# Performing Successful Airport Approach Surveys


## Advisory Circular 150/5300-18B
**(Draft May 8, 2008)**

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# Agenda

1. Starting the Project
2. Field Surveys
3. Obstruction Analysis
4. Drawing Preparation
5. Final Documents

# Pre-Survey Preparations

1. Contact Airport Owner
   a. When should you visit the site?
   b. Badging requirements
   c. Operations requirements
2. Collecting Existing Information
   a. Previous Aeronautical surveys
   b. Existing ALP drawing
   c. Airnav.com
   d. 5010 Forms
   e. FAA Facility Directory
3. Review Necessary FAA Survey Forms
4. Initial Preparation for Final Survey Report

# Pre-Survey Preparations (cont)

1. Interviews
   a. Airport Manager
   b. Airport Operations Manager
   c. Air Traffic Control Tower Staff
   d. FAA Airway Facilities staff
2. Line out Field Crew(s)
   a. Provide list of all information to be acquired
   b. Coordinate positions on NAVAID's, runway ends, significant buildings, etc
   c. Maps and/or photos of airport
   d. Familiarity with FAA/NGS forms and procedures
3. Develop the Survey Work and Quality Control Plan

# Airside Safety Procedures

1. Staff training for on-airport operations
2. Operator ground school (*if available*)
3. Security clearance requirements (*if necessary*)
4. Communication protocols with ATCT and the airport (*two-way air band radio calls, UNICOM/Tower/ Ground frequencies*)
5. Identification of surveyor vehicles (*including lighting and signage*)
6. Access to sites on and around the airport

# Onsite Communications Coordination

1. Close communication with airport management is critical
2. Inquire about planned construction or changes in the airport layout
3. Summarize future construction plans in the project survey plan

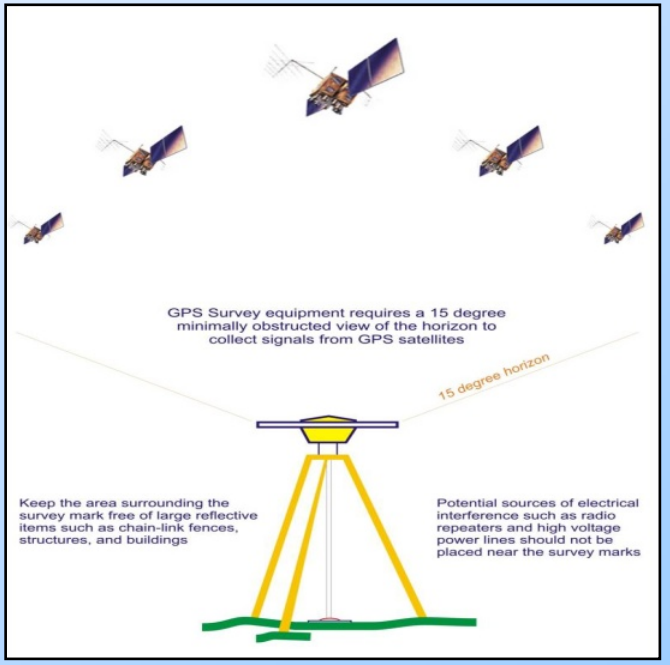
# Collection Methods - Field Surveying

1. Geodetic Control
2. Control Monument Verification/Establishment
3. Runway Information
4. NAVAID Information
5. Obstruction Information

# Geodetic Control

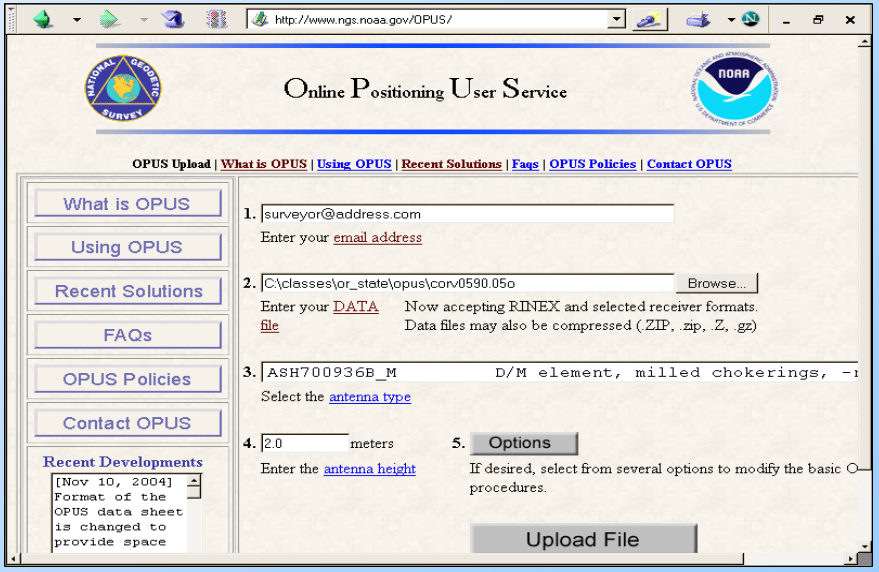
1. Horizontal Control - North American Datum of 1983 (NAD83)
2. Vertical Control - North American Vertical Datum (NAVD88)
3. GPS observations - GEOID03 for Orthometric Height reductions

Direct ties to the National Spatial Reference System (NSRS) will be made by observing geodetic control monuments that exist in the NSRS or through OPUS.



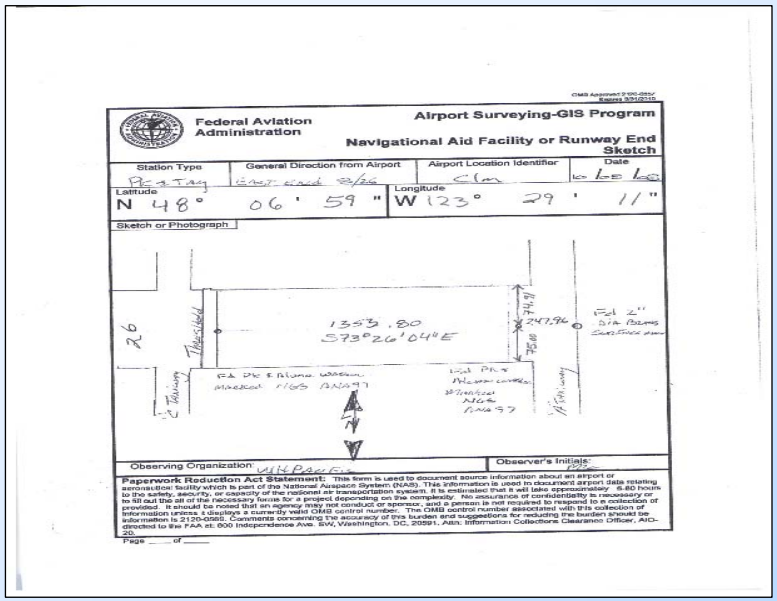
# Control Monument Verification/Establishment

1. Validate Existing Control (PACS and SACS) if available
2. Establish Temporary Survey Mark (TSM) if control is not available
3. Use the program INVERS3D to complete calculations between points
4. Use Online Positioning User Service (OPUS) to tie in control points

# Runway Information

1. Collect Runway Length, Width and Profile information
   a. Use Inverse3D (NGS program) to compute runway lengths
2. Complete sketches of runway end information on FAA forms
3. Obtain photographs of runway end information for inclusion in Final Report



Federal Aviation Administration

Airport Surveying-GIS Program

Navigational Aid Facility or Runway End Sketch

| Station Type | General Direction from Airport | Airport Location Identifier | Date |
|---|---|---|---|
| PC & Tag | | | |

Latitude N 48° 06' 59"

Longitude W 123° 29' 11"

Sketch or Photograph

# Navigation Aid Information

1. Collect information on all NAVAID's
   a. 18B provides specific guidance on where measurements are to be completed
   b. Collect both the critical survey point and highest elevation
2. Complete NAVAID Facilities Abstract Form
3. Obtain photographs of NAVAIDs for inclusion in Final Report

OMB Approved 2120-0557
Expires 3/31/2010

**Federal Aviation Administration**

**Airport Surveying-GIS Program**

**Navigational Aid Facilities Abstract**

| Airport Name | City | State | Airport Identifier |
|---|---|---|---|
| WILLIAM FAIRCHILD INT'L | PORT ANGELES | WA | CLM |

| Party Chief's Name | Organization/Company | Date |
|---|---|---|
| MIKE EDWARDS | WHPACIFIC | FEB. 13, 2009 |

Instructions: For each facility identify the currently published data by the FAA for the airport. If there are no previous records for the airport or navigational aids then this form is optional. Compare the determined positions against FAA records to determine and identify any differences. Use additional forms as required.

| Facility Name | Facility ID | Facility Type | Latitude N | Longitude W | Elevation | Associated Runway | |
|---|---|---|---|---|---|---|---|
| ILS | CLM | Glide Slope | 48°07'16.518" | 123°30'25.564" | 278 | 08 | Published |
| | | | 48°07'16.532" | 123°30'25.564" | 277.94 | 08 | WHP '08 |
| | | | +1.37' North | −0.03' East | 0.06' lower | | |
| | CLM | Localizer | 48°06'59.204" | 123°29'06.597" | 292.3 | 26 | Published |
| | | | 48°06'59.210" | 123°29'06.605" | 292.03 | 26 | WHP '08 |
| | | | +0.61' North | −0.54' East | 0.27' lower | | |
| ELWHA | CLM | NDB/OM | 48°09'00.718" | 123°40'12.903" | – | 08 | Published |
| | | Outer | 48°09'00.758" | 123°40'12.908" | 1077.97 | 08 | WHP '08 |
| | | Marker | +4.10' North | −0.36' East | | | |
| | CLM | Middle | 48°07'22.322" | 123°31'19.281" | – | 08 | Published |
| | | Marker | 48°07'22.320" | 123°31'19.326" | 238.192 | 08 | WHP '08 |
| | | | −0.17'North | −3.04' East | | | |

# Obstruction Information

1. Use Aerial Photogrametry to collect obstruction information
2. Utilize field survey methods to collect additional obstruction information
3. Tie-in aerial and field work to same geodetic control

# Quality Assurance/Quality Control Procedures
# Discrepancy Resolution

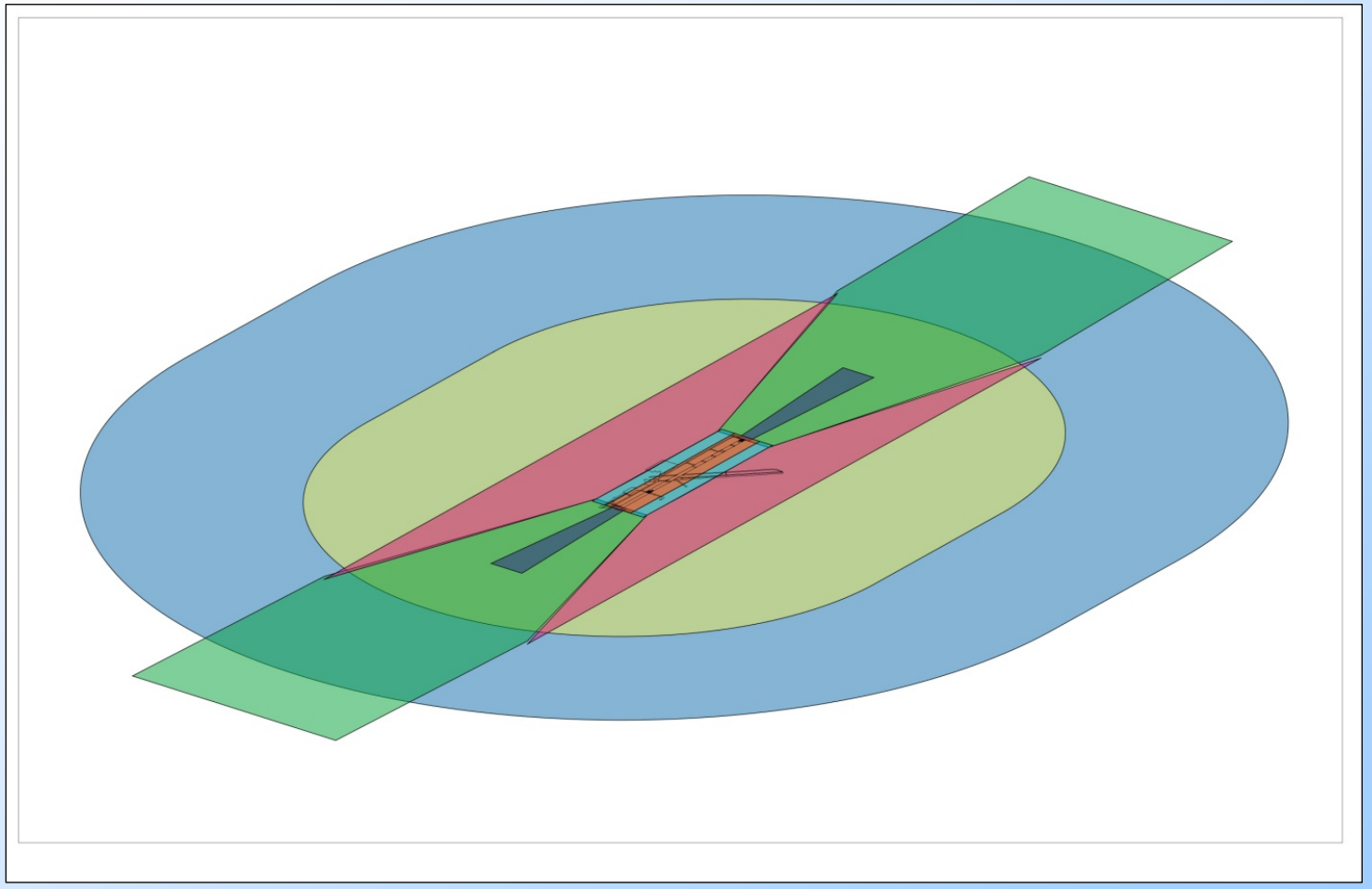
**Points Comparison - Port Angeles Obstruction Survey**
2/25/2009

| | | | | | | | Detailed Point Information - Position and Elevation | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Point Information | | Approximate Location | | | | | WHP Field Survey | | | Aerometric | Comparison | | AME Review Reading | | | | |
| Point # | Point Description | Nearest Runway End | Approx. Distance from Rwy End* | Approx. Offset** | Surface Type | Required Accuracy | WHP Survey Point | Easting | Northing | Elevation | Aero-Metric Point ID | Vertical Difference (WHP-AM) (ft) | Horizontal Distance (WHP-AM) (ft) | Easting | Northing | Elevation | Horizontal Distance (WHP-AM) (ft) | Vertical Difference (WHP-AM) (ft) |
| 1 | GS Ant. Bldg | 8 | -1,040 | 350 LT | VGRPS | 3 | 2338 | 987506.87 | 420343.55 | 287.0 | TREE0010 | 0.8 | 1.8 | 987508.70 | 420345.07 | 287.6 | 2.4 | 0.6 |
| 3 | Tree | 8 | 1,670 | 1300 LT | VGAS | 10 | 2589 | 985263.34 | 421999.66 | 364.1 | TREE0344 | -23.5 | 1.1 | 985267.93 | 421994.17 | 359.3 | 7.2 | -4.8 |
| 4 | Tree | 8 | 2,870 | 290 RT | VGPS | 3 | 2598 | 983568.82 | 420846.62 | 351.0 | TREE0130 | -8.6 | 3.3 | 983573.26 | 420850.78 | 353.2 | 6.1 | 2.2 |
| 5 | Tree | 8 | 1,610 | 1170 RT | VGAS | 10 | 2581 | 984533.41 | 419643.88 | 379.8 | TREE0124 | -12.6 | 14.8 | 984535.38 | 419649.53 | 384.0 | 6.0 | 4.2 |
| 6 | Tree | 8 | 63 | 730 RT | VGAS | 10 | 2577 | 986142.90 | 419617.50 | 357.6 | TREE0092 | -27.2 | 6.1 | 986140.38 | 419613.50 | 351.9 | 4.7 | -5.7 |
| 7 | Tree | 8 | -3,520 | 1970 RT | VGATS | 3 | 2554 | 989271.59 | 417398.37 | 423.4 | TREE3303 | -16.9 | 15.4 | 989263.03 | 417392.79 | 422.0 | 10.2 | -1.4 |
| 11 | Tree | 26 | 100 | 750 RT | VGAS | 10 | 2515 | 992799.75 | 419190.11 | 381.1 | TREE0469 | -16.0 | 5.6 | 992798.28 | 419180.79 | 379.6 | 9.4 | -1.5 |
| 13 | Tree | 26 | 1,070 | 550 RT | VGAS | 10 | 2525 | 993680.83 | 418710.57 | 368.1 | TREE0480 | -12.2 | 14.4 | 993682.30 | 418707.71 | 366.3 | 3.2 | -1.8 |
| 14 | Tree | 26 | 1,540 | 550 RT | VGAS | 10 | 2522 | 994128.65 | 418577.74 | 392.4 | TREE0487 | -7.6 | 12.2 | 994141.50 | 418582.21 | 389.7 | 13.6 | -2.7 |
| 16 | Tree | 26 | 2,140 | 290 LT | VGPS | 3 | 2528 | 994468.48 | 417604.65 | 441.0 | TREE0782 | -15.5 | 0.5 | 994469.90 | 417603.51 | 441.0 | 1.8 | 0.0 |
| 17 | Tree | 26 | 920 | 530 LT | VGAS | 10 | 2548 | 993233.25 | 417720.21 | 379.3 | TREE0821 | -13.5 | 3.8 | 993228.36 | 417722.73 | 375.2 | 5.5 | -4.1 |
| 18 | Tree | 26 | 1,340 | 730 LT | VGAS | 10 | 2538 | 993578.96 | 417415.56 | 442.6 | TREE0610 | -11.4 | 19.2 | 993577.93 | 417414.74 | 439.1 | 1.3 | -3.6 |
| 19 | Tree | 26 | 1,210 | 1130 LT | VGAS | 10 | 2546 | 993338.49 | 417062.36 | 471.4 | TREE0774 | -19.3 | 23.5 | 993338.95 | 417068.87 | 475.8 | 6.5 | 4.4 |
| 20 | Tree | 26 | 1,190 | 1240 LT | VGHS | 10 | 2547 | 993280.97 | 416966.42 | 469.3 | TREE0775 | -19.1 | 7.0 | 993279.01 | 416972.83 | 467.4 | 6.7 | -1.9 |
| 22 | Tree | 26 | 160 | 1210 LT | VGATS | 3 | 2517 | 992312.68 | 417280.91 | 454.7 | TREE0830 | -11.7 | 9.3 | 992317.44 | 417275.29 | 452.2 | 7.4 | -2.5 |
| 23 | Pole | 26 | 170 | 630 LT | VGAS | 10 | 2611 | 992483.89 | 417837.38 | 366.9 | POLE0043 | -19.1 | 2.2 | 992483.29 | 417834.68 | 365.4 | 2.8 | -1.6 |
| 24 | Pole | 26 | 1,220 | 350 RT | VGAS | 10 | 2541 | 993766.09 | 418478.39 | 326.2 | POLE0019 | 3.1 | 1.2 | 993765.90 | 418480.47 | 319.9 | 2.1 | -6.3 |
| 25 | Pole | 26 | 1,070 | 140 LT | VGPS | 3 | 2543 | 993488.38 | 418055.10 | 322.8 | POLE0003 | 1.5 | 4.2 | 993488.35 | 418052.92 | 322.7 | 2.2 | -0.1 |
| 26 | Tree | 26 | 305 | 820 LT | VGAS | 10 | 2519 | 992555.97 | 417621.37 | 401.8 | TREE0405 | -5.7 | 1.3 | 992557.89 | 417621.43 | 397.0 | 1.9 | -4.9 |
| 27 | Tree | 26 | 1,110 | 750 LT | VGAS | 10 | 2545 | 993348.70 | 417453.13 | 415.4 | TREE0683 | 3.8 | 5.4 | 993350.53 | 417453.90 | 413.3 | 2.0 | -2.1 |
| 28 | Tree | 26 | 1,270 | 280 LT | VGAS | 10 | 2535 | 993635.95 | 417864.38 | 399.7 | TREE0817 | 2.3 | 33.5 | 993637.35 | 417864.95 | 397.5 | 1.5 | -2.2 |
| 30 | Tree | 26 | 1,280 | 160 LT | VGPS | 3 | 2532 | 993680.74 | 417977.47 | 394.4 | TREE0682 | 7.6 | 12.6 | 993678.03 | 417965.78 | 397.5 | 12.0 | 3.1 |
| 31 | Pole | 26 | 1,145 | 110 RT | VGAS | 10 | 2542 | 993624.94 | 418269.30 | 323.3 | POLE0020 | -1.2 | 2.3 | 993627.22 | 418267.02 | 325.8 | 3.2 | 2.4 |
| 32 | Tree | 26 | 1,680 | 866 RT | VGAS | 10 | 2540 | 994355.13 | 418843.41 | 454.7 | TREE0486 | -9.5 | 9.3 | 994369.46 | 418841.62 | 446.1 | 14.4 | -8.6 |
| 33 | Tree | 26 | 1,510 | 890 RT | VGAS | 10 | 2544 | 994196.93 | 418918.22 | 422.0 | TREE0481 | 2.0 | 38.8 | 994196.82 | 418915.13 | 426.2 | 3.1 | 4.2 |
| 34 | Tree | 26 | 2,240 | 275 LT | VGAS | 10 | 2527 | 994566.63 | 417590.32 | 449.2 | TREE0788 | 4.8 | 19.8 | 994570.66 | 417592.42 | 442.8 | 4.5 | -6.4 |
| 36 | Tree | 26 | 1,900 | 290 LT | VGAS | 10 | 2529 | 994234.04 | 417676.91 | 434.9 | TREE0786 | -2.8 | 80.2 | 994237.03 | 417673.67 | 433.7 | 4.4 | -1.2 |
| 39 | Tree | 26 | -2,350 | 1710 LT | VGATS | 3 | 2555 | 989755.37 | 417524.55 | 412.6 | TREE0387 | 4.1 | 29.2 | 989747.43 | 417515.11 | 410.1 | 12.3 | -2.5 |
| 43 | Tree | 8 | 2,935 | 50 LT | VGPS | 3 | 2594 | 983615.61 | 421184.74 | 338.5 | TREE0310 | -6.0 | 5.1 | 983613.35 | 421186.33 | 336.3 | 2.8 | -2.2 |
| 45 | Tree | 8 | 1,295 | 1350 LT | VGAS | 10 | 2588 | 985555.61 | 421958.02 | 357.6 | TREE0019 | -6.9 | 1.7 | 985549.38 | 421940.22 | 356.1 | 18.9 | -1.5 |
| 46 | Tree | 8 | 2,940 | 50 RT | VGPS | 3 | 2597 | 983579.43 | 421095.08 | 342.2 | TREE0311 | 3.7 | 52.2 | 983571.53 | 421092.31 | 341.5 | 8.4 | -0.7 |
| 47 | Tree | 8 | 2,930 | 180 RT | VGPS | 3 | 2596 | 983550.71 | 420964.84 | 349.3 | TREE0294 | -3.4 | 13.7 | 983554.70 | 420965.66 | 350.4 | 4.1 | 1.1 |
| 50 | Tree | 26 | 1,620 | 1760 LT | VGATS | 3 | 2554 | 990472.31 | 417287.49 | 402.2 | TREE3298 | 8.5 | 7.8 | 990470.88 | 417294.08 | 404.2 | 6.7 | 2.0 |
| 52 | Tree | 26 | 1,510 | 760 LT | VGAS | 10 | 2536 | 993727.28 | 417333.52 | 460.9 | TREE0612 | -9.6 | 2.8 | 993726.40 | 417334.22 | 457.1 | 1.1 | -3.8 |
| 53 | Tree | 26 | 1,450 | 750 LT | VGHS | 10 | 2537 | 993675.02 | 417362.04 | 456.1 | TREE0611 | -9.3 | 6.2 | 993672.93 | 417360.46 | 454.0 | 2.6 | -2.2 |
| 54 | Tree | 26 | 1,300 | 790 LT | VGHS | 10 | 2539 | 993522.35 | 417365.73 | 456.6 | TREE0766 | -11.4 | 43.3 | 993520.32 | 417362.42 | 453.1 | 3.9 | -3.5 |

# Airport Airspace Analysis Surfaces

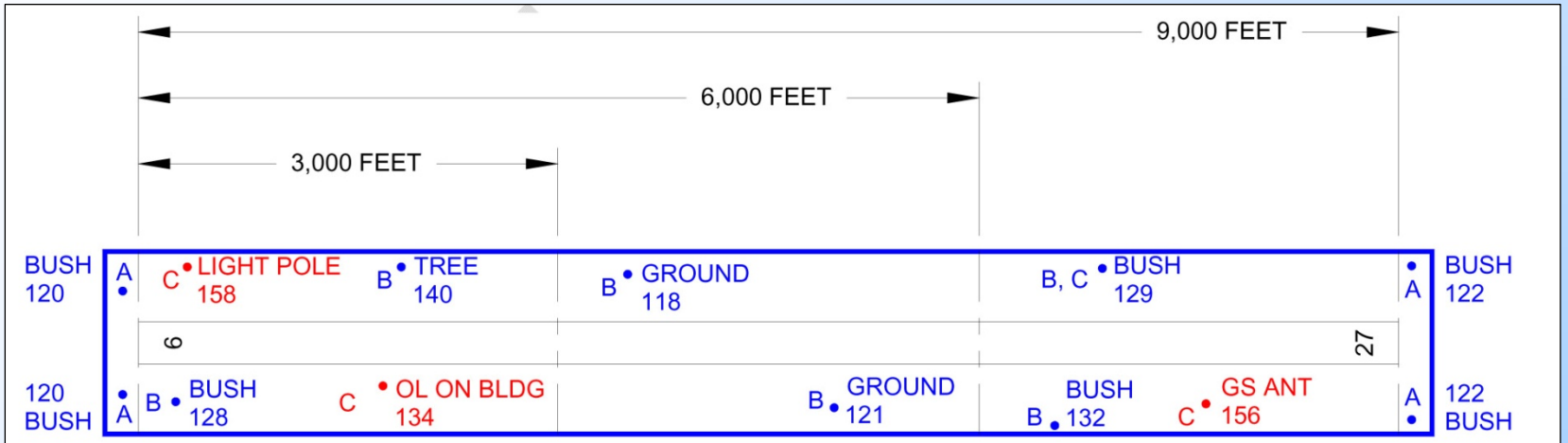
1. Runways with Vertical Guidance
   a. VGRPS, VGPCS, VGAS, VGPS, VGATS, VGHS, VGCS
2. Runways without Vertical Guidance
   a. NVG Primary, NVG Approach, NVG Transitional, NVG Horizontal

# Airport Airspace Analysis Surfaces



# Airport Airspace Analysis – VGRPS

# Vertically Guided Runway Primary Surface (VGRPS)




NOTE:

THE OBSTACLE REPRESENTATION IN THE OBSTACLE SURVEY PRIMARY SURFACE AREA (BLUE RECTANGLE) MUST INCLUDE THE:

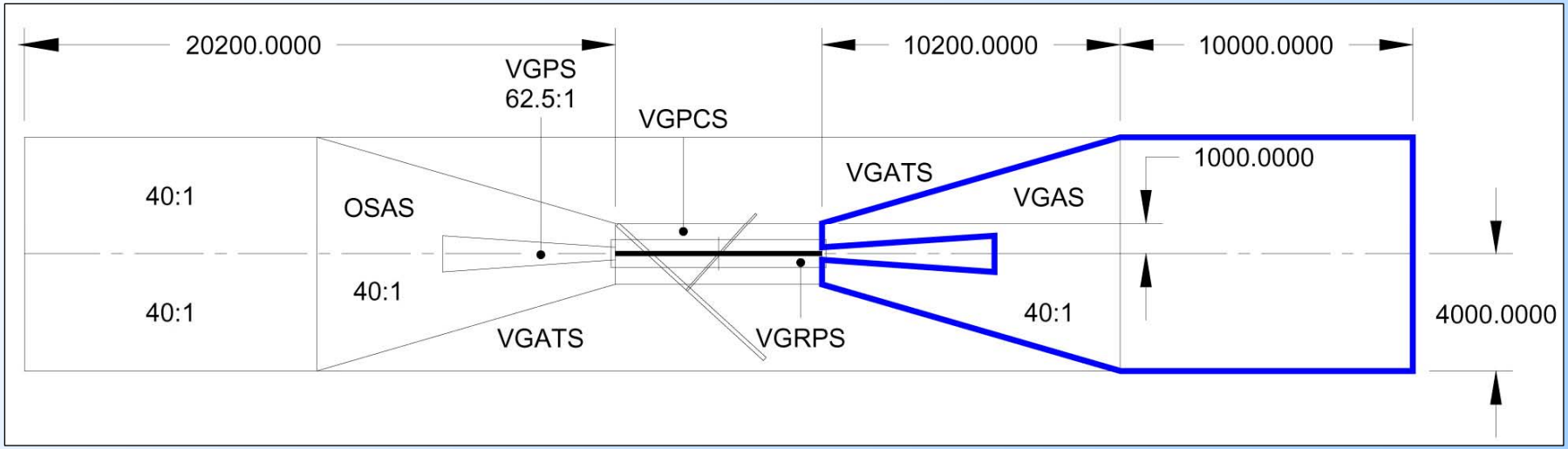
A - HIGHEST OBJECT OUTWARD FROM THE RUNWAY END

B - HIGHEST OBJECT IN EACH 1/3 SECTION OF RUNWAY LENGTH

C - HIGHEST NON-MANMADE OBJECT IN EACH 1/3 SECTION OF RUNWAY LENGTH

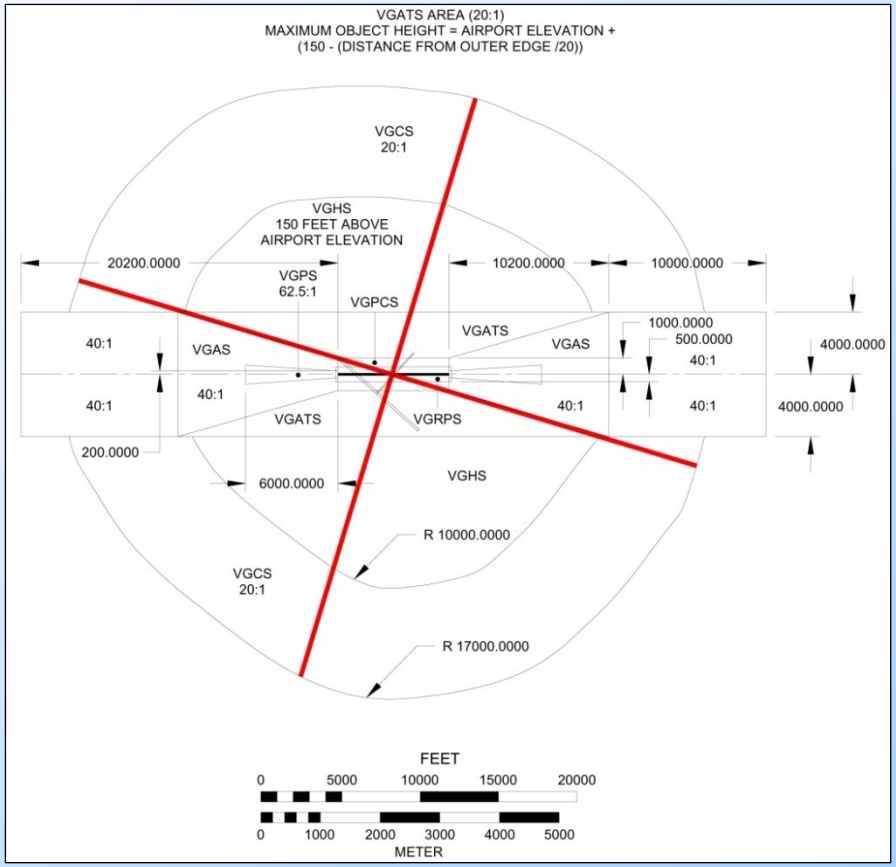
# Airport Airspace Analysis – VGAS

## Vertically Guided Approach Surface (VGAS)



# Airport Airspace Analysis – VGHS

# Vertically Guided Horizontal Surface (VGAS)

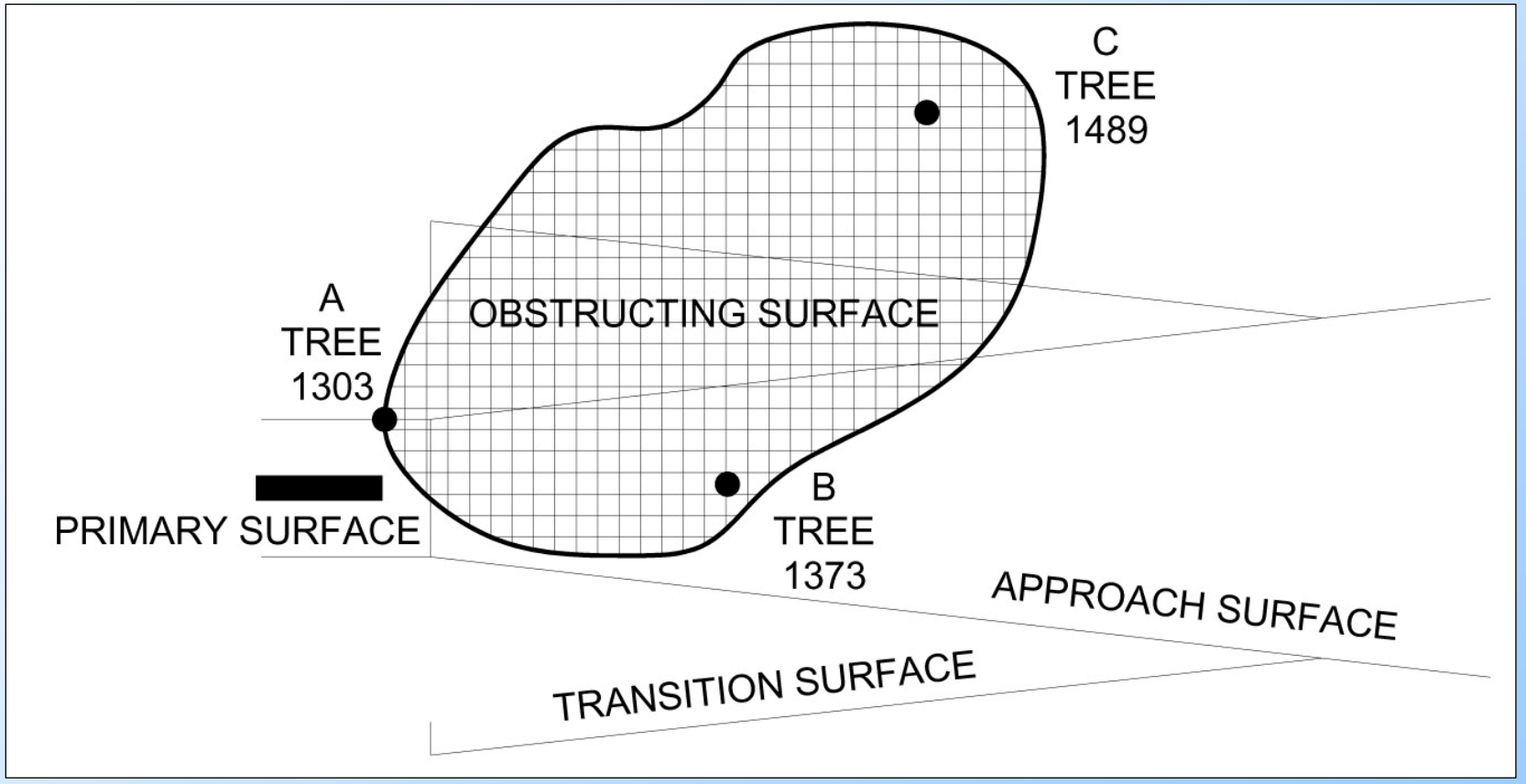





WHPacific

# Airport Airspace Analysis – Obstruction Areas

## Area Limit Object Requirements

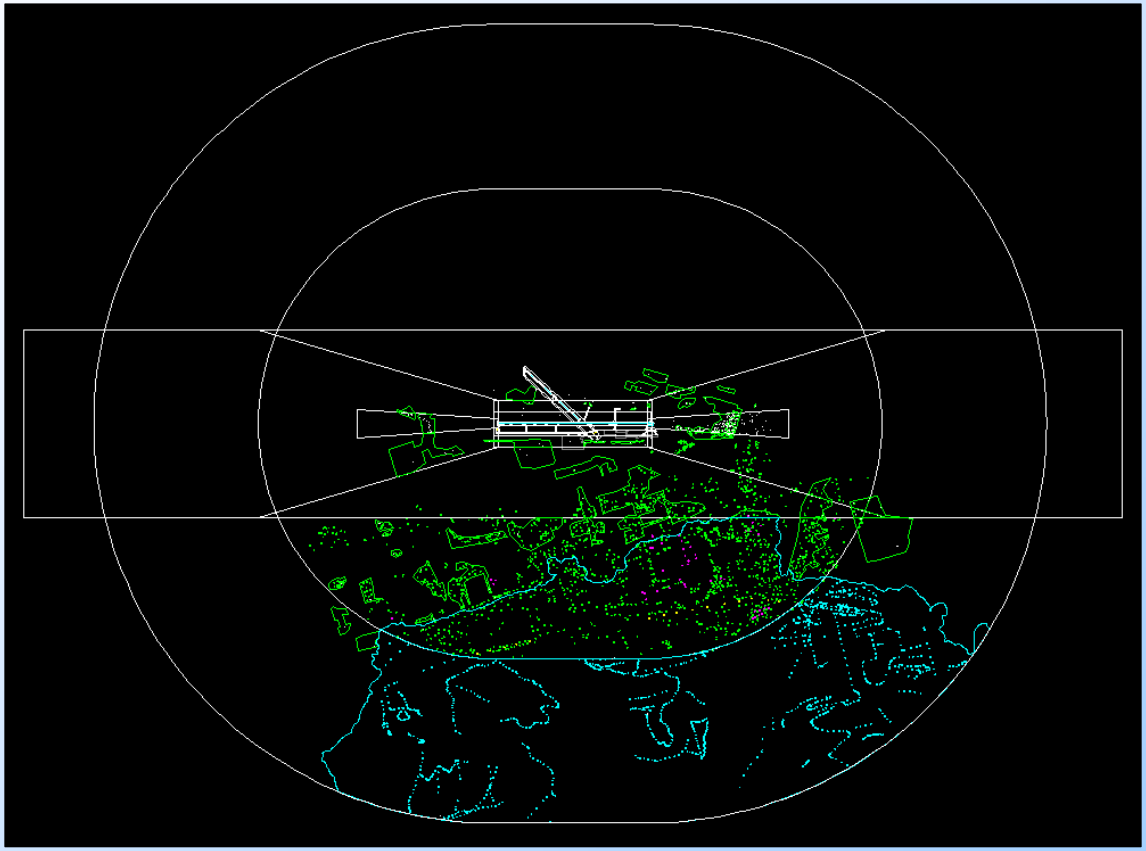


# William R. Fairchild International Airport

## Port of Port Angeles

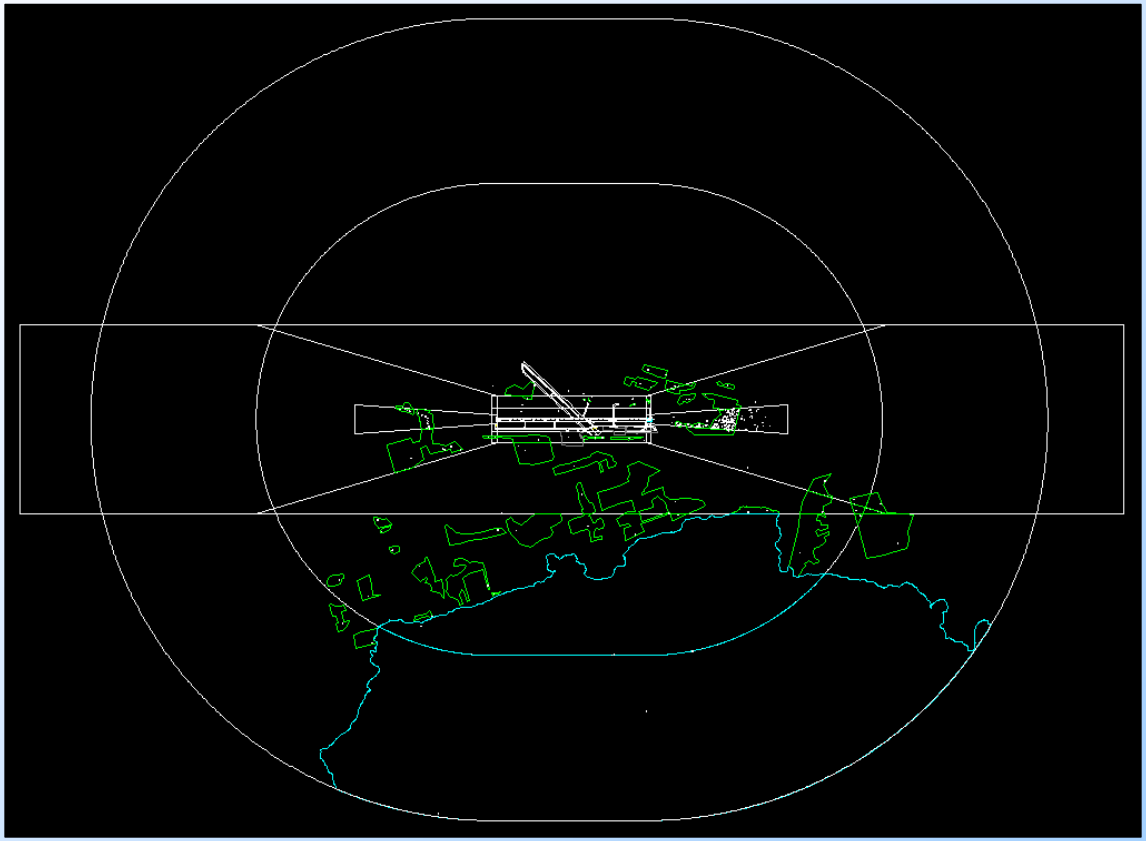
# Obstacles Penetrating AC 18B Surfaces

## William R. Fairchild International Airport



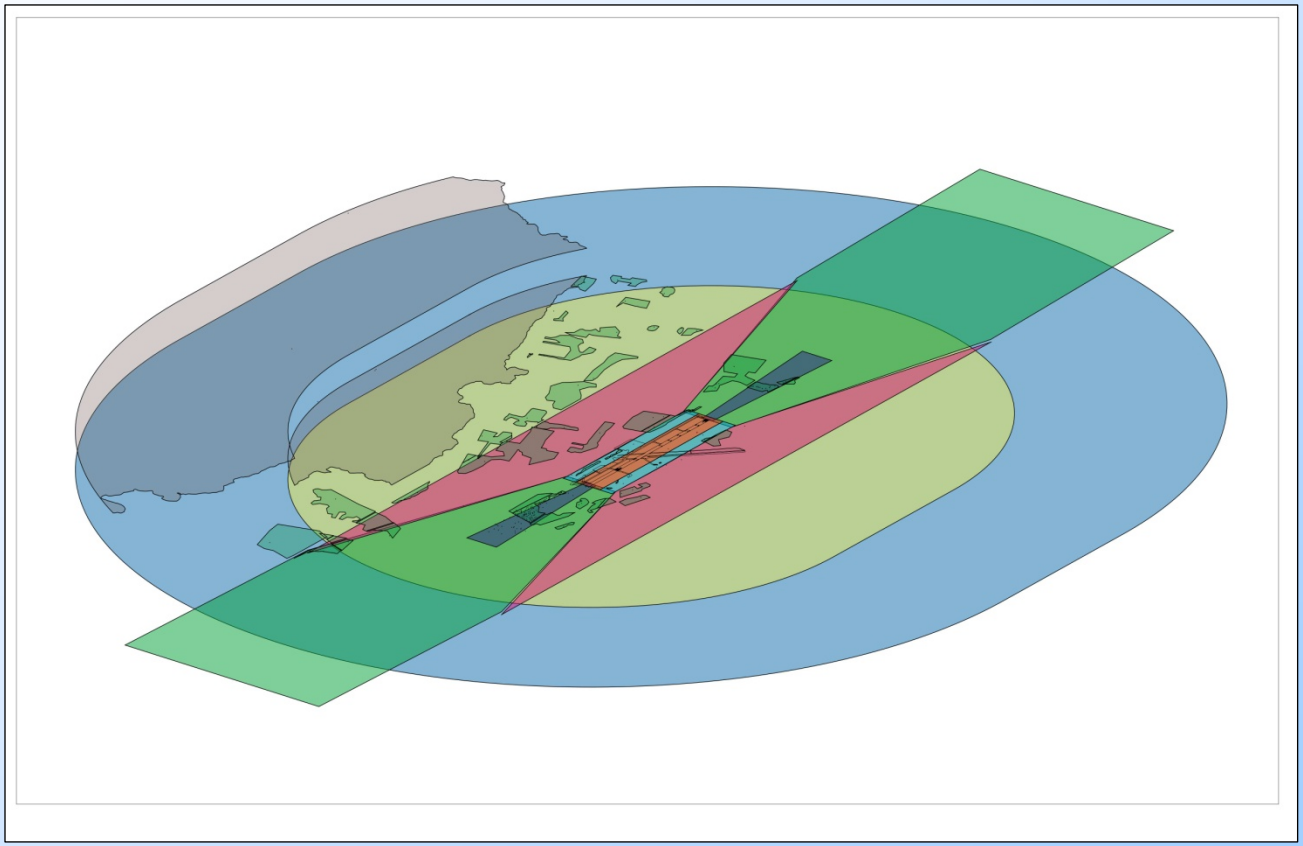
# Analyzed Critical Obstacles to be Reported

## William R. Fairchild International Airport



# Analyzed Obstacle Information

## AC 18B Surfaces



# Preparation of Drawing for Submission

1. Drawing submittal takes place of the former UDDF submissions to TPSS
2. AC 18B allows submission of data in many formats
   a. AutoCAD
   b. MicroStation
   c. Arc-GIS
3. CAD information to be provided in the following types
   a. Point
   b. Line
   c. Polygon
4. All additional data shall be provided in Attribute Format
   a. Requires the use of Metadata

# Continued Development of the Drawing

1. Data Migration Tool (DMT)
   a. This allows your data to be translated to FAA requirements
   b. Be sure to toggle to AC18B from the dropdown menu
   c. Provides all attribute cells for each object type
2. Multiple drawings in data set
   a. AC18B provides for multiple drawings (x-ref)
   b. Each drawing has specific data requirements
   c. Every drawing needs to meet CAD standards
3. Airport Data Features – Chapter 5
   a. Each feature on the airfield specific information to collect
   b. Review the requirements for all features prior to field collection

# Drawing Submission to AGIS

1. Purge and Test
   a. Purge the drawing prior to submission
   b. Place all drawings into a folder and compress (zip) the folder
   c. Test the drawing for errors on website
2. Drawing Upload
   a. Submit for verification
   b. Picture creation possible from uploaded information
3. Final Survey Report
   a. Documents all field and analysis work
   b. Include all FAA forms

# Questions???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