



## MEMO

**TO:** Susan St Cyr, PE, SAAS SDP Project Manager  
**FROM:** John van Woensel  
**SUBJECT:** New Airport Implementation Process Overview  
**DATE:** October 26, 2018

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## PURPOSE

The purpose of this technical memorandum is to provide general information on the topic of developing a new airport on a new site. It generally describes the process, the required steps, associated time line, order of magnitude cost, and what a new airport would most likely look like. The high-growth scenario of the San Antonio International Airport's Strategic Development Plan 20-year forecast, which is under review by the FAA, was extrapolated to 2068 for the purpose of defining the needs that a new airport would have to accommodate. There are no recommendations regarding a new airport concept and no research was undertaken regarding potential new airport sites in the greater San Antonio area.

## EXECUTIVE SUMMARY

- Because of the high cost of establishing a new commercial service airport, it is not financially feasible to use private funding. The Federal Aviation Administration (FAA) will assist with some level of funding once justification has been established.”
- The FAA's site selection and planning process for a new airport begins with establishing in an FAA-approved planning process, that an existing airport site cannot be expanded to meet long-term regional aviation needs.
- Based on the timeline of the steps needed to approve other major airport projects in the United States that are partially federally funded, it would likely take at least 15 to 20 years to open a new airport from the start of a site selection process.
- Approximately five to six thousand acres would be the minimum area required for a new airport to serve the San Antonio region's long-term aviation needs. This is based on a minimum airfield of two independent, widely-spaced parallel (approximate separation of 5,000 feet) air carrier runways, required (FAA) safety zones, an assumed midfield 63-gate passenger terminal complex, access road and transit corridor, as well as airport support and tenant facilities. The land requirement could be slightly reduced if the airport were a second, supplemental facility rather than a new single San Antonio airport to replace the existing airport.
- Cost is difficult to estimate without a selected site and development plan, but considering rough order of magnitude costs of airport facility project in the United States and the cost of land outside the San Antonio metro area, new airport cost could range from \$5 to \$10 billion or more (in 2018 dollars).



## NEW AIRPORT DEVELOPMENT PROCESS:

Generally, the search for a new airport site is started if it is determined that the existing airport cannot be expanded to meet the long-term future demand. In the United States, the cost of construction of a new airport is generally prohibitive without FAA funding participation and no commercial service airports have been built without FAA-funding assistance. Since federal funding will be needed, this technical memorandum therefore focuses on describing the FAA's process for establishing the need for a new airport, selecting a site, and implementing a new airport. It is assumed that the new airport will be larger and replace the existing airport. The existing airport would then be closed and reused for other purposes<sup>i</sup>. Potential alternative paths to establish a new airport are described toward the end of this technical memorandum. The following general steps apply to developing new airport projects with FAA funding assistance:

### AIRPORT MASTER PLANNING

The FAA-guided process to determine how to best plan for accommodating future airport needs is called "airport master planning". This process serves to forecast future aviation demand and associated airport needs and whether or when those needs can no longer be met at the existing airport site. Generally, the FAA considers 20 years the longest reasonable planning horizon. Once an airport has completed an approved FAA master plan, the planned projects from these studies are eligible for funding from the FAA's Airport Improvement Program (AIP). All planned eligible projects are subject to additional environmental and financial approvals. Planned airport projects can range from expansions of tenant areas, to airport access road improvements, to large projects such as a new passenger terminal or runway extensions, and property acquisition.

The ongoing San Antonio Airport System (SAAS) Strategic Development Plan (SDP) will meet and exceed the FAA's requirements for an airport master plan and will forecast the region's aviation needs for the next 50 years. This planning horizon was chosen by the SAAS to explore if the existing airport location can be made to meet the region's ultimate aviation needs; specifically, to project whether the site might run out of the ability to sufficiently expand beyond 20 years.

### SITE SELECTION STUDY

If it is established in an FAA-accepted master plan that an existing airport cannot be expanded to meet long term aviation needs, the next step is to start a new airport site selection effort.<sup>ii</sup> A site selection study process would start with the definition of the overall requirements of the future airport facilities that the site would have to be able to accommodate. Initial criteria that can be used to identify and evaluate different potential sites and to determine if each can function as an airport and meets the needs of the community and users include driving and transit access time for the passengers and a minimum land area.

Given the large land requirement for a new airport, it is possible no sites can be identified that are both large enough and offer reasonable access travel time for the passengers. It is therefore important to analyze where passengers originate in the region and are destined to travel to in the future.

Once preliminary sites have been identified, an evaluation would be conducted to screen out those with the most obvious shortcomings. Initial screening factors typically include topography and geotechnical considerations, natural and man-made obstructions, airspace, accessibility,



environmental impacts, and development costs. If any sites are eliminated from further consideration, thorough documentation of the objective reasons for that decision is essential for the project to successfully undergo subsequent environmental processing.

The remaining potential sites would then undergo a detailed comparison using comprehensive evaluation criteria. While the criteria may vary, the following would be considered at a minimum:

- Operational capability – The site should provide the operational capability necessary to serve the defined role of the airport and the needs of its users.
- Capacity potential – If the new airport is needed to provide additional capacity, the capability of the site in providing long-term capacity growth is important.
- Ground access – An important factor is the ability of the users to get to and from the airport easily and in a timely manner.
- Development costs – Simple order of magnitude cost estimates are useful in determining the financial feasibility of building a new airport.
- Environmental consequences – The potential environmental impacts, including noise, associated with a new site may be critical to gaining approval.
- Planning – Consistency with area-wide planning.

## **AIRLINE SUPPORT**

At some point early during the planning process, it is critical to obtain airline support as they are key airport tenants and would share in the direct and indirect cost of the new airport development. They would help pay for the new airport through terminal rentals and airfield charges (landing fees). Airlines, as for-profit business enterprises, would only be interested in relocating if they supported the need for a new airport, the proposed development plan, and the general lease terms. In the United States, airlines cannot be made to relocate to another airport.

## **DETAILED SITE PLANNING AND FEASIBILITY**

The detailed site-specific airport planning in the form of a master plan would occur after the recommended site would have received preliminary approval by the FAA. Such preliminary site information would include local updated wind data, an aviation activity forecast, identification of the critical aircraft, required runway dimensions, type of instrument approach capability needed, total acreage and minimum dimensions required of the site. Upon approval of detailed site planning, the airport would be included in the National Plan of Integrated Airports by the FAA, which makes it eligible to continue as a project and FAA funding<sup>iii</sup>.

## **ENVIRONMENTAL REVIEW**

The site ultimately selected and planned in more detail will be subject to environmental review and approval under the National Environmental Protection Act (NEPA), which in the case of a new commercial service airport, entails an Environmental Impact Statement (EIS). This process will scrutinize the need for the new airport, evaluate the sites studied in the selection process (including those that were dismissed), and compare them against a no-build scenario. Local support for the project is important, and without it, the EIS would most likely not be successfully completed and the project would stall. All projects associated with the proposed new airport will be considered in the impact evaluation, including impacts caused by the construction of the airport, its access road, transit access, and airspace. The alternatives analysis serves to select the alternative that meets the long-term need with the least environmental impact. As such, it will consider options to expand the existing airport to the extent possible. The FAA, rather than the



city or a state agency, leads the NEPA process, which currently requires approximately 36 months to complete, if no complications arise. The NEPA process focuses on project justification, avoiding impacts, minimizing those that cannot be avoided, and lastly, mitigating remaining impacts. After unavoidable impacts are identified and planned to be minimized, commitments will be made on specific environmental mitigation measures. A successful EIS results in an FAA Record of Decision that allows the project to proceed.<sup>iv</sup>

## **BENEFIT COST ANALYSIS (BCA)**

The planning and construction of a new airport is eligible for FAA funding, if it was accepted by the FAA in the planning process described above. For the project to proceed beyond the planning stage with FAA funding participation, BCA is required<sup>v</sup>. This process will compare the economic benefits of the new airport to the construction costs and must find that the benefits exceed the cost (have a BCA ratio greater than 1.00).

## **LAND ACQUISITION**

Next, land acquisition proceeds and may include condemnation of property, assuming the sponsor of the new airport initiative has eminent domain rights in the jurisdiction of the new site. While land acquisition may be started sooner in the anticipation of obtaining the required approvals, land acquisition costs are significant and only those acquisition costs incurred after the EIS Record of Decision are eligible for FAA funding. Given the amount of property that is required for a new airport, land acquisition can take years. Land acquisition costs could be partially offset with the eventual proceeds from the sale of the existing airport property.

## **ENVIRONMENTAL/CONSTRUCTION PERMITTING**

Separate from the NEPA process, development projects also require various environmental and construction permits from local and state agencies. These are requested by the airport sponsor<sup>vi</sup>, usually during the latter stages of NEPA or during the engineering design. Generally, major construction on a large new site has unavoidable environmental impacts that will need to be mitigated and become part of the cost of the project. In addition, FAA Form 7460, Notice of Proposed Construction or Alteration, and FAA Form 7480, Notice of Construction, Alteration, or Deactivation of Airports, which both serve to among other things, identify any airspace hazards to navigation, must be submitted and approved by FAA.

## **ENGINEERING DESIGN**

This step involves converting the plan for the new airport into detailed engineering design that can be used for construction. In the interest of time, design, which would normally take several years, can be started while land acquisition is underway.

## **CONSTRUCTION**

Construction of a new airport includes site work, implementing environmental mitigation measures, and construction of the airport and associated facilities, including access roadway and transit facilities, runways and taxiways, terminals, parking, support facilities, and other facilities. Ultimately, the facility would be commissioned and employees of the airport, airlines, and relocating tenants would be moved to the new facility.



## **AIRPORT CLOSURE**

The existing airport would be decommissioned, released from federal obligations, and reused as a nonaviation facility after the new airport would open.

## **NEW AIRPORT IMPLEMENTATION TIMEFRAME**

In the United States, major airport development projects at existing airports, such as a major new runway or larger project, typically take 10 to 20 years. The larger, more complex and controversial a project is, the longer it tends to take. In addition to the steps in the FAA process described above, factors that affect the implementation timeframe include coming to a regional consensus and political support, procurement of professional and construction services, and litigation. Few new commercial service airports have been built in the United State in the last decade<sup>vii</sup>, and no major ones were. Based on the timeline of other major airport infrastructure projects, it would likely require 15 to 20 or more years from initial planning to commissioning of a new commercial service airport.

## **NEW AIRPORT SITE SIZE**

The property requirement for a new airport will be defined by the need to accommodate the long-term aviation and supporting facilities. The high-growth scenario of the San Antonio International Airport's Strategic Development Plan 20-year forecast, which is under review by the FAA, was extrapolated to 2068, by when projections are for approximately 34 million passengers and 320,000 aircraft movements per year. The following assumptions can be made to arrive at a general new airport size requirement to meet this demand:

## **AIRFIELD**

The system of runways and taxiways is most restrictive and demanding in terms of property required and therefore is considered first. The runways must be oriented to offer acceptable alignment with prevailing winds and within existing airspace constraints. The airfield also includes required safety setbacks alongside the runways and especially off the end of each runway (2,500-foot-long runway protection zones start 200 feet beyond each runway end). According to FAA's guidance on airport planning and design and on runway capacity, two independent parallel air carrier runways are the minimum requirement to accommodate this level of aircraft movements<sup>viii</sup>. Independent parallel runways are ideally spaced at 4,300 to 5,000 feet, although closer separations of approximately 3,000 to 3,500 feet are possible under certain conditions. For new airport planning purposes, by the time the new airport would open, the length of the runways would need to be approximately 12,500 to 14,000 feet long to accommodate direct service to any location in Europe as well as Asia, by aircraft such as the Boeing B-787/Airbus A-350, Boeing B-777, and future long-haul aircraft currently under development, such as the Boeing B-797.

## **TERMINAL COMPLEX**

To accommodate the projected 2068 passenger activity level of 34 million annual passengers the terminal complex would need to provide approximately 63 passenger gates, and would be approximately 2,100,000 square feet in size. Other facilities in the terminal area would include car parking, rental car facilities, intermodal center/transit access, and support facilities. The most efficient use of the new site would be to place the terminal buildings in between the parallel

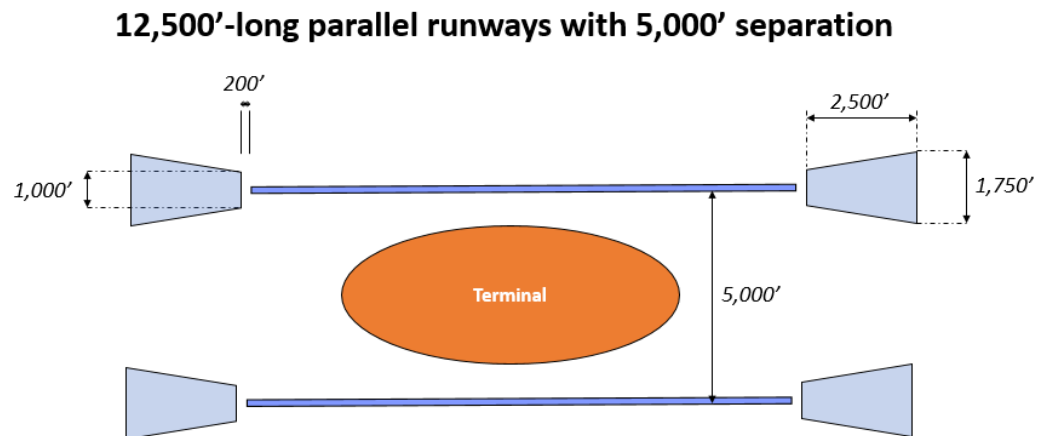
runways. However, the space between the runways is limited and most of the other airport facilities, such as cargo, maintenance/repair/overhaul, fuel, firefighting, airport maintenance, support facilities, fixed based operations, and tenants, would need to be located around the outside of the airfield, depending on the constraints and configuration of the site. Allowing for growth and revenue-generating land uses could add 1,000 or more acres to the project.

## ACCESS

Given that sufficient required available property does not currently appear to exist within the metro area, the new airport site would be located outside the metro area and require a new access roadway would need to be planned and constructed for passengers and employees for the companies operating at the airport. The access road would likely be a six-lane freeway with an approximate right of way width of 130 feet to connect to the existing freeway system. Mass transit access would need to be provided suitable for buses as well as the right of way for a dedicated transit corridor, with a station at the airport.

## ESTIMATED SIZE

It is difficult to estimate the ultimate size of the overall airport footprint as factors beyond those described above also affect it, including space for tenants, future revenue-producing growth, environmental/noise mitigation, availability and configuration of available property, terrain, and the length and complexity of the access roadway system. However, to establishing what the acreage range might be, the following can be said: the airfield portion of the property alone, illustrated below, would require on the order of 3,000 acres. The other components of the airport might add several thousand acres for an order of magnitude total of 5,000 to 6,000 acres.



## POTENTIAL COST OF A NEW AIRPORT:

Because there are many factors that contribute to the cost of developing a new airport site, and without any identified potential sites, no accurate estimate can be established at this time. However, considering a rough order of magnitude of cost an airport facility in the United States and specifically the value for land outside of the San Antonio metropolitan area could range from \$5 to \$10 billion or more (in 2018 dollars). Key contributors would be the cost of land, airfield



and terminal building construction, and development of a new access roadway system, as discussed below:

## **LAND ACQUISITION**

Land Cost in 2018 in the area surrounding the greater San Antonio development area range from a low of \$25,000 per acre in the rural areas south of the metro area, to a high of \$70,000 per acre to the north<sup>ix</sup>. The metro area is expanding rapidly, and land costs can be expected to increase by the time property would be purchased. Using today's high cost estimate and the range of property needed from 5,000 to 6,000 acres, the property costs could be more than \$400 million in 2018 dollars.

## **AIRFIELD**

Construction costs depend on unknown factors including the terrain, geotechnical, drainage, availability of utilities and other factors. However, given the size of the airfield, and considering earthwork, runway and taxiways pavement, internal perimeter road, lighting, etc., these costs could be on the order of magnitude of \$2 billion in 2018 dollars.

## **TERMINAL BUILDING**

Terminal space needs are for approximately 2.1 million square feet, although less than that would be provided on opening day. Today's terminal space costs vary, but for new space in an undeveloped area (likely without utilities), costs are probably about \$1,000 per square foot, or approximately \$2 billion, including adjacent facilities such as short-term parking and aircraft parking apron. Other costs include the access roadway system, new utilities, navigational aids, support facilities such as fire stations, maintenance buildings, certain tenant facilities, and staff office space.

## **ALTERNATIVE AIRPORT DEVELOPMENT SCENARIOS:**

This memo describes the FAA-guided process to establish a new airport. Several alternative paths to new airport development may be possible, including:

## **PRIVATIZATION**

Any form of participation by the private sector can be referred to as privatization. This technical memo focuses on the FAA's process and funding because that is the prevailing method for development of major airport projects, except for terminals. In the United States<sup>x</sup>, airport privatization has mostly taken the form of privately-funded terminals – as they produce revenue that makes new construction financially viable – rather than new airports. Several airports have terminals that can be considered privatized, including New York's LaGuardia and JFK airports, and Branson, Missouri. One US airport is entirely privatized; the Puerto Rico Luis Munoz Marin International Airport, which involved the long-term lease of an existing airport. Other airports, such as Chicago Midway and New York Stewart Airport have attempted privatization but were ultimately unsuccessful. There are currently several existing airports studying privatization. Many

other countries have fully privatized airports, but this involved long-term leases, operating agreements, or sales of existing airports rather than the establishment of new ones.

## **SUPPLEMENTAL AIRPORT**

Instead of a new airport to replace SAT, a smaller airport could be developed to supplement SAT. In such a scenario, SAT would focus on larger aircraft and longer flights by legacy carriers and the supplemental airport would likely offload demand at SAT by accommodating low-fare airlines and charter activity. Examples of such a dual-airport system include Chicago, with supplemental airport Midway, Dallas, with Love Field, Houston, with Hobby Airport, and Los Angeles with Ontario and Burbank Airports. Typically, the metro areas with supplemental airports are very large and have busy and sometimes congested main airports, often international connecting hubs or gateways. In second tier metropolitan areas, a second commercial airport is usually either not viable or very small, as there is not enough demand to support two facilities. The presence of nearby competing markets with their own airports can further dilute the market for each airport. Airlines consider market dilution a negative because it is more efficient to serve a single larger market than a market split between two airports. If the secondary airport would only serve charters or low-cost carriers it would only be viable as an existing airport rather than a newly constructed airport.

## **FORMER MILITARY AIRFIELD**

In some cases, surplus military airfields that have been closed have been converted to commercial airports. Austin's Bergstrom Airport is the former site of an Air Force base, for example. In the past, transfer of surplus federal property could occur for an artificially low cost – sometimes as low as one dollar, but current federal rules require a transfer at fair market value. While this change does away with the opportunity to obtain future airport property at almost no cost, there still would be an advantage in that the surplus property would be available in a single purchase and that the existing military airfield could be used or enhanced. This difference with open-market multiparcel acquisition would reduce the cost, complexity and duration of establishing a second airport at a former military airfield or other surplus military installation. None of the military installations in the San Antonio area is currently slated for closure.

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<sup>i</sup> Examples of this include Austin Mueller and Denver Stapleton airports which were closed and reused.

<sup>ii</sup> Whether an FAA-funding eligible site selection study is justified and started or not, an airport owner could choose on its own initiative to acquire rural property in case of a future airport need, such as Atlanta did in the past prior to agreeing on adding a 5<sup>th</sup> runway at William B Hartsfield International Airport.

<sup>iii</sup> The National Plan of Integrated Airport Systems (NPIAS) is prepared by DOT at the direction of Congress and is available from the FAA.





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<sup>iv</sup> The guidance on NEPA is contained in FAA Orders 1050.1 and 5050.4.

<sup>v</sup> BCA guidance is provided in FAA Order 5100.38, *AIP Handbook*, Chapter 3, Paragraphs 3-14, 3-15, 3-16.

<sup>vi</sup> The sponsor is the entity pursuing the new airport.

<sup>vii</sup> Panama City Airport (FL) opened in 2010 and St. George (UT) opened in 2011.

<sup>viii</sup> Airport design guidance is contained in FAA Advisory Circular (AC) 150/5300-13A and airfield capacity guidance is provided in AC 150/5060-5 Airport Capacity and Delay.

<sup>ix</sup> Based on an informal review of large parcel sales in the areas surrounding the SA MSA.

<sup>x</sup> As stated earlier in the memo, the high cost of establishing a new airport makes doing so without FAA funding financially infeasible.