



CHAPTER 5
ALTERNATIVES ANALYSIS
MASTER PLAN UPDATE

Nogales International Airport
Santa Cruz County

April 2002

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CHAPTER 5 ALTERNATIVE ANALYSIS

Having identified the airport facility needs based on projected demand, the subsequent alternatives analysis serves to present airport development alternatives for review and evaluation. The alternatives present various logical arrangements of both proposed and contingent development. Proposed development refers to airport facilities needed to accommodate projected demand through the planning period (2020) of the Master Plan Update. Contingent development refers to development beyond the study's 20-year planning period and/or aviation demand that is realized sooner than projected.

The alternatives analysis process includes: identification of opportunities and constraints having significant influence on possible future development; identification of various development alternatives; evaluation of the alternatives; and selection of a preferred alternative. The last two steps in the analysis process are conducted in close coordination with the Planning Advisory Committee (PAC).

5.1 OPPORTUNITIES AND CONSTRAINTS

5.1.1 Opportunities

Airport opportunities offer flexibility in the alternatives identification process by increasing the possibilities for development. Opportunities identified for Nogales International Airport include:

- Undeveloped and underutilized property east of the runway.
- Vacant lease areas north of the terminal area with water and sewage available.
- Encroachment protection provided by an adopted airport overlay zone.
- Business park planned adjacent to the eastern airport boundary.
- Existing Industrial park infrastructure

5.1.2 Constraints

Airport constraints are challenges or limitations to future airport development. Constraints identified for Nogales International Airport include:

- Terrain restrictions due to topography north and along the eastern boundary of the airport.
- Current airport property boundary confined by State Route 82 to the west.
- Three parcels inside airport perimeter fencing mistakenly identified as airport property – these three parcels belong to an adjacent property owner
- TVOR location and associated critical area east of the runway.

- Minimal infrastructure available east of the runway.
- Existing roadway easement in Runway 3's Runway Protection Zone (RPZ) for adjacent land owner

5.2 ALTERNATIVES IDENTIFICATION

Airport development alternatives represent various logical arrangements of physical facilities to meet future aviation demand. In addition, the location and size of these facilities should consider all current applicable FAA design standards and airspace regulations as well as the development opportunities and constraints identified above. However, Santa Cruz County has the option of relocating the airport to a new site or displacing the aviation demand in Nogales International Airport to one or more other airports in the area. For the purpose of this chapter and the master planning scope, the focus is placed on development alternatives for the existing site.

It is also important to note that all development alternatives assume the acquisition of three parcels on the east side of the airport, which are not currently owned by the County. These three parcels are outlined in red on Exhibit 5-1. All three fall inside the airport perimeter fencing since they were mistakenly identified as airport property in the past. While two of the parcels actually reflect proposed long-term development in Alternatives 2-5, the third parcel has limited use in these alternatives because of its terrain constraints. This parcel is currently an island within the airport property and therefore should be acquired. Alternative 6 identifies the use of all three parcels.

5.2.1 Basic Development

Basic development consists of airport needs identified by the study as necessary to meet FAA standards or maintain operation of existing facilities. These are "located by function." In other words, their placement is dictated by other existing facilities. Consequently, various development alternatives do not exist for these basic development projects, and therefore, they are considered "givens" or "additive projects." Basic development for Nogales International Airport includes:

- Widen the runway so that the entire runway is 100 feet wide.
- Provide the proper grading off Runway 3 to ensure safety area meets FAA design standards.
- Relocate holdline position markings 250 feet from runway centerline.
- Upgrade taxiway reflectors to MITLs.
- Continue with pavement maintenance program.
- Replace SAVASI with more current technology.

5.2.2 Development Land Uses

Future airport development plans are built on the pre-establishment of airport land uses. These land uses should be distributed by function. This functional distribution should support future airport development through an appropriate balance of safety, efficiency, and flexibility. Further, the land use categories and layout should be defined in accordance with the goals and objectives for the airport.

A total of six (6) land use categories are defined for Nogales International Airport to include:

- Air Operations Area/Critical Areas
- Cargo Area
- General Aviation
- Terminal Area
- U.S. Customs/Border Patrol
- FBO/Flight School

AIR OPERATIONS AREA (AOA)/CRITICAL AREAS

The air operations area is the portion of the airport designed and used for landing, takeoff, or surface maneuvering of airplanes, and critical areas define the clearing and separation requirements for the navigational aids and special facilities such as a fuel farm. The AOA dimensions are defined by the FAA geometric design standards as dictated by the airport's classification or airport reference code. As mentioned earlier under Section 4.1.1 Runway Facility Requirements, Nogales International Airport is classified as an ARC C-II airport and is anticipated to maintain the same classification through the study's 20-year planning period. Critical areas are a function of the navigational aids and special facilities specifications to ensure operability, security, and safety.

CARGO AREA

The purpose of the cargo area is to serve the transport of commercial cargo, including freight and small packages. It consists of staging areas, warehouses, truck loading docks, and associated auto parking spaces.

GENERAL AVIATION (GA)

General aviation refers to that portion of civil aviation that includes corporate and private operations. It is typically associated with smaller size aircraft. The GA area consists of hangars and tiedowns in support of based and transient general aviation aircraft.

TERMINAL AREA

The terminal area is the area used or intended to be used for the terminal facility and ancillary functions. It may include a lobby, food service, shops, restrooms, airport management, auto parking, and other support services.

U.S. CUSTOMS/BORDER PATROL FACILITIES

Airports with international traffic require space for inspection of passengers, aircraft, crewmembers, baggage, and cargo. The U.S. Customs Service is responsible for controlling the entrance and clearance of aircraft arriving into the United States. The Border Patrol, which falls under the Immigration and Naturalization Services, is responsible for examining all persons arriving in the United States to determine their admissibility, which includes patrolling the international border. The facilities include storage, office space, inspection areas, and other space necessary for regular Customs operations.

FIXED BASED OPERATOR (FBO)/FLIGHT SCHOOL

A FBO is generally a private firm providing airport services such as fuel sales, aircraft maintenance, aircraft rental, and flight instruction. At lower activity airports, such as Nogales International Airport, the FBO also serves to operate and maintain the airport for the owner.

5.2.3 Development Alternatives

ALTERNATIVE 1 – NO DEVELOPMENT

This alternative (**Figure 5-1**) proposes that no additional development be accomplished on the airport, but that existing facilities be maintained. This alternative supports the option to relocate the airport to a new site or displace the aviation demand to one or more other airports in the area. However, the “no development” alternative is primarily presented for comparison purposes when evaluating possible environmental impacts.

→ AOA/Critical Areas

The AOA at Nogales International Airport under the current ARC C-II classification covers approximately 234 acres. It extends north and south the length of the airport property. The western boundary goes out 65.5 feet from the parallel taxiway and includes the helipad clearances and critical areas for the fuel farm, non-directional beacon, and the automated surface observation system. On the eastern side, the AOA divides the property based on the TVOR's critical area, which calls for a 1,000-foot radius clearance requirement.

→ Cargo Area

Since the start of the Master Plan Update, the staging of cargo has been relocated to the north apron. The 45,000 SF apron supports two cargo-staging areas.

→ General Aviation

The general aviation area extends from the current corporate tiedown area south to the existing hangars. It covers approximately seven acres and includes 21 hangars and 22 tiedown spaces. Direct surface access is provided from the main airport entrance road.

→ Terminal Area, U.S. Customs/Border Patrol, and FBO/Flight School

The terminal area, U.S. Customs/Border Patrol, and FBO/Flight School are located midfield adjacent to each other. They share the apron area immediately in front of their facilities. Typically, the FBO and flight school are associated with general aviation. However, the terminal building houses the FBO, as well as the U.S. Customs services. The terminal provides the FBO space for a restaurant, flight school classrooms, aircraft rentals and sales, and administration of its fixed based operations. Therefore, the FBO

is tied with the terminal area. Combined, the three land uses cover approximately one and a half acres.

ALTERNATIVE 2 – CARGO NORTH/GENERAL AVIATION SOUTH

Alternative 2 (Figure 5-2) proposes cargo development to take place at the northern half of the airport, while general aviation development occurs at the southern part of the airport. Expansion of the terminal area, U.S. Customs/Border Patrol facilities, and the FBO/Flight School is identified at their current location midfield, west of the runway. A perimeter roadway running around Runway 3 would provide access to development intended east of the runway. For the purpose of this chapter, a perimeter roadway refers to an airport roadway intended for commercial and public use in providing access to airport development east of runway. Due to significant rising terrain off the north side of the airport (Runway 21 end), the only option for a perimeter roadway within airport property is off the south side around Runway 3. However, service roads (paved or unpaved) to support airport maintenance and operations is not limited to south of the airport.

→ AOA/Critical Areas

The AOA in this alternative is similar to the first alternative in that its dimensions are defined under the current ARC C-II classification.

→ Cargo Area

Proposed cargo development identifies a new apron north of the existing helipad. In addition to relocating the two existing cargo staging areas to the new apron, it would also accommodate an additional 20,000 SF cargo staging area. Contingent development is identified west of the new apron to the airport boundary and continuing south behind the terminal area. Other cargo development is intended east of the runway and north of the TVOR critical area to accommodate additional contingency demand. The conceptual layout is designed to accommodate parking and circulation for large and regional/feeder aircraft and trucks. This development includes the use of the largest of the three parcels the County is planning to acquire on the east side of the airport (as outlined in red on each exhibit). The parcels fall inside the airport perimeter fencing since they were mistakenly identified as airport property in the past.

→ General Aviation

All general aviation (GA) expansion is proposed south of the terminal area on both the east and west sides of the runway. All development to meet projected demand is proposed in the vicinity of the existing GA hangars (13 acres) with contingent development intended to extend to the south and along the east side of the airport (24 acres). This proposed development includes the use of the southernmost parcel of the three the County is planning to acquire.

→ Terminal Area, U.S. Customs/Border Patrol, and FBO/Flight School

Expansion of the terminal area, U.S. Customs/Border Patrol, and the FBO/flight school is proposed to take place from their current location. Terminal area development would occur south replacing the corporate tiedown area. U.S. Customs/Border Patrol growth is shown between the terminal and FBO hangar. It includes space for an additional facility, if needed, plus two helicopter parking spaces between the apron and helipad taxiway. Expansion of the FBO and flight school includes additional hangar and classroom

facilities north and west from its existing location. It adopts the current north apron as a tiedown area for its aircraft fleet. A contiguous auto parking area west of the facilities would support the land uses. The total area is estimated around eight acres.

ALTERNATIVE 2A – CARGO NORTH/GENERAL AVIATION SOUTH/INDUSTRIAL PARK

This development concept (**Figure 5-2A**) is nearly identical to Alternative 2. However, this alternative replaces a portion of the west cargo area with an industrial park, which currently has limited infrastructure in-place.

All other land use development areas remain as identified in Alternative 2.

ALTERNATIVE 3 – CARGO EAST/GENERAL AVIATION WEST

In this development concept (**Figure 5-3**), all cargo facilities (proposed and contingent) are intended east of the airport. Consequently, all GA development takes place on the west side, both north and south of the terminal area.

→ AOA/Critical Areas

The AOA in this alternative is similar to the first and second alternatives in that its dimensions are defined under the current ARC C-II classification.

→ Cargo Area

Cargo operations are displaced east of the runway under Alternative 3 with initial development occurring south of the TVOR minimizing the extents of the perimeter roadway. Additional or contingent development would expand north as demand is realized. The area covers over 52 acres providing enough space for cargo staging, warehouses, loading docks, and auto parking. Two of the three parcels to be acquired by the County will accommodate a portion of this cargo development and its associated support facilities on the east side.

→ General Aviation

Similar to the second alternative, Alternative 3 suggests proposed development take place in the vicinity of the existing GA area. Contingent development is intended to extend south and continue north of the terminal area. This alternative provides the largest amount of space (39 acres) for GA development, which would support an aggressive increase of GA activity.

→ Terminal Area, U.S. Customs/Border Patrol, and FBO/Flight School

Alternative 3 also implies development for the terminal area, U.S. Customs/Border Patrol, and the FBO/flight school to occur at their current location. However, it does provide additional space along State Route 82 for auto parking, which would allow additional expansion of the facilities in the immediate area. This alternative provides the three land uses with over 11 acres for development.

ALTERNATIVE 3A – CARGO EAST/GENERAL AVIATION WEST/ INDUSTRIAL PARK

Alternative 3A (**Figure 5-3A**) is nearly identical to Alternative 3. The difference is that Alternative 3A replaces a portion of the northwest general aviation development area with

an industrial park. This still allows more than adequate development area for GA while accommodating the County's ongoing industrial development plans.

All other land use development areas remain as identified in Alternative 3.

ALTERNATIVE 4 – CARGO WEST/GA NORHTEAST

Alternative 4 (**Figure 5-4**) initiates planning and protecting for a larger airplane design group. The AOA under this alternative is based on an ARC C-III versus a C-II. Consequently, the AOA coverage increases minimizing the available space for development. In addition, this alternative is based on the concept that cargo becomes the most important and subsequently the most land-demanding function at the airport. The entire west side of the airport is converted to cargo development while the terminal area facilities and all GA development are relocated to the east side. The terminal area and GA development proposed will use two of the three parcels to be acquired by the County.

→ AOA/Critical Areas

As mentioned above, the AOA under Alternative 4 is defined by an ARC C-III airport classification for the purpose of planning and protecting the airport for a larger airplane design group. Consequently, the dimensions of the AOA change based on the new design standards. Beginning with increasing the runway-to-taxiway separation by shifting the runway east 20 feet to meet the new standards followed by higher critical surface dimensions, the larger AOA (264 acres) encroaches on the undeveloped land available east of the runway. Since the design standards do not change between an aircraft approach category C to a D, planning for an aircraft approach category C inadvertently also protects for a category D.

Another change in the AOA suggests the approach to the current helipad be rotated to run perpendicular from the runway and heading west. The purpose for the rotation is to keep rotorcraft from flying over aircraft parked on the apron.

→ Cargo Area

This alternative dedicates the largest available area (41 acres) for cargo development. The conceptual layout defines ample apron space along with warehouses and truck loading docks to support significant cargo activity.

→ General Aviation

GA is relocated entirely to the northeast of the airport. The area available for development measures approximately 33 acres and access is provided by the proposed perimeter road around Runway 3.

→ Terminal Area, U.S. Customs/Border Patrol, and FBO/Flight School

Terminal area, U.S. Customs/Border Patrol, and FBO/flight school are also relocated east of the runway, but south of the TVOR. The area (11 acres) can accommodate proposed and contingent development, which includes apron space, buildings, auto parking space, and a new helipad to support the three land uses.

ALTERNATIVE 5 – RELOCATED TVOR/TERMINAL AREA NORTHEAST

This alternative proposes relocation of the TVOR, which currently divides the east side of the airport into two separate useable parcels. Relocating the TVOR to the north slightly will eliminate the east development split allowing for contiguous parcel development of cargo on the east side. This alternative also proposes the relocation of all terminal-related (i.e. terminal, U.S. Customs/Border Patrol, and FBO/flight school) facilities to the northwest to allow for a larger contiguous GA development area from the central west to the southwest area of the airport. Alternative 5 also identifies a potential off-airport taxiway connector for through-the-fence operations and an airport-controlled alternative public access roadway on the east side.

→ **AOA/Critical Areas**

The AOA in this alternative is similar to Alternative 4 in that its dimensions are defined under the ARC C-III classification. However, the relocation of the TVOR minimizes its impact on the undeveloped land east of the runway by reducing the amount of airport property it covers (256 acres).

→ **Cargo Area**

Similar to Alternative 3, the cargo under this alternative is displaced east of the runway with initial development occurring on the south end. However, under Alternative 5, surface access is provided from a public roadway potentially from the planned adjacent business park. The access is proposed for public use under the Airport's control similar to the access currently available on the west side of the airport. Thus, this access is not considered through-the-fence. Proposed cargo development will use two of the three parcels to be acquired by the County.

→ **General Aviation**

Similar to other alternatives, GA development is proposed to occur at its current location under this alternative. However, contingent development is intended to expand north into the current terminal-related area. Together, the proposed and contingent development cover approximately 28 acres.

→ **Terminal Area, U.S. Customs/Border Patrol, and FBO/Flight School**

This alternative provides the largest space (13 acres) for terminal-related development. The terminal area, U.S. Customs/Border Patrol, and FBO/flight school are relocated to the northwest segment of the airport. U.S. Customs/Border Patrol, who has the most significant level of rotorcraft operations, is proposed adjacent to the helipad. Also, the FBO, which dispenses fuel, is located close to the fuel farm.

ALTERNATIVE 5A – RELOCATED TVOR/TERMINAL AREA NORTHEAST/INDUSTRIAL PARK

Alternative 5A (**Figure 5-5A**) represents a modification of Alternative 5. Similar to Alternatives 2A and 3A, this alternative includes an industrial park. The difference between Alternative 5 and 5A is that the industrial park shown on Alternative 5A replaces a portion of the west general aviation development area and realigns the layout of the terminal area and FBO flight School. In addition, the U.S. Customs/Border Patrol is relocated to the east side of the airport. More than adequate development area for these modified land uses is still available while accommodating the County's ongoing industrial development plans.

ALTERNATIVE 6 – PARALLEL RUNWAY

This alternative is similar to Alternative 2's layout. However, this concept includes a parallel runway to the east of the existing runway so all landside development is limited to the west side. Further, the parallel runway concept requires land acquisition to accommodate the air operations area.

→ Air Operations Area (AOA)/Critical Areas

The AOA under this alternative, which is driven by the proposed parallel runway at the minimum separation distance of 700 feet, would cover the entire east side of the airport. In addition, it would converge on adjacent land not currently owned by the Airport.

→ Cargo Area

Cargo development is similar to Alternative 2, but because it is limited to the west side of the airport, it only has approximately 20 acres available for development.

→ General Aviation

The proposed parallel runway impacts general aviation development the same way as cargo development. The area available for GA development is reduced from 37 to 22 acres.

→ Terminal Area, U.S. Customs/Border Patrol, and FBO/Flight School

The terminal-related facilities are the only land uses not directly impacted by the proposed parallel runway considering that none of the development was proposed east of the runway. However, the limited available space may result in GA and cargo encroaching on the terminal area, U.S. Customs/Border Patrol, and FBO/flight school.

5.3 ALTERNATIVES EVALUATION

5.3.1 Alternative 1 – No Development

ADVANTAGES

This alternative is a "no development" alternative which translates to three primary advantages – low cost, least environmental impact, and no disruption to airfield operations for construction.

DISADVANTAGES

This approach, however, presents a significant long-term problem for the airport. "No development" would magnify the facility deficiencies over time as based aircraft and operations demand increased. This would progressively impact both local and transient airport user and, thus, make the airport less desirable to business traffic. While the primary advantage is the low cost, inadequate facilities could negatively impact the airport's long-term economic viability, increase liability for the owner and contribution to the community and regional airport system. Further, this alternative is not consistent with the ultimate goals and objective of Santa Cruz County.

5.3.2 Alternative 2 (and 2A) – Cargo North/GA South (w/ Industrial Park on 2A)

ADVANTAGES

Alternative 2 presents an advantage in short-term investments. The alternative proposes future development from the existing land use locations, thus, minimal infrastructure investment is needed early on. In addition, each of the land uses have direct access to State Route 82 allowing flexibility on surface circulation.

DISADVANTAGES

The primary disadvantage under this alternative is that the contingent development ultimately results in GA and cargo being divided by the runway. In addition, all support services are located on one side of the runway leaving contingent GA and cargo development without immediate service available. Consequently, a significant amount of runway crossing results.

5.3.3 Alternative 3 (and 3A) – Cargo East/GA West (w/ Industrial Park on 3A)

ADVANTAGES

The advantage of Alternative 3 is that all GA development occurs on the west side of the airport providing surface access from State Route 82. Consequently, it eliminates the most diverse group, which is hardest to oversee, from having to cross the airport via privately owned vehicles. In addition, it keeps the airport support services together with GA, which is probably the higher user of those services. In reference to the cargo area, the east development is compatible with the business park planned for development adjacent to the eastern boundary of the airport. The adjacent land uses could potentially compliment each other's economic growth.

DISADVANTAGES

The primary disadvantage is the immediate infrastructure investment needed for cargo development. In addition, the GA and cargo areas are still basically divided even though each is located on one side of the runway. The terminal-related facilities split general aviation while the cargo area is divided by the TVOR and associated critical area.

5.3.4 Alternative 4 – Cargo West GA Northeast

ADVANTAGES

Alternative 4 provides the most flexible space for cargo development, which would be beneficial if cargo becomes the most important and subsequently the most land-demanding function at the airport. By keeping cargo development west of the runway, it eliminates the need for large trucks to cross the airport property. In addition, this alternative allows for a new GA layout design that would make the best use of the limited space.

DISADVANTAGES

Similar to Alternative 3, this Alternative 4 requires significant infrastructure investment early in the development process due to complete relocation of facilities east of the runway. It also isolates the airport service facilities from the users needing their services by placing the terminal-related facilities at the southeast corner of the airport. Alternative 4 also requires the average flyer to cross the airport property with their privately owned vehicles.

5.3.5 Alternative 5 (and 5A) – Relocated TVOR/Terminal Area NW (w/Industrial Park on 5A)

ADVANTAGES

By relocating the TVOR, it opens up more of the east side of the airport for contiguous cargo development. GA also benefits in contiguous development as the terminal-related facilities are shifted northward. Alternative 5's layout allows for the U.S. Customs/Border Patrol, which has the highest level of rotorcraft operations, to be located adjacent to the helipad on the west side. Alternative 5A locates helipads and U.S Customs Border/Patrol on the east side to accommodate the Industrial Park. GA is located next to the airport service facilities and their placement east of the runway eliminates their need to cross the airport property. The alternative access from the east side of the airport also eliminates the need for trucks to cross the airport, while the cargo area the adjacent to the business park promotes economic development.

DISADVANTAGES

The primary disadvantage of this alternative lies with the proposed taxiway connector for through-the-fence operations. It is important to note that the FAA does not favor through-the-fence operations. The FAA's unfavorable view of through-the-fence operations generally stems from the high risk for litigation. Even airports that have spent a lot of staff hours in research have found themselves subject to litigation for issues such as discrimination. Consequently, Santa Cruz County would have to commit staff and time to implement and manage through-the-fence operations at Nogales International Airport.

5.3.6 Alternative 6 – Parallel Runway

ADVANTAGES

The primary advantage of an airport having parallel runway is the increased capacity of its airfield.

DISADVANTAGES

A parallel runway at Nogales International Airport eliminates available space for land use development, requires additional land acquisition, and may require significant dollars to construct due to challenging terrain issues. Further, while the airport may benefit from the higher capacity from an airside standpoint, the landside component of the airport would suffer.

5.4 SUMMARY

In February 2001, a PAC work session was held to review, discuss, and further evaluate the six primary development alternatives presented in the preceding sections. The PAC work session included the distribution of an evaluation matrix/worksheet to facilitate the evaluation process. The worksheet identified all of the land uses, their various proposed development locations on the airport, and the general evaluation categories to include operational feasibility, environmental, capital investment/technical feasibility, and socioeconomics. A copy of this matrix worksheet is included in Appendix C. As a result of the evaluation process, a preferred development alternative was selected.

The preferred alternative selected by the PAC is presented here and represents a combination of two alternatives with modifications -- Alternative 2A's west side development and Alternative 5A's east side development. Modifications include the following:

- ◆ Addition of a second airport access roadway off of State Route 82. The perimeter roadway shown through the Runway 3 RPZ assumes the existing roadway easement for the adjacent landowner will be vacated and the new road will accommodate their access needs.
- ◆ Removal of the proposed through-the-fence access at the southeast end of the airport.
- ◆ Placement of U.S. Customs on both sides of the airport to accommodate primarily GA and passengers on the west side and cargo on the east side.
- ◆ Addition of "Aviation Reserve" land use as secondary and ultimate land use designation for the TVOR critical area (portion of the AOA) based on the assumption that the TVOR will ultimately be decommissioned.

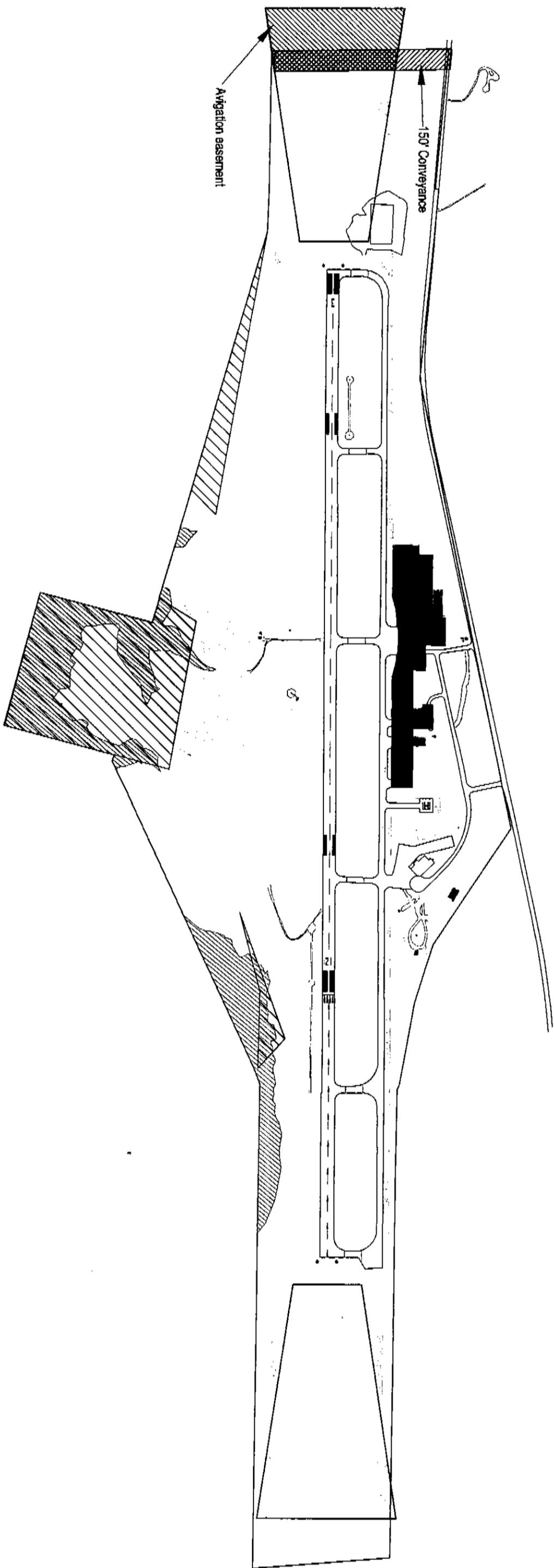
Highlights of the preferred development alternative, shown in Exhibit 5-7, reflect GA development expanding in the southwest part of the airport; the terminal, US Customs/Border Patrol, and FBO Flight School developing just north of the GA area development; cargo developing to the north of the terminal area and ultimately in the southeast part of the airport; a second US Customs office on the east side for cargo; industrial development (see Appendix H for development plan) between SR 82 and the terminal area/west side cargo area; and a new parallel taxiway system on the east side to serve cargo.

Additional changes to the existing airfield configuration include the relocation of the existing displaced threshold. This relocation will be integrated into subsequent master plan chapters to include the airport layout plan drawings. FAA approved the request in a recent letter dated September 17, 2001. The approval followed a formal request submitted in a FAA Form 7480-1 in January 2001 and supplemented in August 2001. The current displaced threshold is 1,912 feet from the end of Runway 21, and the relocation will reduce it to 900 feet.

5.5 CONCLUSIONS

The proposed airport development selected in this chapter is the result of the Nogales International Airport Master Plan PAC's discussion and input. A further refinement of airport development proposed for Nogales is presented in Chapter 8, Airport Plans. This refinement includes further consideration of security such as fencing based on recent events. Proposed airport development is outlined by phase in Chapter 9, Airport Development Schedule and Financial Analysis.

Figure 5-1 Alternative 1 - No Development



Land Use Legend

- Airfield Operating Area / Critical Areas
- General Aviation
- Cargo
- U.S. Customs / Border Patrol
- Terminal Area
- FBO / Flight School

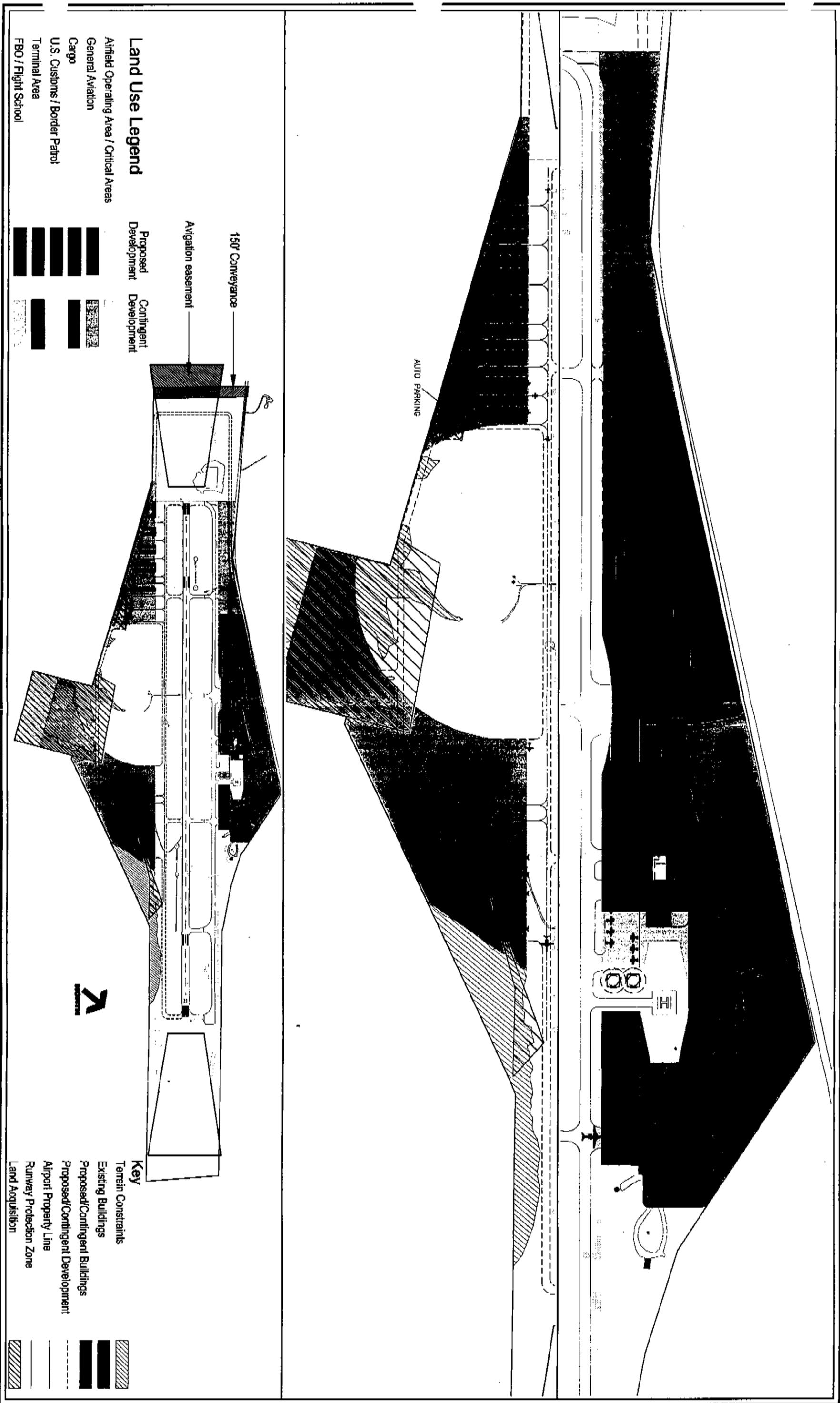


Key

- Terrain Constraints
- Existing Buildings
- Airport Property Line
- Runway Protection Zone
- Land Acquisition



Figure 5-2 Alternative 2 - Cargo North/GA South



- Land Use Legend**
- Airfield Operating Area / Critical Areas
 - General Aviation
 - Cargo
 - U.S. Customs / Border Patrol
 - Terminal Area
 - FBO / Flight School

- Proposed Development
- Contingent Development

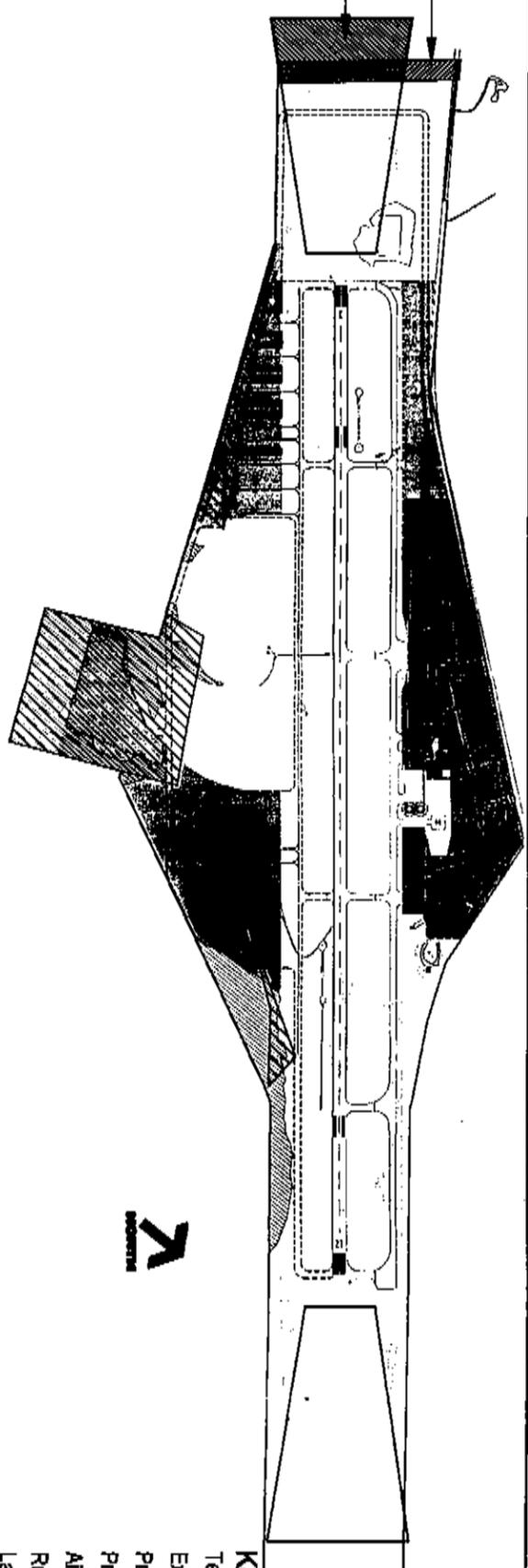
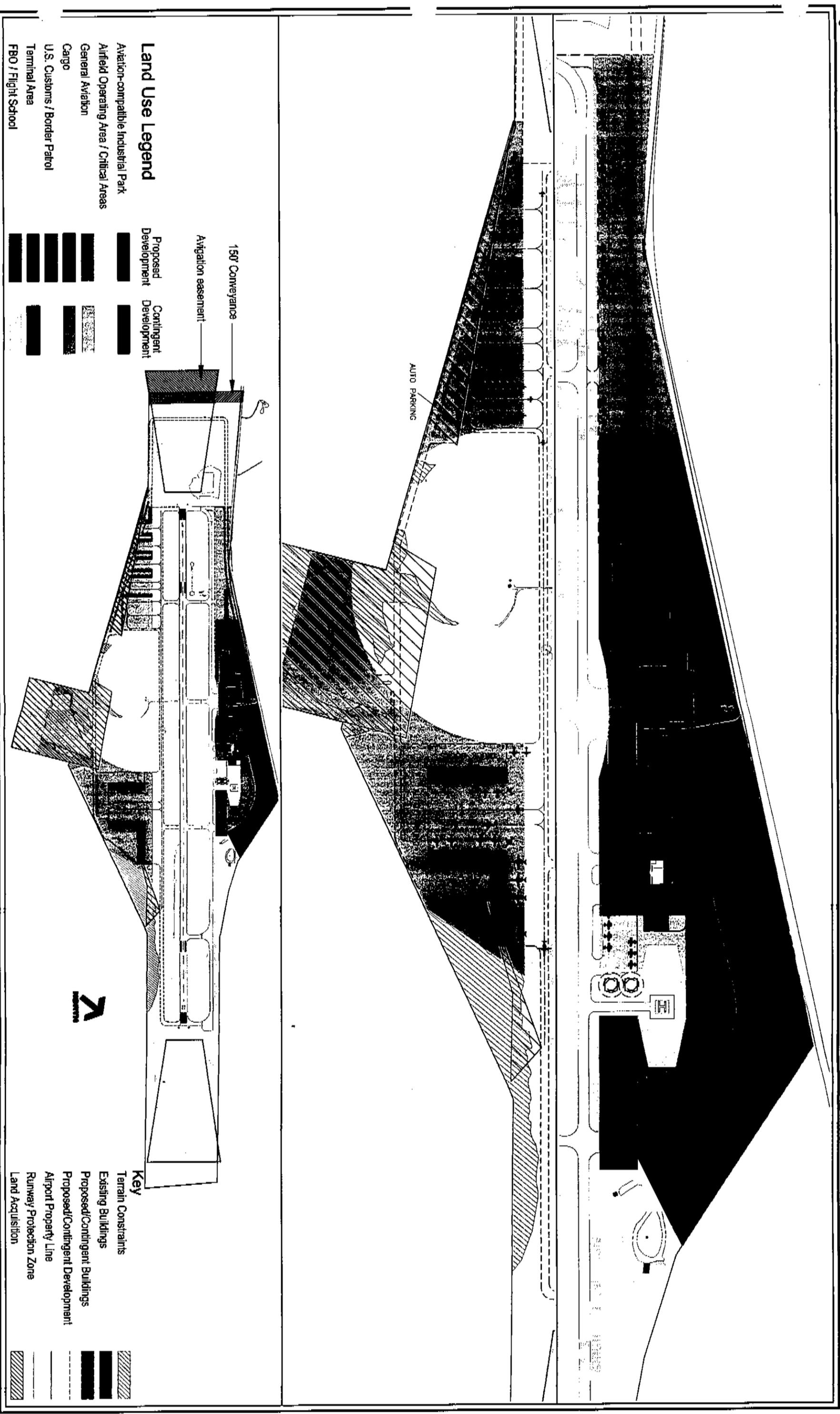


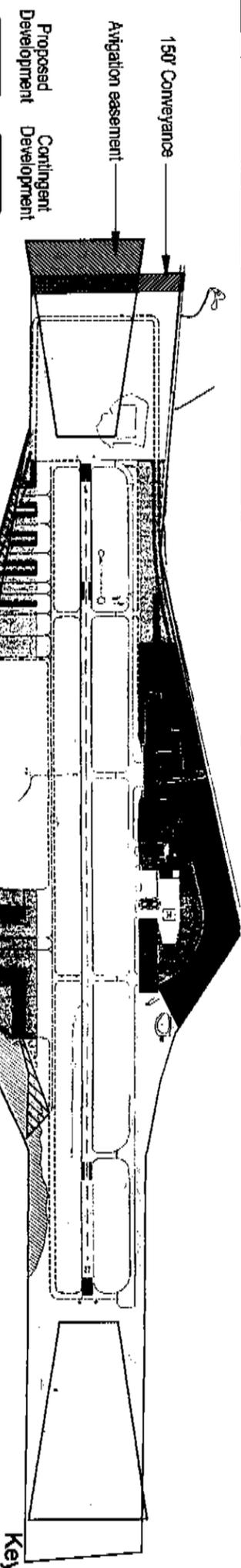
Figure 5-2A Alternative 2A - Cargo North/GA South/Industrial Park



Land Use Legend

- Aviation-compatible Industrial Park
- Airfield Operating Area / Critical Areas
- General Aviation
- Cargo
- U.S. Customs / Border Patrol
- Terminal Area
- FBO / Flight School

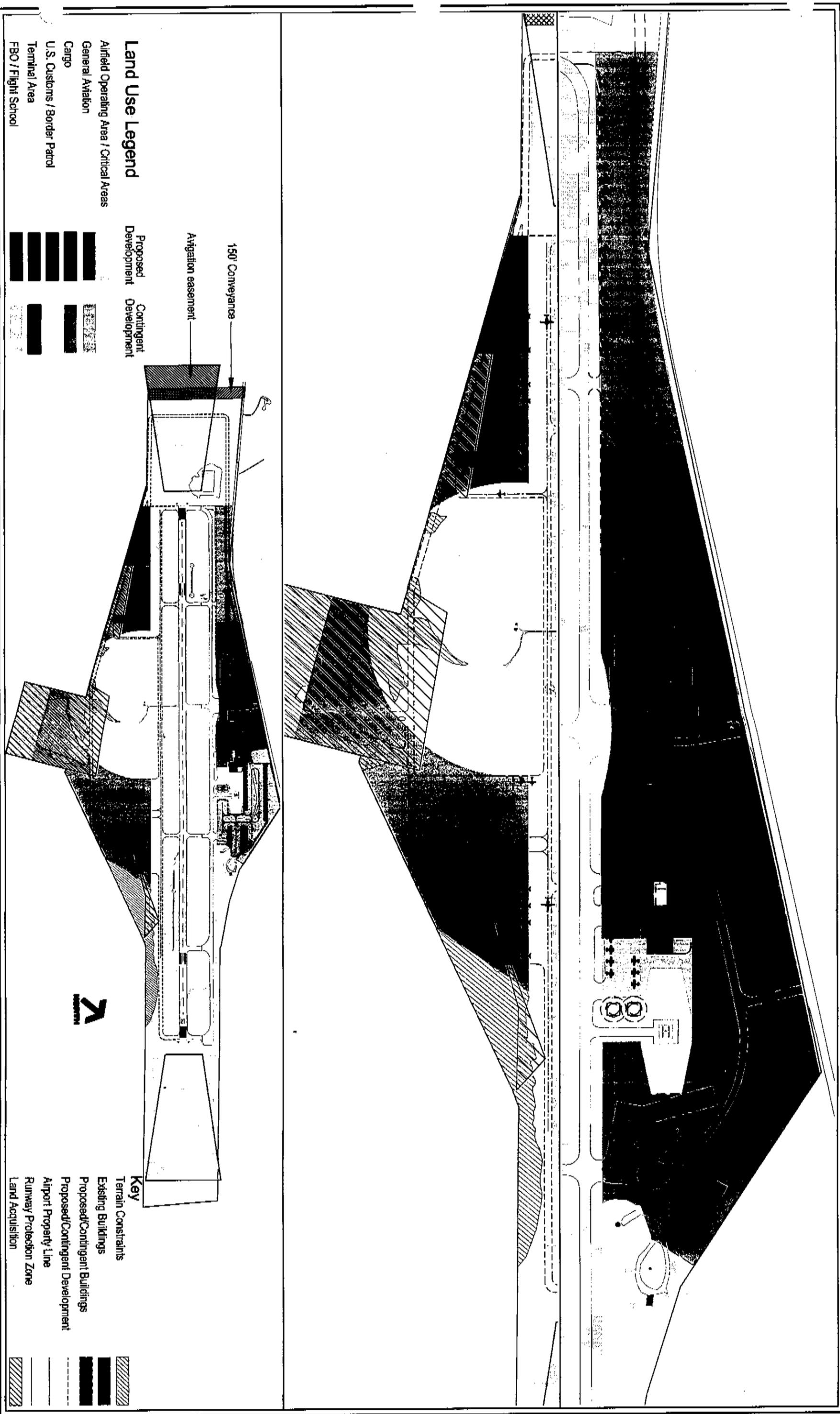
- Proposed Development
- Contingent Development



Key

- Terrain Constraints
- Existing Buildings
- Proposed/Contingent Buildings
- Proposed/Contingent Development
- Airport Property Line
- Runway Protection Zone
- Land Acquisition

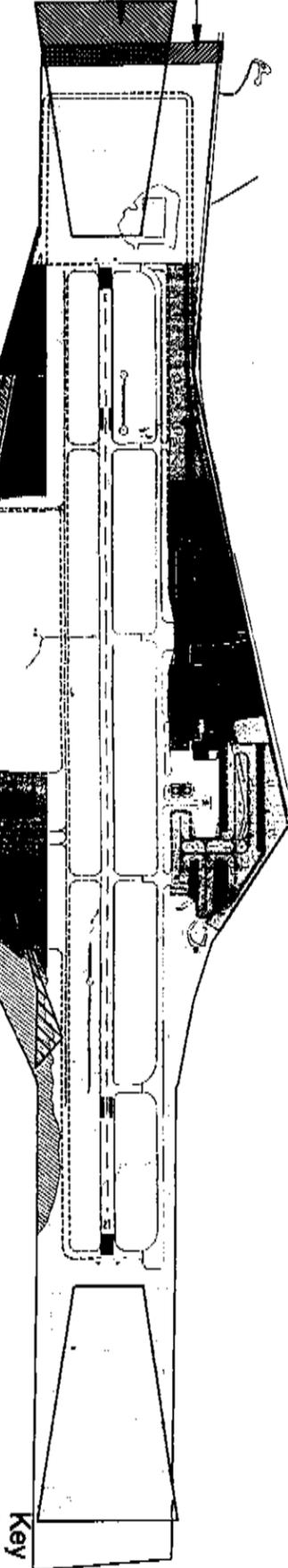
Figure 5-3 Alternative 3 - Cargo East/GA West



Land Use Legend

- Airfield Operating Area / Critical Areas
- General Aviation
- Cargo
- U.S. Customs / Border Patrol
- Terminal Area
- FBO / Flight School

- Proposed Development
- Contingent Development

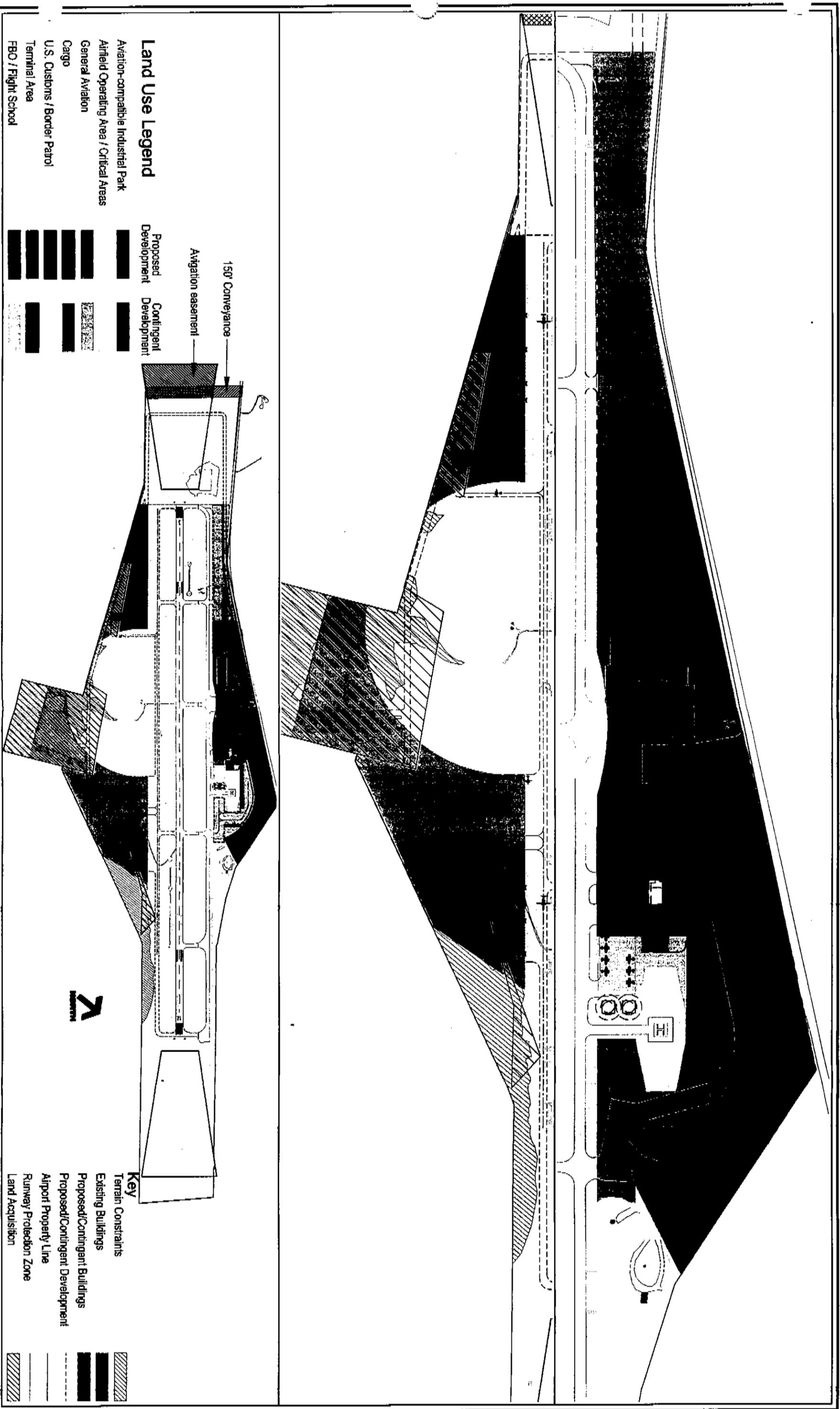


Key

- Terrain Constraints
- Existing Buildings
- Proposed/Contingent Buildings
- Proposed/Contingent Development
- Airport Property Line
- Runway Protection Zone
- Land Acquisition



Figure 5-3A Alternative 3A - Cargo East/GA West/Industrial Park



Land Use Legend

- Aviation-compatible Industrial Park
- Airfield Operating Area / Critical Areas
- General Aviation
- Cargo
- U.S. Customs / Border Patrol
- Terminal Area
- FBO / Flight School

- Proposed Development
- Contingent Development

150' Conveyance
 Aviation easement



Key

- Terrain Constraints
- Existing Buildings
- Proposed/Contingent Buildings
- Proposed/Contingent Development
- Airport Property Line
- Runway Protection Zone
- Land Acquisition

Figure 5-4 Alternative 4 - Cargo West/GA Northeast

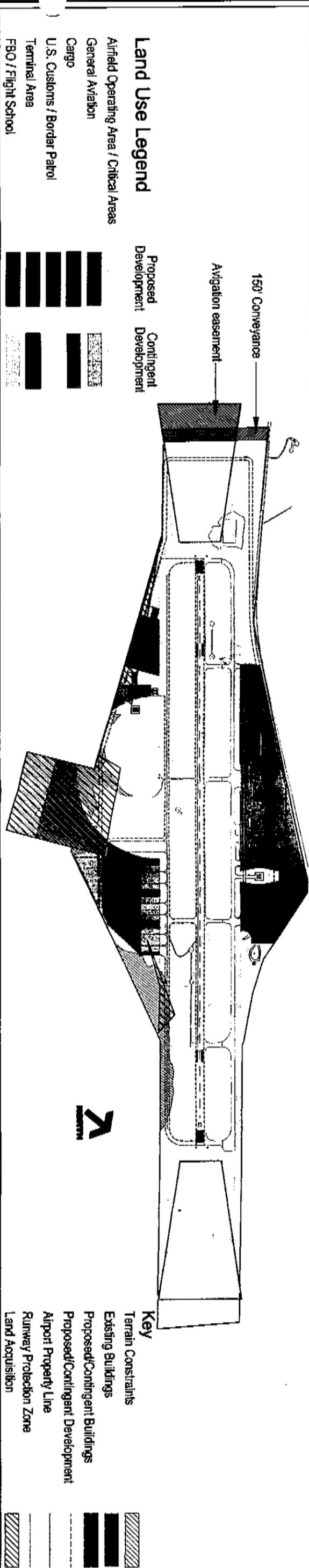
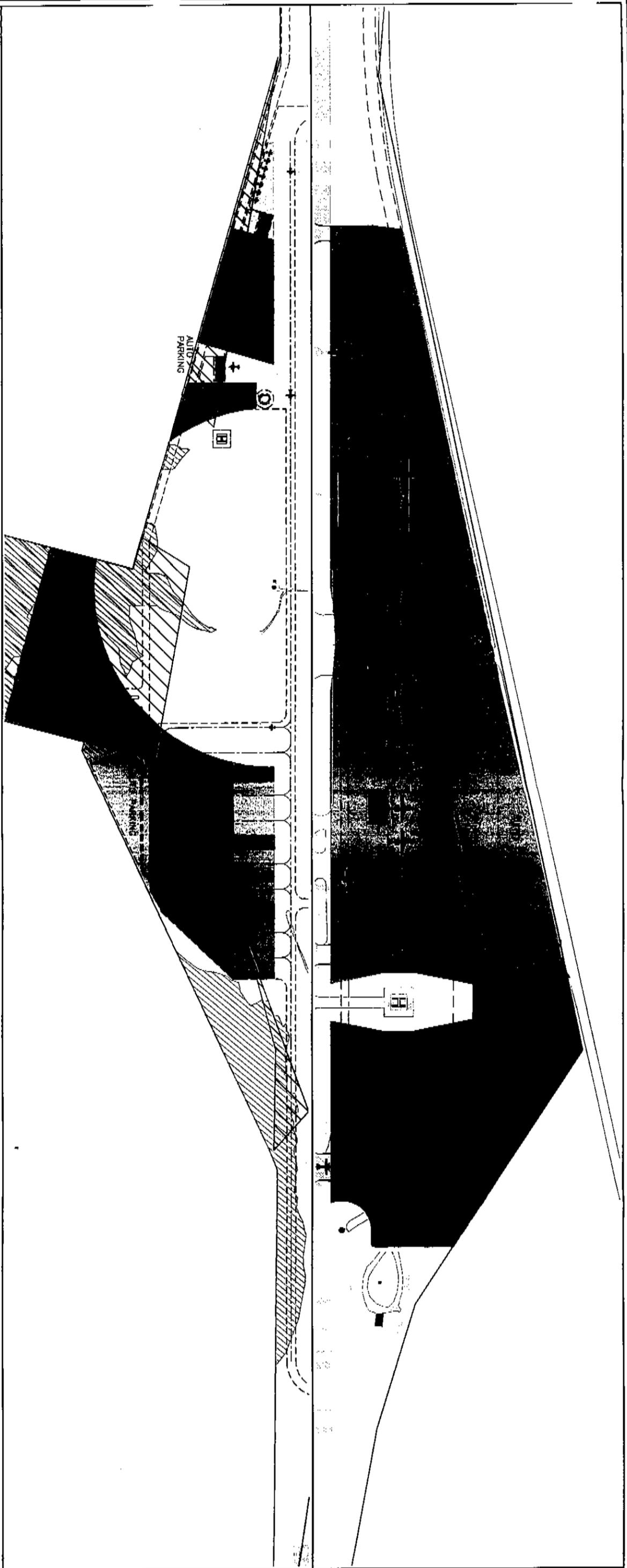
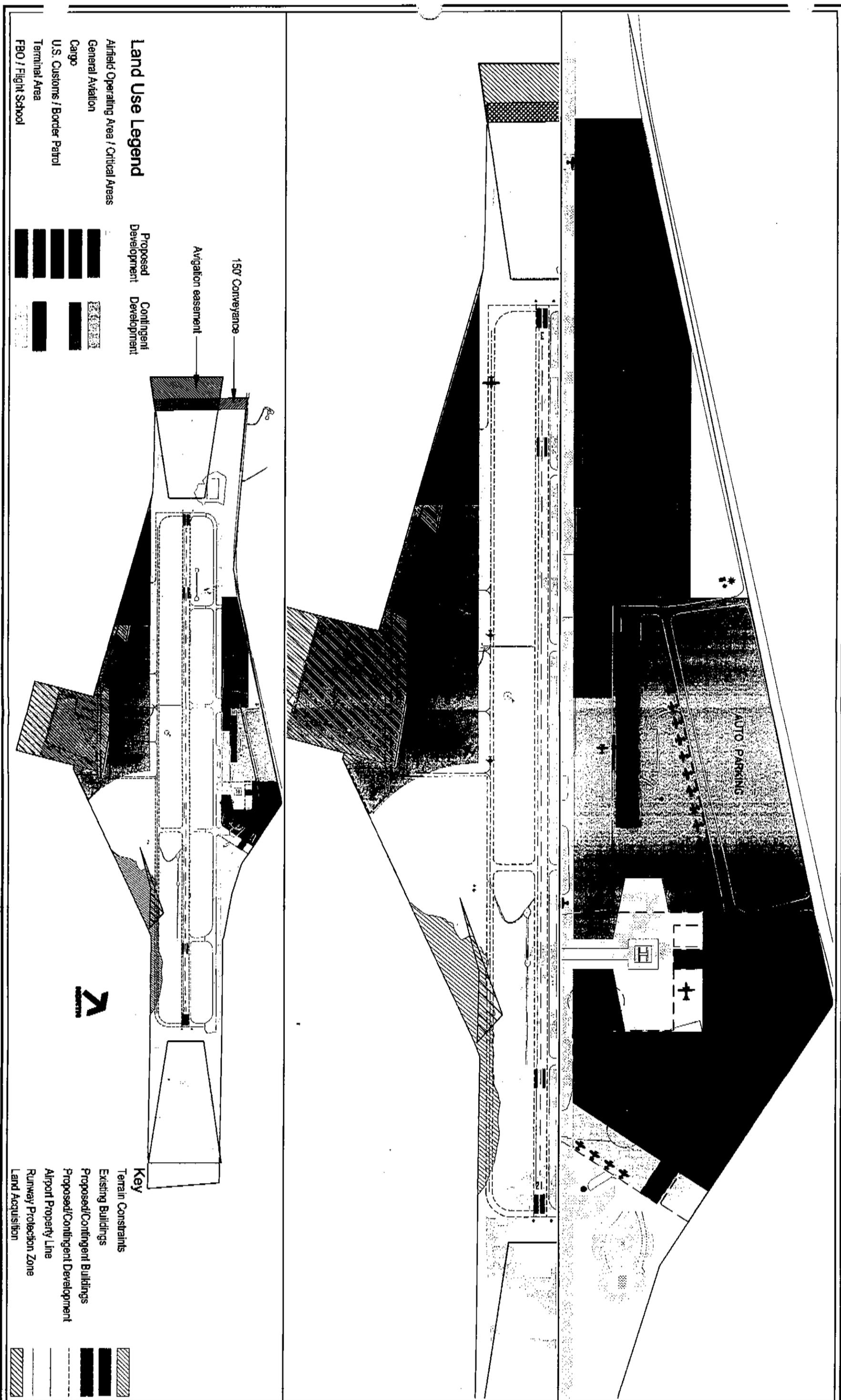


Figure 5-5 Alternative 5 - Relocated TVOR/Terminal Area Northwest



Land Use Legend

- Airfield Operating Area / Critical Areas
- General Aviation
- Cargo
- U.S. Customs / Border Patrol
- Terminal Area
- FBO / Flight School

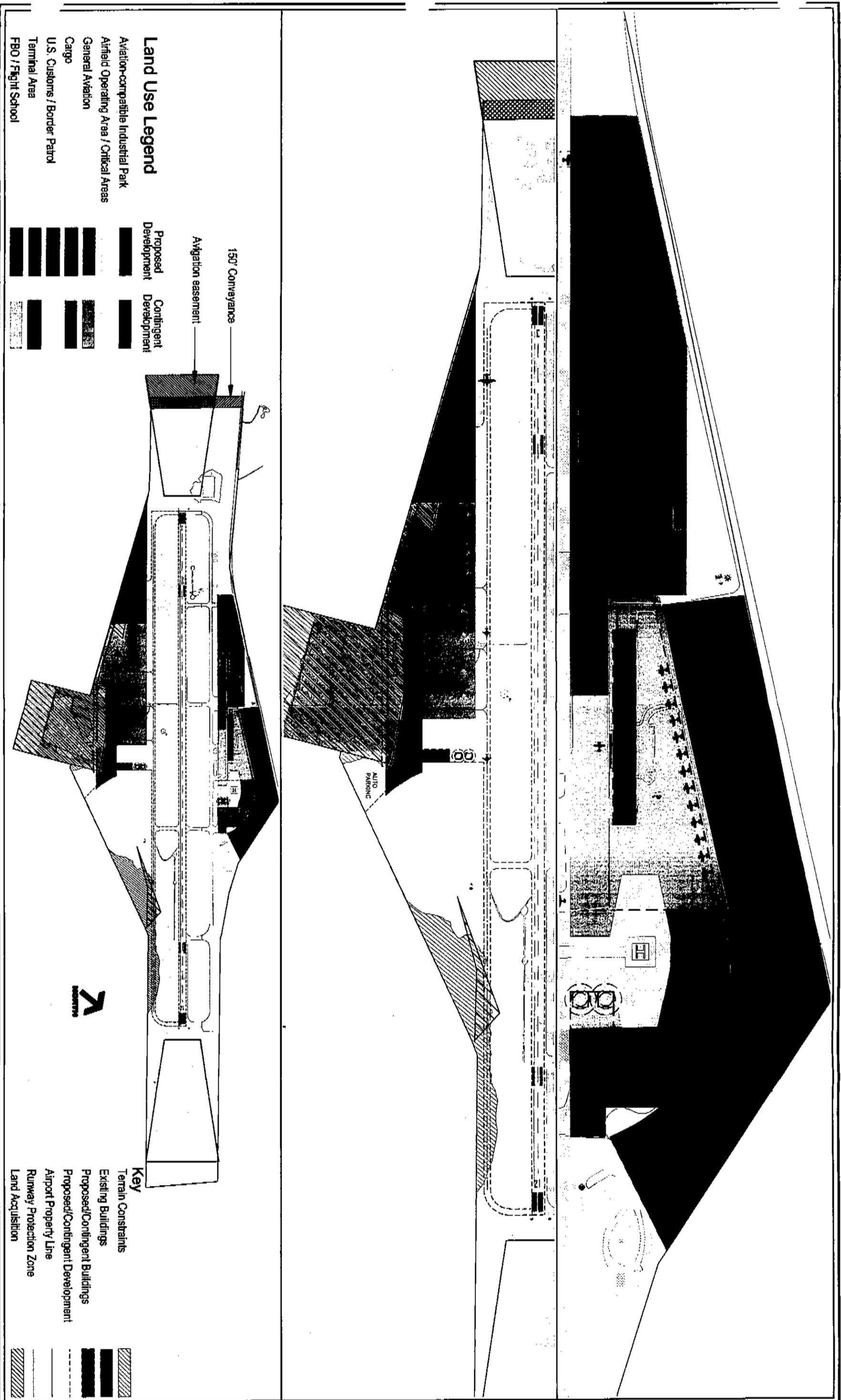
Proposed Development

- Contingent Development

Key

- Terrain Constraints
- Existing Buildings
- Proposed/Contingent Buildings
- Proposed/Contingent Development
- Airport Property Line
- Runway Protection Zone
- Land Acquisition

Figure 5-5 A Alternative 5A - Relocated T/O/R Terminal Area Northwest/Industrial Park

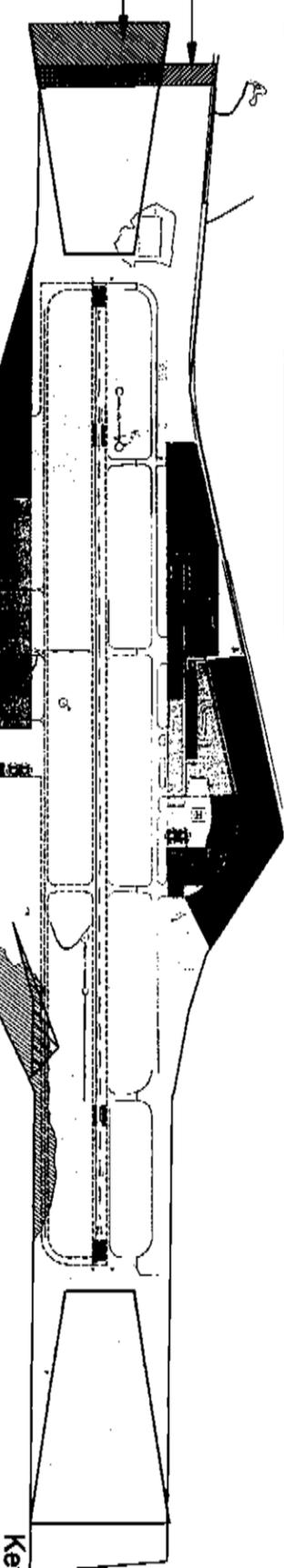


Land Use Legend

- Aviation-compatible Industrial Park
- Airfield Operating Area / Critical Areas
- General Aviation
- Cargo
- U.S. Customs / Border Patrol
- Terminal Area
- FBO / Flight School

- Proposed Development
- Contingent Development

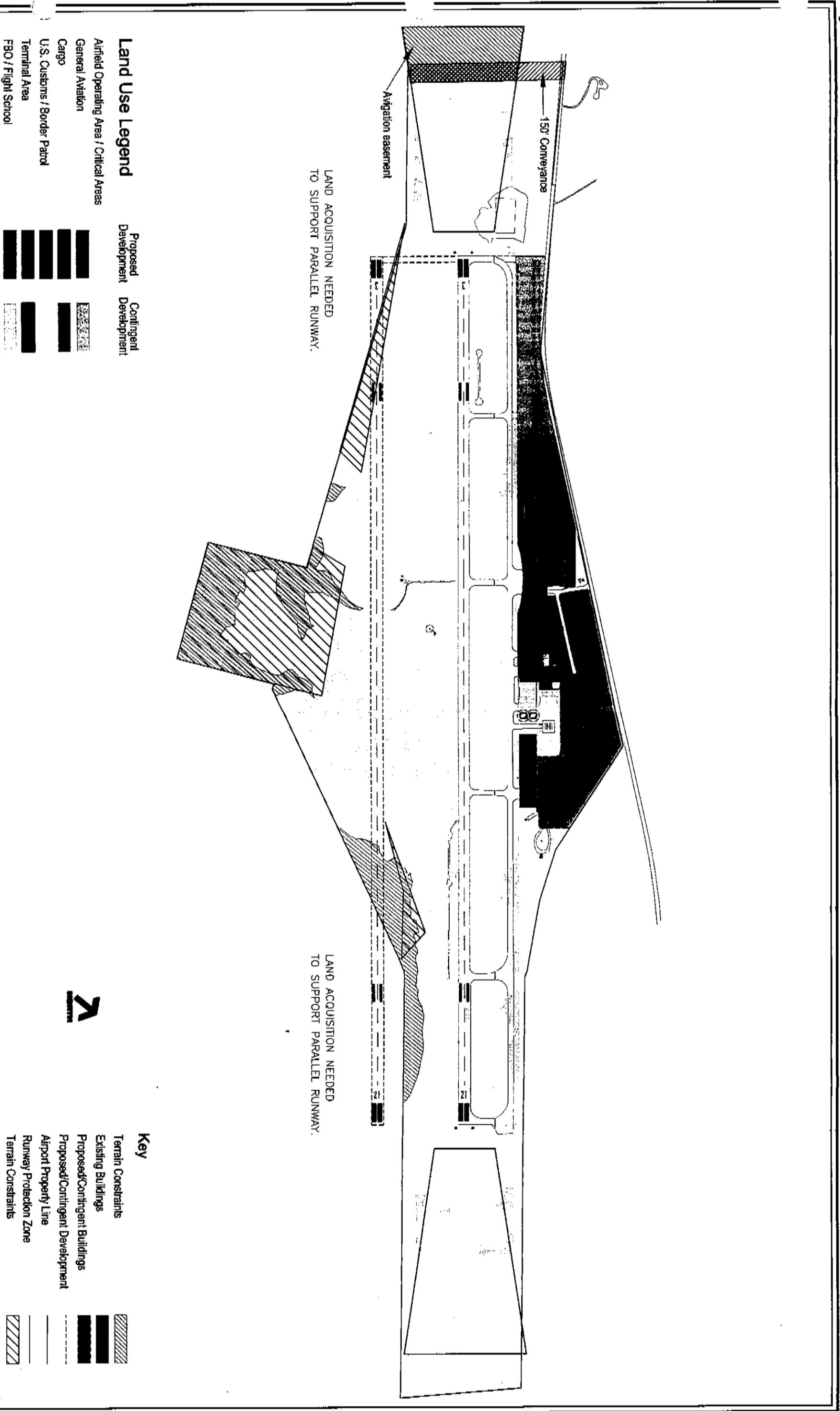
150' Conveyance
 Aviation easement



Key

- Terrain Constraints
- Existing Buildings
- Proposed/Contingent Buildings
- Proposed/Contingent Development
- Airport Property Line
- Runway Protection Zone
- Land Acquisition

Figure 5-6 Alternative 6 - Parallel Runway



Land Use Legend

- Airfield Operating Area / Critical Areas
- General Aviation
- Cargo
- U.S. Customs / Border Patrol
- Terminal Area
- FBO / Flight School

Proposed Development

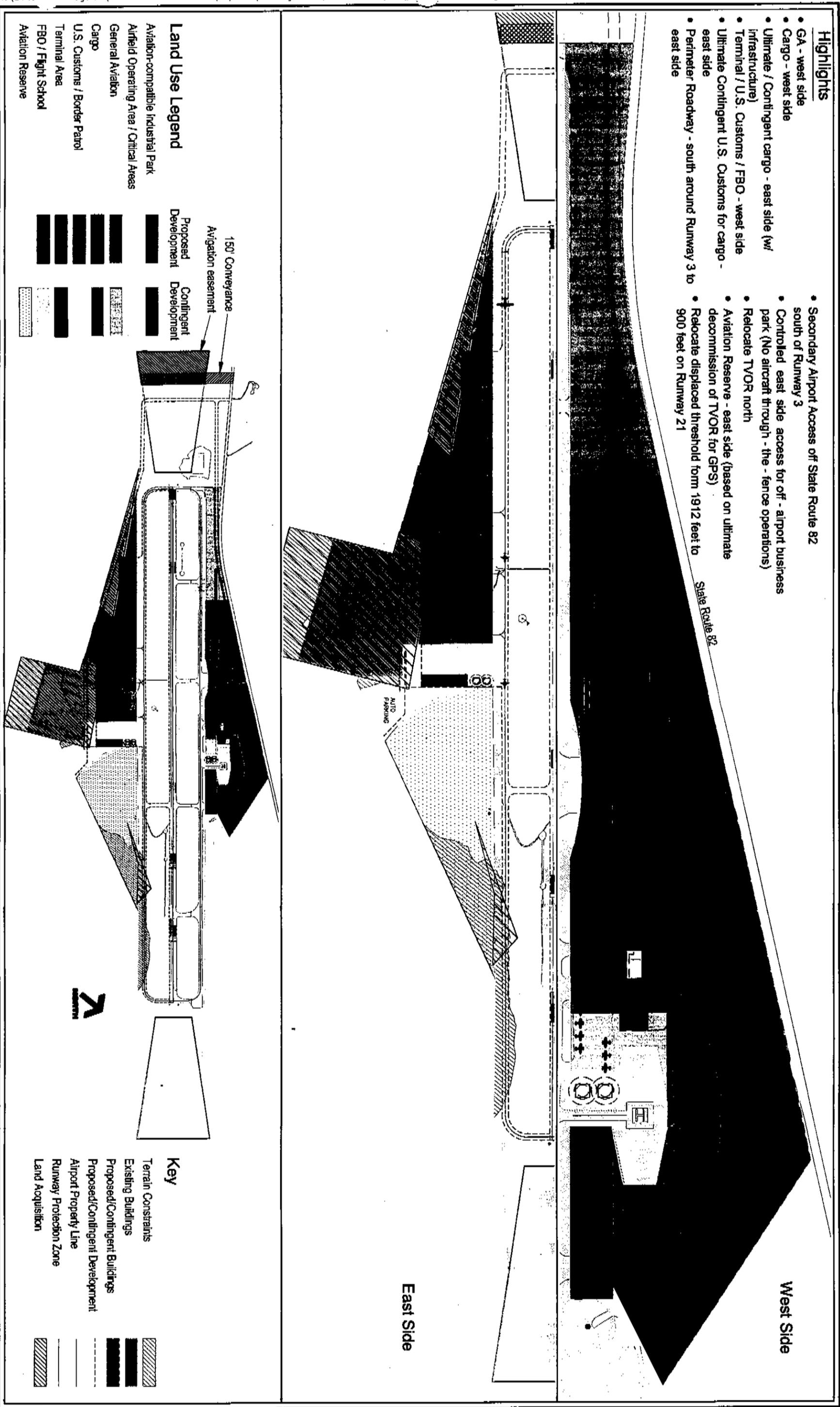
- Contingent Development



Key

- Terrain Constraints
- Existing Buildings
- Proposed/Contingent Buildings
- Proposed/Contingent Development
- Airport Property Line
- Runway Protection Zone
- Terrain Constraints

Figure 5-7 Preferred Alternative



Highlights

- GA - west side
- Cargo - west side
- Ultimate / Contingent cargo - east side (w/ infrastructure)
- Terminal / U.S. Customs / FBO - west side
- Ultimate Contingent U.S. Customs for cargo - east side
- Perimeter Roadway - south around Runway 3 to east side
- Secondary Airport Access off State Route 82 south of Runway 3
- Controlled east side access for off-airport business park (No aircraft through - the fence operations)
- Relocate TVOR north
- Aviation Reserve - east side (based on ultimate decommission of TVOR for GPS)
- Relocate displaced threshold from 1912 feet to 900 feet on Runway 21

Land Use Legend

- Aviation-compatible Industrial Park
- Airfield Operating Area / Critical Areas
- General Aviation
- Cargo
- U.S. Customs / Border Patrol
- Terminal Area
- FBO / Flight School
- Aviation Reserve
- Proposed Development
- Contingent Development
- 150' Conveyance
- Aviation easement

Key

- Terrain Constraints
- Existing Buildings
- Proposed/Contingent Buildings
- Proposed/Contingent Development
- Airport Property Line
- Runway Protection Zone
- Land Acquisition