VERTICAL OBSTRUCTIONS and Your Property

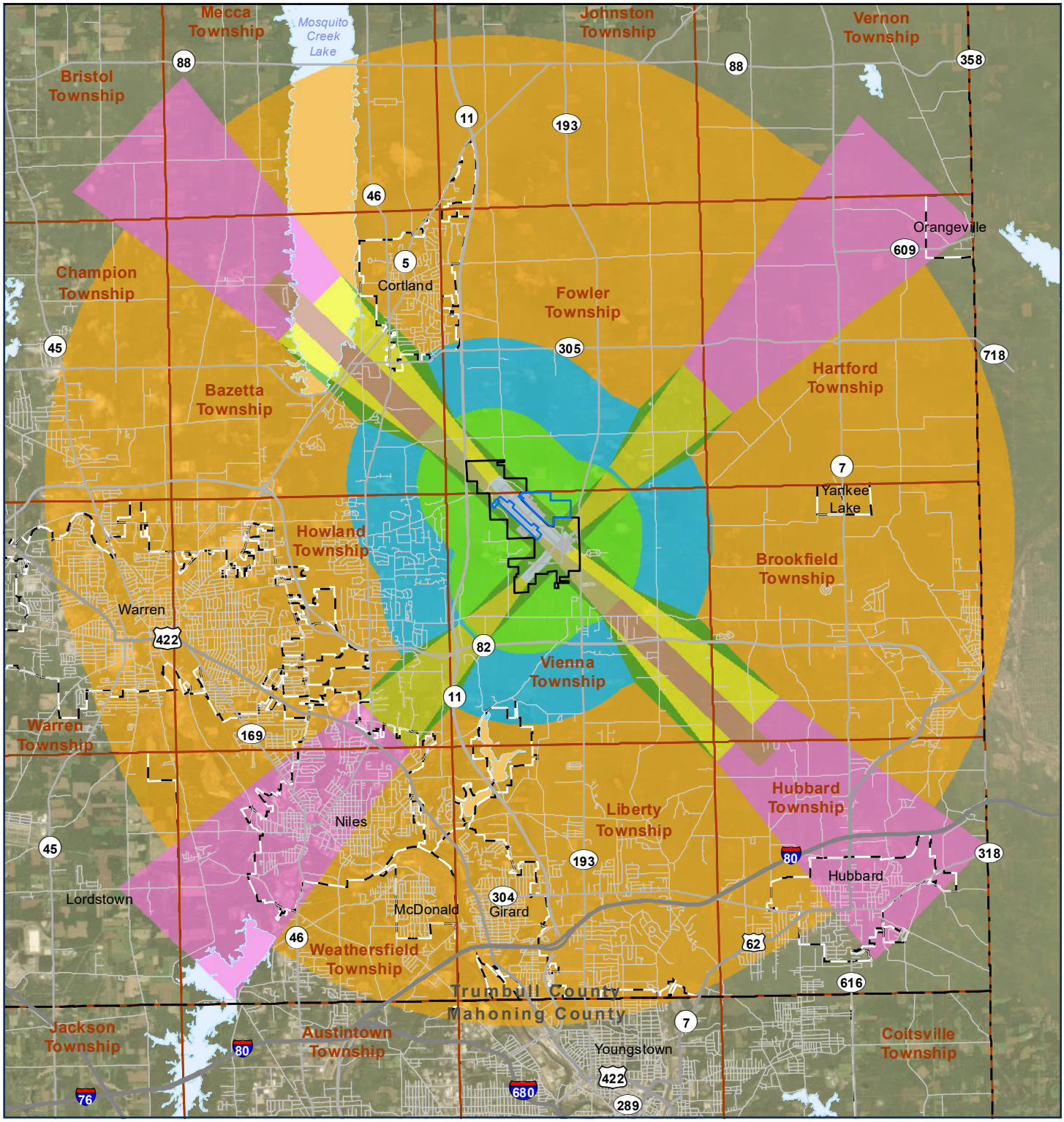
Vertical obstructions can be a safety hazard to both the public and military personnel and can compromise the value of low-level flight training by limiting areas where such training can occur.

What are Vertical Obstructions?

Vertical obstructions are objects or structures that encroach into navigable airspace used by the military due to their height. These obstructions can be safety hazards to both the public and military personnel and can compromise the value of low-level flight training by limiting areas where such training can occur. As a consequence, military readiness can be compromised. The Federal Aviation Administration (FAA) evaluates vertical obstructions through Title 14 of the Code of Federal Regulations — commonly known as Part 77, and the FAA and Department of Defense have developed imaginary surfaces to identify recommended maximum object/structure heights around airfields.

How are Vertical Obstructions Defined in Zoning?

Without proper land planning that controls heights, structures such as tall buildings, cell towers, agricultural silos, and smokestacks built near the Youngstown-Warren Regional Airport and Youngstown Air Reserve Station (YARS) have the potential to encroach into flight paths. Surrounding townships and cities can take a proactive approach to ensure that their citizens and YARS aircrews are safe from vertical obstructions. Jurisdictions can control structure heights based on the imaginary surfaces in their respective zoning regulations.



Imaginary Surfaces

- Primary Surface
- Approach Departure Zone (50:1)
- Approach/Departure Zone (40:1)
- Approach/Departure (Horizontal)
- Approach/Departure (Assault Strip - Outer 35:1)
- Approach/Departure (Assault Strip - Inner 35:1)
- Inner Horizontal Surface (150 ft)
- Conical Surface (20:1)
- Outer Horizontal Surface (500 ft)
- Transitional Surface (7:1)
- Youngstown ARS
- Youngstown-Warren Regional Airport
- County
- Township
- Municipality

0 1 2 Miles

What Are Imaginary Surfaces?

Imaginary surfaces are the areas surrounding a runway that should be kept clear of objects that might create vertical obstructions for aircraft.

Any man-made or natural object that penetrates an imaginary surface is considered an obstruction. Imaginary surfaces extend around runways in a stadium shape. The imaginary surfaces start at specified heights measured above an established airfield elevation (EAE). The EAE for the runways at Youngstown-Warren Regional Airport used by YARS are 1,192 feet above mean sea level. Any man-made or natural object that penetrates an imaginary surface is considered an obstruction.

Imaginary Surfaces Around YARS

Primary Surface. This surface is located on the ground, horizontally centered on and spanning the same length as the runway. The width of the primary surface is 2,000 feet.

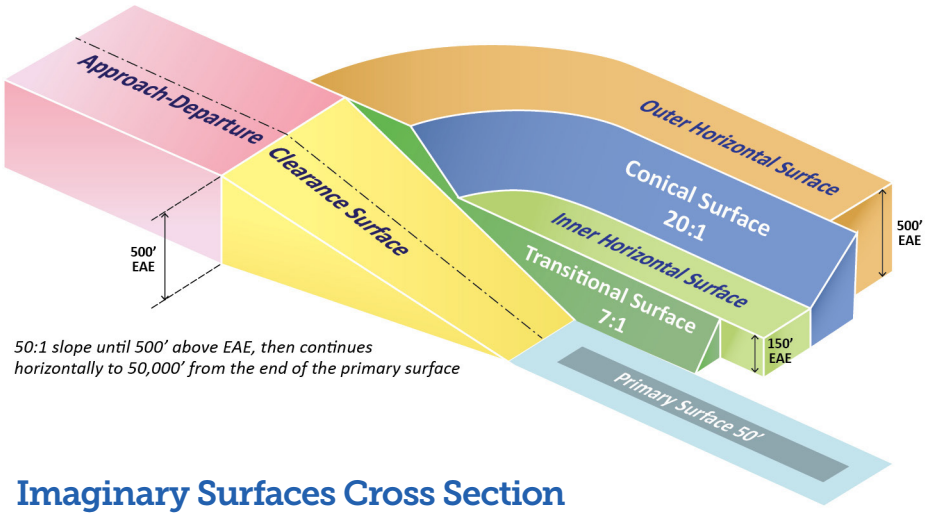
Approach/Departure Clearance Surface. This is an inclined plane, symmetrical relative to the runway centerline, beginning 200 feet beyond each end of the primary surface and extending for 50,000 feet. The slope of this surface is 50 horizontal feet for every one vertical foot, or 50:1, along the runway centerline, until it reaches an elevation of 500 feet above the EAE (25,000 feet from the starting point). The surface then continues horizontally at this elevation for another 25,000 feet. This surface is the same width as the primary surface where first extending from the end of the runway and then flares uniformly to 16,000 feet wide at its end.

Inner Horizontal Surface. This is an oval-shaped plane 150 feet above the EAE. The plane is constructed by scribing an arc with a radius of 7,500 feet about the centerline at each end of the runway and interconnecting these arcs with tangents.

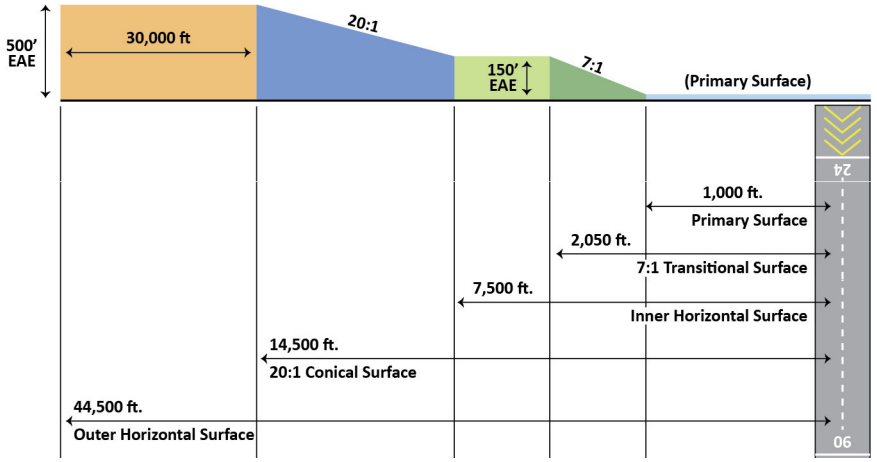
Conical Surface. This inclined surface extends 7,000 feet outward from the inner horizontal surface to 500 feet above the EAE with a slope of 20:1.

Outer Horizontal Surface. This plane is located 500 feet above the EAE. It extends outward from the outer periphery of the conical surface for 30,000 feet.

Imaginary Surfaces Quarter Section for Typical Airfield Runway



Imaginary Surfaces Cross Section for Typical Airfield Runway



Transitional Surfaces. Transitional surfaces connect the other surfaces to each other, with a slope of 7:1.

Assault Strip Approach/Departure Clearance Surface *(Not shown on the typical diagrams above)***.** This surface is specific to the landing zone runway. It is an inclined plane arranged symmetrically about the runway centerline beginning at the end of the clear zone, 500 feet beyond each end of the runway threshold, and extending 10,500 feet. The slope is 35:1 with the surface extending 300 feet above the runway. The surface starts at 500 feet wide and then flares uniformly until reaching a width of 2,500 feet at 10,500 feet above the runway.

YARS ▪ Vertical Obstructions and Your Property

Will Your Proposed Development Create a Vertical Obstruction?

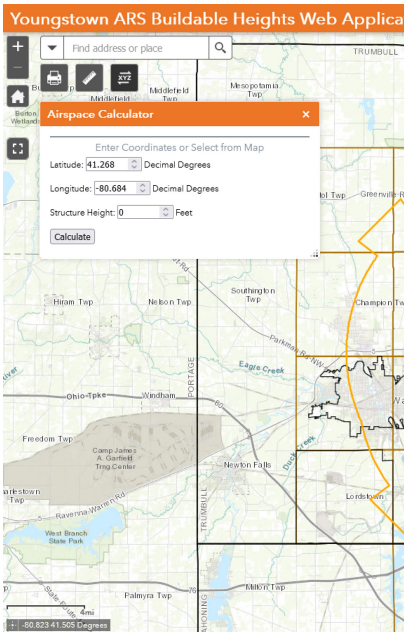
Property owners or developers who propose projects that include structures taller than 200 feet should submit an Obstruction Evaluation form to the FAA to determine whether the structures would create a vertical obstruction. The FAA may waive height restrictions and approve taller buildings or structures if the obstruction is minimal and certain conditions are met. FInformation on the FAA obstruction evaluation process is located at: https://oeaaa.faa.gov/

Vertical obstructions are most likely to occur in the approach/departure clearance surface. The closer a property is to a runway, the more likely a tall structure will be a vertical obstruction. Vertical obstructions are also a concern in low-level flight areas, which are often close to airfields. Height limitations are associated with each surface to help identify existing and potential obstructions. Structures proposed within the imaginary surfaces should be evaluated based on their height and distance from the airfield to determine whether they pose a vertical obstruction.

To find out if your proposed development may cause a vertical obstruction, you can use the Buildable Heights Calculator developed for the imaginary surfaces surrounding the Youngstown-Warren Regional Airport. The Calculator provides site-specific information by 1) entering a proposed structure height at a selected location on the map to determine whether the structure is under or above an imaginary surface or 2) selecting a location on the map to determine the maximum buildable height before penetrating an imaginary surface. The Buildable Heights Calculator is located at:
https://gis-map-fe.matrixdesigngroup.com/YARS/

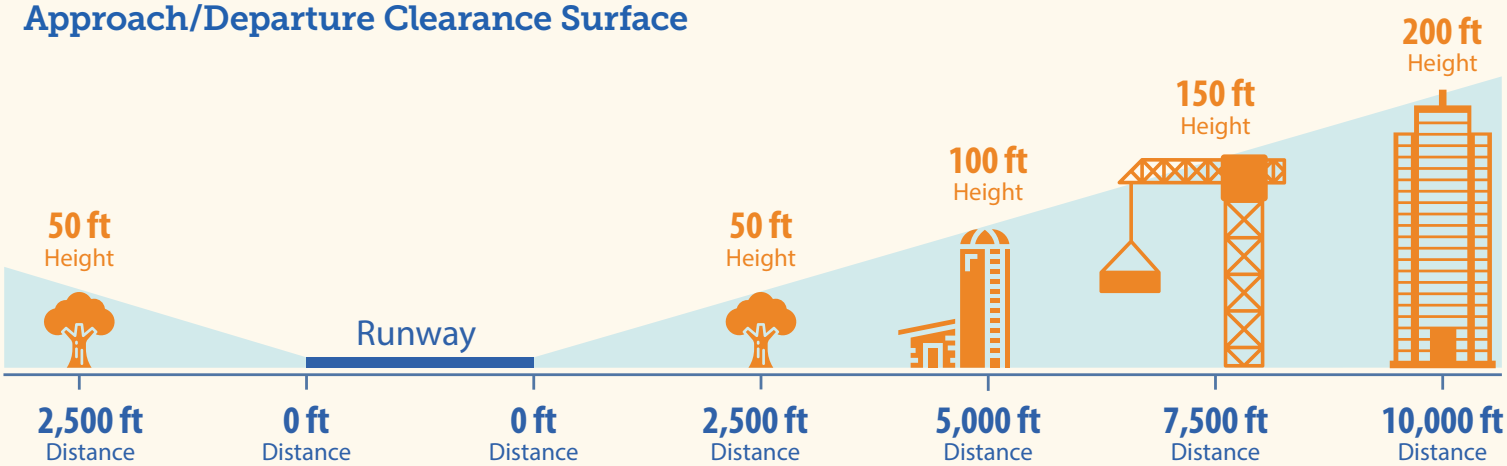
Obstruction Evaluation Forms are located at:

https://oeaaa.faa.gov/



Online Buildable Heights Calculator for the Youngstown-Warren Regional Airport and YARS

Example Allowable Heights Under the Approach/Departure Clearance Surface



Note : Not to scale

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