Chapter 4
Alternatives Analysis

In the previous chapter, airport facilities required to satisfy the demand through the long-range planning period were identified. The next step in the planning process is to evaluate reasonable ways these facilities can be provided. There can be numerous combinations of design alternatives, but the alternatives presented here are those with the perceived greatest potential for implementation.

Any development proposed for a master plan evolves from an analysis of projected needs for a set period of time. Although the needs were determined by utilizing industry-accepted statistical methodologies, unforeseen future events could impact the timing of the needs identified. The master planning process attempts to develop a viable concept for meeting the needs caused by projected demands for the next 20 years; however, no plan of action should be developed that may be inconsistent with the future goals and objectives of the Clark County Department of Aviation (CCDOA), which has a vested interest in the development and operation of North Las Vegas Airport (VGT).

The development alternatives for the airport can be categorized into two functional areas: the **runway** and **airside (hangars, aprons, taxilanes)**. Within each of these areas, specific capabilities and facilities are required or desired. In addition, the utilization of airport property to provide revenue support and to benefit the economic development and well-being of the local area must be considered.

Each functional area interrelates and affects the development potential of the others; therefore, all areas are examined individually and then coordinated as a whole to ensure the final plan is functional, efficient, and cost effective. The total impact of all these factors on the airport must be evaluated to determine if the investment in VGT will meet the needs of the CCDOA and the users of its system of airports, both during and beyond the 20-year planning period.

The alternatives considered later in this chapter will be evaluated by a variety of methods to determine which will best fulfill local aviation needs. With this information, as well as input from various airport stakeholders, a final airport concept can evolve into a realistic development plan.

4.1 SUMMARY OF FACILITY NEEDS

This section summarizes the facility requirements described in Chapter 3 to accommodate forecast demand. **Table 4.1** presents a summary of the primary planning considerations. A detailed explanation for each issue outlined in the table is provided in Chapter Three. Alternatives developed within this master plan seek to accommodate all of these facilities, to the extent practicable.

Table 4.1 | Facility Requirements Summary

Existing Condition	Requirement	Trigger
Runways		
Runway 12R-30L • RDC C-II-5000 • 5,000' x 75' **Runway 12L-30R** • RDC B-II-4000 • 4,199' x 75'	Runway 12R-30L is not in compliance with recently applied RDC C-II-5000 design standards Consider upgrading the parallel runways to higher design standards (C-II & D-III) and extending and widening to better serve the business jet fleet	Airport operations dictate C-II standards need to be met now D-III standards apply with a change in design aircraft when annual operations by AAC D or ADG III exceed 500
Runway 7-25 • RDC B-II-VIS • 5,005' x 75'	Maintain B-II design standards; consider extension options to better serve all aircraft during high crosswind conditions	Annual operations exceeding 500 by aircraft needing an extension
Segmented circle and apron pavement obstruct the 7-25 ROFA and ROFZ	Relocate segmented circle and mitigate apron pavement	Existing condition
Public roads and buildings in existing RPZs	Mitigate RPZ incompatibilities	Existing condition
Taxiways		
Parallel taxiways available for each runway; minimum 240' separation from runway centerline	Increase separation to 300' for C-II runway; increase separation to 400' for D-III runway	Airport operations dictate C-II standards need to be met now Change in design aircraft when annual operations by AAC D or ADG III exceed 500
Two exit taxiways per runway in target areas	Add exits to each runway target area (2,000' to 4,000' from landing threshold)	Existing condition
Hot Spots 1-4[1]	Implement corrective measures	Existing condition
Eight direct access points	Implement corrective measures	Existing condition
Two high-energy runway crossings	Implement corrective measures	Existing condition
Five wide expansive pavement areas	Implement corrective measures	Existing condition
One aligned taxiway	Implement corrective measures	Existing condition
Five run-up aprons; three do not meet TOFA standards	Improve/expand run-up aprons	Existing condition

(Continues on next page)

[1] Since the original publishing of this chapter, the FAA has eliminated hot spots 5 and 6, resulting in four total hot spots at VGT.

Table 4.1 | Facility Requirements Summary (continued)

Existing Condition	Requirement	Trigger
Hangar/Apron & Other		
Airport traffic control tower (ATCT)	Consider increasing ATCT height to 150 feet above ground level	Existing condition
1,153,000 sf of storage hangar capacity	Increase capacity to 1,608,500 sf	Based on tenant/user demand
275,800 sy of apron	Increase capacity to 357,200 sy	Based on tenant/user demand
18 helicopter helipads/parking spaces	Consider locations for vertiport development	Based on tenant/user demand

Notes:
AAC = Aircraft Approach Category
ADG = Airplane Design Group
RDC = Runway Design Code
ROFA = Runway Object Free Area
ROFZ = Runway Obstacle Free Zone
RPZ = Runway Protection Zone
sf = square feet
sy = square yards
TOFA = Taxiway Object Free Area

Source: Coffman Associates

4.2 AIRPORT LAND USE PLANNING

This section documents, at a high level, the land use zoning adjacent to VGT. More detailed information regarding zoning and land uses adjacent to the airport can be found in Chapter 1. In addition to summarizing the existing agreement with the Bureau of Land Management (BLM), ongoing development activities within the City of North Las Vegas are highlighted. Adjacent land uses and zoning will be considered in the evaluation of alternatives developed within this phase of the master plan.

4.2.1 OVERVIEW

Land use planning for areas immediately adjacent to VGT is the responsibility of the City of North Las Vegas and the City of Las Vegas. The City of North Las Vegas adopted their Comprehensive Master Plan in November 2006, with an amendment made in February 2011. The plan includes three specific planning areas: residential neighborhoods, activity centers, and employment districts. VGT is bounded to the north by the Cheyenne North District and to the south by the South District, both of which are categorized as residential neighborhoods. The Cheyenne North District also includes the Cheyenne Technology Corridor, which includes mixed-use development (i.e., office, retail, services, and housing). The city's current land use plan, which was updated in February 2024, identifies the areas immediately adjacent to the airport as community commercial, resort commercial, mixed-use employment, employment, single family residential, multi-family, and mixed-use neighborhood. The City of Las Vegas, which bounds the airport on the west, adopted the 2050 Master Plan in July 2021. Specific plans for the area adjacent to VGT along Rancho Drive include mixed use center, corridor mixed use, and medium density residential.

4.2.2 BUREAU OF LAND MANAGEMENT MEMORANDUM OF UNDERSTANDING

Clark County has a Memorandum of Understanding (MOU) with the United States Department of the Interior, Bureau of Land Management (BLM), that was originally executed September 7, 1999, and then amended on September 6, 2005; June 20, 2006; and December 21, 2010. Under the MOU, BLM is granted 110 acres of undeveloped land at North Las Vegas Airport that includes Las Vegas bearpoppy habitat. In exchange, the BLM agreed to keep 102 acres of land adjacent to Henderson Executive Airport undisturbed

and undeveloped to provide a noise/safety buffer around the airport. This is a long-term agreement that will last for 30 years from the original agreement and automatically renews for a term of 10 years unless one or both parties takes a termination action, which would require a one-year advance notice.

4.2.3 RECENT DEVELOPMENTS

- Simmons Airpark is an industrial complex recently developed east of the airport on Simmons Street. The nine-acre site is seeking various tenants, including distribution centers, offices, and retail stores.

- A 144-lot, single-family subdivision is under development immediately north of the airport along Cheyenne Avenue. The site is approximately 24.3 acres in size. A portion of the Runway 12R runway protection zone (RPZ) extends over this area; however, the subdivision plan shows this area as an undeveloped lot.

- Windsor Commerce Park is an 86-acre industrial park located east of Simmons Street and north of Carey Avenue. This site includes eight logistic facilities, office space, parking, and loading docks.

4.3 OPPORTUNITIES AND CONSTRAINTS

Prior to defining potential alternatives to accommodate forecasted demand, it is important to understand the unique opportunities and constraints present at VGT. The sections below summarize some of the key opportunities and constraints associated with the physical development of the airport to accommodate forecasted demand. For additional information regarding the strengths, weaknesses, opportunities, and threats at the airport, refer to Chapter 1, Section 1.1.4.

4.3.1 OPPORTUNITIES

Las Vegas is the event capital of the world, and with that comes visitors from all over the globe. Some recent examples include Super Bowl LVIII, which was hosted in Las Vegas in February 2024, and Formula 1 races held in Las Vegas in November 2023 and 2024. These events resulted in VGT and other CCDOA airports reaching full capacity in terms of parked/serviced aircraft and operations in the days leading up to and following them. Las Vegas is becoming home to a Major League Baseball team and is in talks to become home to a National Basketball Association team. The opening of the Sphere in 2023 also furthered Las Vegas as a top destination for the biggest entertainers in the music industry. Aviation demand is closely tied to every element of the local economy and all indications are that demand will continue to grow into the future. VGT's location just a few miles north of the Las Vegas Strip makes it a valuable part of Las Vegas' transportation infrastructure. The airport has developable property sufficient to accommodate projected demand, including the introduction of emergent technologies in the aviation industry, such as advanced air mobility (AAM). VGT has every opportunity to support existing and future users and to increase and diversify revenue streams to ensure long-term financial sustainability.

4.3.2 CONSTRAINTS

Potential alternatives for VGT are limited by several physical constraints. There are multiple roadways near the airport, including Cheyenne Avenue to the north, Rancho Drive to the west, Simmons Street to the east, and Carey Avenue to the south. In addition, approximately 110 acres of airport property is designated as a bearpoppy conservation area; another approximately 77 acres of property in the southeast corner contains fissures, which cause challenges for development; and airport property located south of Carey Avenue is used primarily for a detention basin. There are also numerous residential neighborhoods in the vicinity of the airport, particularly those to the north, west, and southeast, which present constraints to development. Vicinity airspace is also a constraint due to the proximity of VGT to Harry Reid International Airport (LAS) and Nellis Air Force Base (AFB). These various constraints must be weighed as part of the alternative's evaluation process.

4.4 EVALUATION CRITERIA

Various airfield alternatives have been prepared to address the facility requirements summarized above. The details of each alternative are described below along with the alternative's associated advantages and disadvantages. Each alternative will be evaluated based on the following factors:

- **Achieved Runway Design Standards |** The forecasts established that business jets within AAC C/D and ADG III are using the airport on a much more frequent basis. Improving the airfield to meet these higher design standards is necessary to ensure VGT can continue to serve in its role as a general aviation reliever. The target design standard for the primary runway is D-III.

- **Achieved Primary Runway Length |** Similar to meeting higher runway design standards, additional runway length is also needed at VGT to serve business jets, particularly during hot weather. The evaluation will consider the full length of the primary runway and the resulting accelerate-stop distance available (ASDA) and landing distance available (LDA) based upon applied declared distances. ASDA and LDA are considered the key declared distances used by pilots when determining whether to operate at an airport and are subject to runway safety area (RSA) standards.

- **Non-standard Airfield Geometry Impacts |** Various non-standard geometry conditions were identified in the facility requirements section, including direct-access points, high-energy area intersections, wide expansive pavements, and hot spots. Each alternative will be evaluated on its ability to meet FAA airfield geometry standards. It should be noted, regarding high-energy area intersections (those occurring within the middle third of a runway), the FAA recommends avoiding these types of intersections; however, because VGT is a multi-runway airport equipped with an airport traffic control tower, mitigation of these intersections is given a lower priority as having fewer crossings or moving the intersections out of the high-energy area is not always feasible and can result in greater inefficiencies.

- **RPZ Incompatibility Impacts |** The FAA prefers that RPZs be cleared of developments that might attract large congregations of people. Each alternative will be evaluated on whether the RPZs are cleared of incompatible development.

- **Airfield Capacity Impacts |** The facility requirements identified a need to increase the number of exit taxiways within the target area (2,000 feet to 4,000 feet from the landing threshold) to provide a benefit to airfield capacity. There are currently two exits in the target area for each runway; ideally three to four would be available to provide a capacity improvement.

- **Other Impacts |** Other impacts on and off airport property are very important to the viability of a given alternative. How a configuration affects airport infrastructure, local roadways, existing businesses, future development, and land acquisition (either in fee title or through an avigation easement) are all important factors to consider.

- **Estimated Costs |** Important to any project is its cost to implement. This criterion is a comparative analysis between the various alternatives and will focus primarily on the amount of new pavement and/or development that would be required. The intention is to understand, at a high level, which alternatives will be most and least costly. Detailed cost estimates are not developed for these alternatives. The alternative that is least costly to implement would receive a '+' rating and the costliest alternative would be a '-' rating. All other alternatives would receive a score of '0'.

4.5 NO-BUILD ALTERNATIVE

The no-build alternative essentially considers making no new capital investments in the airport. Limited maintenance and upkeep would continue so that the airport remains safe for aviation activity. No new hangars or apron area would be planned to be built by the airport sponsor; however, this would not (and could not) include the prohibition of hangar construction by a private entity. The obvious result of the no-build alternative is that the airport would be unable to meet the existing and forecast demand for aviation services in the area. As previously established, based on increases in jet traffic, the airfield needs to be improved to meet C-II design standards at a minimum. Maintaining the airfield to a lower B-II design standard in a no-build scenario is not a viable option.

The primary reason a community might choose a no-build alternative is to ultimately not be bound by the grant assurances associated with the acceptance of airport development grants. Grant assurances are part of the grant package contract to which the airport sponsor commits when accepting a development grant from the Federal Aviation Administration (FAA). As such, airport sponsors are bound to maintain the useful life of the facilities developed or equipment acquired for an airport development project. Useful life is typically a term not to exceed twenty (20) years from the date of acceptance of a grant offer of federal (FAA) funds for a project. There is no limit on the duration of the terms, conditions, and assurances with respect to real property acquired with federal funds.

The CCDOA has received almost $31.3 million in development grants since 2002. These grants represent a direct economic stimulus that has lasting and positive economic impacts. The no-build alternative means the CCDOA would forgo future grants for airport development, which would have a negative economic impact that would become more noticeable over time.

The CCDOA has a vested interest in maintaining and improving airport facilities. Without a commitment to ongoing improvement of the airport, users of the airport will be constrained from taking full advantage of its air transportation capabilities. The unavoidable consequence of the no-build alternative is that the capability of the airport would diminish over time as its ability to serve in its role as a general aviation reliever would deteriorate. This would lead to diminished activity levels and would ultimately negatively impact the local and regional economy. Safety concerns would also arise – especially if necessary, routine maintenance was deferred – and the liability for damage to aircraft or accidents would increase. The long-term consequences of the no-build alternative would be to reduce the quality of the existing airport facilities over time, producing undesirable results. Therefore, the no-build alternative is not a viable development strategy and is not recommended for VGT. It is included in this analysis to serve as a baseline for future environmental study.

4.6 RUNWAY ALTERNATIVES

Runway Configuration Alternative 1 – Figure 4.1

This alternative is a slight modification of the preferred alternative from the 2020 VGT *Runway Incursion Mitigation (RIM) Study*.

- Runway 12R-30L is improved to C-II design standards and extended by 755 feet north and 580 feet south for a full length of 6,336 feet and a width of 100 feet. The difference between this alternative from the 2020 RIM study is that the Runway 12R threshold would be displaced by 1,825 feet in order to shift the RPZ onto airport property and prevent it from extending over Cheyenne Avenue.

- Runway 12L-30R is maintained at B-II design standards and extended to a full-length of 4,408 feet by converting the aligned taxiway beyond the 12L threshold to displaced runway pavement.

- Runway 7-25 is maintained at B-II design standards. No extension is shown for this runway.

- Taxiway B is shifted west to meet the C-II 300-foot separation standard between a runway and parallel taxiway centerline. Several new connecting stub taxiways from Taxiway B to the apron are shown in an offset orientation to eliminate direct access points.

- Taxiway H is shifted south between Taxiway P and Taxiway B to eliminate the taxiway intersection within the middle third of the runway.

- New entrance and bypass taxiways are shown at the end of Runway 12R and 30L, as well as new entrance taxiways at the end of Runway 30R to mitigate the need for aircraft to back-taxi on the runway to use the full length for takeoff. Bypass taxiways allow tower controllers to re-sequence aircraft waiting for departure, which can improve airfield efficiency.

- Hot spot 1 is mitigated by removing Taxiway F and reconstructing Taxiway G with an offset connector to the apron to eliminate the direct access point.

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Runway Data						
	12R	30L	12L	30R	7	25
RDC	C-II-5000		B-II-5000		B-II-VIS	
Runway Length	6,336′		4,408′		5,005′	
Displaced Threshold	1,825′	580′	205′	199′	0′	0′
TORA	6,336′	4,511′	4,408′	4,408′	5,005′	5,005′
TODA	6,336′	6,336′	4,408′	4,408′	5,005′	5,005′
ASDA	5,412′	5,429′	4,408′	4,408′	5,005′	5,005′
LDA	3,587′	4,849′	4,203′	4,209′	5,005′	5,005′

TORA – Take-off Run Available
TODA – Take-off Distance Available
ASDA – Accelerate Stop Distance Available
LDA – Landing Distance Available

LEGEND
- Airport Property Line
- A Taxiway Designation
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Protection Zone (RPZ)
- ADG III Taxiway Object Free Area (TOFA)
- Ultimate Runway Pavement
- Ultimate Taxiway Pavement
- Ultimate Pavement Removal
- Bearpoppy Conservation Area

Convert 205-foot Aligned Taxiway to Displaced Runway
Runway 7/25 5,005′ x 75′
Runway 12L/30R (4,408′ x 75′)
Runway 12R/30L (6,336′ x 100′)
240′
300′
755′ Runway Extension
580′ Runway Extension
574
Valley Dr
W Cheyenne Ave
N Decatur Blvd
N Rancho Dr.
Airport Dr
Perimeter Rd
Thunderbird Field Rd
Sky Haven Dr
W Evans Ave
Citizen Ave
N Simmons St
W Carey Ave
W Lake Mead Blvd
0 800
SCALE IN FEET
Photo: Google Earth 04/2023

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Figure 4.1
RUNWAY CONFIGURATION ALTERNATIVE 1

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- Hot spot 2 is mitigated by the extension of Runway 12R to the north, which helps address the hot spot by shifting the 12R away from the intersection with Taxiway G.
- Hot spot 3 is mitigated by removing Taxiway R, which eliminates the confusing intersection.
- Taxiway E is removed between Runway 7-25 and Taxiway C where it creates a non-standard intersection angle near the holdbars for Runway 12L.
- A new partial-parallel taxiway is added 240 feet north from the Runway 7-25 centerline, which improves circulation and access/egress for the Runway 25 end.
- Hot spot 4 is mitigated by removing the holding bay located at the intersection of Taxiways D and A between the parallel runways and replacing it with a new holding bay that is shifted south along Taxiway D away from the taxiway intersections.
- New holding bay designs are also included at the north and south ends of Taxiway B.

From a cost perspective, this alternative has the least amount of new runway/taxiway pavement, which makes it the least costly runway alternative. Some pros/cons of this alternative from an engineering and constructability perspective include:

Pros
• Minimal grading is required for the Runway 12R extension. • Runway 12R-30L ADG remains the same, which reduces the need for a full width pavement strengthening/reconstruction. • No impacts to the detention basin.
Cons
• Does not meet the recommended RDC D-III-5000 design standards. • Runway 12R-30L length is the shortest of each alternative considered, providing the least amount of utility. • The Runway 12R displaced threshold results in a reduced landing distance available compared to what is currently available. • Realignment/relocation of Taxiway B would include the need for a new parallel storm drain system. • Approximately 15,000 cubic yards (cy) of fill would be needed for the extension of Runway 30L.

Runway Configuration Alternative 2 – Figure 4.2

This alternative considers the following:

- Runway 12L-30R is improved to RDC D-III-4000 design standards. The runway is extended by 1,932 feet south and the aligned taxiway converted to usable displaced threshold to achieve a full length of 6,336 feet. The runway is also widened to 100 feet to meet the higher design standard. To maximize runway length, this alternative applies an engineered material arresting system (EMAS) bed to the 30R end. EMAS is a crushable material that decelerates aircraft during an excursion incident without damaging the landing gears. The implementation of an EMAS bed reduces the C/D-II/III RSA/ROFA beyond the end of the runway requirement from 1,000 feet to 600 feet. The EMAS bed shown in the alternative is 300 feet long and is set back from the end of the runway with a 300-foot blast pad in between. The 30R threshold is displaced by 1,343 feet to keep the RPZ from extending over a neighboring residential neighborhood.

- The Runway 12L-30R south extension crosses Carey Avenue, which requires the road to be closed between Simmons Drive and the entrance to the Walmart parking lot. A new connector road between Carey Avenue and Lake Meade Boulevard is shown on airport property and is intended to improve circulation in that area because of the closure of a portion of Carey Avenue. The extension also impacts the detention basin on airport property.

- Runways 12R-30L and 7-25 are maintained at their current length, width, and design standards.

- Taxiways P and D are relocated to a 400-foot separation distance from Runway 12L-30R to meet D-III standards. Several new exit taxiways are added to both parallel runways to increase exit factors for the runways, allowing aircraft to exit the runways faster, reducing runway occupancy times, and improving capacity.

- Exit taxiways that intersect in the middle third of each runway are offset to mitigate intersections within the high energy area of the runways. As mentioned previously, the elimination of high energy area intersections is recommended by the FAA, but is not required.

- Portions of Taxiways C, F, and H are removed to mitigate direct access points. No-taxi islands are applied prior to Taxiways K, L, and M to mitigate direct access points on the east apron.

- Portions of Taxiway E and C are removed where they intersect with Taxiway A and P to address non-standard intersection angles.

- Hot spot 1 is mitigated by reconfiguring Taxiways G and F and adding new Taxiway A pavement connecting the two. The direct access point is eliminated as well.

- Hot spot 3 is mitigated by removing Taxiway A pavement between the intersection with Taxiway B and Taxiway D.

Runway Data						
	12R	30L	12L	30R	7	25
RDC	B-II-5000		D-III-5000		B-II-VIS	
Runway Length	5,000′		6,336′		5,005′	
Displaced Threshold	0′	0′	205′	1,343′	0′	0′
TORA	5,000′	5,000′	4,993′	6,131′	5,005′	5,005′
TODA	5,000′	5,000′	6,336′	6,336′	5,005′	5,005′
ASDA	5,000′	5,000′	6,336′	6,336′	5,005′	5,005′
LDA	5,000′	5,000′	6,131′	4,993′	5,005′	5,005′

TORA – Take-off Run Available
TODA – Take-off Distance Available
ASDA – Accelerate Stop Distance Available
LDA – Landing Distance Available

LEGEND
- Airport Property Line
- A Taxiway Designation
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Protection Zone (RPZ)
- ADG III Taxiway Object Free Area (TOFA)
- Ultimate Runway Pavement
- Ultimate Taxiway Pavement
- Ultimate Roads/Parking
- Ultimate Pavement Removal
- Bearpoppy Conservation Area

Convert 205-foot Aligned Taxiway to Displaced Runway
Relocated Segmented Circle Lighted Wind Cone
W Carey Avenue Closure
Blast Pad
EMAS Bed
1,932′ Runway Extension
Proposed Realignment for Carey Ave.
Runway 7/25 5,005′ x 75′
Runway 12L/30R (6,336′ x 100′)
Runway 12R/30L (5,000′ x 75′)
400′
400′
Valley Dr
W Cheyenne Ave
Thunderbird Field Rd
Sky Haven Dr
W Evans Ave
N Simmons St
Citizen Ave
574
N Decatur Blvd
N Rancho Dr.
Airport Dr.
Perimeter Rd
W Carey Ave
W Lake Mead Blvd

SCALE IN FEET
0 800
Photo: Google Earth 04/2023

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The Carey Avenue Realignment Connection alignment shown on this exhibit is strictly conceptual and would only be considered if the Clark County Department of Aviation (CCDOA) secures any required easement(s) on a voluntary basis from the adjacent property owner(s). CCDOA has other conceptual alignment options that remain entirely within CCDOA-owned property. Nothing in this exhibit shall be construed as a commitment to acquire any property interest by condemnation. This conceptual exhibit does not grant, reserve, or imply any present or future property rights or limitations on current use.

Figure 4.2
RUNWAY CONFIGURATION ALTERNATIVE 2

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- Hot spot 4 is mitigated by eliminating the holding bay at the intersection of Taxiway A and D. A new holding bay in this area is not proposed.

- New holding bays are added at the south end of Taxiways D and P (near the ultimate end of Runway 30R), as well as at the east end of Runway 25.

Cost considerations for this alternative are that it includes more pavement construction than the first alternative but still less than others, so it would have low to mid-level costs compared to the other alternatives. Some pros/cons of this alternative from an engineering and constructability perspective include:

Pros
• Minimal grading is required for the Runway 12L extension. • Minimal construction impacts to Runway 12R-30L, Taxiway B, and west development.
Cons
• Requires relocation of detention basin and drainage culverts. • Realignment/relocation of Taxiways P and D would require a new parallel storm drain system. • Approximately 225,000 CY of fill is required for the Runway 30R extension. • Requires realignment of Carey Avenue and cover/depression of adjacent culvert. • Requires relocation of the Runway 12L localizer. • Full reconstruction of Runway 12L-30R and associated taxiway pavements for ADG III aircraft loads.

Runway Configuration Alternative 3 – Figure 4.3

This alternative considers the following:

- Improving both parallel runways to higher design standards. Runway 12R-30L meets C-II standards and Runway 12L-30R meets D-III standards. Having two runways capable of accommodating larger/faster business jets on a regular basis would greatly expand the utility of the airport and relieve congestion at other county airports, especially during high activity events.

- Runway 12R-30L is extended 286 feet north and 2,620 feet south for a full length of 7,906 feet and a width of 100 feet. EMAS beds are applied to both ends of the runway to reduce the RSA/ROFA requirement beyond the end of the runway from 1,000 feet to 600 feet. Both thresholds are displaced to keep the RPZs from extending beyond airport property.

- Runway 12L-30R is extended 1,932 feet south and 205 feet north (via the conversion of the aligned taxiway to usable displaced threshold) for a full length of 6,336 feet and width of 100 feet. The 12L threshold is displaced a total of 800 feet to shift the RPZ off the Cheyenne hangar complex, and the 30R threshold is displaced 1,343 feet to keep the RPZ from extending off airport property. An EMAS bed is applied to the 30R end to maximize the length potential of the alternative.

- The extension of both runways results in the closure of a portion of Carey Avenue and impacts the detention basin on airport property.

- Runway 7-25 maintains B-II design standards but is extended by 400 feet east and 800 feet west for a full length of 6,205 feet. The added length provides more utility for the airport during high crosswind conditions. The entirety of the 800-foot extension to the west is a displaced threshold to keep the RPZ on airport property.

- Taxiways D and P are relocated to a 400-foot separation distance from the Runway 12L-30R centerline in order to meet D-III standards.

- Taxiway B is also relocated to a 300-foot separation distance from the Runway 12R-30L centerline to meet C-II standards.

- A dual-parallel taxiway is added to mirror Taxiway B between Taxiways G and K in the terminal area. Dual-parallel taxiways improve circulation efficiency in high activity areas. The application of the dual-parallel taxiway results in several existing facilities and a significant amount of apron pavement obstructing the taxiway object free area (TOFA). Obstructing facilities and apron pavement are shown to be removed.

- All direct access points are eliminated by either offsetting connecting taxiways or implementing no-taxi islands.

- High-energy area taxiway intersections are maintained in this alternative. As mentioned previously, the elimination of high energy area intersections is recommended by the FAA, but is not required.

Runway Data						
	12R	30L	12L	30R	7	25
RDC	C-II-5000		D-III-5000		B-II-VIS	
Runway Length	7,906′		6,336′		6,205′	
Displaced Threshold	1,355′	1,265′	800′	1,343′	800′	0′
TORA	6,641′	6,551′	4,993′	5,536′	6,205′	5,405′
TODA	7,906′	7,906′	6,336′	6,336′	6,205′	6,205′
ASDA	7,906′	7,906′	6,336′	6,336′	6,205′	6,205′
LDA	6,551′	6,641′	5,536′	4,993′	5,405′	6,205′

TORA – Take-off Run Available
TODA – Take-off Distance Available
ASDA – Accelerate Stop Distance Available
LDA – Landing Distance Available

LEGEND
- Airport Property Line
- Taxiway Designation
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Protection Zone (RPZ)
- ADG III Taxiway Object Free Area (TOFA)
- Ultimate Runway Pavement
- Ultimate Taxiway Pavement
- Ultimate Pavement Removal
- Bearpoppy Conservation Area
- Ultimate Facility Relocation

400′ Runway Extension
Convert 205-foot Aligned Taxiway to Displaced Runway
Runway 7/25 (6,205′ x 75′)
Relocated Segmented Circle Lighted Wind Cone
No-Taxi Island
W Carey Avenue Closure
Blast Pad
EMAS Bed
Runway 12L/30R (6,336′ x 100′)
400′
400′
Blast Pad
1,932′ Runway Extension
EMAS Bed
Runway 12R/30L(7,906′ x 100′)
EMAS Bed
286′ Runway Extension
2,620′ Runway Extension
Blast Pad
800′ Runway Extension
DRAFT - FOR DISCUSSION PURPOSES ONLY

Valley Dr
W Cheyenne Ave
W Evans Ave
N Simmons St
Citizen Ave
Thunderbird Field Rd
Sky Haven Dr
574
N Decatur Blvd
N Rancho Dr.
Airport Dr
Perimeter Rd
W Carey Ave
W Lake Mead Blvd

SCALE IN FEET
0
800
Photo: Google Earth 04/2023

Figure 4.3
RUNWAY CONFIGURATION ALTERNATIVE 3

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- Portions of Taxiway C and E are removed to eliminate non-standard intersection angles.
- Hot spot 1 is mitigated by reconfiguring Taxiways G and F and developing a new connection point to the apron.
- Hot spot 2 is mitigated by extending Runway 12R north, forcing pilots to make a turn onto Taxiway B to reach the ultimate end of the runway.
- Hot spot 3 is mitigated by the elimination of Taxiway A pavement between Taxiway B and the end of Runway 12L.
- Hot spot 4 is mitigated by the elimination of the holding bay along Taxiway D between the runways. A new holding bay in this area is not proposed.
- New holding bays are added at the south end of both parallel runways and at the east end of Runway 7-25.

This alternative presents the most new runway and taxiway pavement and would require the reconstruction of Runway 12L-30R to meet higher weight bearing capacity, which results in the highest cost of all the runway alternatives presented. Some pros/cons of this alternative from an engineering and constructability perspective include:

Pros
• Minimal paving/grading is required for the Runway 12L extension. • Balanced cut/fill for Runway 7-25 extensions.
Cons
• Requires relocation of detention basin and drainage culverts. • Realignment/relocation of Taxiways P, D, and B would require a new parallel storm drain system. • Approximately 678,000 CY of fill is required for the Runway 30R/30L extensions. • Requires closure of Carey Avenue and cover/depression of adjacent culvert without a realignment of the road to West Lake Meade Boulevard. • Requires relocation of the Runway 12L localizer. • Full reconstruction of Runway 12L-30R and associated taxiway pavements for ADG III aircraft loads.

Runway Configuration Alternative 4 – Figure 4.4

This alternative considers the following:

- Improving both parallel runways, like in Airfield Alternative 3 but with the difference coming from improving Runway 12R-30L to D-III standards and Runway 12L-30R to C-II standards. To accomplish this, both runways must be shifted east by approximately 160 feet. This is necessary to meet the D-III runway/taxiway centerline separation standard of 400 feet while also keeping Taxiway B and minimizing impacts to existing hangar/apron facilities. The runways must also maintain a minimum 700-foot separation from each other so that they can be used simultaneously during visual flight rule (VFR) conditions. Connected actions to shifting the runways would be the need to relocate all navigational aids, lighting systems, signage systems, and visual approach aids.

- Runway 12R-30L has a full length of 8,076 feet and width of 100 feet.

- Runway 12L-30R is 5,970 feet long and 100 feet wide.

- Thresholds for both runways are displaced to keep the RPZs from extending beyond airport property. EMAS beds are applied to the ends of 12L, 30R, and 30L to maximize runway length.

- The extension of both runways results in the closure of a portion of Carey Avenue and impacts the detention basin on airport property. A new connector road between Carey Avenue and Lake Meade Boulevard is shown on airport property and is intended to improve circulation in that area because of the closure of a portion of Carey Avenue.

- Runway 7-25 is maintained at B-II standards, but is extended 400 feet east and 800 feet west for a full length of 6,205 feet. The added length provides more utility for the airport during high crosswind conditions. The entirety of the 800-foot extension to the west is displaced threshold to keep the RPZ on airport property.

- Taxiway F is eliminated, and Taxiway G is reconfigured to force pilots to taxi around the ultimate end of Runway 7 to access Runway 12R, which is less efficient but mitigates hot spots 1 and 2.

- Taxiway A pavement is eliminated from Taxiway B to Taxiway C, which mitigates hot spots 3 and 4.

- Direct access points from the aprons are also eliminated by removing connecting taxiways and constructing new taxiways to the shifted parallel runways. No-taxi islands are applied prior to Taxiways K, L, and M to mitigate direct access points on the east apron.

- New holding bays are shown at the south end of the parallel runways and near both ends of Runway 7 and 25.

Runway Data						
	12R	30L	12L	30R	7	25
RDC	D-III-5000		C-II-5000		B-II-VIS	
Runway Length	8,076′		5,970′		6,205′	
Displaced Threshold	1,418′	1,400′	230′	1,316′	800′	0′
TORA	6,676′	6,658′	4,654′	5,740′	6,205′	5,405′
TODA	8,076′	8,076′	5,970′	5,970′	6,205′	6,205′
ASDA	8,076′	8,076′	5,970′	5,970′	6,205′	6,205′
LDA	6,658′	6,676′	5,740′	4,654′	5,405′	6,205′

TORA – Take-off Run Available
TODA – Take-off Distance Available
ASDA – Accelerate Stop Distance Available
LDA – Landing Distance Available

LEGEND
- Airport Property Line
- Taxiway Designation
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Protection Zone (RPZ)
- ADG III Taxiway Object Free Area (TOFA)
- Ultimate Runway Pavement
- Ultimate Taxiway Pavement
- Ultimate Roads/Parking
- Ultimate Pavement Removal
- Bearpoppy Conservation Area

400′ Runway Extension
W Evans Ave
N Simmons St
Citizen Ave
Thunderbird Field Rd
Sky Haven Dr
Valley Dr
W Cheyenne Ave
Runway 7/25 (6,205′ x 75′)
Relocated Segmented Circle Lighted Wind Cone
No-Taxi Island
W Carey Avenue Closure
Blast Pad
EMAS Bed
Runway 12L/30R (5,970′ x 100′)
300′
Runway 12R/30L(8,076′ x 100′)
400′
Blast Pad
EMAS Bed
Blast Pad
EMAS Bed
574
N Decatur Blvd
800′ Runway Extension
N Rancho Dr.
Airport Dr
Perimeter Rd
W Carey Ave
Proposed Realignment for Carey Ave.
W Lake Mead Blvd

0 800
SCALE IN FEET
Photo: Google Earth 04/2023

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The Carey Avenue Realignment Connection alignment shown on this exhibit is strictly conceptual and would only be considered if the Clark County Department of Aviation (CCDOA) secures any required easement(s) on a voluntary basis from the adjacent property owner(s). CCDOA has other conceptual alignment options that remain entirely within CCDOA-owned property. Nothing in this exhibit shall be construed as a commitment to acquire any property interest by condemnation. This conceptual exhibit does not grant, reserve, or imply any present or future property rights or limitations on current use.

Figure 4.4
RUNWAY CONFIGURATION ALTERNATIVE 4

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This alternative requires the construction of two new runways and a significant amount of new taxiway pavement, resulting in mid- to high-level costs compared to the other runway alternatives. Some pros/cons of this alternative from an engineering and constructability perspective include:

Pros
• Minimal paving/grading is required for the Runway 12L extension. • Balanced cut/fill for Runway 7-25 extensions.
Cons
• Requires relocation of detention basin and drainage culverts. • Realignment/relocation of Taxiways P, D, and B would require a new parallel storm drain system. • Approximately 678,000 CY of fill is required for the Runway 30R/30L extensions. • Requires realignment of Carey Avenue and cover/depression of adjacent culvert. • Requires relocation of the Runway 12L localizer. • Full reconstruction of Runway 12L-30R and associated taxiway pavements for ADG III aircraft loads.

Runway Configuration Alternative 5 – Figure 4.5

This alternative considers the following:

- A similar 160-foot shift of the parallel runways to the east as presented in Alternative 4. The shift is necessary to accomplish meeting the D-III runway/taxiway separation standard of 400 feet. Connected actions to shifting the runways would be the need to relocate all navigational aids, lighting systems, signage systems, and visual approach aids.

- Runway 12R-30L has a full length of 6,860 feet and width of 100 feet, which maximizes the length while avoiding impacts to the detention basin at the south end of airport property. EMAS beds are applied to both ends of the runway to reduce the RSA/ROFA requirement beyond the end of the runway from 1,000 feet to 600 feet.

- The Runway 12R and 30L thresholds are displaced appropriately to keep the RPZs from extending beyond airport property.

- Runway 12L-30R is constructed at 4,300 feet long and 75 feet wide, meeting B-II design standards. The Runway 12L threshold is displaced by 230 feet to provide proper approach surface clearance over the ultimate parallel taxiway north of Runway 7-25.

- Runway 7-25 is maintained at its current length and width, also meeting B-II design standards.

- Taxiway D is reconstructed and shifted 200 feet east to meet the 400-foot separation distance from Runway 12R-30L.

- A new connector road, which would be located on airport property, is intended to improve circulation between Lake Meade Boulevard and Carey Avenue because of the closure of a portion of Carey Avenue, which is needed to allow for the development of the new Runway 12R-30L.

- Taxiway P is reconstructed at a 240-foot separation distance from Runway 12L-30R.

- A portion of Taxiway H is shifted south (between Taxiway P and B) to provide an offset that forces pilots to make a turn prior to entering the runway when traveling in either direction.

- Taxiway C is removed and new 90-degree connectors are added to provide access to the Runway 12L threshold.

- Direct access points are mitigated by eliminating connectors and/or applying no-taxi islands.

- Hot spot 1 is mitigated by reconfiguring the alignment of Taxiways G and F.

- Hot spot 2 is mitigated by the extension of Taxiway B.

- Hot spots 3 and 4 are mitigated by the removal of a portion of Taxiway A pavement between Taxiway B and Taxiway C and the holding bay on Taxiway D.

Runway Data						
	12R	30L	12L	30R	7	25
RDC	D-III-5000		B-II-5000		B-II-VIS	
Runway Length	6,860′		4,300′		5,005′	
Displaced Threshold	1,418′	200′	230′	0′	0′	0′
TORA	6,660′	5,442′	4,300′	4,300′	5,005′	5,005′
TODA	6,860′	6,860′	4,300′	4,300′	5,005′	5,005′
ASDA	6,860′	6,860′	4,300′	4,300′	5,005′	5,005′
LDA	5,442′	6,660′	4,070′	4,300′	5,005′	5,005′

TORA – Take-off Run Available
TODA – Take-off Distance Available
ASDA – Accelerate Stop Distance Available
LDA – Landing Distance Available

LEGEND

- Airport Property Line
- Taxiway Designation
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Protection Zone (RPZ)
- ADG III Taxiway Object Free Area (TOFA)
- Ultimate Runway Pavement
- Ultimate Taxiway Pavement
- Ultimate Roads/Parking
- Ultimate Pavement Removal
- Bearpoppy Conservation Area

Valley Dr
W Cheyenne Ave
Runway 7/25 (5,005′ x 75′)
Thunderbird Field Rd
Sky Haven Dr
W Evans Ave
N Simmons St
Citizen Ave
W Carey Avenue Closure
Relocated Segmented Circle Lighted Wind Cone
240′
300′
Runway 12L/30R (4,300′ x 75′)
Blast Pad
EMAS Bed
Runway 12R/30L(6,860′ x 100′)
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N Decatur Blvd
N Rancho Dr.
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Perimeter Rd
W Carey Ave
Proposed Realignment for Carey Ave.
W Lake Mead Blvd

0 800
SCALE IN FEET
Photo: Google Earth 04/2023

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Figure 4.5
RUNWAY CONFIGURATION ALTERNATIVE 5

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- Taxiway E is reconfigured and extended from Runway 7-25 to Taxiway P.
- New holding bays are proposed at the south end of Taxiway P and at the east end of Runway 25.

This alternative reduces the amount of new runway/taxiway pavement compared to most of the other alternatives resulting in low to mid-level costs compared to the other runway alternatives. Some pros/cons of this alternative from an engineering and constructability perspective include:

Pros
• No improvements within the existing detention basin requiring its relocation. • Maintains the Taxiway B alignment and lessens construction impacts to existing west hangar/ apron development.
Cons
• Approximately 176,000 CY of fill is required for the Runway 30L extension. • Requires realignment of Carey Avenue and cover/depression of adjacent culvert. • Requires relocation of the Runway 12L localizer and glideslope. • Full reconstruction of Runway 12R-30L and associated taxiway pavements for ADG III aircraft loads.

4.6.1 RUNWAY CONFIGURATION ALTERNATIVES SUMMARY

The runway configuration alternatives are summarized and compared by the evaluation criteria in **Table 4.2**.

TABLE 4.2 | Runway Configuration Alternatives Summary

	ALTERNATIVES				
	1	2	3	4	5
RDC	C-II	D-III	D-III	D-III	D-III
Primary Runway Length (ft)	6,336	6,336	7,906	8,076	6,860
Accelerate Stop Distance Available (ASDA) (ft)	5,429	6,336	7,906	8,076	6,860
Landing Distance Available (LDA) (ft)	4,849	6,131	6,641	6,676	6,660
Airfield Geometry	Mitigates most issues; maintains Taxiway A acute-angled intersections and high-energy intersections	Maintains Taxiway A acute-angle intersection; high-energy intersections offset	Mitigates non-standard conditions; requires removal of hangar facilities to clear TOFA	Mitigates non-standard conditions; maintains high-energy intersections	Mitigates non-standard conditions; maintains high-energy intersections
RPZs	Cheyenne Ave and Carey Ave in RPZs	Cheyenne Ave in 12L/12R RPZs; Cheyenne hangar complex impacted	No incompatibilities	Hangar within 12L RPZ; no other incompatibilities	No incompatibilities
Capacity	2/3 exits in target area	2/3 exits in target area	3 exits in target area	3 exits in target area	3 exits in target area
Other	No impact on vicinity roads or developments	Portion of Carey Ave closed; impacts detention basin; new connecting road between Carey Ave and Lake Mead Blvd	Portion of Carey Ave closed; impacts detention basin	Portion of Carey Ave closed; impacts detention basin; new connecting road between Carey Ave and Lake Mead Blvd	Portion of Carey Ave closed; new connecting road between Carey Ave and Lake Mead Blvd
Cost Consideration	+	0	-	0	0

Source: Coffman Associates analysis

4.7 AIRSIDE ALTERNATIVES

Strategizing the development of new airside (hangars, aprons, and taxilanes) facilities is entirely dependent on how the runway and taxiway systems are improved. It is in the best interest of the airport to develop new airside facilities so that a natural segregation of users occurs. Segregating the larger business aircraft from smaller aircraft results in a safer and more efficient operating environment. The existing core airside facilities at VGT are focused primarily on the west side of the airfield, including the terminal facility, hangar developments, aprons, and specialty aviation service operator (SASO) facilities. For example, if Runway 12R-30L is improved to accommodate larger business aircraft, it would make sense for the west side of the airfield to be focused on facilities and services to accommodate business aircraft while the east side could be developed with facilities and services accommodating smaller aircraft.

The CCDOA has determined that advanced air mobility (AAM) integration will be focused on a 226-acre CCDOA-owned site south of Sloan, as opposed to the general aviation airports. For this reason, the master plan will not identify specific areas for AAM development at VGT.

4.8 ALTERNATIVES SUMMARY

The process utilized in assessing airport alternatives involved a detailed analysis of planning period facility requirements, as well as the growth potential for airport property. Current airport design standards were considered at each stage of development.

Several development alternatives have been presented. After review by the planning advisory committee (PAC), technical advisory committee (TAC), the CCDOA, and the public, a recommended concept will be presented in the next chapter. The resulting plan will represent an airport facility that fulfills safety and design standards.