Airport Master Plan Update

Middlebury State Airport (6B0)

Technical Advisory Committee Meeting #2

June 7, 2022

VERMONT AGENCY OF TRANSPORTATION

CHA design/construction solutions

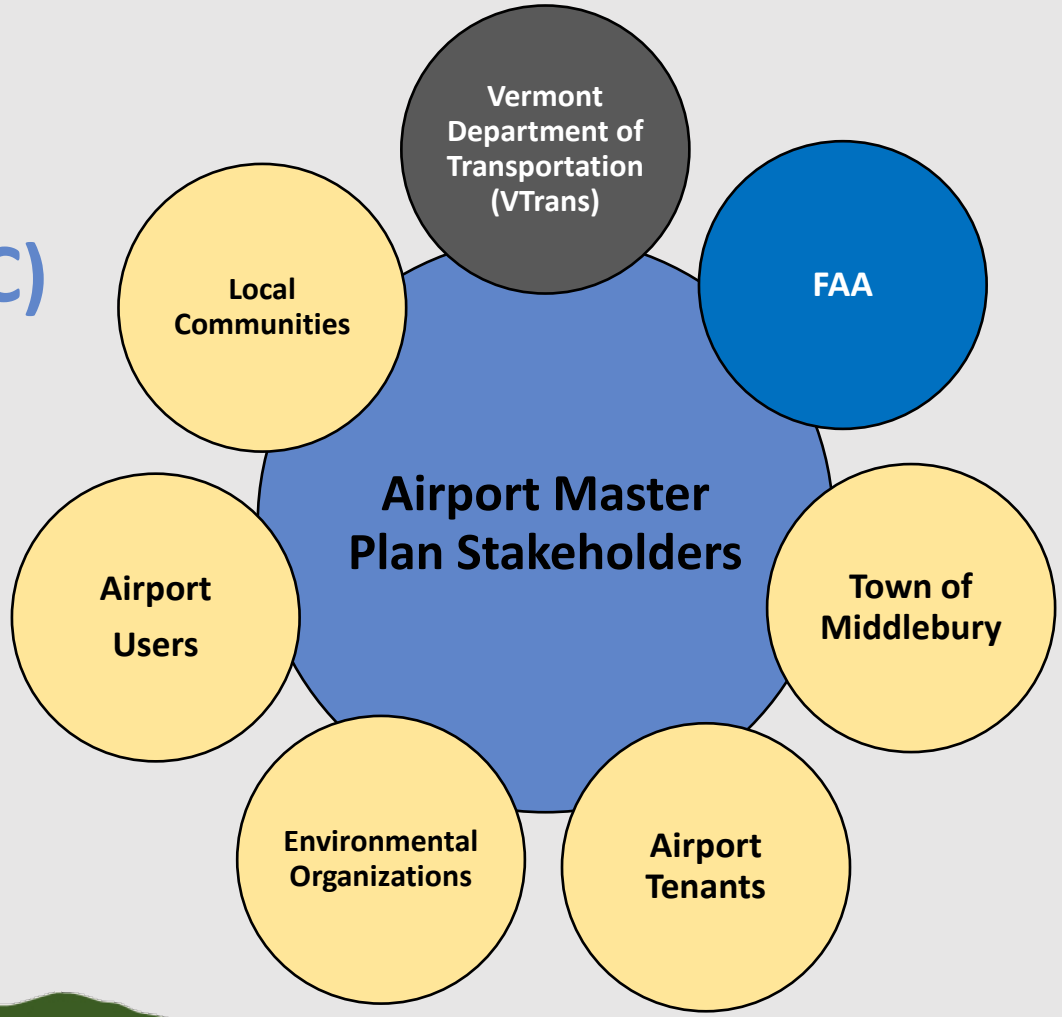
Today's Agenda

- Introductions
- Overview of Master Plan Process
- Review of Initial Findings
  - Airport Inventory
  - Airport Forecast
  - Feasibility Study
- Airport Facility Requirements
- Airport Development Alternatives
- Next Steps
  - Airspace/Obstruction Analysis
  - Airport Layout Plan Development
  - Final TAC & Public Meetings

Introductions

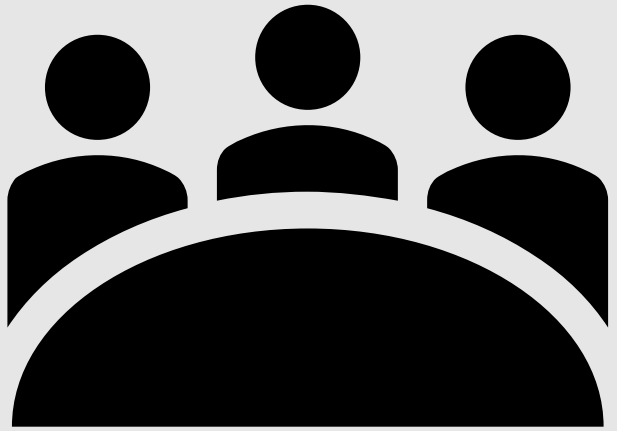
Technical Advisory Committee (TAC)

- Technical Advisory Committee Members
- Airport / VTrans Staff
- Federal Aviation Administration
- CHA (Airport Consultant)



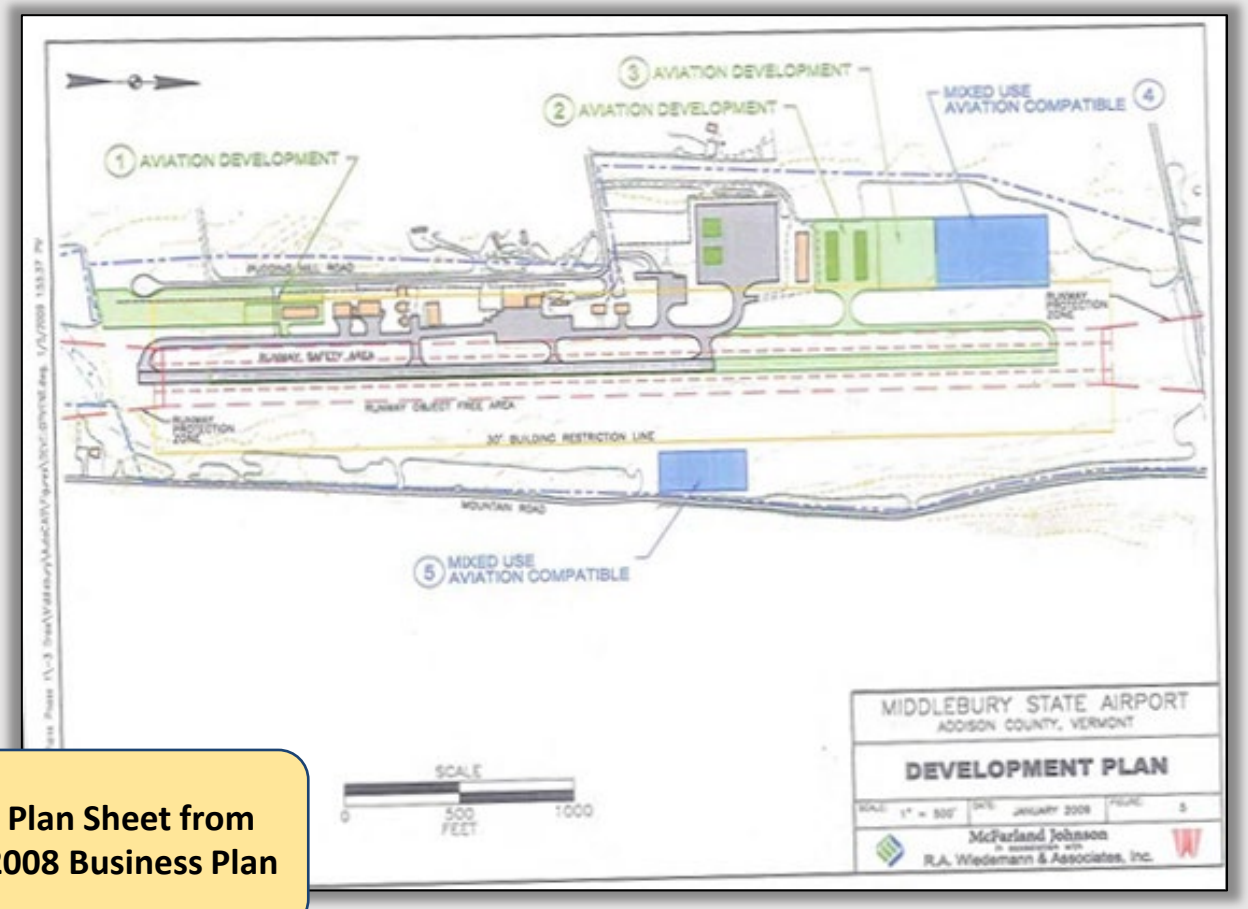
Why Are You Here?

- **Technical Advisory Committee (TAC):**
  Airport and community stakeholders supporting the planning process
- Support Actions Includes:
  - Provide insight on airport, community and regional issues
  - Provide technical input on operational and facility matters
  - Review and comment on the Master Plan Update findings and recommendations



What is an Airport Master Plan?

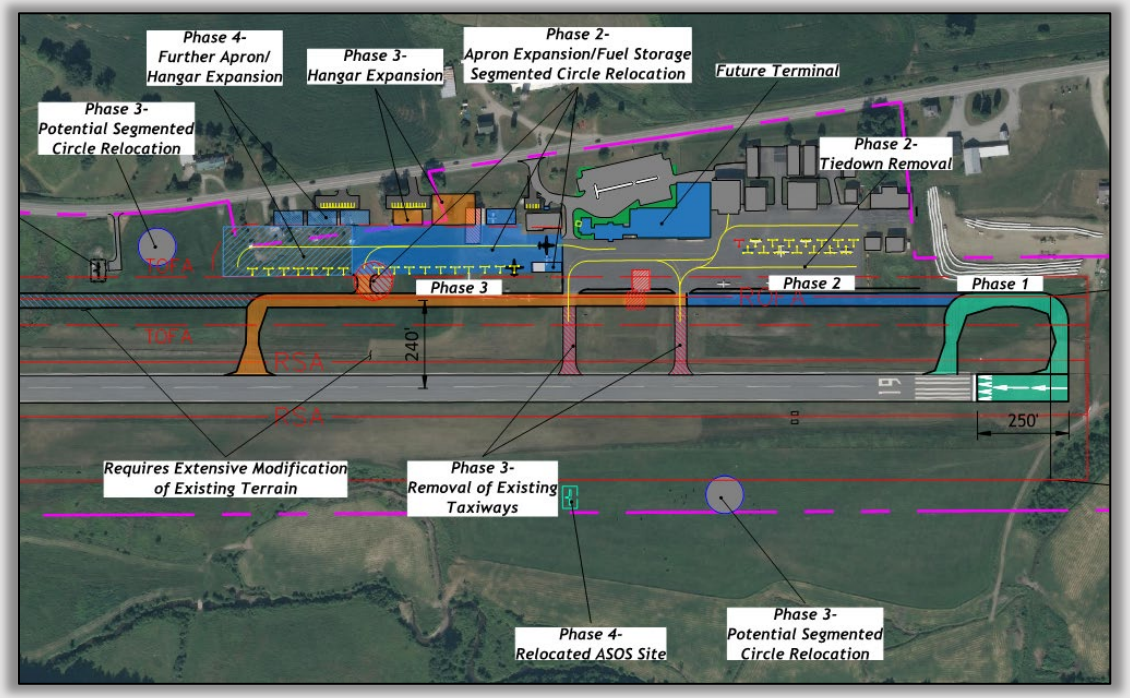
- Guides the Airport's Development
- Two Parts:
  - *Master Plan Report*
  - *Airport Layout Plan (ALP) (Drawing Set)*
- Covers 5, 10, and 20-year horizons
- Typically updated in 10-year cycles
- Follows FAA Guidance and Standards
- Last ALP completed in 2003



Plan Sheet from 2008 Business Plan

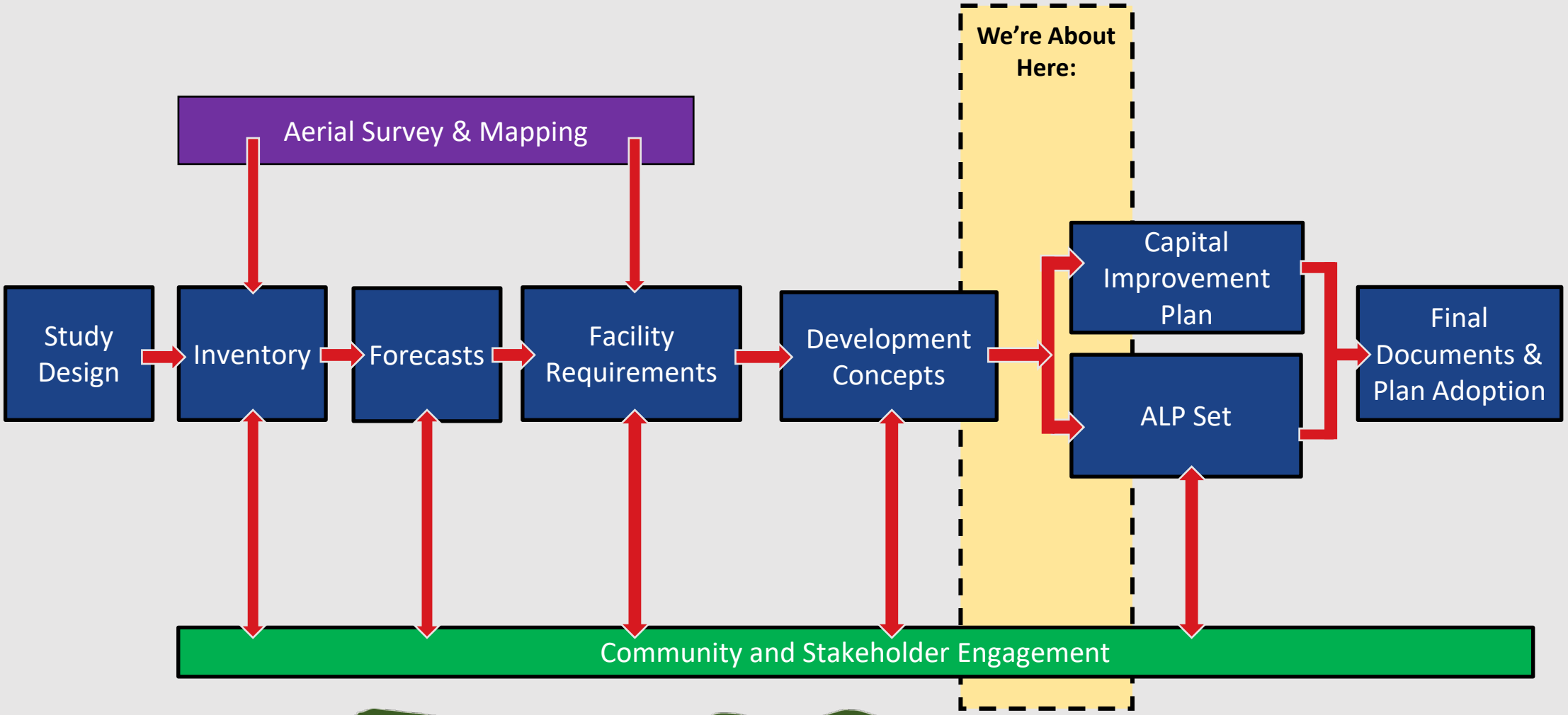
Why do an Airport Master Plan?

- Meet Foreseeable Aviation Demand & Customer Needs
- Facilitate Airport Improvements
- Identify Future Development that is:
  - Planned & Logical
  - Feasible & Flexible
  - Fiscally Responsible
  - Environmentally Compatible
- Allow for Federal Funding on Eligible Projects



Example: Morrisville-Stowe State Airport (2018)

Airport Master Planning Process



Airport Master Plan – Focus Areas

- Industry Trends & Changes Since Previous ALP
- Follow up to the Vermont Aviation System Plan (VASP)
- Specific Focus Areas:
  - Airport Survey & Mapping (i.e., AGIS)
  - Airfield Needs & FAA Design Standards
  - Airspace Obstruction Considerations
  - Potential for Instrument Approach Procedures
  - Airfield Lighting
  - Hangar/Terminal Development Concepts
  - Financial Considerations / Costs

Image Courtesy of Terry Fletcher at Airport-Data.com


Source: VTrans

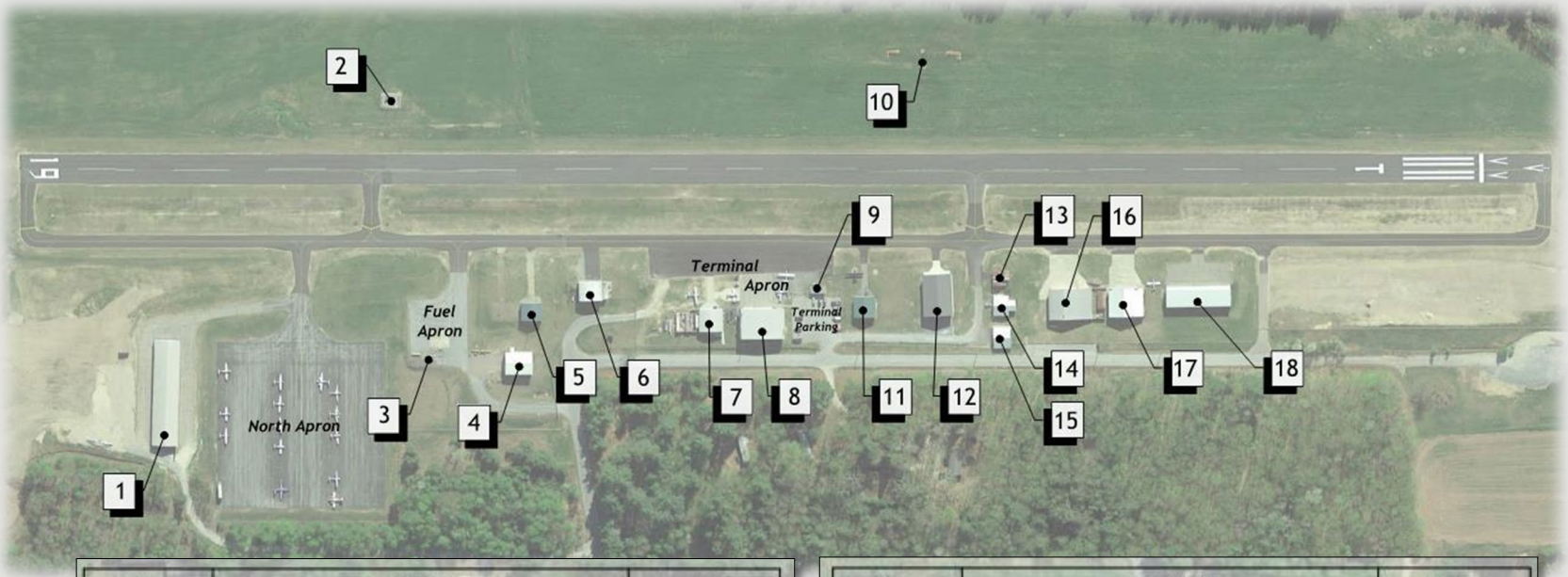
Review of Initial Findings

Key Airport Features

- Approximately 156 acres
- Single Runway: *1-19*
  - 3,206’ x 60’; 141’ displacement
    - *Recent survey will correct published runway and displaced threshold lengths*
- Parallel Taxiway ‘A’
  - Six Taxiway Connectors
- 30 Based Aircraft
- 13 Aircraft Hangars
- 2 Aircraft Parking Aprons
- Two Business Tenants
  - Green Mountain Avionics
  - J & M Aviation

Existing Facilities

- Terminal Building / Hangar
  - Approx. 5,400 Sf
  - Owned & Maintained By VTrans
- 13 Aircraft Hangars
- 40+ Aircraft Tie-downs
- Automated Weather Observation System (AWOS)
- Fuel Farm/Aircraft Refueling
- Segmented Circle/Wind Indicator
  - Runway 1 – Standard Left Traffic
  - Runway 19 Right-hand Traffic
- 15+ Vehicle Parking Spaces



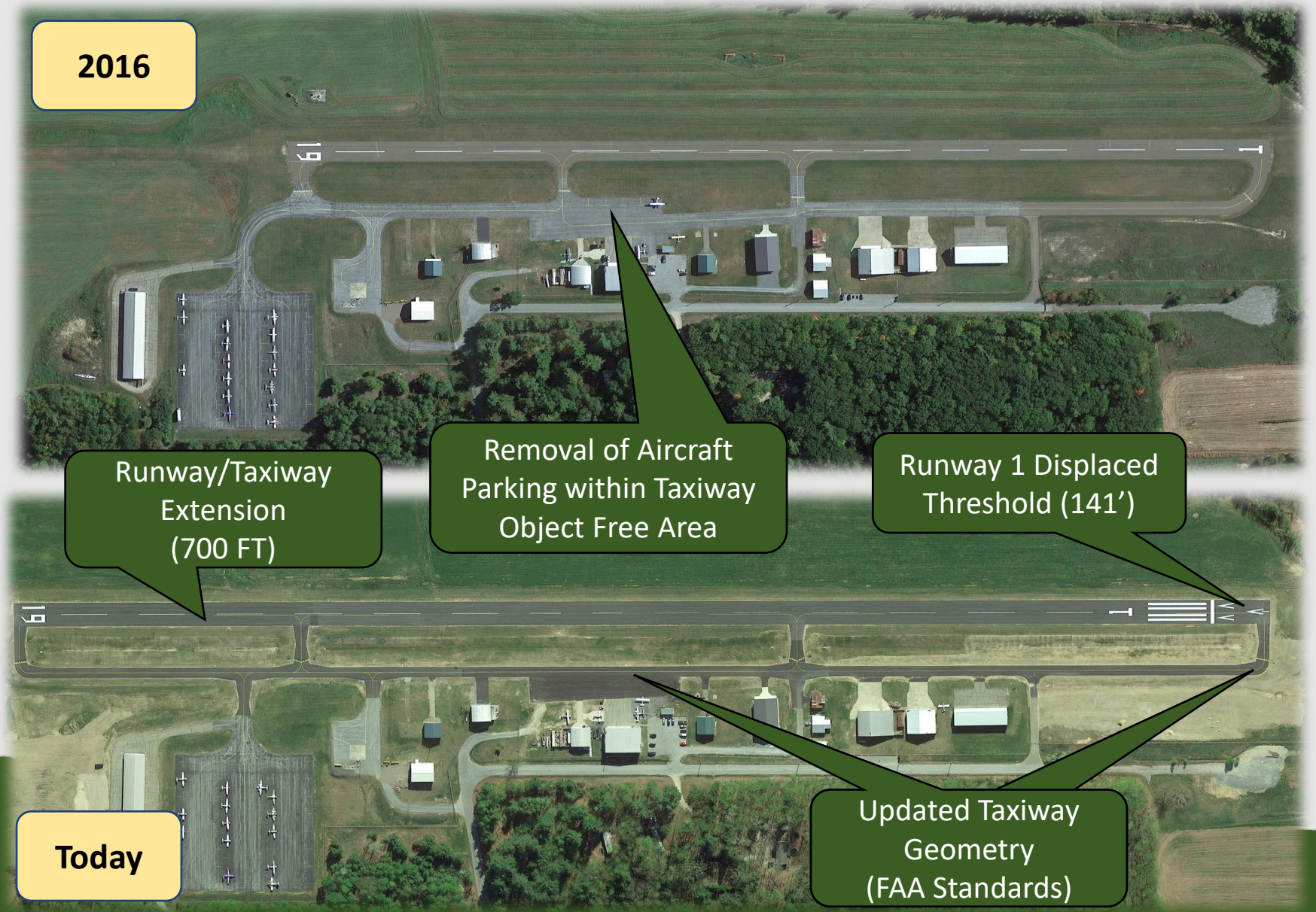
No.	Facility	Area
1	T-Hangar	8 Stalls
2	AWOS-III	-
3	Fuel Farm	-
4	Equipment Storage	2,750 SF
5	Box Hangar	1,850 SF
6	Box Hangar	1,850 SF
7	Box Hangar	2,275 SF
8	Terminal Building/Hangar	5,400 SF
9	Equipment Storage	400 SF

Building area is approximated from aerial imagery

No.	Facility	Area
10	Segmented Circle	-
11	Box Hangar	2,000 SF
12	Box Hangar	5,000 SF
13	T-Hangar	1,000 SF
14	T-Hangar	1,675 SF
15	T-Hangar	1,500 SF
16	Box Hangar	5,575 SF
17	Box Hangar	4,350 SF
18	T-Hangar	3 Stalls

Recent Airfield Improvements

- 700’ Runway/Taxiway Extension
- Runway Widening To 60’
- Updated Taxiway Geometry
  - Narrowing To 25’
  - Fillets & Tapers
  - Partial Realignment (Parallel)
- Runway 1 Displaced Threshold
  - 141’ in Length
  - Non-precision Instrument Approach Markings
- Removal of Aircraft Parking Apron within Taxiway Object Free Area



Airport Reference Code (ARC)

- FAA System to Classify Airports
- Based on Approach Speed & Wingspan
  - Aircraft Approach Category (AAC)
  - Airplane Design Group (ADG)
- Dictates Dimensional Requirements of the Airfield
- Most aircraft at 6B0 are A-I or B-I
- ARC aircraft A-II and B-II are occasional users at 6B0
- **The official ARC for 6B0 is B-I***

*per operational/flight plan data

Approach Category	
	Airspeed (knots)
A	< 91
B	91 ≤ 121
C	121 ≤ 141
D	141 ≤ 166
E	166+

Design Group	
	Wingspan (feet)
I	< 49
II	49 ≤ 79
III	79 ≤ 118
IV	118 ≤ 171
V	171 ≤ 214
VI	214 ≤ 262

A-I

Piper Cherokee

Cessna 172

B-I

Cessna 421

Socata TBM

A-II

Cessna 208

Pilatus PC-12

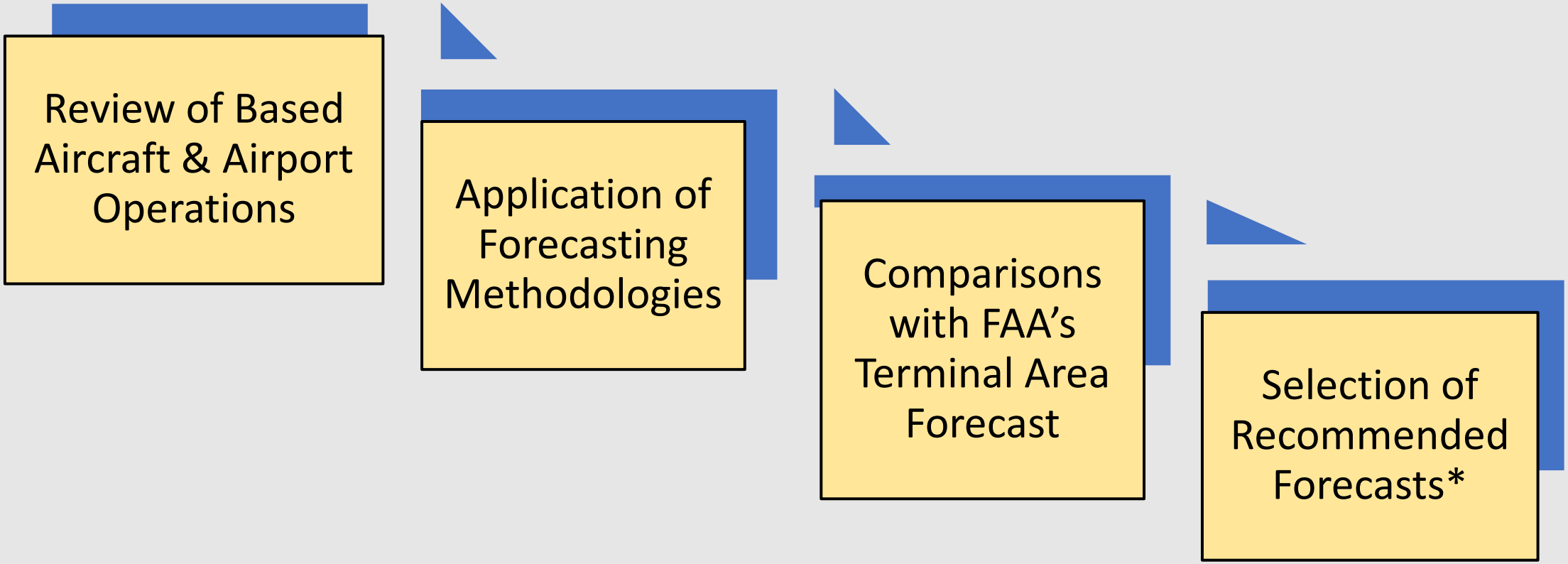
B-II

King Air 200

Cessna Citation XL

Forecasts of Aviation Demand

Forecasting Process



* FAA Approval is Required

TAF Based Aircraft & Airport Operations

- FAA Terminal Area Forecast (TAF)
  - Annual based aircraft & airport operations report issued by the FAA
  - Forecasted numbers often remain static (i.e., no growth) for non-commercial airports
- Justification must be Document if Airport Master Plan Operations Forecast Exceeds the TAF by:
  - 10% within 5-years
  - 15% within 10-years

Base Year
Actual

6B0 TAF (2020)

Year	Based Aircraft	Airport Operations
2010	46	10,900
2011	31	10,900
2012	32	10,900
2013	32	10,900
2014	32	10,900
2015	36	10,900
2016	37	10,900
2017	36	10,900
2018	29	10,900
2019	17	6,350
2020	17	6,350
TAF Projected		
2021	***17***	***6,350***
2026	***17***	***6,350***
2031	***17***	***6,350***
2036	***17***	***6,350***
2041	***17***	***6,350***

**Excludes military operations*

6B0 Master Plan Forecasts

Based Aircraft & Airport Operations

- TAF-Based Forecasts
  - 6B0 Growth: Determined maximum growth possible without exceeding FAA parameters
  - Statewide Growth: Determines market share of state operations
- VT Airport System Plan (VASP) Forecasts
  - Used growth parameters listed within the draft 2020 VASP:
    - Low Growth: 0.21%
    - Average Growth: 0.42%
    - High Growth: 0.84%
- Econometric Forecasts
  - Addison County population growth (-0.12%)
  - Addison County household income growth (2.5%)
- Operations per Based Aircraft (OPBA)
  - Uses household income forecast to calculate OPBA

Based Aircraft & Airport OperationsForecast
Selected as Recommended Forecast

6B0 Master Plan Forecasts

*Recommended Forecasts**

- **Based Aircraft**
  - Recommended VASP High Growth forecast projects 9 additional aircraft by 2041

- **Airport Operations**
  - Recommended VASP High Growth forecast projects modest growth by approximately 1,220 additional operations
  - Does not exceed TAF parameters

Based Aircraft

Year	Recommended Forecast
2020	30
2021	30
2026	32
2031	34
2036	36
2041	39

Airport Operations

Year	6B0 TAF	Recommended Forecast	Recommended Forecast vs. FAA TAF
2020	6,350	6,350	0.0%
2021	6,350	6,403	0.8%
2026	6,350	6,677	5.1%
2031	6,350	6,962	9.6%
2036	6,350	7,259	14.3%
2041	6,350	7,569	19.2%

* Recommended Forecast updated since TAC #1 meeting due to FAA-verified based aircraft numbers

Aircraft Fleet Mix

- Mix of Based Aircraft Types
  - Single-engine, multi-engine, turbo-prop, jet, rotor/helicopter
- Used to Determine Potential Airport Space/Sizing Needs
- Fleet Mix Forecast
  - Based upon recommended based aircraft forecast
  - *FAA Aerospace Forecast Report (FY 2020 – 2040)* used to develop percent breakdown of aircraft fleet

Based Aircraft Fleet Mix Forecast

Year	Single-Engine	Multi-Engine	Turbine Engine	Rotor-Craft	Total
2020	29	0	1	0	30
2021	29	0	1	0	30
2026	30	1	1	0	32
2031	32	1	1	0	34
2036	32	1	3	0	36
2041	34	2	3	0	39

Critical Aircraft Determination

- Critical Aircraft
  - Type or family of aircraft with 500 or more annual operations at the airport
- Most Aircraft Activity at 6B0 is from ARC A-I Aircraft with Consistent Activity from A-II, B-I, & Occasional B-II Aircraft
- As A-I & B-I FAA Design Standards are alike, ARC B-I was Retained with the **Cessna 421** designated as the sample Critical Aircraft

Recorded Flight Plans: Figures

Aircraft Design Type	2011-2021
A-I	535
A-II	86
B-I	76
B-II	6
Grand Total	**809**

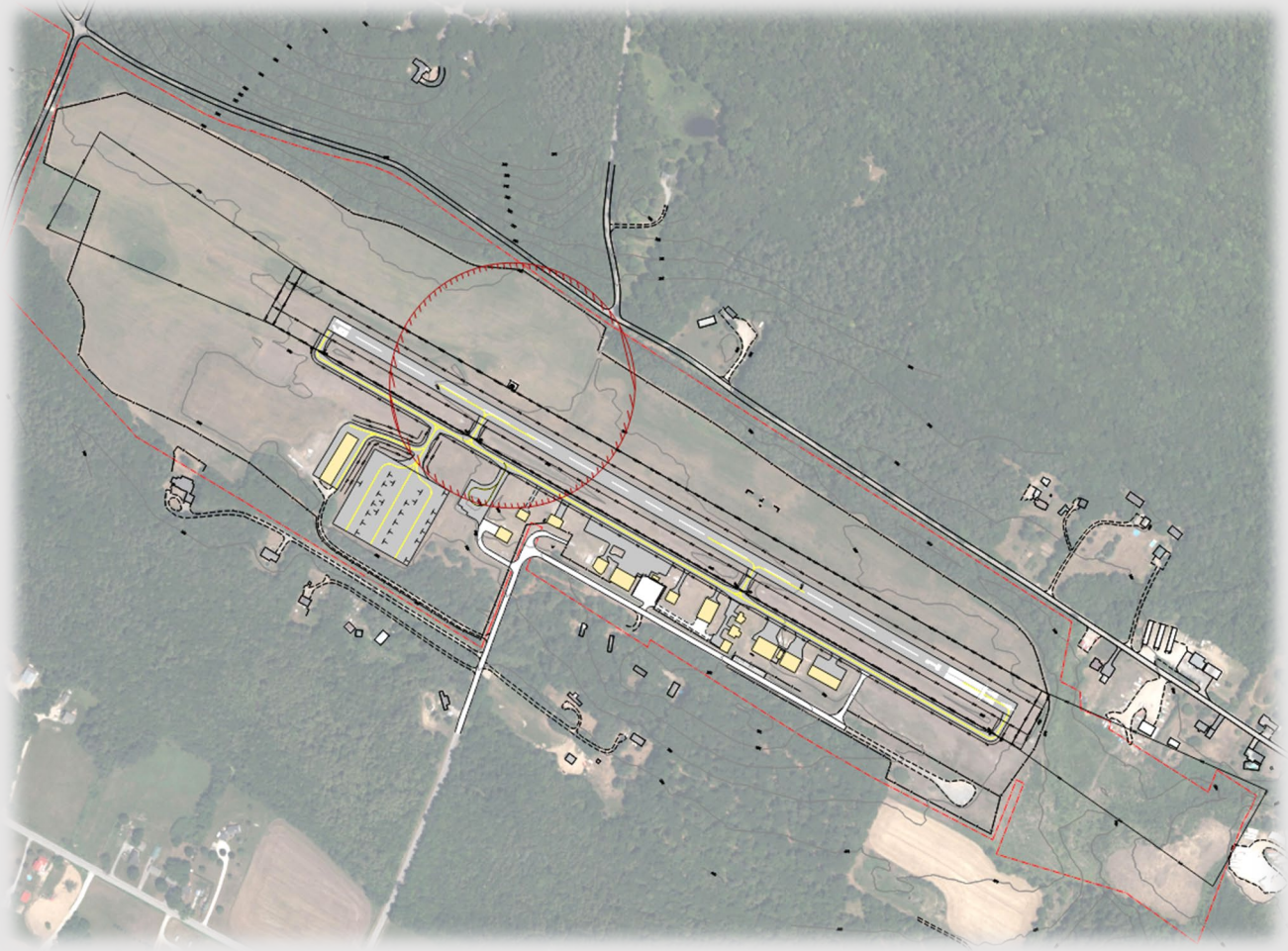
Recorded Flight Plans: Percentages

Aircraft Design Type	2011-2021
A-I	66.1%
A-II	10.6%
B-I	9.4%
B-II	0.7%

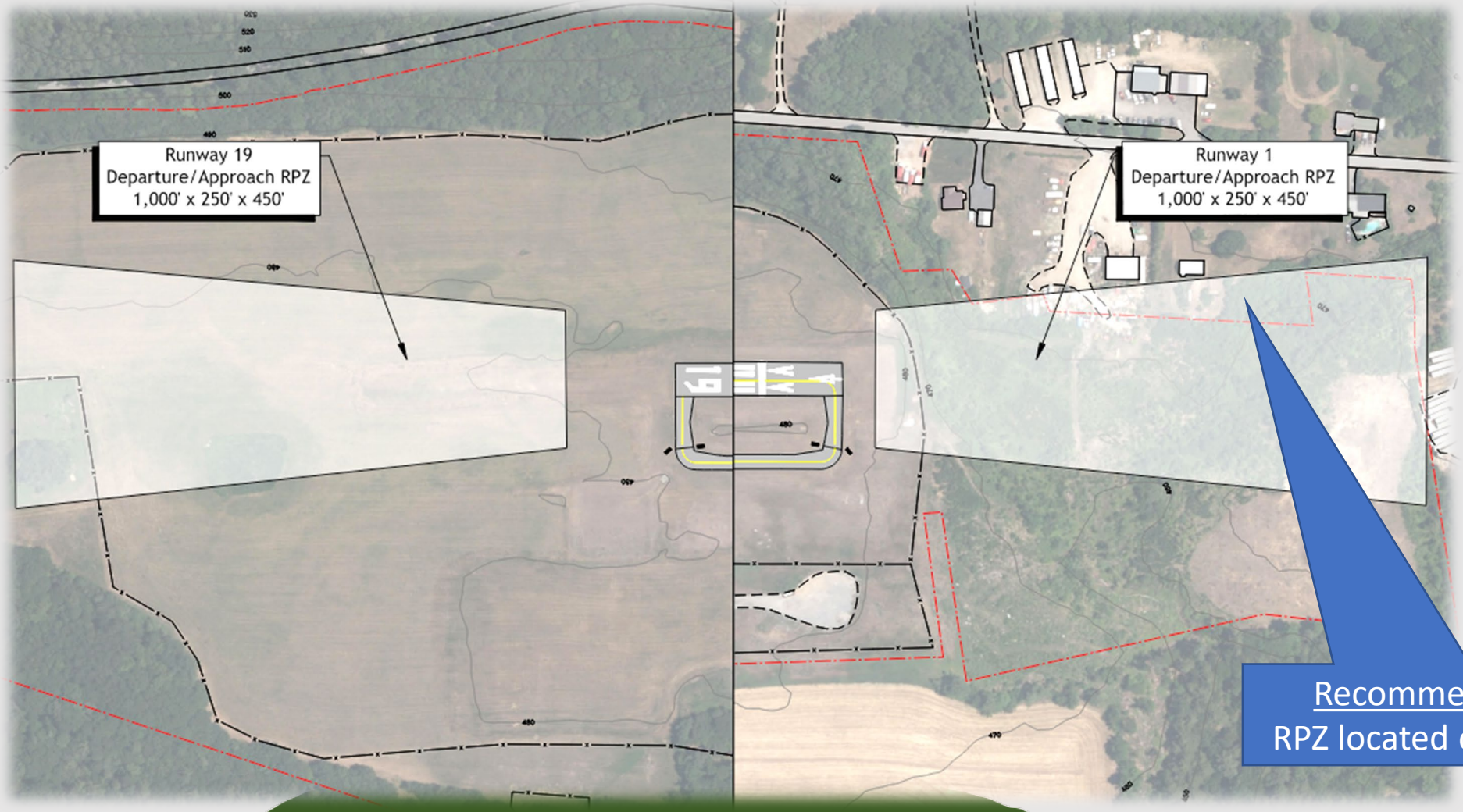
Airport Facility Requirements

Runway Safety Evaluation

- Runway Safety Area (RSA)
  - Runway 1/19 Width: 120 FT
  - Clear of non-frangible objects
  - Graded to elevation of runway centerline
- Runway Object Free Area (ROFA)
  - Runway 17/35 Width: 250 FT
  - Clear of non-frangible objects
  - Terrain should not be higher than adjacent runway elevation
- 6B0 meets all FAA Runway Safety Standards



Runway Protection Zone (Avigation Easements)



Airport Facility Requirements

Table 3-14 – Facility Recommendations

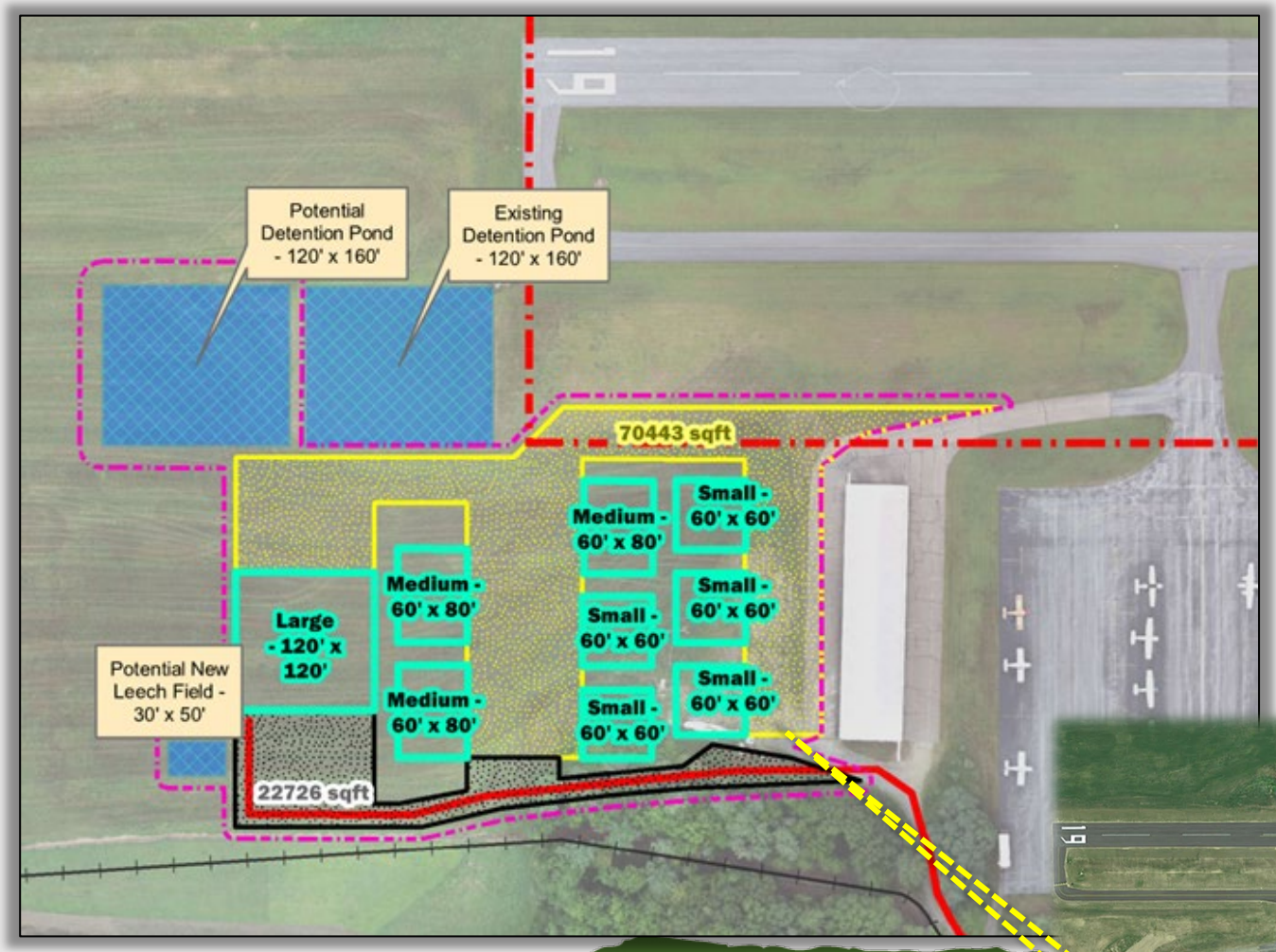
Facility	Recommendation
Navigational Aids	• Add Non-Precision Instrument Approaches to Runways 1 and 19 • Install PAPI-2 to Runways 1 and 19
Hangar and Apron Parking	• Construct additional hangar space • Construct additional apron space for transient aircraft
Terminal/FBO Building	• Comprehensive renovation of the existing passenger/pilot lounge • Alternatively, construct standalone building offering amenities in line with an FBO. • Construct additional vehicle parking lot
Airspace	• Acquire avigation easements for Runway RPZs & off-airport aircraft surfaces

Airport Development Concepts

Airport Development Concepts

- Components of Master Plan *(Working Paper #2)*
  - Airfield Facility Requirements
  - Terminal Building Requirements
  - Hangar & Apron Needs
  - Support Facilities
  - Development Options & Recommendations

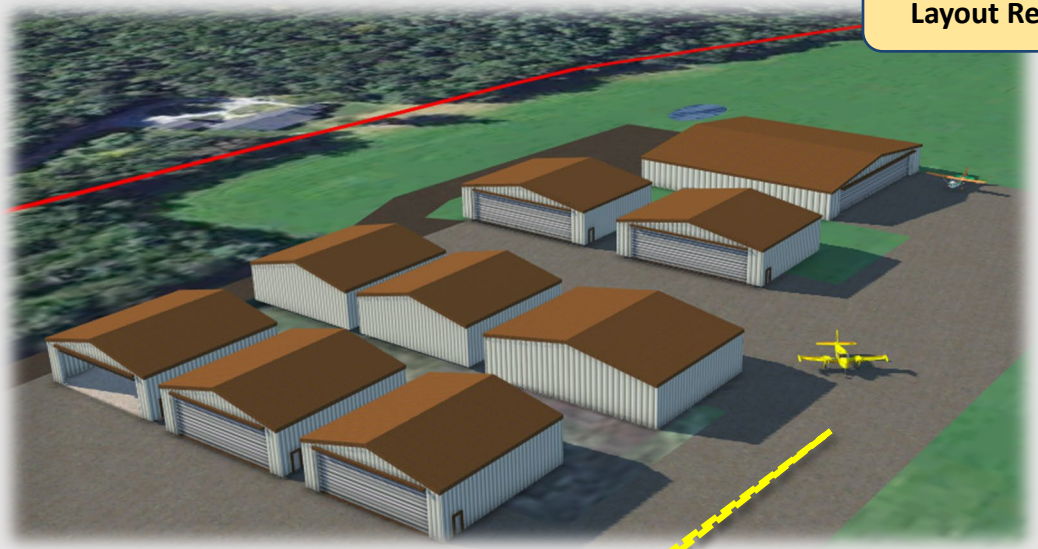
Airport Development Concepts

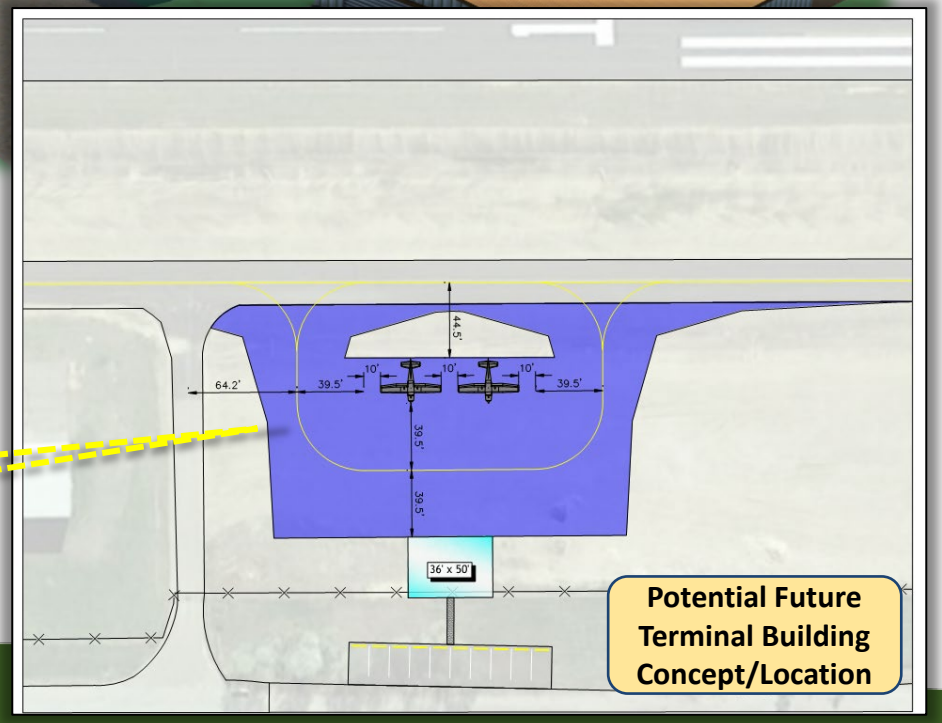


- VTRANS Hangar Permitting *(ACT 250)*
  - VTrans is advancing an effort to "pre-permit" hangar sites to streamline private hangar development
- Additional Locations for Hangar & Terminal Building Development will be Examined

Airport Development Concepts

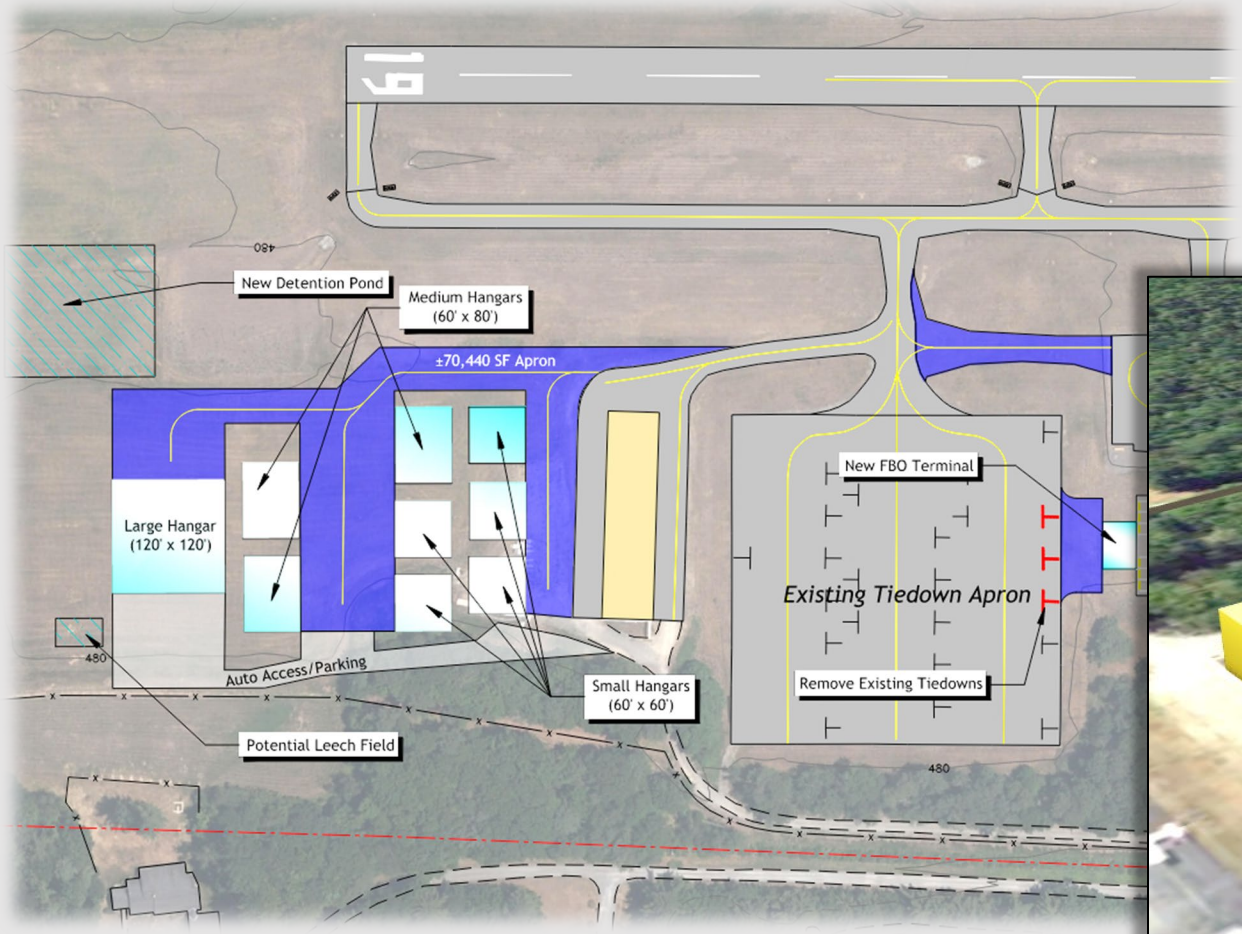
Potential Hangar Layout Renderings



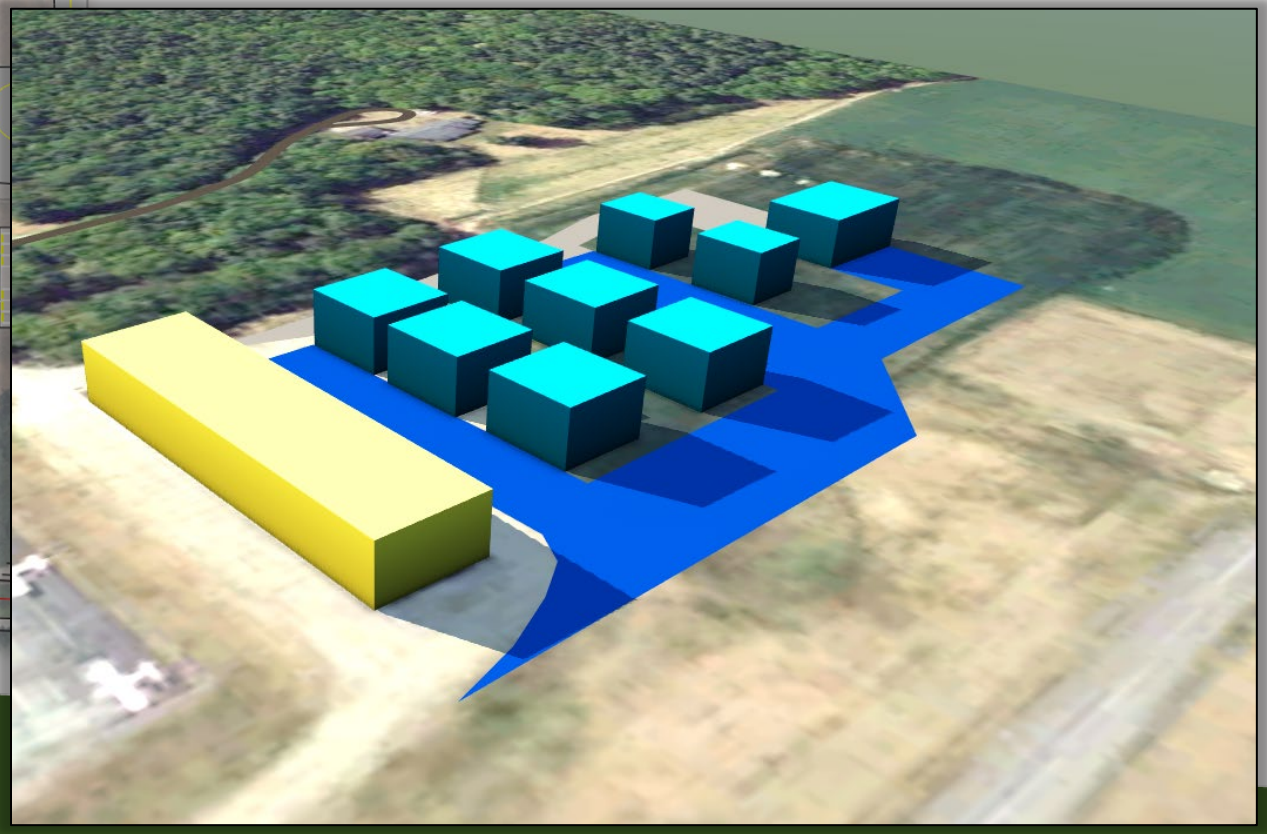


Potential Future Terminal Building Concept/Location

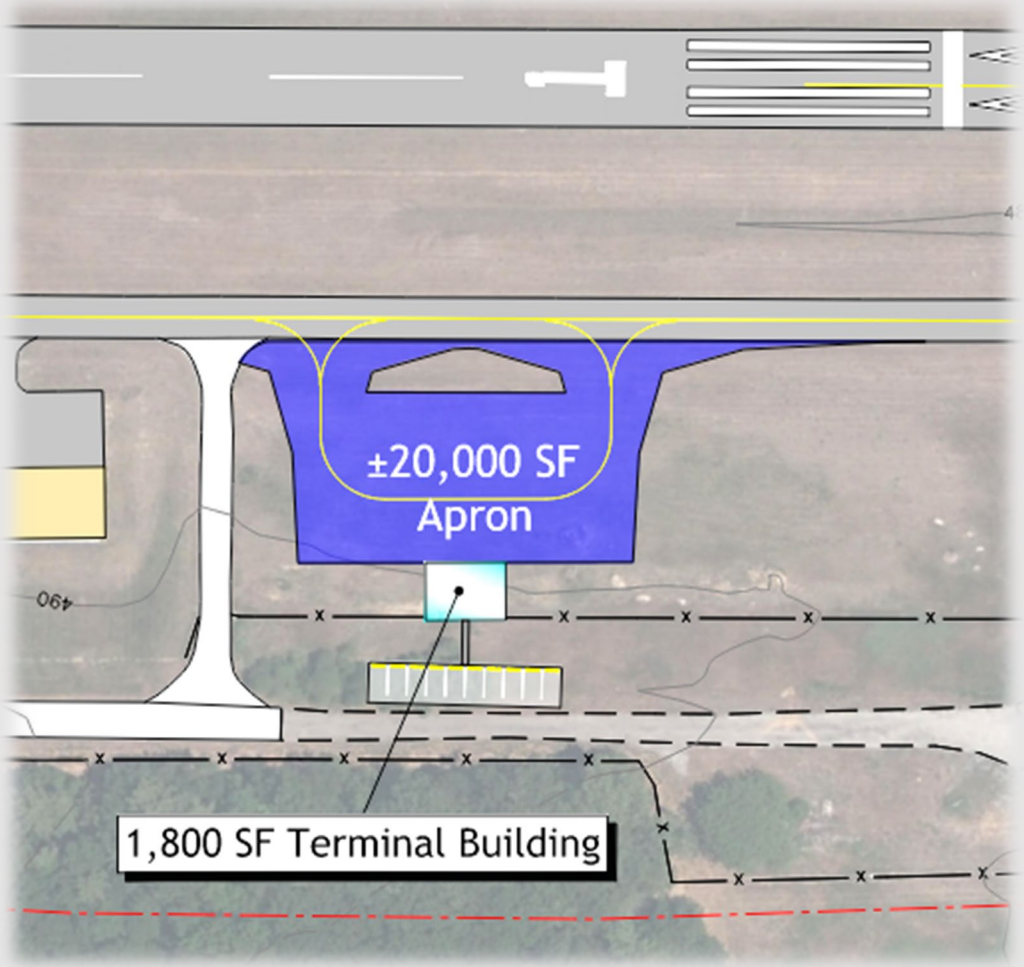
Master Plan Concept Shortlist



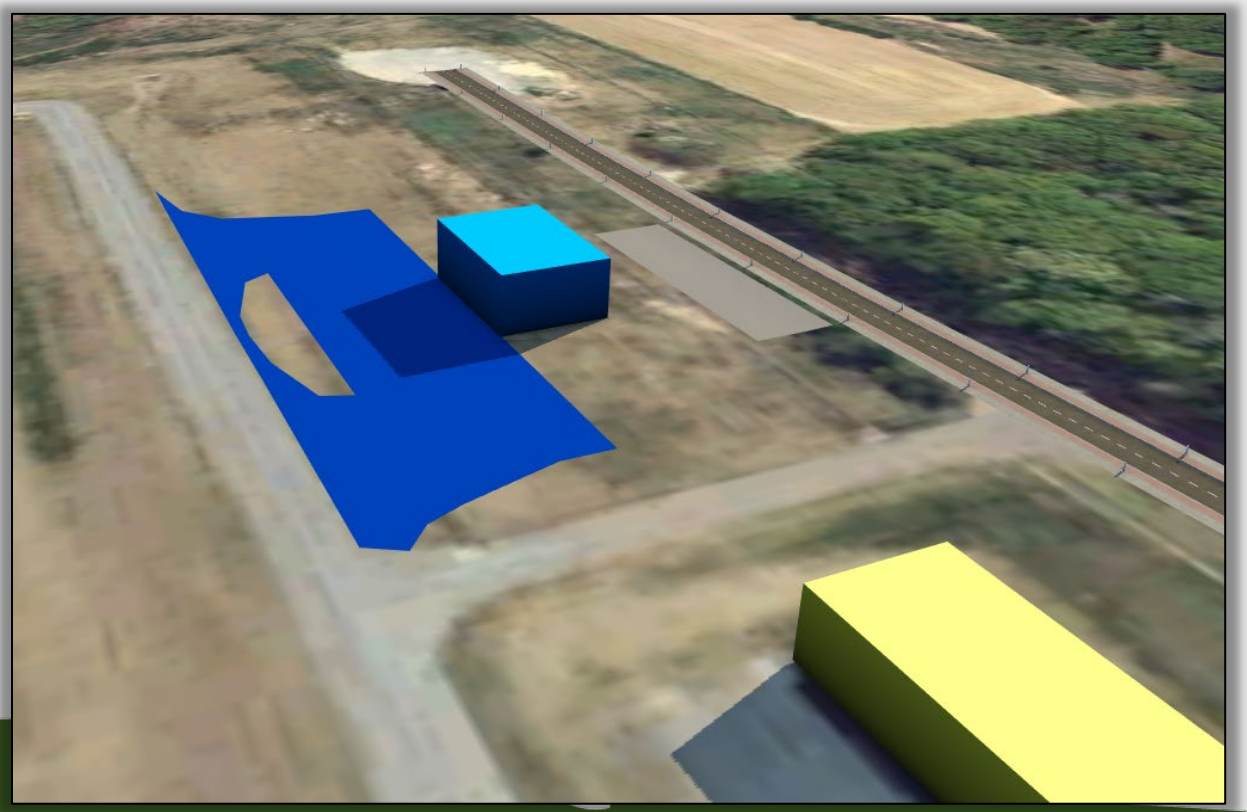
- North Hangar Development
  - Provides additional hangar for corporate and small GA aircraft
  - Component of Act 250 Permitting Process



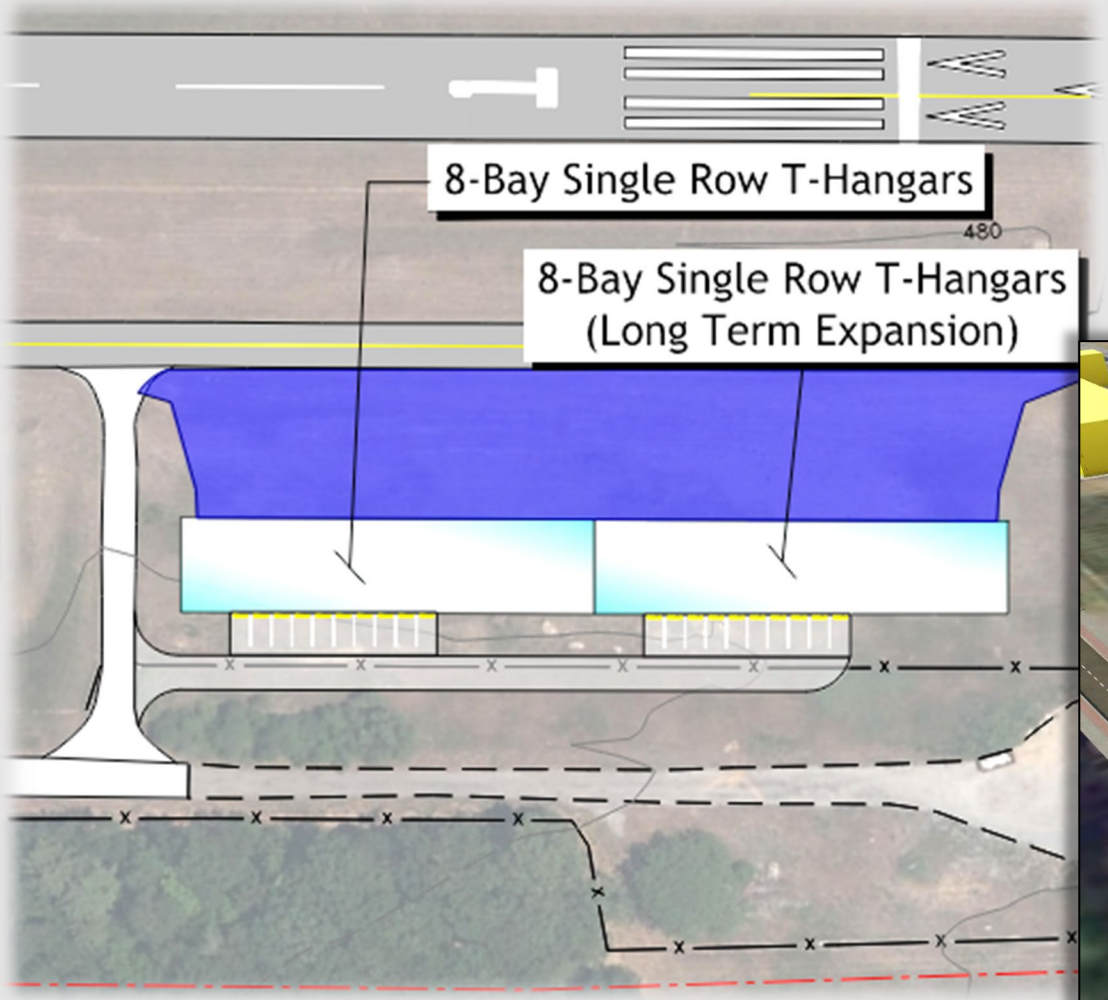
Master Plan Concept Shortlist



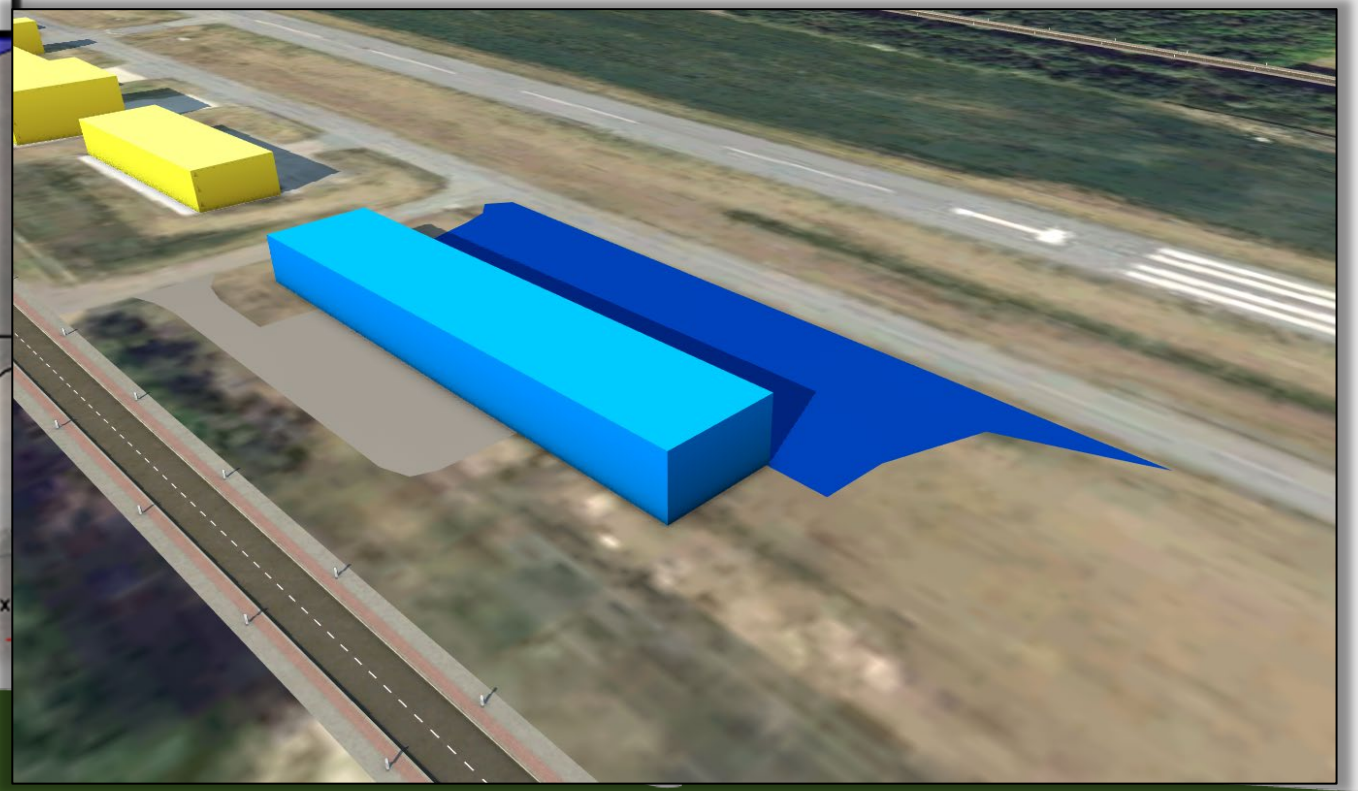
- South Development Area
  - Option A
  - Terminal Building with vehicular access via Airport Road



Master Plan Concept Shortlist

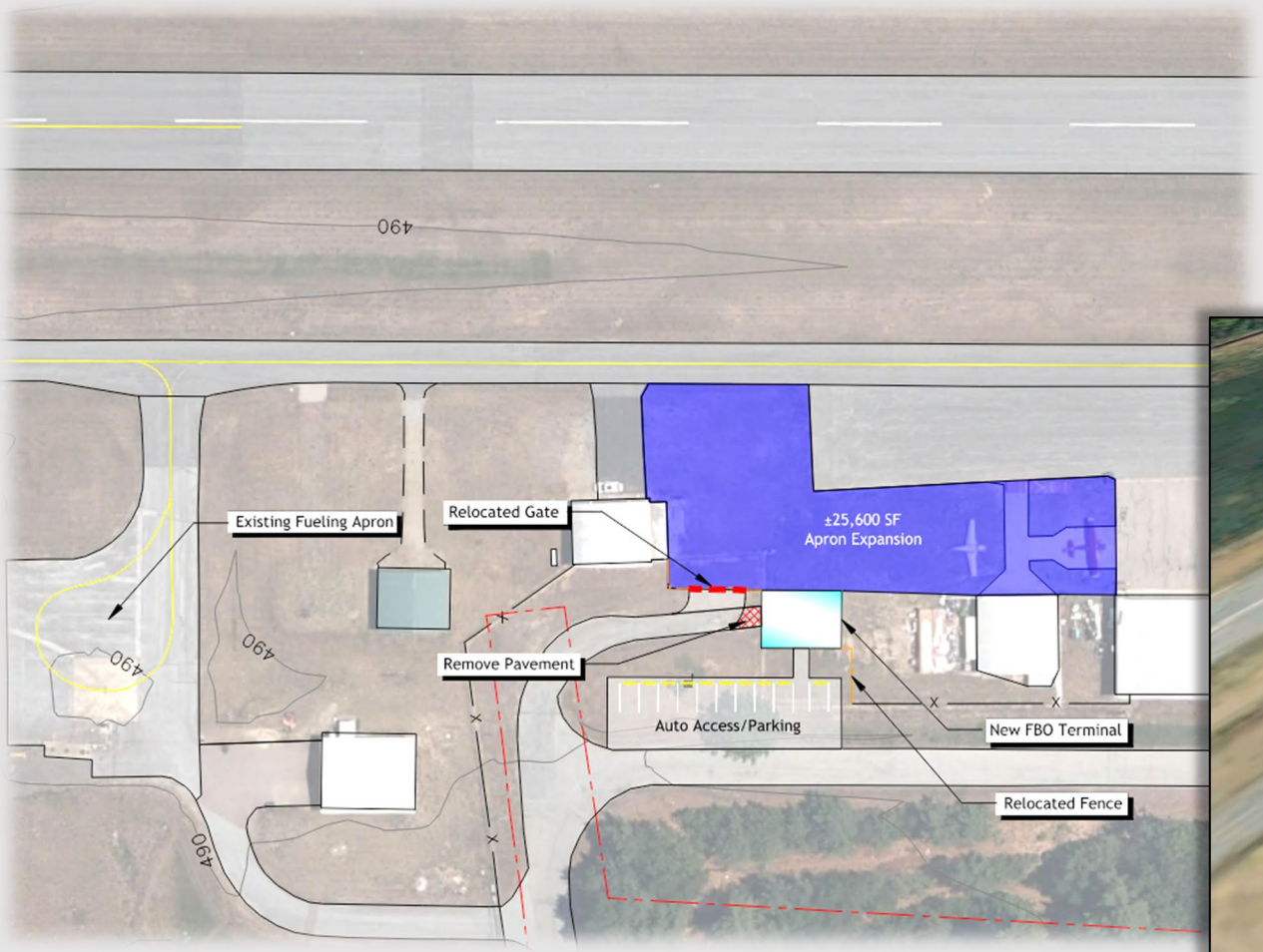


- South Development Area
  - Option B
  - Provides additional hangar for corporate and small GA aircraft

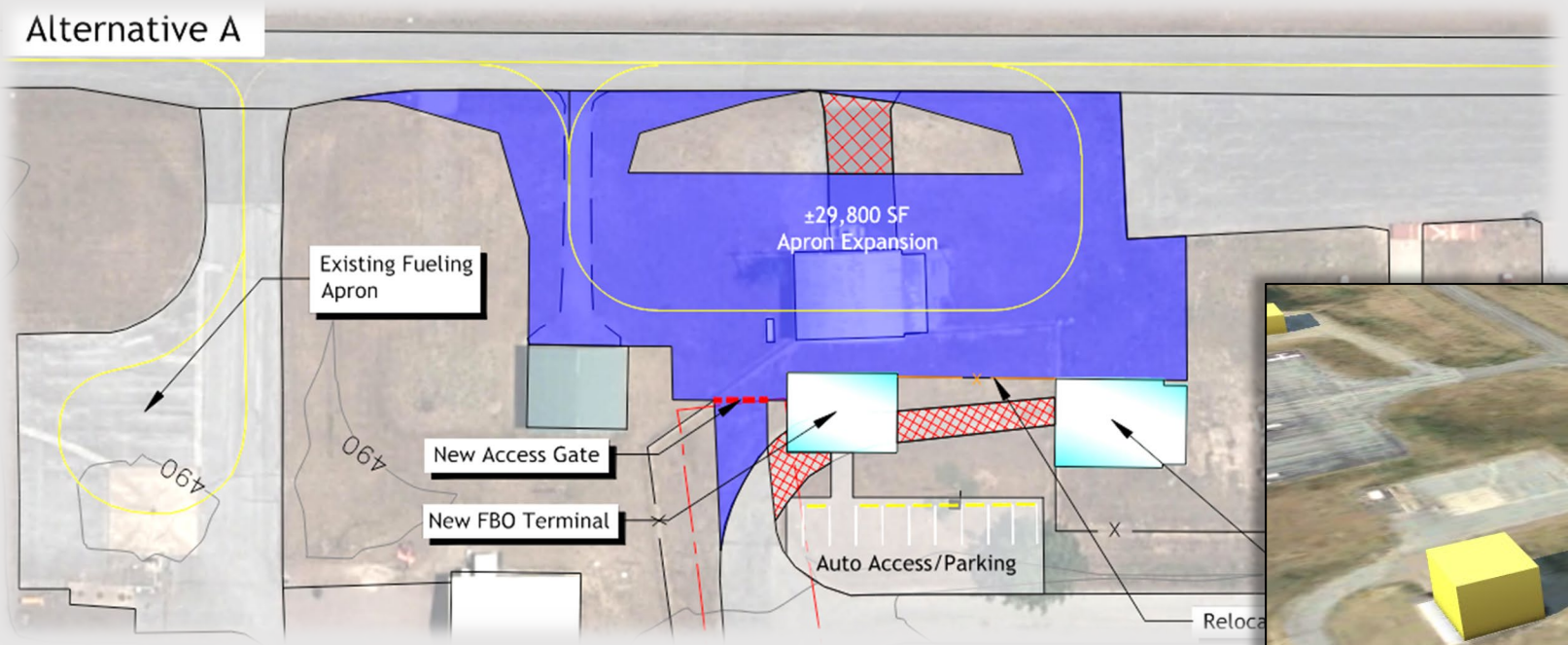


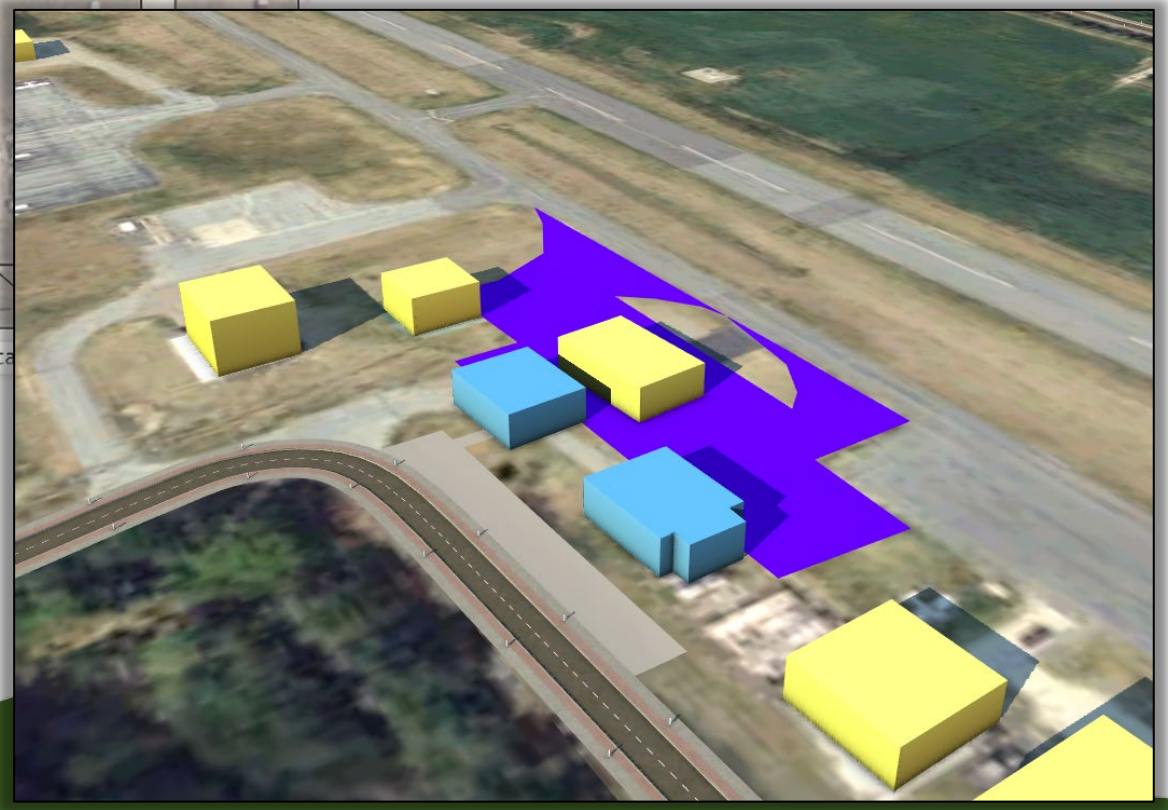
Master Plan Concept Shortlist

- Terminal Development Site 1
  - Provides GA Terminal for Pilots and Airport Users
  - Retains all existing facilities as is



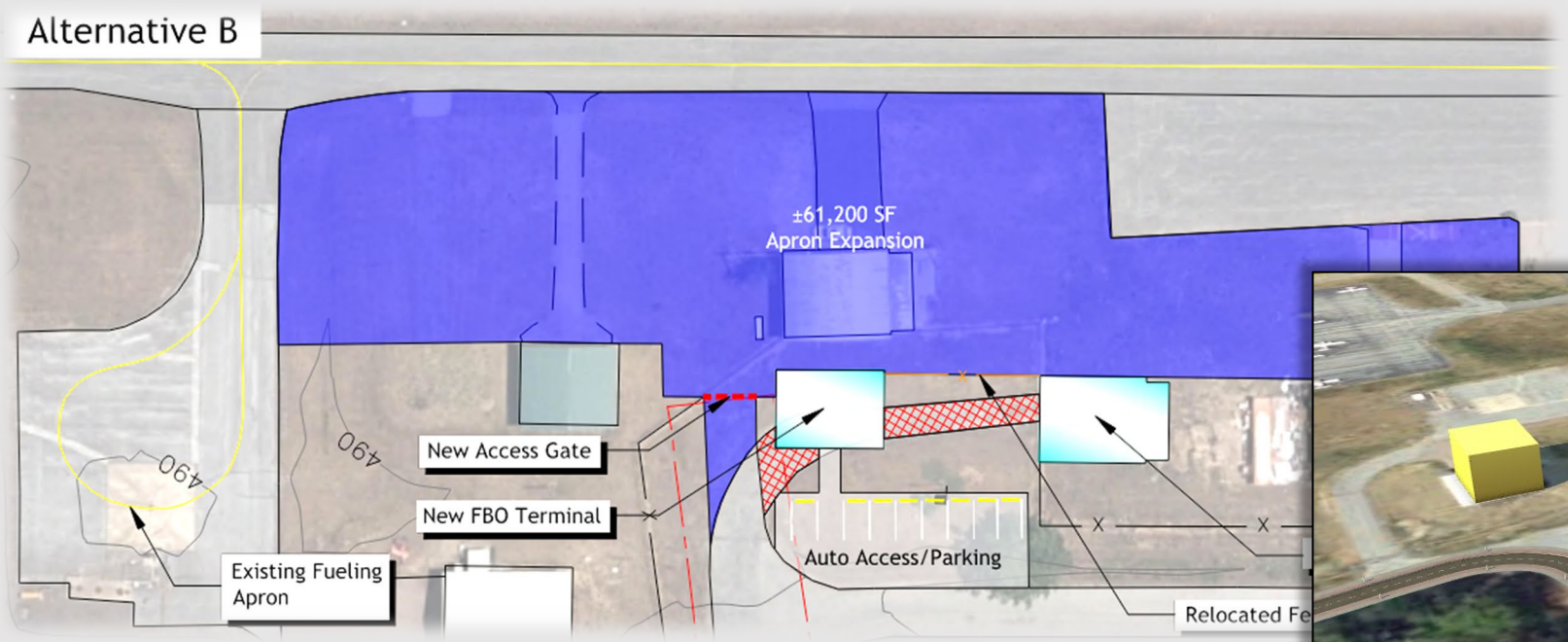
Master Plan Concept Shortlist





- Terminal Development Site 2 (Opt 1)
  - Provides GA Terminal for Pilots and Airport Users
  - Requires Relocation of Existing Hangar
  - Minimizes Additional Pavement Areas

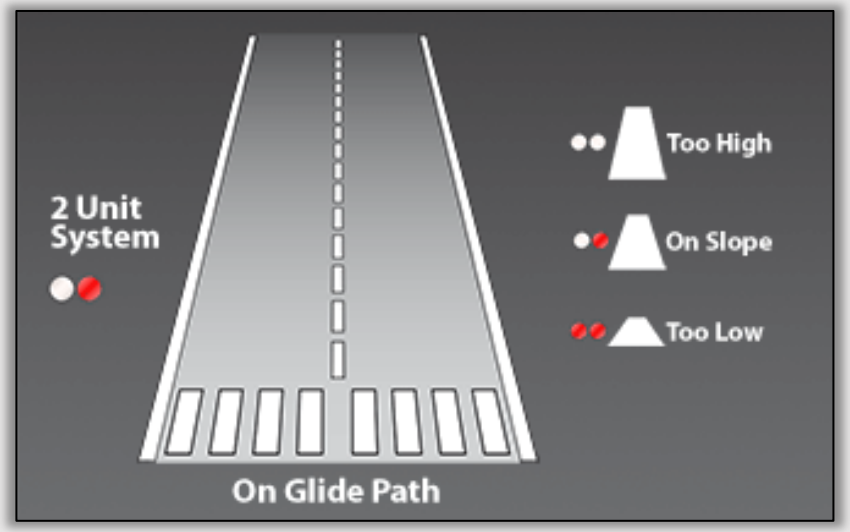
Master Plan Concept Shortlist

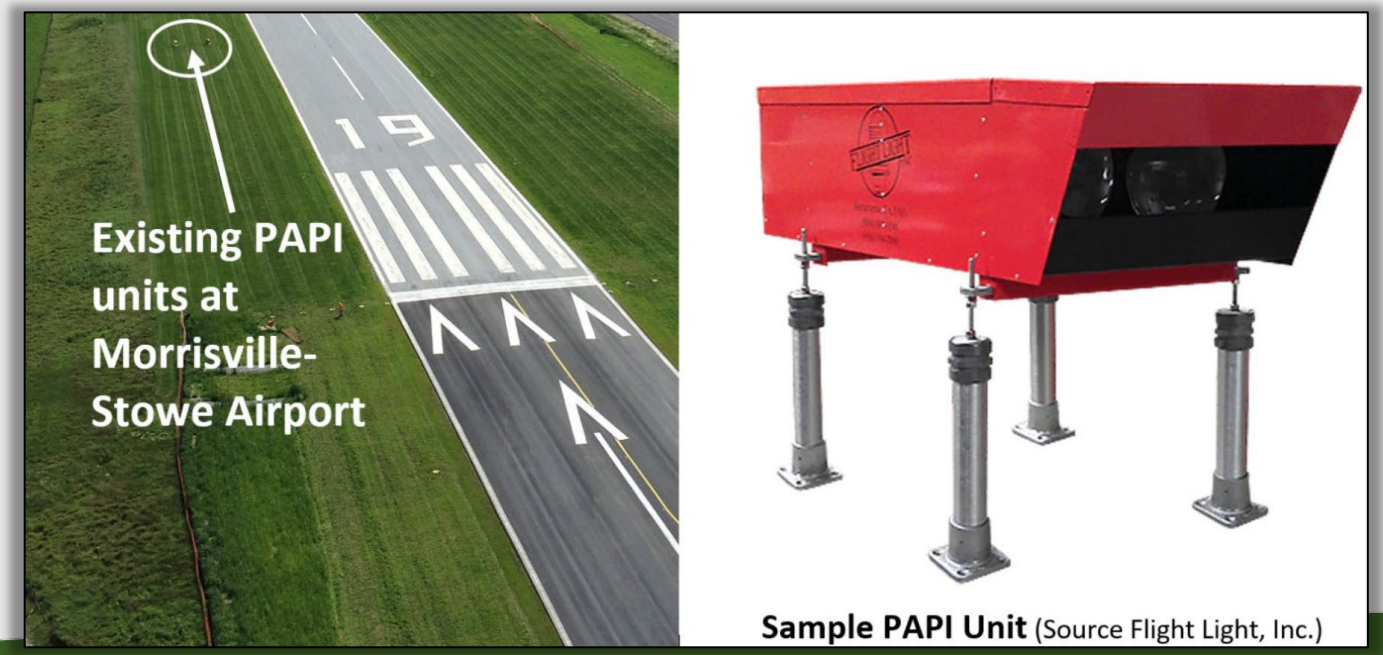


- Terminal Development Site 2 (Opt 2)
  - Provides GA Terminal for Pilots and Airport Users
  - Requires Relocation of Existing Hangar
  - Maximizes Additional Pavement Areas

Precision Approach Path Indicator

- 2-Box Precision Approach Path Indicator – PAPI-2
  - Visual aid for pilots
  - Indicates if aircraft is on the ideal glide path to the runway end

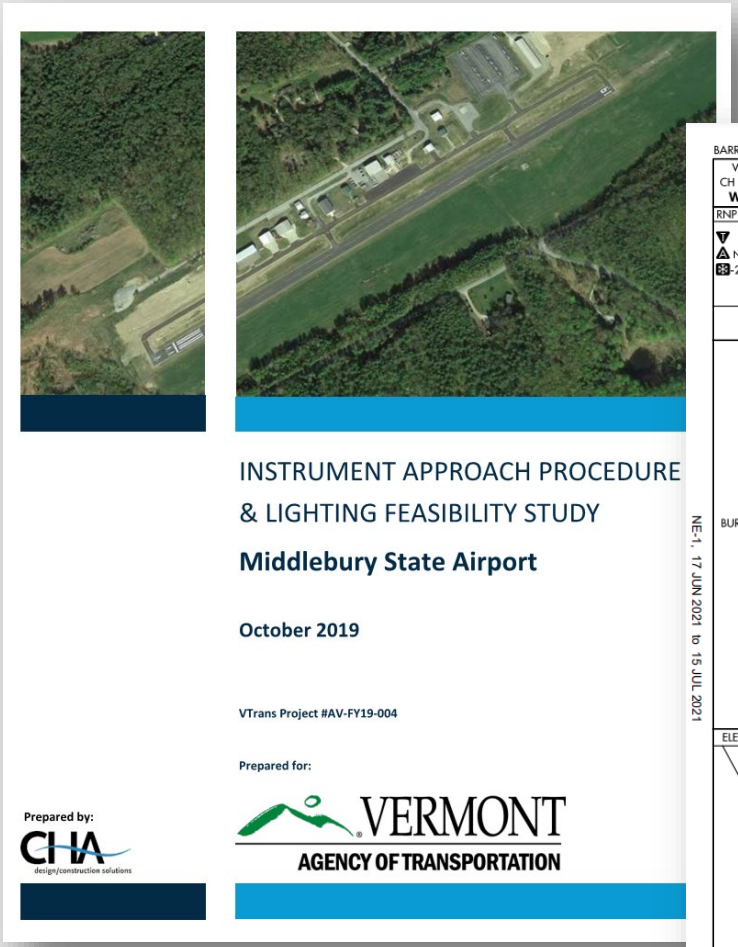


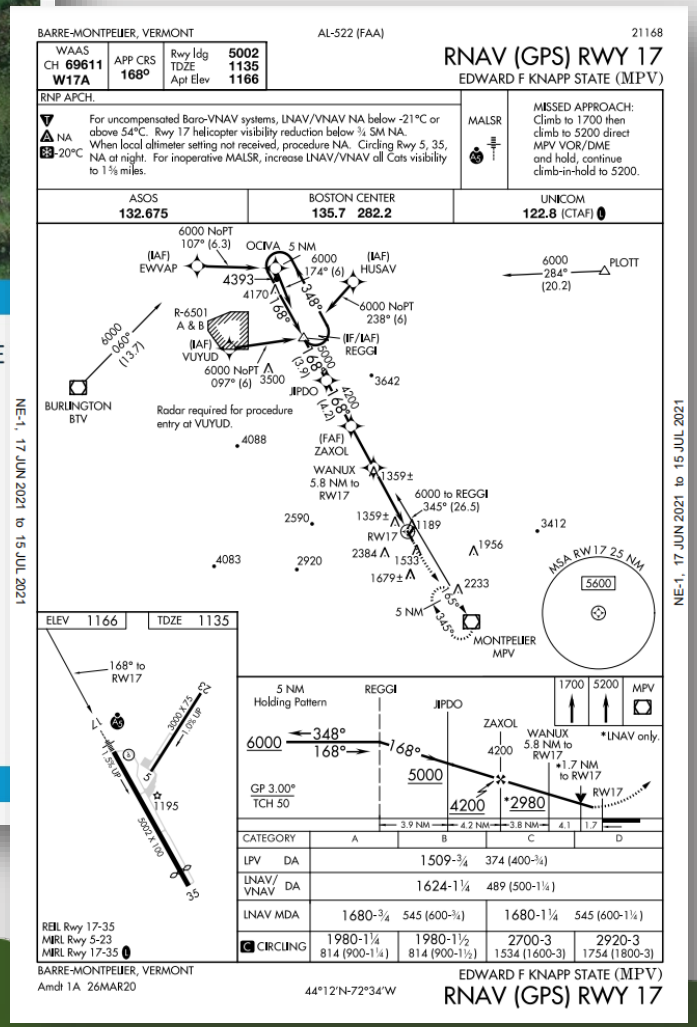


Sample PAPI Unit (Source Flight Light, Inc.)

Instrument Approach Procedure

- 6B0 is not currently equipped with Runway Instrument Approach Procedures (IAP)
- A Feasibility Study was Completed in 2019 to examine the feasibility of establishing IAPs at 6B0



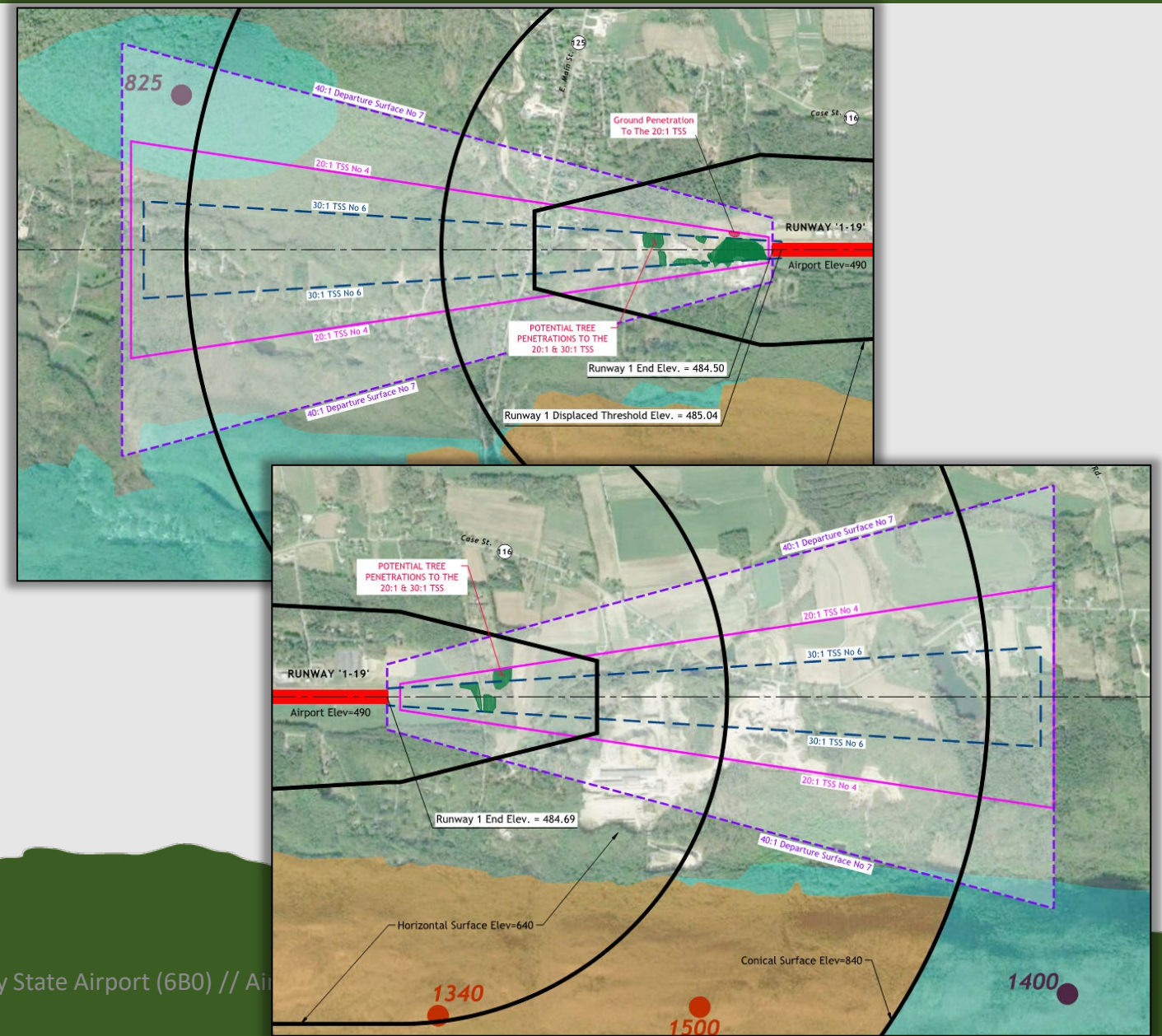


Sample Instrument Approach Procedure Plate

(RNAV RWY 17 at MPV)

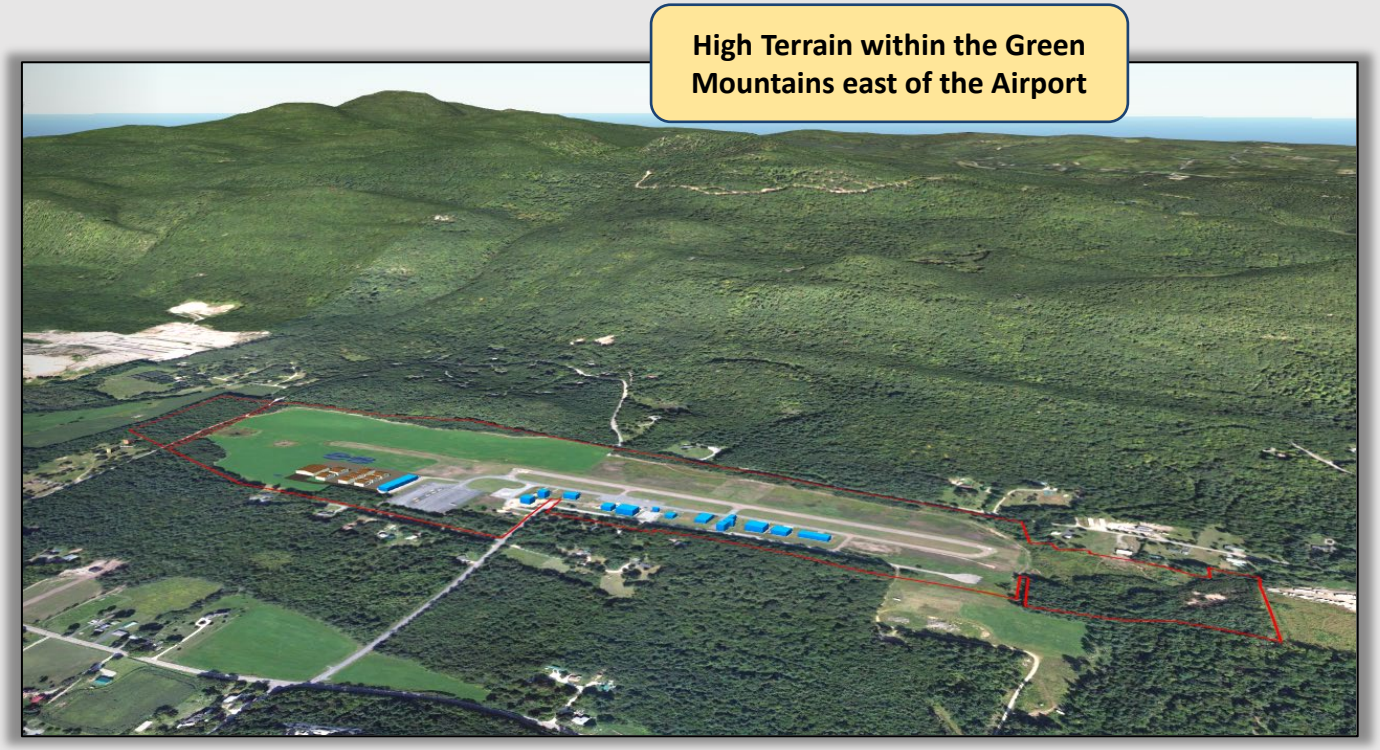
Instrument Approach Procedure

- Instrument Approach Procedure Findings:
  - Daytime only approaches
  - Lack of Radar coverage and high terrain may result in high minimum decent altitudes
- Instrument Approach Options:
  - *North & West Approach:* Feasible
  - *South Approach:* Possible, but likely circling-only due to terrain
  - *East Approach:* Not feasible or high visibility minimums required due to terrain
- Further FAA coordination upon completion of AGIS survey



Airspace Obstruction Analysis

- Heavily Wooded Areas & Hills
- Green Mountain to the East
- Approach Surfaces
  - FAR Part 77 Surface (Regulated Airspace)
  - Threshold Siting Surface (FAA Standards)
- Identify Mitigation/Obstruction Action
- Potential for Instrument Approach Procedures

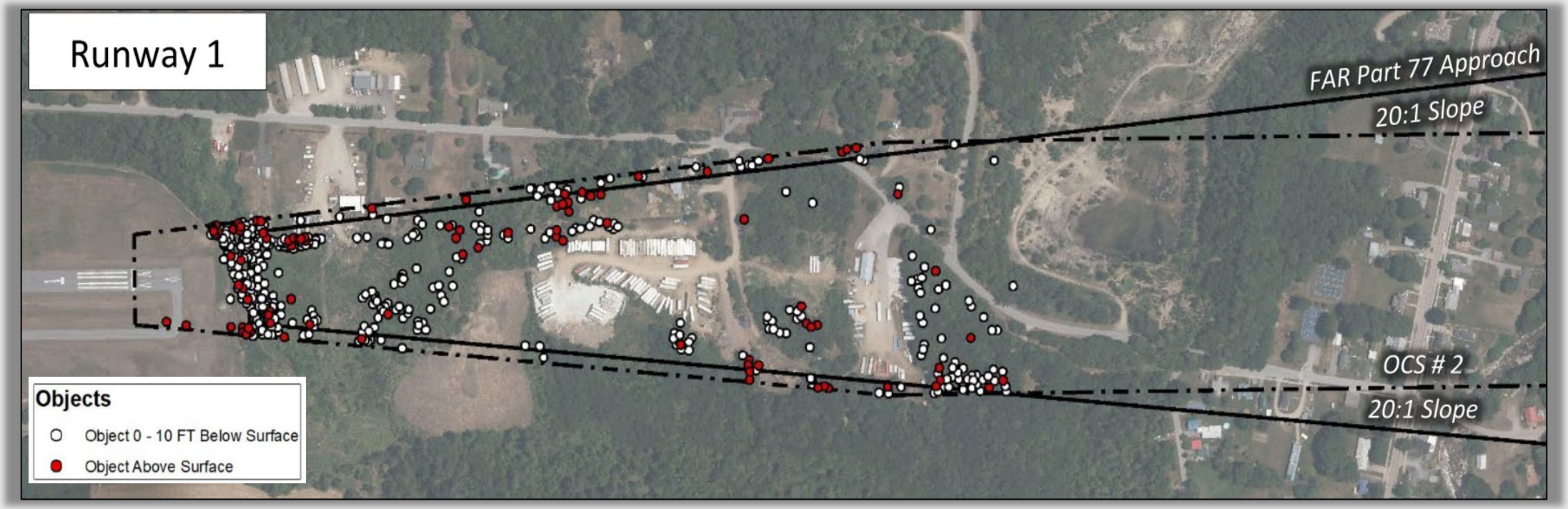


Runway 19 Obstructions

- Tree cutting project ongoing to mitigate obstructions for the Runway 19 Approach End, along Munson Road.
- Addition of a vertically guided Instrument Approach Procedure would require additional clearing further North.

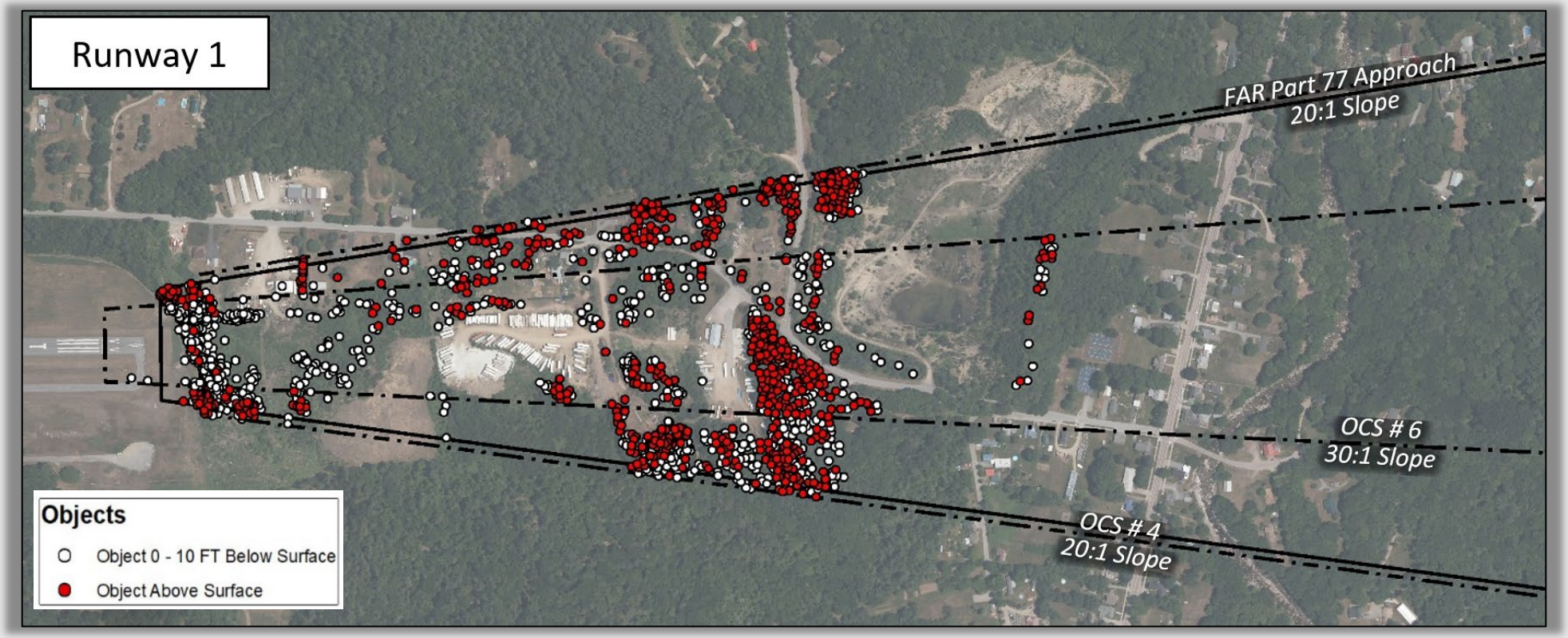
Runway 1 Obstructions

- Currently no design standard penetrations to the Runway 1 Approach Surfaces
  - Various Part 77 penetrations



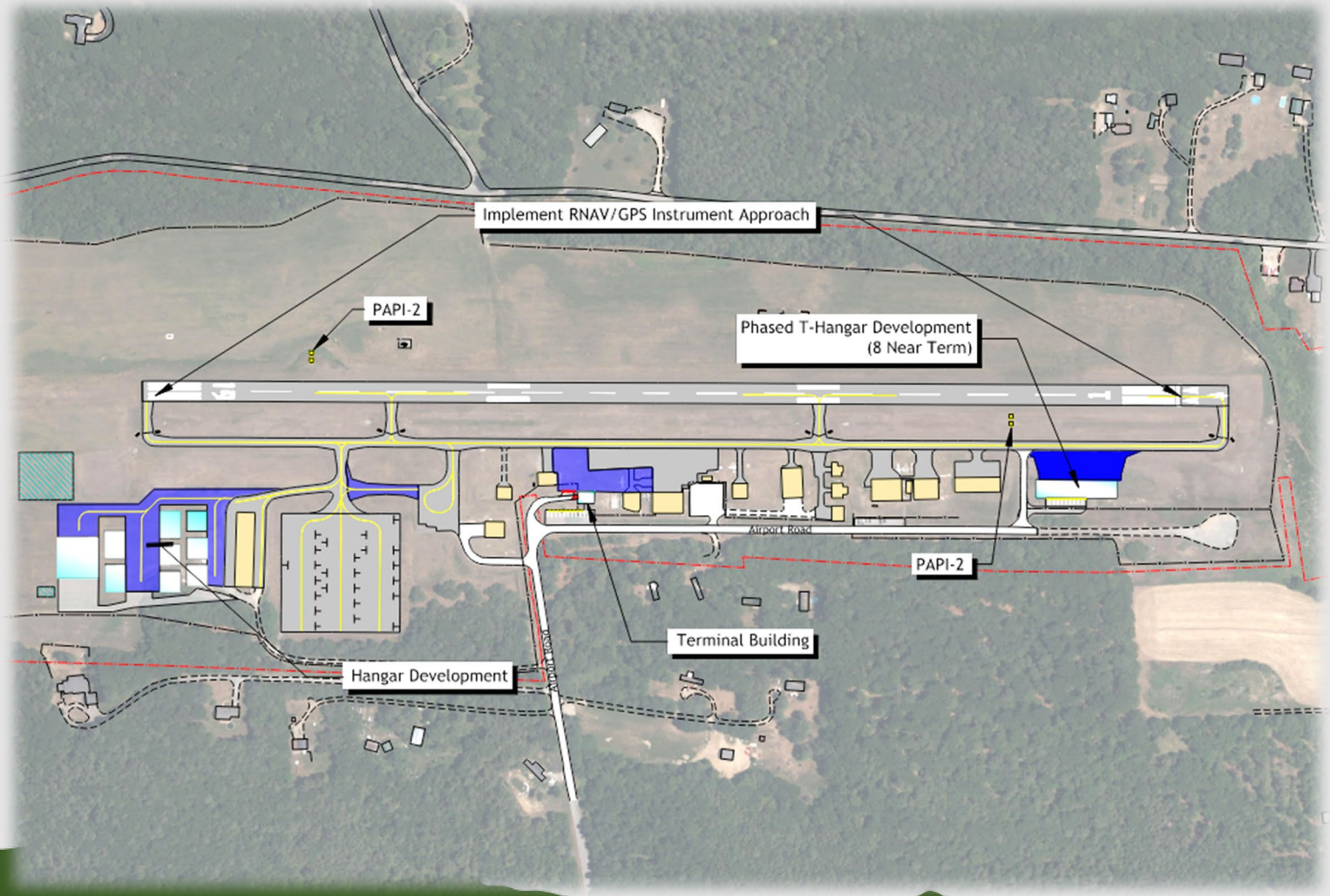
Runway 1 Obstructions

- Addition of IAP would result in shift of the Approach Surface, resulting in penetrations



Draft Recommended Plan

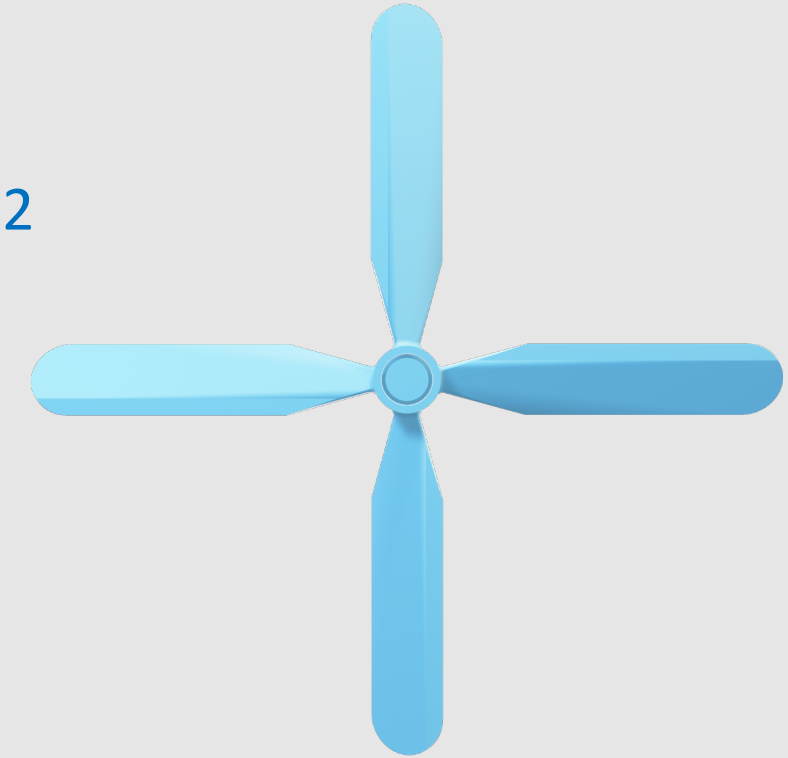
- North Hangar Development
- South Hangar Development
- Terminal Building Construction
- Instrument Approach Procedure
- PAPI-2 Installation
- Tree Obstruction Removal



NEXT STEPS

NEXT STEPS

- Prepare Airport Layout Plan (ALP) – Fall 2022
- Prepare Draft Master Plan Report – Fall 2022
- Final Meetings – Review & Comments: Fall 2022
  - TAC Meeting #3
  - Public Meeting



Questions/Comments

Questions or comments regarding the Airport Master Plan?
Available for contact:

Shaun Corbett, Project Manager

(802) 371-7943

Shaun.Corbett@Vermont.gov

VTrans Rail & Aviation Bureau

219 North Main Street

Barre, VT 05641

VERMONT
AGENCY OF TRANSPORTATION