

Southern Departure Study

Jackson Hole Airport

Study Input Task Force Meeting #3

April 28, 2022



Agenda

- Introductions and Purpose of the Meeting
- Overview of Existing Southern Departure Procedures
- Review of Terrain and Procedure Constraints
- Presentation of Preliminary new Southern Departure Procedure Concepts
- Facilitated Discussion



Setting the Stage

- Review of six preliminary departure route concepts
 - Study will not propose simply moving noise from one neighborhood to another
 - There is no voting, but we want to focus the discussion on pros and cons and any potential revisions
 - Work to identify any concepts which are “nonstarters” and should be screened out from further design analysis or noise modeling
 - Identify concepts that offer the most promise
 - Move forward with more detailed design/noise analysis for discussion at next meeting
- Facilitated discussion relative to concepts
 - Federal partners and implications for wildlife and park management
 - Neighborhood representatives
- Questions welcome throughout the presentation!
 - Questions/ideas outside the scope meeting saved in the project parking lot

Review of Existing Conditions

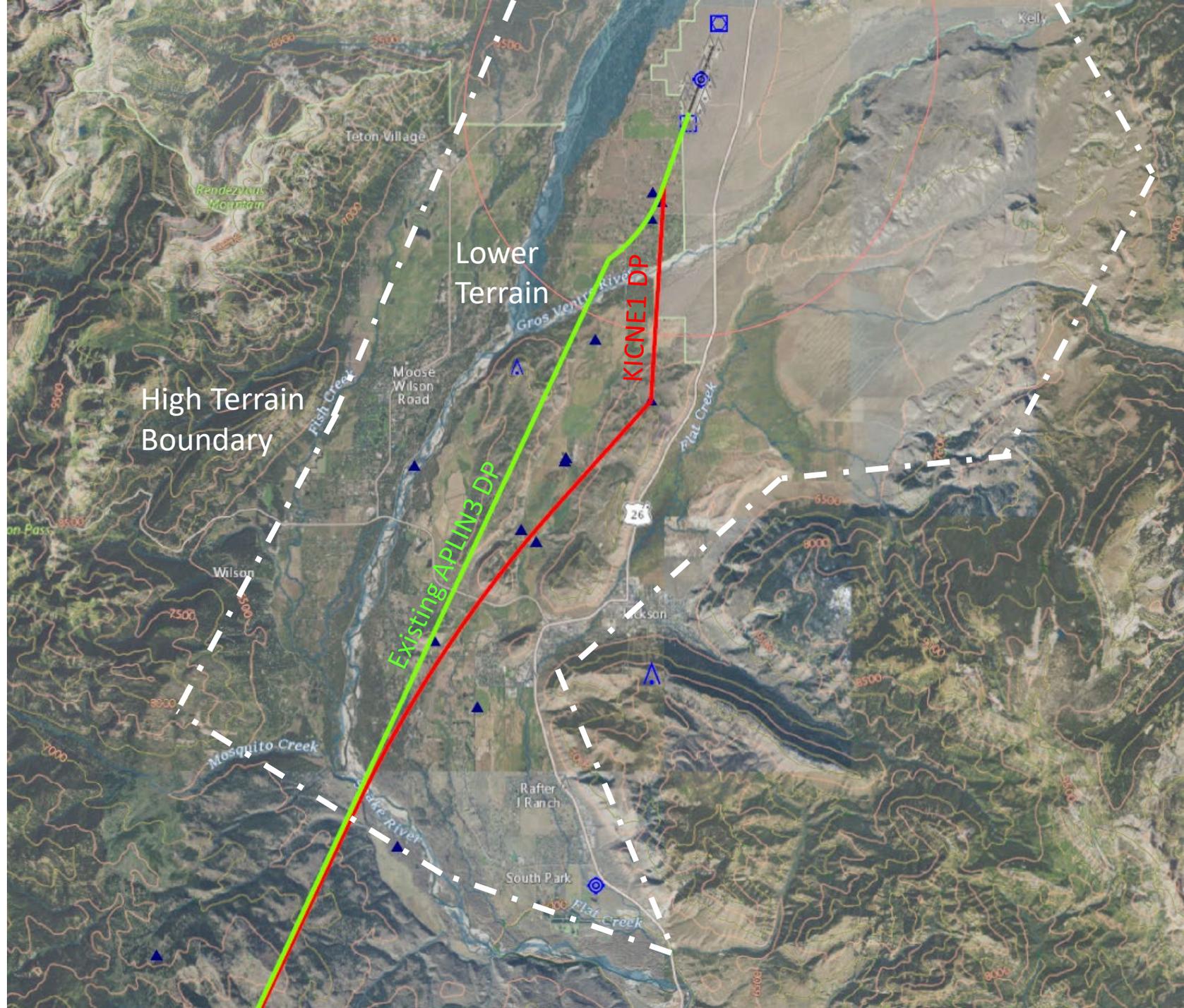
- Current Southbound (Runway 19) departure assignments.
 - Note: Southern departures utilize Runway 19 –which is based on the magnetic orientation of the runway centerline in relation to magnetic north.
- Procedure design constraints
- Air Traffic Control Considerations (ATC)
- Initial Climb Altitudes before turning



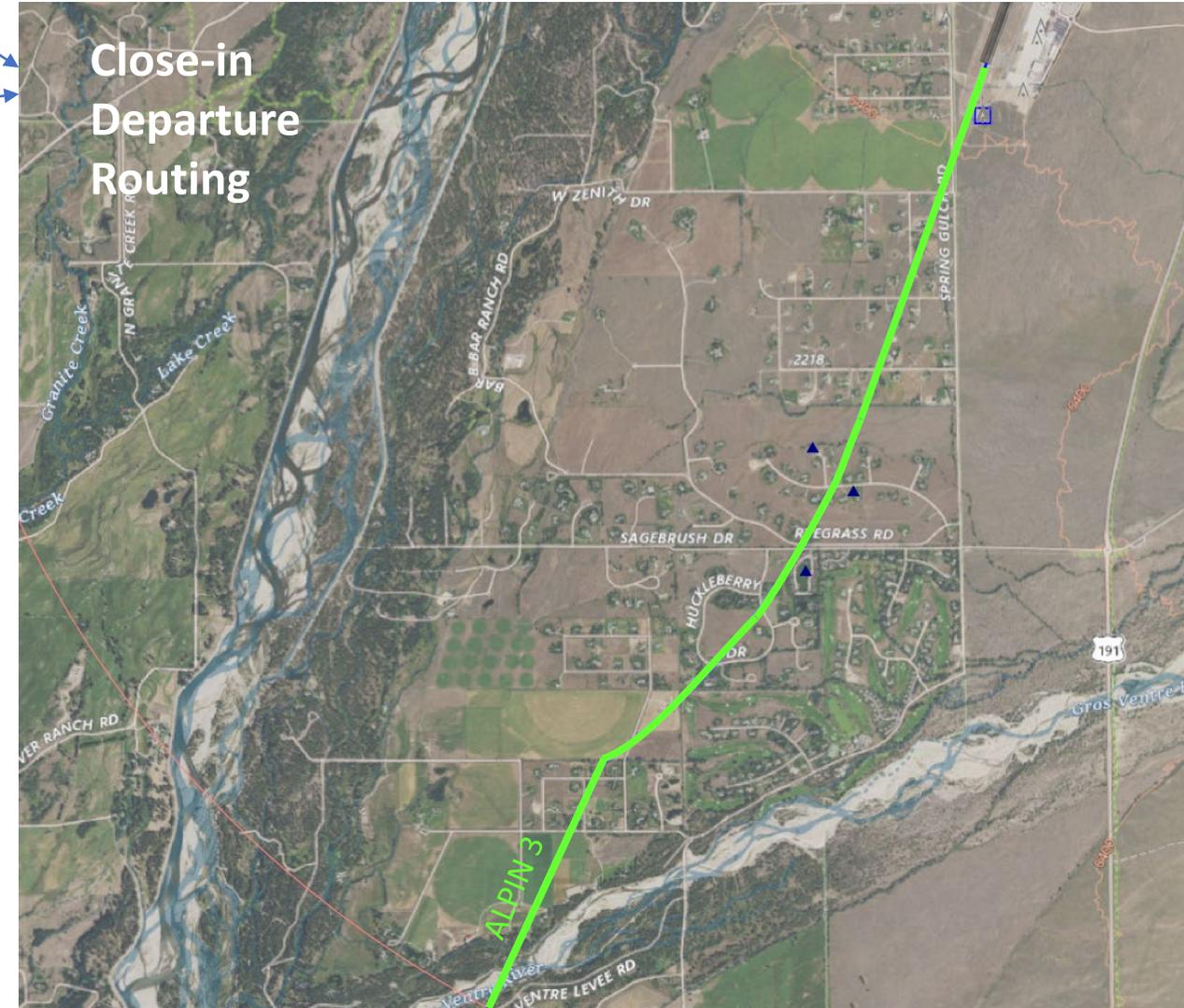
Terrain Constraints

Design Considerations:

- Developing departures starts with identifying an Initial Climb Area (ICA)
- The closer to mountainous terrain - the more likely turbulence is for the aircraft and passengers

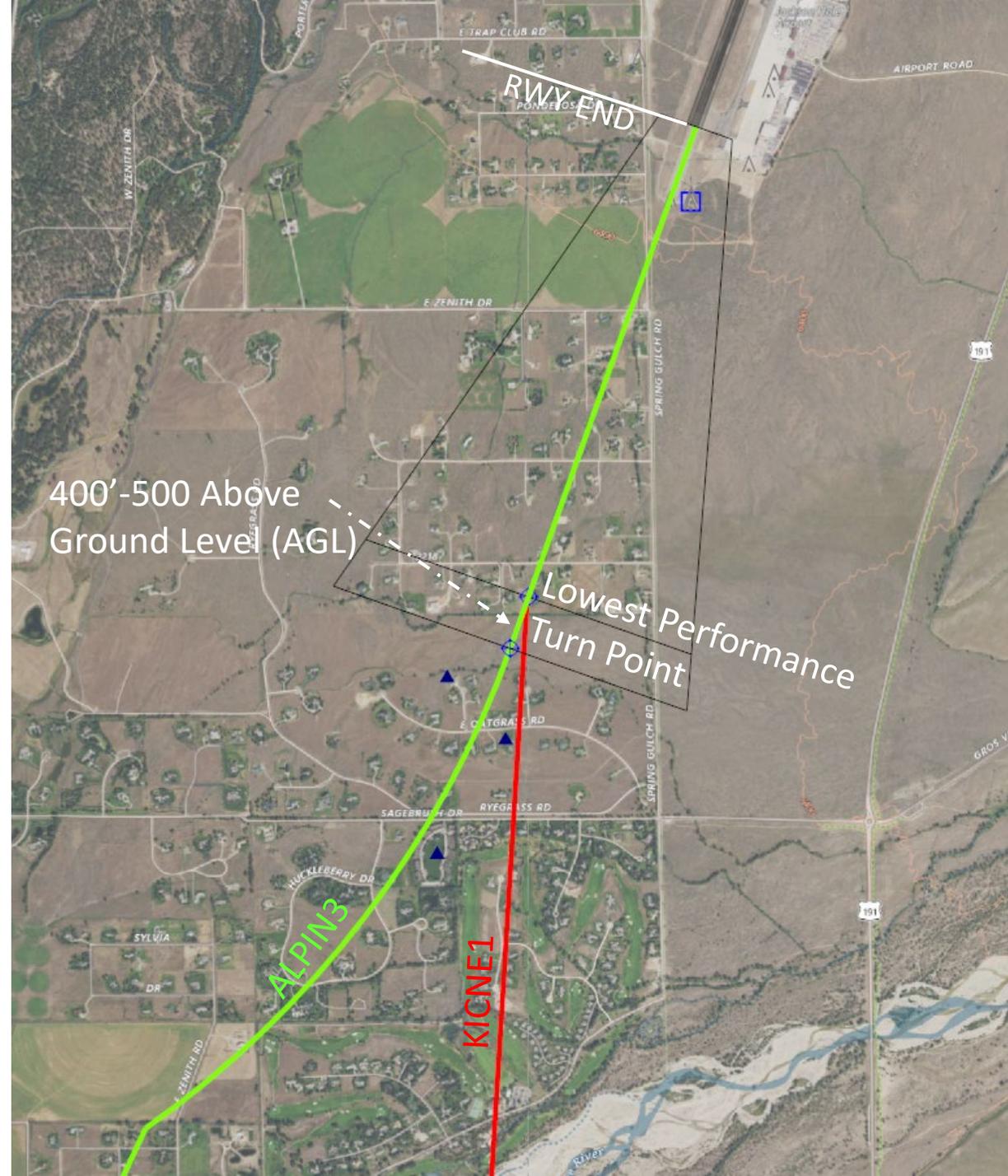
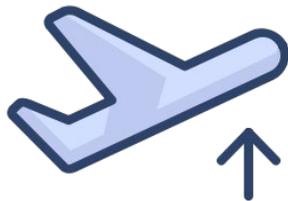


Current ALPIN 3 & TETON 3 Departures (Radio Nav)



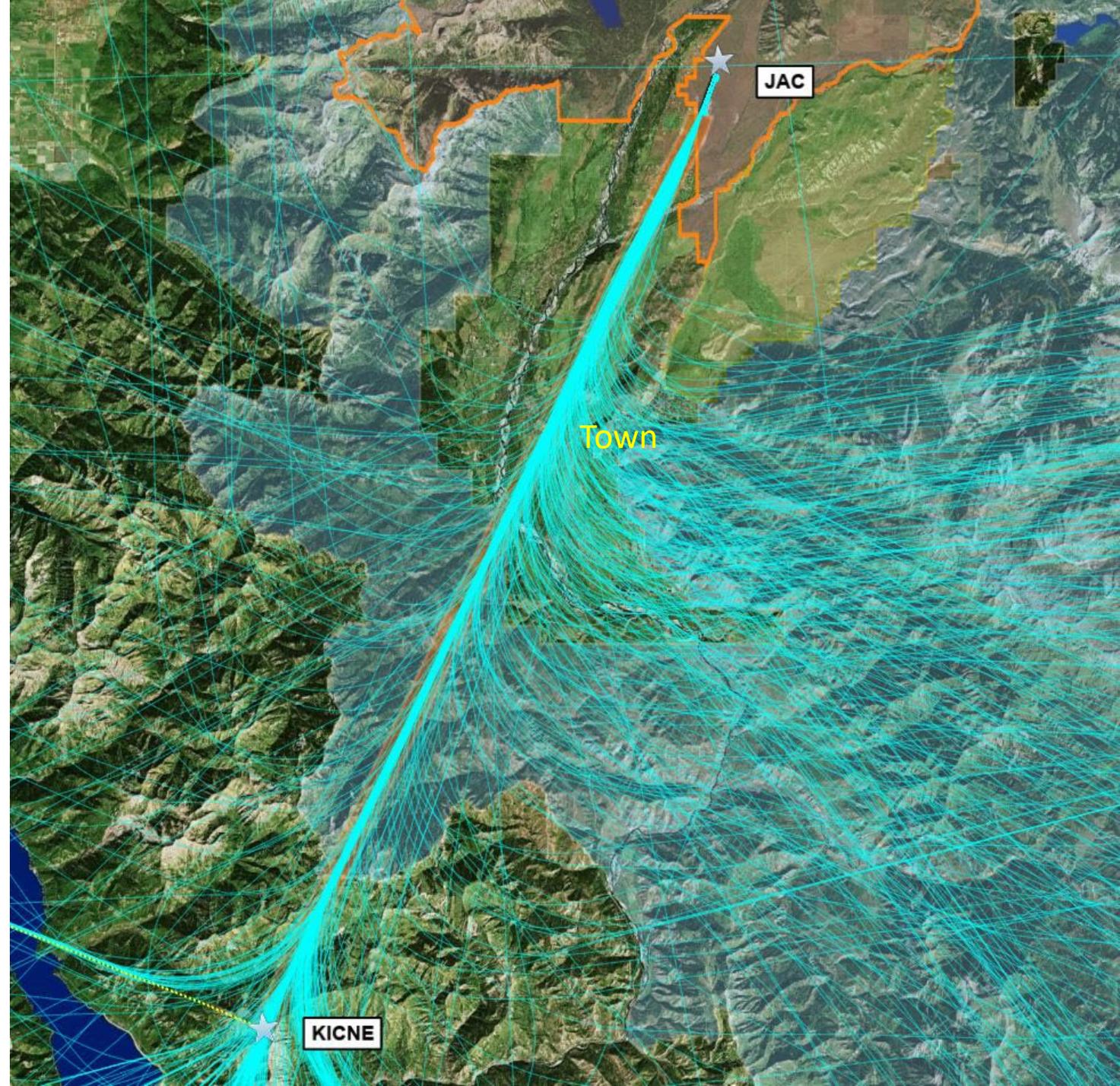
Altitude Requirements

- When applying standard FAA design rules, aircraft must be allowed to climb to an altitude between 400 ft (radio nav) to 500 ft (RNAV/GPS) Above Ground Level (AGL) before the initial turn is made.
- **Why?** This accounts for climb rate differences between aircraft.
- Higher performance aircraft will reach this point quicker and thus begin their turn closer to the runway.



ALPIN 3 Departure Tracks

- Image depicts the actual routes aircraft take when departing the airport.
- Higher performing aircraft are often vectored (turned) off the departure towards their destination by Air Traffic Control (ATC) when possible, to save time and mileage.
- Aircraft must reach an altitude of 12,000-14,000 ft before they can be vectored by ATC.



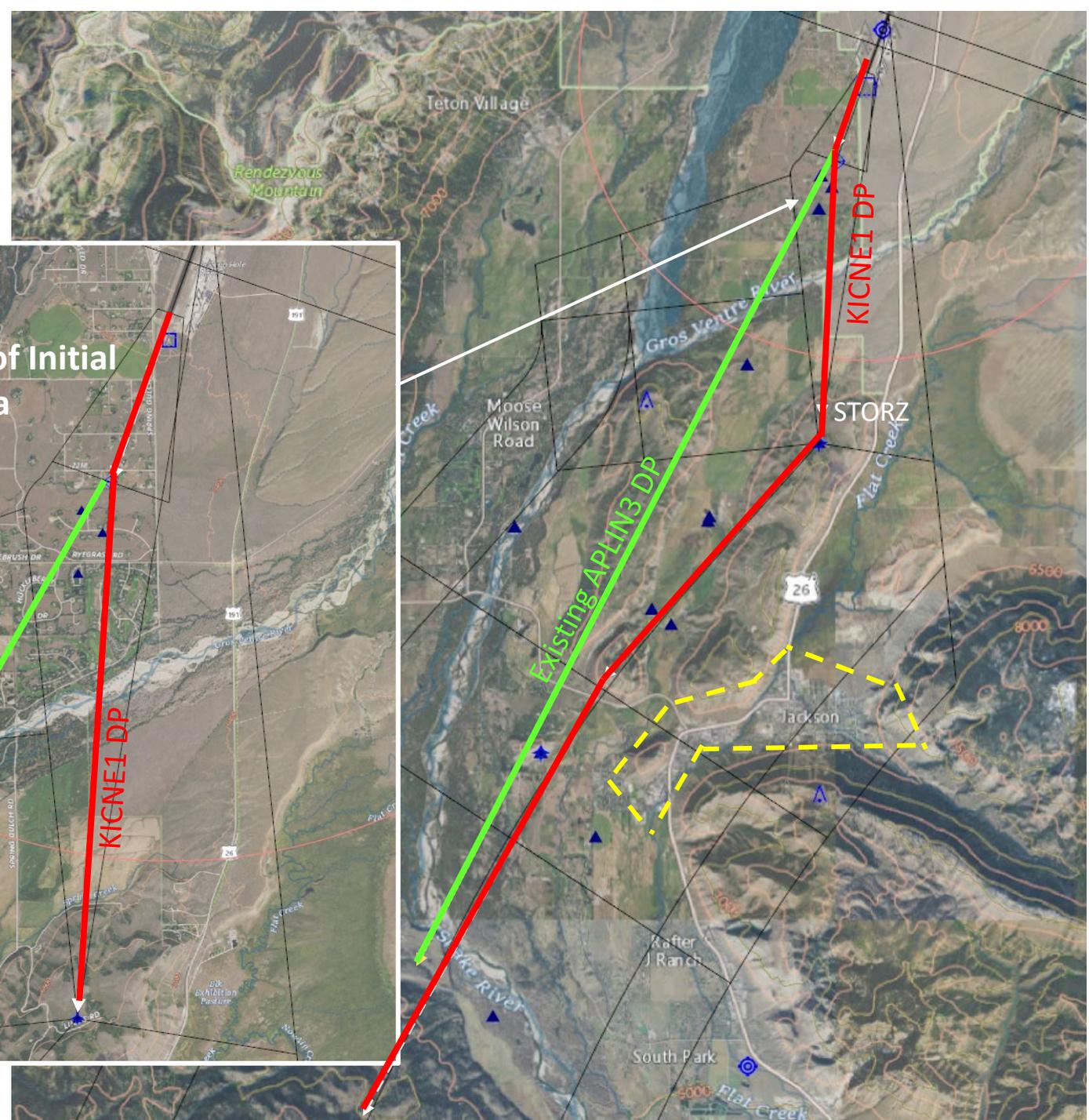
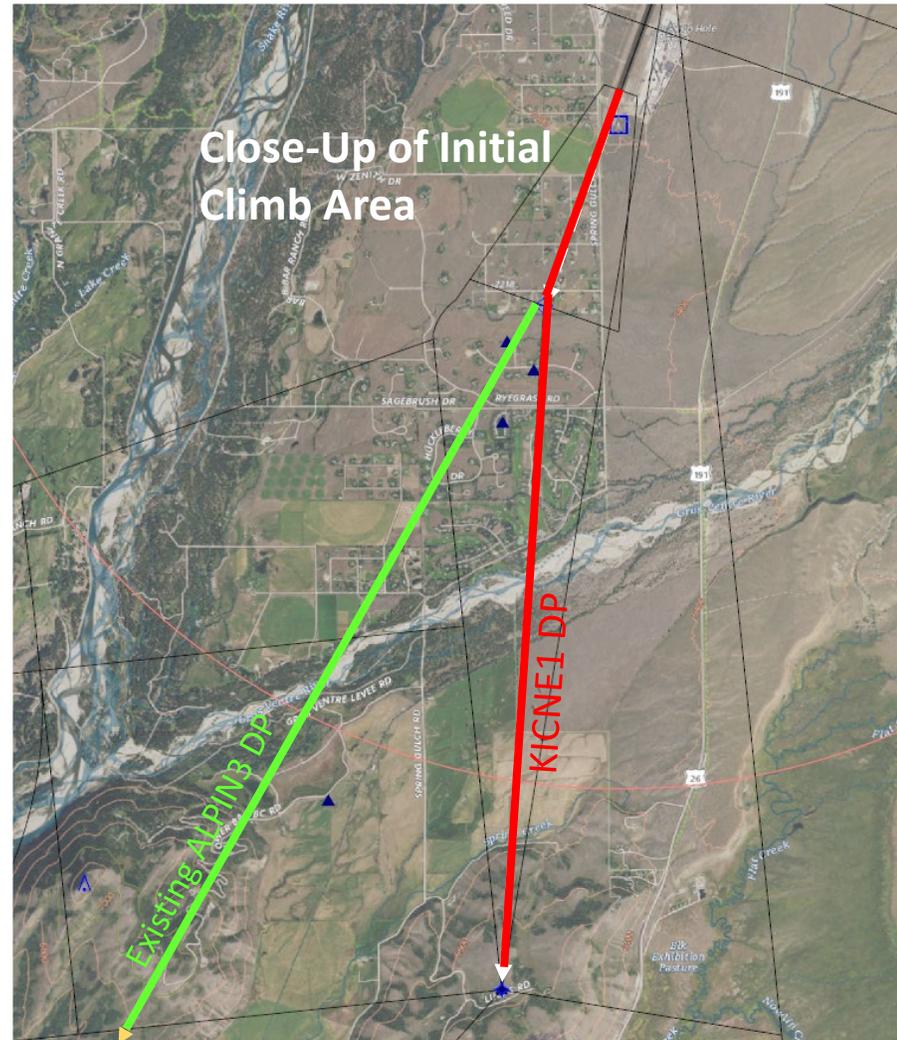


Fanning Considerations— ATC Perspective

- RWY 19 currently only has a single (common) departure route.
- To create lateral path diversity at lower altitudes One solution is to implement multiple departure procedures that could possibly diversify the initial departure routing over different points in the valley.
- The route must be programmed in the aircraft nav system.
- Each successful procedure will establish the best low-level route, a precise climbing path above terrain, and a connection with the en-route environment.

Recap - Previous (FAA) KICNE ONE RNAV D.P.

- Originally designed and proposed by the FAA during 2020-2021.
- Currently on hold and is NOT scheduled to be published.
- Was an attempt to route the initial departure route as far east of the departure runway as possible.



Recap - Design Standards for new Concepts

- There is no one size fits all solution to eliminate noise from RWY 19 Departures due to the proximity of nearby housing to the airport.
- FAA design rules and navigation best practices must be observed. Aircraft can't handle abrupt, or knife edge turns and must abide by certain system and performance limitations.
- The (rule-based) design software we use ensures aircraft can fly the procedure as designed and without overshooting waypoints based on the design speed.
- The new procedures represent feasibility assessments to explore the range of possibilities and are not final.

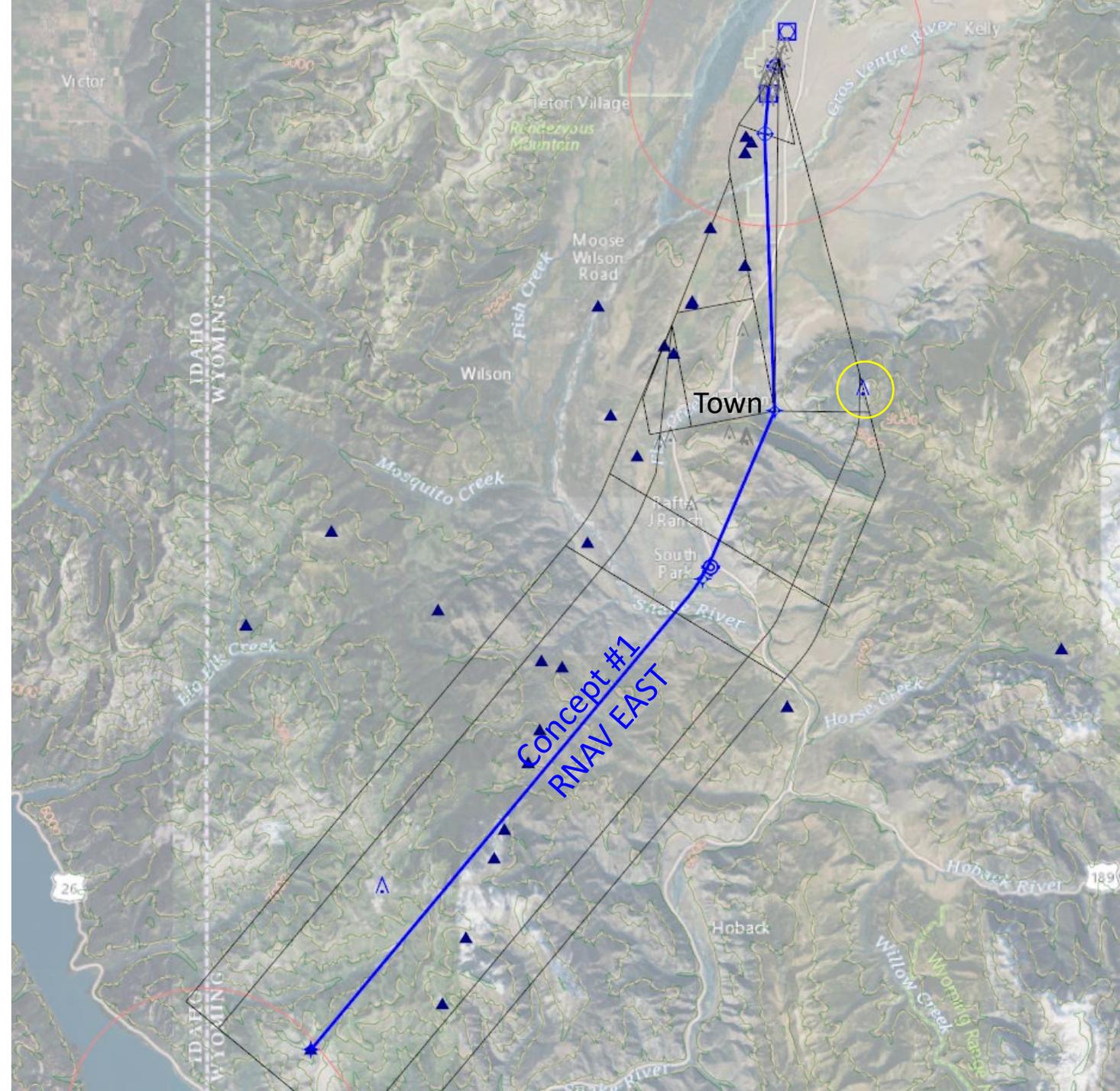


New RWY 19 Departure Concepts

- The following procedures represent the range of possible solutions while working within the ATC and terrain constraints of the valley.
- They observe the requirement that the first turn must occur not less than 400-500 ft above ground.
- Designs account for the wide range of Aircraft that could use the procedures:
 - General Aviation (Personal aircraft– piston & small turbine aircraft)
 - Charter & Private Jet Operations
 - Scheduled Airline & Cargo Operations
- While not widely useable yet - Advanced Concepts were also assessed in preparation for continuing technology improvements of the fleet.

Concept #1 RNAV DP – EAST SHIFT

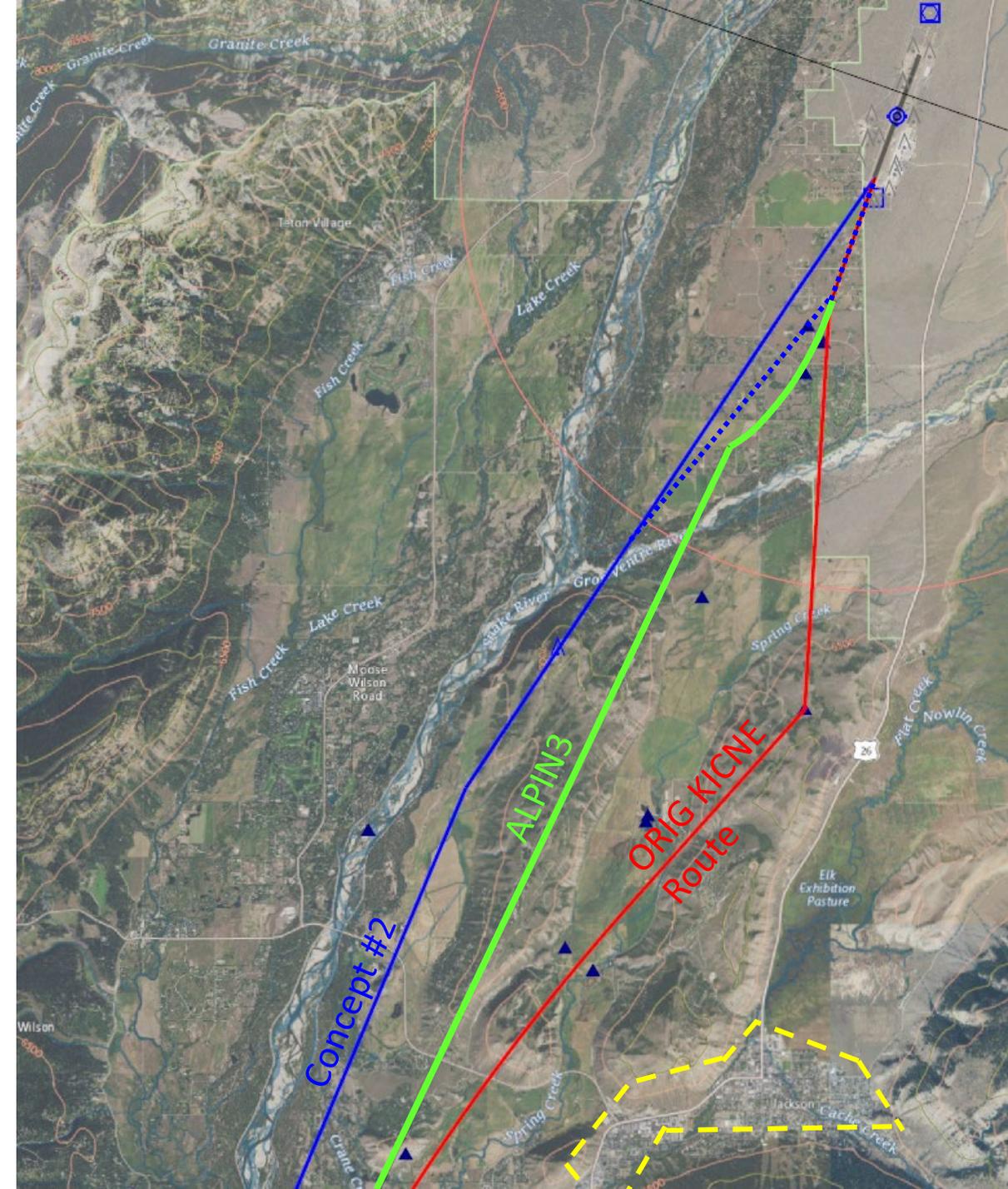
- Modifies the the original FAA KICNE Proposal by shifting the initial course to the eastern extent
- Terrain on the eastern edge of the procedure (yellow circle) requires a higher than standard climb rate (529 ft/nm to 10200')



Concept #2

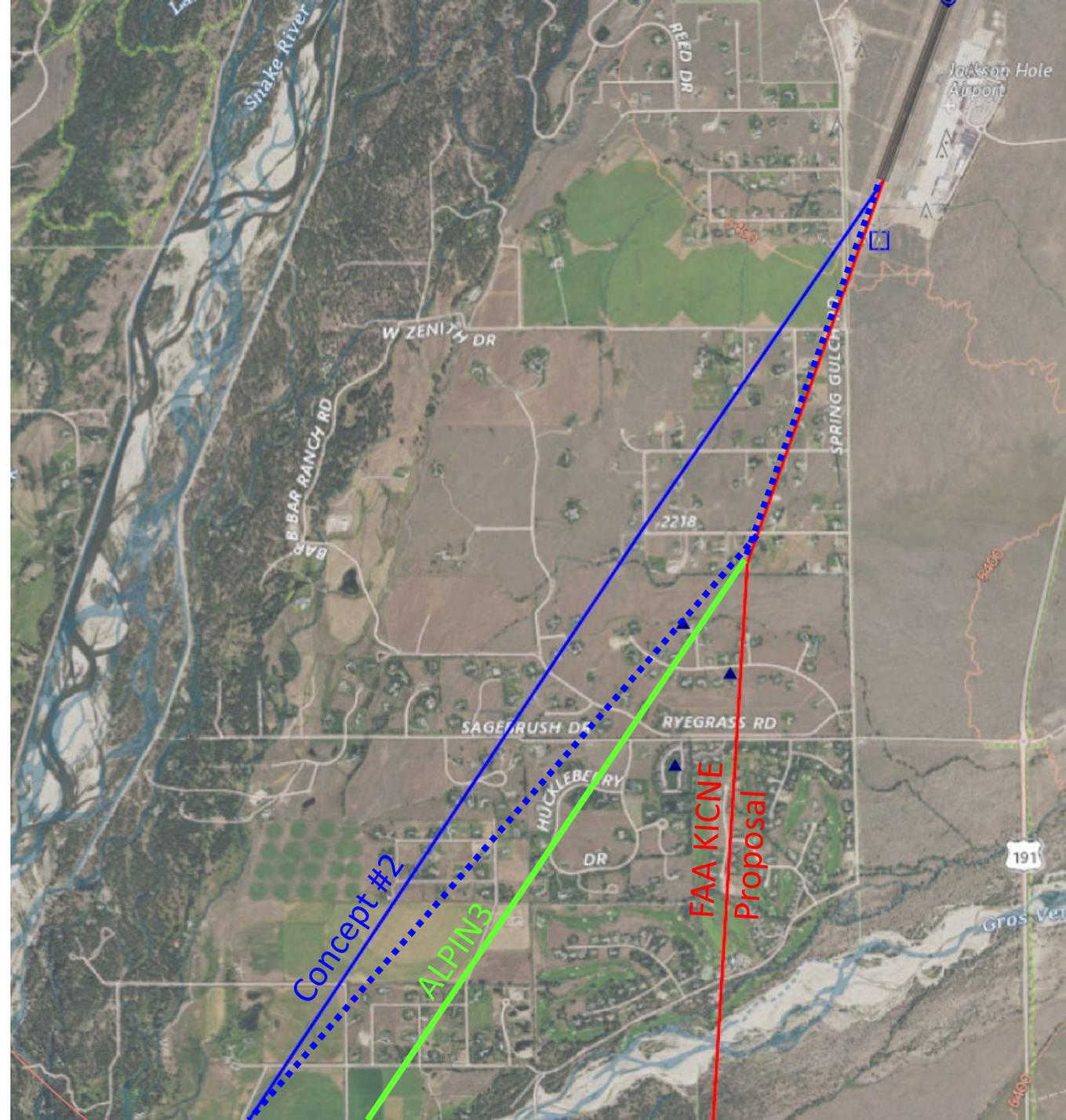
RNAV DP— WEST SHIFT

- Similar to existing ALPIN 3 with slightly more southwestern initial routing.
- While closer, route avoids direct overflight of Snake River.



Concept #2 RNAV DP - WEST SHIFT

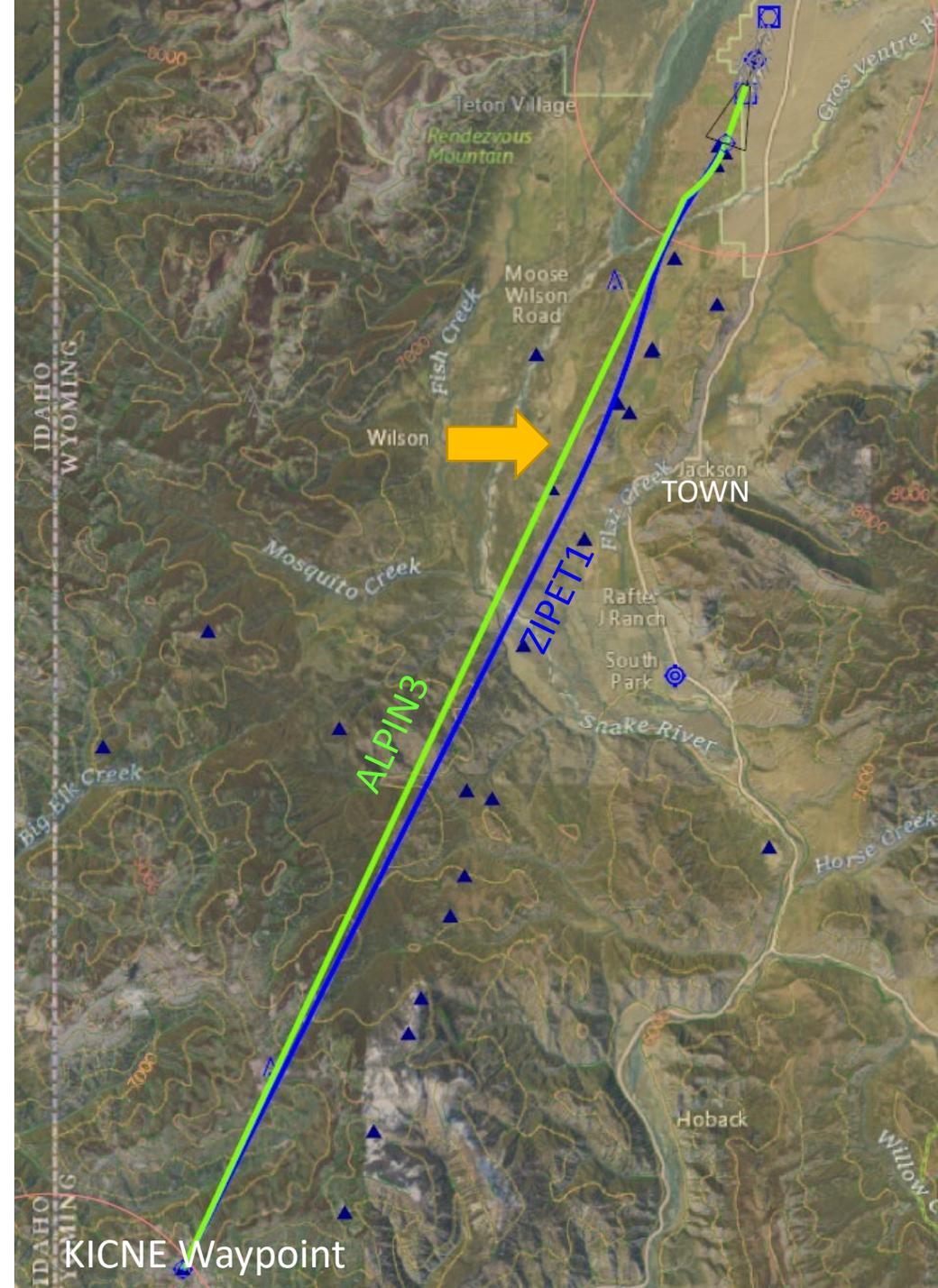
- Close-in view
- Dashed blue line indicates worst case climb rate.



Concept #3

ZIPET ONE RNAV

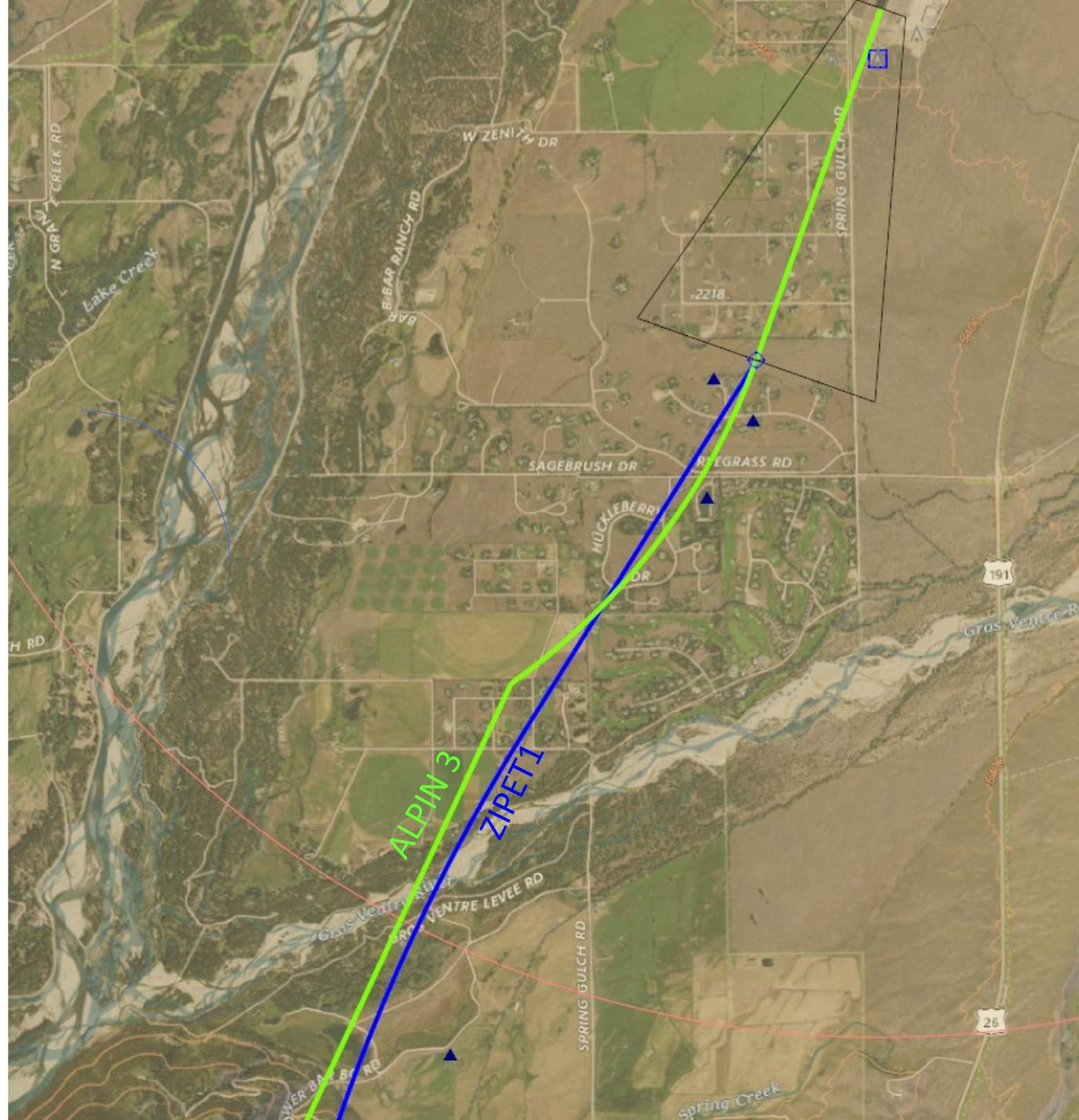
- Provides a simple RNAV overlay of the current ALPIN3 (Radio Nav) Departure.
- Has a slight turn mid-valley (between the two ridgelines) to help prevent direct overflight of the ridgelines (marked by orange arrow).
- Ends at the current KICNE Waypoint.
- Avoids overflight of Town.



Concept #3

ZIPET ONE RNAV

- Close-up view of initial climb area.
- Distance between the two paths does not exceed 800 ft of lateral distance.
- Easily flyable by all aircraft types.
- Provides redundancy for use during outages of ground-based nav aids used in ALPIN3.



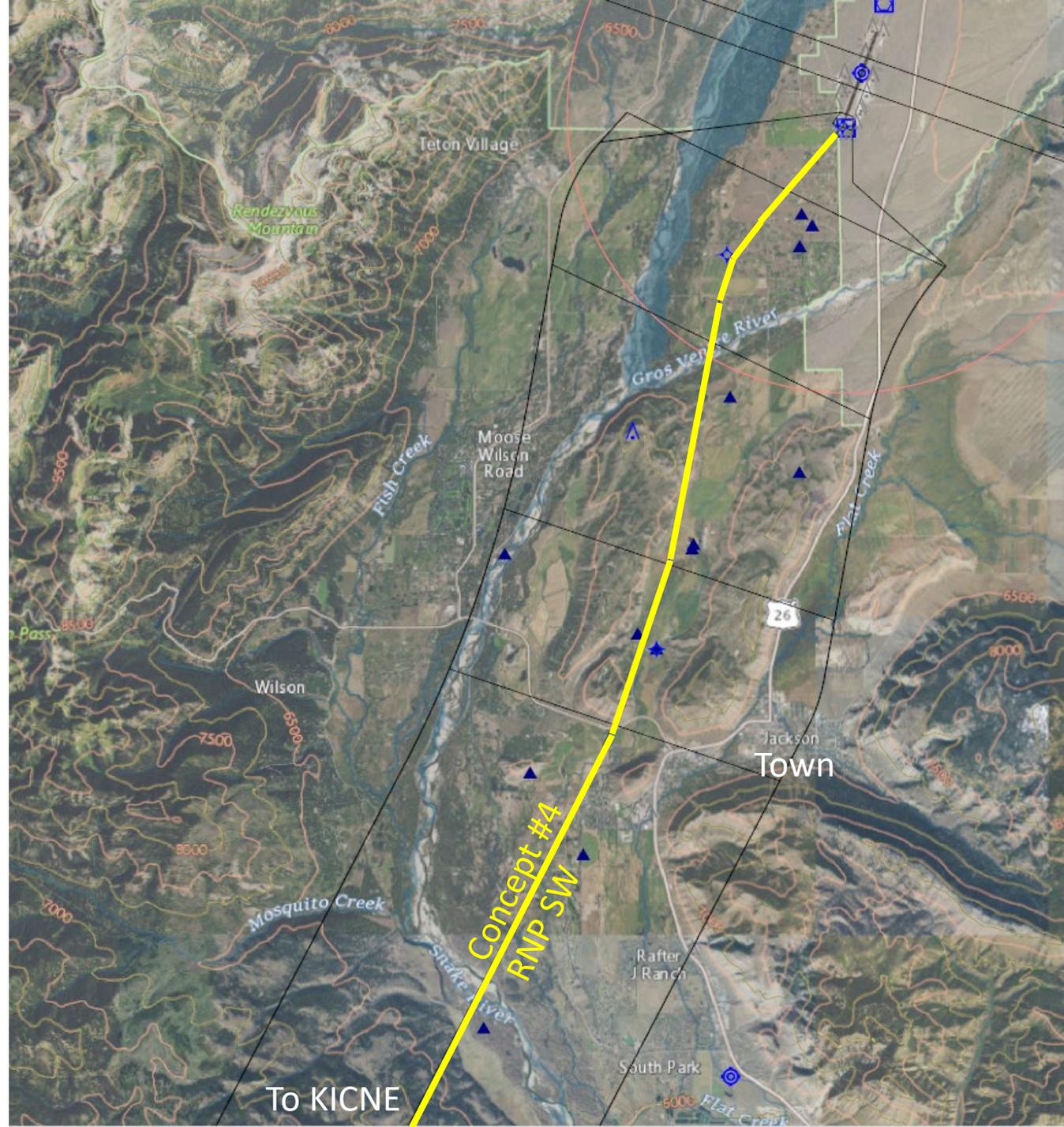


Advanced Concepts

- Departure Procedures may require Modifications to Standards (FAA Waivers).
- Some procedures utilize Required Navigation Performance – Authorization Required (RNP-AR) which is useable by some airlines, but not by the wider general aviation and business jet fleet.
- May limit the number of operators/aircraft who can utilize the procedures.
- Use may be limited initially due to advanced equipage requirements, but over time as aircraft technology improves, use could increase.

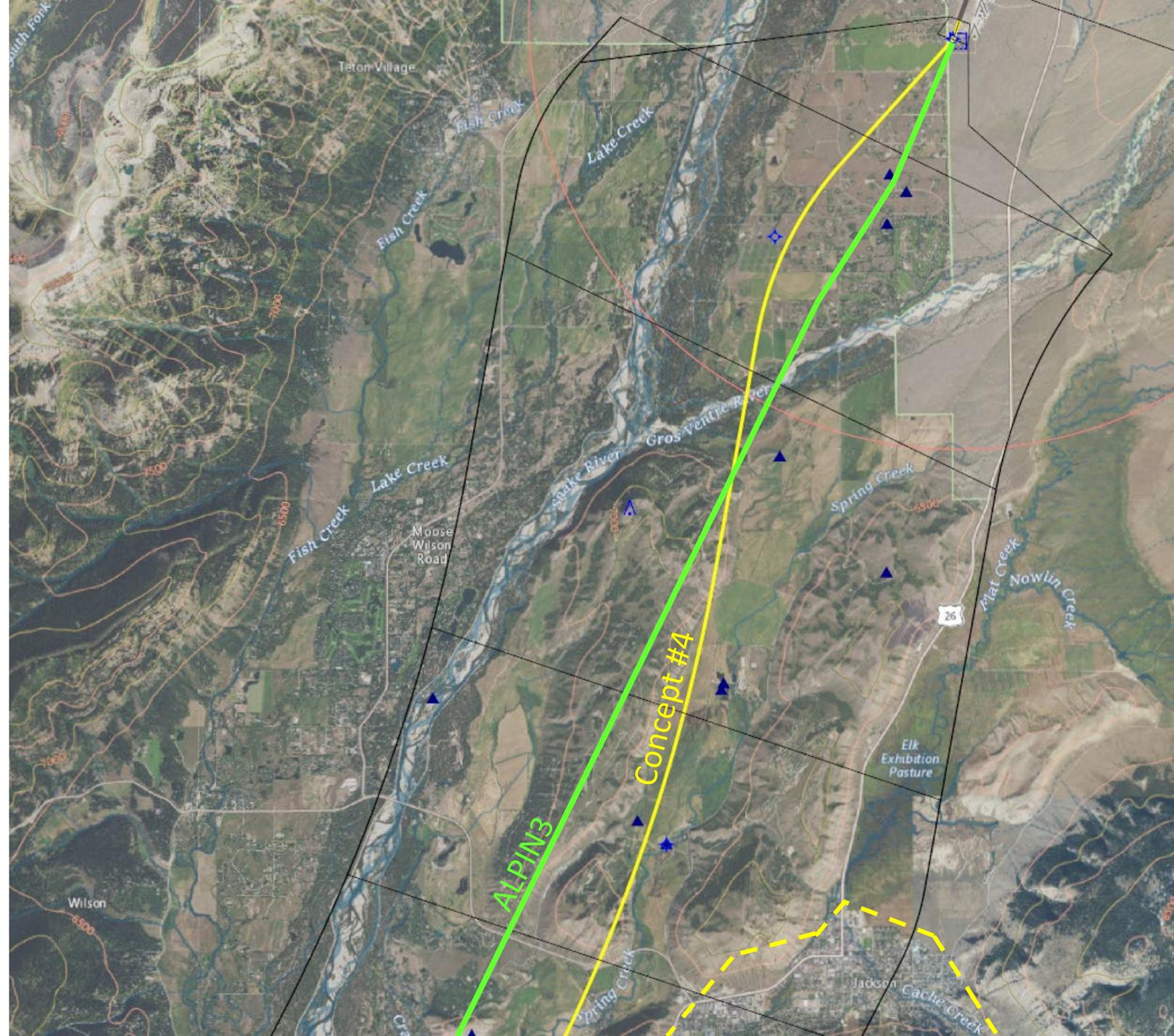
Concept #4: Immediate Turn to Southwest

- Advanced RNP design.
- Requires early turn to the southwest, then rejoins ALPIN3 route.
- Would require waivers which could limit use.
- Other than the early (non-standard) turn, it utilizes navigation methods that are easily achievable by a most aircraft.
- Terrain optimized and has a relatively low Climb Rate Requirement (329 ft/nm to 8100)



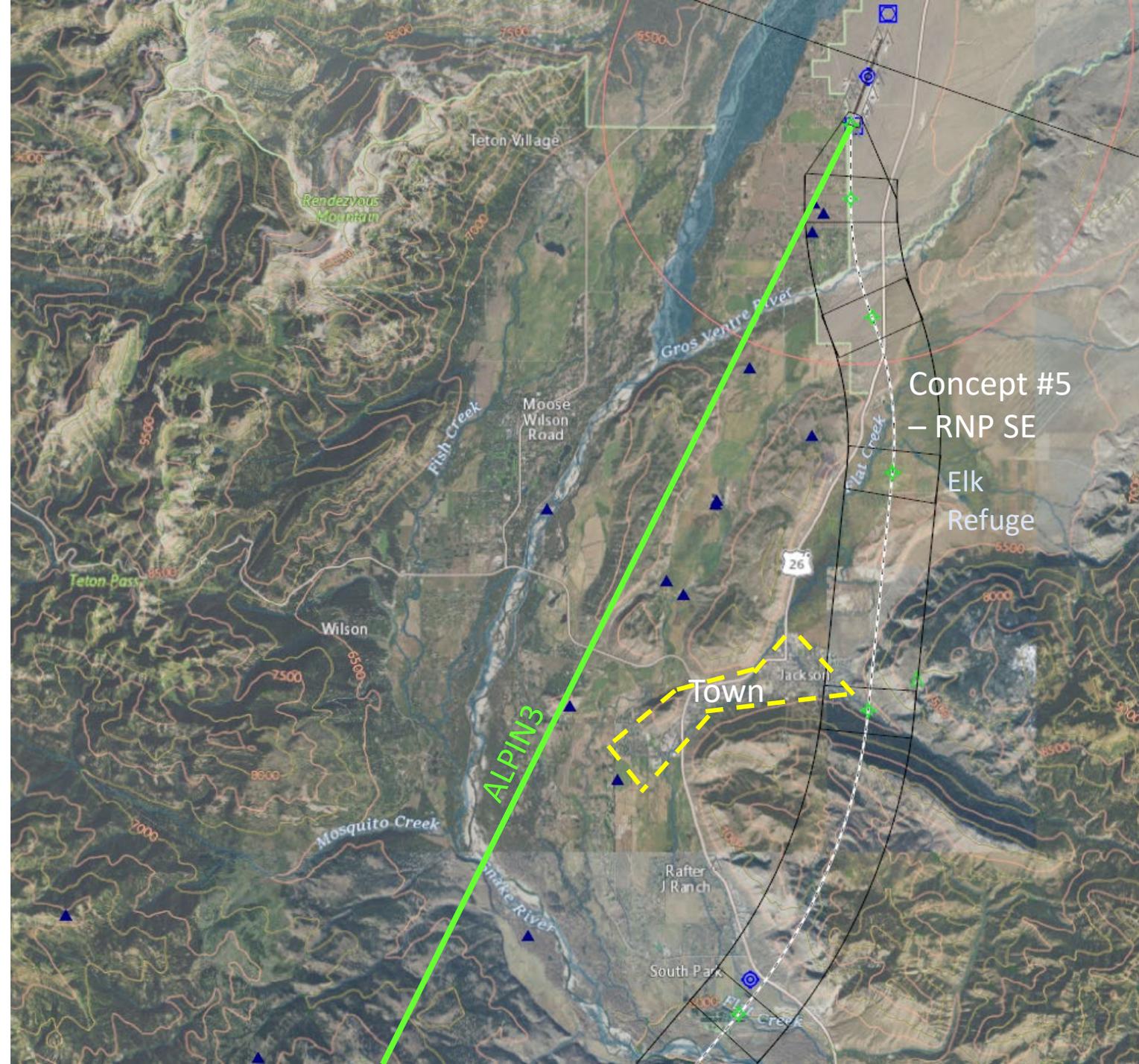
Concept #4 Cont. Immediate Turn to Southwest

- Close-in View
- Eventually joins similar path as the ALPIN3 departure once down valley



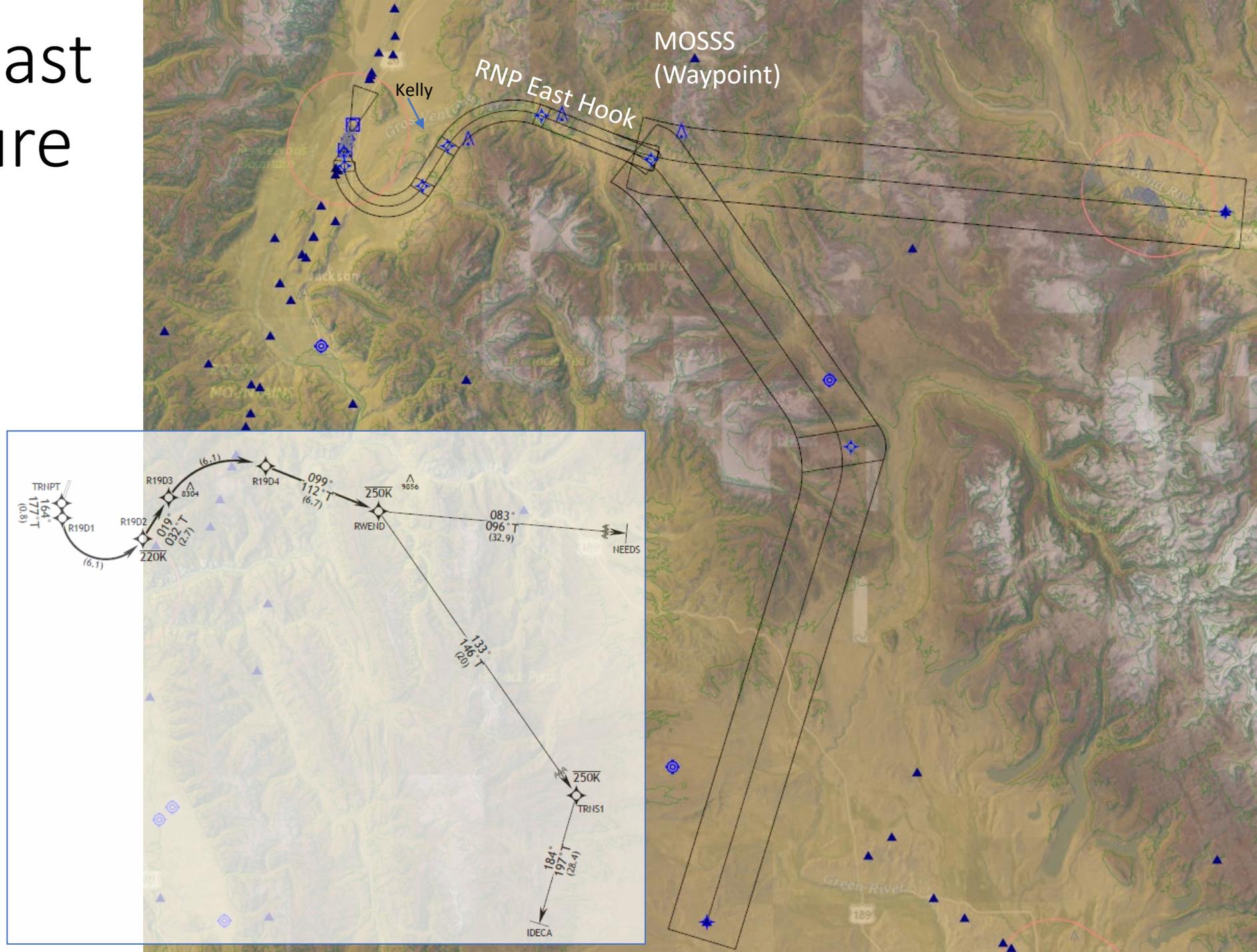
Concept #5: Immediate Turn to Southeast

- Limited to the most advanced aircraft due to curved path technology.
- Requires Waivers due to Early Turn.
- Avoids majority of valley.
- Overflies Elk Refuge and mountainous terrain sooner.



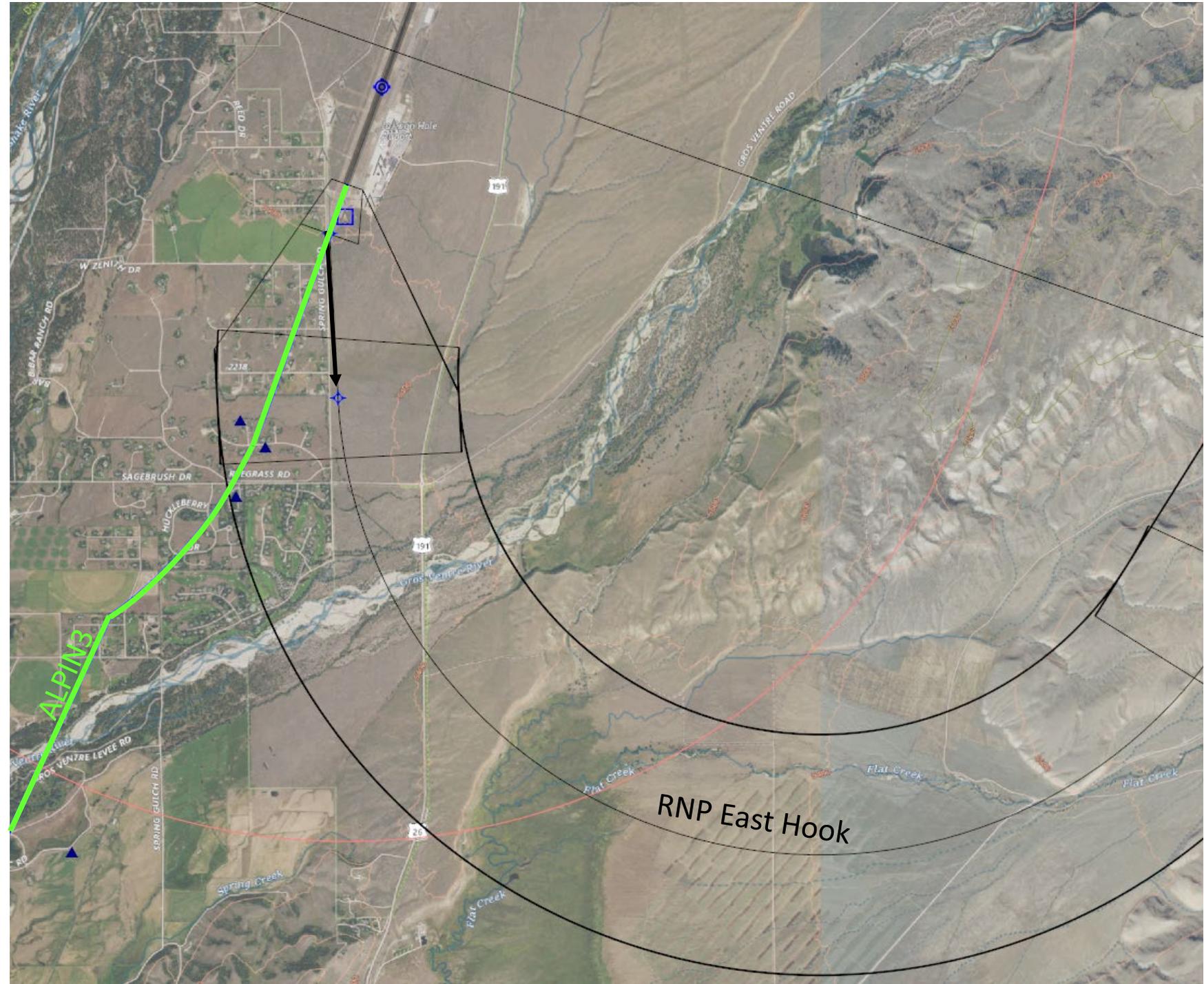
Concept #6: East Hook Departure

- Utilizes Advanced RNP Navigation to route departing aircraft away from the Jackson Valley.
- Presents ATC challenges due to the turn towards oncoming arrival flows.



Concept #6 Cont.. East Hook Departure

- Close-in view of immediate departure area.
- Requires a turn at runway end.
- Green line indicates existing ALPIN Departure
- Could be limited to summer months





Next Steps

- Revision of concepts based on comments
- Noise analysis of concepts moving forward
- Potential Next meetings: June 29th & August 16th
 - *Focus of next meeting will be using the noise analysis of refined concepts to further narrow procedures to potentially submit to FAA in September*

Thank you

- Questions, Comments & Discussions

