINES
F-RPZ	RPZ	RUNWAY PROTECTION ZONE
		RUNWAY VISIBILITY ZONE

1 INCH = 400 FEET
0 200 400 800

MAGNETIC DECLINATION:
5° 0' W, 0° 4' W
PER YEAR AS OF 05/26/11



REVISIONS				
NO.	DATE	REMARKS	BY	CHK
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WEST MICHIGAN REGIONAL AIRPORT
HOLLAND, MI

AIRPORT LAYOUT PLAN
AERIAL PLAN

Mead & Hunt
2605 PORT LANSING ROAD
LANSING, MICHIGAN 48906
517.321.8334 - 517.321.5932 FAX

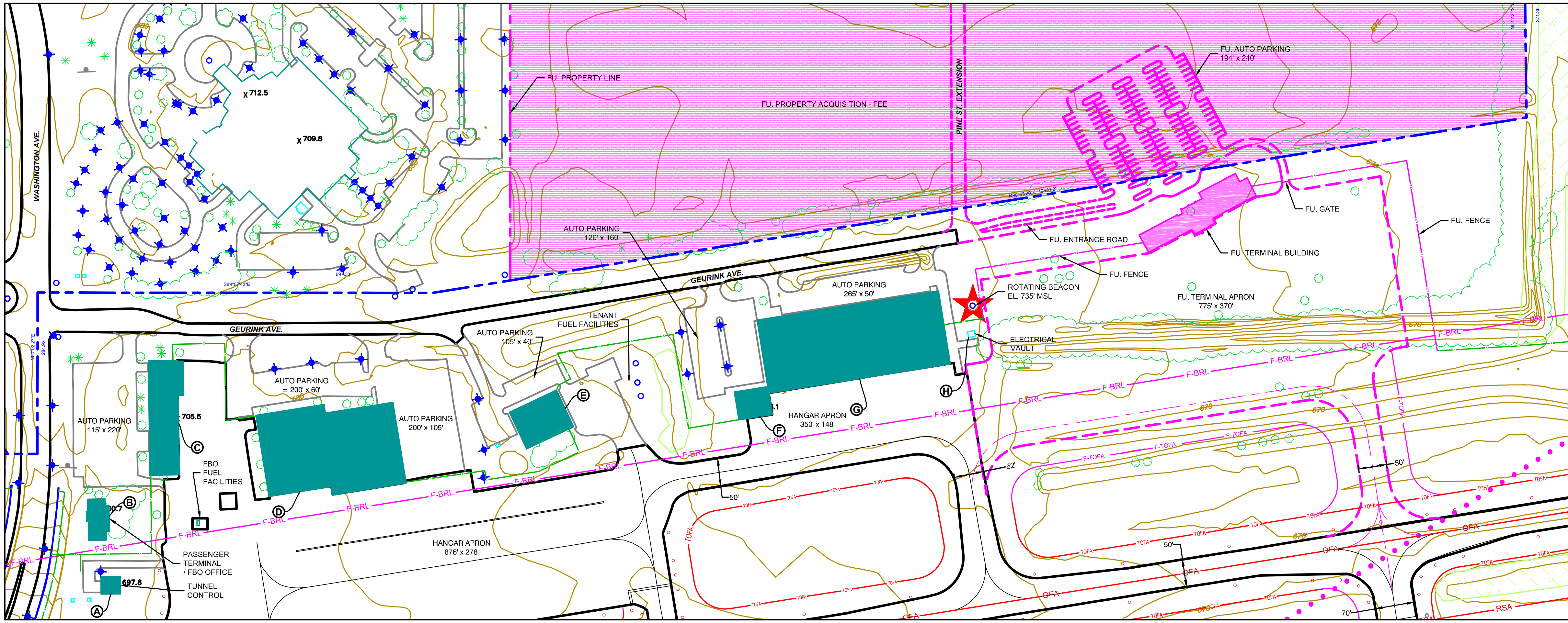
STATE ID. NO.	M&H PROJECT NO. — 08199-00-09001	DESIGNED	SADW	5/11
03-07	FEDERAL CONTRACT NO. — n/a	DRAWN	AEF	5/11
	STATE CONTRACT NO. — B-26-0045-3006	CHECKED	SADW	5/11

IF PAPER SIZE IS 24"x36" USE SCALE SHOWN. ALL OTHER PAPER SIZES ARE NOT TO SCALE.

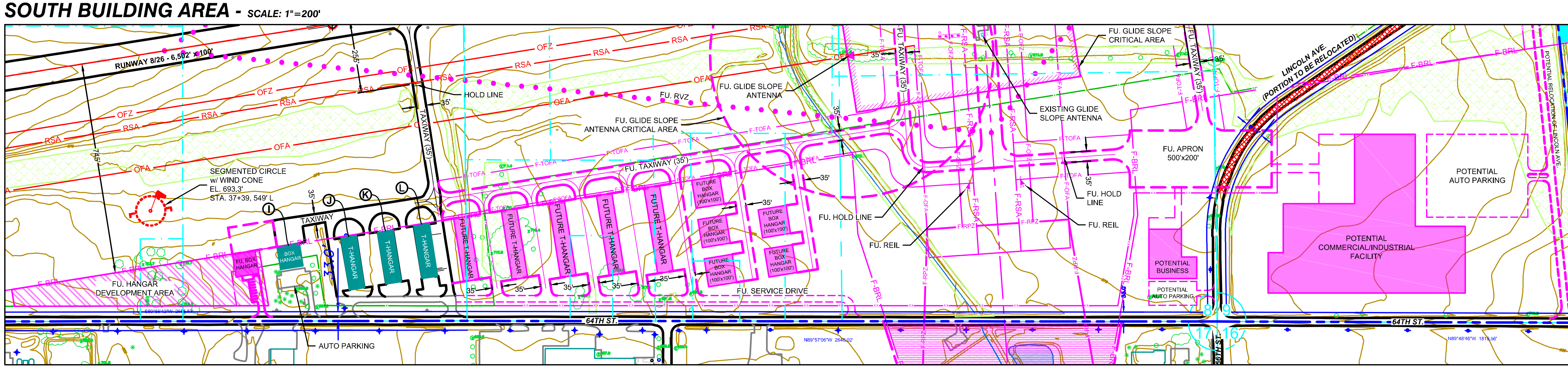
GENERAL NOTES:

1. AIRPORT PROPERTY IS LOCATED WITHIN SECTIONS 7, 8, 9, 16, 17, and 18 OF FILLMORE TOWNSHIP, ALLEGAN COUNTY, MICHIGAN (T.4N-R.15W) WITHIN THE CITY OF HOLLAND POLITICAL JURISDICTION.
2. AERIAL PHOTOGRAPHY AND BASE INFORMATION PROVIDED BY **WOOLPERT, LLP.** DATE OF PHOTOGRAPHY: 5/5/09.
3. AN AIRPORT PROPERTY LINE SURVEY PROVIDED BY **NEDERVELD, INC.** DATE OF SURVEY: 5/27/09.
4. THE NORTH MAGNETIC DECLINATION WAS CALCULATED USING INFORMATION FOUND ON **WWW.NGDC.NOAA.GOV/SEG/GEOMAG/DECLINATION**. THESE CALCULATED FIGURES ARE BASED ON THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD MODEL, VERSION 10 (2005-2010). DECLINATION AND VARIANCE CALCULATED: 05/26/11.
5. THE AIRPORT IS CLASSIFIED AS AN AIRPLANE DESIGN GROUP II; HOWEVER, SEVERAL TAXIWAYS ARE CONSTRUCTED USING AIRPLANE DESIGN GROUP III STANDARDS.
6. CONTACT "MISS DIG" PRIOR TO ANY CONSTRUCTION TO DETERMINE THE LOCATION OF BELOW GROUND UTILITIES.
7. HEIGHT OF PERIMETER FENCE VARIES AND SHOULD BE CONFIRMED WITH AIRPORT SPONSOR REGARDING HEIGHTS AT SPECIFIC LOCATIONS.
8. THE SYMBOLS SHOWN ARE SMALL DUE TO SCALE; HOWEVER, THEY ARE LEGIBLE IN THE ELECTRONIC FILE.

NORTH BUILDING AREA - *SCALE: 1"=100'*



SOUTH BUILDING AREA - *SCALE: 1"=200'*



LEGEND

FUTURE	EXISTING	ITEM
		BUILDINGS
		TREES AND TREE LINES
		FENCE LINES
		ROADS
		RAILROAD
		WETLANDS
		RIVERS, LAKES, COUNTY DRAINS
		GROUND CONTOURS
		WIND CONE
		ROTATING BEACON
		RUNWAY / TAXIWAY LIGHTING
		POWER POLE
		AIRPORT PROPERTY LINE
		PROPERTY ACQUISITION - FEE
		PROPERTY PARCELS
		SECTION LINES
		AVIGATION EASEMENT
		RUNWAYS, TAXIWAYS, PARKING
		PAVEMENT TO BE REMOVED
		RUNWAY MARKINGS
		CENTERLINES
F-RPZ	RPZ	RUNWAY PROTECTION ZONE
F-RSA	RSA	RUNWAY SAFETY AREA
F-OFA	OFA	OBJECT FREE AREA
F-OFZ	OFZ	OBSTACLE FREE ZONE
F-BRL	BRL	BUILDING RESTRICTION LINE
F-AS	AS	APPROACH SURFACE
F-TOFA	TOFA	TAXIWAY OBJECT FREE AREA
		RUNWAY VISIBILITY ZONE

BUILDING DATA TABLE

STRUCTURE	DESCRIPTION	HEIGHT - AGL	TOP ELEVATION - MSL
Ⓐ	TUNNEL CONTROL	15.5'	698'
Ⓑ	TERMINAL / FBO	18'	701'
Ⓒ	CORPORATE HANGAR	24.5'	706'
Ⓓ	FBO MAINTENANCE HANGAR	29'	709'
Ⓔ	TENANT COMMUNITY HANGAR	23'	702'
Ⓕ	TENANT OFFICE BUILDING	16'	694'
Ⓖ	TENANT COMMUNITY HANGAR	40.5'	718'
Ⓗ	ELECTRICAL VAULT	10'	686'
Ⓘ	BOX HANGAR	30'	706'
Ⓙ	T-HANGARS (8 UNIT)	18.5'	693'
Ⓚ	T-HANGARS (8 UNIT)	18.5'	692'
Ⓛ	T-HANGARS (8 UNIT)	18.5'	692'

NOTE:
AGL = ABOVE GROUND LEVEL
MSL = MEAN SEA LEVEL

MAGNETIC DECLINATION:
5° 0' W, 0° 4' W
PER YEAR AS OF 05/26/11

REVISIONS

NO.	DATE	REMARKS	BY	CHK
1				
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WEST MICHIGAN REGIONAL AIRPORT
HOLLAND, MI

AIRPORT LAYOUT PLAN
BUILDING AREA PLAN

Mead & Hunt
2605 PORT LANSING ROAD
LANSING, MICHIGAN 48906
517.321.8334 - 517.321.5932 FAX

STATE ID. NO.				
03-07	M&H PROJECT NO. — 08199-00-09001	DESIGNED	SADW	5/11
	FEDERAL CONTRACT NO. — n/a	DRAWN	AEF	5/11
	STATE CONTRACT NO. — B-26-0045-3006	CHECKED	SADW	5/11

IF PAPER SIZE IS 24"x36" USE SCALE SHOWN. ALL OTHER PAPER SIZES ARE NOT TO SCALE.

EXISTING LAND INTERESTS

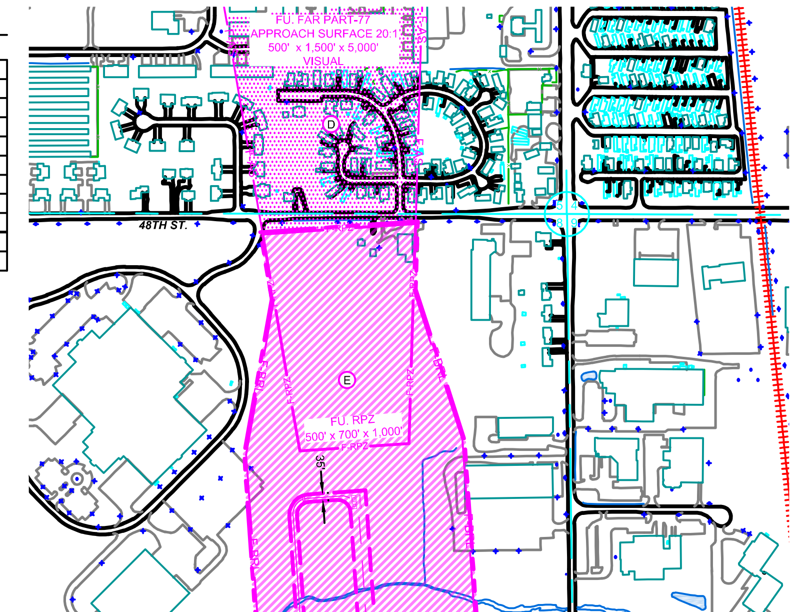
NO.	DESCRIPTION	ACRES	DATE ACQUIRED	FEDERAL PROJECT #	GRANTORS	NOTES
1						
E2	AVIGATION EASEMENT	0	10-28-1986	3-26-0045-0185	PRINCE CORP.	1
3	WARRANTY DEED	15.3	10-28-1986	3-26-0045-0185	PRINCE CORP.	
4	WARRANTY DEED	36.69	10-28-1986	3-26-0045-0185	TULIP CITY AIRPORT	
5	WARRANTY DEED	0.57	10-28-1986	3-26-0045-0185	PRINCE CORP.	
6	WARRANTY DEED	0.39	10-28-1986	3-26-0045-0185	TULIP CITY AIRPORT	
7	WARRANTY DEED	0.39	10-28-1986	3-26-0045-0185	PRINCE CORP.	
8	DECLARATION OF TAKING	1.2	6-14-1989	3-26-0045-0487	R. HEIDEN	
9	WARRANTY DEED	36.42	10-28-1986	3-26-0045-0185	PRINCE CORP.	
10	WARRANTY DEED	30.0	10-28-1986	3-26-0045-0185	PRINCE CORP.	
11	WARRANTY DEED	43.77	10-28-1986	3-26-0045-0185	TULIP CITY AIRPORT	
12	WARRANTY DEED	24.1	7-14-1987	3-26-0045-0286	AD-GO CORP.	
13	WARRANTY DEED	9.8	10-28-1986	3-26-0045-0185	PRINCE CORP.	
14	WARRANTY DEED	30.0	12-8-1987	3-26-0045-0286	R. HOMKES	
15	DECLARATION OF TAKING	13.3	8-5-1988	3-26-0045-0487	G. OETMAN	
E16	AVIGATION EASEMENT	7.9	12-18-1986	3-26-0045-0286	HAWORTH, INC.	
E17	AVIGATION EASEMENT	0.3	12-18-1986 / 4-29-1987	3-26-0045-0286	HAWORTH, INC./B. JACOBS	
18	DECLARATION OF TAKING	52.51	1-17-1988	3-26-0045-0286	G. SCHOLTEN	
19	DECLARATION OF TAKING	1.71	7-5-1988	3-26-0045-0286	M. BLOEMERS/R. TAR HAAR	
20	DECLARATION OF TAKING	63.4	7-5-1988	3-26-0045-0487	A. OVERBEEK	
21	WARRANTY DEED	34.0	9-10-1987	3-26-0045-0487	D. KONING	
22	WARRANTY DEED	2.46	11-23-1987	3-26-0045-0487	PET LIFE FOODS, INC.	
E23	AVIGATION EASEMENT	3.42	11-9-1988	3-26-0045-0487	CSX TRANS., INC.	
24	WARRANTY DEED	1.0	7-17-1990	3-26-0045-0589	P. SYTSMA	
E25	AVIGATION EASEMENT	5.3	10-11-1990	3-26-0045-0487	J. PIERS	2
E26	AVIGATION EASEMENT	0	10-28-1986	3-26-0045-0185	PRINCE CORP.	1
27	DECLARATION OF TAKING	7.58	9-5-1990	3-26-0045-0589	F. HOMKES	
28	WARRANTY DEED	1.0	12-6-1989	3-26-0045-0589	C. LEMS	
29	WARRANTY DEED	2.0	6-28-1990	3-26-0045-0589	S. BAUMAN	
30	WARRANTY DEED	0.68	6-20-1990	3-26-0045-0589	S. McNEAL	
31A	WARRANTY DEED	8.32	10-5-1992	3-26-0045-0691	B. HULST	
31B	WARRANTY DEED	26.0	10-5-1992	3-26-0045-0691	AIRPORT CENTRE PARTNERS	1
32	WARRANTY DEED	60.62	10-27-03	C-26-0045-1601	JOHNSON CONTROL INC.	
E33	DECLARATION OF TAKING	2.09	3-19-2003 / 4-30-2003	C-26-0045-1601	PIERS	
34	WARRANTY DEED	0.32	10-27-2003	C-26-0045-1601	JOHNSON CONTROL INC.	
E35	AVIGATION EASEMENT	14.53	10-27-2003	C-26-0045-1601	JCI - COTTONWOOD	
36	DECLARATION OF TAKING	17.43	3-19-2003 / 4-30-2003	C-26-0045-1601	PIERS	2,3
TOTAL FEE PROPERTY INTERESTS =	520.96 ACRES±					
TOTAL EASEMENT INTERESTS =	33.32 ACRES±					

NOTES:

1. EASEMENT E2 (37.42 ac.) AND E26 (3.50 ac.) ARE NOW PART OF THE NEW PARCEL 32.
2. PART OF EASEMENT E25 IS NOW INCORPORATED INTO PARCEL 36.
3. PARCEL 36 HAS TWO CLEAR VISION EASEMENT LAYING WITHIN THE PARCEL.

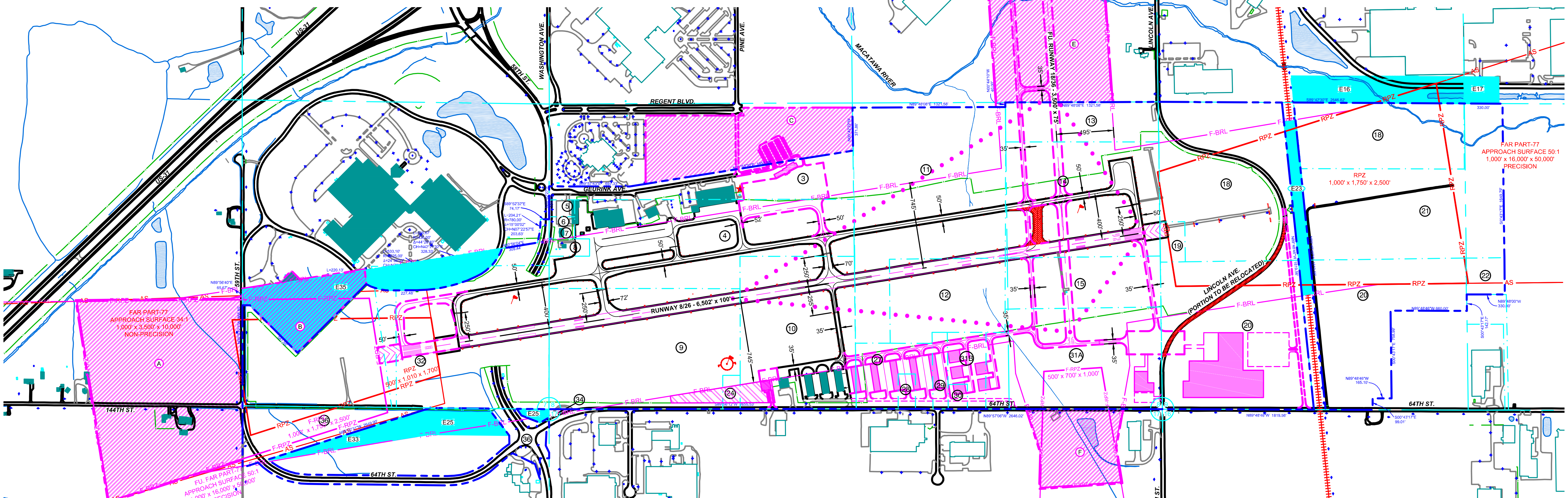
GENERAL NOTES:

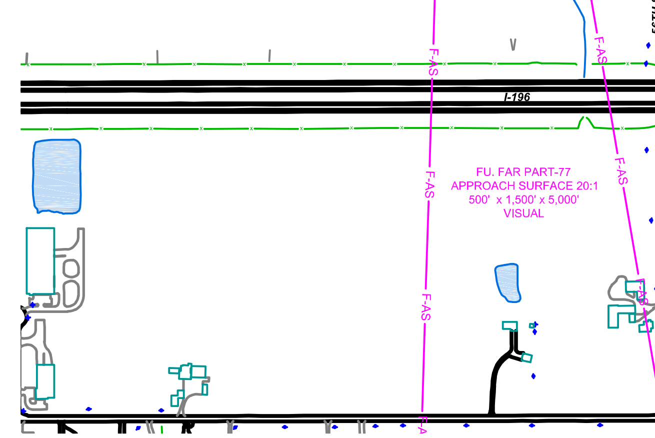
- NO ABOVE GROUND STRUCTURES PERMITTED WITHOUT CITY OF HOLLAND (GRANTEE) APPROVAL.
- A TITLE SEARCH WAS NOT CONDUCTED AS PART OF THIS ALP UPDATE.
- SEE THE EXHIBIT "A" PROPERTY MAP FOR ADDITIONAL INFORMATION.



LEGEND

FUTURE	EXISTING	ITEM
		BUILDINGS
		FENCE LINES
		ROADS
		RAILROAD
		RIVERS, LAKES, COUNTY DRAINS
		WIND CONE
		ROTATING BEACON
		RUNWAY / TAXIWAY LIGHTING
		POWER POLE
		AIRPORT PROPERTY LINE
		PROPERTY ACQUISITION - FEE
		PROPERTY PARCELS
		SECTION LINES
		AVIGATION EASEMENT
		RUNWAYS, TAXIWAYS, PARKING
		PAVEMENT TO BE REMOVED
		RUNWAY MARKINGS
		CENTERLINES
F-RPZ	RPZ	RUNWAY PROTECTION ZONE
F-BRL		BUILDING RESTRICTION LINE
F-AS	AS	APPROACH SURFACE
		RUNWAY VISIBILITY ZONE





EXISTING RUNWAY DATA

	EXISTING 8	EXISTING 26
LATITUDE (LAT.)	42° 44' 28.73" N	42° 44' 39.31" N
LONGITUDE (LONG.)	86° 07' 07.75" W	86° 05' 48.61" W
ELEVATION (EL.)	698'	686'
STATION (STA.)	62+02	02+00
BEARING	N 79° 42' 18.36" E	N 79° 42' 18.36" E
APPROACH TYPE	NON-PRECISION	PRECISION

EXISTING EASEMENTS

	DESCRIPTION	ACRES	DATE ACQUIRED	FEDERAL PROJECT NUMBER	GRANTORS
E16	AVIGATION EASEMENT	7.9	12-18-86	3-26-0045-0286	HAWORTH, INC.
E17	AVIGATION EASEMENT	0.3	12-18-86, 4-29-87	3-26-0045-0286	HAWORTH, INC. & B. JACOBS
E23	AVIGATION EASEMENT	3.42	11-9-88	3-26-0045-0487	CSX TRANS., INC.
E25	AVIGATION EASEMENT	5.3	10-11-90	3-26-0045-0487	J. PIERS
E33	AVIGATION EASEMENT	2.09	3-19-03, 4-30-03	C-26-0045-1601	J. PIERS
E35	AVIGATION EASEMENT	14.53	10-27-03	C-26-0045-1601	J. PIERS
	TOTAL EASEMENTS =	33.32 ACRES±			

FUTURE RUNWAY DATA

	FUTURE 8	FUTURE 26	FUTURE 18	FUTURE 36
LATITUDE (LAT.)	42° 44' 27.84" N	42° 44' 39.31" N	42° 45' 03.92" N	42° 44' 29.48" N
LONGITUDE (LONG.)	86° 07' 14.34" W	86° 05' 48.61" W	86° 06' 00.97" W	86° 05' 56.77" W
ELEVATION (EL.)	698'	686'	672'	672'
STATION (STA.)	67+02	02+00	100+00	135+00
BEARING	N 79° 42' 18.36" E	N 79° 42' 18.36" E	N 174° 51' 36" E	N 174° 51' 36" E
APPROACH TYPE	PRECISION	PRECISION	VISUAL	VISUAL

FUTURE EASEMENTS AND LAND ACQUISITION

	DESCRIPTION	ACRES
A	LAND AQCUISITION	47.7
B	LAND ACQUISITION	9.3
C	LAND ACQUISITION	19.8
D	AVIGATION EASEMENT	18.5
E	LAND ACQUISITION	55.1
F	LAND ACQUISITION	11.0
	TOTAL FUTURE LAND INTERESTS =	161.4

1 INCH = 400 FEET

0 200 400 800

MAGNETIC DECLINATION:
5° 0' W, 0° 4' W
PER YEAR AS OF 05/26/11

REVISIONS

NO.	DATE	REMARKS	BY	CHK
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WEST MICHIGAN REGIONAL AIRPORT

HOLLAND, MI

AIRPORT LAYOUT PLAN

PROPERTY PLAN

Mead & Hunt
2605 PORT LANSING ROAD
LANSING, MICHIGAN 48906
517.321.8334 - 517.321.5932 FAX

STATE ID. NO.	M&H PROJECT NO. — 08199-00-09001	DESIGNED	SADW	5/11
03-07	FEDERAL CONTRACT NO. — n/a	DRAWN	AEF	5/11
	STATE CONTRACT NO. — B-26-0045-3006	CHECKED	SADW	5/11

March 22, 2013 - BIV_03-07_Tulip City Airport ALP.dwg

IF PAPER SIZE IS 24"x36" USE SCALE SHOWN. ALL OTHER PAPER SIZES ARE NOT TO SCALE.

LEGEND

FUTURE	EXISTING	ITEM
		BUILDINGS
		TREES AND TREE LINES
		FENCE LINES
		ROADS
		RAILROAD
		WETLANDS
		RIVERS, LAKES, COUNTY DRAINS
		WIND CONE
		ROTATING BEACON
		RUNWAY / TAXIWAY LIGHTING
		POWER POLE
		AIRPORT PROPERTY LINE
		PROPERTY ACQUISITION - FEE
		PROPERTY PARCELS
		SECTION LINES
		AVIGATION EASEMENT
		RUNWAYS, TAXIWAYS, PARKING
		RUNWAY MARKINGS
		RUNWAY VISIBILITY ZONE

1 INCH = 400 FEET

0 200 400 800

MAGNETIC DECLINATION:
5° 0' W, 0° 4' W
PER YEAR AS OF 05/26/11

EXISTING LAND USES

- AGR AGRICULTURE
- C-2 HIGHWAY COMMERCIAL
- I-1 INDUSTRIAL
- I-2 INDUSTRIAL PARK
- PRD PLANNED RESIDENTIAL DEVELOPMENT
- R-3 RESIDENTIAL
- R-4 MOBILE HOME & RESIDENTIAL

SOURCE: CITY OF HOLLAND, GIS MAPPING DEPARTMENT

48TH ST

END OF F-RWY 18
STA. 100+00
EL. 672'
LAT. 42° 45' 03.92" N
LONG. 86° 06' 00.97" W

HEDCOR ST

LINCOLN AVE

PINE AVE

WASHINGTON AVE

68TH ST

REGENT BLVD

GEURINK BLVD

US-31

FILLMORE TOWNSHIP

CITY OF HOLLAND

END OF RWY 26
STA. 02+00
EL. 686'
LAT. 42° 44' 39.31" N
LONG. 86° 05' 48.61" W

END OF RWY 8
STA. 62+02
EL. 698' (HIGH POINT)
LAT. 42° 44' 28.73" N
LONG. 86° 07' 07.75" W

M-6

CITY OF HOLLAND

FILLMORE TOWNSHIP

64TH ST

END OF F-RWY 36
STA. 135+00
EL. 672'
LAT. 42° 44' 29.48" N
LONG. 86° 05' 56.77" W

61ST ST

58TH ST

CITY OF HOLLAND

I-196

FILLMORE TOWNSHIP

REVISIONS				
NO.	DATE	REMARKS	BY	CHK
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WEST MICHIGAN REGIONAL AIRPORT
HOLLAND, MI

AIRPORT LAYOUT PLAN
LAND USE PLAN

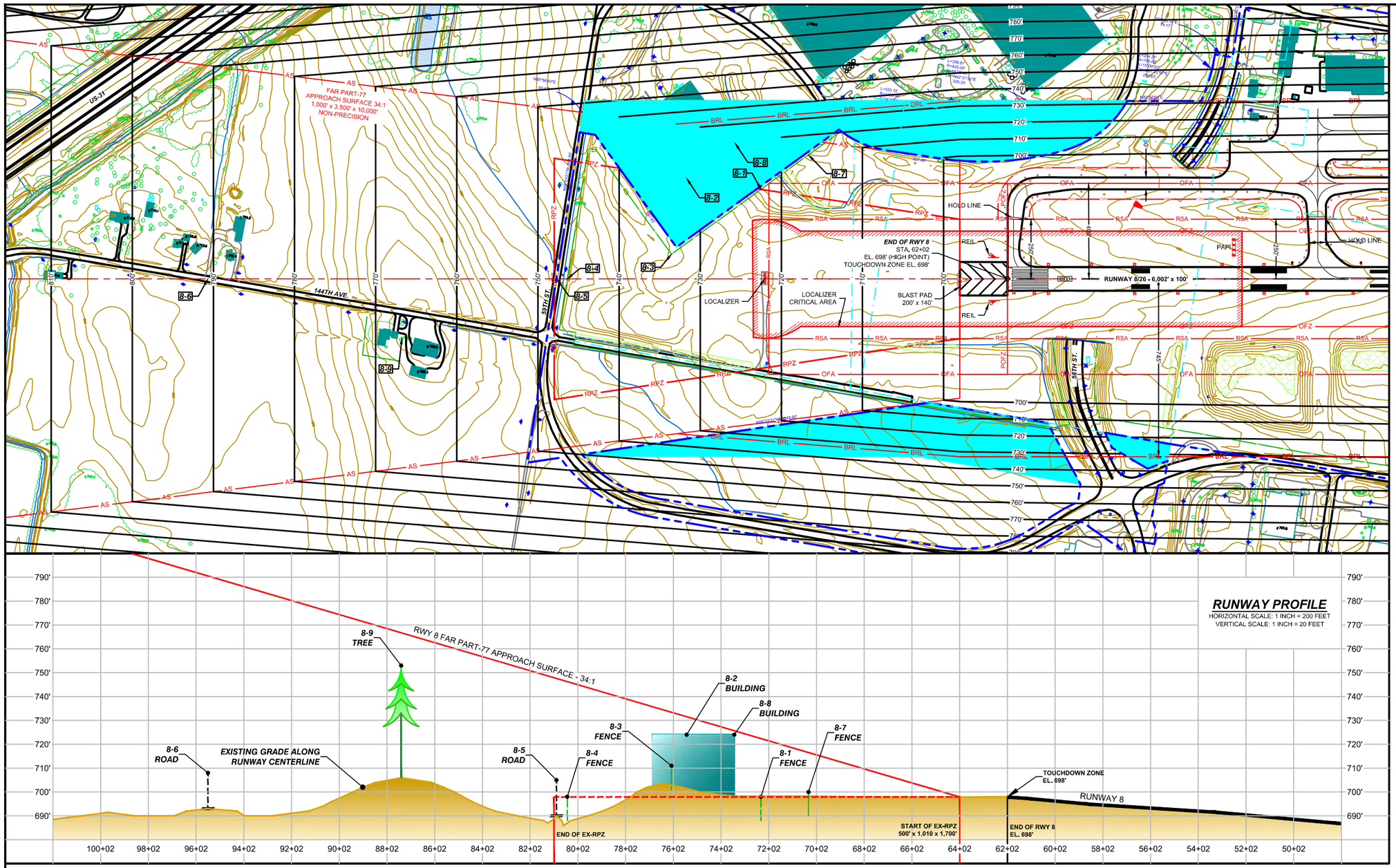
Mead & Hunt
2805 PORT LANSING ROAD
LANSING, MICHIGAN 48906
517.321.8334 - 517.321.5032 FAX

STATE ID. NO.	M&H PROJECT NO. —	08199-000-09001	DESIGNED	SADW	5/11
03-07	FEDERAL CONTRACT NO. —	n/a	DRAWN	AEF	5/11
	STATE CONTRACT NO. —	B-26-0045-3006	CHECKED	SADW	5/11

SHEET: 8 OF 14

March 22, 2013 - HW_03-07_Table City Airport ALP.dwg

IF PAPER SIZE IS 24"x36" USE SCALE SHOWN. ALL OTHER PAPER SIZES ARE NOT TO SCALE



RUNWAY PROFILE
HORIZONTAL SCALE: 1 INCH = 200 FEET
VERTICAL SCALE: 1 INCH = 20 FEET

RUNWAY DATA

EXISTING 8	
LATITUDE (LAT.)	42° 44' 28.73" N
LONGITUDE (LONG.)	86° 07' 07.75" W
ELEVATION (EL.)	698'
STATION (STA.)	62+02
BEARING	N 79° 42' 18.36" E
APPROACH TYPE	NON-PRECISION

LEGEND

EXISTING	ITEM
	BUILDINGS
	TREES AND TREE LINES
	FENCE LINES
	ROADS
	WETLANDS
	RIVERS, LAKES, COUNTY DRAINS
	GROUND CONTOURS
	WIND CONE
	RUNWAY / TAXIWAY LIGHTING
	POWER POLE
	AIRPORT PROPERTY LINE
	PROPERTY PARCELS
	SECTION LINES
	AVIGATION EASEMENT
	RUNWAYS, TAXIWAYS, PARKING
	RUNWAY MARKINGS
	CENTERLINES
RPZ	RUNWAY PROTECTION ZONE
RSA	RUNWAY SAFETY AREA
OFA	OBJECT FREE AREA
OFZ	OBSTACLE FREE ZONE
BRL	BUILDING RESTRICTION LINE
AS	APPROACH SURFACE
TOFA	TAXIWAY OBJECT FREE AREA
(TS)	OBJECTS WITHIN TRANSITION SURFACES

1 INCH = 200 FEET
0 100 200 400
VERTICAL SCALE 1 INCH = 20 FEET
MAGNETIC DECLINATION:
5° 0' W, 0° 4' W
PER YEAR AS OF 05/26/11

GENERAL NOTES:

1. THE EXISTING RWY 8 APPROACH SURFACE INNER WIDTH DIMENSION CORRESPONDS TO THE WIDTH OF THE PRIMARY SURFACE WHICH IS REGULATED BY THE RWY 26 APPROACH SURFACE DIMENSION.
2. OBSTRUCTION MITIGATION IN THE TRANSITIONAL SURFACE NOT OWNED BY THE AIRPORT SHOULD BE CLEARED AS FUNDS BECOME AVAILABLE.
3. FINAL DISPOSITION (PRUNING OR REMOVAL) OF TREES WILL BE DETERMINED AT TIME OF CONSTRUCTION, AND WILL BE BASED UPON ACTUAL HEIGHT OF TREES AND PREFERENCE OF OWNER.
4. ORDER OF IMPORTANCE FOR LOCATION OF THE OBSTRUCTION:
   1. RUNWAY AREA
   2. PRIMARY SURFACE (PS)
   3. OBJECT FREE AREA (OFA) / RUNWAY SAFETY AREA (RSA)
   4. RUNWAY PROTECTION ZONE (RPZ)
   5. APPROACH SLOPE (AS)
   6. TRANSITIONAL SURFACE (TS)

"OBSTRUCTION TABLE" LEGEND

NO.	= OBJECT LABEL ON APPROACH SHEETS
DESCRIPTION	= TYPE OF OBJECT - (EX. ROAD, TREES, BUILDINGS)
TOP EL.	= HIGHEST POINT OF OBJECT
ALLOWABLE EL.	= ELEVATION ALLOWED BY THE RUNWAY SURFACE - (EX. RPZ, AS, TS)
PENETRATION	= TOTAL AMOUNT OF OBJECT LOCATED WITHIN APPROACH SURFACE
DISPOSITION	= THE DETERMINATION OF WHAT ACTION TO TAKE WITH REFERENCE TO THE OBJECT
SURFACE IMPACTED	= THE OBJECTS LOCATION RELATIVE TO THE FAR PART-77 APPROACH SURFACES SURROUNDING THE RUNWAY

"DISPOSITION" LEGEND

REMAIN	= THE OBJECT IS LOCATED WITHIN A RUNWAY SURFACE; HOWEVER, IT DOES NOT PENETRATE THE APPROACH SURFACE.
REMOVE	= THE OBJECT IS CONSIDERED AN OBSTRUCTION AND WILL BE COMPLETELY REMOVED.
MITIGATE	= THE OBJECT IS A TREE WHICH REQUIRES MITIGATION TO MAINTAIN HEIGHT CLEARANCE DUE TO MINIMAL IMPACT INTO THE FAR PART-77 APPROACH SURFACE.

"SURFACE IMPACTED" LEGEND

RPZ	= RUNWAY PROTECTION ZONE
AS	= APPROACH SURFACE
TS	= TRANSITIONAL SURFACE

OBSTRUCTION TABLE

NO.	DESCRIPTION	TOP EL.	ALLOWABLE EL.	PENETRATION	DISPOSITION	SURFACE IMPACTED
8-1	FENCE	698'	722'	-24'	REMAIN	RPZ, AS
8-2	BUILDING	724'	731'	-7'	REMAIN	AS
8-3	FENCE	711'	733'	-22'	REMAIN	RPZ, AS
8-4	FENCE	698'	746'	-48'	REMAIN	RPZ, AS
8-5	ROAD	705'	747'	-42'	REMAIN	RPZ, AS
8-6	ROAD	708'	790'	-82'	REMAIN	AS
8-7	FENCE	700'	716'	-16'	REMAIN	AS
8-8	BUILDING	724'	725'	-1'	REMAIN	AS
8-9	TREE	753'	766'	-13'	REMAIN	AS

NOTES:
1. THE "TOP EL." AND "ALLOWABLE EL." ELEVATIONS ARE SHOWN AT MEAN SEA LEVEL.
2. THE "PENETRATION" ELEVATIONS ARE SHOWN AT ABOVE GROUND LEVEL.
3. THE TOP ELEVATION FOR ROADS INCLUDES THE FAR PART-77 15' CLEARANCE OVER ROADS REQUIREMENT.

REVISIONS				
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WEST MICHIGAN REGIONAL AIRPORT
HOLLAND, MI

AIRPORT LAYOUT PLAN
EXISTING RUNWAY 8 APPROACH

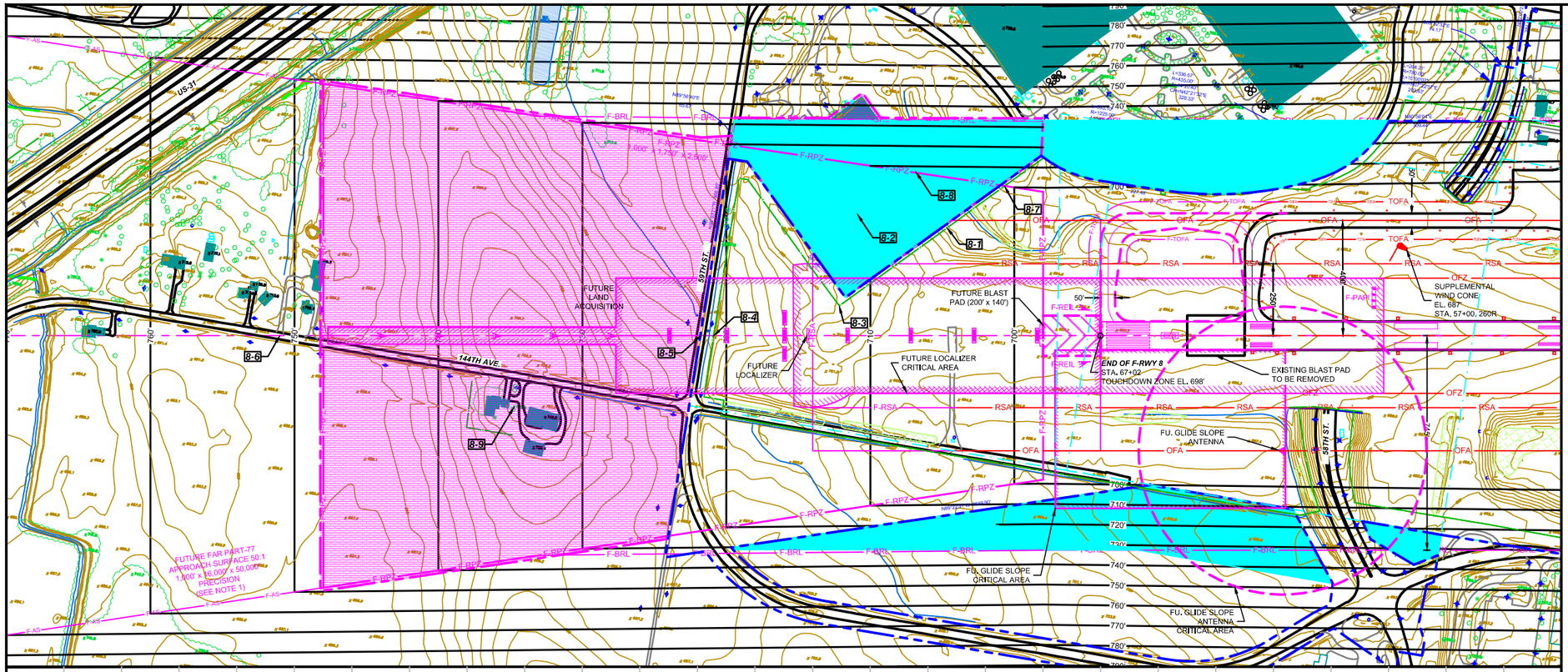
Mead & Hunt
2605 PORT LANDING ROAD
LANSING, MICHIGAN 48906
517.321.8334 - (FAX) 517.321.5932

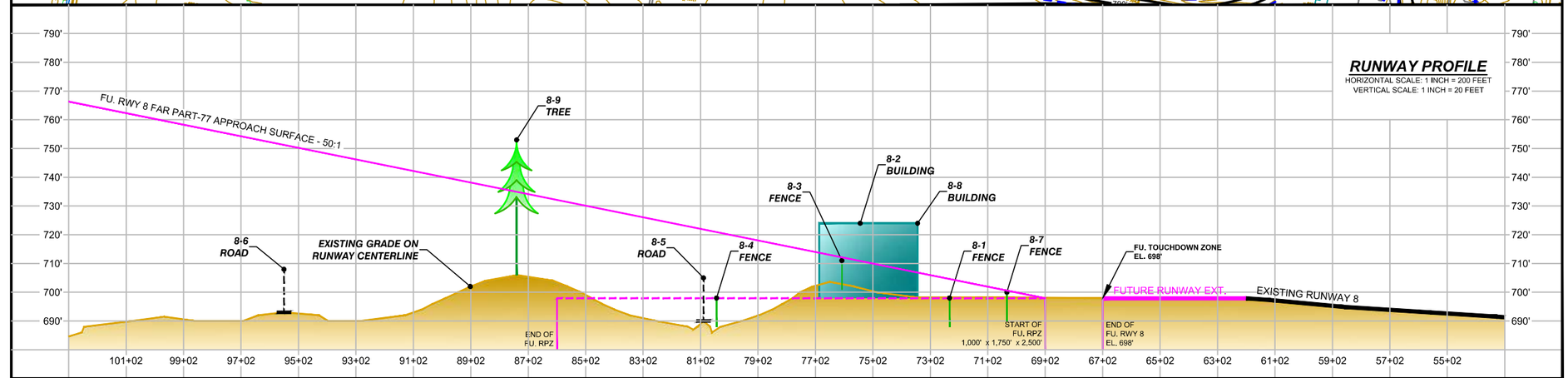
STATE ID. NO.	M&H PROJECT NO.	—	08199-000-09001	DESIGNED	SADW	5/11
03-07	FEDERAL CONTRACT NO.	—	n/a	DRAWN	AEF	5/11
	STATE CONTRACT NO.	—	B-26-2045-3006	CHECKED	SADW	5/11

SHEET: 9 OF 14

March 22, 2013 — BV_03-07_Ltr_City Airport ALP.dwg

IF PAPER SIZE IS 24"x36" USE SCALE SHOWN. ALL OTHER PAPER SIZES ARE NOT TO SCALE





RUNWAY PROFILE

HORIZONTAL SCALE: 1 INCH = 200 FEET
VERTICAL SCALE: 1 INCH = 20 FEET

RUNWAY DATA

	FUTURE 8
LATITUDE (LAT.)	42° 44' 27.84" N
LONGITUDE (LONG.)	86° 07' 14.34" W
ELEVATION (EL.)	698'
STATION (STA.)	67+02
BEARING	N 79° 42' 18.36" E
APPROACH TYPE	PRECISION

LEGEND

FUTURE	EXISTING	ITEM
		BUILDINGS
		TREES AND TREE LINES
		FENCE LINES
		ROADS
		WETLANDS
		RIVERS, LAKES, COUNTY DRAINS
		GROUND CONTOURS
		WIND CONE
		RUNWAY / TAXIWAY LIGHTING
		POWER POLE
		AIRPORT PROPERTY LINE
		PROPERTY ACQUISITION - FEE
		PROPERTY PARCELS
		SECTION LINES
		AVIGATION EASEMENT
		RUNWAYS, TAXIWAYS, PARKING
		RUNWAY MARKINGS
		CENTERLINES
F-RPZ	RPZ	RUNWAY PROTECTION ZONE
F-RSA	RSA	RUNWAY SAFETY AREA
F-OFA	OFA	OBJECT FREE AREA
F-OFZ	OFZ	OBSTACLE FREE ZONE
F-BRL	BRL	BUILDING RESTRICTION LINE
F-AS	AS	APPROACH SURFACE
F-TOFA	TOFA	TAXIWAY OBJECT FREE AREA
	(TS)	OBJECTS WITHIN TRANSITIONAL SURFACES

1 INCH = 200 FEET
0 100 200 400
VERTICAL SCALE 1 INCH = 20 FEET
MAGNETIC DECLINATION:
5° 0' W, 0° 4' W
PER YEAR AS OF 05/26/11

GENERAL NOTES:

1. THE FUTURE RUNWAY 8 APPROACH SURFACE SLOPE IS 50:1 FOR THE FIRST 10,000 FT. AND THEN 40:1 FOR THE FINAL 40,000 FT.
2. OBSTRUCTION MITIGATION IN THE TRANSITIONAL SURFACE NOT OWNED BY THE AIRPORT SHOULD BE CLEARED AS FUNDS BECOME AVAILABLE.
3. FINAL DISPOSITION (PRUNING OR REMOVAL) OF TREES WILL BE DETERMINED AT TIME OF CONSTRUCTION, AND WILL BE BASED UPON ACTUAL HEIGHT OF TREES AND PREFERENCE OF OWNER.
4. ORDER OF IMPORTANCE FOR LOCATION OF THE OBSTRUCTION:
   1. RUNWAY AREA
   2. PRIMARY SURFACE (PS)
   3. OBJECT FREE AREA (OFA) / RUNWAY SAFETY AREA (RSA)
   4. RUNWAY PROTECTION ZONE (RPZ)
   5. APPROACH SLOPE (AS)
   6. TRANSITIONAL SURFACE (TS)

"OBSTRUCTION TABLE" LEGEND

NO.	= OBJECT LABEL ON APPROACH SHEETS
DESCRIPTION	= TYPE OF OBJECT - (EX. ROAD, TREES, BUILDINGS)
TOP EL.	= HIGHEST POINT OF OBJECT
ALLOWABLE EL.	= ELEVATION ALLOWED BY THE RUNWAY SURFACE - (EX. RPZ, AS, TS)
PENETRATION	= TOTAL AMOUNT OF OBJECT LOCATED WITHIN APPROACH SURFACE
DISPOSITION	= THE DETERMINATION OF WHAT ACTION TO TAKE WITH REFERENCE TO THE OBJECT
SURFACE IMPACTED	= THE OBJECTS LOCATION RELATIVE TO THE FAR PART-77 APPROACH SURFACES SURROUNDING THE RUNWAY

"DISPOSITION" LEGEND

REMAIN	= THE OBJECT IS LOCATED WITHIN A RUNWAY SURFACE; HOWEVER, IT DOES NOT PENETRATE THE APPROACH SURFACE.
REMOVE	= THE OBJECT IS CONSIDERED AN OBSTRUCTION AND WILL BE COMPLETELY REMOVED.
MITIGATE	= THE OBJECT IS A TREE WHICH REQUIRES MITIGATION TO MAINTAIN HEIGHT CLEARANCE DUE TO MINIMAL IMPACT INTO THE FAR PART-77 APPROACH SURFACE.
DONH	= THE OBJECT IS LOCATED WITHIN A RUNWAY SURFACE; HOWEVER, IT IS ADVISABLE TO SUBMIT A REQUEST FOR DETERMINATION OF NON-HAZARD.

"SURFACE IMPACTED" LEGEND

RPZ	= RUNWAY PROTECTION ZONE
AS	= APPROACH SURFACE
TS	= TRANSITIONAL SURFACE

OBSTRUCTION TABLE

NO.	DESCRIPTION	TOP EL.	ALLOWABLE EL.	PENETRATION	DISPOSITION	SURFACE IMPACTED
8-1	FENCE	698'	706'	-8'	REMAIN	RPZ, AS
8-2	BUILDING	724'	710'	14'	DONH	RPZ, AS
8-3	FENCE	711'	712'	-1'	REMAIN	RPZ, AS
8-4	FENCE	698'	720'	-22'	REMAIN	RPZ, AS
8-5	ROAD	705'	721'	-16'	REMAIN	RPZ, AS
8-6	ROAD	708'	751'	-43'	REMAIN	AS
8-7	FENCE	700'	700'	0'	REMAIN	RPZ, AS
8-8	BUILDING	724'	706'	18'	DONH	RPZ, TS
8-9	TREE	753'	734'	19'	MITIGATE	AS

NOTES:
1. THE "TOP EL." AND "ALLOWABLE EL." ELEVATIONS ARE SHOWN AT MEAN SEA LEVEL.
2. THE "PENETRATION" ELEVATIONS ARE SHOWN AT ABOVE GROUND LEVEL.
3. THE TOP ELEVATION FOR ROADS INCLUDES THE FAR PART-77 15' CLEARANCE OVER ROADS REQUIREMENT.

REVISIONS				
NO.	DATE	REMARKS	BY	CHK
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WEST MICHIGAN REGIONAL AIRPORT
HOLLAND, MI

AIRPORT LAYOUT PLAN
FUTURE RUNWAY 8 APPROACH

Mead & Hunt
2605 PORT LANSING ROAD
LANSING, MICHIGAN 48906
517.321.8334 - (FAX) 517.321.5932

STATE ID. NO.	M&H PROJECT NO. — 08199-000-09001		DESIGNED	SADW	5/11
03-07	FEDERAL CONTRACT NO. — n/a		DRAWN	AEF	5/11
	STATE CONTRACT NO. — B-26-0045-3006		CHECKED	SADW	5/11

SHEET: 10 OF 14

March 22, 2013 — BV_03-07_Tulip City Airport ALP.dwg

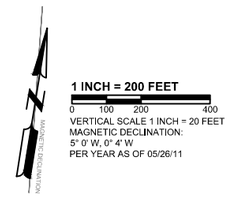
IF PAPER SIZE IS 24"x36" USE SCALE SHOWN. ALL OTHER PAPER SIZES ARE NOT TO SCALE

RUNWAY DATA

	EXISTING 26
LATITUDE (LAT.)	42° 44' 39.31" N
LONGITUDE (LONG.)	86° 05' 48.61" W
ELEVATION (EL.)	686'
STATION (STA.)	02+00
BEARING	N 79° 42' 18.36" E
APPROACH TYPE	PRECISION

LEGEND

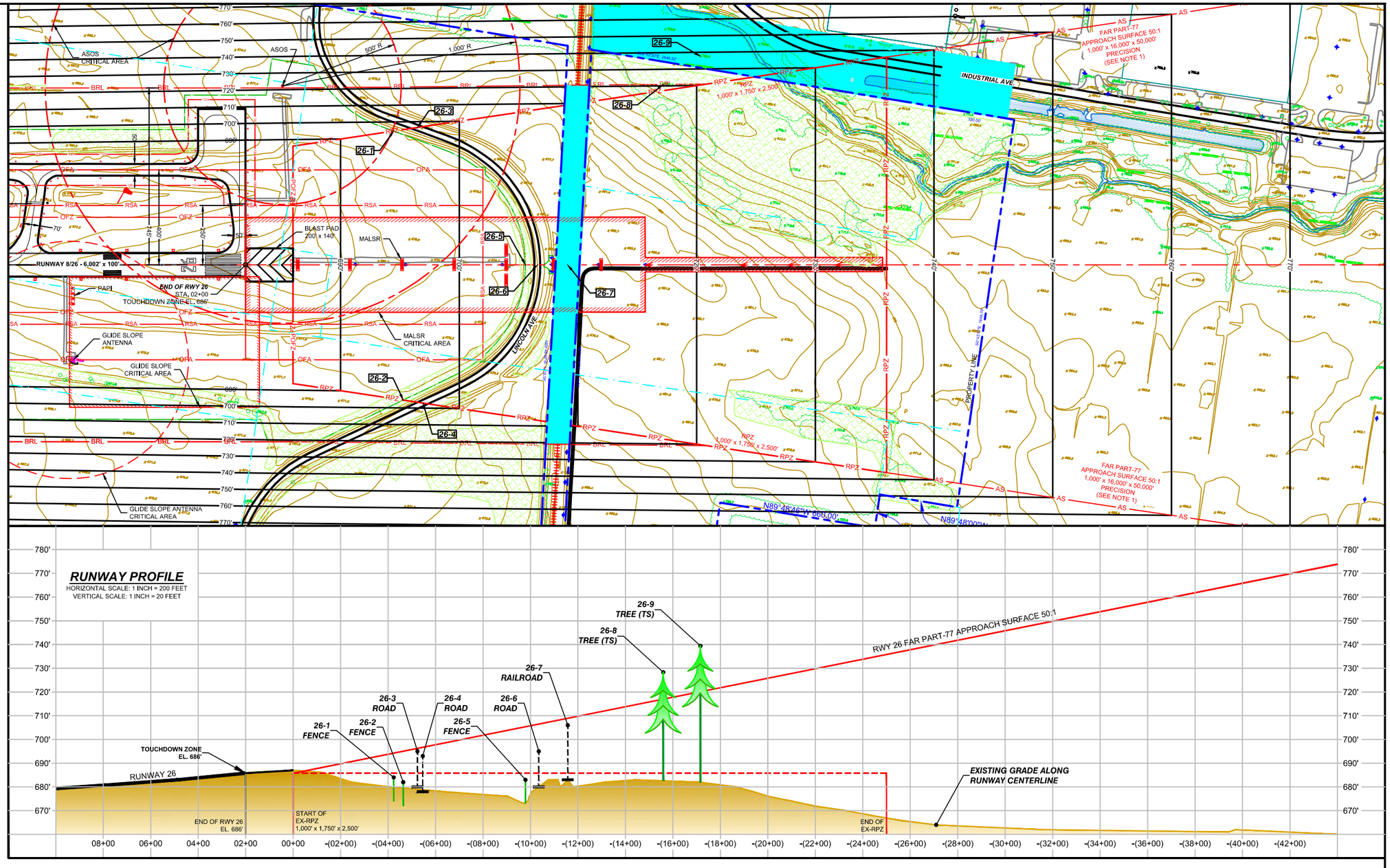
EXISTING	ITEM
	BUILDINGS
	TREES AND TREE LINES
	FENCE LINES
	ROADS
	RAILROAD
	WETLANDS
	RIVERS, LAKES, COUNTY DRAINS
	GROUND CONTOURS
	WIND CONE
	ROTATING BEACON
	RUNWAY / TAXIWAY LIGHTING
	POWER POLE
	AIRPORT PROPERTY LINE
	PROPERTY PARCELS
	SECTION LINES
	AVIGATION EASEMENT
	RUNWAYS, TAXIWAYS, PARKING
	RUNWAY MARKINGS
	CENTERLINES
RPZ	RUNWAY PROTECTION ZONE
RSA	RUNWAY SAFETY AREA
OFA	OBJECT FREE AREA
OFZ	OBSTACLE FREE ZONE
BRL	BUILDING RESTRICTION LINE
AS	APPROACH SURFACE
TOFA	TAXIWAY OBJECT FREE AREA
(TS)	OBJECTS WITHIN TRANSITION SURFACES



1 INCH = 200 FEET

0 100 200 400

VERTICAL SCALE 1 INCH = 20 FEET
MAGNETIC DECLINATION:
5° 0' W, 0° 4' W
PER YEAR AS OF 05/26/11



RUNWAY PROFILE

HORIZONTAL SCALE: 1 INCH = 200 FEET
VERTICAL SCALE: 1 INCH = 20 FEET

NOTES:

1. THE EXISTING RUNWAY 26 APPROACH SURFACE SLOPE IS 50:1 FOR THE FIRST 10,000 FT. AND THEN 40:1 FOR THE FINAL 40,000 FT.
2. OBSTRUCTION MITIGATION IN THE TRANSITIONAL SURFACE NOT OWNED BY THE AIRPORT SHOULD BE CLEARED AS FUNDS BECOME AVAILABLE.
3. FINAL DISPOSITION (PRUNING OR REMOVAL) OF TREES WILL BE DETERMINED AT TIME OF CONSTRUCTION, AND WILL BE BASED UPON ACTUAL HEIGHT OF TREES AND PREFERENCE OF OWNER.
4. ORDER OF IMPORTANCE FOR LOCATION OF THE OBSTRUCTION:
   1. RUNWAY AREA
   2. PRIMARY SURFACE (PS)
   3. OBJECT FREE AREA (OFA) / RUNWAY SAFETY AREA (RSA)
   4. RUNWAY PROTECTION ZONE (RPZ)
   5. APPROACH SLOPE (AS)
   6. TRANSITIONAL SURFACE (TS)

"OBSTRUCTION TABLE" LEGEND

NO.	= OBJECT LABEL ON APPROACH SHEETS
DESCRIPTION	= TYPE OF OBJECT - (EX. ROAD, TREES, BUILDINGS)
TOP EL.	= HIGHEST POINT OF OBJECT
ALLOWABLE EL.	= ELEVATION ALLOWED BY THE RUNWAY SURFACE - (EX. RPZ, AS, TS)
PENETRATION	= TOTAL AMOUNT OF OBJECT LOCATED WITHIN APPROACH SURFACE
DISPOSITION	= THE DETERMINATION OF WHAT ACTION TO TAKE WITH REFERENCE TO THE OBJECT
SURFACE IMPACTED	= THE OBJECTS LOCATION RELATIVE TO THE FAR PART-77 APPROACH SURFACES SURROUNDING THE RUNWAY

"DISPOSITION" LEGEND

REMAIN	= THE OBJECT IS LOCATED WITHIN A RUNWAY SURFACE; HOWEVER, IT DOES NOT PENETRATE THE APPROACH SURFACE.
REMOVE	= THE OBJECT IS CONSIDERED AN OBSTRUCTION AND WILL BE COMPLETELY REMOVED.
MITIGATE	= THE OBJECT IS A TREE WHICH REQUIRES MITIGATION TO MAINTAIN HEIGHT CLEARANCE DUE TO MINIMAL IMPACT INTO THE FAR PART-77 APPROACH SURFACE.

"SURFACE IMPACTED" LEGEND

RPZ	= RUNWAY PROTECTION ZONE
AS	= APPROACH SURFACE
TS	= TRANSITIONAL SURFACE

OBSTRUCTION TABLE

NO.	DESCRIPTION	TOP EL.	ALLOWABLE EL.	PENETRATION	DISPOSITION	SURFACE IMPACTED
26-1	FENCE	684'	694'	-10'	REMAIN	RPZ, AS
26-2	FENCE	682'	695'	-13'	REMAIN	RPZ, AS
26-3	ROAD	695'	696'	-1'	REMAIN	RPZ, AS
26-4	ROAD	693'	696'	-3'	REMAIN	RPZ, AS
26-5	FENCE	683'	705'	-22'	REMAIN	RPZ, AS
26-6	ROAD	695'	706'	-11'	REMAIN	RPZ, AS
26-7	RAILROAD	706'	708'	-2'	REMAIN	RPZ, AS
26-8	TREE	728'	721'	7'	REMOVE	TS
26-9	TREE	739'	738'	1'	REMOVE	TS

NOTES:
1. THE "TOP EL." AND "ALLOWABLE EL." ELEVATIONS ARE SHOWN AT MEAN SEA LEVEL.
2. THE "PENETRATION" ELEVATIONS ARE SHOWN AT ABOVE GROUND LEVEL.
3. THE TOP ELEVATION FOR ROADS INCLUDES THE FAR PART-77 15' CLEARANCE OVER ROADS REQUIREMENT.
4. THE TOP ELEVATION FOR RAILROADS INCLUDES THE FAR PART-77 23' CLEARANCE OVER RAILROADS REQUIREMENT.

REVISIONS				
NO.	DATE	REMARKS	BY	CHK
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WEST MICHIGAN REGIONAL AIRPORT
HOLLAND, MI

AIRPORT LAYOUT PLAN

EXISTING RUNWAY 26 APPROACH

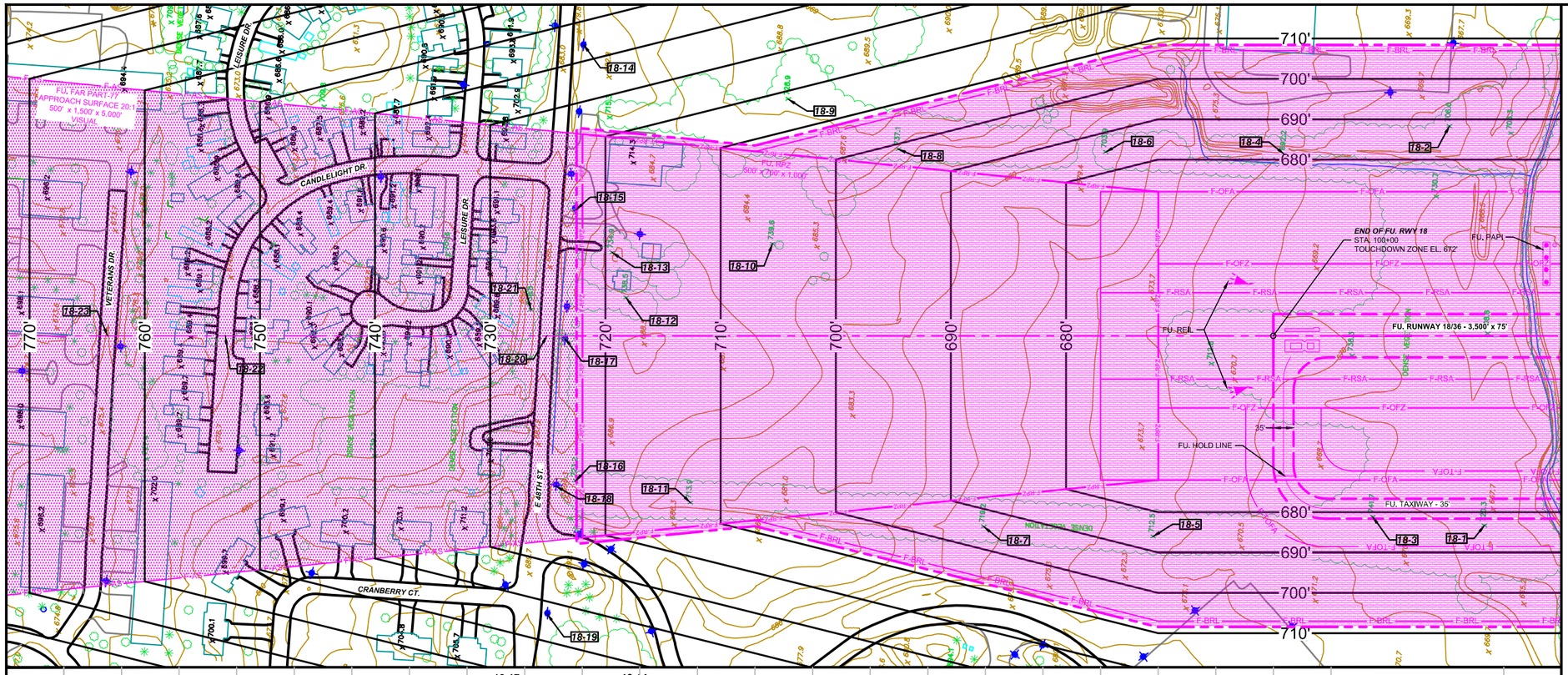
Mead & Hunt
2605 PORT LANSING ROAD
LANSING, MICHIGAN 48906
517.321.8334 – (FAX) 517.321.5932

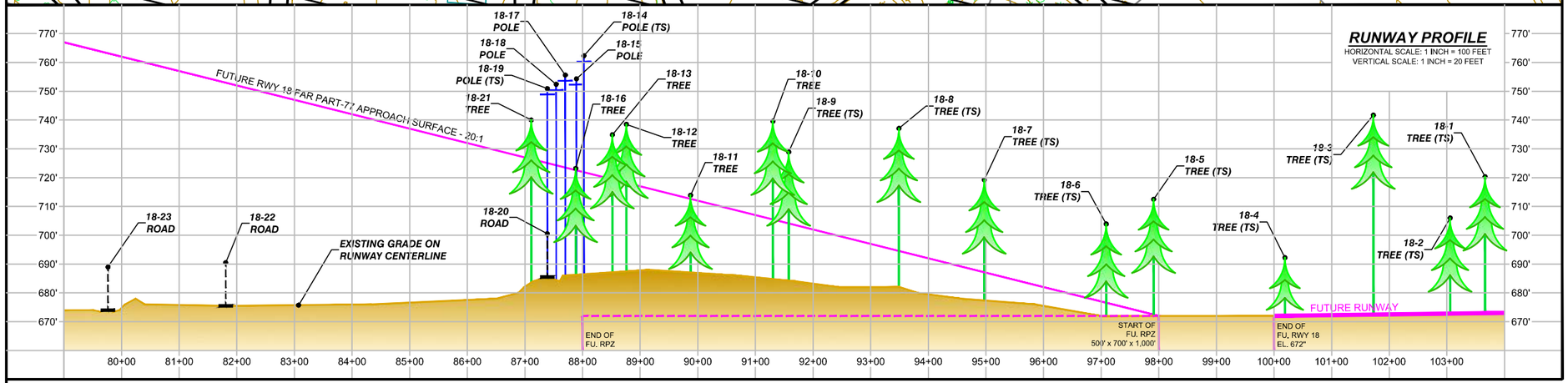
STATE ID. NO.	M&H PROJECT NO.	—	08199-00-09001	DESIGNED	SADW	5/11
03-07	FEDERAL CONTRACT NO.	—	n/a	DRAWN	AEF	5/11
	STATE CONTRACT NO.	—	B-26-2045-3006	CHECKED	SADW	5/11

SHEET 11 OF 14

March 22, 2013 – WV_03-07_Jelly City Airport_AUP.dwg

IF PAPER SIZE IS 24"x36" USE SCALE SHOWN. ALL OTHER PAPER SIZES ARE NOT TO SCALE





RUNWAY DATA

	FUTURE 18
LATITUDE (LAT.)	42° 45' 03.92" N
LONGITUDE (LONG.)	86° 06' 00.97" W
ELEVATION (EL.)	672'
STATION (STA.)	100+00
BEARING	N 174° 51' 36" E
APPROACH TYPE	VISUAL

LEGEND

FUTURE	EXISTING	ITEM
		BUILDINGS
		TREES AND TREE LINES
		FENCE LINES
		ROADS
		WETLANDS
		RIVERS, LAKES, COUNTY DRAINS
		GROUND CONTOURS
		WIND CONE
		RUNWAY / TAXIWAY LIGHTING
		POWER POLE
		AIRPORT PROPERTY LINE
		PROPERTY ACQUISITION - FEE
		PROPERTY PARCELS
		SECTION LINES
		AVIGATION EASEMENT
		RUNWAYS, TAXIWAYS, PARKING
		RUNWAY MARKINGS
		CENTERLINES
F-RPZ	RPZ	RUNWAY PROTECTION ZONE
F-RSA	RSA	RUNWAY SAFETY AREA
F-OFA	OFA	OBJECT FREE AREA
F-OFZ	OFZ	OBSTACLE FREE ZONE
F-BRL	BRL	BUILDING RESTRICTION LINE
F-AS	AS	APPROACH SURFACE
F-TOFA	TOFA	TAXIWAY OBJECT FREE AREA
	(TS)	OBJECTS WITHIN TRANSITIONAL SURFACES

MAGNETIC DECLINATION

1 INCH = 100 FEET

0 50 100 200

VERTICAL SCALE 1 INCH = 20 FEET
MAGNETIC DECLINATION:
5° 0' W, 0° 4' W
PER YEAR AS OF 05/26/11

GENERAL NOTES:

1. OBSTRUCTION MITIGATION IN THE TRANSITIONAL SURFACE NOT OWNED BY THE AIRPORT SHOULD BE CLEARED AS FUNDS BECOME AVAILABLE.
2. FINAL DISPOSITION (PRUNING OR REMOVAL) OF TREES WILL BE DETERMINED AT TIME OF CONSTRUCTION, AND WILL BE BASED UPON ACTUAL HEIGHT OF TREES AND PREFERENCE OF OWNER.
3. ORDER OF IMPORTANCE FOR LOCATION OF THE OBSTRUCTION:
   1. RUNWAY AREA
   2. PRIMARY SURFACE (PS)
   3. OBJECT FREE AREA (OFA) / RUNWAY SAFETY AREA (RSA)
   4. RUNWAY PROTECTION ZONE (RPZ)
   5. APPROACH SLOPE (AS)
   6. TRANSITIONAL SURFACE (TS)

"OBSTRUCTION TABLE" LEGEND

NO.	= OBJECT LABEL ON APPROACH SHEETS
DESCRIPTION	= TYPE OF OBJECT - (EX. ROAD, TREES, BUILDINGS)
TOP EL.	= HIGHEST POINT OF OBJECT
ALLOWABLE EL.	= ELEVATION ALLOWED BY THE RUNWAY SURFACE - (EX. RPZ, AS, TS)
PENETRATION	= TOTAL AMOUNT OF OBJECT LOCATED WITHIN APPROACH SURFACE
DISPOSITION	= THE DETERMINATION OF WHAT ACTION TO TAKE WITH REFERENCE TO THE OBJECT
SURFACE IMPACTED	= THE OBJECTS LOCATION RELATIVE TO THE FAR PART-77 APPROACH SURFACES SURROUNDING THE RUNWAY

"DISPOSITION" LEGEND

REMAIN	= THE OBJECT IS LOCATED WITHIN A RUNWAY SURFACE; HOWEVER, IT DOES NOT PENETRATE THE APPROACH SURFACE.
REMOVE	= THE OBJECT IS CONSIDERED AN OBSTRUCTION AND WILL BE COMPLETELY REMOVED.
MITIGATE	= THE OBJECT IS A TREE WHICH REQUIRES MITIGATION TO MAINTAIN HEIGHT CLEARANCE DUE TO MINIMAL IMPACT INTO THE FAR PART-77 APPROACH SURFACE.

"SURFACE" LEGEND

RPZ	= RUNWAY PROTECTION ZONE
AS	= APPROACH SURFACE
TS	= TRANSITIONAL SURFACE

OBSTRUCTION TABLE

NO.	DESCRIPTION	TOP EL.	ALLOWABLE EL.	PENETRATION	DISPOSITION	SURFACE IMPACTED
18-1	TREE	720'	683'	37'	REMOVE	TS
18-2	TREE	706'	688'	18'	REMOVE	TS
18-3	TREE	742'	681'	61'	REMOVE	TS
18-4	TREE	692'	681'	11'	REMOVE	TS
18-5	TREE	713'	686'	27'	REMOVE	TS
18-6	TREE	704'	684'	20'	REMOVE	TS
18-7	TREE	719'	694'	25'	REMOVE	TS
18-8	TREE	737'	698'	39'	REMOVE	TS
18-9	TREE	729'	717'	12'	REMOVE	TS
18-10	TREE	740'	705'	35'	REMOVE	RPZ, AS
18-11	TREE	714'	712'	2'	REMOVE	RPZ, AS
18-12	TREE	739'	718'	21'	REMOVE	RPZ, AS
18-13	TREE	735'	719'	16'	REMOVE	RPZ, AS
18-14	POLE	762'	744'	18'	LOWER	TS
18-15	POLE	754'	722'	32'	LOWER	AS
18-16	TREE	723'	722'	1'	REMOVE	AS
18-17	POLE	756'	723'	33'	LOWER	AS
18-18	POLE	752'	724'	28'	LOWER	AS
18-19	POLE	751'	743'	8'	LOWER	TS

NO.	DESCRIPTION	TOP EL.	ALLOWABLE EL.	PENETRATION	DISPOSITION	SURFACE IMPACTED
18-20	ROAD	701'	725'	-24'	REMAIN	AS
18-21	TREE	739'	726'	13'	REMOVE	AS
18-22	ROAD	691'	753'	-62'	REMAIN	AS
18-23	ROAD	689'	763'	-74'	REMAIN	AS

NOTES:
1. THE "TOP EL." AND "ALLOWABLE EL." ELEVATIONS ARE SHOWN AT MEAN SEA LEVEL.
2. THE "PENETRATION" ELEVATIONS ARE SHOWN AT ABOVE GROUND LEVEL.
3. THE TOP ELEVATION FOR ROADS INCLUDES THE FAR PART-77 16' CLEARANCE OVER ROADS REQUIREMENT.

REVISIONS				
NO.	DATE	REMARKS	BY	CHK
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WEST MICHIGAN REGIONAL AIRPORT
HOLLAND, MI

AIRPORT LAYOUT PLAN
FUTURE RUNWAY 18 APPROACH

Mead & Hunt
2605 PORT LANSING ROAD
LANSING, MICHIGAN 48906
517.321.8334 - (FAX) 517.321.5932

STATE ID. NO.	M&H PROJECT NO. —	08199400-09001	DESIGNED	SADW	5/11
03-07	FEDERAL CONTRACT NO. —	n/a	DRAWN	AEF	5/11
	STATE CONTRACT NO. —	B-26-0045-3006	CHECKED	SADW	5/11

SHEET: **12** OF **14**

March 22, 2013 — W:_AS--07_Ville City Airport ALP.dwg

IF PAPER SIZE IS 24"x36" USE SCALE SHOWN. ALL OTHER PAPER SIZES ARE NOT TO SCALE

RUNWAY DATA

	FUTURE 36
LATITUDE (LAT.)	42° 44' 29.48" N
LONGITUDE (LONG.)	86° 05' 56.77" W
ELEVATION (EL.)	672'
STATION (STA.)	135+00
BEARING	N 174° 51' 36" E
APPROACH TYPE	VISUAL

LEGEND

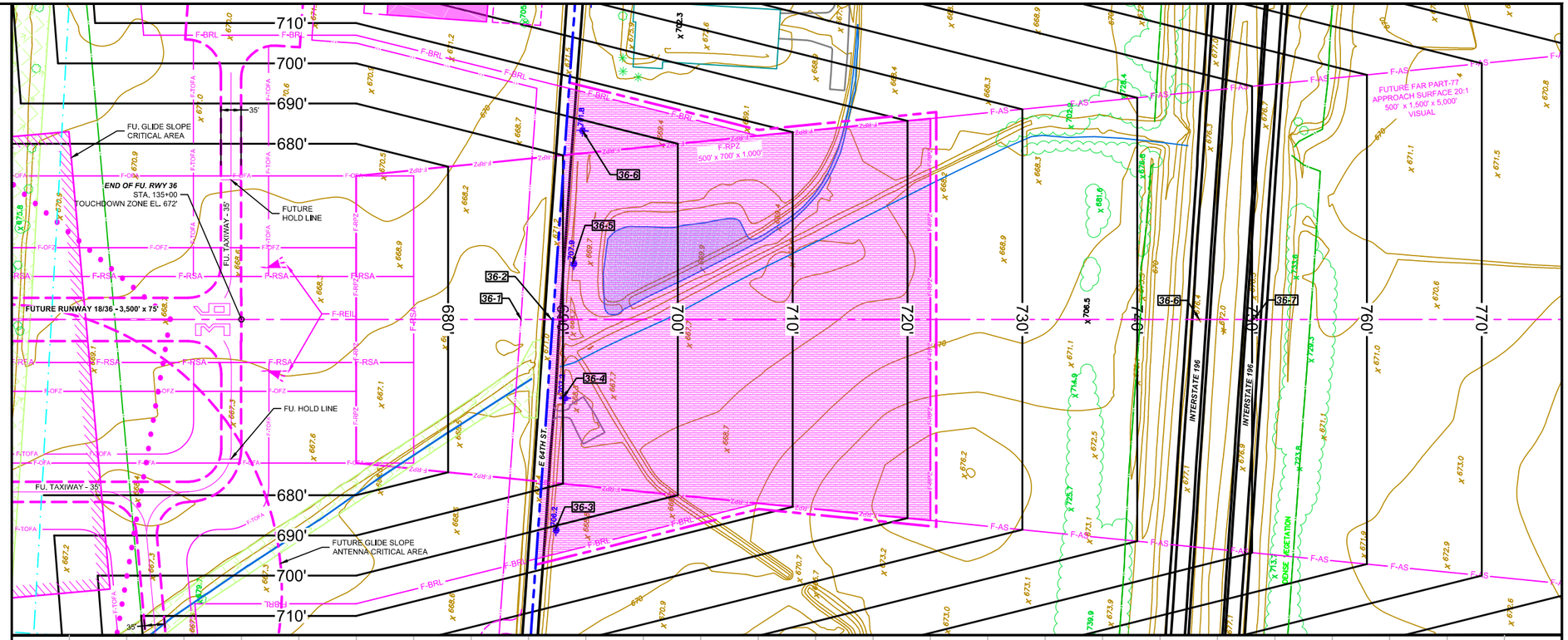
FUTURE	EXISTING	ITEM
		BUILDINGS
		TREES AND TREE LINES
		FENCE LINES
		ROADS
		WETLANDS
		RIVERS, LAKES, COUNTY DRAINS
		GROUND CONTOURS
		WIND CONE
		RUNWAY / TAXIWAY LIGHTING
		POWER POLE
		AIRPORT PROPERTY LINE
		PROPERTY ACQUISITION - FEE
		PROPERTY PARCELS
		SECTION LINES
		AVIGATION EASEMENT
		RUNWAYS, TAXIWAYS, PARKING
		RUNWAY MARKINGS
		CENTERLINES
F-RPZ	RPZ	RUNWAY PROTECTION ZONE
F-RSA	RSA	RUNWAY SAFETY AREA
F-OFA	OFA	OBJECT FREE AREA
F-OFZ	OFZ	OBSTACLE FREE ZONE
F-BRL	BRL	BUILDING RESTRICTION LINE
F-AS	AS	APPROACH SURFACE
F-TOFA	TOFA	TAXIWAY OBJECT FREE AREA
	(TS)	OBJECTS WITHIN TRANSITIONAL SURFACES

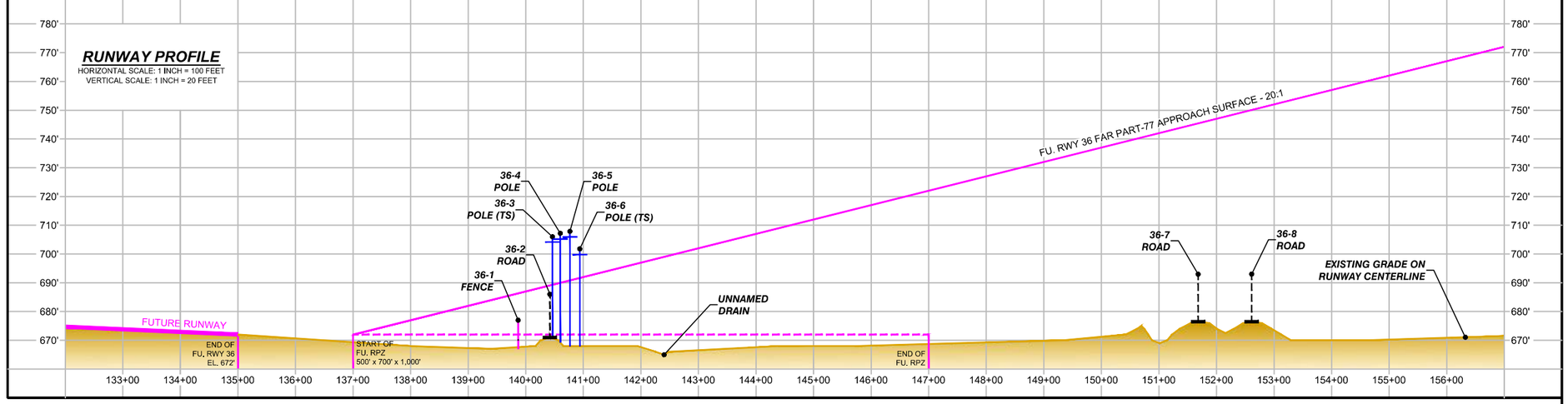
MAGNETIC DECLINATION

1 INCH = 100 FEET

0 50 100 200

VERTICAL SCALE 1 INCH = 10 FEET
MAGNETIC DECLINATION:
5° 0' W, 0' 4' W
PER YEAR AS OF 05/26/11





GENERAL NOTES:

1. OBSTRUCTION MITIGATION IN THE TRANSITIONAL SURFACE NOT OWNED BY THE AIRPORT SHOULD BE CLEARED AS FUNDS BECOME AVAILABLE.
2. FINAL DISPOSITION (PRUNING OR REMOVAL) OF TREES WILL BE DETERMINED AT TIME OF CONSTRUCTION, AND WILL BE BASED UPON ACTUAL HEIGHT OF TREES AND PREFERENCE OF OWNER.
3. ORDER OF IMPORTANCE FOR LOCATION OF THE OBSTRUCTION:
   1. RUNWAY AREA
   2. PRIMARY SURFACE (PS)
   3. OBJECT FREE AREA (OFA) / RUNWAY SAFETY AREA (RSA)
   4. RUNWAY PROTECTION ZONE (RPZ)
   5. APPROACH SLOPE (AS)
   6. TRANSITIONAL SURFACE (TS)

"OBSTRUCTION TABLE" LEGEND

NO.	= OBJECT LABEL ON APPROACH SHEETS
DESCRIPTION	= TYPE OF OBJECT - (EX. ROAD, TREES, BUILDINGS)
TOP EL.	= HIGHEST POINT OF OBJECT
ALLOWABLE EL.	= ELEVATION ALLOWED BY THE RUNWAY SURFACE - (EX. RPZ, AS, TS)
PENETRATION	= TOTAL AMOUNT OF OBJECT LOCATED WITHIN APPROACH SURFACE
DISPOSITION	= THE DETERMINATION OF WHAT ACTION TO TAKE WITH REFERENCE TO THE OBJECT
SURFACE IMPACTED	= THE OBJECTS LOCATION RELATIVE TO THE FAR PART-77 APPROACH SURFACES SURROUNDING THE RUNWAY

"DISPOSITION" LEGEND

REMAIN	= THE OBJECT IS LOCATED WITHIN A RUNWAY SURFACE; HOWEVER, IT DOES NOT PENETRATE THE APPROACH SURFACE.
REMOVE	= THE OBJECT IS CONSIDERED AN OBSTRUCTION AND WILL BE COMPLETELY REMOVED.
MITIGATE	= THE OBJECT IS A TREE WHICH REQUIRES MITIGATION TO MAINTAIN HEIGHT CLEARANCE DUE TO MINIMAL IMPACT INTO THE FAR PART-77 APPROACH SURFACE.

"SURFACE IMPACTED" LEGEND

RPZ	= RUNWAY PROTECTION ZONE
AS	= APPROACH SURFACE
TS	= TRANSITIONAL SURFACE

OBSTRUCTION TABLE

NO.	DESCRIPTION	TOP EL.	ALLOWABLE EL.	PENETRATION	DISPOSITION	SURFACE IMPACTED
36-1	FENCE	677'	686'	-9'	REMAIN	RPZ, AS
36-2	ROAD	686'	689'	-3'	LOWER	TS
36-3	POLE	706'	701'	5'	LOWER	RPZ, AS
36-4	POLE	707'	690'	17'	LOWER	RPZ, AS
36-5	POLE	707'	691'	16'	LOWER	TS
36-6	POLE	701'	697'	4'	REMAIN	AS
36-7	ROAD	693'	745'	-52'	REMAIN	AS
36-8	ROAD	693'	750'	-57'	REMAIN	AS

NOTES:
1. THE "TOP EL." AND "ALLOWABLE EL." ELEVATIONS ARE SHOWN AT MEAN SEA LEVEL.
2. THE "PENETRATION" ELEVATIONS ARE SHOWN AT ABOVE GROUND LEVEL.
3. THE TOP ELEVATION FOR ROADS INCLUDES THE FAR PART-77 15' CLEARANCE OVER ROADS REQUIREMENT.

REVISIONS				
NO.	DATE	REMARKS	BY	CHK
1				
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WEST MICHIGAN REGIONAL AIRPORT
HOLLAND, MI

AIRPORT LAYOUT PLAN
FUTURE RUNWAY 36 APPROACH

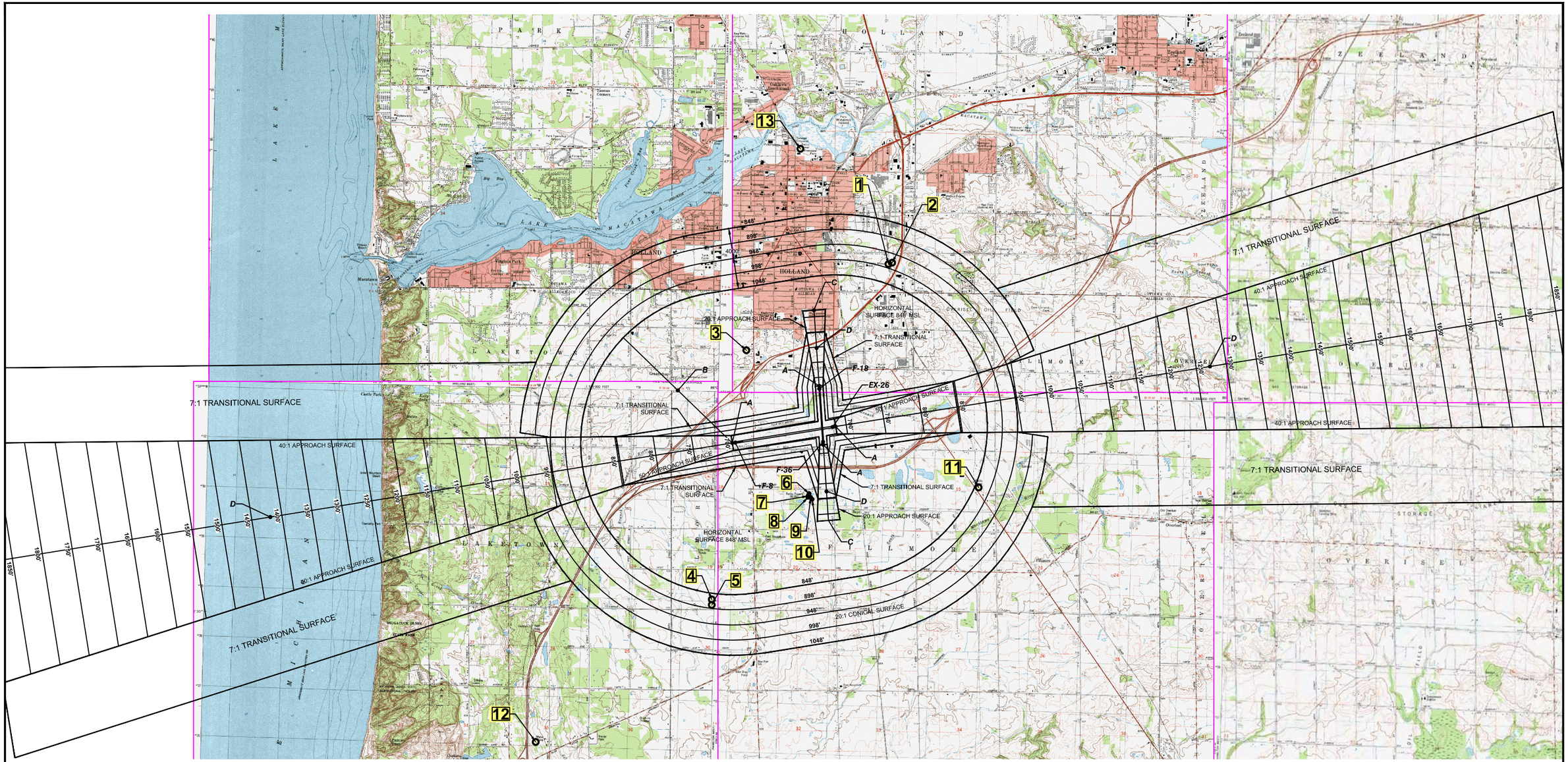
Mead & Hunt
2605 PORT LANSING ROAD
LANSING, MICHIGAN 48906
517.321.8334 - (FAX) 517.321.5932

STATE ID. NO.	M&H PROJECT NO. —	08199-000-09001	DESIGNED	SADW	5/11
03-07	FEDERAL CONTRACT NO. —	n/a	DRAWN	AEF	5/11
	STATE CONTRACT NO. —	B-26-0045-3006	CHECKED	SADW	5/11

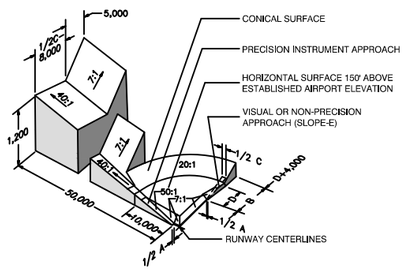
SHEET: **13** OF **14**

March 22, 2013 – W:_03-07_Holle City Airport ALP.dwg

IF PAPER SIZE IS 24"x36" USE SCALE SHOWN. ALL OTHER PAPER SIZES ARE NOT TO SCALE



ISOMETRIC VIEW OF SECTION A



APPROACH SURFACE DIMENSIONS

		FUTURE 8	EXISTING 26	FUTURE 18	FUTURE 36
A	WIDTH OF PRIMARY SURFACE	1,000'	1,000'	500'	500'
B	RADIUS OF HORIZONTAL SURFACE	50,000'	50,000'	5,000'	5,000'
C	APPROACH SURFACE WIDTH AT END	16,000'	16,000'	1,500'	1,500'
D	APPROACH SURFACE LENGTH	50,000'	50,000'	5,000'	5,000'
E	APPROACH SURFACE RATIO	50:1	50:1	20:1	20:1

RUNWAY DATA

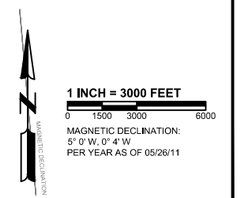
	FUTURE 8	EXISTING 26	FUTURE 18	FUTURE 36
LATITUDE (LAT.)	42° 44' 28.73" N	42° 44' 39.31" N	42° 45' 03.92" N	42° 44' 29.48" N
LONGITUDE (LONG.)	86° 07' 07.75" W	86° 05' 48.61" W	86° 06' 00.97" W	86° 05' 56.77" W
ELEVATION (EL.)	698'	686'	672'	672'
STATION (STA.)	62+02	02+00	100+00	135+00
BEARING	N 79° 42' 18.36" E	N 79° 42' 18.36" E	N 174° 51' 36" E	N 174° 51' 36" E
APPROACH TYPE	PRECISION	PRECISION	VISUAL	VISUAL

OBSTRUCTION DATA TABLE

OBJECT	TYPE	LATITUDE	LONGITUDE	ABOVE GROUND LEVEL (AGL)	MEAN SEA LEVEL (MSL)
1	OTHER W/O ANTENNA	42°46'26.08" N	86°05'02.14" W	300'	960'
2	OTHER W/O ANTENNA	42°46'27.00" N	86°04'59.00" W	225'	887'
3	OTHER W/O ANTENNA	42°45'28.08" N	86°07'06.14" W	199'	884'
4	OTHER W/O ANTENNA	42°42'45.23" N	86°07'32.16" W	199'	937'
5	OTHER W/O ANTENNA	42°42'41.70" N	86°07'32.00" W	195'	936'
6	OTHER W/O ANTENNA	42°43'55.52" N	86°06'08.11" W	195'	874'
7	TOWER	42°43'54.00" N	86°06'09.00" W	199'	889'
8	OTHER W/O ANTENNA	42°43'53.08" N	86°06'09.14" W	196'	876'
9	TOWER	42°43'51.84" N	86°06'05.34" W	199'	879'
10	OTHER W/O ANTENNA	42°43'51.84" N	86°06'05.34" W	196'	878'
11	TOWER	42°43'52.00" N	86°06'05.00" W	196'	878'
12	TOWER	42°41'10.00" N	86°10'05.00" W	353'	1,033'
13	TOWER	42°47'40.00" N	86°06'22.00" W	406'	996'

GENERAL NOTES:

1. OBJECTS LOCATED WITH THE USE OF "OBSTRUCTION EVALUATION" DATA PROVIDED BY MDOT OFFICE OF AERONAUTICS. THE CURRENT FILE CONTAINS ALL APPLICATIONS RECEIVED SINCE 1996.
2. MEAD & HUNT AND MDOT OFFICE OF AERONAUTICS ARE NOT RESPONSIBLE FOR THE ACCURACY OF THE NOAA DATABASE. THE DATABASE MAY NOT BE INCLUSIVE OF ALL OBSTACLES WITHIN THE PART-77 SURFACES SHOWN.
3. SECTIONAL CHARTS & THE FAA SHOULD BE REFERENCED FOR ADDITIONAL INFORMATION DUE TO THE CONTINUED PROLIFERATION OF TOWERS AND ASSOCIATED OBSTACLES.



REVISIONS				
NO.	DATE	REMARKS	BY	CHK
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WEST MICHIGAN REGIONAL AIRPORT
HOLLAND, MI

AIRPORT LAYOUT PLAN
FAR PART-77 PLAN

Mead & Hunt
2605 POINT LANSING ROAD
LANSING, MICHIGAN 48906
517.321.8334 - (FAX) 517.321.5932

STATE ID. NO.	M&H PROJECT NO.	—	08199-000-09001	DESIGNED	SADW	5/11
03-07	FEDERAL CONTRACT NO.	—	n/a	DRAWN	AEF	5/11
	STATE CONTRACT NO.	—	B-26-0045-3006	CHECKED	SADW	5/11

SHEET: **14 OF 14**

March 22, 2013 - 8:8y (3-07)_Holl-City Airport ALP.dwg

IF PAPER SIZE IS 24"x36" USE SCALE SHOWN. ALL OTHER PAPER SIZES ARE NOT TO SCALE

JULY 31, 2017

WEST MICHIGAN REGIONAL AIRPORT

SITE DEVELOPMENT EVALUATION

West Michigan Airport Authority
Airport Site Development Evaluation
July 31, 2017

There are a variety of parcels at the Airport that are unused or underutilized. Through this evaluation, the West Michigan Airport Authority has developed a strategy for use of each parcel. This strategy serves as a guide for linking potential uses with available parcels. This evaluation is general in nature but does provide direction for future use. The evaluation is also a first step in a business development effort for the airport, the purpose and scope of which are described as follows.

Purpose:

To attract greater use of the airport by ensuring an awareness of local flight benefits, utilizing airport properties effectively, providing opportunities for additional airport uses, and conducting outreach activities for possible development.

Scope of Work:

- Conduct an inventory of airport properties, including an evaluation of how these properties could be used.
- Prepare a plan for use of these properties, setting priorities for possible land uses (i.e., corporate, public, air-service related, government, non-airport related, etc.).
- Begin an airport development effort in cooperation with Tulip City Air Service, Lakeshore Advantage, Michigan West Coast Chamber of Commerce, Mead & Hunt, and the Allegan and Ottawa Counties Economic Development Offices that will:
    - Work with local and regional companies to determine opportunities at the airport;
    - Develop a network with airport-related companies and governmental entities to determine opportunities at the airport;
    - Develop available land at the airport.
- Determine potential incentives for attracting and/or accommodating development.

Airport Site Development Evaluation
July 31, 2017

Refer to Attached Map for Site Location

Site A (1 acre):

- Short-term – renovate site as an attractive entranceway.
- Market property for aeronautical use.
- Pursue FAA land release only if to be used for non-aeronautical purposes. However, it is unlikely that this parcel would be released by the FAA.

Site B (4+ acres):

- Market for aeronautical use.
- Preserve for airport accessory uses.

Site C (8 acres):

- Develop as a future corporate hangar park.
- Market for aeronautical use.
- Preserve for airport accessory uses.

Site D (2.6 acres):

- Preserve & market for aeronautical use but access could be difficult due to adjacent wetland and distance from current access.

Site E (3 acres):

- Market for aeronautical use.
- Could be an attractive site for a corporate hangar.

Site F (5.8 acres):

- Difficult site for aeronautical uses due to the lack of direct access to taxiways and the runway.
- Market for non-aeronautical use but a land release would be required.

Site G (3 acres):

- Great site for future corporate or public hangars.

Site H (14 acres):

- Reserve for future public or corporate hangars.
- Also, a possible site for aeronautical uses.

Site I (5.4 acres):

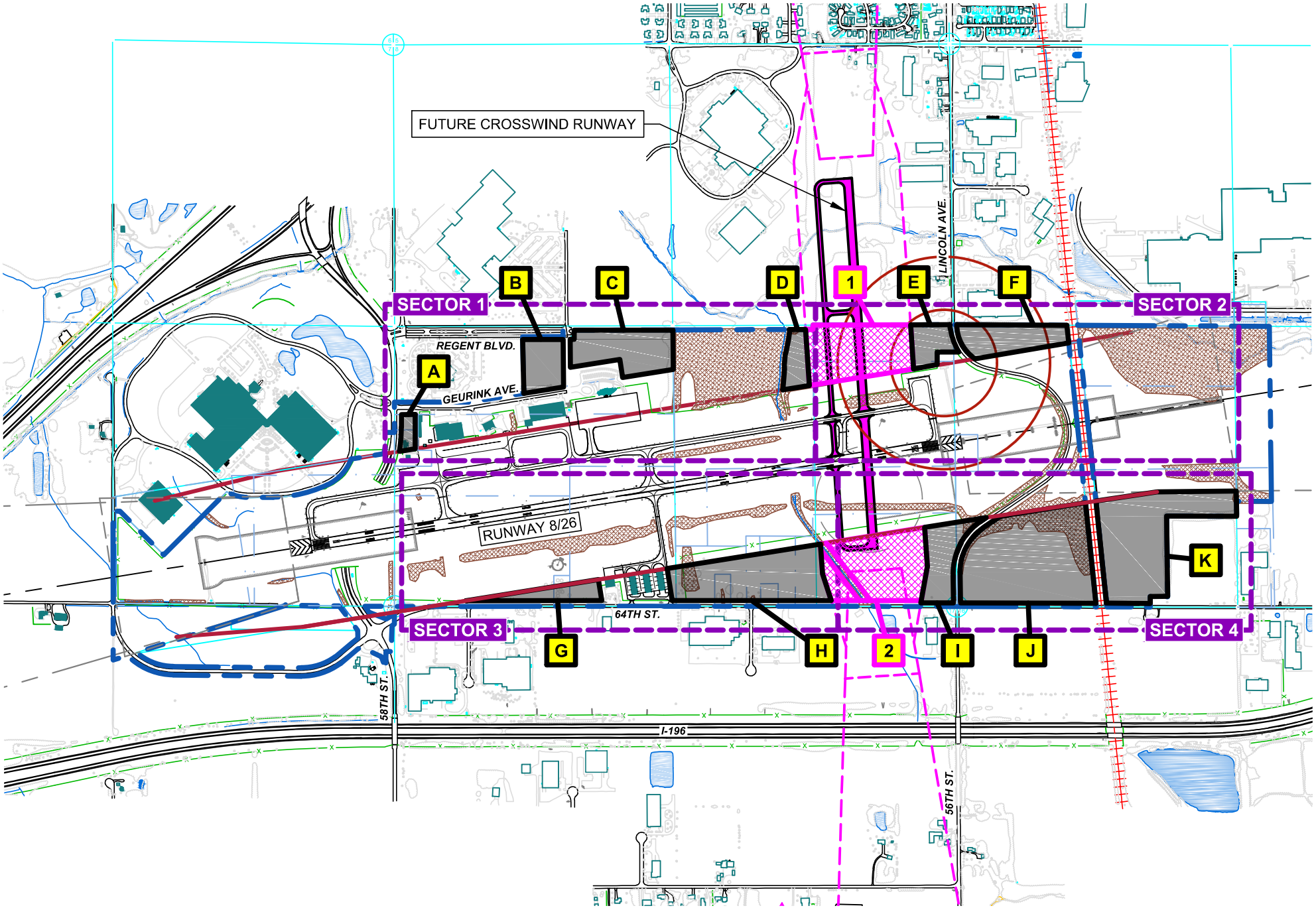
- Market for aeronautical uses.

Site J (23 acres):

- This site is difficult for aeronautical development if access to the runway is desired, due to Lincoln Avenue.
- Evaluate relocating Lincoln Avenue to combine this site with site I.
- If Lincoln Avenue is relocated, then market the combined sites for aeronautical uses.

Site K (18 acres):

- This site is very difficult to develop with aeronautical uses due to its being separated from the runway by the railroad tracks and Lincoln Avenue. As a result, a land release request has been submitted to the FAA.

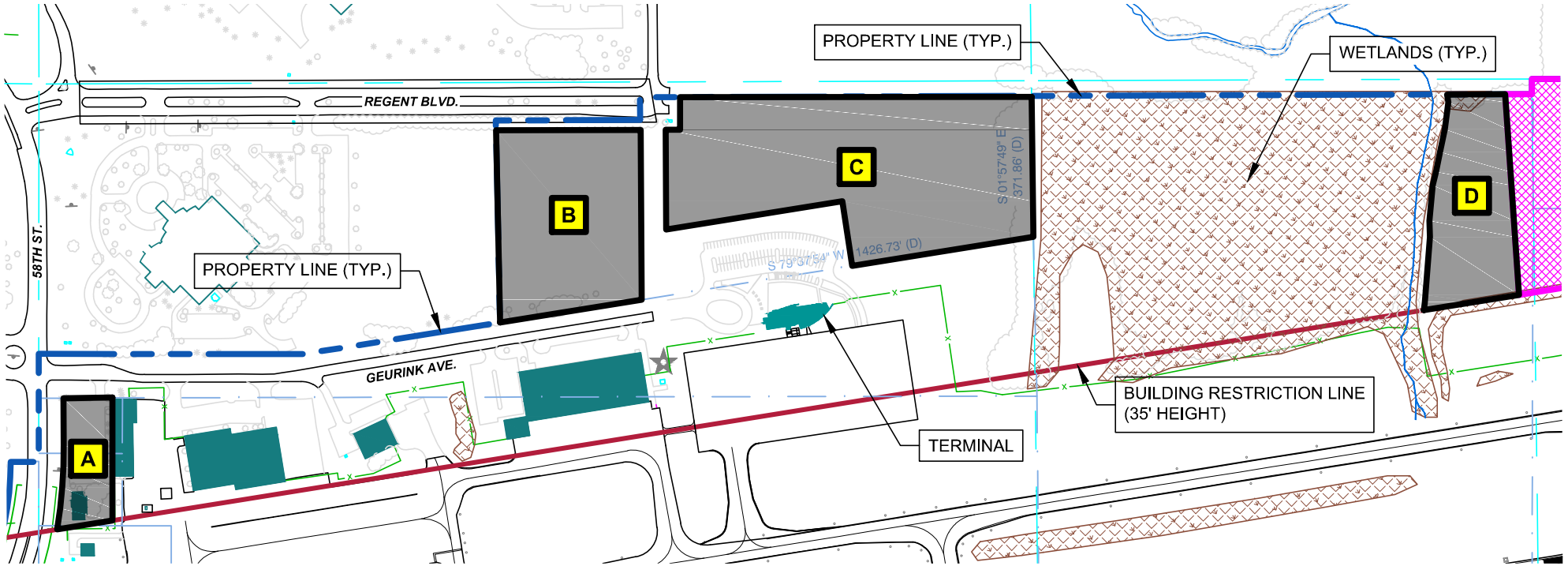


Mead & Hunt

0 300 600 1200

AIRPORT BUILDING DEVELOPMENT OPPORTUNITIES

SITE OVERVIEW



CONSIDERATIONS	***AREA***	**A** **± 1.01 AC.**	**B** **± 4.15 AC.**	**C** **± 7.94 AC.**	**D** **± 2.58 AC.**
AIRFIELD ACCESS		YES	NO	YES	YES
POTENTIAL LAND RELEASE		YES	YES	NO	NO
WETLANDS		NO	NO	NO	NO
HEIGHT LIMITATIONS		NO	NO	NO	NO

SUMMARY:

AREA A - AVIATION DEVELOPMENT IS VIABLE IN THIS AREA DUE TO ITS PROXIMITY TO AN APRON AND PUBLIC ROADWAY.

AREA B - AVIATION DEVELOPMENT IS LIMITED DUE TO THE AREA BEING LOCATED AWAY FROM THE AIRFIELD ACROSS GEURINK BLVD. THE AREA COULD BE CONSIDERED FOR A LAND RELEASE.

AREA C - WITH ACCESS TO THE AIRFIELD THROUGH A NARROW CORRIDOR, AVIATION DEVELOPMENT IS LIMITED AND MAY BE RESERVED FOR T-HANGARS, OR SMALLER BOX STYLE HANGARS. IN ADDITION, THE AREA COULD BE CONSIDERED FOR A LAND RELEASE.

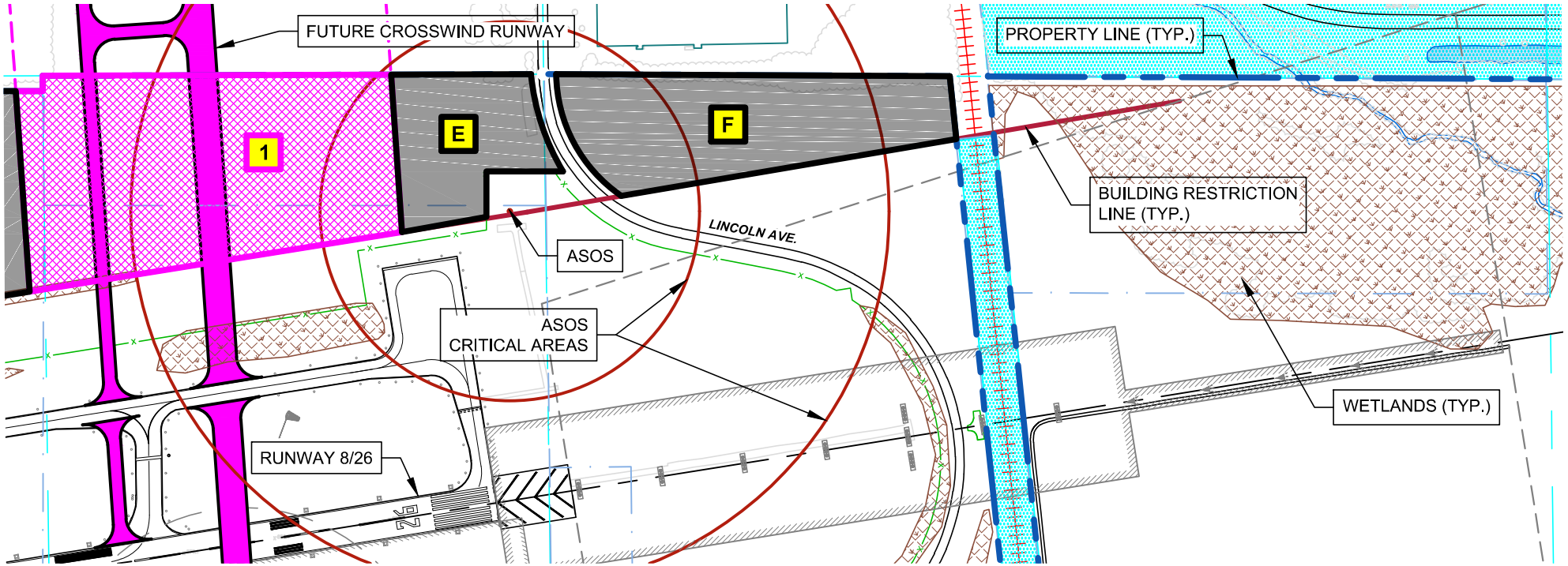
AREA D - WHILE THE AREA HAS ACCESS TO THE AIRFIELD, AVIATION DEVELOPMENT IS LIMITED DUE TO THE ABSENCE OF DIRECT ACCESS FROM A PUBLIC ROADWAY. IF THE FUTURE CROSSWIND RUNWAY WAS ABANDONED THEN THIS AREA COULD BE COMBINED WITH AREAS 'E' AND 'L' TO FORM A LARGER DEVELOPMENT AREA.

Mead & Hunt

0 100 200 400

AIRPORT BUILDING DEVELOPMENT OPPORTUNITIES

SECTOR 1 - AREA 'A', 'B', 'C', AND 'D'



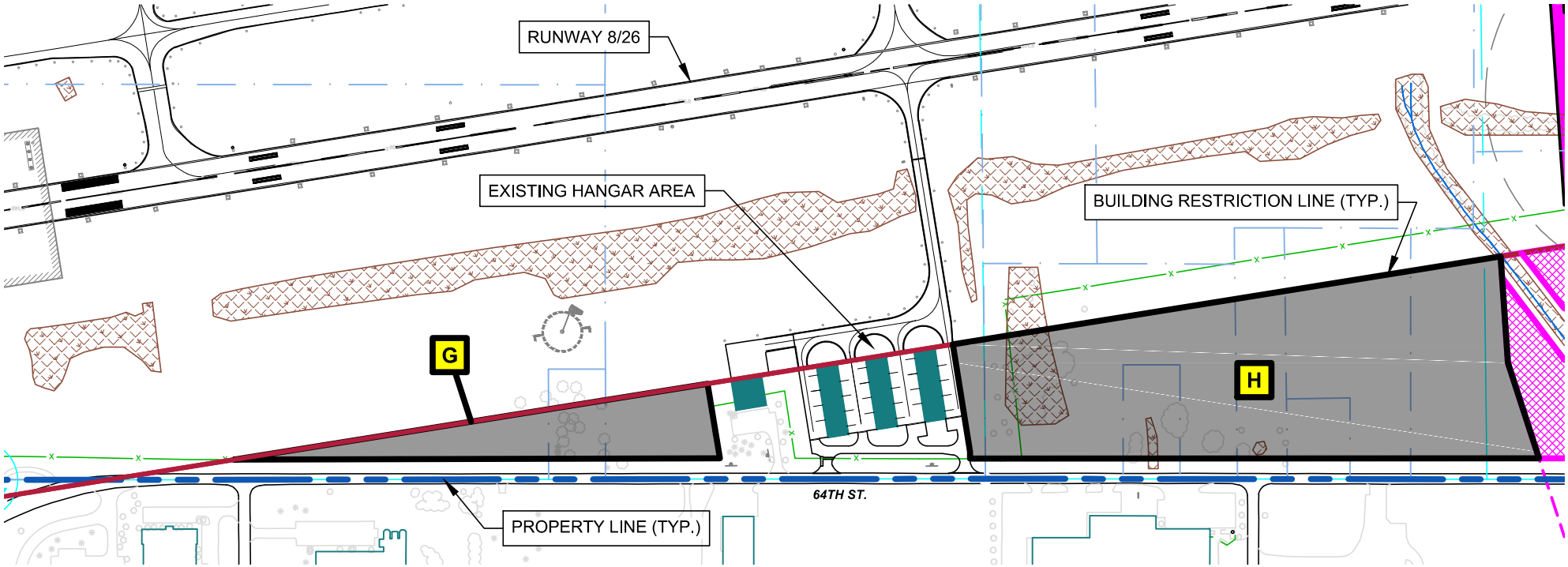
CONSIDERATIONS	***AREA***	**E** **± 3.04 AC.**	**F** **± 5.78 AC.**	**1** **± 11.14 AC.**
AIRFIELD ACCESS		YES	NO	YES
POTENTIAL LAND RELEASE		NO	YES	NO
WETLANDS		NO	NO	NO
HEIGHT LIMITATIONS (ASOS CRITICAL AREA)		YES	YES	YES

SUMMARY:

AREA E - AVIATION DEVELOPMENT IS IMPRACTICAL DUE TO THE PROXIMITY TO THE ASOS AND ASOS CRITICAL AREAS. IF THE ASOS WERE TO BE RELOCATED AWAY FROM THE AREA THEN IT'S POSSIBLE THAT IT COULD SUPPORT HANGAR DEVELOPMENT.

AREA F - AVIATION DEVELOPMENT IS LIMITED DUE TO THE PROXIMITY TO THE ASOS AND ASOS CRITICAL AREA. MOREOVER, THE PROPERTY IS LOCATED ACROSS LINCOLN AVE AND DOES NOT HAVE ACCESS TO THE AIRFIELD. THE AREA COULD BE CONSIDERED FOR A LAND RELEASE.

AREA 1 - THIS AREA WOULD ONLY BECOME AVAILABLE IF THE FUTURE CROSSWIND RUNWAY WERE TO BE ABANDONED. IF THE ASOS WERE TO BE RELOCATED AWAY FROM THE AREA THEN IT WOULD COULD BECOME FULLY DEVELOPED; HOWEVER, IF THE ASOS STAYS IN ITS CURRENT LOCATION THEN ONLY A PORTION OF THE AREA WOULD BE CONSIDERED DEVELOPABLE.

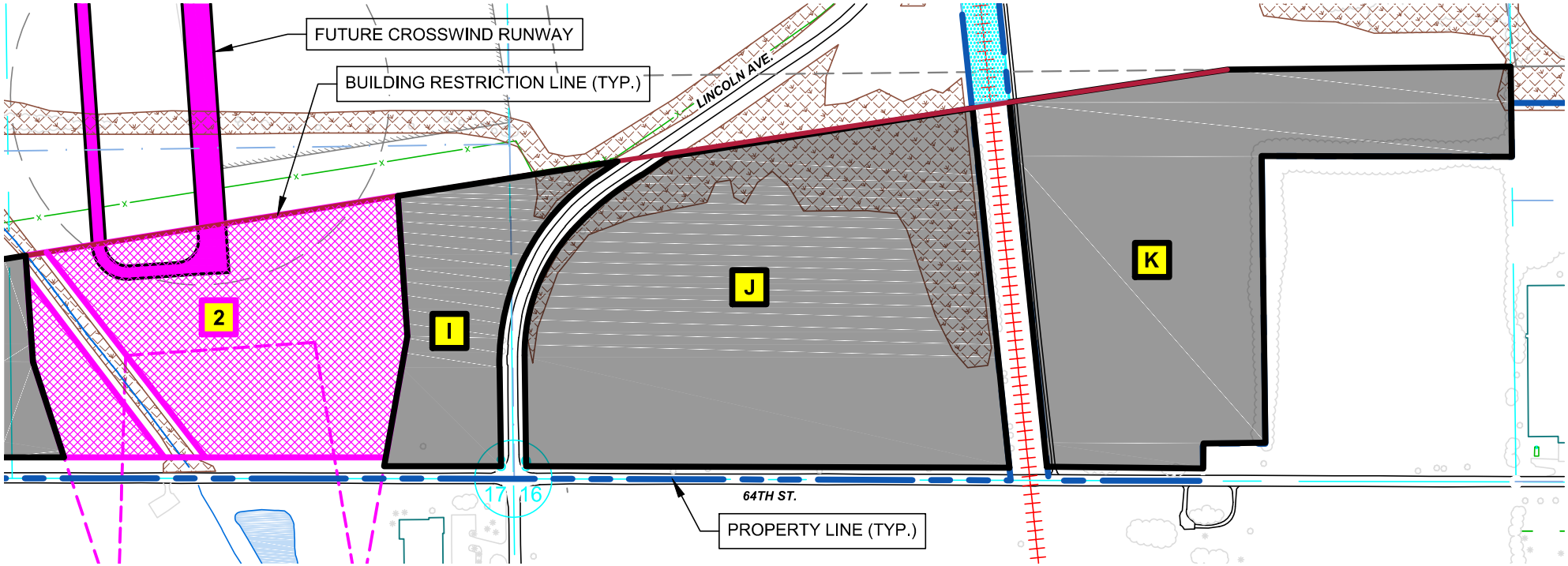


CONSIDERATIONS	***AREA***	**G** **± 2.89 AC.**	**H** **± 14.07 AC.**
AIRFIELD ACCESS		YES	YES
POTENTIAL LAND RELEASE		NO	NO
WETLANDS		NO	YES
HEIGHT LIMITATIONS		NO	NO

SUMMARY:

AREA G - AVIATION DEVELOPMENT IS LIMITED DUE TO THE SMALL SIZE AND TRIANGULAR SHAPE OF THE AREA. HOWEVER, ONE OR TWO HANGARS MAY FIT ALONG THE EASTERN BORDER DEPENDING ON THE SIZE OF THE BUILDINGS.

AREA H - AVIATION DEVELOPMENT IS POSSIBLE DUE TO ACCESS TO THE AIRFIELD AND THE CLOSE PROXIMITY TO THE EXISTING HANGAR AREA. A PORTION OF THE AREA IS COVERED IN WETLANDS WHICH WOULD NEED TO BE MITIGATED IN ORDER TO MAXIMIZE HANGAR DEVELOPMENT ACROSS THE ENTIRE AREA.



CONSIDERATIONS	AREA	I ± 5.39 AC.	J ± 23.00 AC.	K ± 17.70 AC.	2 ± 12.18 AC.
AIRFIELD ACCESS		YES	NO	NO	YES
POTENTIAL LAND RELEASE		NO	YES	YES	NO
WETLANDS / COUNTY DRAIN		YES	YES	NO	YES
HEIGHT LIMITATIONS		NO	NO	NO	NO

SUMMARY:

AREA I - AVIATION DEVELOPMENT IS POSSIBLE DUE TO ACCESS TO THE AIRFIELD.

AREA J - AVIATION DEVELOPMENT IS LIMITED DUE TO THE AREA BEING LOCATED AWAY FROM THE AIRFIELD ACROSS LINCOLN AVE. THE AREA COULD BE CONSIDERED FOR A LAND RELEASE. HOWEVER, THE AREA COULD BECOME DEVELOPABLE IF LINCOLN AVE. WAS RELOCATED ALONG THE RAILROAD AND THE WETLANDS WERE MITIGATED.

AREA K - AVIATION DEVELOPMENT IS LIMITED DUE TO THE AREA BEING LOCATED AWAY FROM THE AIRFIELD ACROSS LINCOLN AVE. AND THE RAILROAD. THE AREA COULD BE CONSIDERED FOR A LAND RELEASE.

AREA 2 - THIS AREA WOULD ONLY BECOME AVAILABLE IF THE FUTURE CROSSWIND RUNWAY WERE TO BE ABANDONED. AVIATION DEVELOPMENT IS POSSIBLE DUE TO ACCESS TO THE AIRFIELD; HOWEVER, THERE IS A COUNTY DRAIN THAT RUNS THROUGH A PORTION OF THE AREA AND WOULD NEED TO BE INCLUDED IN ANY HANGAR DEVELOPMENT PLAN.

West Michigan Airport Authority
60 Geurink Blvd., Holland, MI 49423
P (616) 953.9633
Comprising City of Zeeland, Park Township and City of Holland

DATE: **November 12, 2018**

SUBJECT: **WMAA Communications Committee Board Update**

Tier 1 *(most important)*

UPDATE WEBSITE ON A CONTINUAL BASIS

- Please check the WMRA website for news and updates. www.WestMichiganRegionalAirport.com
  There is a new slider on the home page featuring airport facts.

SOCIAL NETWORKING

- WMRA's **Facebook** page is online listed as "West Michigan Regional Airport." Please take a moment to visit and "Like" the page, make a comment, and share with colleagues, friends and family.

  The WMRA Facebook page has 2,607 "Likes ."

  2018 RECENT PHOTOS

- WMRA's **Twitter** microblogging account is up and "Tweeting." Please join in and add your "Tweets."

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P (616) 953.9633
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Tier 2 *(important)*

PRESS RELEASES/NEWS ARTICLES

- As needed.

2018-2019 PARADES & EVENTS

- **Zeeland's Pumpkinfest Parade**: Saturday, October 6, 2018

  Thanks to Aaron Thelenwood and his family for riding on the jet float in the 2018 Pumpkinfest Parade on Saturday, October 6. We're not sure if the adults had the most fun or the kids!

- The jet float participated in the **Tulip Time Muziekparade** for the 7th year on Saturday, May 12, 2018.

  The float received a Director's Award for "Creativity" from the Tulip Time Board in 2013 and 2015.

- **Wings of Mercy CareAffaire**: Saturday, August 25, 2018

  Due to the weather, the event turned into a huge fundraising hangar party that everyone enjoyed.

PRESENTATIONS/SPEAKING ENGAGEMENTS

- Please contact a Communications Committee member for presentations or speaking engagements.

TIER 3 *(less important)*

- **Design for History Wall in Boardroom**

  The History Wall is being designed in-house and is on its way to be completed.

West Michigan Airport Authority
60 Geurink Blvd., Holland, MI 49423
P (616) 953.9633
Comprising City of Zeeland, Park Township and City of Holland

- **2018 WMRA Video**

  The video will include the new Business Center, airport activities and amenities. It will be designed with the Communications Committee's recommendations.

- **Note Cards and Business Cards**

  Note cards and business cards for Board members are printed and available for use.

Tier 3 *(less important)*

- **eNEWS**

  The eNews was sent out on August 21, 2018. A hard copy is available.

PLEASE CONTACT KAREN IF YOU HAVE ANY QUESTIONS OR COMMENTS.

k.scholten@wmregionalairport.com C 616.953.9633

City of Holland

Accounts Payable Payment Post Listing

Batch Department / Invoice Department	Bank Account	Check Date	Starting Check Number
AIR Airport	PAYABLES ACCOUNT	10/11/2018	49750

Selected Invoices	Vendor	Invoice Number	Invoice Description	Invoice Date	Due Date	Invoice Net Amount
AIR Airport						
	2087 - KAREN SCHOLTEN	2019-00001279	AIRPORT - REIMBURSEMENT FOR FLOAT EXPENSES	10/11/2018	10/11/2018	458.97
	Total Selected Invoices: 1					$458.97

City of Holland

Payment Batch Register

Bank Account: CITY AP - PAYABLES ACCOUNT

Batch Date: 10/10/2018

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
Bank Account: CITY AP - PAYABLES ACCOUNT						
Check	10/11/2018	49750	Accounts Payable	KAREN SCHOLTEN		458.97

Invoice	Date	Description	Amount
2019-00001279	10/11/2018	AIRPORT - REIMBURSEMENT FOR FLOAT EXPENSES	458.97

CITY AP PAYABLES ACCOUNT Totals:		Transactions: 1	$458.97
Checks:	1	$458.97	

City of Holland

Accounts Payable Payment Post Listing

Batch Department / Invoice Department	Bank Account	Check Date	Starting Check Number
AIR Airport	PAYABLES ACCOUNT	10/18/2018	49898

Selected Invoices

AIR Airport

Vendor	Invoice Number	Invoice Description	Invoice Date	Due Date	Invoice Net Amount
101 - CUNNINGHAM DALMAN P.C.	254811	AIRPORT - LEGAL SERVICES	10/05/2018	10/18/2018	131.44
1103 - GREG ROBINSON	2019-00001313	AIRPORT - STIPEND TO OFFSET FAMILY HEALTH INS 10/18-12/18	10/18/2018	10/18/2018	1,625.00
146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001315	AIRPORT - ACCT #77524493-02	09/22/2018	10/18/2018	93.20
316 - MEAD & HUNT INC	283568	AIRPORT - SERVICES FOR SEPTEMBER	10/09/2018	10/18/2018	202.38
3138 - PROGRESSIVE AE	00169420	AIRPORT - AUGUST SERVICES	09/12/2018	10/18/2018	1,175.00
190 - QUALITY AIR HEATING & COOLING INC	220283	AIRPORT - SERVICES FOR 9/1/18-11/30/18	09/11/2018	10/18/2018	664.25
130 - SEMCO ENERGY GAS COMPANY	2019-00001314	AIRPORT - ACCT #0361537.501	10/01/2018	10/18/2018	51.69
800 - STATE OF MICHIGAN	591-10366134	AIRPORT - 7/18-9/18 COSTS FOR WEATHER OBSERVATION DATA SYSTEM	10/05/2018	10/18/2018	103.50
322 - TULIP CITY AIR SERVICE INC	18-047517	AIRPORT - SEPTEMBER SERVICES	09/30/2018	10/18/2018	6,573.76
322 - TULIP CITY AIR SERVICE INC	18-047384	AIRPORT - PHONES AND INTERNET	09/26/2018	10/18/2018	504.50
322 - TULIP CITY AIR SERVICE INC	18-047003	AIRPORT - SUPPLIES	09/11/2018	10/18/2018	74.10
Total Selected Invoices: 11					$11,198.82

City of Holland

Payment Batch Register

Bank Account: CITY AP - PAYABLES ACCOUNT

Batch Date: 10/17/2018

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
Bank Account: CITY AP - PAYABLES ACCOUNT						
Check	10/18/2018	49898	Accounts Payable	CUNNINGHAM DALMAN P.C.		131.44
	Invoice		Date	Description		Amount
	254811		10/05/2018	AIRPORT - LEGAL SERVICES		131.44
Check	10/18/2018	49899	Accounts Payable	GREG ROBINSON		1,625.00
	Invoice		Date	Description		Amount
	2019-00001313		10/18/2018	AIRPORT - STIPEND TO OFFSET FAMILY HEALTH INS 10/18-12/18		1,625.00
Check	10/18/2018	49900	Accounts Payable	HOLLAND BOARD OF PUBLIC WORKS		93.20
	Invoice		Date	Description		Amount
	2019-00001315		09/22/2018	AIRPORT - ACCT #77524493-02		93.20
Check	10/18/2018	49901	Accounts Payable	MEAD & HUNT INC		202.38
	Invoice		Date	Description		Amount
	283568		10/09/2018	AIRPORT - SERVICES FOR SEPTEMBER		202.38
Check	10/18/2018	49902	Accounts Payable	PROGRESSIVE AE		1,175.00
	Invoice		Date	Description		Amount
	00169420		09/12/2018	AIRPORT - AUGUST SERVICES		1,175.00
Check	10/18/2018	49903	Accounts Payable	QUALITY AIR HEATING & COOLING INC		664.25
	Invoice		Date	Description		Amount
	220283		09/11/2018	AIRPORT - SERVICES FOR 9/1/18-11/30/18		664.25
Check	10/18/2018	49904	Accounts Payable	SEMCO ENERGY GAS COMPANY		51.69
	Invoice		Date	Description		Amount
	2019-00001314		10/01/2018	AIRPORT - ACCT #0361537.501		51.69
Check	10/18/2018	49905	Accounts Payable	STATE OF MICHIGAN		103.50
	Invoice		Date	Description		Amount
	591-10366134		10/05/2018	AIRPORT - 7/18-9/18 COSTS FOR WEATHER OBSERVATION DATA SYSTEM		103.50
Check	10/18/2018	49906	Accounts Payable	TULIP CITY AIR SERVICE INC		7,152.36
	Invoice		Date	Description		Amount
	18-047517		09/30/2018	AIRPORT - SEPTEMBER SERVICES		6,573.76

City of Holland

Payment Batch Register

Bank Account: CITY AP - PAYABLES ACCOUNT

Batch Date: 10/17/2018

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
	18-047384		09/26/2018	AIRPORT - PHONES AND INTERNET		504.50
	18-047003		09/11/2018	AIRPORT - SUPPLIES		74.10
CITY AP PAYABLES ACCOUNT Totals:				Transactions: 9		$11,198.82

Checks: 9 $11,198.82

City of Holland

Accounts Payable Payment Post Listing

Batch Department / Invoice Department	Bank Account	Check Date	Starting Check Number
AIR Airport	PAYABLES ACCOUNT	10/25/2018	50029

Selected Invoices	Vendor	Invoice Number	Invoice Description	Invoice Date	Due Date	Invoice Net Amount
AIR Airport						
	2780 - DEANNE BUCKLAND	2019-00001485	AIRPORT - REIMBURSEMENT OF PETTY CASH	10/25/2018	10/25/2018	156.80
	459 - LANDSCAPE DESIGN SERVICES INC	120084	AIRPORT - Annual Landscaping Services - ABC SEPTEMBER 2018	10/10/2018	10/25/2018	160.00
	316 - MEAD & HUNT INC	282545	AIRPORT - AUGUST SERVICES	09/12/2018	10/25/2018	1,799.25
	316 - MEAD & HUNT INC	281783	AIRPORT - JULY SERVICES	08/13/2018	10/25/2018	8,177.25
	2060 - MICHIGAN WEST COAST CHAMBER OF COMMERCE	1144643	AIRPORT - ANNUAL MEMBERSHIP DUES	09/05/2018	10/25/2018	315.00
	Total Selected Invoices: 5					$10,608.30

City of Holland

Payment Batch Register

Bank Account: CITY AP - PAYABLES ACCOUNT

Batch Date: 10/24/2018

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
Bank Account: CITY AP - PAYABLES ACCOUNT						
Check	10/25/2018	50029	Accounts Payable	DEANNE BUCKLAND		156.80
	Invoice		Date	Description		Amount
	2019-00001485		10/25/2018	AIRPORT - REIMBURSEMENT OF PETTY CASH		156.80
Check	10/25/2018	50030	Accounts Payable	LANDSCAPE DESIGN SERVICES INC		160.00
	Invoice		Date	Description		Amount
	120084		10/10/2018	AIRPORT - Annual Landscaping Services - ABC SEPTEMBER 2018		160.00
Check	10/25/2018	50031	Accounts Payable	MEAD & HUNT INC		9,976.50
	Invoice		Date	Description		Amount
	282545		09/12/2018	AIRPORT - AUGUST SERVICES		1,799.25
	281783		08/13/2018	AIRPORT - JULY SERVICES		8,177.25
Check	10/25/2018	50032	Accounts Payable	MICHIGAN WEST COAST CHAMBER OF COMMERCE		315.00
	Invoice		Date	Description		Amount
	1144643		09/05/2018	AIRPORT - ANNUAL MEMBERSHIP DUES		315.00
CITY AP PAYABLES ACCOUNT Totals:				Transactions: 4		$10,608.30

Checks: 4 $10,608.30

City of Holland

Accounts Payable Payment Post Listing

Batch Department / Invoice Department	Bank Account	Check Date	Starting Check Number
AIR Airport	PAYABLES ACCOUNT	11/01/2018	50146

Selected Invoices	Vendor	Invoice Number	Invoice Description	Invoice Date	Due Date	Invoice Net Amount
AIR Airport						
	1295 - COUNTY OF OTTAWA TREASURER	69723A	AIRPORT - DUE FOR 4TH QTR 2018 TAX ADJUSTMENTS	10/08/2018	10/31/2018	89.42
	159 - FRIS OFFICE OUTFITTERS	919235-0	AIRPORT - SUPPLIES	10/25/2018	10/31/2018	87.38
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001550	AIRPORT - ACCT #77526597-00	10/08/2018	10/31/2018	50.41
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001551	AIRPORT - ACCT #77524873-01	10/08/2018	10/31/2018	97.36
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001552	AIRPORT - ACCT #05614220-01	10/08/2018	10/31/2018	896.45
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001553	AIRPORT - ACCT #05614000-01	10/08/2018	10/31/2018	237.21
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001554	AIRPORT - ACCT #05613990-01	10/08/2018	10/31/2018	225.83
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001555	AIRPORT - ACCT #05613700-01	10/08/2018	10/31/2018	427.91
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001556	AIRPORT - ACCT #05613100-02	10/08/2018	10/31/2018	222.06
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001557	AIRPORT - ACCT #77526661-02	10/08/2018	10/31/2018	14.90
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001558	AIRPORT - ACCT #77527804-01	10/08/2018	10/31/2018	3,347.49
	452 - MIDSTATE SECURITY LLC	SV016820	AIRPORT - ANNUAL MONITORING	10/20/2018	10/31/2018	300.00
	3138 - PROGRESSIVE AE	00170048	AIRPORT - SEPTEMBER SERVICES	10/15/2018	10/31/2018	1,400.00
	800 - STATE OF MICHIGAN	591-10359692	AIRPORT - LICENSE FEE	09/13/2018	10/31/2018	50.00
	733 - THE HOLLAND SENTINEL	2019-00001559	AIRPORT - ACCT #0166308	10/22/2018	10/31/2018	224.60
	Total Selected Invoices: 15					$7,671.02

City of Holland

Payment Batch Register

Bank Account: CITY AP - PAYABLES ACCOUNT

Batch Date: 10/31/2018

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
Bank Account: CITY AP - PAYABLES ACCOUNT						
Check	11/01/2018	50146	Accounts Payable	COUNTY OF OTTAWA TREASURER		89.42
	Invoice		Date	Description		Amount
	69723A		10/08/2018	AIRPORT - DUE FOR 4TH QTR 2018 TAX ADJUSTMENTS		89.42
Check	11/01/2018	50147	Accounts Payable	FRIS OFFICE OUTFITTERS		87.38
	Invoice		Date	Description		Amount
	919235-0		10/25/2018	AIRPORT - SUPPLIES		87.38
Check	11/01/2018	50148	Accounts Payable	HOLLAND BOARD OF PUBLIC WORKS		5,519.62
	Invoice		Date	Description		Amount
	2019-00001550		10/08/2018	AIRPORT - ACCT #77526597-00		50.41
	2019-00001551		10/08/2018	AIRPORT - ACCT #77524873-01		97.36
	2019-00001552		10/08/2018	AIRPORT - ACCT #05614220-01		896.45
	2019-00001553		10/08/2018	AIRPORT - ACCT #05614000-01		237.21
	2019-00001554		10/08/2018	AIRPORT - ACCT #05613990-01		225.83
	2019-00001555		10/08/2018	AIRPORT - ACCT #05613700-01		427.91
	2019-00001556		10/08/2018	AIRPORT - ACCT #05613100-02		222.06
	2019-00001557		10/08/2018	AIRPORT - ACCT #77526661-02		14.90
	2019-00001558		10/08/2018	AIRPORT - ACCT #77527804-01		3,347.49
Check	11/01/2018	50149	Accounts Payable	MIDSTATE SECURITY LLC		300.00
	Invoice		Date	Description		Amount
	SV016820		10/20/2018	AIRPORT - ANNUAL MONITORING		300.00
Check	11/01/2018	50150	Accounts Payable	PROGRESSIVE AE		1,400.00
	Invoice		Date	Description		Amount
	00170048		10/15/2018	AIRPORT - SEPTEMBER SERVICES		1,400.00
Check	11/01/2018	50151	Accounts Payable	STATE OF MICHIGAN		50.00
	Invoice		Date	Description		Amount
	591-10359692		09/13/2018	AIRPORT - LICENSE FEE		50.00
Check	11/01/2018	50152	Accounts Payable	THE HOLLAND SENTINEL		224.60
	Invoice		Date	Description		Amount

City of Holland

Payment Batch Register

Bank Account: CITY AP - PAYABLES ACCOUNT

Batch Date: 10/31/2018

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
	2019-00001559		10/22/2018	AIRPORT - ACCT #0166308		224.60
CITY AP PAYABLES ACCOUNT Totals:				Transactions: 7		$7,671.02
	Checks:	7	$7,671.02			

City of Holland

Accounts Payable Payment Post Listing

Batch Department / Invoice Department	Bank Account	Check Date	Starting Check Number
AIR Airport	PAYABLES ACCOUNT	11/08/2018	50254

Selected Invoices	Vendor	Invoice Number	Invoice Description	Invoice Date	Due Date	Invoice Net Amount
AIR Airport						
	159 - FRIS OFFICE OUTFITTERS	2019-00001618	AIRPORT - ACCT #115780	10/31/2018	10/31/2018	87.38
	3992 - PROFESSIONAL BUILDING SERVICES LLC	4052	AIRPORT - OCTOBER 2018 CUSTODIAL SERVICES	10/31/2018	10/31/2018	598.00
	3992 - PROFESSIONAL BUILDING SERVICES LLC	3988	AIRPORT - CLEANING OF INTERIOR AND EXTERIOR WINDOWS	10/31/2018	10/31/2018	1,428.00
	Total Selected Invoices: 3					$2,113.38

City of Holland

Payment Batch Register

Bank Account: CITY AP - PAYABLES ACCOUNT

Batch Date: 11/07/2018

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
Bank Account: CITY AP - PAYABLES ACCOUNT						
Check	11/08/2018	50254	Accounts Payable	FRIS OFFICE OUTFITTERS		87.38

Invoice	Date	Description	Amount
2019-00001618	10/31/2018	AIRPORT - ACCT #115780	87.38

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
Check	11/08/2018	50255	Accounts Payable	PROFESSIONAL BUILDING SERVICES LLC		2,026.00

Invoice	Date	Description	Amount
4052	10/31/2018	AIRPORT - OCTOBER 2018 CUSTODIAL SERVICES	598.00
3988	10/31/2018	AIRPORT - CLEANING OF INTERIOR AND EXTERIOR WINDOWS	1,428.00

CITY AP PAYABLES ACCOUNT Totals:		Transactions: 2	$2,113.38
Checks:	2	$2,113.38	

City of Holland

Accounts Payable Payment Post Listing

Batch Department / Invoice Department	Bank Account	Check Date	Starting Check Number
AIR Airport	PAYABLES ACCOUNT	10/11/2018	49750

Selected Invoices	Vendor	Invoice Number	Invoice Description	Invoice Date	Due Date	Invoice Net Amount
AIR Airport						
	2087 - KAREN SCHOLTEN	2019-00001279	AIRPORT - REIMBURSEMENT FOR FLOAT EXPENSES	10/11/2018	10/11/2018	458.97
	Total Selected Invoices: 1					$458.97

City of Holland

Payment Batch Register

Bank Account: CITY AP - PAYABLES ACCOUNT

Batch Date: 10/10/2018

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
Bank Account: CITY AP - PAYABLES ACCOUNT						
Check	10/11/2018	49750	Accounts Payable	KAREN SCHOLTEN		458.97

Invoice	Date	Description	Amount
2019-00001279	10/11/2018	AIRPORT - REIMBURSEMENT FOR FLOAT EXPENSES	458.97

CITY AP PAYABLES ACCOUNT Totals:		Transactions: 1	$458.97
Checks:	1	$458.97	

City of Holland

Accounts Payable Payment Post Listing

Batch Department / Invoice Department	Bank Account	Check Date	Starting Check Number
AIR Airport	PAYABLES ACCOUNT	10/18/2018	49898

Selected Invoices

AIR Airport

Vendor	Invoice Number	Invoice Description	Invoice Date	Due Date	Invoice Net Amount
101 - CUNNINGHAM DALMAN P.C.	254811	AIRPORT - LEGAL SERVICES	10/05/2018	10/18/2018	131.44
1103 - GREG ROBINSON	2019-00001313	AIRPORT - STIPEND TO OFFSET FAMILY HEALTH INS 10/18-12/18	10/18/2018	10/18/2018	1,625.00
146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001315	AIRPORT - ACCT #77524493-02	09/22/2018	10/18/2018	93.20
316 - MEAD & HUNT INC	283568	AIRPORT - SERVICES FOR SEPTEMBER	10/09/2018	10/18/2018	202.38
3138 - PROGRESSIVE AE	00169420	AIRPORT - AUGUST SERVICES	09/12/2018	10/18/2018	1,175.00
190 - QUALITY AIR HEATING & COOLING INC	220283	AIRPORT - SERVICES FOR 9/1/18-11/30/18	09/11/2018	10/18/2018	664.25
130 - SEMCO ENERGY GAS COMPANY	2019-00001314	AIRPORT - ACCT #0361537.501	10/01/2018	10/18/2018	51.69
800 - STATE OF MICHIGAN	591-10366134	AIRPORT - 7/18-9/18 COSTS FOR WEATHER OBSERVATION DATA SYSTEM	10/05/2018	10/18/2018	103.50
322 - TULIP CITY AIR SERVICE INC	18-047517	AIRPORT - SEPTEMBER SERVICES	09/30/2018	10/18/2018	6,573.76
322 - TULIP CITY AIR SERVICE INC	18-047384	AIRPORT - PHONES AND INTERNET	09/26/2018	10/18/2018	504.50
322 - TULIP CITY AIR SERVICE INC	18-047003	AIRPORT - SUPPLIES	09/11/2018	10/18/2018	74.10
Total Selected Invoices: 11					$11,198.82

City of Holland

Payment Batch Register

Bank Account: CITY AP - PAYABLES ACCOUNT

Batch Date: 10/17/2018

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
Bank Account: CITY AP - PAYABLES ACCOUNT						
Check	10/18/2018	49898	Accounts Payable	CUNNINGHAM DALMAN P.C.		131.44
	Invoice		Date	Description		Amount
	254811		10/05/2018	AIRPORT - LEGAL SERVICES		131.44
Check	10/18/2018	49899	Accounts Payable	GREG ROBINSON		1,625.00
	Invoice		Date	Description		Amount
	2019-00001313		10/18/2018	AIRPORT - STIPEND TO OFFSET FAMILY HEALTH INS 10/18-12/18		1,625.00
Check	10/18/2018	49900	Accounts Payable	HOLLAND BOARD OF PUBLIC WORKS		93.20
	Invoice		Date	Description		Amount
	2019-00001315		09/22/2018	AIRPORT - ACCT #77524493-02		93.20
Check	10/18/2018	49901	Accounts Payable	MEAD & HUNT INC		202.38
	Invoice		Date	Description		Amount
	283568		10/09/2018	AIRPORT - SERVICES FOR SEPTEMBER		202.38
Check	10/18/2018	49902	Accounts Payable	PROGRESSIVE AE		1,175.00
	Invoice		Date	Description		Amount
	00169420		09/12/2018	AIRPORT - AUGUST SERVICES		1,175.00
Check	10/18/2018	49903	Accounts Payable	QUALITY AIR HEATING & COOLING INC		664.25
	Invoice		Date	Description		Amount
	220283		09/11/2018	AIRPORT - SERVICES FOR 9/1/18-11/30/18		664.25
Check	10/18/2018	49904	Accounts Payable	SEMCO ENERGY GAS COMPANY		51.69
	Invoice		Date	Description		Amount
	2019-00001314		10/01/2018	AIRPORT - ACCT #0361537.501		51.69
Check	10/18/2018	49905	Accounts Payable	STATE OF MICHIGAN		103.50
	Invoice		Date	Description		Amount
	591-10366134		10/05/2018	AIRPORT - 7/18-9/18 COSTS FOR WEATHER OBSERVATION DATA SYSTEM		103.50
Check	10/18/2018	49906	Accounts Payable	TULIP CITY AIR SERVICE INC		7,152.36
	Invoice		Date	Description		Amount
	18-047517		09/30/2018	AIRPORT - SEPTEMBER SERVICES		6,573.76

City of Holland

Payment Batch Register

Bank Account: CITY AP - PAYABLES ACCOUNT

Batch Date: 10/17/2018

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
	18-047384		09/26/2018	AIRPORT - PHONES AND INTERNET		504.50
	18-047003		09/11/2018	AIRPORT - SUPPLIES		74.10
CITY AP PAYABLES ACCOUNT Totals:				Transactions: 9		$11,198.82

Checks: 9 $11,198.82

City of Holland

Accounts Payable Payment Post Listing

Batch Department / Invoice Department	Bank Account	Check Date	Starting Check Number
AIR Airport	PAYABLES ACCOUNT	10/25/2018	50029

Selected Invoices	Vendor	Invoice Number	Invoice Description	Invoice Date	Due Date	Invoice Net Amount
AIR Airport						
	2780 - DEANNE BUCKLAND	2019-00001485	AIRPORT - REIMBURSEMENT OF PETTY CASH	10/25/2018	10/25/2018	156.80
	459 - LANDSCAPE DESIGN SERVICES INC	120084	AIRPORT - Annual Landscaping Services - ABC SEPTEMBER 2018	10/10/2018	10/25/2018	160.00
	316 - MEAD & HUNT INC	282545	AIRPORT - AUGUST SERVICES	09/12/2018	10/25/2018	1,799.25
	316 - MEAD & HUNT INC	281783	AIRPORT - JULY SERVICES	08/13/2018	10/25/2018	8,177.25
	2060 - MICHIGAN WEST COAST CHAMBER OF COMMERCE	1144643	AIRPORT - ANNUAL MEMBERSHIP DUES	09/05/2018	10/25/2018	315.00
	Total Selected Invoices: 5					$10,608.30

City of Holland

Payment Batch Register

Bank Account: CITY AP - PAYABLES ACCOUNT

Batch Date: 10/24/2018

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
Bank Account: CITY AP - PAYABLES ACCOUNT						
Check	10/25/2018	50029	Accounts Payable	DEANNE BUCKLAND		156.80
	Invoice		Date	Description		Amount
	2019-00001485		10/25/2018	AIRPORT - REIMBURSEMENT OF PETTY CASH		156.80
Check	10/25/2018	50030	Accounts Payable	LANDSCAPE DESIGN SERVICES INC		160.00
	Invoice		Date	Description		Amount
	120084		10/10/2018	AIRPORT - Annual Landscaping Services - ABC SEPTEMBER 2018		160.00
Check	10/25/2018	50031	Accounts Payable	MEAD & HUNT INC		9,976.50
	Invoice		Date	Description		Amount
	282545		09/12/2018	AIRPORT - AUGUST SERVICES		1,799.25
	281783		08/13/2018	AIRPORT - JULY SERVICES		8,177.25
Check	10/25/2018	50032	Accounts Payable	MICHIGAN WEST COAST CHAMBER OF COMMERCE		315.00
	Invoice		Date	Description		Amount
	1144643		09/05/2018	AIRPORT - ANNUAL MEMBERSHIP DUES		315.00
CITY AP PAYABLES ACCOUNT Totals:				Transactions: 4		$10,608.30

Checks: 4 $10,608.30

City of Holland

Accounts Payable Payment Post Listing

Batch Department / Invoice Department	Bank Account	Check Date	Starting Check Number
AIR Airport	PAYABLES ACCOUNT	11/01/2018	50146

Selected Invoices	Vendor	Invoice Number	Invoice Description	Invoice Date	Due Date	Invoice Net Amount
AIR Airport						
	1295 - COUNTY OF OTTAWA TREASURER	69723A	AIRPORT - DUE FOR 4TH QTR 2018 TAX ADJUSTMENTS	10/08/2018	10/31/2018	89.42
	159 - FRIS OFFICE OUTFITTERS	919235-0	AIRPORT - SUPPLIES	10/25/2018	10/31/2018	87.38
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001550	AIRPORT - ACCT #77526597-00	10/08/2018	10/31/2018	50.41
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001551	AIRPORT - ACCT #77524873-01	10/08/2018	10/31/2018	97.36
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001552	AIRPORT - ACCT #05614220-01	10/08/2018	10/31/2018	896.45
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001553	AIRPORT - ACCT #05614000-01	10/08/2018	10/31/2018	237.21
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001554	AIRPORT - ACCT #05613990-01	10/08/2018	10/31/2018	225.83
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001555	AIRPORT - ACCT #05613700-01	10/08/2018	10/31/2018	427.91
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001556	AIRPORT - ACCT #05613100-02	10/08/2018	10/31/2018	222.06
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001557	AIRPORT - ACCT #77526661-02	10/08/2018	10/31/2018	14.90
	146 - HOLLAND BOARD OF PUBLIC WORKS	2019-00001558	AIRPORT - ACCT #77527804-01	10/08/2018	10/31/2018	3,347.49
	452 - MIDSTATE SECURITY LLC	SV016820	AIRPORT - ANNUAL MONITORING	10/20/2018	10/31/2018	300.00
	3138 - PROGRESSIVE AE	00170048	AIRPORT - SEPTEMBER SERVICES	10/15/2018	10/31/2018	1,400.00
	800 - STATE OF MICHIGAN	591-10359692	AIRPORT - LICENSE FEE	09/13/2018	10/31/2018	50.00
	733 - THE HOLLAND SENTINEL	2019-00001559	AIRPORT - ACCT #0166308	10/22/2018	10/31/2018	224.60
	Total Selected Invoices: 15					$7,671.02

City of Holland

Payment Batch Register

Bank Account: CITY AP - PAYABLES ACCOUNT

Batch Date: 10/31/2018

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
Bank Account: CITY AP - PAYABLES ACCOUNT						
Check	11/01/2018	50146	Accounts Payable	COUNTY OF OTTAWA TREASURER		89.42
	Invoice		Date	Description		Amount
	69723A		10/08/2018	AIRPORT - DUE FOR 4TH QTR 2018 TAX ADJUSTMENTS		89.42
Check	11/01/2018	50147	Accounts Payable	FRIS OFFICE OUTFITTERS		87.38
	Invoice		Date	Description		Amount
	919235-0		10/25/2018	AIRPORT - SUPPLIES		87.38
Check	11/01/2018	50148	Accounts Payable	HOLLAND BOARD OF PUBLIC WORKS		5,519.62
	Invoice		Date	Description		Amount
	2019-00001550		10/08/2018	AIRPORT - ACCT #77526597-00		50.41
	2019-00001551		10/08/2018	AIRPORT - ACCT #77524873-01		97.36
	2019-00001552		10/08/2018	AIRPORT - ACCT #05614220-01		896.45
	2019-00001553		10/08/2018	AIRPORT - ACCT #05614000-01		237.21
	2019-00001554		10/08/2018	AIRPORT - ACCT #05613990-01		225.83
	2019-00001555		10/08/2018	AIRPORT - ACCT #05613700-01		427.91
	2019-00001556		10/08/2018	AIRPORT - ACCT #05613100-02		222.06
	2019-00001557		10/08/2018	AIRPORT - ACCT #77526661-02		14.90
	2019-00001558		10/08/2018	AIRPORT - ACCT #77527804-01		3,347.49
Check	11/01/2018	50149	Accounts Payable	MIDSTATE SECURITY LLC		300.00
	Invoice		Date	Description		Amount
	SV016820		10/20/2018	AIRPORT - ANNUAL MONITORING		300.00
Check	11/01/2018	50150	Accounts Payable	PROGRESSIVE AE		1,400.00
	Invoice		Date	Description		Amount
	00170048		10/15/2018	AIRPORT - SEPTEMBER SERVICES		1,400.00
Check	11/01/2018	50151	Accounts Payable	STATE OF MICHIGAN		50.00
	Invoice		Date	Description		Amount
	591-10359692		09/13/2018	AIRPORT - LICENSE FEE		50.00
Check	11/01/2018	50152	Accounts Payable	THE HOLLAND SENTINEL		224.60
	Invoice		Date	Description		Amount

City of Holland

Payment Batch Register

Bank Account: CITY AP - PAYABLES ACCOUNT

Batch Date: 10/31/2018

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
	2019-00001559		10/22/2018	AIRPORT - ACCT #0166308		224.60
CITY AP PAYABLES ACCOUNT Totals:				Transactions: 7		$7,671.02
	Checks:	7	$7,671.02			

City of Holland

Accounts Payable Payment Post Listing

Batch Department / Invoice Department	Bank Account	Check Date	Starting Check Number
AIR Airport	PAYABLES ACCOUNT	11/08/2018	50254

Selected Invoices	Vendor	Invoice Number	Invoice Description	Invoice Date	Due Date	Invoice Net Amount
AIR Airport						
	159 - FRIS OFFICE OUTFITTERS	2019-00001618	AIRPORT - ACCT #115780	10/31/2018	10/31/2018	87.38
	3992 - PROFESSIONAL BUILDING SERVICES LLC	4052	AIRPORT - OCTOBER 2018 CUSTODIAL SERVICES	10/31/2018	10/31/2018	598.00
	3992 - PROFESSIONAL BUILDING SERVICES LLC	3988	AIRPORT - CLEANING OF INTERIOR AND EXTERIOR WINDOWS	10/31/2018	10/31/2018	1,428.00
	Total Selected Invoices: 3					$2,113.38

City of Holland

Payment Batch Register

Bank Account: CITY AP - PAYABLES ACCOUNT

Batch Date: 11/07/2018

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
Bank Account: CITY AP - PAYABLES ACCOUNT						
Check	11/08/2018	50254	Accounts Payable	FRIS OFFICE OUTFITTERS		87.38

Invoice	Date	Description	Amount
2019-00001618	10/31/2018	AIRPORT - ACCT #115780	87.38

Type	Date	Number	Source	Payee Name	EFT Bank/Account	Transaction Amount
Check	11/08/2018	50255	Accounts Payable	PROFESSIONAL BUILDING SERVICES LLC		2,026.00

Invoice	Date	Description	Amount
4052	10/31/2018	AIRPORT - OCTOBER 2018 CUSTODIAL SERVICES	598.00
3988	10/31/2018	AIRPORT - CLEANING OF INTERIOR AND EXTERIOR WINDOWS	1,428.00

CITY AP PAYABLES ACCOUNT Totals:		Transactions: 2	$2,113.38
Checks:	2	$2,113.38	

West Michigan Airport Authority
60 Geurink Boulevard, Holland, MI 49423
P (616) 510-2332
Comprising City of Zeeland, Park Township and City of Holland

November 12, 2018

To: West Michigan Airport Authority Board.

From: Greg Robinson, Authority Manager.

Subject: **Development Activities.**

Regarding development activities at the airport, the following has taken place since the last Board meeting.

1. I have met with Chris Hart on the status of the **restaurant analysis.** Chris is doing extensive research on this and hopes to have the phase 1 report into us by November 16. This phase will evaluate the potential for a restaurant at the airport, possible menu and hours. If his phase 1 work indicates that there is the potential for a restaurant, then he will research possible tenants and building costs
2. We have had interest expressed for constructing a **corporate hangar** at the airport. We do receive interest/inquiries like this from time to time and our intent is to be as responsive and informative as we can.
3. I have a meeting set with a representative of **Lakeshore Advantage** to discuss available properties at the airport and what role they may be able to play in assisting us or vice versa.
4. Ron Engel of airport consultant Mead & Hunt will be connecting me with someone in this organization to discuss possible **aeronautical-related companies** that we may be able to contact.
5. We have contacted our MDOT/AERO representative concerning the status of the **FAA land release** for parcel K. We do not have a status report yet.
6. As explained in an earlier report, the Building & Development Committee is evaluating concepts for the location of **additional public and corporate hangars** at the airport.

I do not want to create any unreasonable expectations with you about developing airport properties. This can be a long, labor-intensive activity that may at times seem not to bear significant results. However, we need to be sure that:

West Michigan Airport Authority
60 Geurink Boulevard, Holland, MI 49423
P (616) 510-2332
Comprising City of Zeeland, Park Township and City of Holland

- We have our plans in place;
- The properties are ready for development;
- Area economic development organizations and companies are aware of opportunities at the airport;
- We are conducting outreach activities;
- We are aware of the development process with the City and FAA; and that
- We are ready to move quickly.

REQUEST FOR PROPOSALS – CARD READERS FOR SECURITY GATES

West Michigan Airport Authority

October 23, 2018

The West Michigan Airport Authority is seeking Bids for installation/replacement of security card readers at vehicle gates surrounding the runway located at the West Michigan Regional Airport, 60 Geurink Boulevard, Holland, Michigan 49423. The intent is for all card readers currently maintained by the airport authority to be supported by the same system/vendor.

I. SCOPE OF WORK

A. Required Equipment & Software:

1. Three (3) security card readers located at vehicle gates surrounding the airport runway*
2. All requisite hardware to support & connect the card readers
3. Installation of relevant hardware to open vehicle gates when security card is scanned
4. Installation of required software to support & monitor the card reader systems, installed on a designated computer system operated by Tulip City Air Service (FBO)
5. Software & hardware allowing FBO to directly activate, deactivate, or edit security cards and parameters

*see attached map

B. Optional Equipment & Software:

1. Integrated video system for driver identification
2. Integrated system to notify FBO/request runway access at the gate (buzzer, intercom, etc.)
3. Mobile/app friendly interface, allowing FBO staff to monitor gates from a mobile device

Each Bidder is expected to provide pricing for each of the items as outlined above (both A & B), in an itemized list (broken out by items/products offered by the Bidder), attached to this bid, clearly marked as "Product List A" & "Product List B." The Airport Authority, at it's sole discretion will determine, which combination of the equipment and features outlined above will be installed.

For A & B, the Bidder will provide a summary of service options (in lay terms) it offers to meet the needs of the airport Authority as described in A & B. The Bidder should be prepared to provide any relevant technical specs for the systems & equipment it proposes.

Once selected, the approved Bidder (Contractor) will work directly with FBO staff to coordinate installation of equipment and software. The selected Contractor must provide a designated point of contact for all technical and customer service support questions.

II. INDEMNIFICATION

The Contractor will agree to defend, indemnify, and save harmless the West Michigan Airport Authority, its officers, agents, and employees, from any and all claims and liabilities that may result from the Contractors work. This covenant of indemnification shall include reasonable attorney's fees and costs incurred by the West Michigan Airport Authority, its officers, agents, and employees in defense of such claim or liability.

III. INSURANCE

The Contractor is to maintain the following insurance:

a. General liability insurance with bodily injury limits of not less than $1,000,000.
b. Automobile Liability insurance with bodily injury limits of not less than $1,000,000.
c. Workers Compensation insurance in accordance with statutory requirements and employer's liability insurance with limits of not less than $100,000 for each occurrence.
d. Property Damage insurance in an amount of not less than $1,000,000.
e. Bonds if work exceeds $50,000.

f. The Contractor shall name the West Michigan Airport Authority, its officers, agents, and employees as additional insureds and the insurance coverage for general liability, automobile liability, and property damage shall waive subrogation against the West Michigan Airport Authority, its officers, agents, and employees.

IV. QUALIFICATIONS

Contractors must have experience performing work as described above.

V. WARRANTY

The Contractor shall warrant that the Work performed under the Contract conforms to the Contract requirements and is free of any defect in equipment, material, workmanship, furnished or performed by the Contractor or any subcontractor or supplier of the Contractor. This warranty shall continue for a period of one (1) year from the final acceptance of the Work. If the Authority takes possession of any part of the Work before final acceptance, this warranty shall continue for a period one (1) year from the date the Authority takes possession. However, this will not relieve the Contractor from corrective items required by the final acceptance of the Work. The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to the Authority's real or personal property when that damage is the result of: (1) The Contractor's failure to conform to contract requirements; or (2) Any defect of equipment, material, workmanship, or design furnished by the Contractor or any subcontractor or supplier of the Contractor. The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for one year from the date of repair or replacement. The Authority will notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage. If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Authority shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage, at the Contractor's expense, including reasonable attorney's fees and costs incurred to enforce the warranty. This warranty shall not limit the Authority's rights with respect to latent defects, gross mistakes, or fraud.

VI. MATERIALS TO BE USED

All materials used must comply with relevant state & federal regulations

VII. CONTRACTOR BID

Each Bidder is to provide an itemized price list for all relevant equipment & software attached to the bid form as an Addendum and clearly marked as "Product List A" & "Product List B."

Option A:

	Equipment Cost	Mobilization fees
Items 1-5		
Option A Total		
Expected Timeline to complete installation (hours)		

Option B:

	Equipment Cost	Mobilization fees
Items 1-3		
Option B Total		
Expected Timeline to complete installation (hours)		
Total Project Cost		

Proposals are due by 5:00 p.m. on Tuesday, November 6th, 2018. Two (2) sealed hard copies and one electronic (email or PDF) copy must be delivered to the reception desk at the Airport Business Center, 60 Geurink Boulevard. The envelope should be addressed to:

The West Michigan Airport Authority
60 Geurink Blvd.
Holland, MI 49423

And conspicuously labeled as:

Vehicle Gate Card Reader Bid

And must include the name of the contractor and business address.

The emailed copy may be submitted to Airport Authority assistant manager, Aaron Thelenwood, at: a.thelenwood@wmairportauthority.com with the subject line "Vehicle Gate Card Reader Bid"

VIII. AWARD OF BID

The Airport Authority, at it's sole discretion, will determine which equipment/system options will be approved. The contract will be awarded to the lowest, responsible, and qualified bidder.

The West Michigan Airport Authority reserves the right to accept or reject any or all bids, in whole or part, or rebid if it is in the best interest of the Authority. The Authority also retains the right to waive any informalities/irregularities in the bids, as well as the right to split the award or bid between two or more bidders.

Further information can be obtained from Authority Assistant Manager Aaron Thelenwood at a.thelenwood@wmairportauthority.com.

West Michigan Regional Airport

Produced By: City of Holland | Cartographer: Alex Ebenstein | Date: 10/11/2018

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WEST MICHIGAN REGIONAL AIRPORT
REQUEST FOR PROPOSALS – CARD READERS FOR SECURITY GATE
ADDENDUM I.

This addendum serves as notice to all contractors initially contacted regarding the change of due date for bids related to the Request for Proposals to install/replace security card readers on the West Michigan Regional Airport Airfield.

Whereas, the Original Due Date was November 6th, 2018 by 5pm, that date has been extended to Friday, November 16th by 5:00pm.

Please note, there are no additional changes to the original RFP at this time. Any questions can be directed to Assistant Airport Authority Manager, Aaron Thelenwood at (616) 368-3021 or a.thelenwood@wmairportauthority.com.