

Michigan Aeronautics Commission

20:1 Approach Penetrations and Loss of Night Procedures

March 20, 2014
Lansing, Michigan

Mark Grennell, P.E.
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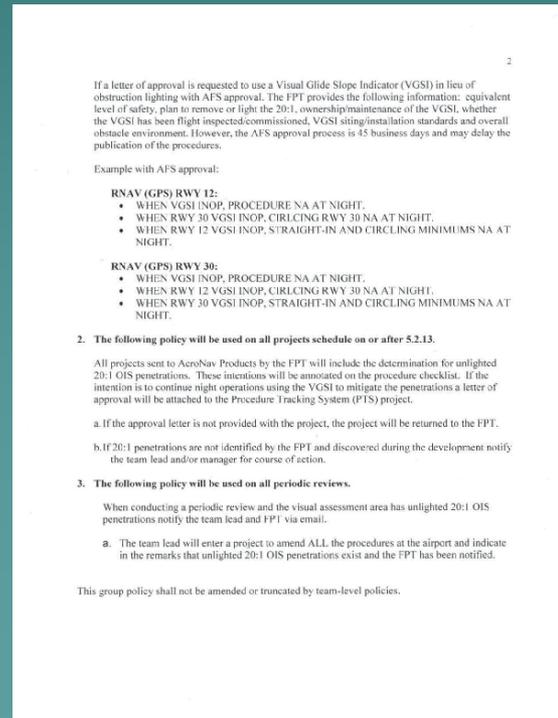
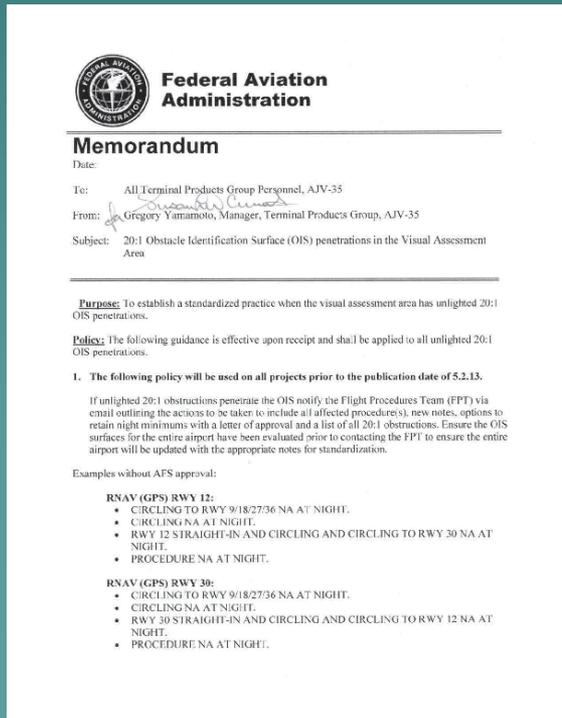


20:1 Approach Penetrations



History

- ◆ Oakland/Troy Airport: January 2013
 - RNAV (GPS) RWY 9, Procedure NA at Night
 - VOR-A, Procedure NA at Night
- ◆ FAA Memorandum: September 2012



FAA Approach Guidance

- ◆ 14 CFR Part 77
- ◆ Terminal Instrument Procedures (TERPS)
8260.3/8260.19

20:1 Approach

- ◆ FAA reviews approach procedures every 2 years.
- ◆ During the review, new obstacles are routinely identified that penetrate the 20:1 visual surface.
 - New surveys
 - On/Off airport construction adds obstacles to the database
 - Flight check observed obstacles
- ◆ Keeping the 20:1 surface clear is the responsibility of the airport authority/sponsor

FAA Notification

◆ Obstacle Listing

Copy all on the VOR-A and RNAV (GPS) RWY 28 procedures. I needed to send you a list of the 20:1 penetrations and let you know that due to the penetrations, the procedures will be "NA AT NIGHT". Below is an e-mail of how we will handle situations regarding mitigation of 20:1's utilizing VGSI. I'm sending the information below to you so that you can determine whether we will attempt to mitigate 20:1 penetrations for the RNAV (GPS) RWY 28 procedure or just keep it "NA AT NIGHT".

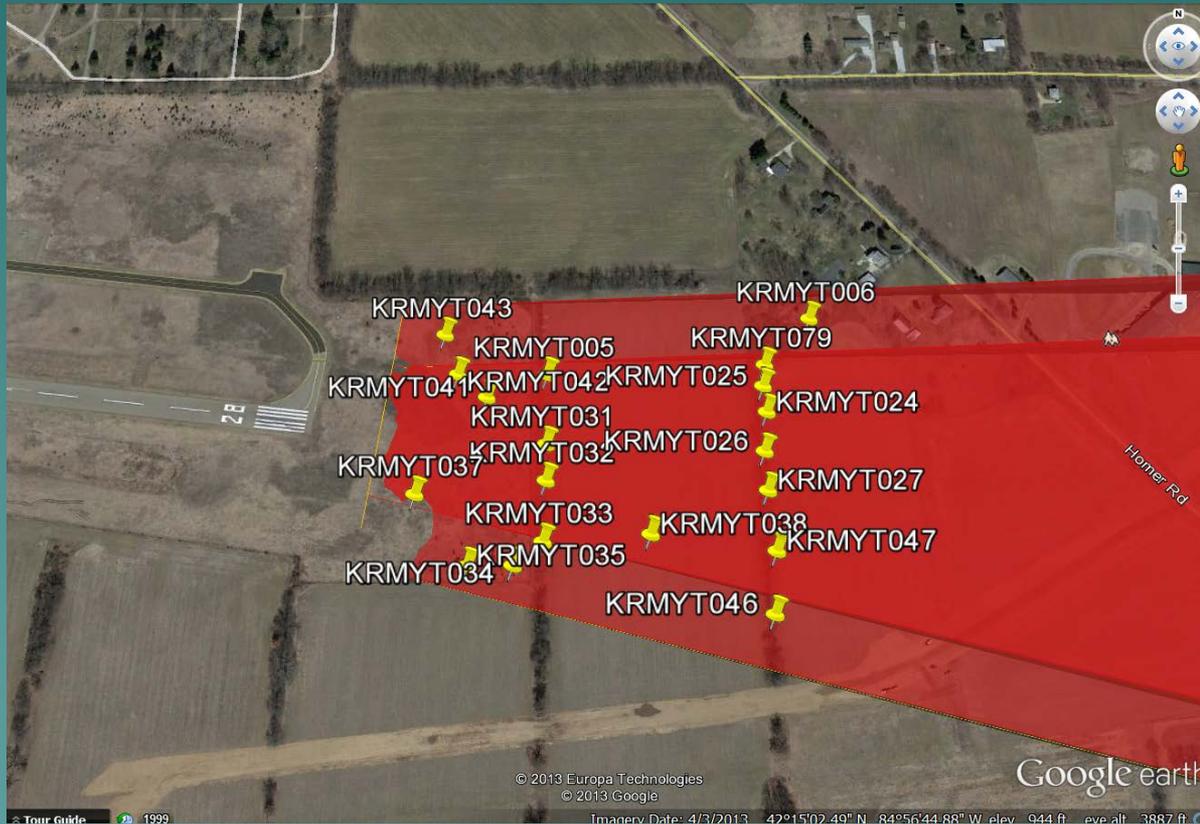
TERPS, VOLUME 1 "VISUAL PORTION OF FINAL" PENETRATIONS:

20:1

R28 962 TREE (KRMYP032) 421500.07N-0845647.50W (0.57)
R28 944 TREE (KRMYP043) 521504.59N-0845651.63W (0.63)
R28 963 TREE (KRMYP033) 421458.30N-0845647.57W (0.79)
R28 948 TREE (KRMYP042) 421503.31N-0845651.04W (1.68)
R28 954 TREE (KRMYP035) 421457.62N-0845650.37W (1.85)
R28 965 TREE (KRMYP031) 421501.16N-0845647.52W (4.28)
R28 1000 TREE (KRMYP046) 421456.28N-0845638.99W (4.58)
R28 964 TREE (KRMYP034) 421457.63N-0845648.67W (5.51)
R28 950 TREE (KRMYP037) 421459.66N-0845652.47W (6.88)
R28 968 TREE (KRMYP005) 421503.30N-0845647.52W (8.82)
R28 1003 TREE (KRMYP026) 421500.95N-0845639.09W (10.68)
R28 1009 TREE (KRMYP006) 421505.07N-0845637.08W (11.59)
R28 952 TREE (KRMYP038) 421458.52N-0845643.52W (12.14)
R28 1004 TREE (KRMYP079) 421503.60N-0845638.94W (12.67)
R28 1006 TREE (KRMYP027) 421459.79N-0845639.03W (12.78)
R28 1010 TREE (KRMYP047) 421458.04N-0845638.81W (14.93)

FAA Notification (continued)

◆ Aerial

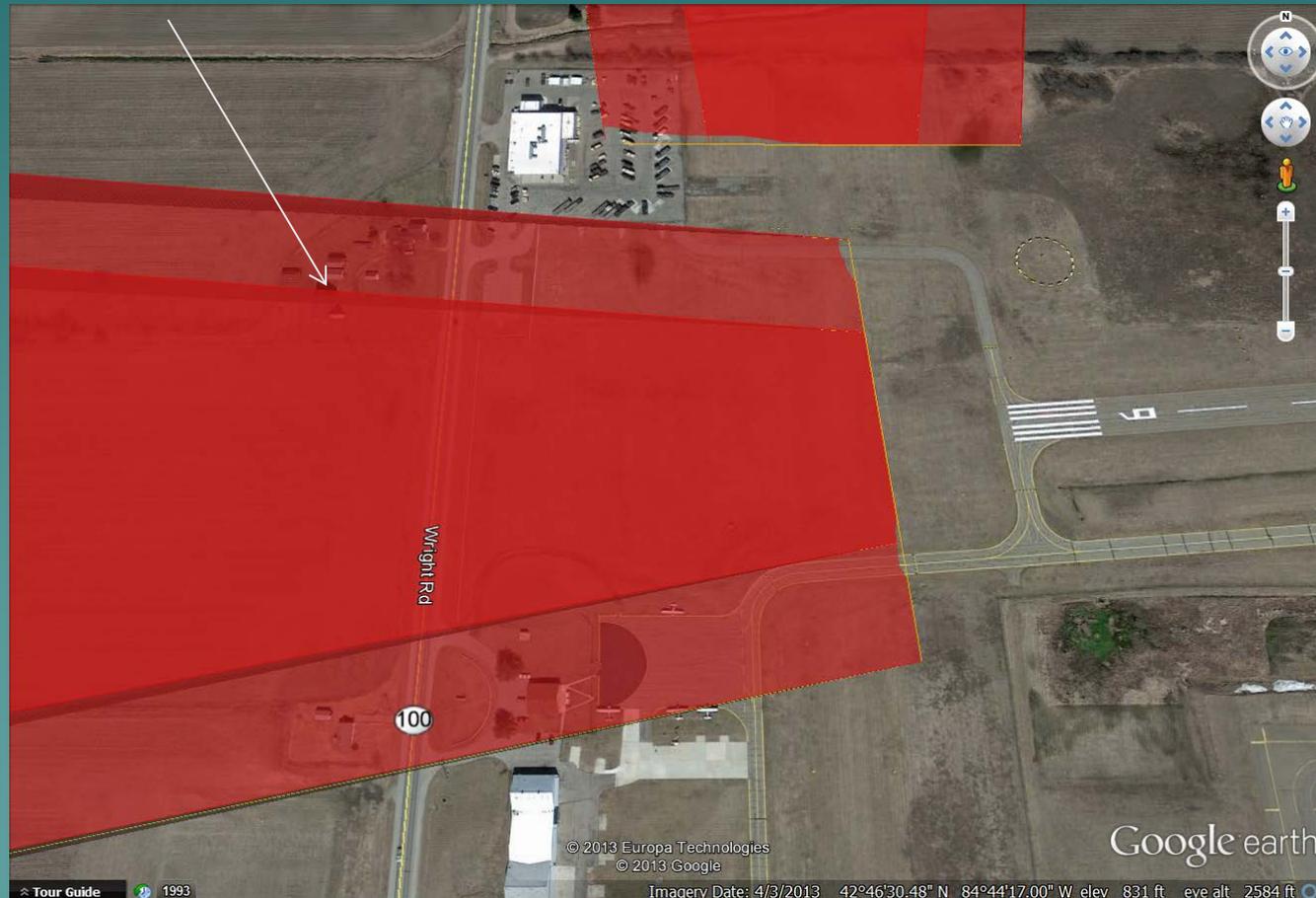


20:1 Approach Mitigation

- ◆ When 20:1 penetrations are found, the FPT immediately notifies the Airport Manager.
- ◆ Action for Airport to take once notified:
 - Confirm obstacle exists
 - Clear the 20:1 penetrations, if possible
 - Light the 20:1 penetrations, if possible
 - If the unlit penetration(s) cannot be removed, reduced in height, or lighted, a properly sited , certified and maintained VGSI (Visual Guidance Slope Indicator) could be used to mitigate the effects of the unlit obstacles, is approved by FAA Flight Standards Division, AFS-400.

Airport Examples

◆ Grand Ledge: Cat A & B



CAT C/D Restrictions

◆ 'PROCEDURE NA AT NIGHT FOR CAT C AIRCRAFT'



**Federal Aviation
Administration**

Memorandum

Date: *ALB* OCT 30 2013

To: Abigail Smith, Director, Aeronautical Navigation (AeroNav) Products, AJV-3

From: Bruce DeCleene, Manager, Flight Technologies and Procedures Division, AFS-400 *B. DC*

Subject: Waiver to FAA Order 8260.3B, United States Standard for Terminal Instrument Procedures (TERPS), Volume 1, Chapter 3, Paragraph 3.3.2c(1)(b).

Purpose: This memorandum authorizes a waiver to TERPS, Volume 1, Chapter 3, paragraph 3.3.2c(1)(b), straight-in visual area beginning width. This memorandum also provides examples for chart notes when it's necessary to limit night operations for specific aircraft approach categories (CATs) due to unlighted 20:1 visual surface penetrations.

Discussion: The subject paragraph specifies the requirements for the alignment, length, and width of visual areas associated with straight-in instrument approach procedures. The beginning width of the straight-in visual area for **runways** limited to CAT A/B minimums is +/- 200 feet, and +/- 400 feet for all other runways. This waiver authorizes a beginning width of +/- 200 feet for CAT A/B **aircraft**, even when higher CAT minimums are established to the same runway.

Action: When establishing the straight-in visual area under TERPS, Volume 1, Chapter 3, paragraph 3.3.2c(1)(b), use a beginning width of +/- 200 feet for CAT A/B, and a beginning width of +/- 400 feet for all other CATs.

Evaluate the visual area associated with each CAT to determine the effect of 20:1 and 34:1 visual surface penetrations. When an unlighted 20:1 visual area penetration is located only within the larger CAT C/D visual area, annotate the chart to deny or to restrict night minimums only for the affected CAT(s).

For example, when use of a visual glide slope indicator (VGS) is not approved in lieu of 20:1 obstruction lighting, and the procedure contains CAT A, B, and C minimums, use: "Chart note: Procedure NA at night for CAT C aircraft."

Or, when use of VGS is approved in lieu of obstruction lighting for a procedure that contains CAT A, B, C, and D minimums, use: "Chart note: When VGS inop, procedure NA at night for CAT C and D aircraft."

FAA's Official Memorandum

◆ Risks: High, Medium, Low



Federal Aviation
Administration

Memorandum

Date: NOV 15 2013

To: Bruce DeCleene, Manager, Flight Technologies and Procedures Division, AFS-400
Michael J. O'Donnell, Director, Office of Airports Safety and Standards, AAS-001

From: *William S. Davis*
William S. Davis, Deputy Vice President, Mission Support Services, AJV-0

Subject: Interim Policy Guidance for Mitigation of Penetrations to the 20:1 Visual Area Surface

PURPOSE: To provide consolidated interim policy guidance for FAA staff to address the process related to the discovery, verification, risk assessment, and mitigation of obstacles identified as penetrations to the 20:1 Visual Area Surface (20:1 surface) of instrument approach procedures (IAP).

ACTION: When 20:1 surface obstacle/terrain penetrations (penetrations) are discovered within the Visual Area Surface of an IAP (see attachment 1- 20:1 Risk Assessment), action will be taken to evaluate the entire airport to ensure that all 20:1 penetrations for every IAP have been identified. Effective January 6, 2014, use the following process (see attachment 2- 20:1 Mitigation Flow Chart) for the notification, verification, risk assessment, and mitigation of each penetration:

1. **Notification and Verification.** The Operations Support Group (OSG) Flight Procedures Team (FPT) will notify the airport owner/sponsor and the Airports District Office (ADO) within three business days of being informed of a potential penetration of an IAP. The OSG FPT will request the airport owner/sponsor to verify the validity of each penetration as soon as possible but not to exceed 30 calendar days after notification. The airport owner/sponsor must respond in writing to the OSG FPT with a copy to the ADO (scanned documents are acceptable). This reply is due as soon as possible and shall not be delayed to address mitigation, which is addressed through the compliance process (below). The preferred methods for an airport owner/sponsor to update data regarding trees that have been trimmed are contained in the Office of Airports (ARP) Engineering Brief (EB) #91: Management of Vegetation in the Airport Environment. EB #91 is available at the FAA website link: http://www.faa.gov/airports/engineering/engineering_briefs/. If no response is received within the prescribed timeframe, actions must be taken to restrict the IAP visibility minima/night operations as appropriate.

2. **20:1 Penetration Determined Invalid.** If the 20:1 penetration(s) at issue have been determined to be invalid by an airport owner/sponsor, the OSG FPT will notify AeroNav Products and the Aeronautical Information Management Terrain and Obstacle Data (TOD) Team. AeroNav products will update the documentation on the periodic review sheet. The TOD Team will update the obstacle database within 10 business days. No action is required to restrict or modify the subject IAP.

3. **20:1 Penetration Determined Valid.** If the 20:1 penetration(s) at issue is/are valid, one or more of the actions specified in paragraphs 3.1 through 3.3 below is/are required (see attachment 3-Timelines and IAP Restrictions). If any of the timelines are not met, or the airport compliance plan does not remove, light, or lower the obstacle, or if no compliance plan is contemplated (e.g., the airport operator/sponsor elects to not mitigate the obstacle risk), AeroNav Products must restrict the IAP accordingly (e.g., using a Notice to Airmen (NOTAM) or a Procedure Amendment).

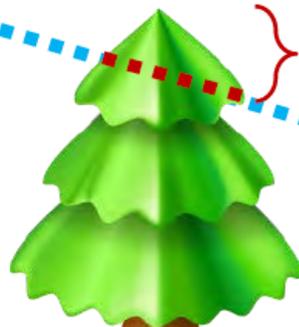
3.1 **High Risk.** If the penetration(s) are verified as more than 11.0 feet above the 20:1 surface they are considered as high risk and **immediate action** is required to restrict the IAP visibility to at least 1 statute mile (SM) and if the obstacle is unlighted, restrict night operations. The airport operator/sponsor must submit a compliance plan as soon as possible but no later than 30 calendar days from the date of obstacle validation (by the airport owner/sponsor) to the OSG FPT with a copy to the ADO. The compliance plan must indicate actions to remove, light, or lower the obstruction as soon as possible for FAA to review the removal of restrictions. Appropriate IAP restrictions (above) must remain in force on subject IAP(s) until the Visual Area Surface penetration risk is mitigated.

3.2 **Medium Risk.** If the penetrations are verified as more than 3 feet and up to 11.0 feet above the 20:1 surface they are considered as medium risk and no immediate action is required to restrict the IAP. The airport operator/sponsor must submit a compliance plan as soon as possible but no later than 30 calendar days from the date of obstacle validation (by the airport owner/sponsor) to the OSG FPT with a copy to the ADO. The compliance plan must indicate actions to remove, light, or lower the obstruction as soon as possible but not to exceed 180 calendar days. If the penetrations are not mitigated within the prescribed timeframe, appropriate action must be taken to restrict the IAP.

3.3 **Low Risk.** If the penetration(s) are verified as 3 feet or less above the 20:1 surface, they are considered as low risk and no immediate action is required to restrict the IAP. The airport operator/sponsor must submit a compliance plan as soon as possible but no later than 30 calendar days from the date of obstacle validation (by the airport operator/sponsor) to the OSG (FPT) with a copy to the ADO. The compliance plan must indicate actions to remove, light, or lower the obstruction as soon as possible but not to exceed one year. If the penetrations are not mitigated within the prescribed timeframe, appropriate action must be taken to restrict the IAP.

Risk Level Categories

RISK CATEGORIES	Obstacle Penetrates 20:1 by:	Verification Timelines	IAP Restrictions if 20:1 are valid	Compliance Plan Timelines
HIGH	More than 11 feet	Not to exceed 30 days	Immediately restrict IAP visibility and If unlighted restrict night operations (e.g., using a Notice to Airmen (NOTAM) or a Procedure Amendment	IAP Restrictions will remain until penetration(s) are mitigated
MEDIUM	More than 3 feet and up to 11 feet	Not to exceed 30 days	No immediate action	30 days for Compliance Plan & 180 days to light, lower, or remove
LOW	3 feet or less	Not to exceed 30 days	No immediate action	30 days for Compliance Plan & 1 year to light, lower, or remove



9-FEET

20:1 TERPS Surface

AERO Notice



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

KIRK T. STEUDLE
DIRECTOR

December 2, 2013 (emailed to SBGP sponsors)

Dear Airport Sponsors:

Click on link for FAA's attachment. http://www.michigan.gov/documents/aero/Interim_Policy_-_Visual_Area_Nov_2013_441205_7.pdf

We are reaching out in an effort to improve communications and transparency as it relates to FAA actions associated with obstacle penetrations of instrument approach surfaces as a result of FAA's periodic review of all instrument flight procedures. We are committed to working with airport sponsors to resolve the issues together, however please be aware that certain obstacle penetrations that FAA deems to be a high risk safety hazard will require the immediate cancellation of procedures or the adjustment of visibility minima.

In response to concerns by many airport sponsors, the FAA has established interim policy guidance to address penetrations of the 20:1 Visual Area Surface of instrument approach procedures using a risk-based approach (see attached). This guidance becomes effective on January 6, 2014. In the interim, action will not be taken to NOTAM procedures regarding 20:1 penetrations identified through the FAA periodic reviews, unless the FAA has determined that the obstruction penetration is of sufficient concern to warrant immediate action. However, this policy does not preclude the FAA from issuing other necessary NOTAMs as a result of FAA flight inspections or construction activities.

The FAA is responsible for conducting regular airspace reviews and uses the requirements under Terminal Instrument Procedures (TERPs) and Advisory Circulars to evaluate the effect of existing and proposed obstructions under FAR Part 77. Likewise, airports are responsible to ensure the approach surfaces remain clear under grant assurances 20 and 21, as well as 14 CFR Part 139.

The FAA highly recommends Airport Sponsors take a proactive approach by reviewing all approach surfaces in advance of any flight check schedule to ensure they are clear, including any planned approaches depicted on the Airport Layout Plan (ALP). Please refer to Advisory Circular (AC) 150/5300-13A, Table 3-2, "Approach/Departure Standards Table" for guidance on assessing approaches. Please pay particular attention to the Glide Path Qualification Surface (GQS) and the 20:1 surfaces, since penetrations to these surfaces may result in more severe impacts to procedures. Airport sponsors should also review and update policies to ensure that monitoring of approach surfaces occur on a regular basis.

In addition, to help you stay ahead of any near-term potential impact to approach procedures we have provided an FAA web link below. The link contains the official procedure review schedule. It will allow you to determine when your airport approaches are scheduled for FAA review. This information will allow you to prioritize efforts and resolve any obstacle issues.

AERONAUTICS BUILDING • 2700 PORT LANSING ROAD • LANSING, MICHIGAN 48906
www.michigan.gov • (517) 335-9283

LH-LAN0 (01/03)

It's important to note that if an airport is part of a review that uncovers obstacle penetrations, there is a limited amount of time to act before procedures are impacted. For example, immediate action will be taken on obstacles that are validated and deemed to be a high risk as outlined in the guidance, which could adversely impact capacity and operations at your airport due to the cancellation of procedures or adjustments to the visibility minima. So it is imperative that you are proactive and not wait until the FAA has scheduled a review of the procedures at your airport.

This is the link to the Instrument Flight Procedures Gateway. Please check back regularly for schedule updates. The flight procedures scheduled for publication are available on this website.

https://www.faa.gov/air_traffic/flight_info/aeronav/procedures/

Steps to follow to get to Periodic Review List on IFP Gateway:

1. Select the URL (link) to IFP Gateway
2. On the left side of the website, under Instrument Flight Procedure Information Gateway you will see 5 arrows pointing to five different links.
3. Select the first arrow: IFP Announcements & Reports.
4. Now in the center of the page under the header "IFP Announcements/Report Table" click on the link for the "Periodic Review List" and select OPEN.

If you have questions or concerns or need additional information please contact:

Mark Grennell
MDOT – Office of Aeronautics
Project Support Unit Manager
517-335-9024
grennellm@michigan.gov

Important: MDOT Office of Aeronautics is awaiting response from FAA ADO regarding airports that have existing approach issues prior to FAA's interim policy going into effect 1/6/14.



FAA AGL-620 Q & A

20:1 Questions & Answers

1. Do we need to notify military airports of this process that have published IAPs?

No. USAF and NAVY develop and maintain their own approach procedures whereas the U.S. Army has FAA developed procedures. We are only to notify the joint use airports.

2. Is the survey work, compliance plan, clearing of objects AIP eligible?

- **Survey Work.** Only eligible if part a full obstruction survey for all of the runways on an airport, a master plan, or a system plan. Surveys of individual runway ends or objects are not eligible.
- **Compliance Plan.** Not eligible.
- **Clearing of Objects.** Eligible per FAA policy in the draft AIP Handbook. Note that the current AIP Handbook limits obstruction removal to objects that have been determined to be a hazard per an aeronautical study (Paragraph 582). However, the draft AIP Handbook (Table D-1, Item b) expands this eligibility to obstruction removal needed to meet the object clearing criteria of AC 150/5300-13 (including, but not limited to, 14 CFR Part 77 surfaces, approach and departure surfaces, and TERPs surfaces). Obstruction removal is limited to obtain 100 feet vertical clearance above the elevation of the runway ends but no more than 5000 feet beyond the end of the runway. Clearing/trimming an object more than once is not eligible.

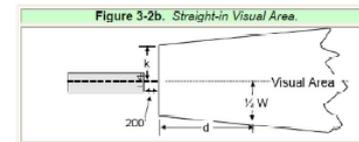
3. What type of documentation is needed from the Sponsor for the validation process? We have received different requirements depending upon the FP person we talk with.

Required documentation is handled case by case. At times Flight Procedures accepts recent google earth images, obstruction surveys, or a signed letter from the airport certifying their approach is clear. The Airport Sponsor is to work with their assigned Flight Procedure specialist on what documentation is required for resolution.

4. What is the exact surface that Flight Procedures is using for this analysis?

The surface is defined in the TERPS ORDER 8260.3B, Volume 1, Chapter 3, Paragraph 3.3.2. Please note the width of the trapezoid is dependent on approach speed category. (See dimension "k")

Formula 3-3b. Straight-in Visual Area 1/2 width.
$\frac{1}{2}W = (0.138 \cdot d) + k$
Where 1/2W = perpendicular distance from RCL (extended) to edge of area
"d" = distance (ft) measure along RCL from area origin
"k" = 200 for Cat A/B, 400 for Cat C/D/E
$0.138 \cdot d + k$



Formula 3-3c. Visual Area OIS height.
20:1 Surface Height = $\frac{d}{20}$
34:1 Surface Height = $\frac{d}{34}$
Where "d" = distance (ft) measure along RCL from area origin extended
$d/20$ or $d/34$

- 3.3.2 d. (2)(a) If the 34:1 surface is penetrated, take ONE of the following actions:
- 3.3.2 d. (2)(a) 1. Adjust the obstacle height below the surface or remove the penetrating obstacles.
- 3.3.2 d. (2)(a) 2. Limit minimum visibility to 1/4 mile/ 4000 RVR.
- 3.3.2 d. (2)(b). If the straight-in runway's 20:1 surface is penetrated (in addition to the 34:1 evaluation), take ONE of the following actions:
- 3.3.2 d. (2)(b) 1. Adjust the obstacle height below the surface or remove the penetrating obstacles.
- 3.3.2 d. (2)(b) 2. Do not publish a VDP, limit minimum visibility to 1 mile/5000 RVR, and take action to have the penetrating obstacles marked and lighted.
- 3.3.2 d. (2)(b) 3. Do not publish a VDP, limit minimum visibility to 1 mile/5000 RVR, and publish a note denying the approach (both straight-in and circling) to the affected runway at night [also see paragraph 3.3.2d(2)(d)].
- 3.3.2 d. (2)(c) 20:1 Surface Penetrations (circling runways). Mark and light the penetrating obstacles or publish a note denying night circling to the affected runway (except as noted below).
- 3.3.2 d. (2)(d) 20:1 Surface Penetrations are sometimes impossible to mark and light. In these cases ONLY, nighttime operations may continue where an operating VGSIs set at an angle 2-3 degrees across the runway and its associated OCS is verified to be clear. The approach chart must be annotated to indicate the straight-in approach procedure or circling operation (as appropriate) is not authorized at night when the VGSIs is inoperative.

FAA AGL-620 Q & A

5. For airports with circling approaches, is FP looking at all runway ends at once?

If there is a circling approach to the other runways, FP will review. Flight Procedures periodic review list is shown on the link below.

https://www.faa.gov/air_traffic/flight_info/aeronav/procedures/reports/media/Periodic_Review_List.pdf

6. Who issues the NOTAM amending or cancelling approaches?

NOTAMS regarding cancellation/amending of an IAP or N/A night minima is considered a FDC NOTAM which is handled by FP.

7. What is guidance from HQ on best practices/the best surface to use to proactively protect approaches? The letter states the GQS, but the GQA is a 30:1, not 20:1, surface. There are five 20:1 surfaces in Table 3-2 of airport design.

The surface to protect, which is described in FAA Engineering Brief No. 91, is the approach/departure standards table in AC 150/5300-13 for protection of instrument and visual operations and any applicable surfaces defined in Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS).

8. Will the airports receive a notification from FP on the outcome of their reviews when there is not an amendment or cancellation of the IAP?

No.

9. Are there any resources available to better illustrate this surface?

Yes. Flight Standards has created a .kml file for Google Earth which is located on the 'P:\Airport Issues\20 to 1 Obstructions' folder. Simply double click on the .kml file and it will load onto your Google Earth. To prevent slow speed of the program, deselect the states you are not utilizing. Caution: This Google Earth imagery is unofficial and for information only.

UNOFFICIAL AGL TERPS Visual 20 to 1 Surfaces



10. The 20:1 surface impacts only Approach Category C, D, and E. Can Flight Procedures only NOTAM the impacts for these users, and not Approach Category A and B?

Yes. The 20:1 surface has different dimensions based on whether or not it's an Approach Category A/B or C/D/E. The dimensions for the latter are larger due to its larger beginning width. If there are no 20:1 impacts to A/B, then the Airport is to request FP for a NOTAM on only C/D/E operations. See below for depiction of the two surfaces.



20:1 for Approach Category A/B

20:1 for Approach Category C/D/E

AERO Website



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Planning and Development

Planning Your Airport

- [FAA Advisory Circular 150/5300-13A - Airport Design](#)
Federal Aviation Administration's (FAA) standards and recommendations for the geometric layout and engineering design of runways, taxiways, aprons, and other facilities at civil airports.
- [FAA Standard Operating Procedures](#)
- [FAA Standard Operating Procedure \(SOP No. 2.00\) for Review and Approval of Airport Layout Plans](#) [PDF](#)
- [FAA Standard Operating Procedure \(SOP 3.00\) for FAA Review of Exhibit "A" Airport Property Inventory Maps](#) [PDF](#)
- [FAA Great Lakes Region Guidance Letter \(RGL 5070.1\) Preparation and Review of Airport Layout Plans](#) [PDF](#)

Developing Your Airport

- [Airport construction project information and advertisements.](#)
Click here for project advertisements and information and resources related to airport equipment and construction projects.

Approach Procedures

- [FAA Memorandum 2012 - 20:1 Obstacle Identification Surface \(OIS\) penetrations in the Visual Assessment Area](#) [PDF](#)
- [FAA presentation - 20:1 approach penetrations and loss of night minimums](#) [PDF](#)
- [FAA memorandum November 15, 2013 - Interim policy guidance for mitigation of penetrations to the 20:1 visual area surface](#) [PDF](#)
- [Office of Aeronautics letter to sponsors dated December 2, 2013 regarding 20:1 penetrations](#) [PDF](#)
- [Questions and Answers pertaining to 20:1 penetrations/airport approach procedures](#) [PDF](#)

Pavements and Paint

- [Airport Crack-Sealing & Pavement Marking Programs](#)
- [Airport Pavement Marking Application Form](#)
- [Crack Sealing/Paint Marking Procedures and Responsibilities](#) [PDF](#)
- [History of Paint Marking & Crack Sealing Programs](#) [PDF](#)
- [Office of Aeronautics - Statewide Pavement Management System \(APMS\)](#)

QuickLinks

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- Aeronautics Flight Services
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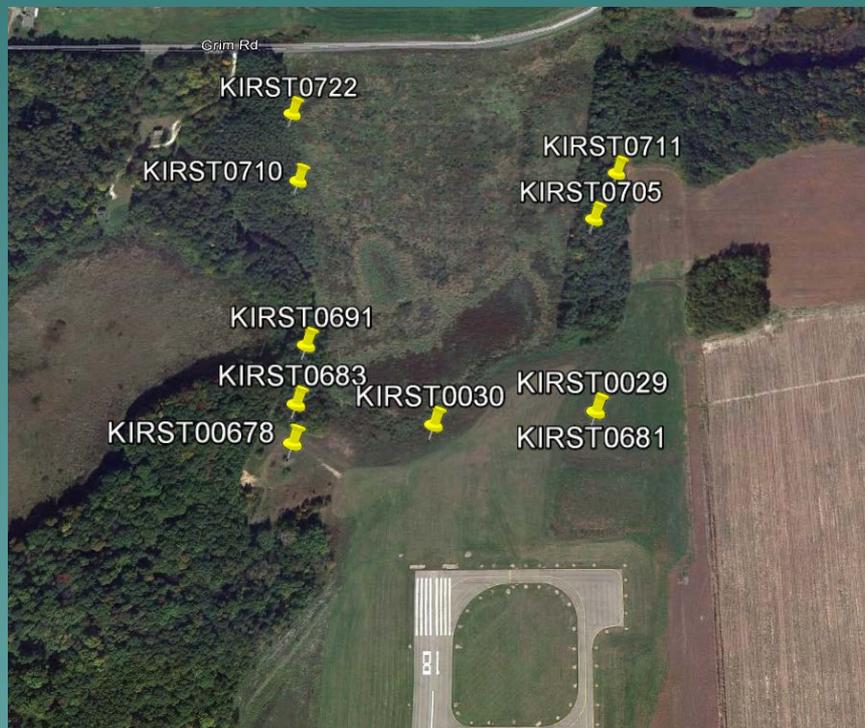
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Customer Satisfaction Survey

Kirsch Municipal Airport, Sturgis

◆ RWY 18 Approach: Part 77

- Greater than Utility, 1 Mile Minimums: CAT A thru D
- 500' x 3,500' x 10,000' (34:1)



Kirsch Municipal Airport, Sturgis

◆ RWY 18 Approach: TERPS

– 800' x 3,800' x 10,000'



Michigan Airports Affected

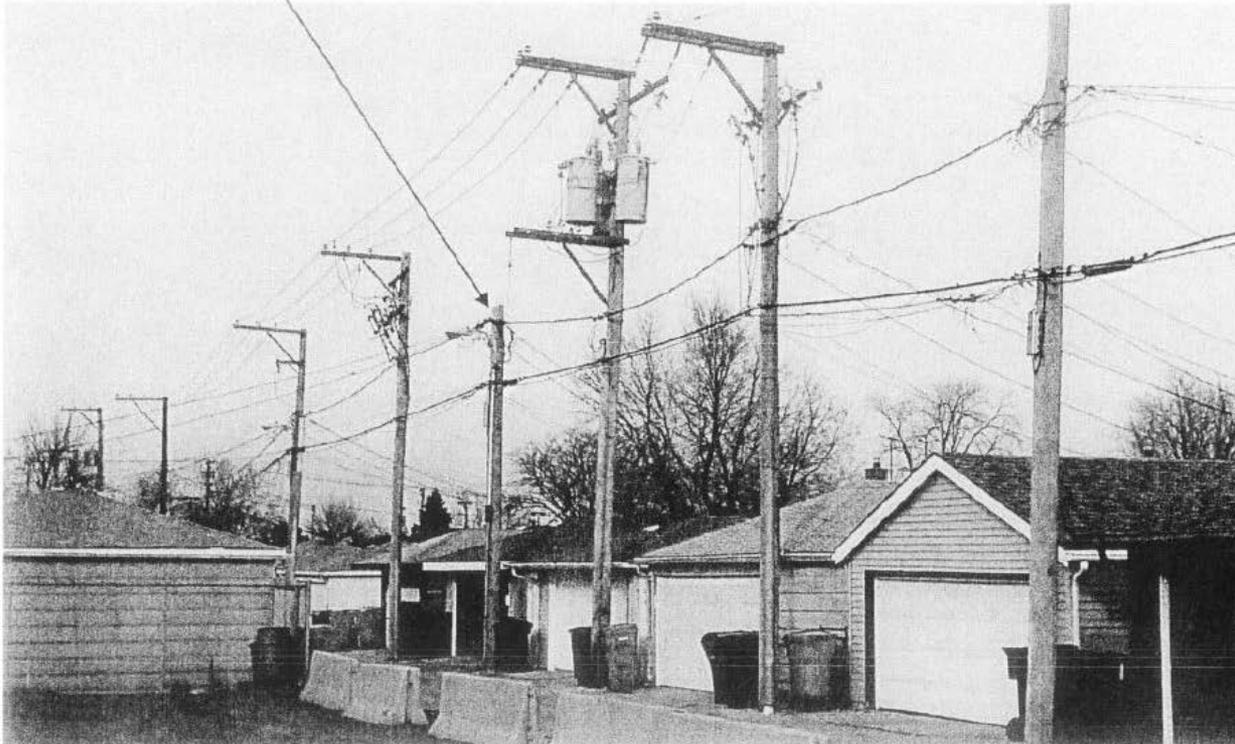
- ◆ NPIAS Airports w/Approach Procedures: 88
 - Number currently with Night Procedure Restrictions: 54 (61%)
- ◆ Non-NPIAS Airports w/Approach Procedures: 9
 - Number currently with Night Procedure Restrictions: 3 (33%)

Problem Solved?

Description of Obstruction _____ Power Pole that has been cut



Point Measured



Questions?

