GUIDEBOOK FOR AIRPORT

MASTER PLANNING

2016

Florida Department of Transportation
Aviation and Spaceports Office

FDOT

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Guidebook Overview

The Florida Department of Transportation (FDOT) Aviation and Spaceports Office, through Florida Statute Chapter 332, developed this Guidebook to assist airport owners/sponsors, operators, and consultants throughout the state develop effective and attainable Airport Master Plans. It is of the highest importance to FDOT that this Guidebook be utilized to help the state meet its airport improvement needs in a logical and cohesive manner.

A structured and measured approach is critical so that improvement recommendations from a master planning process support the airport's role as defined in the Florida Aviation System Plan (FASP) and ultimately become the foundation of the FDOT Joint Automated Capital Improvement Program (JACIP), which is used to program airport development grants.

Florida Statutes (F.S.) Chapter 332 *"It shall be the duty, function, and responsibility of the Department of Transportation to plan airport systems in this state. In carrying out this duty and responsibility, the department may assist and advise, cooperate, and coordinate with the federal, state, local, or private organizations and individuals in planning such systems of airports, and to promote the further development and improvement of air routes, airport facilities, and landing fields and protect their approaches and to stimulate the development of aviation commerce and air facilities."*

Various factors cause an airport to reassess, update, or develop a Master Plan. When an airport decides to begin the master planning process, the owner/sponsor should utilize this Guidebook to develop a comprehensive planning program that can best meet the needs of the airport and will result in a useful and cost-effective product. While planning report elements and graphic requirements are defined in this Guidebook, airport facilities serving different roles and accommodating different levels of activity will not necessarily require the same planning products or level of study. Because each airport's Master Plan is based on the characteristics present at the individual airport, this Guidebook presents information in a manner that allows airports to select the information/components specific to their Master Plan.

As such, this Guidebook should be looked at as a menu of planning tasks and products which can be individually selected to meet comprehensive airport planning needs and requirements. It has been designed to help the user better understand the planning process, the role of stakeholders, the components of the plan, and the approval process. This last consideration is critical as Master Plans must ultimately be submitted to FDOT and as appropriate to the Federal Aviation Administration (FAA) for a final review and conditional approval to be eligible for funding of any projects resulting from the Master Plan. This Guidebook provides references and checklists that users can apply to research a specific planning related subject in detail and ensure appropriate steps have been completed. This Guidebook is the standard in which all Florida airport master planning documents will be produced. Therefore, all Florida Airport Master Plans should be consistent with this Guidebook.

The sponsor is ultimately responsible for approving the Airport Master Plan based on the contents of the plan and accuracy of the data. FAA and FDOT conditionally approve Airport Master Plans and ALPs based on federal and state standards and this Guidebook.

It should be noted that for the remainder of this Guidebook, all references to FDOT are referencing the FDOT Aviation and Spaceports Office and all references to the FAA are referencing the FAA's Orlando Airports District Office (ADO). Additionally, links providing access to the documents referenced throughout this Guidebook are provided in **Appendix 1**.

What's New

This Guidebook was developed to present the most up-to-date thinking on airport master planning in Florida. Since the last version of this document was updated in 2010, there have been numerous changes to Federal and State guidance, regulations, most notably, *FAA AC 150/5300-13A, Airport Design* which reconfigured many design standards and *FAA AC 150/5070-6B, Airport Master Plans* which includes provisions of the FAA Modernization and Reform Act of 2012. Additionally, there has been an overall shift in the way that FDOT develops resources. In recent years, FDOT has adopted a more holistic approach to airport planning that aims to address the overall goals of the aviation system. To support this approach, this Guidebook was developed to assist all Florida airports in their master planning efforts while also providing guidance on attaining the individual goals of each airport.

Purpose of the Guidebook

A Master Plan is the framework of an airport's conceptual short-, medium-, and long-term facility development requirements and strategy based on current and future conditions of the airport and aviation industry, based on a variety of factors considered during the development of the plan. This plan is documented and approved by the local governmental agency or authority, which owns and/or operates the airport, referred to as the sponsor. A Master Plan provides the data and the justification upon which the plan is based in a narrative format and illustrates the ultimate development concepts as an Airport Layout Plan (ALP) drawing. Airport Master Plans are regularly updated to support maintenance, development, expansion, and modernization of existing airports, as well as to justify construction of additional airports needed to accommodate growth in demand for aviation services on a local, regional and national basis.

This Guidebook is intended to provide guidance in the development, preparation, and use of Airport Master Plans in Florida. Step by step instructions carry the user through the preparation of the scope of services for the actual development of the plans. This Guidebook is the standard by which all Florida airport master planning documents will be produced. **Therefore, all Florida Airport Master Plans should be consistent with this Guidebook.**

The Florida Philosophy of Airport Master Planning

Florida's philosophy of airport master planning is to encourage effective airport planning while reducing costs by:

- Only updating the information in the necessary elements when needed
- Focusing on computer-based rather than paper-based Airport Master Plan information, which should be delivered as a product of the project to the airport manager

FDOT's philosophy on Airport Master Planning is provided in:

FDOT Procedure No: 725-040-100 (series), Airport Master Plans

This philosophical approach to airport master planning is consistent with the current state of the industry as reflected in all levels of aviation planning. As such, employment of technological resources is prudent given the need to keep critical airport information up-to-date, as well as to utilize public monies appropriately and efficiently.

The FDOT philosophy of airport master planning allows an airport manager to focus on critical issues in a timely manner without carrying the burden of managing an unnecessarily large planning project.

Traditionally, this type of update could prove to be a time consuming endeavor, whereby the airport could lose funding support due to any delay. However, by utilizing the FDOT approach, an airport manager or staff can typically enact the update and obtain FDOT district office approval more quickly. While it is understood that this process would take longer if the ALP itself had to be altered and approved, even this additional level of effort could be completed in a reasonable timeframe, possibly by airport staff alone, if the required effort was kept at a minimum. FDOT coordination should take place to determine the minimum necessary steps before any are by-passed to sure proper procedures are followed.

Within this master planning philosophy, FDOT essentially views the individual planning elements as separate modules that can be added, deleted, and changed individually at any time as long as the necessary justification is shown for any added projects. Consideration of the impact to the entire Master Plan from changing individual elements should be given, ensuring that the overall Master Plan still remains generally valid. Thus, the Airport Master Plan itself is not a static document, but in fact becomes a continuing, dynamic process that is always evolving and is easy to update as necessary.

Guidebook Components and Structure

The remainder of this Guidebook is divided into three parts: Part 1 – Master Plans: Setting the Stage, Part 2 – Master Plans: Developing the Vision, and Part 3 – Master Plans: Product Development. In general terms, each part includes the following information:

- **Part 1 – Master Plans: Setting the Stage**
  - Introduces basic information on Master Plans as well as summarizes state and Federal guidance on Master Planning
- **Part 2 – Master Plans: Developing the Vision**
  - Details the beginning steps of a Master Plan, including pre-planning and scoping
- **Part 3 – Master Plans: Product Development**
  - Walks users though all of the Master Plan elements and allows them to select the information that will be useful in developing a Master Plan

Using this Guidebook

This Guidebook was developed as a singular reference for Florida airports completing an airport master plan, which is intended to augment the existing resources provided by the FAA. This Guidebook provides Florida-specific information related to the additional requirements of FDOT, State Statutes, Administrative Codes, and other state agencies that are applicable to Florida airports beyond FAA guidance. Additionally, this Guidebook has been developed to unify the process and requirements provided by both the FAA and FDOT. To support the inclusion of Florida-specific information, call-out boxes have been added throughout the Guidebook to highlight Florida-specific information that is pertinent to, and required as part of the master planning process.

Florida Specific Information!

Look for helpful Florida specific information here!

It is not the intent of this Guidebook to duplicate the information provided by the FAA; rather, it was developed to guide Florida airports through the master planning process to ensure compatibility and consistency with both Federal and state guidance.

Part 1 - Master Plans: Setting the Stage

Airport Master Plans

Introduction

Planning for the future of an airport is the fundamental responsibility of any airport sponsor. Generally, airport planning has been described as the employment of an organized strategy for the future management and development of airport policies, facility designs and configurations, financial allocations and revenues, environmental considerations, and organizational structures. The development of a comprehensive and attainable Airport Master Plan is a primary responsibility of a sponsor. This Guidebook lays the foundation for the development of each phase of a Master Plan and provides information on coordination throughout the process.

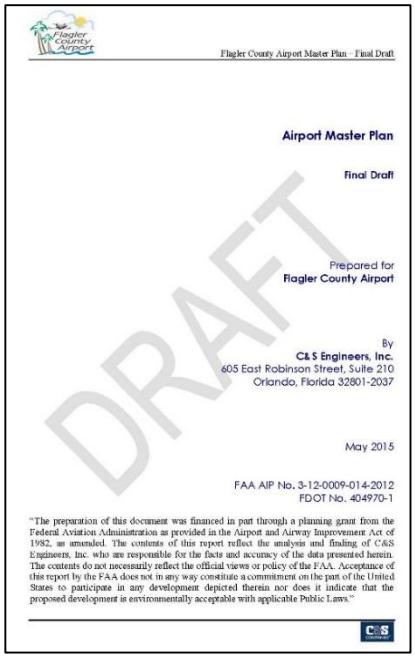
Setting the Stage

At the most comprehensive level, airport planning guides effectual development of airports within the local, state, and national airport system. Structurally, airport planning in Florida is classified in the following manner:

- National Plan of Integrated Airport Systems (National System Plan)
- Florida Aviation System Plan (State System Plan)
  - Individual regional plans for the 9 CFASPP regions
- Airport Master Plans (Individual Airport Plan)

Under this structure, Master Plans are the most localized form of airport planning; however, to understand the relationship between Master Plans; regional, state, and national system plans; their funding mechanisms; and the requirements of a Master Plan, background must be provided that illuminates the Master Planning process. To accomplish this**, Part 1 – Master Plans: Setting the Stage**, of this Guidebook is divided into two sections:

- Airport Master Plans
- State and Federal Guidelines and Regulatory Requirements


Flagler County Airport Master Plan – Final Draft

Airport Master Plan

Final Draft

DRAFT

Prepared for
Flagler County Airport

By
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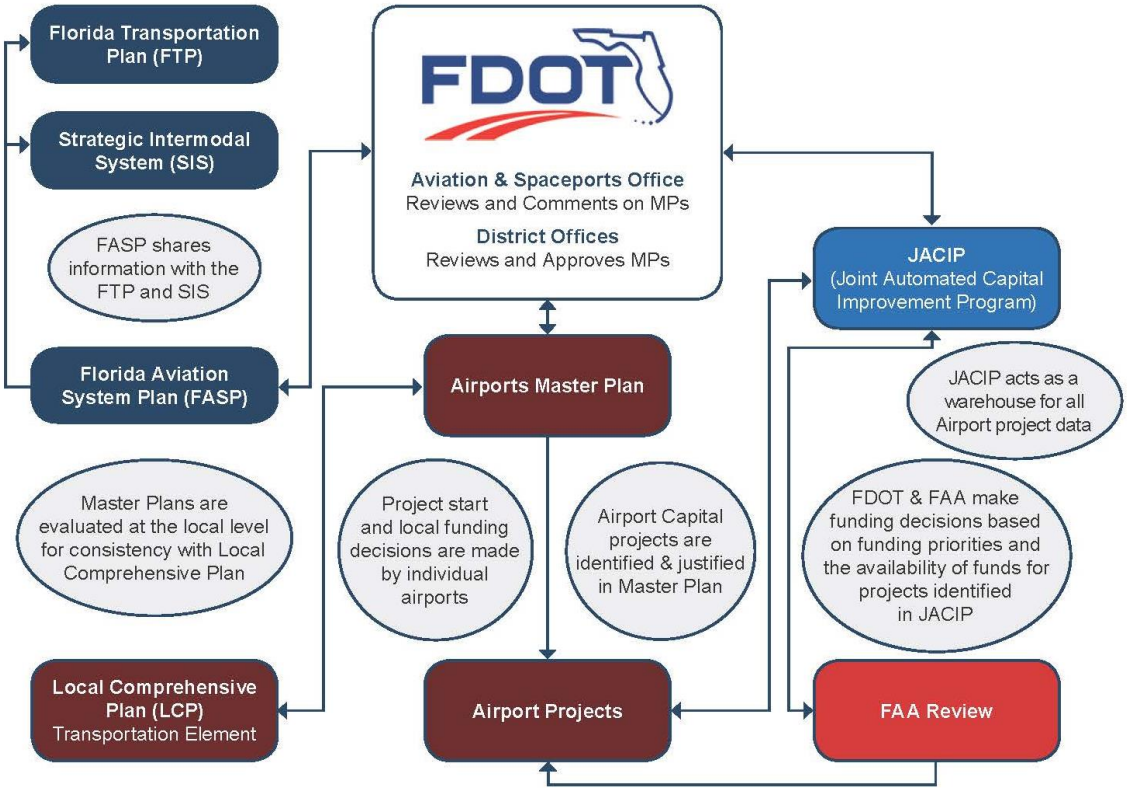
Flagler County Airport Master Plan, 2015.

Together, these sections provide the framework for the preparation of a Master Plan. Further, **Figure 1** displays the interrelatedness and connectivity between airport master plans, the FAA, FDOT, and local governments as well as highlights how airport master plan recommendations are programmed for project funding.

FIGURE 1. FLORIDA AIRPORTS PLANNING PROCESS FLOWCHART



Airport Master Plans

The basis of airport planning at the local or airport level is an Airport Master Plan. At its core, a Master Plan is a comprehensive analysis of an airport that ultimately illustrates the short-, medium-, and long-term development plans to meet the future aviation demand requirements in a safe, sustainable, and cost-effective manner. The elements of a Master Plan vary in complexity and level of detail, depending on the size, function, issues, opportunities, and conditions of the individual airport. A successful Master Plan is presented in a professional format that effectively communicates the research, process, and justification from which the final development plan was created to the airport stakeholders.

FAA Coordination

For federally-obligated airports, extensive coordination with the FAA and its local Airport District Office (ADO) in Orlando is highly recommended as part of any Airport Master Plan project. Though the FAA is only responsible for approving the aviation forecasts, critical aircraft, and the ALP, utilizing the FAA as a resource throughout the process helps to ensure planning consistency and compliance with current standards. As the FAA does not fund projects that are not shown on the ALP, FAA approval of the ALP is critical. It is recommended that FAA approval is obtained during the scoping process to ensure the project begins and ends with the appropriate information. Suggestions for FAA coordination and required approvals are provided throughout this Guidebook.

FDOT Coordination

Coordination with FDOT is imperative at all stages of the master planning process, beginning prior to the scoping effort and through final documentation FDOT is responsible for reviewing all deliverables of a Master Plan and ultimately conditionally approves a plan for adoption. FDOT's conditional approval is important, as a plan cannot be adopted locally if not approved by FDOT. FDOT is unlikely to fund projects not justified through an approved master plan or ALP.

Florida Specific Information!

FDOT is responsible for reviewing all deliverables of a Master Plan and ultimately conditionally approves a plan for adoption.

Utilizing both the FAA and FDOT throughout the planning process is critical for ensuring a successful and appropriate Master Plan scope and project. The FAA relies heavily on FDOT to review draft deliverables to ensure compliance with both FAA and state standards and guidelines. While the FAA can only officially approve the forecasts, critical aircraft, and ALP, FDOT is in a position to provide comment and approve all elements of the Master Plan. This guidance affords greater control of the process, ensuring a higher quality product for the end users. Thus, regardless of the source of funding, both the FAA and FDOT should be consulted prior to beginning the Master Plan scoping process to confirm that an appropriate scope of work is developed. More information on this coordination effort is provided in **Part 2 - Master Plans: Developing the Vision**.

Types of Airport Master Plans

Based on each individual airport's situation and needs, a Master Plan can take a variety of forms. Because of this, the elements of a Master Plan vary in complexity and level of detail, depending on the size, function, issues, opportunities, and constraints of the individual airport. This section introduces the two primary types of Master Planning studies an airport can develop; these include:

- **Master Plans**
  - Master Plan Update
  - "From Scratch" Update and Master Plans
- **ALP**
  - ALP Update with Narrative
  - ALP "Pen and Ink" Changes

Master Plans

FAA Advisory Circular (AC) 150/5070-6B, Airport Master Plans, defines the different types of master plans as:

> *"An airport master plan is a comprehensive study of the airport and typically describes short-, medium-, and long-term plans for airport development. Master planning studies that address major revisions are commonly referred to as "Master Plans," while those that change only parts of the existing document and require a relatively low level of effort tend to be known as "Master Plan Updates." In common usage, however, the distinction refers to the relative levels of effort and detail of master planning studies."*

For the purposes of this section, Master Plans and "From Scratch" Updates are considered the same; however, it is the intent of this Guidebook to provide the guidance necessary for an airport to determine the appropriate type of study that is needed at their airport. In most instances, a Master Plan will include at least some form of the following sections:

- Public Involvement
- Environmental Considerations
- Existing Conditions
- Aviation Forecasts
- Facility Requirements
- Alternatives Evaluation
- Airport Layout Plans (as described below, these can also be completed as a stand-alone project)
- Facilities Implementation Plan
- Financial Feasibility Analysis

A Master Plan study always includes a technical report and an ALP drawing set, in addition to many supplemental deliverables. In terms of elements of the technical report, an Airport Master Plan should contain those listed above, which are discussed in detail in **Part 3 - Master Plans: Product Development.**

Master Plan Update

A Master Plan Update is the most common form of Master Plan. Many airports have completed a Master Plan within the last five to seven years that still reflects similar conditions at the airport. As such, basic data and information such as facility inventory, regional ground access, or ALP data from previous studies can be reviewed and updated for current conditions rather than collecting "from scratch," which reduces the cost associated with data collection tasks. A Master Plan Update should still include all the "traditional" master planning components described in **Part 3 - Master Plans: Product Development** of this Guidebook, but benefits from using sections or information from previous studies.

"From Scratch" Update and Master Plans

A "From Scratch" Update or a Master Plan is conducted at airports that have existing Master Plans that are out of date and no longer reflect the conditions at the airport or airports that have not previously completed a Master Plan. These updates are similar to a "New" Master Plan and include new information and data for all components. It is likely that most "from scratch" Master Plan Updates have components that must be redone entirely while some sections can be updated from the previous Master Plan. A "New" Master Plan document should only be completed by new airports or airports that have never completed a previous Master Plan. In this instance, all data collection and development needs to be completed.

Airport Layout Plans

ALP Update with Narrative

An ALP drawing set is the principle deliverable of all Airport Master Plan efforts as maintaining a current ALP is a legal requirement for any airport that receives Federal or state assistance. In terms of a master planning study and the associated level of effort required to address particular issues, an ALP Update with a narrative report may be an appropriate alternative to a full Airport Master Plan Update. This is particularly true whenever the fundamental assumptions of the previous Master Plan (e.g. major changes in airport activity, improvements that have had unanticipated consequences, etc.) have not changed to any significant degree. Generally, at airports with less than 50 based aircraft, an ALP Update is recommended instead of a full Master Plan. Typically, an ALP Update involves fewer elements than that of a full Master Plan study, but does include the below as defined by *FAA AC 150/5070-6B, Airport Master Plan*: (*Note that if additional steps are required to complete the ALP Update, a full Master Plan study is likely more appropriate*.)

- Basic aeronautical forecasts
- Identification of the basis for the proposed items of development
- Rationale for unusual design features and/or modifications to FAA Airport Design Standards
- Summary of the various stages of airport development and layout sketches of the major items of development in each stage

The narrative report accompanying the ALP drawing set would provide some of these details, such as forecasts, as the details would not be illustrated in the ALP drawing set. A narrative report typically includes the following sections:

- Airport activity forecast that supports the need for the proposed development
- Airport reference code (ARC and also referred to as the "design" aircraft) and Runway Design Code (RDC) on which the proposed development is based
- Rationale for the proposed development (ex. runway length)
- Rationale for any modifications of standards (including an alternatives analysis)
- Development schedule for each stage of development, i.e. 5, 10 and 20-year plan. (This schedule should be based on activity levels, not just the years these levels are forecast to occur)

The FAA's Standard Operating Procedure (SOP) 2.00 establishes procedures for the FAA's review and approval of ALPs. It is recommended that this SOP be followed whenever an airport is making modifications to their ALP along with coordination with the FAA to ensure all applicable components will be included. More information on ALPs can be found in **Part 2 - Master Plans: Developing the Vision** as well as in **Part 3 - Master Plans: Product Development**.

ALP "Pen and Ink" Changes

Almost all Florida airports have FAA-approved ALPs on file; therefore, in most instances, ALPs are completed as ALP Updates. In some cases, informal revisions to an ALP are appropriate. These revisions, called pen and ink changes, are based on small changes such as a new T-hangar or to update an ALP based on as-builts following construction. Pen and ink changes are most commonly minor modifications to individual sheets of the ALP, and do not represent a major change in the information or conditions depicted in the ALP. Pen and ink changes are still required to be reviewed and coordinated through FDOT and the FAA and will require some type of supporting documentation based on the scale of the change.

Products of an Airport Master Plan

The products of the master planning process vary with the complexity of the effort. However, most Master Plans include the following deliverables described below. (Note that these deliverables are described in detail in **Part 3 - Master Plans: Product Development**.)

Master Plan Document

The overall Master Plan document contains the primary technical report that reflects the results of the analyses conducted during the development of the Master Plan. The Master Plan document generally contains the standard Master Plan components including inventory, aviation forecasts, alternatives analysis, and capital improvement plan. For complex studies, interim reports could be produced to facilitate coordination with various government agencies, tenants, users, the public, and other interested parties. Additionally, a summary or executive report is often beneficial to bring together pertinent facts, conclusions, and recommendations for a streamlined review by the public and other stakeholders. Such a report is an excellent place to highlight the economic benefits that flow from the airport to the communities it serves.

Airport Layout Plan Drawing Set

Other than the overall document itself, the ultimate deliverable of an airport Master Plan effort is the ALP drawing set. The ALP depicts existing airport facilities and proposed developments as determined from the planners' review of the aviation activity forecasts, facility requirements, and alternatives analysis. This plan set can vary in the number and types of sheets included depending on the complexity and

requirements of the airport. The individual ALP sheet depicting proposed development at the airport is approved and signed by the airport sponsor and the FAA. When implementing projects on an airport, they must be consistent with current, approved ALP. This requirement is fully explained in Exhibit "C" Aviation Program Assurances, Assurance No: 7 – Consistency with Airport Master Plan and Airport Layout Plan.

Capital Improvement Plan

The Capital Improvement Plan (CIP) includes all projects proposed as part of the master planning effort, including those not eligible for Federal and state funding (ex: maintenance and building repair). The projects shown in the ALP must be broken down into specific projects and time periods and incorporated into the sponsor's CIP which also includes maintenance and repair projects for existing infrastructure. All of the airport's projects must be coordinated with regard to schedule, scope, and sources and uses of funds in order to produce a realistic CIP. The realistic CIP is of the utmost importance as it flows into the planning module of the FAA's System of Airport Reporting (SOAR) for the airport, as well as the FDOT JACIP, which is used to program airport development grants. Airport sponsors are required by Exhibit "C" Aviation Program Assurances, Assurance No: 8 – Airport Financial Plan, to develop and maintain a cost-feasible financial plan to accomplish the proposed improvements in an Airport Master Plan. Later sections of this Guidebook provide more detail on the CIP process as well as the requirements of Exhibit "C" Aviation Program Assurances.

Final Deliverables

As stated previously, FDOT is committed to producing Master Plan work products that are proper, useful, and reflect the current state of the industry in terms of process and technology. Therefore, beyond the standard paper deliverables of the Master Plan technical report and ALP drawing set, electronic copies of all deliverables must be delivered in appropriate formats for future use. At the discretion of the project sponsors, such formats could include those used for publication on internet resources, for use in CAD and/or Geographic Information System (GIS) programs, and for use in various other technological applications.

Standardization of Products - Not Planning

While developing a Master Plan, planners should consider the potential additional costs and inefficiencies of overly creative approaches to a study. The potential inefficiencies that can result from the lack of consistency in approach of deliverables are of particular concern, as multiple airport Master Plan efforts are conducted within Florida every year. It is important to understand that each one of these Master Plan projects must be managed by airport staff, developed by a consultant, and reviewed by FDOT and the FAA. Furthermore, the cost estimates must be entered into the FAA and FDOT capital improvement programs, as well as the statewide Florida Aviation System Plan database, in order to estimate future Florida airport funding needs. As such, any additional effort required for this multi-layered process due to an overly creative planning approach likely results in increased and unnecessary costs.

Therefore, it is anticipated that cost savings can be realized if Master Plan deliverables are standardized as proposed by this Guidebook. A consistency of approach to products affords the airport, its consultants, the reviewing agencies, and the database managers the ability to anticipate the order and format of data resulting from the Master Plans, allowing all to recognize and take advantage of potential efficiencies.

Relationship to Funding

The FAA and FDOT make planning grants available to airport owners/sponsors for airport planning studies. Due to budget constraints, it is important that the airport owner/sponsor work closely with the FAA and/or the FDOT to ensure that the airport-planning project is justified, that the scope of work

reflects the actual planning requirements of the airport, and that the proper steps for securing funding are taken.

Regardless of the source of funding (Federal, State, or Local), the airport owner/sponsor should schedule a meeting with the FDOT and FAA, at which, the justification for the project, its goals, and any special planning issues that the study is anticipated to address should be discussed. This coordination allows the owner/sponsor, FDOT, and the FAA to work as a team to verify the justification and outline a preliminary scope of work specific to the individual project needs and characteristics of the airport.

To assist in understanding the funding process, FDOT developed the *Florida Aviation Project Handbook* to help airports better understand the funding of airport projects in Florida. The primary funding mechanism for planning studies in Florida is the Florida Aviation Grant Program, while Federal funding is provided through the Airport Improvement Program (AIP). The various funding opportunities for airports is discussed in detail in this *Florida Aviation Project Handbook* (www.dot.state.fl.us/aviation/flpub.shtm).

Relationship to Other Planning Efforts

Airport planning is a diverse and dynamic discipline that can encompass all elements of aviation facilities and operations. As such, airport planning is a continuing effort that should be coordinated and integrated in order to ensure that multiple efforts support each other in an efficient and effective manner. Though system plans are briefly introduced, this Guidebook focuses on planning at the individual airport level. Strategic planning is the primary guide for all other planning efforts as it drives the long term vision of the airport and is supported by all subsequent planning efforts. These planning studies and their relationship/correlation to the Master Plan effort are discussed below.

It should be noted that the integration of these different planning studies form a chain of influence. For instance, a Master Plan affects a financial plan through the recommended development, which affects the business plan through the expected cash flow. This interrelatedness of planning activities highlights the importance of understanding how these documents correlate with each other. It is important to recognize that all levels of airport planning play a critical role within their respective areas of analysis. Therefore, they must be thoughtfully integrated in order to ensure the overall success of these multi-layered planning initiatives.

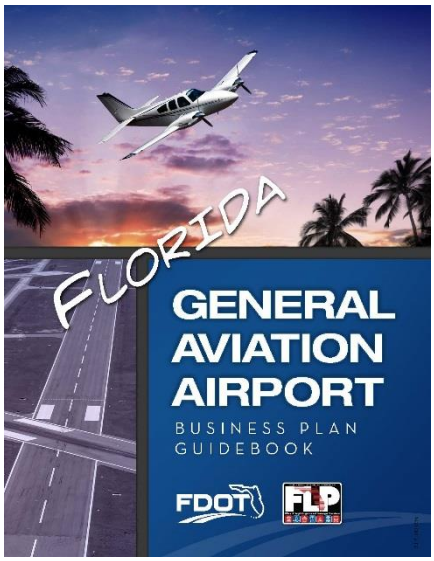
Strategic Plans

Airport strategic planning provides a long term framework that guides an airport towards achieving its future goals. As stated in Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP) *Report 20, Strategic Planning in the Airport Industry*, "In the case of either a single airport or a multiple-airport system, strategic planning for airports projects a future vision for the airport organization, determines strategies and objectives for the growth or prosperity of the organization (including the type of products and services it should provide), and defines how the vision and objectives can be accomplished." A strategic plan's broad scope allows it to analyze an airport in a more comprehensive manner as well as build consensus on key issues prior to beginning the Master Plan process.

At its core, master planning is fully dependent on having a well-developed strategic plan as it relies on that process to define the airport's vision, the customer base, and services to be provided. The primary Master Plan deliverable, the ALP, is intend to provide a development plan that fulfills these identified goals.

Business Plans

An airport business plan lays out the goals and objectives of the airport sponsor that are not directly related to facility requirements as in the Master Plan, but can inform facility-related needs. At its most basic form, a business plan is a document that helps airports become financially self-sufficient. It is not the intention of a business plan to condense the long range planning effort into one year; rather, the business plan seeks to achieve these goals by outlining incremental short term actions that help to achieve the long term goals. Another typical output of a business plan is the economic impact of the airport, which may be used as a promotional tool to illustrate the value of the airport.



FDOT GA Business Plan Guidebook

In Florida, sometimes a business plan component may be added as a section of a Master Plan or Master Plan Update. If conditions warrant it, a business plan may be completed as a stand-alone document, but would not be eligible for Federal funding. If completed as a stand-alone document, integration of any previous or ongoing business planning initiatives must be appropriately incorporated into a Master Plan.

Marketing Plans/Analysis

Marketing plans are developed by airports as a way to promote the facilities and services that are available at an airport. The form of the plan depends on the size and role of an airport. For large commercial service airports, a marketing plan seeks to inform potential passengers of new destinations, passenger amenities, or ease of access. A GA airport may promote fuel available for sale, available hangars, or the presence of a control tower. Marketing plans are not considered part of a Master Plan process, but rather used to promote the vision of the airport as described in the Airport Master Plan and formulated in the Business Plan.

Compatible Land-Use Plans

Land-use planning can encompass both on- and off-airport applications. While on-airport land-use planning is typically addressed within the context of an Airport Master Plan, off-airport land-use planning has become a critical component of an airport's long-term growth and sustainability strategy. Increasingly, off-airport development has had significant impacts on the operational and development capacities of airports, directly affecting on-airport development plans and initiatives. FDOT developed the *Airport Compatible Land Use Guidebook* to assist airports and their local municipalities in understanding the regulations and limitations of land use planning in Florida. This resource is available for download at: www.dot.state.fl.us/aviation/flpub.shtm

Generally, it is incumbent upon the airport to work to maximize the compatibility between its operations and the surrounding uses and activities, including minimization of potential noise impacts and environmental conflicts and establishment of appropriate zoning, overlay districts, and regulations. However, by its very nature, off-airport planning must be accomplished through extensive coordination with local, regional, and state governments, planning agencies, the local populace, and other interested stakeholders. As such, integration of any land-use planning initiatives, both on- and off-airport, should be pursued to help ensure the viability of the overall airport master planning effort. Additionally, future land

use plans or updates should review the recommended development plan of the Master Plan to ensure continuing compatibility.

Airport Master Plans may include planning elements which are inconsistent with the local government comprehensive plan. However, the CIP outlined in the Airport Master Plan should be consistent with the local government comprehensive plan and must be consistent with the Florida Aviation System Plan. Projects in the CIP which are inconsistent with the local government comprehensive plan must be adequately addressed in the narrative portion of the Airport Master Plan and will not be eligible for FDOT funding.

Florida Specific Information!

Chapter 163, F.S requires the future land use element to include surveys, studies and data that address the compatibility of uses on lands adjacent to an airport as defined in Ch. 330, F.S. and consistent with Ch. 333, F.S.

Additionally, Ch. 163, F.S. requires that the future land use element include criteria to be used to achieve compatibility of lands adjacent to an airport as defined in Ch. 330, F.S. and consistent with Ch. 333.02, F.S.

As a means of furthering planning integration, it is strongly suggested that cities and counties address protection of existing and planned airport improvements in the future land use, transportation, intergovernmental coordination and capital improvement program elements of their local government comprehensive plan. It should be noted that the Airport Master Plan is an excellent source of information for these elements, and that much of the data required for the airport-related elements of the comprehensive plan may be taken directly from an Airport Master Plan.

As a final means of suggested planning integration, airport sponsors can elect to officially incorporate their Airport Master Plans into their local governmental comprehensive plan. In such an instance, aviation related developments that have been addressed within the approved Airport Master Plan would be exempt from the Development of Regional Impact (DRI) review process outlined in Chapter 163 and 380 of the Florida Statutes.

Aviation related projects in an approved Master Plan that has been integrated into the local comprehensive plan are exempt from the Development of Regional Impact (DRI) review process, per Chapter 163 and 380 of the Florida

Sustainability Plans

In recent years, the FAA and FDOT have promoted airport sustainability projects to help promote and preserve airports. The FAA has provided support to airports around the United States through the Airport Sustainable Master Plan Pilot Program. This program was developed to assist airports in developing both Airport Sustainability Plans and Sustainability Master Plans. While both documents achieve a similar objective, a Sustainability Master Plan fully integrates sustainability into an airport's long-range plan while an Airport Sustainability Plan is a stand-alone document.

Both plans use baseline assessments of environmental resources and community outreach to identify sustainability objectives that can reduce environmental impacts, realize economic benefits, and improve community relations.

Asset Management

Currently, there is no single standard in to guide the implementation and application of asset management. An internationally recognized documented approach for infrastructure asset management called Publicly Available Specification (PAS) 55 2008, defines asset management as:

"Systematic and coordinated activities and practices through which an organization optimally and sustainably manages its assets and asset systems, their associated performance, risks and expenditures over their lifecycles for the purposes of achieving its organizational strategic plan."

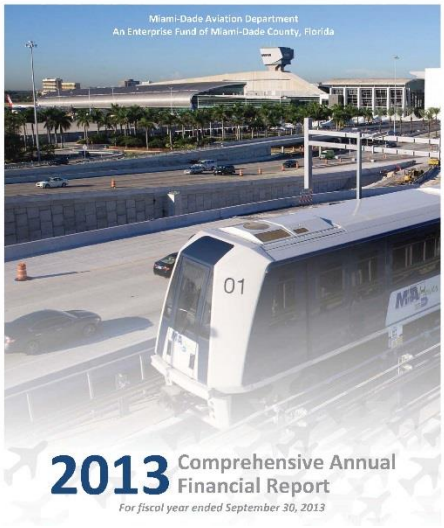
To support NextGen, the FAA now requires airports to utilize GIS when developing and maintaining ALPs. Airport GIS directly benefits the asset management effort by providing the infrastructure and operational data in a streamlined collection effort. Computer models such as Building Information Modeling (BIM) uses 3D models to capture, explore, and maintain consistent and coordinated planning, design, construction, and operational data. This allows the sponsor to have a greater insight into the project needs and constraints that may impact the cost and schedule. By providing this digital data to planners and engineers, sponsors can ensure everyone is utilizing the same data source. Additionally, the BIM systems would allow designers to "visualize" the project within the existing airport infrastructure to better ensure constructability.

Examples of utilizing asset management in real time at an airport would be noticing that a certain section of lighting has an underlying issue based on the number of work orders being placed or having road signs automatically direct passengers to a different parking lot at 9:00 AM when it is known that lot is typically full by 9:30 AM. By building a model that allow this type of consistent tracking the airport can better identify issues and opportunities that can be reviewed as part of the Master Planning effort.

ACRP Report 69, Asset and Infrastructure Management for Airports provides more information on asset management.

Financial Plans

Financial planning within the airport spectrum can encompass a wide array of analyses, ranging from a proposed project's cost-benefit analysis to the financial sustainability and economic impact of an entire airport system. Regardless of their size and focus, financial plans all recognize the importance of appropriate and responsible planning with respect to funding, return on investment, and whether or not an investment is justified by the result. Additionally, financial plans can include efforts to establish or update airport rates, minimum standards, or leasing terms. Such plans may also involve concessions, properties, and financing large capital projects. Each of these revenue streams could have significant impact on an airport operation due to their potential to influence that airport's operations, capital development, and ultimately its balance sheet.



Miami International Financial Report, 2013

As noted above, a primary element of all airport master planning efforts is conducting a financial analysis to identify funding sources for proposed projects. Direct integration of this Master Plan element with any other relevant financial plans is essential to ensure that the results of the Master Plan are financially feasible.

Terminal Area Plans

The terminal area is the interface between landside and airside operations for aircraft passengers. While the basics of the terminal area are addressed in the Master Plan, a Terminal Area Plan provides more in-depth analysis of the accessibility, passenger convenience, operating efficiency, facility investment, and aesthetics of the terminal area. Considering the range and extent of planning considerations that can be included within a Terminal Area Plan, its results would have a significant impact on any associated airport development and financial plans. These plans are typically developed for commercial service airports.

Access Plans

While it may be included in a terminal area plan, a standalone airport ground access plan can include any element that an aircraft passenger and/or cargo shipment could encounter while traveling to and from the local and regional transportation infrastructure network. These plans are typically developed for commercial service airports. All modes of transportation should be considered including roadways, highways, railways, taxis, limousines, buses, ride sharing, rapid transit, waterborne modes, and helicopter links. It should also be noted that since much of the transportation elements addressed within an airport access plan typically lie outside of the airport itself, access plans are often more general and strategic in nature. This is largely due to the potential coordination efforts required with local and regional transportation agencies, highway departments, transit authorities, and comprehensive planning bodies.

Regardless of their general nature, airport access plans can have an immediate and significant impact on the Master Plan process given that the landside capacity of the airport could be a limiting factor for airport development. As such, airport access plans must be integrated appropriately with any master planning effort.

System Plans

An airport system plan is a representation of the aviation facilities and service required to meet the needs of a metropolitan area, region, state or country. Generally, the overall purpose of a system plan is to determine appropriate airport development needed to establish a viable and integrated system of airports. FDOT has developed the Florida Aviation System Plan (FASP) to serve as its statewide system planning document, which is administered through the Continuing Florida Aviation System Planning Process (CFASPP). The FASP identifies future development needs by region, new trends, performance measures, and forecast input data that should be considered in the Airport Master Plan. Development proposed in an airport master plan must be consistent with the FASP role for that airport. The FASP is currently being updated to include the newest thinking in system planning and will provide airports with a wealth of knowledge on their airport's role in the overall system.

Florida Specific Information!

The FASP identifies future development needs by region, new trends, performance measures, and forecast input data that should be considered in the Airport Master Plan. Development proposed in an airport master plan must be consistent with the FASP role for that airport.

Additional Planning Efforts

In addition to the plans referenced above, Master Plans are encouraged to make use of any additional studies or plans that may have pertinent information related to the airport and its future needs. Collecting previously gathered information from other planning efforts helps reduce effort and save time devoted to the Airport Master Plan. Some other examples of plans or studies that may have an effect on the Master Plan process can be seen below:

- Environmental Impact Studies
- Project Feasibility Studies
- Land Acquisition Studies
- Wildlife Hazard Studies
- Site Selection Studies
- Stormwater and Drainage Plans
- Pavement Maintenance Management Plans
- Municipal Codes, Ordinances, and Zoning Regulations

This list of plans and studies is not all inclusive; other documents may also effect the master planning process and should be explored as applicable.

State, Federal, and Regulatory Requirements and Guidelines

Federal and state regulatory requirements and guidelines play a significant role in the development of the Florida Aviation System. In an effort to support airport development that is both safe and compatible with the local community, Federal and state agencies participate in airport development and provide regulatory guidance to airport sponsors. In many cases, both FAA and FDOT policies and procedures are complementary. The following paragraphs briefly summarize the relationship between these two agencies.

The FAA typically reviews all elements of a Master Plan to ensure that sound planning techniques have been applied. Currently, the key Master Plan components that the FAA evaluates and formally approves are the Forecasts of Aviation Demand, Selection of Critical Aircraft, and the Airport Layout Plan (ALP). This is affirmed through a Federal statute related to ALPs. Title 49 of the United States Code (USC), specifically 49 USC 47107(a)(16), obligates an airport sponsor to "***keep up to date, at all times, a layout plan of the airport***."

All airport development at federally obligated airports must be done in accordance with the FAA and sponsor-approved ALP. Additionally, proposed development must be shown on an ALP to be eligible for AIP funding. FAA conditional approval of the ALP indicates that existing facilities and proposed development depicted in the ALP conforms to the FAA airport design standards in effect at the time of the approval and that the FAA finds the proposed development to be safe and efficient. Specifically, FAA Order 5100.38C, AIP Handbook, states:

> *"A current airport layout plan (ALP) that depicts the proposed project and which has FAA approval from the standpoint of safety, utility, and efficiency of the airport shall be required before a development project is approved."*

At the state level, Chapter 332 (Ch. 332), Florida Statutes (F.S.) defines the duties and responsibilities of FDOT. Specifically:

> *"It shall be the duty, function, and responsibility of the Department of Transportation to plan airport systems in this state. In carrying out this duty and responsibility, the department may assist and advise, cooperate, and coordinate with the federal, state, local, or private organizations and individuals in planning such systems of airports, and to promote the further development and improvement of air routes, airport facilities, and landing fields and protect their approaches and to stimulate the development of aviation commerce and air facilities."*

One key provision within Ch. 332 is directly parallel to FAA funding requirements, in that:

> *"Only those projects or programs provided for in this act that will contribute to the implementation of the state aviation system plan, that are consistent with and will contribute to the implementation of any airport master plan or layout plan, and that are consistent, to the maximum extent feasible, with the approved local government comprehensive plans of the units of government in which the airport is located are eligible for the expenditure of state funds in accordance with fund participation rates and priorities established herein."*

Similar to the FAA AIP Handbook, FDOT Procedure 725-040-040-k (Aviation Program Management) states that "to be eligible for FDOT funding, the airport sponsor must have an FDOT approved Master Plan and airport layout plan that has been developed in accordance with FDOT Procedure No. 725-040-100, Airport Master Plans."

The FDOT Airport Master Plan Procedure provides additional guidance related to Master Plan projects, however, the key element within this procedure states that, "***the Guidebook is the standard in which all master planning documents will be produced***." Thus, this Guidebook update not only addresses changes in both Federal and state requirements and guidelines, it also complies with the Airport Master Plan procedure.

Florida Specific Information!

FDOT Procedure 725-040-040-k (Aviation Program Management) states that:

"To be eligible for FDOT funding, the airport sponsor must have an FDOT approved Master Plan and airport layout plan that has been developed in accordance with FDOT Procedure No. 725-040-100, Airport Master Plans."

Additionally, the Florida Aviation System Plan (FASP) is the statewide planning document that prescribes the recommended growth plan for all Florida airports to support future aviation demand. Thus, when developing a Master Plan, these documents must be reviewed in order to have an understanding of the state requirements for developing an Airport Master Plan. (Note: For more information concerning the FASP, visit: www.dot.state.fl.us/aviation/FASP_details.shtm)

Though much more is discussed in subsequent sections, understanding how FAA and FDOT requirements parallel and augment each other validates that **close coordination with both agencies is imperative for the success of any Master Plan.** Florida's airports also have a luxury few others do: all of our airports are under one FAA ADO and that the Orlando ADO services no other states. This unique relationship provides the airports in Florida, FDOT, and the Orlando ADO with an environment that allows all to work together towards common goals without the distraction of adjacent priorities or program development concerns.

Thus, this section of the Guidebook summarizes and synthesizes state and Federal guidance as well as provides tips to consider during the development of a Master Plan or ALP Update. Counties, cities, authorities, and municipalities may also provide local guidance that can be utilized, although that is addressed on an airport-by-airport basis.

Federal Master Plan Guidance

Federal guidance provides the technical basis for all airport development. Typical guidance is provided in the form of FAA Advisory Circulars, or ACs. It is important to note that the usage of many of these ACs is **mandatory** for federally obligated airports through Grant Assurance 34. The documents shown in **Table**

1 should all be referenced both prior to and during the development of an Airport Master Plan. As shown, **Table 1** provides a summary of the Federal Master Plan Guidance, as well as suggestions on the individual sections of a Master Plan where the guidance should be utilized. More information on each of the documents or resources shown in **Table 1** can be found in **Appendix 2**. The most current version of all FAA ACs that are referenced can be accessed at: www.faa.gov/regulations_policies/advisory_circulars/

TABLE 1. FAA AIRPORT MASTER PLAN GUIDANCE FOR FEDERALLY OBLIGATED AIRPORTS

Document	Master Plan Sections that Should Consider Document
AC 150/5070-6B Airport Master Plans	- All sections
AC 150/5300-13A Airport Design	- Facility Requirements - Alternatives **This AC provides design standards that will assist in understanding facility requirements and developing suitable alternatives recommendations.**
AC 150/5060-5 Airport Capacity and Delay	- Facility Requirements - Alternatives - ALP **This AC allows airports to understand what capacity issues exist (or are anticipated) and recommends suggestions for mitigating deficiencies.**
Standard Operating Procedure for FAA Review and Approval of Airport Layout Plans (ALPs)	- ALP - Narrative Report **This SOP provides detailed instructions on the Federal requirements of an ALP set.**
Standard Operating Procedure for FAA Review of Exhibit 'A' Airport Property Inventory Maps	- ALP **This SOP provides detailed instructions on the Federal requirements of an Exhibit 'A' map in an ALP set.**
Standard Operating Procedure for Runway Safety Area Determinations	- ALP - Narrative Report **This SOP provides detailed instructions on documenting of Runway Safety Area Determinations.**
Airport Improvement Handbook	- All sections
Code of Federal Regulations, Part 77 – Safe, Efficient Use, and Preservation of Navigable Airspace	- Facility Requirements - Alternatives - ALP **Part 77 will help the airport understand the limitations of land uses and intensities of land surrounding an airport.**
Forecasting Aviation Activity by Airport	- Aviation Forecasts
FAA Recycling, Reuse and Waste Reduction at Airports: A Synthesis Document	- Environmental - Existing Conditions **This document provides baseline information to assist in identifying sustainability programs at an airport.**

State/FDOT Guidelines and Guidance

Just as Federal guidance provided by the FAA provides the basis for all airport development, Florida Statutes provide the basis for all development within Florida. In most instances FAA and FDOT guidance will be complimentary; however, there are regulations specific to Florida that are provided through Florida Statutes and Florida Administrative Code. The following is a summary of the state regulations related to airport planning and development. As shown, **Table 2** provides a summary of the FDOT procedures and guidance as well as suggestions on the individual sections of a Master Plan for which the guidance should be utilized. More information on each of the documents or resources shown in **Table 2** can be found in **Appendix 2**. Unless otherwise noted, the most current version of all state/FDOT guidelines that are referenced below can be accessed at: www.dot.state.fl.us/aviation/flpub.shtm

TABLE 2. FDOT/STATE OF FLORIDA AIRPORT MASTER PLAN GUIDANCE

Document	Master Plan Sections that Should Consider Document
Florida Statute 332 Airports and Other Air Navigation Facilities	- All sections
Airport Master Plans FDOT Topic No. 725-040-100-h Last Update: 2012	- All sections **This document allows airports to understand the review and approval process that FDOT follows during a Master Plan.**
Aviation Program Management FDOT Topic No. 725-040-040-k Last Update: 2012	- As Needed
Exhibit "C" Aviation Program Assurances FDOT Form No. 725-040-15 Joint Participation Agreement FDOT Form No. 725-030-06	- As Needed
Florida Aviation System Plan 2025 Last Update: 2012 Next Update: 2017	- Existing Conditions - Aviation Forecasts - Alternatives **FASP 2025 helps an airport understand their role within the regional and state aviation system. All recommendations in a Master Plan must be in accordance with the FASP.**
Florida Statute 333 Airport Zoning	- Public/Stakeholder Involvement - Environmental - Existing Conditions - Alternatives - ALPs **Chapter 333 helps airports understand the limitations of land uses and intensities of land surrounding their airport.**
Florida Administrative Code 14-60: Airport Licensing, Registration, and Airspace Protection	- Existing Conditions - Alternatives - Facility Requirements - ALPs **Rule 14-60 provides airport standards that ensure safe airport operation. Understanding these standards will allow an airport to comply with current state licensing standards.**
Florida Statute 163 Intergovernmental Programs	- Public/Stakeholder Involvement - Existing Conditions - Alternatives - ALPs **Chapter 163 identifies how airport planning relates to local planning efforts and the interrelatedness of various local plans.**

Additional FAA Guidance and Regulation

In addition to the primary FAA resource documents, the following ACs are also recommended to be reviewed based on the scope of a Master Plan. As shown, **Table 3** provides a summary of the additional Federal Master Plan Guidance as well as suggestions on the individual sections of a Master Plan where the guidance should be utilized. More information on each of the documents or resources shown in **Table 3** can be found in **Appendix 2**. The most current version of all FAA ACs that are referenced below can be accessed at: www.faa.gov/regulations_policies/advisory_circulars/

TABLE 3. ADDITIONAL FAA AIRPORT MASTER PLAN GUIDANCE FOR FEDERALLY OBLIGATED AIRPORTS

Document	Master Plan Sections that Should Consider Document
AC 150/5075-7 The Airport Planning System Process	- As needed
AC 150/5100-14E Architectural, Engineering, and Planning Consultant Services for Airport Grant Projects	- Scoping
AC 150/5300-16A General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey	- Existing Conditions - ALPs **This AC will be helpful if an aeronautical survey is needed as part of a Master Plan.**
AC 150/5300-17C Standards for Using Remote Sensing Technologies in Airport Surveys	- Existing Conditions - ALPs **Though this AC does not specifically relate to Master Plans, its information may be helpful if a survey is needed.**
AC 150/5300-18B General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards	- Existing Conditions - ALPs **For airports completing AGIS or any aeronautical survey, use of this AC will be helpful in understanding the standards.**
AC 150/5300-19 Airport Data and Information	- Existing Conditions - Facility Requirements - Alternatives **Though this AC does not specifically relate to Master Plans, its information may be helpful during development**.
AC 150/5325-4B Runway Length Requirements for Airport Design	- Existing Conditions - Forecasting - Facility Requirements - Alternatives - ALPs **Airports that are recommending lengthened or new runways must reference this AC.**
AC 150/5100-(Version Update Number To Be Determined) Guidance on the Extraction of Oil and Gas on Federally Obligated Airports	- As needed
The Brooks Act Title IX of the Federal Property and Administrative Services Act of 1949	- As needed

Security Guidance and Regulation

In the years following September 11, 2001, numerous laws were passed to enhance security at all airports in the United States. The following four resources provide guidance and standards for numerous aspects of airport security. For any airport completing a Master Plan, use of these resources is suggested. As shown, **Table 4** provides a summary of the Security Guidance and Regulation, as well as suggestions on the individual sections of a Master Plan for which the guidance should be utilized. More information on each of the documents or resources shown in **Table 4** can be found in **Appendix 2.**

TABLE 4. SECURITY GUIDANCE AND REGULATIONS FOR AIRPORT MASTER PLANNING

Document Name	Authority	Master Plan Sections that Should Consider Document
Florida Statute 330 Regulation of Aircraft, Pilots, and Airports	State of Florida	- Existing Conditions - Facility Requirements
Recommended Security Guidelines for Airport Planning, Design, and Constructions	TSA	- Existing Conditions - Facility Requirements
Title 49 Code of Federal Regulations, Part 1542 Airport Security	Federal Government	- Existing Conditions - Facility Requirements
Title 49 Code of Federal Regulations, Part 1540 Civil Aviation Security: General Rules	Federal Government	- Existing Conditions - Facility Requirements

Part 2 – Master Plans: Developing the Vision

Scope Development

Introduction

A well-defined scope is critical to the definition and success of any Airport Master Plan. This chapter takes into account the varying goals and objectives of every airport's Master Plan by providing guidance for all airports, regardless of size or desired outcome. Throughout the scoping development process, airports should coordinate with the FAA, FDOT, and relevant stakeholders to identify airport needs and understand how to address them within the Master Plan. This chapter provides the tools necessary for an airport to begin identifying their needs as well as understand how to address those needs in the scoping process.

The three primary components of this chapter are summarized below:

- **Needs Determination**
  - Provides a general overview of items to consider before scoping a Master Plan
  - Includes items to consider when determining needs to be addressed during the development process
- **Pre-Planning**
  - Helps airports determine specific elements or tasks and consider the general level of effort needed relative to the scope for the Master Plan
  - Discusses how to gather input from relevant stakeholders, determine the desired outcome of the study, form an estimated budget, and ultimately, select a consultant
- **Scope Development**
  - Provides detailed information on how Master Plan elements can be incorporated into a scope based on the needs of the individual airport
  - References information in the respective Master Plan Elements Chapter and allows flexibility when developing sections of a scope

Per FDOT Procedure No: 725-040-100

In the fiscal year that the project is programmed, a project justification and scope meeting between the respective District Office, the FAA, FDOT, and the airport sponsor will be held. The purpose of this meeting will be to establish a preliminary scope of work, and to develop cost estimates for the project.

In this meeting, the sponsor should be prepared to provide a well-organized rationale to support the planning effort which includes the goals of the effort and the issues that the study is intended to resolve.

*A complete checklist of steps that must be followed during a Master Plan are provided in **Appendix 3**, this checklist will ensure compliance with the FDOT Airport Master Planning Procedure.*

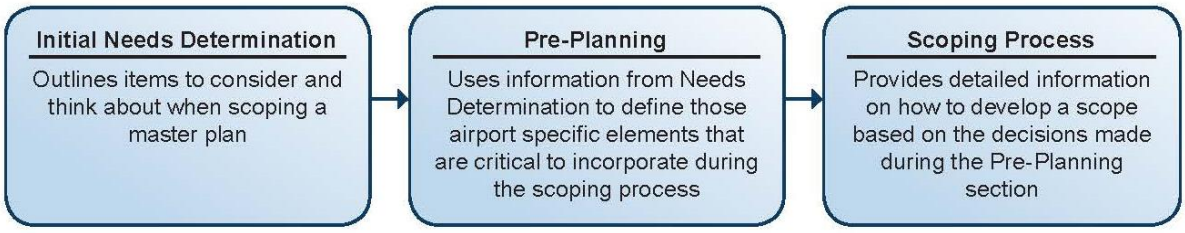
Information on using this checklist is provided throughout this chapter with the header:

FDOT Compliance Checklist Item!

Using this Chapter

As mentioned previously, the information contained in this chapter is divided into three distinct components to guide users through the scoping process. Each component builds on previous information, as shown in **Figure 2**.

FIGURE 2. SCOPE DEVELOPMENT PROCESS FLOWCHART



The list below guides users through the entire scoping process and conveys the overall order of events that should transpire during the scoping process. Individual sections identified are referenced as appropriate throughout this chapter.

1. Initial Needs Determination
2. Pre-Planning
3. Budget Estimates
4. Budget Approval
5. Qualifications and Consultant Selection
6. Scope Development
7. Applicable Authority Approval

The information in this Scope Development section was developed to be evaluated with the associated Master Plan Work Element information provided in **Part 3 - Master Plan: Product Development**. As such, information presented in here makes reference to its associated element, as needed. FDOT has certain requirements that must be followed throughout the master planning process. These requirements are detailed in FDOT *Procedure No: 725-040-100, Airport Master Plans*. These requirements, outlined in **Appendix 3**, include information on the roles and responsibilities of the airport sponsor, FDOT District Office, ASO, and the FAA, if required. Prior to beginning any Master Plan, the airport sponsor should meet with FDOT to understand the requirements of the entire master planning process.

Although individual Master Plan scoping efforts will differ from airport to airport, the following steps represent the typical process for scoping a Master Plan:

Step 1: Needs Determination and Project Justification

See Initial Needs Determination.

Step 2: Pre-Planning: Desired Outcomes and Purpose of the Project

See the Purpose of the Project and Desired Outcome.

Step 3: Schedule a Project Justification and Scope Meeting with FDOT and the FAA

The airport sponsor should meet with the FDOT and FAA to discuss the purpose, goals, and special planning issues anticipated for the study. This allows the airport, FAA, and FDOT to verify the justification of the study and ensure project needs are addressed in a preliminary scope. The airport sponsor should use feedback from this meeting to develop an estimated budget range and project schedule.

Step 4: Requesting Funding from the FAA and FDOT

The JACIP process is the official method of requesting funding through the FAA and FDOT (detailed in Application for State and Federal Funding). The following items should be included in the request and justification discussions with these agencies:

- Statement of project needs, desired outcome, and any special issues
- Scope of work (see Scoping Process)
- Project schedule
- Cost estimates and requested funding sources

Step 5: Approvals and Issuance of Grants

Once a project has been approved, funding is typically provided to the airport in a planning grant from the FAA and/or a JPA from FDOT. It is important to note that once the grant has any funding activity, the airport sponsor is held to certain grant assurances. These assurances, or obligations, require the airport sponsor to maintain and operate the facilities safely and efficiently. Grant approval also triggers a Notice to Proceed (NTP), which means the airport may move forward with the desired project. It should be noted that work performed prior to issuance of an NTP is typically not reimbursable from either FAA or FDOT.

Each grant and corresponding agency may have its own set of grant assurances. It is recommended that the airport sponsor reach out to the funding source to identify all grant requirements

Initial Needs Determination

Introduction

The Initial Needs Determination introduces the scoping process and identifies the “big picture” items to consider when developing a Master Plan scope. The information in this section is general in nature and was developed to provide planners and airport representatives with a starting point for the scoping process. The Initial Needs Determination is the basis for scope development and is comprised of the following information:

FDOT Compliance Checklist Item!

FDOT provides nine checklist items that must be completed as part of the Initial Needs Determination and Project Justification phase of a Master Plan

These checklist items can be found in **Appendix 3, Project Justification and Scope Meeting**

Please review the Procedure and the checklist to ensure the proper process is followed

- **Items to Address in the Scope**
  - Identifies items/issues that could be the impetus for a Master Plan or update
- **Determining the Appropriate Type of Study**
  - Identifies study types to address the airport’s items/issues through stakeholder engagement and existing document review

This information describes the process(es) airports can follow to select an appropriate Master Plan that accomplishes the established goals.

Items to Address in the Scope

Every Airport Master Plan should be considered a unique project with a scope of work tailored to the individual airport being examined. Designing a Master Plan scope that appropriately addresses an airport's particular requirements and areas of interest requires an in-depth understanding of all potential considerations and issues. Considerations start by examining existing planning documentation for the airport—whether it be a previous Master Plan or the current approved ALP—to determine the continued validity or extent of change that may be needed. Though nearly all Florida airports have received some form of planning services, their documents may be outdated. The list below introduces several issues and considerations that could be the impetus for an Airport Master Plan:

- Capacity demands
  - Landside and airside
- Landside changes
  - New terminal structures, new access, new facility development
- Changes to FAA, FDOT, or other regulatory standards or requirements
- Deficiencies or modifications of standards that exist or may likely exist in the future
- Land use development or plans within and around the airport property
- Approaches
  - New approach desired
- State and Federal compliance considerations
- Through-the-fence activities
- Anticipated major projects
- Change in airspace

This broad list of items may not reflect several unique conditions some airports face. It is recommended that this list be used as a starting point to determine if an airport Master Plan is needed. Any number of the items listed above could trigger the need for an Airport Master Plan or update and it is likely that more than one of these items are relevant to most airports. Once an airport understands all the issues and considerations that should be addressed in its Master Plan, the scoping process can begin. As an airport begins this process, *FAA AC 150/5070-6B, Airport Master Plans* indicates that entities involved must answer two important questions:

- What type of study should be conducted?
- What level of detail should be assigned to the individual elements of the study?

Answering these two questions allows an airport to scope a project that best addresses its needs and appropriately budgets the time and resources necessary for the individual components of the selected plan.

Determining the Appropriate Type of Study

For each airport, the type of study selected should address the specific needs identified previously. As defined in *FAA AC 150/5070-6B*, *Airport Master Plans*, Airport Master Plans and ALP Updates generally contain the elements contained in **Table 5**.

TABLE 5. AIRPORT MASTER PLAN AND ALP ELEMENTS

Master Plans	Airport Layout Plans
Public involvement	Basic aviation forecasts
Existing conditions	Basis for development
Environmental considerations	Rationale for modifications to standards
Aviation forecasts	Summary of stages of development
Facility requirements	Sketches of development in each stage
Alternatives development	
Facilities implementation plan	
Financial feasibility analysis	

Depending on the needs and conditions of an airport, these two options should be evaluated to ensure the most appropriate study is selected. Per *FAA AC 150/5070-6B, Airport Master Plans*:

> *"An ALP drawing set update is an appropriate alternative to a full master plan whenever the fundamental assumptions of the previous master plan have not changed. If there have not been any major changes in airport activity or improvements that have had unanticipated consequences, a master plan update is not necessary. Another situation where only an ALP update would be appropriate is the examination of a single development item, such as runway safety area improvements."*

Coordination with FDOT, the FAA, and stakeholders is key to identifying the most suitable study. It is recommended that the airport involve both the FAA and FDOT as early as possible in the process to ensure all requirements are addressed. Involving non-governmental stakeholders (tenants, FBOs, etc.) adds airport-specific feedback and accounts for local issues.

Pre-Planning

Introduction

Once the Needs Determination process is complete, the airport then moves into the Pre-Planning process. Since each airport's master planning efforts are unique, this section highlights the steps that should be followed to effectively pre-plan a scope of work that suits the airport. Information provided in *FAA AC 150/5070-6B, Airport Master Plans* is primarily referenced to provide cohesive direction for airport master planning. Specific information and details related to master planning in Florida are included, as applicable. This section was developed with the following steps:

- Purpose of the Project
- Desired Outcome
- Budget
- Application for Funding
- Approvals
- Consultant Selection

The following subsections lay out the Pre-Planning process, after which the airport sponsor should be prepared to develop a scope that addresses its needs.

Florida Specific Information!

Per FDOT, the airport sponsor must provide the following items to the FDOT District Office before the issuance of a planning grant:

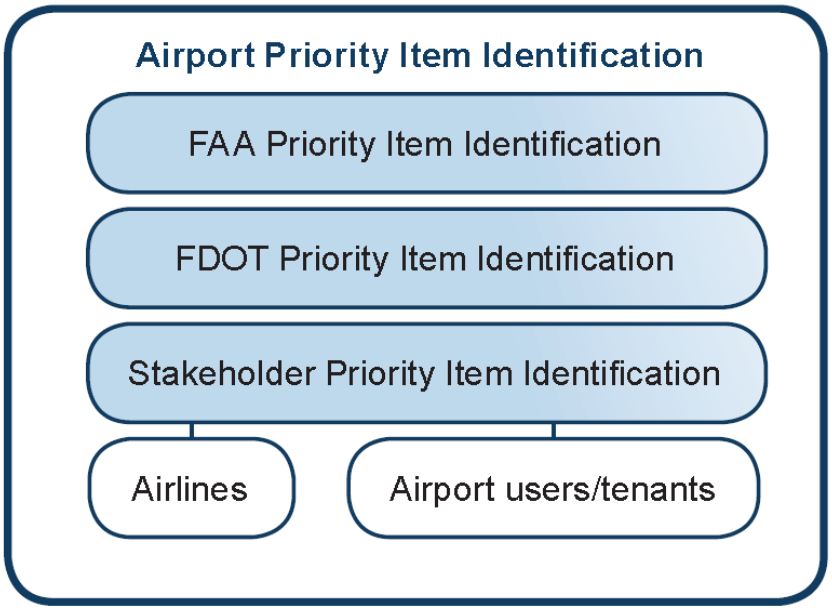
1. *Type of study*
2. *Statement of project needs, goals and objectives, and identified special issues*
3. *Proposed scope of work*
4. *A copy of the completed FAA ARP SOP 2.00 (include ARP SOP 3.00 if applicable)*
5. *Project schedule*
6. *Cost estimates and requested state funds*

Purpose of the Project

The airport sponsor should cultivate a project purpose to justify developing or updating a master planning study. This purpose should be broad enough to encompass the entire project but also focus on the specific issues the Master Plan must address.

At this stage, the airport sponsor has data from the Initial Needs Determination regarding the issues that triggered the need for a Master Plan. The airport sponsor should engage stakeholders to formulate priorities, establish what is most important, and addresses the airport's existing and projected needs. **Figure 3** graphically shows the collaborative process that occurs when identifying key items for a Master Plan.

FIGURE 3. PRE-PLANNING EFFORT



Source: Kimley-Horn and Associates, Inc., 2016

Meetings between the airport sponsor, the FAA, and FDOT representatives, as well as airport tenants and stakeholders, provide an opportunity to review potential needs and deficiencies associated with the proposed Master Plan. During this process, the airport sponsor should prioritize what is needed to comply with safety requirements, design standards, and state licensing standards. Non-essential items should be acknowledged, but based on funding and resources they may not be prioritized as part of the Master Plan. It is recommended that airport sponsors document the justification for not including elements as part of the Master Plan, as questions may arise later.

As an example, the *Tampa International Airport (TPA) Master Plan Update* Pre-Planning effort led to the development of nine focus areas, four of which are included below:

- Prepare new airport activity projections taking into consideration the impact of the economic recession, consolidations in the airline industry and actions to enhance international service at TPA.
- Evaluate facility capacity with a specific focus on terminal and passenger processing facilities.
- Evaluate the potential benefits of Common Use Passenger Processing technologies and the ability to enhance the operational efficiency and capacity of existing Main Terminal functions and facilities.
- Conduct a detailed assessment of the Main Terminal Complex to identify reasonable and viable actions to extend the capacity of terminal facilities beyond the level identified in the 2005 Master Plan (28.7 Million Annual Passengers) and delay the need to initiate the development of the North Terminal while maintaining high levels and standards of service.

Reasons for not including certain elements in the master planning process were also identified:

> *"One element that is not a primary focus of the 2012 Master Planning effort is the re-evaluation of airfield alternatives that were prepared under the 2005 Master Plan. While it was recognized that the timing of several of the improvements recommended in the previous plan would be pushed back, it was determined that the configurations of airfield recommendations from the 2005 Master Plan remained valid and should be carried forward. The one exception to this was the proposed extension of Runway 10-28, which was identified for re-evaluation."*

Understanding information and documentation that is still valid and what needs to be updated is essential in the scoping process. This example shows how the pre-planning process can be used to define the purpose of the airport's project. Each airport (and consultant project team) should develop the project purpose in a way that is most beneficial to the airport.

Desired Outcome

An Airport Master Plan must establish desired outcomes and identify associated goals and objectives to provide overall direction. The desired outcome of a project is the long-term overall goal that the airport sponsor is trying to achieve through developing a Master Plan. The associated goals and objectives are the intermediate steps necessary to achieving the desired outcome. It is anticipated that the desired outcome and goals and objectives may be updated during the scoping process as well as during Master Plan development.

Each airport sponsor is charged with developing the desired outcome to meet the ever changing conditions at the airport. It is advised that airport sponsors utilize the stakeholder engagement process to identify the desired outcome. The desired outcome should solidify an airport's role in the community and ensure the services being provided to the national airport system continue to be realized. For example, the *Tampa International Airport Master Plan Update* states:

> *"The 2012 Master Plan Update was undertaken to take a refocused look at TPA with the emphasis on maximizing the capacity and longevity of the existing main terminal facilities while ensuring that the high level of service which TPA is known for is not diminished."*

The desired outcome simply outlines what the airport sponsor wishes to achieve though the Master Plan process. Stakeholders and the airport sponsor should utilize previously completed work and information to ensure that the desired outcome is realistic and meets the needs of the airport identified within the project purpose.

Goals and Objectives

Formulating project goals and objectives to achieve the desired outcome is the next step. Generally, part of scope development, a tiered goal framework is an important part of designing any planning study. Defining goals and objectives begins with the airport sponsor, FDOT, the FAA, and other stakeholders acknowledging key items associated with the purpose of the project and creating measureable steps to achieve them within the planning horizon. The goals are likely broad, long-term principles that the airport can accomplish to meet the needs established within the Purpose of the Project. Generally speaking, goals should represent realistic and ideal airport conditions.

SMART Model

- **S**mart
- **M**easurable
- **A**ttainable
- **R**elevant
- **T**ime Bound

Once an airport sponsor has identified goals and established a framework, objectives should then be established. Objectives are specific, tangible, and short-term statements designed to achieve established goals. It is not uncommon to have multiple objectives for each goal. To develop objectives, it is recommended that project teams follow the SMART model, as described in the *ACRP Report 77, Guidebook for Developing General Aviation Airport Business Plans*. It should be noted that ACRP Report 77 can also be used by commercial service airports, but that many of the recommendations were developed specifically for general aviation airports.

Using this tiered approach, the airport sponsor has clear direction in which to utilize resources and move toward the desired future. The *Fort Lauderdale Executive Airport Strategic Business Plan and Master Plan Update* developed seven goals. Two of these goals and the associated objectives are detailed below:

Goals and Objectives of the Fort Lauderdale Executive Airport Strategic Business Plan and Master Plan Update

Goal:

- Provide an airport that promotes safety as its most important objective

Associated Objective:

- Coordinate with the FAA, aviation industry, and legislative leaders to enhance safety training and standards to minimize runway incursions and aircraft accidents

Goal:

- Ensure the airport evolves in a manner that is both flexible and adaptable to changing conditions in the aviation world

Associated Objectives:

- Develop the airside (facilities) while being cognizant of new aircraft technology to retain future development options
- Consider acquiring underperforming leaseholds as well as additional land areas to optimize the airport's capabilities to satisfy potential aeronautical demand under each growth strategy

The goals and objectives development process requires a comprehensive understanding of the approximate effort and information desired from the master planning process. It is critical that the goals are realistic and feasible for the airport sponsor to implement.

Budget

Establishing a budget estimate for the development of the Master Plan is one of the most important aspects of the scoping process. Typically, an Airport Master Plan scope weighs the needs and desires of the airport sponsor against any budgetary constraints. As such, the first stage of budgeting should be addressed by reviewing Pre-Planning. For airport sponsors that have not recently completed a Master Plan, estimating the budget can be difficult as costs and requirements change over time and prior planning budgets may not be relevant. Coordinating with FDOT and the FAA as well as airport peers regarding similar studies and budgets helps an airport sponsor account for current requirements and trends in master planning and provides a range within which to work.

It is also recommended that a well-defined scope be developed prior to any budget submittals for pre-applications or other processes. Developing preliminary budget estimates without knowing the issues may limit the ability of the Master Plan to address all desired and relevant issues once the scope is agreed to and negotiations are underway with a selected consultant.

When developing a budget estimate, state and Federal compliance concerns should be given priority over other desired but not required components. Continually coordinating with the FAA and FDOT helps identify these components and ensure they are addressed appropriately. Where applicable, coordination with local governments that are assisting in funding will also be necessary. Every Master Plan project is unique, so including necessary parties in budgeting the study as early in the process as possible is critical. It is important to note that Federal planning grants cannot be amended to cover increased project

costs. This emphasizes the significance of certifying that the estimated budget reflects the anticipated scope that is required and also certifying what is desired by the airport.

Many of the decisions made at this point have an impact on how smoothly the development program moves from the planning stage to implementation. As such, close attention must be paid to the balance between scope, fees, and budget in order to set the stage for a successful study and allow the primary project stakeholders to develop a budget that meets all goals and objectives. Failure to do so could result in a master planning effort that lacks vital details and affects a successful ultimate decision-making process. Additionally, better planning at this phase will help to confirm that the scope is sufficient enough to complete the tasks that are required and desired by the airport as well as minimize deviation from the scope during implementation.

Application for Federal and State Funding

Funding Process and Timeline

Another important step in the scoping process is applying for funding to develop the Master Plan. In Florida, project funding is programmed through the JACIP—a continuous process through which Florida public airports, the FAA, and FDOT program the airport capital improvement funds for both the FAA and the FDOT work programs. It is required that each public-use airport sponsor update the JACIP each year or whenever a Master Plan is approved. To formally secure project funding, the airport owner/sponsor must specifically request an appropriation through the JACIP process. Note that both the FAA and FDOT have adopted this mechanism as the official method by which funding requests for either agency are made. Complete instructions for using JACIP are available from FDOT. Airports pursuing funding from FDOT are encouraged to consult the most recent version of *The Florida Aviation Project Handbook*; this document contains current information on Florida funding sources. The current version of *The Florida Aviation Project Handbook* can be found at: www.dot.state.fl.us/aviation/flpub.shtm

Florida Specific Information!

The Joint Automated Capital Improvement Program (JACIP) — is a continuous process through which Florida public airports, the FAA, and FDOT program the airport capital improvement funds for both the FAA and the FDOT work programs. It is required that each public-use airport sponsor update the JACIP each year or whenever a Master Plan is approved.

FAA Funding

The FAA AIP provides grants to public agencies and in some cases to private entities for the planning and development of public-use airports within the NPIAS. A public-use airport must meet current eligibility requirements for FAA funding. Airport sponsors should visit http://www.faa.gov/airports/aip/ and review the *AIP Handbook* (Order 5100.38D) to determine project eligibility for Federal funding.

Per *FAA AC 150/5070-6B*, *Airport Master Plans*, the point at which a sponsor submits a Master Plan grant application to the FAA varies with the individual study; therefore, the FAA should be involved in the overall process as early as possible. The FAA can advise a sponsor on the best strategy for obtaining funding and assist with questions pertaining to eligibility of the elements included in the proposed scope of work.

FDOT Funding

The FDOT is able to provide an aviation grant program through Section 332.003-332.007, Florida Statutes (F.S.) to airports that are publically owned, and open for public use, privately owned airport are not eligible to receive funding. These statutes allow the FDOT to provide grants to provide a safe, cost effective, and efficient statewide aviation system. Financial assistance for Florida airports can be provided for those facilities that meet the criteria listed in the *Florida Aviation Project Handbook*. Other funding sources may be identified and applied for, but it is very likely each has a different process than the steps listed above.

FDOT Compliance Checklist Item!

FDOT provides five checklist items that must be completed prior to receiving funding from FDOT

These checklist items can be found in **Appendix 3, FDOT Scope Review and Approval**

Consultant Selection

Typically, airport owners/sponsors contract a consultant to perform the master planning study. The current version of *FAA AC 150/5100-14*, *Architectural, Engineering and Planning Consultant Services for Airport Grant Projects*, as well as *Guidelines to Selecting Airport Consultants*, published by the Airport Consultants Council, both provide excellent guidance for consultant selection. Prior to undertaking the consultant selection process, it is recommended that the airport sponsor have a thorough understanding of the issues that led to developing a planning study and coordinate with the FAA and FDOT to ensure the AC is being followed properly. At this stage in the planning process, the airport should have the study's goals and objectives clearly in place. This increases the efficiency of the scoping negotiations with the consultant. This information should be provided in the Request for Qualifications (RFQ) or Request for Proposal (RFP) that the airport sponsor ultimately issues.

The airport sponsor should assemble an unbiased team/panel to review and conduct consultant evaluations. The qualifications of a submitting firm or team of firms should be judged on experience with similar work, staff professional credentials, and the ability to complete the study within the time specified. Research of the prospective consultant is highly recommended; ask to see similar master planning documents or other work that may give some indication of the qualifications. When possible, the airport sponsor should keep the RFP/RFQ process as simple as possible. The more complex the process, the more the overall cost of the project increases for both the airport and any prospective consultants. Sponsors should also remember to adhere to any Disadvantaged Business Enterprise (DBE) requirements. Scoping Process

Introduction

An accurate scope of work can be established using the information gathered during the Needs Determination and Pre-Planning phases. This section provides detailed information on how each Master Plan element can be incorporated into the scope based on the needs of each airport. This section references information from the Needs Determination and Pre-Planning sections as well as the applicable Master Plan Elements chapter. The following sections provide more

To ensure compatibility with FDOT procedures, the required steps that must be followed during the project justification and scoping portion of a Master Plan are provided in FDOT Topic No: 725-040-100

information on the scoping process and outline how a unique scope should be developed to meet the needs of each airport:

- Airport Considerations
- Project Considerations

Airport Considerations

Each airport has different considerations and concerns that should be addressed through the master planning process. The following information is covered in this section:

- Issues to Address
- Timing of Previous Planning Efforts

Issues to Address

Identifying issues that prompt master planning development is one of the first steps in the scoping process. The Initial Needs Determination phase identified issues that airports face; these issues should be discussed with the FAA and FDOT during the Pre-Planning component. By accurately identifying these issues, airports can be confident an appropriate scope is being developed for the planning study. It is recommended that airports continue to coordinate with the FAA, FDOT, and other stakeholders throughout the master planning process to confirm the project is appropriately developed.

Timing of Previous Planning Efforts

As part of the scoping process, airports should be cognizant of existing available data, historical planning documentation, and other resources that may be available during the master planning process. In many cases, airports can use archived data from prior studies. It is important to gather this information and determine its relevance to the existing conditions of the airport or its desired outcome. Older planning studies may no longer accurately portray the current conditions at the airport but may indicate the types and level of information previously considered in the master planning process. These prior planning studies should be used as a reference point; however, it is up to the airport sponsor to determine how closely these prior efforts represent current conditions.

Airports should also be looking to the future by identifying planning documents that could be developed during the master planning process. In some cases, an airport may have essential studies such as business plans, environmental documentation, or others that are out of date or are planned to be updated in the near future (less than five years). These documents should be considered for inclusion into the scope for the Master Plan. This process can involve an inventory of existing survey data to ensure that new data and information is not needed.

Below is a list of studies that should be reviewed or can be included in the Master Plan if necessary and financially feasible. These different project types were discussed in detail in **Part 1 – Master Plans: Setting the Stage** of this Guidebook:

- Airport Access Plans
- Business Plans
- Comprehensive Plans
- Financial Plans
- Land Use Plans
- Latest Survey Data
- Local Planning Efforts
- Marketing Analyses
- Strategic Plans
- Sustainability Plans
- System Plans
- Terminal Area Plans

The above list is not intended to be comprehensive, as there are many different types of studies that may be relevant to individual airports. Examples of studies that may be beneficial to airports include

environmental assessments, FAR Part 150 studies, rates and charges, air service studies, and economic impact studies. FDOT provides many of these studies at the statewide level for airport sponsors to use, these can be downloaded at: www.dot.state.fl.us/aviation/

Project Considerations

Based on all the previous information collected, the airport can determine the appropriate type and level of analysis needed in each Master Plan element. As previously stated, the information below is explicitly linked to its corresponding Master Plan Work Element section. Where applicable, section references are made to provide users with concise, easy to use guidance.

This section covers the individual project considerations that each airport needs to identify during the scoping process, including the scale and intensity of individual Master Plan components. Additional information is also provided on compliance with FAA and FDOT grant assurances as well as utilizing FAA Standard Operating Procedures (SOPs). This section includes the following subsections:

- Grant Assurances
- Stakeholder and Public Involvement
- Data Availability
- Aviation Forecasts
- Environmental Considerations
- Airport Layout Plans
- SOP Checklists
- Schedules
- Manpower and Effort Requirements
- Deliverables

Grant Assurances

Both the FAA and FDOT have grant assurances that require the recipients to maintain and operate the facilities safely and efficiently and in accordance with specified conditions. Grant assurances must be followed when accepting funds from the respective agency. Below is an overview of the grant assurances provided by the FAA and FDOT related to master planning.

FAA Airports Grant Assurances

The FAA developed four sets of grant assurances related to airports to confirm safety and compliance with grant agreements. These include assurances on the *Aviation Block Grant Program, Airport Sponsors, Non-Airport Sponsors Undertaking Noise Compatibility Program Projects, and Planning Agency Sponsors* (a subsection of Airport Sponsors assurances). Since Florida does not participate in the Block Grant Program, assurances related to this are not appropriate or addressed. Additionally, for the purposes of this Guidebook, information from the Non-Airport Sponsors Undertaking Noise Compatibility Program Projects grant assurances will also not be addressed. For more information on any of the grant assurances, please visit: www.faa.gov/airports/aip/grant_assurances/

Airports must comply with these FAA assurances that are automatically included in the grant agreement once an offer is accepted. As such, it is important to pay special consideration to these when developing the scope of a Master Plan.

Accepting funds is an agreement to comply with all applicable Federal laws, regulations, executive orders, policies, guidelines, and requirements related to the grant agreement of the project. The terms of these grant agreements last throughout the useful life of the facilities developed, but cannot be longer than 20 years from the date of acceptance of a grant offer of Federal funds for the project. These assurances typically last 20 years, but their lifespan may depend on the type of recipient, useful life of the facility, and other conditions. Grant

Grant Reminder!

Acceptance of grant assurances must be submitted as part of the project application (under the provisions of Title 49, U.S.C., subtitle VII).

assurances are indefinite when Federal funds are used to acquire land for the airport.

There are 39 assurances applicable under FAA grants, which include topics such as Federal legislation, construction inspection and approval, hazard removal and mitigation, and compatible land use. For airport master planning projects there are 12 assurances that apply per FAA's *'Airport Improvement Program Assurances for Airport Sponsors'* document, unless otherwise stated in the grant agreement. These assurances can also be found in FAA's '*Airports Planning Agency Sponsors Assurances'* document; those related to airport master planning are as follows:

1. General Federal Requirements
2. Responsibility and Authority of the Sponsor
3. Sponsor Fund Availability
4. Preserving Rights and Powers
5. Consistency with Local Plans
6. Accounting System, Audit, and Record Keeping Requirements
7. Planning Projects
8. Airport Revenues
9. Civil Rights
10. Engineering and Design Services
11. Foreign Market Restrictions
12. Policies, Standards, and Specifications

Under FAA's *Airports Planning Agency Sponsors Assurances,* sponsors, both public agency sponsors and private sponsors have the authority to apply for grants, finance projects, and implement projects. As stated previously, sponsors are required to comply with these 12 assurances while the project/program is receiving FAA assistance. A sponsor's responsibilities include ensuring consistency of a project with local plans, and ensuring there is an accurate system for audit and recordkeeping. Moreover, a sponsor's duties in carrying out planning projects also include:

- Executing project in accordance with approved program
- Providing progress reports and annual or special financial and operation reports
- Providing documentation
- Managing public viewing of project documents
- Granting the Secretary power of staffing for consultants, subcontractors, and employees
- Preserving Rights and Powers

More information on the FAA grant assurances can be found at: www.faa.gov/airports/aip/grant_assurances/

FDOT Airport Grant Assurances

Similar to FAA's grant assurances, FDOT has released its own set of grant assurances named *Exhibit "C" Aviation Program Assurances (Form No: 725-040-15)*. These assurances are meant to protect airports and include the terms and conditions of FDOT's grant agreements, which apply throughout the duration of the project and cannot be longer than 20 years (from the date of acceptance of the grant agreement), however, there is no limit on the duration regarding Exclusive Rights and Airport Revenue so long as the property is used as a public airport and with respect to real property acquired with funds provided by the State of Florida. The assurances applicable under FDOT grants include topics such as consistency with local government comprehensive plans, consistency with airport master plans and ALPs, airport financial plans, general airport planning projects, and land acquisition projects. Complying with these assurances also extends to property acquired with project funds, which are not subject to time limits.

Florida Specific Information!

FDOT Grant Assurances are provided in Exhibit 'C' Aviation Program Assurances (Form No: 725-040-15).

The sponsor is responsible to certify the following for the grant agreement:

1. Sufficient funds are available for costs not covered by grant
2. Holds a good title
3. Compliance of regulation for management and operations
4. Ensure safety of aerial approaches
5. Airport availability under fair and reasonable terms
6. No exclusive rights
7. Revenue will be expended for airport and airport-related facilities' capital and/or operating costs
8. Maintain an up-to-date ALP

Stakeholder and Public Involvement

Airport master planning typically has a regional impact and is likely to have many interested parties. It is important to include all stakeholders in this process to guarantee the master planning process is conducted thoroughly and addresses the needs of the community. Just as every master planning effort is different, every public involvement effort must be tailored to the airport. It is the airport sponsor's responsibility to understand the public involvement requirements within the region, as well as FAA and FDOT guidance and requirements, as the minimums and expectations may vary. In most cases, the airport must, at a minimum, provide notice to the public regarding the plan and allow for comment on the plan's recommendations. Each airport should create a Public Involvement Program (PIP) to scale the public involvement efforts based upon the identified requirements, the complexity of the project, and the perceived demand for information. Less complex projects may only necessitate participation from the airport, the FAA, and FDOT, while larger or complex projects may require input from many different sources. Identifying the appropriate stakeholder involvement needs, level of effort, and time constraints within the scoping process is essential to a successful Master Plan. Below is an example list of typical stakeholder groups for Airport Master Plans:

- Airport sponsor organization representatives
- FDOT personnel
- FAA personnel
- Interested groups
- Resource agencies
- Users and tenants
- General public
- Metropolitan Planning Organizations (MPOs)
- Economic development agencies
- Local agencies

To increase consistency with the stakeholder process, a PIP should be developed and incorporated into the scope. Airports must include a PIP within the master planning process to ensure compliance with grant assurances 6 through 9 of FAA's *Airports Planning Agency Sponsors Assurances* document. These requirements are outlined below:

- Consistency with Local Plans
- Consideration of Local Interest
- Consultation with Users
- Public Hearings

Airports should reference FAA AC 150/5050-4, Citizen Participation in Airport Planning for guidance in public involvement with airport planning and the incorporation of a PIP.

Florida airports should also understand FDOT's view on public involvement in FDOT Topic No. 000-525-050, Public Involvement, which recognizes the importance of PIPs and using outreach techniques adapted to the local conditions when providing transportation facilities.

It is recommended that, for public outreach, the scope should include at a minimum one coordination meeting with the sponsor, FAA, and local stakeholders such as City/Commission official(s), state officials, and Public Representative(s); and one public outreach meeting. In conjunction with the initial local coordination meeting and public outreach meeting, a PIP can be expanded to meet airport-specific needs and desires. This could include additional public outreach meetings, establishing an advisory committee, airport commission/authority/board or other related agency meetings, and meetings with FAA ADO representatives. These ADO representatives may include an environmental or planning specialist or the Assistant ADO Manager.

Information and examples on how to conduct meetings and the different types of meetings associated with Master Plans is discussed in detail within the Stakeholder and Public Involvement Chapter of the Master Plan Work Elements section.

Existing Conditions and Data Availability

A successful master planning process must take into account the existing conditions and available data for the airport and its surroundings. The scoping process should address existing and available documentation, facilities inventory, conditions at the airport, and any recognized or known data deficiencies. Generally, the existing conditions at the airport should be used to create an individualized context from which the desired outcome and changes can be made. The scoping document should acknowledge that the airport sits within a community and tailor the proposed planning efforts to meet the identified needs. As with most aspects of the airport master planning process, the conditions and inventory are unique to each airport and may require different efforts.

For more information on what should be included within master planning project regarding existing conditions, consult the Existing Conditions Chapter and *FAA AC 150/5070-6B, Airport Master Plans* which outlines typical existing conditions information that should be included and evaluated in the scoping for an Airport Master Plan. Generally, airports should scope for the collection and/or review of following existing information at a minimum:

- Inventory and Data Collection Process
- Airport History and Background
- Inventory Elements
- Airport and Surrounding Land Use
- Socioeconomic Data
- Aviation Activity
- Inventory of Financial Data

Airports with well-defined existing conditions information and documentation benefit from a reduced planning effort because much of this information can be referenced and noted in the scoping process and then ultimately used in the Master Plan.

Forecasts

Per *FAA AC 150/5070-6B, Airport Master Plans,* the short-term forecast (1 to 5 years) should support a capital improvement program, the intermediate-term (6 to 10 years) forecast should support a realistic assessment of needs, and the long-term (11 to 20 years) forecast should support a concept-oriented statement of needs in any forecast horizon. When developing aviation forecasts in the Master Plan, the airport should consider activities or data that may impact the specific forecasting needs. For example, if airport activity has been following the FAA Terminal Area Forecast (TAF), identified by the FAA to be within

If airport activity has been following the FAA Terminal Area Forecast (TAF), identified by the FAA to be within 10-percent in the five-year forecast period and 15-percent in the 10-year forecast period, new forecasts may not be needed unless significant demographic or economic changes in the community are anticipated. If substantial changes are anticipated that will change the forecast by 10-percent or more, approval will be required from the FAA

10-percent in the five-year forecast period and 15-percent in the 10-year forecast period, new forecasts may not be needed unless significant demographic or economic changes in the community are anticipated. If substantial changes are anticipated that will change the forecast by 10-percent or more, approval will be required from the FAA (more information is provided in the Aviation Forecast Chapter). For example, these changes to forecasts could result from:

- Establishment (or departure) of a major regional employer
- New service by a scheduled airline
- Anticipated changes in the airport
  - New fixed-base operator facility with flight training
  - Change in operational activity
  - Change in based aircraft fleet mix
  - New development

If the need for new forecasts is evident, these forecasts must be compared to the most recently published FAA TAF. Selecting appropriate forecast methods varies based on the needs of an individual airport. As stated in FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, forecasts should be:

- Realistic
- Based on the latest available data
- Reflect the current conditions at the airport
- Supported by information in the study
- Provide an adequate justification for the airport planning and development

The forecast process for Airport Master Plans consists of a set of similar steps that may vary from airport to airport, depending on the issues to be addressed and the level of effort required to develop the forecast. Steps in the aviation forecasting process are provided in detail in the Aviation Forecast section of the Master Plan Work Elements section. Individual airports should review the Aviation Forecast chapter to identify the intensity of the forecasting process that is needed accurately justify the recommendations of the Master Plan for purposes of appropriately scoping the forecast element.

When scoping the forecast, it is suggested that the FAA's Office of Aviation Policy and Plans (APO-110), *Forecasting Aviation Activity by Airport*, dated July 2001, be used to help determine what approaches to include within the scope. That report can be accessed at: www.faa.gov/data_research/aviation_data_statistics/. The FAA Operations and Performance Data web site, provides some historical traffic counts, forecasts of aviation activity, and delay statistics, but not for all airports.

Forecasts are one of the two sections of a Master Plan that are reviewed by the FAA (with the second being the ALP). As such, sensitivity to the effort associated with responding to the multiple reviews and comments should also be included in the scope. As discussed above, if it is anticipated that the forecast will differ by more than 10-percent from the TAF in the five-year forecast period or 15-percent in the 10-year forecast period, it may be appropriate to enhance the scope to account for the additional effort that may be required to justify the difference in forecasts.

Environmental Conditions

It is paramount to the success of master planning efforts that the environmental conditions and considerations are identified early and clearly within the scoping process. Potential environmental impacts related to development alternatives and potential permitting requirements should be thoroughly outlined within the project scope. It is important to note that in Change 2 of *FAA AC 150/5070-6B, Airport Master*

Plans, environmental analyses are handled differently than in prior versions. Change 2 suggests including environmental conditions in the inventory section as well as throughout all sections of a Master Plan, not just as a stand-alone element. This will affect scoping since environmental conditions should not necessarily be a stand-alone chapter or element but should be woven throughout the master planning document in places such as inventory, alternatives, and possibly the implementation plan.

Airports are encouraged review existing environmental studies and determine if the documentation is still representative of the conditions at the airport. Utilizing existing studies may reduce the overall effort needed in the environmental conditions sections. It is important that airports include environmental-related provisions from the *FAA Modernization and Reform Act of 2012* within the scope, which outlines the recycling and waste management requirements at airports. Airports should be cognizant that some level of sustainability planning should be considered in the Master Plan document. Recycling and sustainability elements within a Master Plan should be coordinated with both the FAA and FDOT to ensure the necessary components are included in the scope and the budget.

When addressing existing environmental studies or considering creating additional documents, airports must understand the required process based on the funding source of their Master Plan. Federally-funded airports should consult the National Environmental Policy Act (NEPA), while state-funded master plans should consult the *FDOT Project Development and Environmental (PD&E) Manual*. It should be noted that the FDOT PD&E guidance should only be used if the project is 100-percent state funded. When scoping a Master Plan, the airport sponsor should consult the FAA, FDOT, and local authorities to ensure that the applicable Federal, state, and local environmental policies are followed. The environmental conditions considered in the evaluation of alternatives should be tailored to each airport's size, setting, and operating conditions. The environmental conditions should be considered throughout the master planning process, starting with the scoping and the initial inventory of existing conditions through the alternatives development and into implementation.

More in-depth information on environmental studies and the actions that may trigger the analysis is explained within the Environmental Conditions section of **Part 3 – Master Plans: Product Development.**

Airport Layout Plans

An ALP is a scaled drawing (or set of drawings), in either paper or electronic form, that depicts the existing and proposed land and facilities necessary for the operation and development of an airport. The drawing(s) provides a graphic representation and tabular data of the existing conditions and long-term development plan for an airport. The ALP is a valuable tool for documenting and describing airport development needs. As such, it intended to be a living tool and should be updated with each infrastructure improvement that is implemented to accurately reflect current conditions.

Additionally, all airport development at Federally-obligated airports must be done in accordance with an FAA-approved ALP. For a development project to be eligible for Federal AIP funding, that project must also be shown on an approved ALP. FAA approval of the ALP indicates that the existing facilities and proposed development depicted in the ALP conforms to FAA airport design and safety standards in effect at the time of the approval.

When scoping the preparation of an ALP, either as part of a Master Plan or an ALP Update, the airport sponsor, FDOT, and the FAA must come to agreement on the format, content, and level of detail to be included in the drawings. The FAA's *Standard Procedure for FAA Review and Approval of Airport Layout Plans* (aka. Standard Operating Procedure 2.00, October 2013), provides a description of the FAA and sponsor roles in preparing, reviewing, and approving an ALP. It also provides a detailed checklist of

mandatory and optional items to be included in the drawings. This checklist should be used to help guide the scoping process. Several of the primary scoping decisions to consider are provided on the following pages.

Considerations when Scoping an ALP

- If the ALP is being prepared independent of a master planning effort, what type of supporting narrative is to be provided?
- Which drawing sheets will be prepared?
  - Required versus optional sheets
- How should the drawing sheets be formatted?
  - Are completely new drawings being prepared or are existing ones being updated?
    - If being updated, are the previous formats compatible with current software programs?
  - Will the sheets be prepared for electronic (eALP) or paper format (not particularly relevant currently, but may become more so when the FAA's eALP program is finalized)?
    - Though full eALPs are not yet a requirement, the FAA requires that new surveys be done to eALP standards, adding to the cost of the effort.
  - Color or black and white?
  - Sheet size – consider storage and production requirements.
  - Does the ALP set need to coordinate with or link to any local municipality or sponsor CAD or GIS systems?
    - If so, what are the standards or format requirements?
- What will be used as the base mapping for the drawing set and who will provide it?
  - Will new or existing aerial mapping and photogrammetry be used?
  - Are there any recent as-built survey data that needs to be incorporated into the base mapping?
  - Do PACS and SACS need to be established at the airport?
- Is an airspace obstruction analysis being performed?
  - What are the data sources going to be?
    - If new aerial mapping and photogrammetry is being obtained, confirm adequate survey extents and time of year (e.g., leaves on versus leaves off), known obstacles, FAA digital obstacle file, recent flight checks, photo slope surveys, recent removal or lighting actions, etc.
  - What are the Airports GIS (AGIS) standards to be met and who will have access to the FAA Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) website to upload data (AGIS is further explained in the ALP section of **Part 3 – Master Plans: Product Development**
  - Is there any data in the FAA's Surface Analysis Visualization (SAV) tool that can be used?

Considerations when Scoping an ALP

- Is a Property Map or Exhibit 'A' being prepared?
  - An Exhibit 'A' is needed to support FAA-funded land acquisitions and is prepared to a higher level of detail and with additional information than a Property Map. Guidance contained in *FAA AC 150/5100-17, Land Acquisition and Relocation Assistance for Airport Improvement Program Assisted Projects* and FAA SOP 3.00 should be used to scope the preparation of an Exhibit 'A' Property Inventory Map.
  - Is a boundary survey needed?
  - Is title and deed research needed?
  - Are there any avigation easements owned by the airport and where can that data be found?
  - Are there any encumbrances or right-of-way easements on airport property? Major utility easements, highway?
- Are noise contours being developed for depiction on land use drawings?
- For the airport data tables, do Pavement Condition Numbers (PCN) need to be calculated? And if so, who is responsible for preparing them?
  - PCN is required for Part 139 airports and for any runway work, at any airport, where that runway work is funded with AIP or PFC monies
- What is the ALP review and submittal process going to be?
  - Depending on the complexity, it is sometimes helpful to have an in-person work session with the FAA community planner and/or program manager to review the preliminary ALP draft prepared during the Master Plan.
  - Following meeting with the FAA and upon FAA and FDOT concurrence, will the drawing set be submitted in paper copies or uploaded to the FAA OE/AAA web portal for Lines of Business Review?
  - Will an airspace review be needed? If the ALP is only depicting as-built conditions, an airspace review and narrative report are not necessary (SOP 2.00, Section 2).
  - Determine the quantity and type (hard copies or electronic) of drawing sets to be produced and distributed at each submission point.

Schedules

Developing a realistic project schedule is significant as the schedule should establish deadlines for meeting planning process milestones and include timelines for completing technical products, conducting coordination efforts, and establishing formal and informal document review periods. An effective schedule should also clearly indicate decision points beyond which work should not proceed without airport owner/sponsor, FDOT and/or FAA approval, such as FAA review and approval of the Master Plan forecast.

FDOT Compliance Checklist Item!

FDOT provides checklist items that should be reviewed when developing the project schedule and deliverables. Ensuring adequate time in the schedule, coupled with an understanding of review and approval process will enable the airport to appropriately scope the plan. These checklist items can be found in **Appendix 3:**

Review and Approval of Draft Deliverables

Final Project Reviews

Final Project Approvals

Implementation of the Airport Master Plan

Deliverables

The project scope should specifically identify the draft and final work products of the master planning process. Additionally, the general level of detail should be described, including the number, type, and format of electronic and paper reports, drawings, and files. *FAA AC 150/5070-6B, Airport Master Plans* highlights the following deliverables for the master planning process. The exact products developed varies based on the complexity of the needs at an airport; however, deliverables noted below should be considered.

Technical Report

Contains the results of the analyses conducted during the development of the Master Plan. For complex studies, interim reports may be produced to facilitate coordination with various government agencies, tenants, users, the general public, and other interested parties

Executive Summary

Summarizes pertinent facts, conclusions and recommendations for public review. The executive summary can be used to publicize the findings of the Master Plan for consumption by elected officials and other agencies in addition to the general public.

ALP Drawing Set

Contains a graphical representation of the proposed development in the Master Plan and is typically produced as a separate set of full-sized drawings. In addition, the ALP drawing set is typically included in the Technical Report in reduced form.

Webpage

Many airport sponsors maintain a public-access webpage with general information about the governmental unit involved and specific information regarding the airport or airports operated by the sponsor. The Internet provides an excellent forum for the distribution of information on the progress of the study and its final findings and recommendations.

Public Information Kit

Throughout the Master Plan study, airport sponsor representatives may be asked to speak to community associations, civic clubs, and other organizations with an active interest in the airport. Visual aids such as models, summary brochures, or computer presentations are excellent tools to use at these events to maintain support for the airport development program.

Summary

Ultimately, the scoping effort lays the foundation for successful Master Plan development. Integrating key stakeholders (FAA, FDOT, local interest groups) early in the process will help to ensure that Federal and state requirements are being followed and that the goals of the airport and community are being met. Utilizing the methodology described in this chapter will ultimately help the airport sponsor understand all of the issues that need to be addressed as part of their master plan study.

Part 3 – Master Plans: Product Development

Section 1: Overview of Traditional Master Plan Work Elements

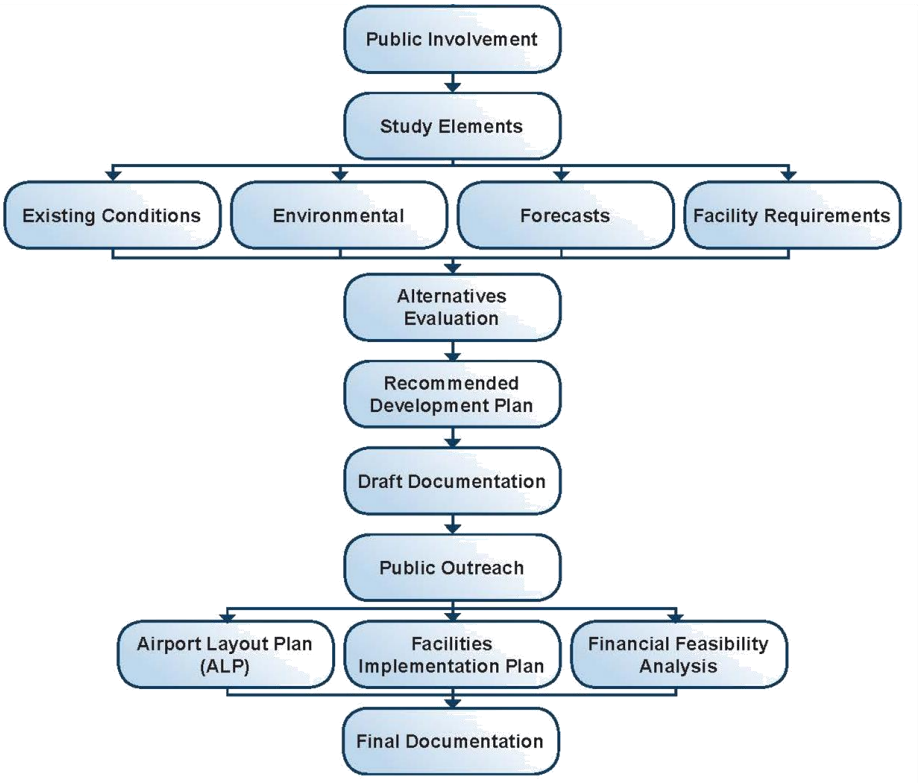
Master Plan Work Elements

This Master Plan Guidebook was developed to enhance *FAA AC 150/5070-6, Airport Master Plans* by providing additional guidance and resources, including Florida-specific information. This Guidebook is a more singular reference for a Florida airport completing a Master Plan as there are additional requirements of FDOT, State Statutes, Administrative Codes, and other state agencies that are applicable to Florida airports beyond the FAA guidance.

As every airport's characteristics, issues, opportunities, and role is unique, the traditional master planning elements and the topics focused on and complexity of the overall plan will vary. It is expected that the study will be tailored to the specific circumstances of the airport, including any that may not be addressed in this Guidebook. As the primary output of a Master Plan is the ALP and Airport Capital Improvement Plan (CIP), the study provides more value to the future development and funding agencies if it addresses the specific challenges and opportunities the airport faces.

Figure 4 illustrates the overall airport master planning process from determining what type of study is needed, involving interested parties, to conducting the research and analyses, obtaining stakeholder input, and developing the final documentation of the Report, ALP, and CIP. A brief summary of the overall Master Plan Work Elements included in this Guidebook are outlined below and discussed in detail in each associated section.

FIGURE 4. AIRPORT MASTER PLANNING PROCESS



Source: Kimley-Horn and Associates, Inc., 2016

Public Involvement Program (PIP)

A Public Involvement Program (PIP) is intended to encourage information sharing and collaboration between the airport sponsor and the stakeholders. This section introduces the key stakeholders, methods of public input, types of public involvement, as well as numerous other methods for properly implementing a PIP. It should be noted that the FAA requires some degree of public participation or input, but highly recommends a more robust program to obtain a greater understanding of the opportunities and constraints of the airport and support by the stakeholders.

Environmental Considerations

Consideration of environmental factors in airport master planning helps the sponsor evaluate airport development alternatives and provides information that will help expedite subsequent environmental processing. This section introduces the requirements and standards related to both state and Federal environmental regulations and provides an overview of documenting and incorporating environmental analysis into the overall Master Plan. While the Master Plan is not intended to conduct the full NEPA or FDOT PD&E process, the information collected and analyses conducted during the Master Plan will identify and help expedite subsequent environmental processes, permits, and approvals that may be needed.

Existing Conditions

One of the initial elements required for an Airport Master Plan is a thorough inventory of existing airport conditions to establish the baseline for the study's analysis and recommendations. Identifying airside, landside, and surrounding airport facilities and their conditions is critical to evaluating facility requirements and opportunities based on existing and forecasted demand. This section discusses collecting and compiling the data of pertinent topics from various sources into a useable format for use in the planning process.

Aviation Activity Forecasts

In the planning process, forecasts are the basis for which the decisions on what facilities will be needed and by when. Thus, reliable forecasts are necessary to provide justification for the funding and development of new infrastructure and policies. Based on historical data collected in the inventory process, a baseline for the aviation forecasts over the 20-year planning horizon can be established. Planners apply the appropriate methodology to the baseline, compare to other forecasts for reasonableness, and submit the forecasts to the FAA for approval. This section introduces sources for aviation activity, elements to be forecasted, methodologies, and documentation of the recommended forecasts.

Facility Requirements

Facility requirements involve the analysis of what additional facilities would be required beyond the existing airport infrastructure to accommodate forecasted aviation activity as well as meet Federal, state, and local regulations, including FAA design standards, and incorporate impacts from emerging trends and stakeholder input. This analysis culminates in a summary of deficiencies and opportunities that is used to develop the recommended development plan. This section highlights the emerging trends that may impact the airport, Federal and state design standards for the airfield that must be met, and resources to assist in the analysis.

Development and Evaluation of Alternatives

The alternatives development and evaluation process resolves deficiencies and builds on the opportunities identified in the facility requirements. As there is typically more than one solution available, the alternatives must be evaluated to arrive at the most appropriate development recommendation. The

ultimate goal of analyzing alternatives is to identify and evaluate all of the alternatives that are designed to meet the current and future needs of all airport users as well as keeping within the strategic vision of the airport sponsor. This section provides guidance on developing alternatives and evaluating the alternatives using specific criteria to determine the final recommended development plan.

Airport Layout Plans

The ALP is an illustrated development document for an airport approved by the airport sponsor, FDOT, and the FAA. The ALP consists of a series of drawings, known as an ALP Drawing Set, that are used to depict airport facilities developed based on either a Master Plan's analysis of needs determined by reviewing the forecasts, facility requirements, and alternatives evaluation, or through other evaluations that support the ALP's depiction of future development. This section reviews the different drawings included in the drawing set and the approval process.

Facilities Implementation Plan

A facilities implementation plan translates the recommended development plan into a series of projects that comprise the Capital Improvement Plan (CIP). Based on all of the information that is gathered throughout the life of the project, including considerations from the public as part of the stakeholder outreach process, the facilities implementation plan consolidates that information and identifies how and when project will be completed. The complexity of the plan depends on the size, type, and role of airport. In some cases, a very simple plan capturing required items may be all that is needed, whereas other situations may call for a more detailed and comprehensive plan information. This section introduces the key steps in developing a CIP from gathering information on the individual projects to scheduling the projects to sharing the plan with funding sources to secure future funding.

Financial Feasibility Analysis

The purpose of the financial feasibility task is to ensure the projects identified in the CIP are in line with anticipated available funding. The financial feasibility analysis identifies funding sources based on the airport's financial position and role and provides a plan for funding projects in both the short and long-term time frames. This step is important to ensure the CIP is realistic as it demonstrates an ability to fund the local share of the project. This section discusses potential funding sources and different types of analysis that may be completed to ensure the projects can be funded and add value to the airport.

Final Documentation

The project scope should specifically identify the draft and final work products of the master planning process. The exact products developed varies based on the complexity of the needs at an airport, but it is recommended that deliverables include a Technical Report, Executive Summary, Airport Layout Plan Drawing Set, Webpage, and Public Information Kit.

Section 2: Stakeholder & Public Involvement Program

Purpose

Establishing a PIP within a Master Plan can be critical to the success of the planning process. In this context, the public refers to all individuals who have contact with or an interest in the airport and its functions, often referred to as stakeholders. This list can range from tenants, employees, FDOT, the FAA, local governments, community members, and many other groups. It is anticipated that every airport will embark on a unique stakeholder and PIP to meet their specific needs. It is also anticipated that the public engaged will be specific to each airport.

Regardless of the intensity of the public interest or the required level of participation, each airport should create a PIP as part of the Master Plan. Each PIP will address and include the public throughout the master planning process to involve the appropriate stakeholders. One critical element of an effective PIP is clearly and simply providing information to the interested parties. In many instances, those affected by changes at an airport will have limited knowledge about airports and how airports operate (this is especially true for GA airports). In these instances, the PIP should focus on purposefully distributing information to these groups to provide an understanding of the goals and the process of the Master Plan that is being developed.

PIP Requirements

An airport's level of public involvement should strive to reflect the size of the airport and the community interest in the airport's Master Plan.

In *FAA AC 150/5070-6B, Airport Master Plans*, the FAA states**:**

> "*Most planning studies will fall between the minimal requirements of a small airport study and extensive public involvement required of a large complex study. The FAA, the airport sponsor and the consultant may be the only participants as long as they coordinate with appropriate local officials, stakeholders, and ensure citizen participation through public information sessions.*"

FDOT also provide guidance on their prioritization of public involvement. As such, FDOT's position on PIPs is summarized in FDOT Topic No. 000-525-050, *Public Involvement*, which states:

> *"The Department recognizes the importance of involving the public in information exchange when providing transportation facilities and services to best meet the state's transportation challenges. Therefore, it is the policy of the Florida Department of Transportation to promote public involvement opportunities and information exchange activities in all functional areas using various techniques adapted to local area condition and project requirements."*

Early in the master planning process, the anticipated level of public involvement needed for the project should be determined. However, regardless of the public involvement process that is selected, public involvement programs as part of an Airport Master Plan do not require public hearings, unlike the environmental process under NEPA.

Grant Assurances

Upon accepting Federal funds, an airport is obligated to a set of grant assurances, highlighted in the FAA document *Assurances: Airport Sponsors*. In total, there are 39 grant assurances that airports must comply with. Of these, three grant assurances are specifically related to stakeholder and public involvement; these are:

FAA Grant Assurances for Public Involvement

Grant Assurance #7 – Consideration of Local Interest

Ensures that the sponsor has given fair consideration of the communities in or near where the project may be located

Grant Assurance #8 – Consultation with Users

Ensures that the sponsor, in making a decision to undertake any airport development project under Title 49, United States Code, has undertaken reasonable consultations with affected parties using the airport at which project is proposed

Grant Assurance #9 – Public Hearings

In projects involving the location of an airport, an airport runway, or a major runway extension, it has afforded the opportunity for public hearings for the purpose of considering the economic, social, and environmental effects of the airport or runway location and its consistency with goals and objectives of such planning as has been carried out by the community and it shall, when requested by the Secretary, submit a copy of the transcript of such hearings to the Secretary

More information on Grant Assurances can be found at: www.faa.gov/airports/aip/grant_assurances/

There are also 24 FDOT Aviation Program Assurances that are used as part of JPAs between FDOT and airports. Though none of FDOT's grant assurances are specifically related to public involvement, they do cover topics like material available for public review and public open access to governmental proceedings.

Florida Sunshine Law

Florida Statutes Chapter 286.011, *Public Meetings and Records; Public Inspection; Criminal and Civil Penalties*—commonly known as the "Florida Sunshine Law"—is an important component of the Master Plan PIP. The "Florida Sunshine Law" states that:

> *"All meetings of any board or commission of any state agency or authority or of any agency or authority of any county, municipal corporation, or political subdivision, except as otherwise provided in the Constitution, including meetings with or attended by any person elected to such board or commission, but who has not yet taken office, at which official acts are to be taken are declared to be public meetings open to the public at all times, and no resolution, rule, or formal action shall be considered binding except as taken or made at such meeting. The board or commission must provide reasonable notice of all such meetings."*

Since public use airports in Florida are typically owned and/or operated by city or county governments or by airport authorities created under statutes of the state, airport meetings are subject to the "Florida Sunshine Law." As such, any gathering—whether formal or casual—of two or more members of the same public or governmental entity where they discuss a subject that could reasonably be considered to come before that entity for action is considered to be a meeting.

Florida Specific Information!

Since public use airports in Florida are typically owned and/or operated by city or county governments or by airport authorities created under statutes of the state, airport meetings are subject to the "Florida Sunshine Law."

Most meetings conducted as part of a Master Plan PIP are subject to the provisions of the statute because they are advisory in nature. If the committees were only to conduct fact-finding activities including gathering and reporting information, they would be exempt. If the planning team is asking for opinions and soliciting advice during meetings, the "Florida Sunshine Law" applies.

Public agencies are also permitted to adopt reasonable procedures with respect to the orderly conduct of public meetings; for example, agencies are allowed to restrict the amount of time each individual speaks. When there are many people wishing to speak, the agency is allowed to request that a representative from each side speak rather than everyone present. More information on the "Florida Sunshine Law" can be found at: www.leg.state.fl.us/statutes/.

Types of Public Involvement

A PIP can be simple or complex, usually depending on the size of the airport and the interest of the community. Simple programs can even take the form of a webpage on an airport website that keeps the community informed. Although this simple form of public involvement doesn't involve face-to-face interaction, it is vital that the webpage provides ample information and allows for the public to comment and discuss. More complex PIPs can involve multiple committees and hired consultants to address the public. A schedule of public meetings to inform the community and facilitate open discussion is recommended for more complex plans. Large public involvement forums and meetings can take place at other public venues such as transportation plan updates or other meetings.

An airport should determine how extensive a PIP needs to be based on the airport size, scope of change, and anticipated public interest. However, all plans should provide stakeholders with adequate opportunities to provide input. Of importance for this process is determining the ways in which information will be both distributed and received as part of this process. Understanding how the information will flow between an airport, the public, and interested parties will help when determining the type of PIP necessary for a project.

PIP Timing

The PIP should be integrated and initiated in the master planning process as early as possible. Early involvement helps identify key concerns and enhances communication between the public and the planning team, which can drastically improve the focus and, ultimately, results of the master planning process. Many airports are vital to the communities in which they reside, and the public may distrust the planning team, the plan's results, and the airport if not actively invited to or involved in the process. Though it is unlikely that every concern voiced will be eliminated, obtaining input from the public before recommendations are developed affords the planning team the opportunity to mitigate the concerns, garner broader support, and develop a more successful project.

Stakeholder Identification

Each airport will have its own list of stakeholders and, as previously mentioned, the involvement will vary based on the scale of project being conducted. Below is a list of typical stakeholder representatives that may be involved within the airport master planning process:

- Airport Sponsor Agency (each sponsor must be a public agency and meet the requirements of 14 CFR 152.103[a][3])
- FDOT personnel (any FDOT personnel authorized to review, comment, and implement Airport Master Plan development through the aviation work program)
- FAA personnel (any FAA employee with insight into AC 150/5070-6B)
- Interested groups (any group interested in the Airport Master Plan, ex: homeowner associations, developers, tourism boards, etc.)
- Resource agencies (Transportation Security Administration, elected officials, etc.)
- Metropolitan Planning Organizations
- Economic development agencies
- Local agencies (Public Works Department, Planning Department, etc.)
- Users and tenants
- General public

Each master planning project will have different issues to address and therefore needs to engage different stakeholder groups. It should be noted that additional stakeholder groups should be included throughout the planning process as they are identified.

Stakeholders should understand that their participation in the planning process may be advisory in nature and that their involvement does not necessarily mean they have decision-making authority. It is the airport sponsor and planning team's responsibility to ensure the appropriate message is conveyed at the beginning of the PIP and throughout as necessary.

Role and Purpose of Stakeholder and Public Involvement

Identification of Issues

One of the most important outcomes of a PIP is the development and identification of key issues affecting the airport and its stakeholders. Early in the master planning process, the public should be made aware of the anticipated direction and ultimate goal of the Master Plan that was identified in the Initial Needs Determination. Utilizing any number of the methods, tools, and techniques identified in the Methods and Techniques for Stakeholder Involvement and Tools for PIP Communication sections will help the project team understand how the proposed Master Plan will affect the public. The concerns that the public voice early in the process will ultimately help determine policy decisions, influence technical criteria and standards, and help identify alternatives. An effective PIP program will help create an airport master planning project that meets the needs of both the airport and its stakeholders.

Review and Comments

When appropriate, identified stakeholders should be afforded the opportunity to review and comment on Master Plan deliverables. Since this may lead to additional work for the project team, a clear understanding of how the comments will be addressed must be noted during the scoping process. Giving stakeholders this review opportunity ensures the conditions are accurately portrayed and provide meaningful and understandable results. Identifying potential solutions and corrections that are realistic for the airport should remain a primary focus of the review. Comments allow for the stakeholders to present their issues or ideas that the airport should strive to address.

Application to Other Master Plan Elements

The PIP process, when implemented effectively, should provide insight on the issues and concerns of the affected community. The information obtained as part of the PIP process should then be considered in the development of the facility requirements and alternatives development elements. It is likely that as the project progresses, new information will arise that causes the alternatives development process to refine and reprioritize some of the elements. Allowing for development to be an iterative process will ultimately provide more flexibility to the project team when developing the Master Plan.

Methods and Techniques for Stakeholder and Public Involvement

There are various methods to employ when distributing and receiving input from the public. The method used will depend on how interested the public is in the Master Plan, the practices and policies of the airport sponsor, the complexity of the Master Plan, and the budget. A balance must be struck between the need for public involvement and the costs associated with the process. Complex master plans may necessitate larger stakeholder groups, but it is important to ensure the discussions remain focused and meaningful. All public meetings should be held in a manner consistent with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*. This Order requires each Federal agency to identify and address "the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low income populations." A selection of tools and techniques that can be used during a Master Plan are discussed below.

Committees

The two most common forms of committees formed as a part of a Master Plan are a Technical Advisory Committee (TAC) and Citizen's Advisory Committee (CAC). Depending on the size and complexity of the Master Plan, it may be beneficial to combine the committees into a single group. The roles of each of the committees should be clearly defined and carefully explained at the beginning of the program.

- **Technical Advisory Committee:** Will review and advise on the technical merit of the Master Plan and verify technical accuracy of documentation. Comprises:
  - Stakeholders with a high level of technical knowledge about airports and airport operations
  - Review documents for technical accuracy
  - Major stakeholders in the airport's operation
- **Citizen's Advisory Committee:** Bring a consensus of opinion from their respective constituencies to the Master Plan project team and ensure public concerns are considered and addressed. Comprises:
  - Stakeholders who can interact with the planning team and take information back to their constituents
  - Review documents to ensure public concerns are considered and addressed
  - Representatives from all stakeholders

Public Information Meetings

There are several types of public information meetings that can be implemented into a master planning process; an "open house" and the "formal public hearing" are two of the more popular choices, along with workshops.

- **Open House**: Informal events that provide the public with an opportunity to interact with airport staff, ask questions, and offer comments on the plan in a more informal setting
  - Airport should provide relevant information, maps, and data

- **Formal Public Hearing**: Formal events held specifically to obtain public testimony or comment on a proposed action or decision
  - Held to obtain input on a variety of proposed actions including environmental impact statements, permits, plans, and proposals
  - Hearing is recorded and an official transcript of the meeting is made publicly available
  - Not mandatory in a Master Plan, but should be considered for more complex plans
- **Workshops**: Include a small group of stakeholders and addresses a narrowly-defined topic
  - Usually short and task-focused

For additional information on public involvement techniques, please use the Federal Highway Administration's (FHWA's) Public Involvement Techniques for Transportation Decision-Making website, available at: www.fhwa.dot.gov/planning/public_involvement/publications/techniques/chapter02.cfm

Meeting Organization

Meetings can be organized in a myriad of ways, and may include some of the following techniques:

- **Visioning:** This process allows the group to develop long-term goals for the planning process and identify how airports should address those goals. This step usually occurs at the beginning of the Master Plan study.
- **Brainstorming:** This allows the group to generate ideas and identify issues within the planning process. This technique is an effective tool for reducing conflict and allows multiple groups to share their opinions. This technique should be implemented in various stages of the master planning process including—but not limited to—alternatives, funding, and implementation strategies.
- **Facilitation:** Regardless of the meeting method selected, having a facilitator present is key to ensuring all groups have their opinions heard and keeping the meeting on time.

Tools for PIP Communication

Communication Methods

When possible, the planning team should use alternative communication methods to ensure stakeholders have an opportunity to participate in the planning process. Some examples of communication methods include:

- **Computer Presentation**: Display data, images, and in some cases allow for interactive experiences
- **Interactive Television**: Using a cable service to reach meeting members
- **Information Gathering Survey**: Both online and paper alternatives
- **Live Polling**: Surveys held during stakeholder meetings offer near instant data gathering
- **Teleconferencing/Video Conferencing**: Can reach stakeholders who were unable to meet face-to-face
- **Visualization**: Includes mapping exercises, visual preference surveys, and 3D visualization
- **Newsletters:** Provide summary information to stakeholders who were unable to attend meetings
- **Websites/Social Media:** Reaches a different demographic of the public and allows for efficient feedback, allows for more frequent updates to information

Distribution of Information

Information should be distributed throughout the airport master planning process, as it will allow for the dissemination to those directly involved in the master planning process and those interested in learning about the project. Stakeholders should be given the opportunity to provide their contact information so they may receive projects updates. Typical methods of information distribution include:

- **Printed Materials**
  - Pamphlets, brochures, information packets, press releases, newspaper articles and advertisements, and general information packets
  - Can be made available at the airport as well as at local governmental offices
- **Webpage**
  - Provide citizens with information on upcoming meetings as well as draft deliverables
  - Provides a method for distributing information to a large number of people
  - Can be included as an additional page on the airport/municipal website
  - Can be developed as a stand-alone page dedicated to the Master Plan (Ex: Wordpress.com)
  - Can include electronic access to any or all printed materials for greater accessibility
- **Social Media**
  - Facebook™, Twitter™, and Instagram™ accounts can be used to provide information about the planning process and meeting times
  - Social media can also allow for constant public input that the project team may address

Challenges of Communication

One of the challenges of effectively communicating with stakeholders is the complex nature of airports and airport operations. In many instances, the public is not familiar with how an airport functions or even what role an airport plays in a community. Therefore, as part of any successful PIP, complex technical components of the Master Plan must be presented in a way that individuals or groups who are unfamiliar with airports can understand. In many instances, the best way to distribute this information is through small group or one-on-one meetings with established members of the community. This allows the information to come from a trusted source and may make concerned parties more open to the process. Below are examples of ways to communicate technical information to the public effectively:

- **Use the TAC and CAC to distribute important information**
  - The TAC and CAC are likely to be integrated with the local community and should understand the different groups and entities that may be a challenge to communicate with. Utilizing their knowledge of the issues that are important to the community will allow the PIP to be developed so that pertinent information can be distributed based on the interests of different groups
- **Meet with leaders of community groups**
  - Meeting with community leaders allow their constituents to be able to hear information from people they are familiar with and trust. If it is anticipated that members of the community will be opposed to certain airport development, scheduling meetings with the leaders of those communities provides an opportunity to distribute information at a smaller scale and allows for the information to be distributed back to the community from people they are familiar with. Holding these meetings early in the process will allow the concerns of the community to be incorporated into the Master Plan and will also increase the trust the community has in the master planning process
- **Meet with key stakeholders**
  - If it is likely that a group is going to oppose any portion of a Master Plan, meeting with them early in the process and getting their input will help in the group feeling that their concerns are being heard. Once the concerns are documented, alternatives can be developed, to the extent feasible, that will accommodate and mitigate the components of the Master Plan that they oppose.

Documentation of PIP in Master Plan

Key Issues

As mentioned above, stakeholder groups and public meetings should be utilized early and often in the master planning process to ensure all issues are identified and mitigated, to the extent feasible. Key issues addressed during the master planning process should be presented to the public in a manner that is clear and accessible. The information gathered throughout the planning process should be thoughtfully and thoroughly documented within the PIP so that those who participate are able to see their input reflected in the plan.

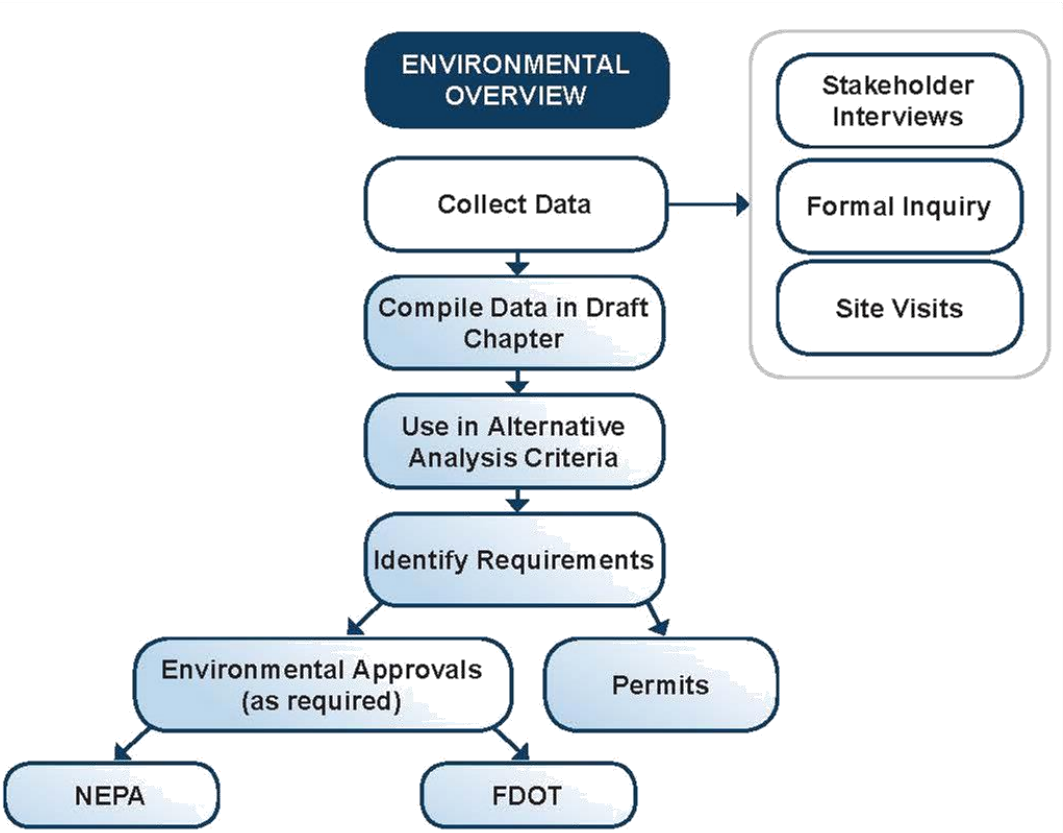
PIP

The PIP should be documented within the appendix of the completed Master Plan document. This should include—but is not limited to—meeting minutes, committee lists, flyers, newsletters, and advertisements used during the PIP. The appendix will then serve as the official record of the PIP throughout the planning process.

Section 3: Environmental Considerations

An important element of an Airport Master Plan is identifying and documenting environmental issues that can affect existing airport facilities as well as proposed short- and long-term developments. These considerations are important because both state and Federal requirements can play a major role in how these issues are addressed or considered. As shown in **Figure 5**, environmental considerations must be identified and assessed to help the airport sponsor thoroughly evaluate development alternatives and expedite subsequent environmental processing. Of importance is understanding the differences in environmental processes for projects that are funded by the FAA or FDOT. Both of these processes are further described in this section. Another important consideration is that any environmental considerations identified during the master planning process should set the stage for future state and Federal environmental processes that may be needed. It is not the intent of the Master Plan to include the full NEPA or FDOT PD&E process; rather, the information collected during the Master Plan should identify and set the stage for understanding what future environmental processes may be needed.

FIGURE 5. ENVIRONMENTAL OVERVIEW



Source: Kimley-Horn and Associates, Inc., 2016

Prior to beginning an Airport Master Plan, it is important for the airport (and its consultant) to understand what environmental issues may be present at an airport. To the extent feasible, this information should be understood during the scoping and budgeting process to ensure that the Master Plan budget allows for the proper environmental analysis to be completed. In the event that the environmental analysis outgrows the context of the master planning scope, a more detailed environmental study may be required for the airport. Understanding the environmental issues that are present at an airport early in the master planning process will help to ensure that proper emphasis is given to documenting environmental issues.

Understanding the environmental issues that are present at an airport early in the master planning process will help to ensure that proper emphasis is given to documenting environmental issues

Utilizing existing maps of the airport area, available documents, aerial photography and online resources, planners can establish a general overview of sensitive environmental resources both on and around the airport. Areas within the Master Plan that benefit from the inclusion of environmental considerations include:

- An inventory (overview) of the airport's environmental setting
- Potential environmental impacts of airport development alternatives
- Environmentally-related permits that may be required for recommended development projects

The importance of environmental planning to the FAA is highlighted in AC 150/5070-6B, which recommends the master planning process consider the needs of subsequent environmental review processes:

> *"The master plan should include thoroughly supported project justifications and thorough documentation of alternatives that meet the planning need and are reasonable and feasible (environmentally as well as technically); and should note any effects of the airport development alternatives on sensitive environmental resources."*

In the past, Airport Master Plans typically provided a general environmental overview as a stand-alone component of—or subsequent to—an alternatives analysis. Due to the sensitivities and limitations to potential airport developments, the FAA now recommends that planners develop each chapter of the Master Plan with environmental considerations in mind and incorporate them into the appropriate chapters, such as existing conditions and alternatives development and evaluation.

Four primary resources to utilize when examining environmental considerations for Airport Master Plans are shown on the following page.

FAA Order 1050.1F, Environmental Impacts: Policies and Procedures

- Should be examined to ensure compliance with NEPA and regulations issued by the Council on Environmental Quality (CEQ). The requirements in this Order apply to, but are not limited to Federal actions such as grants, loans, contracts, leases, construction and installation actions, procedural actions, research activities, rulemaking and regulatory actions, certifications, licensing, permits, plans submitted to the FAA by state and local agencies for approval, and legislation proposed by the FAA.

FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions

- This document is a companion to Order 1050.1F *and* should be consulted as a guide to help planners identify potential environmental impacts specific to the study airport that should be considered as planning continues. Note: this order is currently being updated to incorporate the changes to FAA Order 1050.1F from version 1050.1E.

FDOT Project Development and Environment (PD&E) Manual – Non-Federal Projects

- This chapter should be referenced for any project that is 100-percent state-funded. This manual defines the type of documentation required for non-Federal projects, including State Environmental Impact Reports (SEIR), Non-Major State Actions (NMSA), and projects without FDOT involvement. It should be noted, however, that a PD&E is not sufficient for a project that is state-funded but that has a Federal action (such as ALP approval) included. In this instance, the NEPA process would be required.

Florida Statutes (F.S.)

- These are the codified statutory laws of Florida. These Statutes are updated annually after the conclusion of a regular legislative session.

Federal and State Environmental Processes

FAA Guidance

FAA Orders 1050.1F and 5050.4B provide information for fulfilling NEPA and CEQ requirements for airport actions under the FAA's authority. For the purposes of an Airport Master Plan and the development of airport alternatives, it is not necessary to document environmental considerations to the extent identified in the NEPA process. However, the environmental categories outlined in FAA Orders 1050.1F and 5050.4B should be examined and documented in the Master Plan as a precursor to any subsequent NEPA environmental requirements (Categorical Exclusion (CATEX), Environmental Assessment (EA), and Environmental Impact Statement (EIS)) as a result of recommended alternative developments.

The Environmental Overview should document environmental conditions that should be considered when identifying and analyzing airport development alternatives. Per *FAA Order 5050.4B, National Environmental Policy Act (NEPA*) *Implementing Instructions for Airport Actions* and *FAA Order 1050.1F, Environmental Impacts: Policies and Procedures*, the environmental categories shown in **Table 8** should be reviewed as part of the Environmental Overview.

TABLE 6. ENVIRONMENTAL CATEGORIES

Environmental Categories	
Air quality	Biological resources (including fish, wildlife, and plants)
Climate	Coastal resources
Department of Transportation Act, Section 4(f)	Farmlands
Hazardous materials, solid waste, and pollution prevention	Historical, architectural, archeological, and cultural resources
Land use	Natural resources and energy supply
Noise and noise-compatible land use	Socioeconomics, environmental justice, and children's environmental health and safety risks
Visual effects (including light emissions)	Water resources (including wetlands, floodplains, surface waters, groundwater, and wild and scenic rivers)

Source: Adapted from FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions and FAA Order 1050.1F, Environmental Impacts: Policies and Procedures

NEPA Process

Once a preferred development alternative has been identified and proper environmental documentation for that alternative has been provided, the FAA must complete its project approval process. Specific components of the proposed alternative for a project with a Federal action will require additional environmental review in the form of a CATEX, EA, or EIS.

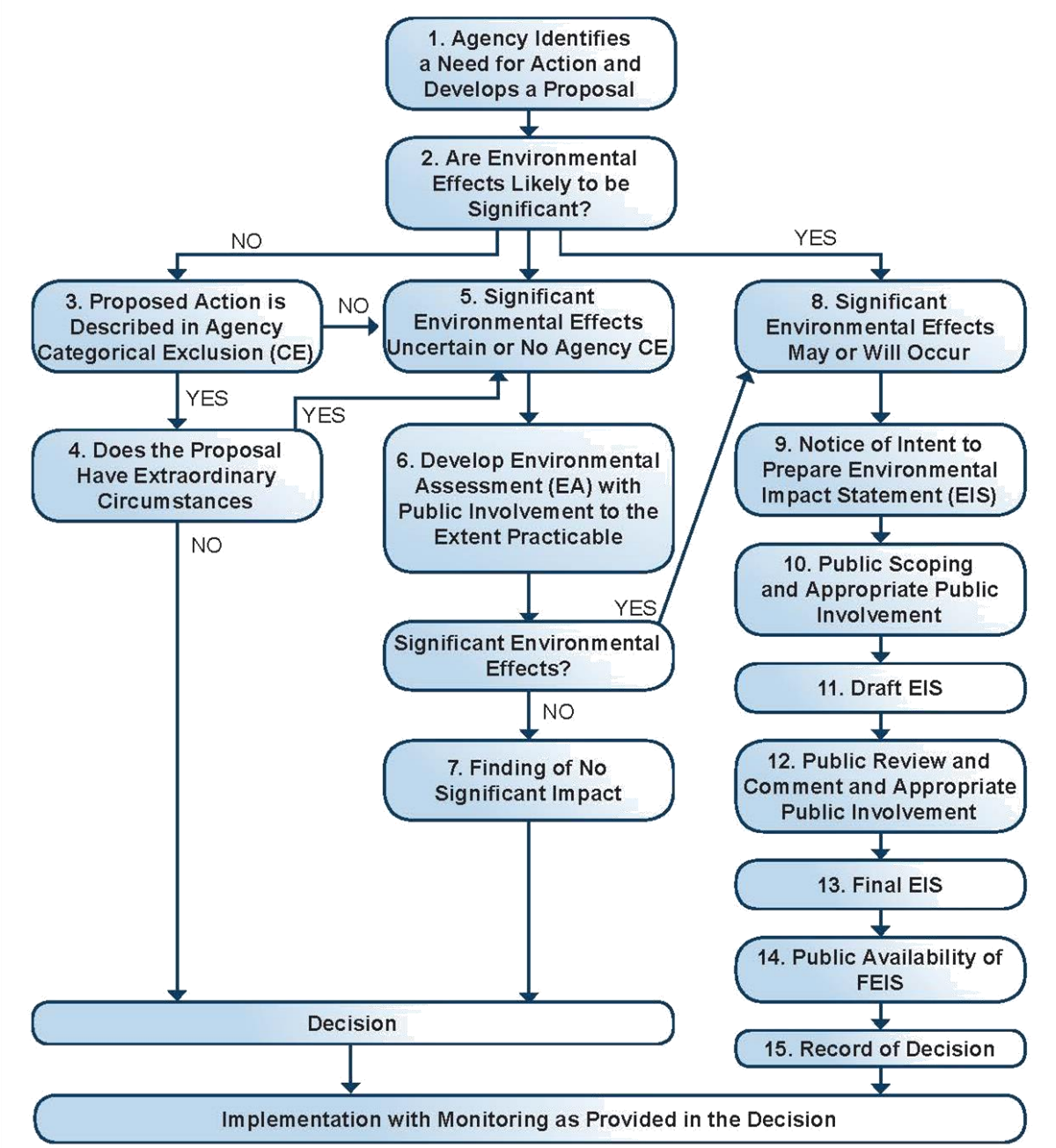
The NEPA process is not intended to be completed as part of a Master Plan study, this information is intended solely to provide an overview of the process

A CATEX is required when a Federal action may be "categorically excluded" from a detailed environmental analysis. *See* Chapter 5, Paragraph 5-6 of Order 1050.1F for the descriptions of FAA's categorically excluded actions. This level of environmental analysis is needed if the action (preferred

development alternative) does not individually or cumulatively have a significant effect on the human environment.

The FAA may determine that a CATEX does not apply for specific components of a preferred alternative. In that case, an EA may be required. An EA determines whether or not the proposed alternative has the potential to cause significant environmental effects (see Chapter 6 of Order 1050.1F). If the FAA determines the proposed alternative will significantly affect the quality of the human environment at or near an airport, an EIS may be required. The regulatory requirements for an EIS are more detailed and rigorous than those of an EA (see Chapter 7 of Order 1050.1F). A graphical representation of the NEPA study determination process is shown in **Figure 6**.

FIGURE 6. THE NEPA PROCESS



Source: A Citizen's Guide to NEPA, 2007

State Guidance

The FDOT PD&E Manual is divided into two parts: Part 1: Process and Guidelines, and, Part 2: Analysis and Documentation. Both parts can be useful and should be referenced in the Environmental Considerations section of a Master Plan. The Non-Federal Projects chapter (found in Part 1) provides the information for fulfilling non-Federal project requirements under FDOT's authority. For the purposes of an Airport Master Plan and the development of airport alternatives, it is not necessary to document environmental considerations to the extent identified in the PD&E Manual – Non-Federal Projects process. However, the environmental categories outlined should be examined and documented in the Master Plan as a precursor to any subsequent environmental requirements such as A Non-Major State Action (NMSA) checklist, State Environmental Impact Report (SEIR), or Projects without FDOT involvement. Other sections of the FDOT PD&E Manual should be referenced in environmental considerations portion of a Master Plan including Part 1 Chapter 6: Environmental Assessment.

Florida Specific Information!

For the purposes of an Airport Master Plan and the development of airport alternatives, it is not necessary to document environmental considerations to the extent identified in the PD&E Manual – Non-Federal Projects process

A Non-Major State Action (NMSA) checklist or State Environmental Impact Report (SEIR) is required for all non-Federal transportation projects where FDOT is responsible for providing funding

State Environmental Requirements for Non-NPIAS Airports

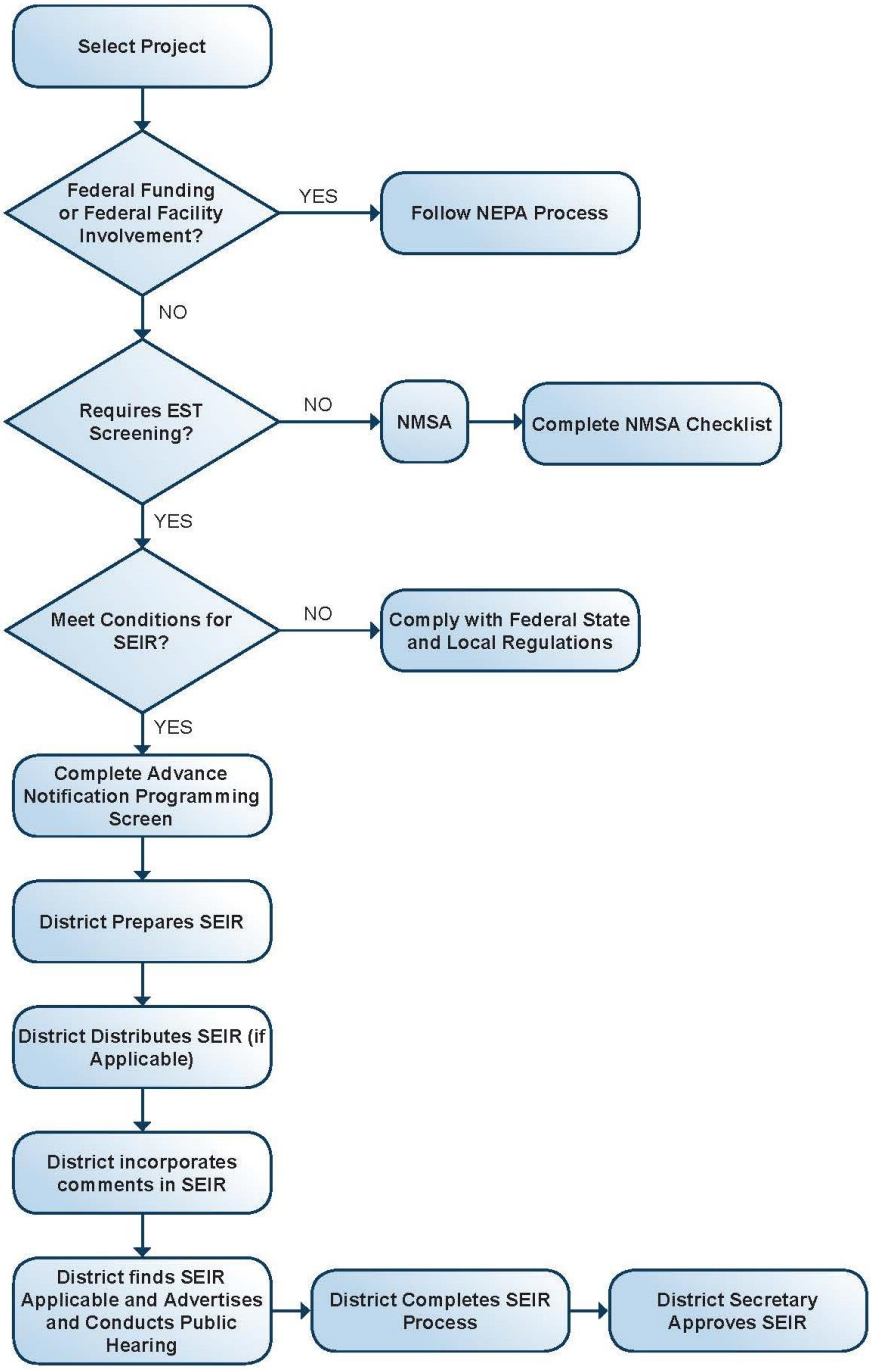
The previously mentioned environmental resources and evaluation processes apply to all airports in the FAA's NPIAS. It is important to note that non-NPIAS airports in Florida are subject to a separate environmental evaluation process with differing requirements. The level of assessment and documentation depends on the nature of the project, the potential for impacts, and FDOT's level of the involvement.

A Non-Major State Action (NMSA) checklist or State Environmental Impact Report (SEIR) is required for all non-Federal transportation projects where FDOT is responsible for providing funding. This is exclusive to state-funded projects, not FAA/Federally funded projects. It should be noted, however, that this process is not sufficient for a project that is state-funded but that has a Federal action (such as ALP approval) included. In this instance, the NEPA process would be required. There are three options for documenting the environmental evaluation of non-Federal projects:

1. **SEIR** – required for non-Federal transportation projects that require screening through the FDOT Environmental Screening Tool (EST). For these projects FDOT is the lead agency, and in some cases, FDOT is a cooperating agency rather than the lead agency.
2. **NMSA** – required for FDOT projects which do not require EST screening and which do not have significant environmental effects. NMSAs are only required when FDOT is the lead agency.
3. **Projects without FDOT involvement** – used when FDOT is not the lead agency; however, compliance with Federal, state and local regulations is still required. The same procedures used when developing a SEIR can be followed. This document should not be called a SEIR.

A graphical depiction of the non-Federal environmental process is shown in **Figure 7**. Additional information regarding environmental requirements pertaining to non-Federal projects in Florida can be found on the FDOT Environmental Management Office website: www.dot.state.fl.us/emo/pubs/pdeman/pdeman1.shtm

FIGURE 7. NON-FEDERAL ENVIRONMENTAL PROCESS



Source: Florida Project Development and Environment Manual

Federal and State Statutory Requirements

In addition to FAA Orders 1050.1F and 5050.4B and the PD&E Manual – Non-Federal projects chapter, Florida Statutes should also be consulted. FDOT projects are subject to environmental regulations that Federal, state, county, and local agencies oversee. Several of the environmental policies administered by these agencies share similar requirements, and consulting with regional planners can streamline agency coordination efforts.

Additional Considerations

Project Identification

As noted previously, for an Airport Master Plan, it is important to identify existing environmental issues that impact an airport as well as those that may arise due to the implementation of future development alternatives. It is imperative that all development alternatives are fully evaluated based on any known or potential environmental impacts on or near an airport. This evaluation helps identify recommended alternatives that may be included in the Master Plan. It also facilitates the decision-making process the FAA must complete as part of its project approval process. When a project enters the NEPA review process additional alternatives must be considered. Per *FAA AC/5070-6B, Airport Master Plans*:

1. The facility requirements and alternatives analysis chapters of the Master Plan should provide sufficient documentation regarding the justification for each project so that these chapters may serve as the basis for the purpose and need section of any environmental document.
2. Planners and environmental specialists should identify the potential key environmental impacts of each development project as part of the Master Plan alternatives analysis.
3. For some airports, only a few of the environmental impact categories will need to be discussed in the alternatives analysis (such as noise, wetlands, and social impacts), based on location-specific environmental issues identified in the environmental overview. Planners do not need to list each specific impact category mentioned in FAA Order 5050.4B, but only those resources the alternatives would likely affect.

To the extent feasible, during the Master Plan scoping process, planners should try to identify all potential short-term capital development projects that may be recommended in the Master Plan that would trigger additional environmental processing, such as safety-related projects. However, environmental analysis should not begin until the projects have been evaluated for their purpose, need, alternatives analysis, and sufficient justification. If an airport identifies capital development projects with sufficient justification before the Master Plan is complete, proceeding with environmental documentation and referencing said documentation in the Master Plan is recommended.

Permits

Permits that may be needed for each proposed project—whether for NPIAS or non-NPIAS airports—should be identified in the Facilities Implementation Plan section unless an issue in the alternatives has been identified and the number or type of permits is different under the different alternatives.

Although such requirements can vary greatly within each locality, several of the permits that are typically necessary include:

- Clean Water Act, Section 404 Dredge and Fill Permit
  - This is a Federal action and will require the NEPA process by the U.S. Army Corps of Engineers
- Air Quality Permit for onsite batch plants or other construction-related activities
- Local government construction permits

- Growth Management Permits
- United States Fish and Wildlife Service, National Marine Fisheries Service opinions, or state Wildlife and Game Commission Permits, if protected and endangered species could be impacted
  - This is a Federal action and will require the NEPA process by the U.S. Fish and Wildlife Service the National Marine Fisheries Service (office of the National Oceanic and Atmospheric Administration)
- Clean Water Act, National Pollution Discharge Elimination System Permits
  - This is a Federal action and will require the NEPA process
- Florida Department of Environmental Protection

Emerging Trends in Environmental Considerations

Sustainability

Some element of sustainability planning must be incorporated into a Master Plan if no existing sustainability management plan exists for an airport. The FAA provides guidance and lessons learned on sustainability planning as determined through their Sustainability Pilot Program at: www.faa.gov/airports/environmental/sustainability/. The FAA allows for sustainability to be incorporated into a Master Plan as either a stand-alone chapter or incorporated into each chapter, as appropriate; though, incorporating sustainability throughout a Master Plan may yield more benefits. As stated by the FAA in the document *Report on the Sustainable Master Plan Pilot Program and Lessons Learned*, the FAA states that

> *"Despite the challenges, integrating sustainability into a master plan affords more opportunities to align sustainability and planning. Airports that chose to prepare a Sustainable Master Plan were pleased with their decision to do so. With one document to work from, it was easier for airport management and consultants to marry needed development with sustainability initiatives. Based on the master plans we've reviewed, those that intersperse sustainability throughout the document are more effective than ones that devote a chapter to the topic."*

Recycling

The FAA Modernization and Reform Act of 2012 (FMRA) included provisions for AIP airports for recycling, reuse, and waste reduction to be more of a focus during the master planning process. The FRMA specifically provides two sections related to recycling, reuse, and waste reduction:

1. Section 132 (b) of the FMRA expanded the definition of airport planning to include "developing a plan for recycling and minimizing the generation of airport solid waste, consistent with applicable state and local recycling laws, including the cost of a waste audit."
2. Section 133 of the FMRA added a provision requiring airports that have or plan to prepare a Master Plan, and that receive AIP funding for an eligible project, to ensure that the new or updated Master Plan addresses issues relating to solid waste recycling at the airport. This includes:
   - The feasibility of solid waste recycling at the airport
   - Minimizing the generation of solid waste at the airport
   - Operation and maintenance requirements
   - Review of waste management contracts
   - The potential for cost savings or the generation of revenue

The FAA provides guidance on the development of this component of a Master Plan in its document "*Recycling, Reuse, and Waste Reduction at Airports: A Synthesis Document*." www.faa.gov/airports/resources/publications/reports/#Environmental

Environmental Documentation in a Master Plan

As noted, environmental issues should be documented throughout applicable sections of an Airport Master Plan, such as the existing conditions or alternatives analysis chapters, instead of a stand-alone section. The existing conditions chapter should document the airport's current environmental setting, while the alternatives analysis chapter should document the potential environmental impacts associated with each development project alternative. Additionally, the recommended development plan for the airport should be evaluated to determine what the appropriate environmental coordination, approvals, and permits are required for the projects that are anticipated to be completed in the short term, defined as three to five years, so these are in place prior to design and construction. If environmental impacts are anticipated, the documentation process may need to be begin sooner than 5 years to ensure adequate analysis can be completed to obtain the necessary approvals.

It is recommended that, for the purposes of environmental documentation in an Airport Master Plan, a chart or matrix be developed to identify the environmental issues and their locations for the evaluation of the development alternatives. This exercise will help to identify location specific environmental considerations, such as sea-level rise. Additionally, this provides a simplified examination of applicable Federal, state, and local environmental issues that currently, or could possibly, exist as a result of the proposed action.

Section 4: Existing Conditions

One of the initial elements required for an Airport Master Plan is a thorough inventory of existing airport conditions to establish the baseline for the study's analysis and recommendations. Identifying airside, landside, and surrounding airport facilities and their conditions is critical to evaluating facility requirements and opportunities based on existing and forecasted demand. **Figure 8** displays an overall flow of collecting and compiling the data of pertinent topics from various sources into a useable format for use in the planning process. Although specific inventory elements included in an Airport Master Plan will vary based on airport size and activity level as well as project scope and budget, the FAA provides general guidelines for identifying and documenting existing conditions in *FAA AC 150/5070-6, Airport Master Plans*.

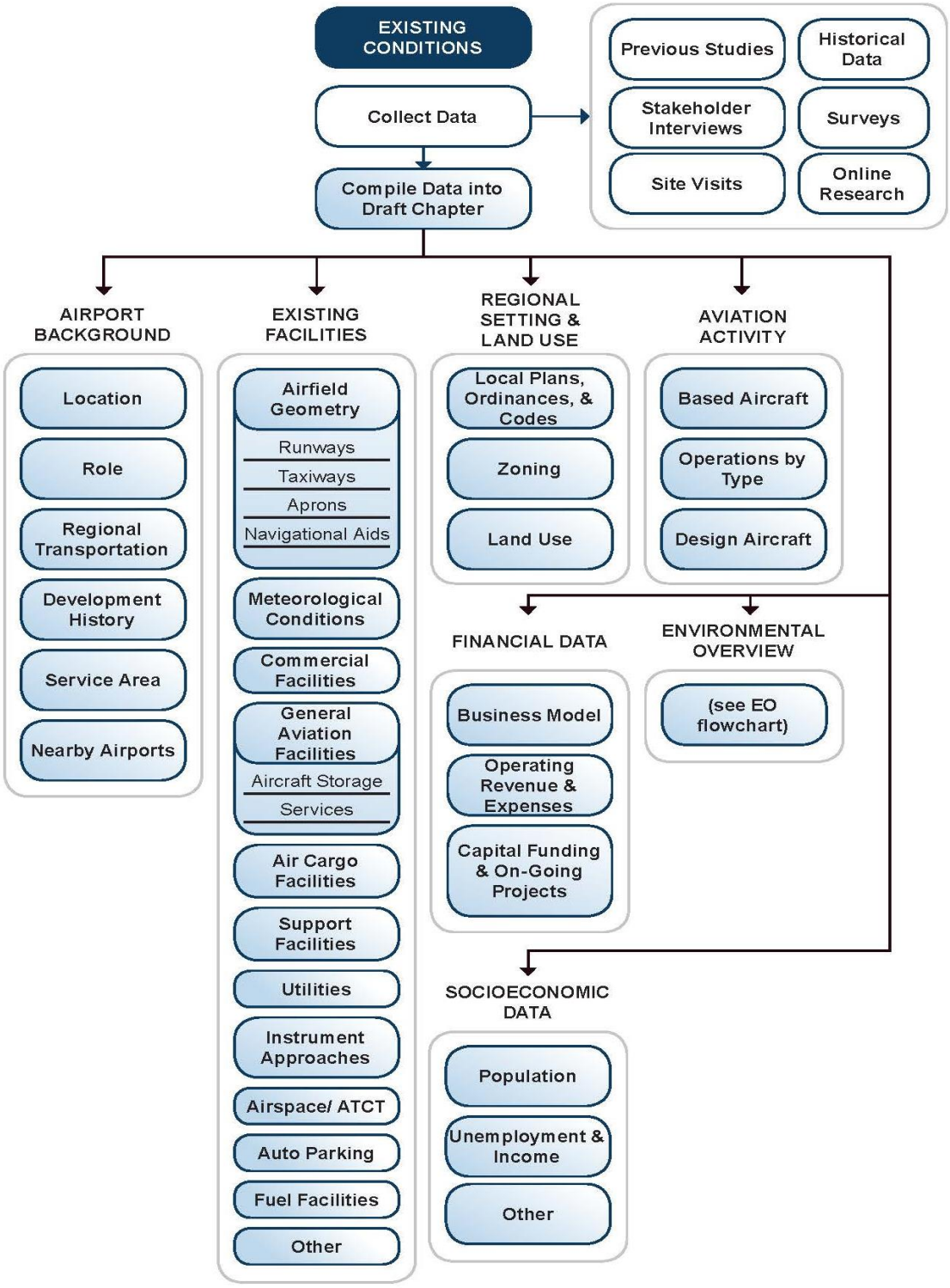
An inventory of existing conditions typically comprises the following elements:

- Airport Background
- Inventory and Description of Existing Facilities
- Regional Setting and Land Use
- Environmental Overview
- Socioeconomic Data
- Historical Aviation Activity
- Airport Financial Data

Collecting and compiling data is key to thoroughly documenting and understanding each element listed above. The majority of data recommended to document an Existing Conditions Chapter can be found online (online sources provided throughout this document), identified in previous planning documents, surveys and interviews with stakeholders, or obtained from an onsite examination. An inventory template form is provided in **Appendix 4**.

The typical elements of the Existing Conditions component of a Master Plan, as listed above, are discussed in the following sections.

FIGURE 8. EXISTING CONDITIONS OVERVIEW



Source: Kimley-Horn and Associates, Inc., 2016

Airport Background

Generally, the Airport Background section provides a brief overview and history of the airport, its location, as well as its role in the national and state aviation systems and surrounding community. In addition to an overview, a graphical depiction of the airport's location in conjunction with its community and major transportation infrastructure is recommended (see **Figure 9**). Other graphical enhancements, such as timelines that identify the history of the airport's development, are also beneficial.

FIGURE 9. AIRPORT LOCATION

Source: Bob Sikes Airport Master Plan, 2007
Created by AVCON, Inc.

For the airport's role, information on NPIAS airports can be found on the FAA's website: www.faa.gov/airports/planning_capacity/npias/ and on the FDOT's Florida Aviation System Plan (FASP) website: www.dot.state.fl.us/aviation/FASP_details.shtm

It is also important that NPIAS GA airports identify their classification according to the FAA's latest General Aviation Airports: A National Asset report (referred to as ASSET). These new classifications are depicted in the latest NPIAS. The FAA has indicated it intends to update the ASSET analysis that determines classifications approximately every two years, with the next review scheduled to be included in the 2017-2021 NPIAS publication.

For commercial service airports, the hub classification can also be an important indicator to include in this section as it speaks to the airport's role in the national aviation system.

Inventory and Description of Existing Facilities

The Existing Conditions Chapter is primarily dedicated to identifying existing facilities within the airport's boundaries. Identifying all facilities on airport property will help guide the remaining section of the Master Plan and develop the ALP. According to *FAA AC 150/5070-6B, Airport Master Plans,* classifications commonly used to organize inventory sections include:

Airfield and Airspace

Functional use and geometry of runways (see **Table 7**), taxiways, holding aprons, lighting, marking, signage, navigational aids, visual approach aids, and instrument approaches. The airfield data should be sufficient to understand how the existing facilities are accommodating activity from the length and width of the runway to its surface and strength, and any supporting facilities that determine which types of aircraft can utilize the airport.

Weather conditions (wind direction and speed, cloud ceiling, and visibility). Weather conditions are important as runways' wind coverage adequacy is identified in the Facility Requirements portion of a Master Plan. Information regarding wind coverage and analysis can be found here: https://airports-gis.faa.gov/public/windrose_help.html. It is important to note that not all airports have existing available wind data and sometimes data for nearby airports is used to document relevant general weather conditions.

Commercial Passenger Terminal Facilities

Building space by functional use and size (area and linear). Ticketing/check-in areas, gates, passenger terminal curb front, restaurants and concessions, hold rooms, circulation, passenger screening, and baggage screening/handling areas

General Aviation Facilities

Quantity and type of aircraft storage hangars, transient aircraft parking apron, tie-down positions, GA terminal facilities, aircraft parking aprons, fixed-base operators (FBOs), maintenance, repair, and overhaul (MRO) facilities, flight schools, pilot shops, and number and mix of stored based aircraft fleet

Information regarding building locations, sizes, and functions should be collected, as well as any information on the dimensions and capacity of the apron areas

Air Cargo Facilities

Facility operators, quantity, and area of air cargo buildings and aircraft parking aprons

Support Facilities

Quantity and type of support facilities including Aircraft Rescue and Fire Fighting (ARFF), airport administrative areas, airport maintenance facilities, airline maintenance hangars, flight kitchens, aircraft fuel storage, heating and cooling systems, as well as FAA facilities and Air Traffic Control Tower (ATCT) (including hours of operation)

Access, Circulation, and Auto Parking

Quantity and type of ground access systems (access roads, circulation and service roads, and parking and curb space). Information on public transportation and rental car facilities and activity, as well as shuttles that routinely use the airport to service off-site rental cars or parking, hotels, or other services

Utilities

Description of major infrastructure elements (water, sanitary sewer, communications, heating and cooling, and power). Stormwater drainage, deicing, and industrial waste disposal systems should also be included, as appropriate

Other

Non-aeronautical uses such as recreational facilities, parks, industrial parks, agricultural or grazing leases, and retail businesses.

TABLE 7. RUNWAY GEOMETRY

	Runway 10 28			
ITEM	**Existing**		**Future**	
Runway Identification	Runway End 10	Runway End 28	Runway End 10	Runway End 28
Runway Design Code (RDC)*	B-I-VIS (Utility)		B-I-VIS (Utility)	
Approach Reference Code (APRC)	B-I-VIS (Utility)		B-I-VIS (Utility)	
Departure Reference Code (DPRC)	B-I-VIS (Utility)		B-I-VIS (Utility)	
Pavement Surface Type	Asphalt		Asphalt	
Pavement Strength (lbs.)	12,500 (Single Wheel)		12,500 (Single Wheel)	
Pavement Strength (PCN)	—		—	
Surface Treatment	None		None	
Effective Runway Gradient (%)**	0.05%		0.05%	
Wind Coverage (%)	92.11%		92.11%	
Runway Length	4,000'		4,000'	
Runway Width	60'		60'	
Critical Aircraft	Piper Aerostar 600/601		Piper Aerostar 600/601	
Approach Speed	94 Knots		94 Knots	
Wing Span	34.3'		34.3'	
Aircraft Tail Height	12.1'		12.1'	
Main Gear Width (Outer)	10.09'		10.09'	
Cockpit to Main Gear/Wheelbase***	11' (est.)		11' (est.)	
Maximum Takeoff Weight (lbs.)	5,500		5,500	
Runway True Bearing	90◦ 16' 53.4"	270◦ 17' 14.3"	90◦ 16' 53.4"	270◦ 17' 14.3"
Runway End Coordinates (NAD83) Latitude Longitude	27◦ 57' 34.58" N 80◦ 33' 56.88" W	27◦ 57' 34.39" N 80◦ 33' 12.27" W	27◦ 57' 34.58" N 80◦ 33' 56.88" W	27◦ 57' 34.39" N 80◦ 33' 12.27" W
Runway End Elevation (MSL)	22.75'	24.08'	22.75'	24.08'
Displaced Threshold from Runway End	None	None	None	None

Displaced Threshold Coordinates (NAD83) Latitude Longitude	N/A N/A	N/A N/A	N/A N/A	N/A N/A
Displaced Threshold Elevation (MSL)	N/A	N/A		
Runway Safety Area (RSA) Actual Design Standard - Length Beyond Departure End Design Standard - Length Prior to Threshold Design Standard - Width	4,480'x120' 240' 240' 120'	4,480'x120' 240' 240' 240'	4,480'x120' 240' 240' 120'	4,480'x120' 240' 240' 240'
Runway Lighting Type	Threshold/End Lights	Threshold/End Lights	Threshold/End Lights	Threshold/End Lights
Approach Runway Protection Zone (RPZ) Length Inner Width Outer Width	1,000' 250' 450'	1,000' 250' 450'	1,000' 250' 450'	1,000' 250' 450'
Departure Runway Protection Zone (RPZ) Length Inner Width Outer Width	1,000' 250' 450'	1,000' 250' 450'	1,000' 250' 450'	1,000' 250' 450'
Runway Marking Type	Visual	Visual	Visual	Visual
14 CFR FAR Part 77 Approach Category	20:01	20:01	20:01	20:01
14 CFR RAR Part 77 Approach Type	Visual (Utility)	Visual (Utility)	Visual (Utility)	Visual (Utility)
14 CFR FAR 77 Approach Dimensions (IWxOWxL)	250'x1,250'x5,000'	250'x1,250'x5,000'	250'x1,250'x5,000'	250'x1,250'x5,000'
14 CFR FAR Part 77 Approach Visibility Minimums	Visual	Visual	Visual	Visual
Visibility Minimums (RVR)	Visual (VIS)	Visual (VIS)	Visual (VIS)	Visual (VIS)
Type of Aeronautical Survey Required for Approach	Not Vertically Guided	Not Vertically Guided	Not Vertically Guided	Not Vertically Guided
Runway Object Free Zone (ROFA) Design Standard - Length Beyond Runway Design Standard - Length Prior to Threshold Design Standard - Width	240' 240' 250'	240' 240' 250'	240' 240' 250'	240' 240' 250'

Runway Obstacle Free Zone (ROFZ) Length Width	200' 250'	200' 250'	200' 250'	200' 250'
Precision Obstacle Free Zone (POFZ) Length Width	N/A N/A	N/A N/A	N/A N/A	N/A N/A
Threshold Siting Approach Surface Type Approach Surface Slope Approach Surface Dimensions	2 20:1 0'x250'x700'x2,250'x2,750'x	2 20:1 0'x250'x700'x2,250'x2,750'x	2 20:1 0'x250'x700'x2,250'x2,750'x	2 20:1 0'x250'x700'x2,250'x2,750'x
Runway Departure Surface Departure Surface Slope Departure Surface Dimensions	N/A N/A	N/A N/A	N/A N/A	N/A N/A
Visual NAVAIDS	PAPI(4)	PAPI(4)	PAPI(4)	PAPI(4)
Instrument NAVAIDS	None	None	None	None
Instrument Approach Procedures Type Approach Instrumentation	None N/A	None N/A	None N/A	None N/A
Touchdown Zone Elevation	24.3'	24.6'	24.3'	24.6'
Taxiway Design Group	1A	1A	1A	1A
Taxiway/Taxilane Width	25'	25'	25'	25'
Taxiway Safety Area (TSA) Width	49'	49'	49'	49'
Taxiway Object Free Area (TOFA) Width	89'	89'	89'	89'
Taxilane Object Free Area Width	79'	79'	79'	79'
Taxiway/Taxilane Separation Taxiway Centerline to Fixed or Movable Object Taxilane Centerline to Fixed or Movable Object	44.5' 39.5'	44.5' 39.5'	44.5' 39.5'	44.5' 39.5'
Taxiway Lighting	None	None	None	None

Source: Valkaria Airport Layout Plan, 2015

Other than where specific resources are identified, the majority of information required for the elements listed above can be obtained from previous airport-related studies, onsite inventories, or through conversations with the airport sponsor and tenants. It should be noted that an inventory of Existing Conditions does not require all of the elements described above, as many of these items may be unavailable or do not apply to all airports such as leasing surplus property for farmland. The data collection process and information to be obtained and analyzed should correspond with the elements and specifics identified in the overall project scope and may be discussed with the FAA or FDOT when the sponsor is unsure if it should be included.

Regional Setting and Land Use

An Airport Master Plan should identify an airport's regional setting and impact, as well as its surrounding land use controls (see **Table 8**). In addition to a graphical depiction of the airport boundary, a Master Plan should describe or depict any local land use provisions and zoning ordinances. Applicable documents include but are not limited to:

- Local government comprehensive plans
- Land use plans
- Local or regional transportation plans
- Local zoning ordinances
- Land use controls
- Building codes
- Height ordinances
- Airport noise zones
- Airport overlay districts
- Statutes
- Sector Plans

TABLE 8. LAND USE INFORMATION

Land Uses in the Vicinity of Peter Prince Airport	
Land Use	**Districts within Land Use**
Residential	Rural (RR-1) Single Family (R-1) Single Family (R-1A)
Agricultural	Agricultural (AG) Agricultural (AG-2)
Industrial	Restricted Industrial (M-1) General Industrial (M-2)
Commercial	Neighborhood Commercial (NC) Highway Commercial Dev. (HCD)

Source: Peter Prince Airport Master Plan Update, 2012
Hatch Mott MacDonald and Ricondo and Associates.

Properly examining and documenting these elements provides information on any existing non-conforming land uses at or near an airport as well as guidelines that assist in analyzing future airport improvements and potential development alternatives. Most of the aforementioned planning and land use documentation can be obtained from local units of government.

In addition to identifying surrounding airport land uses, it is also important to determine any land uses in the area that will be exposed to airport operations. This includes existing land uses as well as the presence of obstructions to air navigation such as trees, terrain, buildings, towers, etc. This will help identify any areas near an airport that may be potentially hazardous to aircraft. Other areas and land uses such as flood control areas, stockyards, and landfills are also beneficial to note as they may represent a potential hazard. Florida has several publications regarding Airport and Airspace Protection that can be found here: www.dot.state.fl.us/aviation/flpub.shtm

FAA Grant Assurance 20, Hazard Removal, states that an airport sponsor must take appropriate action to ensure that terminal airspace will adequately cleared and protected by mitigating existing airport hazards and by preventing the establishment of future hazards. FAA Grant Assurance 21, Compatible Land Use, obligates the airport sponsor to take appropriate actions to control existing and planned land uses in the vicinity of the airport to make them compatible with aircraft operations at the airport.

F.S. 333 provides specific rules regarding airport zoning. For more information on this Statute, please see the State, Federal, and Regulatory Requirements and Guidelines chapter of this Guidebook. The *FDOT Airport Compatible Land Use Guidebook*, also discussed in the State, Federal, and Regulatory Requirements and Guidelines section of this Guidebook, provides additional information useful to airports and local governments during the master planning process.

Florida Specific Information!

Chapter 163.3177(6)(a)2.g, F.S requires the future land use element to include surveys, studies and data that address the compatibility of uses on lands adjacent to an airport as defined in Ch. 330.35, F.S. and consistent with Ch. 333.02, F.S.

Additionally, Ch. 163.3177(6)(a)3.b, F.S. requires that the future land use element include criteria to be used to achieve compatibility of lands adjacent to an airport as defined in Section 330.35 and consistent with Ch. 333.02, F.S.

Environmental Overview

The Environmental Overview section is another important Master Plan element and is an important component to include throughout an Airport Master Plan when applicable. According to *FAA AC 150/5070-6B, Airport Master Plans*, an additional chapter and/or discussion of environmental considerations should be integrated into a Master Plan; this information may be contained within the Inventory chapter or as a separate chapter within the Master Plan. Section 3 of this Guidebook provides more details related to environmental considerations. Per *FAA AC 150/5070-6B, Airport Master Plans*:

In the past, Master Plan studies often focused only on the environmental consequences of the recommended development plan. In those cases, much of the environmental overview would be conducted while other technical analyses were already underway and the environmental data would not be considered in the formulation of alternative development concepts (AC 150/5070-6B)

> *"Current practice is to develop the [development] alternatives with the subsequent environmental processes in mind and to consider environmental data in the evaluation of the alternatives. As a result, the Master Plan may aid in the formation of the purpose and need statements in subsequent environmental documents."*

The primary environmental issues most commonly associated at or near airports are noise, air quality, wildlife, and water quality; however, all categories of environmental conditions identified by the FAA and NEPA should be examined. These are discussed in detail in the Environmental Considerations chapter of this Guidebook.

Planners should coordinate with local resource agencies to obtain information and documentation pertaining to existing environmental issues prior to evaluating development alternatives. Furthermore, any existing airport noise or other environmental programs such as a wildlife hazard management plan should be addressed in the environmental overview in the Existing Conditions Chapter of an Airport Master Plan.

Socioeconomic Data

Socioeconomic data is important to include in an Airport Master Plan because it provides detailed information regarding the market an airport serves. As stated by AC 150/5070-6B, socioeconomic data serves to:

- Ascertain the nature of the community and market the airport serves and/or impacts
- Provide specific inputs for the preparation of aviation demand forecasts, particularly econometric demand models

A thorough understanding of an airport's local community can also assist short- and long-term planning efforts; however, it is the responsibility of the sponsor to identify which data elements will impact an airport. For example, in a community that experiences significant tourism, data pertaining to hotel rooms and occupancy rates may offer insight into passenger enplanements at the local airport. Similarly, a GA airport that experiences significant aerial applicator activity may benefit from data pertaining to the types of crops and aerial spraying activities in the region to help inform local trends in aviation.

Planners should utilize several data sources to properly identify local socioeconomic factors and how they may impact aviation activity. Local government units, the U.S. Census Bureau, and independent database management companies such as Woods & Poole Economics are all viable resources to obtain socioeconomic information. Additional sources also include the Bureau of Economic and Business Research (BEBR) and the Enterprise Florida Data Center.

Socioeconomic Data Sources

U.S. Census Bureau American FactFinder
http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml

Woods & Poole Economics
www.woodsandpoole.com/

Bureau of Economic and Business Research
www.bebr.ufl.edu/

Enterprise Florida Data Center
www.enterpriseflorida.com/data-center/florida-communities/floridas-counties/

Global Insight (formerly DRI McGraw-Hill, Inc.)
http://www.library.hbs.edu/go/globalinsight.html

Historical Aviation Activity

Documentation of current and historical aviation activity levels provides context for airport facilities and identifies local, regional, and national aviation trends. The availability of existing and historical aviation-related data is typically determined by an individual airport's size and activity level. For GA Airport Master Plans, current and historical data should be documented for based aircraft (number and fleet type), aircraft operations (number by operator and aircraft type), fuel sales (volume and fuel type if available), as well as aircraft storage facilities for based and transient aircraft. When collecting this information, consideration should be given to how this data will be used in the Aviation Forecasts section of a Master

Plan. Collecting aviation activity data appropriately during the existing conditions inventory can eliminate redundant effort later in the project, such as peaking characteristics for a specific time of year and time of day that operations are occurring. **Table 9** provides an example of a historical based aircraft inventory.

TABLE 9. HISTORICAL BASED AIRCRAFT

Based Aircraft (1990-2000)					
Year	**Single-Engine (1)**	**Multi-Engine (1)(2)**	**Jet (2)**	**Helicopter (1&2)**	**Total**
1990	50	3	0	0	**53**
1991	44	7	0	0	**51**
1992	52	7	0	0	**59**
1993	52	7	0	0	**59**
1994	50	4	0	0	**54**
1995	50	4	0	0	**54**
1996	50	5	0	0	**55**
1997	70	9	0	0	**79**
1998	72	9	0	0	**81**
1999	80	10	0	0	**90**
2000	80	10	0	0	**90**

Notes: (1) Piston
(2) Turbine
Source: FAA TAF Data & FAA Form 5010
Peter Prince Airport Master Plan Update

For Airport Master Plans at commercial airports, current and historical data should be identified for airlines that serve the airport, passenger enplanements (domestic and international), operations (commercial and GA), based aircraft (number and fleet mix), and air cargo activity (if applicable).

Resources for aviation-related data are described in greater detail in the Aviation Forecast section of this Guidebook. At commercial airports, airlines typically make passenger data available to airport management. At towered airports, operational data is generally made available directly from ATCT personnel. For all facilities (including non-towered), aviation data resources include:

Aviation Data Sources

FAA Terminal Area Forecasts

Forecasts prepared to meet the budget and planning needs of the FAA and provide information for use by state and local authorities, the aviation industry, and the public
Link: http://aspm.faa.gov/main/taf.asp

Florida Aviation System Plan

Incorporates the traditional aviation system planning elements provided for in most State aviation system plans. Also includes an analysis of the intermodal aspects of the state transportation system and a Strategic Planning element which identifies seven strategic goals and the approaches, measurements and recommendations to achieve these goals
Link: www.dot.state.fl.us/aviation/FASP_details.shtm

5010 Airport Master Record

An online database that provides extensive information about any airport in the United States
Link: www.gcr1.com/5010web/

Florida Aviation Database

Central repository for Florida aviation system data
Link: www.florida-aviation-database.com/

Bureau of Transportation Statistics

An online database that provides domestic and international data on passengers, cargo, and fares, as well as numerous other data fields
Link: www.transtats.bts.gov/databases.asp?Mode_ID=1&Mode_Desc=Aviation&Subject_ID2=0

Airport Management and Previous Studies

Airport management and operations at an airport may provide information unless said information is security sensitive information (SSI), additional information may be available from completed plans

Passenger/Tenant Surveys

Surveys of passengers and tenants can yield useful information and provide data for analysis

Manual Operations Counts

Operations counts provide helpful data in a variety of airport analysis systems

Airport Financial Data

Understanding an airport's financial status is important for evaluating development alternatives related to financial implementation feasibility of specific projects later in the Airport Master Plan process. The three primary components of an inventory of Financial Data that should be included in an Airport Master Plan are as follows:

- **Summary of Airport Business Model**
  - Financial operations of the airport (how the airport incurs costs and revenues and applicable funding mechanisms)
  - Funding of capital projects (Passenger Facility Charges, leases, bonds, etc.)
  - Funding of individual airport if part of a multi-airport system
- **Operating Revenues and Expenses**
  - Includes general categories of operating revenues and expenses
- **Capital Funding**
  - Airport's ongoing capital improvement program and how it funds its capital development program

In addition to the three components listed above, it is important to document recently administered and ongoing airport grants. This includes any FAA AIP grants, FDOT grants, and local bonds or other local funding sources. More details on this topic are provided in the Financial Feasibility Analysis chapter of this Guidebook.

Additional information for FAA AIP eligibility and grant assurances can be found here: www.faa.gov/airports/aip/

Florida provides an overview of airport funding and its grant program on the FDOT website, which can be accessed here: http://www.dot.state.fl.us/aviation/fundinginfo.shtm. This link also provides access to the Florida Aviation Project Handbook, which provides detailed information on numerous funding opportunities available to Florida's airports.

Florida Specific Information!

At the state level, FAC Rule 14-60 and Chapter 330 and 333 of the Florida Statutes provide the foundation for compliance for airports within Florida. Standards for airports, airport markings, and airport lighting, as well as airspace protection with respect to the licensing of Florida airports are provided in FAC Rule 14-60; airport zoning requirements, procedures for the adoption of zoning regulations, and the review and enforcement of the zoning regulation are provided in Chapter 333.

Compliance and Other Considerations

Compliance

An airport must adhere to both Federal and state regulations to remain compliant. The FAA provides airport design and engineering standards in its AC library that contain design standards for a multitude of categories including runway lighting, drainage, and airfield facilities. As part of the Existing Conditions, non-standard features should be cataloged and included in the Master Plan document. FAA design standards can be found here: www.faa.gov/airports/engineering/design_standards/

At the state level, FAC Rule 14-60 and Chapter 330 and 333 of the Florida Statutes provide the foundation for compliance for airports within Florida. Standards for airports, airport markings, and airport lighting, as well as airspace protection with respect to the licensing of Florida airports are provided in FAC Rule 14-60; airport zoning requirements, procedures for the adoption of zoning regulations, and the review and enforcement of the zoning regulation are provided in Chapter 333. For more information on both statutes, please see the State, Federal, and Regulatory Requirements and Guidelines chapter of this Guidebook.

Documentation Guidelines

Proper documentation of the existing conditions is key for entire planning process as it is the baseline used to determine the future facility requirements and opportunities based on the forecasted activity of the airport. *FAA AC 150/5070-6B, Airport Master Plans*, provides guidelines for documenting existing airport conditions within the overall Master Plan document. It states that the documentation of existing airport conditions should make liberal use of drawings, tables, aerial photographs, and exhibits produced from GIS databases. Developing the existing conditions in this way makes the information easy to understand, interpret, and locate for later reference.

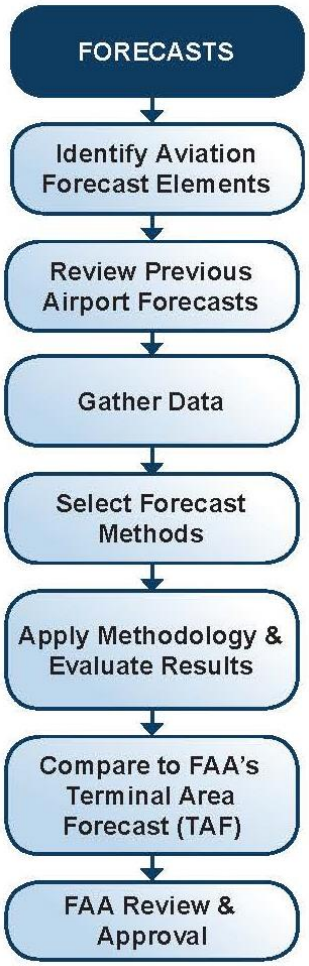
It is important to also remember to include only information pertinent to the planning study so as to not overwhelm or confuse readers; not all information that is collected as part of the Existing Conditions research effort needs to be included within the report. It is likely that some data or information will only be used to support later technical analyses.

Section 5: Aviation Forecasts

Understanding the projected or forecasted future demand for aviation and aviation-related services is a critical element of the overall Master Plan process. Forecasts are used to both justify and validate an airport's ability to accommodate future activity, as well as determine the type, size, and timing of future landside and airside development.

As shown in **Figure 10**, this section discusses the overall process of developing realistic aviation activity forecasts that can later be used to determine the future needs and opportunities of an airport.

FIGURE 10. AVIATION FORECAST OVERVIEW



Source: Kimley-Horn and Associates, Inc., 2016

By identifying types of elements to be forecasted, sources of historical data that help develop aviation-related forecasts, such as the historical aviation activity from the Existing Conditions chapter of the Airport Master Plan, can be identified. It is important to understand that, due to a variety of factors, there can often be significant short- or long-term fluctuations in aviation activity at individual airports, in a specific region, or system-wide. As such, it is imperative that aviation forecasts developed for Master Plans or other aviation-related studies incorporate data beyond historical activity and identify existing and potential future trends that may affect an airport.

The sources and methodologies outlined in this section offer airport sponsors and consultants a framework in which to develop aviation forecasts that, in turn, guide the analysis of future airport development requirements and alternatives.

This chapter addresses the following elements pertaining to the development of aviation-related forecasts:

1. Forecast Purpose
2. Steps in the Forecast Process and Approvals
3. Forecast Elements and Data Resources
4. Forecast Methodologies
5. Specific Forecasts and Examples

It should be noted that if forecasts are submitted to the FAA for approval, there are certain forecast elements required for Master Plans while other elements are merely suggested. These elements are identified in subsequent sections of this chapter.

Forecast Purpose

The general purpose of Master Plan aviation forecasts is to create realistic activity estimates used to evaluate facility needs compared to existing facilities. Typically, historical aviation activity such as aircraft operations, based aircraft, and passenger enplanements can generally indicate future activity levels. However, at many airports, aviation activity can be shaped by a multitude of factors both on and off the airport. Such on-airport factors include existing airport facilities, including capabilities and condition; location of the airport relative to other airports; price and convenience of air services; or costs associated with fueling/aircraft storage. Off-airport factors may include regional or local socioeconomic characteristics of an airport's surrounding community, business activity, or desirability of the community as a tourism or business hub.

Steps in the Forecast Process and Approvals

The Federal guidelines for the aviation forecasting process identified in *FAA AC 150/5070-6B, Airport Master Plans* are useful to all airports regardless of their participation in the Federal aviation system. The level of effort and elements required for an Airport Master Plan will largely be contingent on an airport's role and activity level; however, forecast steps in the master planning process generally include:

- Review Previous Forecasts
- Identify Aviation Forecast Indicators
- Collect Data
- Select Forecast Methods
- Apply Forecast Methods and Evaluate Results
- Compare Forecast Results with the FAA's Terminal Area Forecasts (as applicable)
- Coordinate with Agencies to Approve Forecasts

Even though this Guidebook is specific to the State of Florida, the FAA forecasting process identified includes many components that apply to all Airport Master Plans regardless of location. General guidelines and specific methods of typical forecasts can be found in *FAA AC 150/5070-6B, Airport Master Plans*.

Review Previous Airport Forecasts

The latest published FAA TAF for the study airport, as available, and any forecasts from prior studies including prior master plans should be reviewed. Additional forecasts to review may include state and/or regional plans such as the FASP or other documents such as relevant EAs, EISs, or noise studies. Although forecasts developed for other studies may be dated or no longer relevant, understanding their context can be valuable, especially from a historical perspective that can lend insight into what has driven change in the past.

Identify Aviation Forecast Indicators

Aviation activity indicators required for a forecast include the level and type of activities that are likely to affect facility needs. For airfield planning, the most important activities are aircraft operations and aircraft fleet mix, since these define airfield facility requirements. As a general rule, plans for GA airports require forecasts of aircraft operations by aircraft type, number and type (fleet mix) of based aircraft, and existing and projected critical aircraft type and number of operations. Airports with commercial service require forecasts of aircraft operations, based and operational aircraft fleet mix, and passenger enplanements. Passenger levels are particularly important in determining the size of the terminal building and other important airport infrastructure needs such as parking facilities and access roads. In addition, at larger commercial service airports, the type of system in place plays a big role in terminal sizing in terms of

whether it is an origin and destination (O&D) airport or an airline hub operation. A list of forecast indicators required by the FAA and those that should be included where appropriate is shown in **Table 10**.

TABLE 10. AVIATION DEMAND INDICATORS

Required	Included Where Appropriate
Aircraft Operations (Annual)	
Itinerant Air Carrier Air Taxi and Commuter (Regional) General Aviation Military Local General Aviation Military	Domestic vs. International Annual Instrument Approaches Instrument Flight Rule (IFR) vs. Visual Flight Rule (VFR Operations) Air Cargo Aircraft Operations Touch and Go Operations (Training) Helicopter Operations Average Load Factor (Commercial Airports) Fuel Use
Passengers (Annual)	
Enplanements Air Carrier Commuter Enplanements Originating Connecting	Passenger and Cargo Data Domestic vs. International General Aviation Passengers Helicopter Air Taxi Other Number of Student Pilots Number of Hours Flown
Aircraft	
Based Aircraft Aircraft Fleet Mix Critical Aircraft	Average Seats/Aircraft
Source: FAA AC 150/5070-6B, Airport Master Plans	

Collect Data

The next step is to determine the data needed to prepare the forecasts, identify potential and obtainable data sources, and compile the information for both historical and forecast periods. The data to be gathered and the relevant time periods depend on the forecast parameters as data currently available.

Select Forecast Methods

While there are several appropriate methodologies and techniques for forecasting aviation activity at an airport, selecting and applying the appropriate ones requires astute professional judgment. The availability of data and patterns/fluctuations of airport-specific activity will largely influence which methodologies should be employed, however, several factors can impact activity, including those that are not necessarily dictated by an airport or its facilities. The available data should be evaluated and methodologies should be selected that best reflect those factors that impact an airport, and how to capture this in the development of forecasts. This chapter identifies several commonly used forecast methodologies for Airport Master Plans, although others may be employed if deemed reasonable and justifiable.

Apply Forecast Methods and Evaluate Results

After compiling a list of forecast elements, assembling the necessary data, and selecting the appropriate forecast methods, the next step is to prepare the actual forecasts. It should be noted that if multiple

techniques are employed they will likely yield differing estimates. Therefore, evaluating the reasonableness of the results and their consistency with other forecasts may be necessary.

Compare Forecast Results with the FAA's Terminal Area Forecasts

Forecasts that are subject to FAA approval should compare results with those contained in the most recent TAF. To facilitate this comparison, the FAA recommends completing the template in Appendix C of FAA Office of Aviation Policy and Plans (APO) *Forecasting Aviation Activity by Airport* (July 2001) (www.faa.gov/data_research/aviation_data_statistics/).

Coordinate with Agencies to Approve Forecasts

Typically, any aviation demand forecasts developed for Airport Master Plans or Master Plan Updates that receive FAA AIP funding must be submitted to the FAA for approval. The FAA develops its own aviation demand forecasts for active NPIAS airports in its TAF.

FAA ADOs such as the Orlando ADO or Regional Airports Divisions are responsible for approving forecasts. When reviewing a sponsor's forecast, the FAA must ensure that it is based on reasonable planning assumptions, uses current data, and was developed utilizing appropriate forecast methods. Additional discussion on assumptions, data, and methodologies can be found in the APO report *Forecasting Aviation Activity by Airport*.

For all classes of airports, forecast indicators including enplanements, based aircraft, and operations are evaluated for consistency with the TAF. If a forecast is not consistent with the TAF, differences must be resolved if the forecast is to be used in FAA decision-making. This may involve revising the airport sponsor's submitted forecasts, adjusting the TAF, or both. Master Plan forecasts for enplanements, based aircraft, and operations are considered consistent with the TAF if they meet the following criteria by FAA airport classification:

- **Large, Medium, and Small Hub Airports**
  - Forecasts differ by less than 10-percent in the five-year forecast and 15-percent in the 10-year period, *or*
  - Forecasts do not affect the timing or scale of an airport project
- **Other Commercial Service Airports**
  - Forecasts differ by less than 10-percent in the five-year forecast and 15-percent in the 10-year period, *or*
  - Forecasts do not affect the timing or scale of an airport project, *or*
  - Forecasts do not affect the role of the airport
- **General Aviation and Reliever Airports** (when the five- or 10-year forecasts exceed 100,000 total annual operations or 100 based aircraft[1])
  - Forecasts differ by less than 10-percent in the five-year forecast and 15-percent in the 10-year period, *or*
  - Forecasts do not affect the timing or scale of an airport project, or
  - Forecasts do not affect the role of the airport

If the Master Plan forecasts are expected to be inconsistent with the TAF for any reason, the FAA Project Manager should be contacted early in the forecast development process to discuss the implications of the variance.

[1] When the five- or 10-year forecast is for less than 100,000 total annual operations or 100 based aircraft, the forecast does not need to be reviewed at FAA Headquarters, but the data should be provided to the FAA for the annual update of the TAF.

Locally prepared forecasts may contain a more detailed analysis of socioeconomic conditions or development that is not considered when preparing the TAF. Therefore, airport sponsors should review the FAA's TAF for their airport on a regular basis and notify their FAA Planner/Planning Program Manager when it is believed that local conditions merit a revision to the TAF. When requesting a change to the TAF, the airport sponsor should provide reliable historical data and letters from individuals with the authority to affect airport activity, which document planned changes in operations or based aircraft.

It should be noted that FDOT reviews and approves forecasts for Airport Master Plans developed for airports not included in the NPIAS. Even when FDOT approval of forecasts is not required forecasts should be submitted to FDOT for review as these projections may be incorporated into the FASP or FAD. There are seven districts identified by FDOT in the State of Florida. Final review and/or approval of any master plans, specifically forecasts, should be coordinated with FDOT district offices, although documents are ultimately reviewed by FDOT's ASO office.

Florida Specific Information!

FDOT reviews and approves forecasts for Airport Master Plans developed for airports not included in the NPIAS. Even when FDOT approval of forecasts is not required forecasts should be submitted to FDOT for review as these projections may be incorporated into the FASP or FAD. Final review and/or approval of any master plans, specifically forecasts, should be coordinated with FDOT district offices, although documents are ultimately reviewed by FDOT's ASO office.

Forecast Elements and Data Resources

The classification of an airport impacts the effort required to develop forecasts of aviation-related demand. Similarly, the availability of data varies significantly based on an airport's facilities. Many commercial service airports in the U.S. are towered facilities, while most GA airports are not. According to the FAA's National Flight Data Center, as of October 15, 2015, there were 862 public and private airports in Florida, 64 of which were equipped with an ATCT. This distinction is important because a towered facility is more likely to have accurate historical data in terms of annual, monthly, and sometimes even actual time and date of aircraft operations. As noted in **Table 10**, the FAA identifies both required and suggested forecast elements for Airport Master Plans. Although activity (and forecast effort) can vary significantly among airports, typical Master Plan elements for a GA and commercial service airports are provided on the following pages.

For GA airports, typical forecast elements in a Master Plan include:

- Based Aircraft
  - Based Aircraft Fleet Mix
- Aircraft Operations
  - Local/Itinerant Operations
  - Military Operations
  - Operational Fleet Mix
  - Critical Aircraft (type, existing and projected annual operations)

Other items where appropriate include:

- Auto Parking
- Touch and Go Operations (to determine airfield capacity and delay)
- Daytime/Nighttime Operations

- Instrument Operations/Visual Operations
- Aircraft Fuel Sales
- Tie Downs
- Fuel Farms

For commercial airports, typical forecast elements in a Master Plan include:

- Based Aircraft
  - Based Aircraft Fleet Mix
- Aircraft Operations
  - Local/Itinerant Operations
  - Commercial Operations
    - Commercial Fleet Mix
  - Military Operations
  - Overall Operational Fleet Mix
  - Critical Aircraft (type, existing and projected annual operations)
- Passenger Enplanements
  - Air Carrier/Commuter/Air Taxi
  - Originating/Connecting
  - Domestic/International
  - Average Load Factor

Other items where appropriate include:

- Auto Parking
- Touch and Go Operations
- Daytime/Nighttime Operations
- Instrument Operations/Visual Operations
- Aircraft Fuel Sales
- Air Cargo Operations and Tonnage
- Average Seats per Aircraft

The following section identifies required elements and resources to obtain pertinent data.

Based Aircraft: Based aircraft are GA aircraft considered airworthy and based at an airport for a majority of the year. According to the FAA, an aircraft is airworthy when it conforms to its Type Certificate (configuration and components installed are consistent with drawings, specifications, and other data that are part of the Type Certificate), and the aircraft is in a condition for safe operation. It should be noted that aircraft are often based at airports that provide commercial service; however, commercial aircraft are not included as based aircraft. In some instances, aircraft may remain at multiple airports for significant lengths of time, especially in Florida which has a significant proportion of seasonal residents. This can make it challenging to determine at which facility an aircraft is based. In these instances, an airport sponsor should meet with the aircraft owner to determine if an aircraft is based at their airport. The FAA National Based Aircraft Inventory Program now allows airport sponsors to digitally input based aircraft at their airport into a database. If there are multiple airports that claim an aircraft with the same tail number, this aircraft is flagged and the sponsor is immediately notified and can contact that aircraft owner to confirm its home airport. It is recommended that sponsors upload the most current information on based aircraft to www.basedaircraft.com. There are multiple sources that contain based aircraft data for airports, such as:

- **Form 5010-1 Airport Master Record**
  - Periodically updated by individual airport sponsors and contains current year (or most recent year) information on:
    - Based aircraft
    - Aircraft operations
    - Airport facilities
  - Link: www.gcr1.com/5010web/default.cfm
- **FAA Terminal Area Forecast[2]**
  - The TAF reports historical counts from the Form 5010-1 (dating to 1990), and projected (through year 2040) for:
    - Based aircraft
    - Aircraft operations by type
    - Passenger enplanements for all commercial service airports
  - Link: https://aspm.faa.gov/main/taf.asp
- **FAA Operations and Performance Data**
  - Aviation System Performance Metrics (ASPM)
    - Airport analysis
    - City pair analysis
    - Taxi time
  - Operational Network (OPSNET)
    - Operations and delay
  - Traffic Flow Management System Counts (TFMSC)
    - Airport and distributed OPSNET
  - Airline Service Quality Performance (ASQP)
    - Operations by airport
  - Business Jet Reports
    - Monthly business jet report
  - Link: https://aspm.faa.gov/
- **Florida Aviation System Plan[3]**
  - Provides data on based aircraft
  - Provides an overview of the state's airport system and includes profiles of individual airports
  - The latest FASP should be consulted for available forecasts
  - Link: www.dot.state.fl.us/aviation/FASP_details.shtm
- **FDOT Data and Forecasts[4]**
  - Reports commercial service operations, enplanements, GA operations, and GA based aircraft forecasts at Florida airports
  - Link: www.dot.state.fl.us/aviation/dataforecasts.shtm

5010 Reminder!

5010 records are usually updated at the time of the airport's inspection or when major changes are made to the airport's facilities

Updates are submitted electronically to the FAA

[2] It should be noted that for smaller airports and non-towered airports, the TAF may be only infrequently updated to reflect existing activity at an airport. Using TAF data for historical and current estimates of based aircraft may be useful, but is typically not as accurate as actual counts conducted by an airport sponsor. The TAF is not available for all NPIAS airports and is not available for non-NPIAS airports.

[3] The FASP is currently being updated and is anticipated to be finalized in 2017.

[4] Note: More up to date forecast data on operations, enplanements, and based aircraft is available than the posted 2013 PDFs on this site.

- **Florida Aviation Database (FAD)**
  - The FAD reports historical counts provided by airports (dating to 1988), and projected (through year 2033) for:
    - Based aircraft
    - General aviation operations
    - Commercial operations
    - Commercial enplanements
  - Link: www.florida-aviation-database.com/
- **Previous studies**
  - Master plans that incorporated historical data or forecasts at an airport
    - It is important to review the source of the data included in previous studies and determine if it is valid. Since Airport Master Plans are typically updated every five-to-10 years, there may be a significant time gap between estimates reported in previous studies and an updated or new Master Plan. The conditions may have changed such as airfield additions, new storage facilities, or new businesses making historical activity not a relevant indicator of potential future activity. As such, the party responsible for developing the forecasts for a new study may need to use previous study estimates in conjunction with other resources.
- **Airport Inventory**
  - Actual data that may be recorded by an airport sponsor
    - This is often the most accurate resource for determining historical and existing based aircraft at an airport. In many cases, airport sponsors take annual or periodic inventories of existing based aircraft. Although these counts may be compared to the 5010-1 Airport Master Record or the FAA TAF, the sponsor counts may prove to be the most reliable data available. If possible, it should be noted in the Master Plan how the data was obtained and in what capacity inventories were conducted (annually, semiannually, etc.). Actual airport sponsor inventory data may vary significantly from other resources such as the FAA TAF or National Based Aircraft Inventory; however, if the estimates are believed to be accurate, they should be used as a basis for developing based aircraft forecasts.

A summary of resources for based aircraft is shown in **Figure 11**.

FIGURE 11. BASED AIRCRAFT RESOURCES

Aircraft Operations: The FAA defines an aircraft operation as an airplane's landing, takeoff, or touch-and-go procedure on an airport's runway. Aircraft operations projections are used to determine airport design criteria. There are several factors that impact the number of aircraft operations occurring at a particular airport, including:

- Number of based aircraft
- Local demographics
- National economic and aviation-related trends
- Proximity to other airports
- On-airport businesses
- Capability and condition of facilities
- FBO activity
- Business needs

Airports with ATCTs usually have time- and date-specific aircraft operation data available for developing aircraft operations forecasts. This is the most reliable resource for historical operations data and is particularly useful in identifying aviation activity trends as well as peaking characteristics. If available, tower counts should be used as the primary source for aircraft operations data. It should be noted that most ATCTs are not staffed 24 hours per day, and therefore some number of operations may not be included in reported figures. Other sources for commercial operations data include databases provided by businesses such as Innovata, Data Base Products, Inc., and the Official Airline Guide. These resources are described in later sections of this Chapter.

At non-towered facilities, there are several additional resources that can be utilized to determine historical aircraft operations data including the previously mentioned 5010-1 Airport Master Record, FAA TAF, FAD, and FASP. Additional sources that can prove extremely beneficial for data pertaining to aircraft operations, particularly at non-towered facilities, are databases that report filed flight plans to and from airports. Two of the more well-known sources that provide filed flight plan data available for purchase are FlightAware and AirportIQ, and the data generally includes basic information such as:

- Departure and arrival points
- Estimated time en-route
- Alternate airports in case of bad weather
- Type of flight
  - Instrument flight rule (IFR)
  - Visual flight rule (VFR)
- Pilot information
- Aircraft tail number
- Aircraft type

Flight plans are documents filed by a pilot or flight dispatcher with FAA prior to departure that indicate the plane's planned route or flight path.

Usually, a flight plan is filed for any operation that is conducted under IFR conditions. Reported flight plan data is generally skewed toward commercial and larger GA aircraft operations because all GA pilots are not IFR-certified and some GA aircraft are not equipped with adequate instrumentation for IFR conditions.

Information from these databases is typically obtained through a private company that tracks and records all flight plans for a specific timeframe. Individual airport reports are available for a fee and can be customized to fit the scope and budget of a particular Master Plan or Master Plan Update. A link to FlightAware's custom report center is located here: http://flightaware.com/commercial/customreports/ A link to AirportIQ's custom report center is located here: http://airportiq.com/integrated-solution/

Another resource for identifying operations at non-towered airports is a manual count of aircraft operations. This option is contingent on the budget and schedule of an Airport Master Plan. Manual counts can be conducted using several types of equipment for various lengths of time. Ideally, an entire year's worth of data would be produced; however, more realistically, one-to-three months' worth of observations should provide adequate information regarding the number and type of aircraft operations.

There are multiple methods for counting aircraft operations at airports. The first is visual observation of aircraft operations. Although this method requires stationing of one or more persons at an airport (depending on activity and number of runways) to identify the type of aircraft and make if possible, it is often the most accurate reporting method of operational activity.

Other types of manual counting procedures for aircraft operations are identified in *ACRP Report 129, Evaluating Methods for Counting Aircraft Operations at Non-Towered Airports*, which is available here: http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_129.pdf

Another methodology for estimating aircraft operations specific to non-towered facilities is using operations per based aircraft (OPBA). This methodology applies either a general planning ratio or an average OPBA identified for the state or region in which that the airport is located. For example, using data identified in the FAA TAF, the average OPBA for all non-towered facilities in Florida can be identified. This figure may then be applied to five-, 10-, and 20-year planning horizon forecasts of based aircraft at an airport to generate estimates of aircraft operations. It should be noted that since FAA TAF data for non-towered facilities are estimates, the OPBA methodology also produces an estimate and is not as accurate as actual counts. An OPBA operational estimate may provide context for justification of the operations forecasts. An example of the OPBA methodology is shown later in this section in **Table 11**. A summary of resources for aircraft operations data is shown below:

- **Towered Airports**
  - Tower Data
- **Non-Towered Airports**
  - AirportIQ, FlightAware
  - Manual Counts
  - 5010, TAF, FAD, FASP, OPBA, Previous Studies

Aircraft Fleet Mix

An airport's fleet mix comprises two elements:

- **Based aircraft fleet mix**
  - Identification of historical, existing, and projected number and type of aircraft that will be based at an airport
- **Operational fleet mix**
  - Disaggregate estimates of total activity by specific aircraft type or aircraft grouping

Judgment and the type of analysis determine the level of detail required. Both based aircraft fleet mix and operational fleet mix should be grouped by aircraft class; single-engine piston, multi-engine piston, turboprop, jet, helicopter, military, and other. **Figure 12** provides an example of how this information may be displayed in a Master Plan. Knowing the frequency of the specific make and model of aircraft within each of these aircraft classes is key in determining the applicable dimensional design standards for the overall airport facilities as the specific types of aircraft define the aircraft design groups. This concept is discussed further in the Facility Requirements section.

FIGURE 12. SAMPLE OPERATIONAL FLEET MIX GRAPHIC

Type of Aircraft	Representative Aircraft	Type of Aircraft	Representative Aircraft
Single Engine	Cessna 172 	Helicopter	Sikorsky S-76 
Multi-Engine	Beechcraft Kingair 	Regional Jet	CRJ-700 
Small Jet	Cessna Citation Bravo 	Widebody Jet	767 

Source: Kimlev-Horn and Associates. Inc. and Associates. Inc., 2016

If an airport has a detailed inventory of the type of based aircraft, it should be used as a starting point to forecast future based aircraft fleet mix. If this data is unavailable, conducting an inventory of the existing fleet or reference to the 5010-1 Airport Master Record will be necessary.

As with based aircraft, an airport's fleet mix can also be influenced by several important factors such as existing airfield and landside facilities. For example, if a GA airport specifically caters to small aircraft, has a runway length less than 4,000 feet, and its existing operational fleet is primarily comprised of single-engine piston aircraft, it is less likely that the airport's fleet mix will change significantly in the future without an identified reason. Conversely, if an airport is located in a community with significant business growth or has facilities designed to accommodate larger corporate GA aircraft, it may see a higher proportion of multi-engine piston aircraft or jets based and operating there in the future.

Additional sources of data for GA fleet mix can be produced from locally available data from airport operators, a simple survey of based aircraft owners or an FBO, or an examination of databases from companies such as FlightAware or Airport IQ. It should be noted that data pulled from these databases will not necessarily determine the future based aircraft or operational fleet mix, but provides the necessary information to make reasonable assumptions regarding future activity.

Passenger Enplanements

Typically, passenger enplanement forecasts are only critical to planning at commercial service airports. Passenger activity at a specific airport can be influenced by many factors such as population of the local market, proximity to other airports, cost of airfares, and route destinations and frequencies, to name a few.

Similar to other forecast elements, the most accurate source for passenger enplanement data is from the airport itself. U.S. domestic and international (U.S. and foreign flag carriers) enplanements are derived from the U.S. DOT's T-100 database. Regional carrier enplanements are derived from U.S. Department of Transportation (DOT) T-100 and 298-C data. Since airlines must report all revenue passenger enplanements to the FAA, the TAF is also a useful resource for developing forecasts. However, it should be noted that annual statistics reported in the FAA TAF are based on the Federal fiscal year (October 1 through September 30) rather than the calendar year. Additionally, the FAA TAF and its sources (FAA's National Flight Data Center, U.S. DOT T-100 and 298-C Databases, Airline Origin and Destination Survey, Air Carrier Activity Information System) do not report non-revenue passengers, and in some cases, airlines may report inaccurate passenger counts. As such, there can be discrepancies between annual data reported by an airport and data reported in the FAA TAF.

Peak Period Forecasts

An important component of developing aviation demand forecasts is peak activity levels. Understanding peaking characteristics assists in facility and capacity planning. Peak period forecasts include peaking characteristics for monthly, daily, and hourly aviation-related activity. Although some airports may not experience significant fluctuations in the level of aircraft or passenger activity, many airports do and it is an important component of forecasting.

Peak activity can be attributed to numerous factors depending on an airport's primary role and function, several of which are identified below:

At commercial service airports, peaking may be attributed to:

- Seasonal passenger travel patterns
- Specific annual or one-time events
- Part-time or seasonal airline service
- Airline schedule or equipment changes
- Other

At GA airports, peaking may be attributed to:

- Same as at commercial airports
- Favorable weather conditions
- Seasonal agricultural activity
- Aerial operator activity
- Flight training activity
- Other

Developing peak period forecasts of passenger activity and aircraft operations is critical for facility planning because the information helps identify appropriate benchmarks for when existing facilities may need improvements or when new facilities may be required. It is important to note that facilities should not be planned to accommodate the absolute busiest timeframe that occurs at an airport, but rather typical periods of time that experience regular peaking activity. In other words, it is preferable to identify peak periods that occur regularly at an airport and plan accordingly rather than single out the busiest day or busiest hour that may occur in a given year. This safeguards from "over-planning" or underutilization of airport facilities when the airport is experiencing average or below-average levels of aviation activity.

Peak period forecasts for Airport Master Plans are usually developed for aircraft operations and passenger enplanements and include:

- Peak month enplanement and operations activity
- Average daily activity in the peak month (PMAD)
- Peak hourly activity on PMAD

Typically, towered commercial airports maintain monthly historical passenger and operations data obtained from airlines and the ATCT. This database reports annual, monthly, daily, and hourly scheduled departure and arrival data for large commercial airports. Daily or hourly throughput statistics are the most reliable data for developing baseline and projected daily and hourly peaking activity levels, if available. If

not, several assumptions are used to generate estimates for PMAD and hourly activity. A simple calculation of dividing the number of passenger enplanements or operations for the peak month by the number of days in that month is generally acceptable to identify PMAD. To determine hourly peaking characteristics, further analysis such as examining airline schedules, passenger load factor (LF) or tower counts for the airport is required.

Most commercial service airports post airline schedules on their websites; however, there are several companies that provide airport-specific passenger enplanement data with information such as flight origin and destination, type of aircraft, and passenger load factor data for a fee. The most common such services are Innovata, Data Base Products, Inc., and the Official Airline Guide (OAG):

- A link to Innovata's data analysis center can be found here: www.innovata-llc.com/
- A link to Data Base Product's data products can be found here: www.airlinedata.com/
- A link to OAG's custom report center can be found here: www.oag.com/

At non-towered facilities, basic assumptions can be made to interpret peaking characteristics. These can be aided by manual counts or the previously mentioned databases made available by AirportIQ or FlightAware. If these resources are not available or do not provide adequate data, it may be necessary to identify peaking characteristics through qualitative information provided by airport personnel.

Automobile Traffic (Landside Transportation)

Although not required by the FAA for approval, another forecast element that should be analyzed is automobile (auto) traffic. Although auto traffic at airports is directly tied to aviation activity, it is not specifically considered as an aviation element and therefore is not included in **Table 11**. Although this component is not always necessary for smaller airports, it can be extremely important for busier airports. Understanding traffic volumes that access an airport assists with landside planning components such as parking lots, terminal curbfront, and access roads. It can also be important to compare existing traffic volumes and patterns with proposed airport improvement projects to determine the impacts to the transportation system surrounding the airport.

Typically, there are three resources to determine existing auto traffic volumes at or around an airport, including:

- Data from the airport's host county or municipality
- Manual traffic count data
- Electronic traffic count data
- Passenger/user survey data

Selecting the appropriate source for auto traffic depends on the data available and specific needs of each airport. While surveys are typically more useful at busier GA airports or commercial airports, utilizing a survey is often dictated by the scope and budget for a Master Plan. Regardless of the source, auto traffic should be calculated for annual, monthly, and peak daily and hourly counts, if possible.

Additional general planning estimates for auto trip generation and planning criteria can be found in *ACRP Report 25, Airport Passenger Terminal Planning and Design*. A link to the Report can be found here: http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_025v2.pdf

Air Cargo

Another forecast element that is often analyzed in an Airport Master Plan is air cargo activity. Air cargo activity is generated by a diverse collection of companies with differing business strategies and market roles including:

- **Integrated Carriers**
  - Freight door-to-door using own fleet
- **Freight Forwarders**
  - Brokers that link shippers with freight carriers; coordinate freight but do not transport
- **All-Cargo Carriers**
  - Sell space to freight forwarders or individual companies
- **Combination Carriers**
  - Carry passengers and freight on a single aircraft
- **Belly Freight Carriers**
  - Carry cargo in baggage compartment of passenger aircraft

Airport planners should assess the capacity of existing cargo processing facilities and determine future requirements for buildings, aircraft parking aprons, and ground access facilities.

ACRP Report 143, Guidebook for Air Cargo Facility Planning and Development explores tools and techniques for sizing air cargo facilities, including data and updated metrics for forecasting future facility requirements as a function of changing market and economic conditions. Forecasts of air cargo activity typically identify tonnage of mail and cargo. A link to this report can be found here: www.trb.org/Main/Blurbs/173274.aspx

Airport Master Plan Forecast Elements and Resources – Summary

In general, when collecting data for developing aviation-related activity for Airport Master Plans, valid information obtained directly from an airport is often the most useful and accurate.

The list below identifies general resources for aviation-related activity. The following sections focus on typical methodologies used to develop forecasts as well as the steps for the entire forecasting process.

1) ATCT Counts (if available)
2) Airline Data (if available/applicable)
3) FAA TAF
4) FlightAware/AirportIQ
5) Airport Manager Inventory
6) FASP
7) 5010-1 Master Record
8) ACRP Publications
9) General Aviation Manufacturers Association Publications
10) International Air Transport Association Publications
11) Aircraft Manufacturer Forecasts

Forecast Methodologies

Airport Master Plan forecasts are typically developed to project aviation-related activity over a 20-year period. The effort put forth to develop the forecasts can vary significantly based on the size and type of airport, availability of reliable data, and project scope and budget. A Master Plan conducted for a small GA airport may only examine the most essential basic elements while a plan for a busy commercial airport may require an exhaustive effort that includes elements beyond what is identified in this Guidebook.

Regardless of the level of effort required, the specific types of methodologies typically employed for Airport Master Plans include:

- Regression Analysis
- Linear Trend or Trend Line Analysis
- Share Analysis
- Exponential Smoothing
- Comparison with Other Airports
- Survey Techniques
- Cohort Analysis
- Choice and Distribution Models

This section describes each methodology based on information identified in the 2001 FAA Report, *Forecasting Aviation Activity by Airport*.

Regression Analysis

In regression analysis, the value being estimated (or forecast)—the dependent variable—is related to other variables—the independent or explanatory variables—that "explain" the estimated value. An example of a regression equation is to estimate passenger enplanements as a function of economic variables (e.g., income and airfares). The relationship is estimated using historical data for the independent and dependent variables. The explanatory power of the equation is measured by the R^2 statistic (called the coefficient of determination). An R^2 of 0 indicates that there is no statistical relationship between changes in the independent and dependent variables. R^2 values near 1.0 mean that there is a very strong statistical relationship. Forecasts of the independent variables are used in the regression equation to calculate forecast values for the dependent variable. Regression analysis should be restricted to relatively simple models with independent variables for which reliable forecasts are available. Because regression analysis can be used to infer casual relationships between variables, this methodology is most useful for all types of aviation activity when it is unclear what the driving force is behind aviation activity.

Linear Trend or Trend Line Analysis

The linear trend methodology examines historical activity growth trends and applies these trends to current demand levels to yield projections of future activity. Linear trend analysis assumes that activity, and the factors that have historically affected activity, will continue to influence demand levels at similar rates over an extended period of time. Linear trend projections are typically used to provide baseline forecasts that reflect stable market conditions. This approach is useful for forecasting any type of aviation activity where unusual local conditions differentiate the study airport from other airports in the region.

Share Analysis

Share analysis or "market share" forecasting is a relatively easy method to use, and can be applied to any measure for which a reliable higher-level (e.g., larger aggregate) forecast is available. Historical shares are calculated and used as a basis for projecting future shares. A typical example where this may be appropriate is an airport's percentage share of national enplanements. An airport might historically have a relatively constant 0.22 percentage share of U.S. domestic enplanements. Perhaps the share has shown little variation over the period being measured (e.g., ranged between 0.21-percent and 0.23-percent of the national total). Given no expected structural changes in air service, it may be acceptable to extrapolate the historic share which would indicate that the airport's enplanement activity would be expected to grow at a rate similar to the national enplanement rate. This methodology is useful for all types of aviation activity (enplanements, operations, based aircraft, etc.) when there are strong indications that an individual airport's activity mimics that of a larger grouping of airports.

Exponential Smoothing

Exponential smoothing is a statistical technique that may be especially valuable in producing short-term forecasts. This technique produces a forecast based on a time series analysis of observations in which the most weight is given to the most recent observation and decreasing weights are given to earlier observations. This method would give more weight to the latest trends and conditions at the airport (e.g., new carrier hubbing at the airport). Exponential smoothing would be a recommended forecast methodology for any type of aviation-related activity that has experienced a significant change in a short period of time.

Comparison with Other Airports

Comparing the airport to be forecast with other airports of relative size and relevant characteristics can be a valuable technique, specifically in projecting airport enplanement growth after a major change such as the addition of the first low-fare carrier. In this case, an analogy can be made to growth rates achieved at similar airports after initial low-fare carrier service was obtained. It may also be appropriate to compare airport forecasts to statewide forecasts that are available, such as those identified in the FASP or established forecasts for other airports in the same region.

Survey Techniques

APO report “Forecasting Aviation Activity by Airport” notes that surveys and analyses based on surveys can play an important role in developing airport forecasts, especially when the spatial distribution of passenger trip ends must be estimated. Such information is needed to support ground transportation planning or airport access needs. It is also crucial when considering a new airport or airport relocation. These surveys are specifically aimed at establishing the travel patterns of air travelers — where the trip in the region originates or terminates, trip purpose, and the traveler’s relevant socioeconomic characteristics. Examples of survey techniques include questionnaires distributed to travelers, data collected from travel agents, and license plate surveys conducted at airport parking lots.

Cohort Analysis

Cohort analysis is used to disaggregate a larger group in order to study the components (cohorts) separately. This could apply to passengers, cargo shipments, and GA users but is not normally used in airport planning projects except for special applications. For example, if one is forecasting passengers for a city like Orlando to disaggregate the historical flow of passengers into major groups (e.g., individuals going to theme park, those on business, those attending a convention, and local residents on personal travel) is very useful. If a time series or even a good “snapshot” of each of these cohorts can be established, a separate analysis can be made of the likely factors that underlie the passenger demand of the separate cohorts.

Choice and Distribution Models

In some forecasting analyses, it is important to evaluate regional aviation demand (or even regional transportation demand) and distribute the demand between or among alternate aviation facilities. This can occur especially in the situation where an airport(s) in the region may be opening or closing during the forecast period. The important elements in this technique are an adequate database, and knowledge of the structure of traveler choices. The data requirements for estimating a choice model can be extensive.

Specific Forecasts and Documentation Examples

Forecasts developed for Master Plans should be presented as a stand-alone chapter and culminate with a comparison to the FAA TAF (as applicable and required if subject to FAA approval). Typically, historical activity for the various forecast elements is presented as an introduction to the forecasts themselves. This is followed by the actual forecasts with an explanation of the various methodologies employed. If more than one methodology is presented, each segment of the document dedicated to a forecast element should culminate with a preferred methodology in conjunction with justification for its validity.

Proper documentation of forecasted activity through clear and accurate data is important as planners need to understand potential future conditions in order to ensure the development plans will handle the future demand.

The following provides an overview of typical forecast elements and examples from existing Florida Airport Master Plans to provide guidance on the type and layout of information that should be included.

Based Aircraft Forecast

Forecasts of based aircraft should begin with an accurate determination of the number of existing and, if available, historical based aircraft at an airport. The forecast for based aircraft should broadly mimic one of the previously discussed methodologies or another method that can properly be explained and justified. Typically, the number of based aircraft at an airport can be related to an individual or collective grouping of variables. These variables may include socioeconomic characteristics of an airport's surrounding community such as income, retail sales, population growth, or the number of local businesses that may use GA aircraft. Based aircraft may also be influenced by other factors at the airport such as existing facilities (FBOs, fueling facilities, flight training schools).

In *Forecasting Aviation Activity by Airport* the FAA notes that whatever method is used to forecast aviation demand, it is usually helpful to incorporate an analysis of local and regional socioeconomic data.

A typical Master Plan should develop forecasts for total based aircraft (and all other forecast elements) for five-, 10-, and 20-year horizons beyond the base year (the most recent that full-year data are available).

Once a preferred forecast for the total number of based aircraft has been determined, fleet mix forecasts should also be developed. Understanding the existing and projected composition of an airport's based aircraft fleet assists in planning for airfield facilities such as aircraft storage and parking apron, fueling facilities, runways and taxiways, navigational aids, and others. Fleet mix projections should be presented by aircraft type.

When applicable, local, regional, and national trends in aviation should be examined in conjunction with the existing based aircraft fleet mix to determine future projections. Local and regional trends can often be ascertained by examining levels of aviation-related activity or socioeconomic trends. National trends may not always impact all airports; however, it can be useful to compare existing activity at an airport with national trends in aviation. There are many national publications that offer broad trends in aviation activity and aircraft production. One such publication is the FAA's Aerospace Forecasts, which is a report that is updated annually and provides a 20-year economic and aviation activity outlook for the U.S. airport system. The *FAA Aerospace Forecast Fiscal Years 2016-2036* can be found here: www.faa.gov/data_research/aviation/

An additional element typically included in forecasts of based aircraft is an airport's Critical Aircraft (also known as the Design Aircraft), which is defined by the FAA as the most demanding aircraft with at least 500 annual operations that operates, or is expected to operate at an airport. Identification of an airport's

critical aircraft may be derived from operational data or an approved Airport Layout Plan. It should be noted that in September 2015, a Draft AC (*FAA AC 150/5000-XX, Critical Aircraft and Regular Use Determination*) was published but not yet approved. The draft AC recommends when making the Critical Aircraft determination, total the operations of the aircraft with similar characteristics.

An example of based aircraft forecasts prepared for the St. Lucie County International Airport (FPR) Airport Master Plan are shown in **Table 11** including the legend of methodologies and abbreviations.

TABLE 11. SUMMARY OF BASED AIRCRAFT FORECASTING METHODS FOR ST. LUCIE COUNTY INTERNATIONAL AIRPORT

Forecast Methodology	Table Abbreviation
St. Lucie Population Average Annual Growth Rate (AAGR)	POP AAGR
St. Lucie County Employment AAGR	EMP AAGR
St. Lucie County Transportation Employment	TRANS AAGR
Personal Per Capita Income AAGR	PCPI AAGR
Total Operations Regression Analysis 2000-2008	REG AAGR
2008 FPR Terminal Area Forecast AAGR	TAF AAGR
2002 Airport Master Plan Forecast AAGR	02 AMPU AAGR
Operations per Based Aircraft Based upon 2008 Data	OPS/811
2004 Florida Aviation System Plan FPR AAGR	FASP AAGR
2008-25 FAA Aerospace Forecasts AAGR	AERO AAGR
Composite (Average) of All Ten Forecast Methods	Mid-Composite

Table 11. Summary of Based Aircraft Forecasting Methods for St. Lucie County International Airport (continued)

Year	POP AAGR	EMP AAGR	TRANS AAGR	PCPI AAGR	REG AAGR	TAF AAGR	02 AMPU AAGR	OPS/ 760	FASP AAGR	AERO AAGR	Mid-Composite
2015	253	242	223	281	221	249	251	241	243	233	244
2016	259	247	224	294	223	255	257	246	247	236	249
2017	265	251	226	308	225	261	264	251	252	239	254
2018	271	256	227	323	226	267	270	257	257	242	260
2019	276	261	229	341	228	274	277	262	262	246	266
2020	282	267	230	359	229	280	284	268	267	249	272
2021	287	272	231	379	231	289	291	274	273	253	278
2022	293	277	232	400	232	294	298	280	278	256	284
2023	299	282	234	422	234	301	306	286	284	260	291
2024	305	288	235	446	236	308	313	292	289	264	298
2025	311	294	236	470	237	315	321	299	295	267	305
2026	317	299	238	496	239	323	329	306	301	271	312
2027	324	305	239	524	241	331	337	313	307	275	320
2028	330	311	240	553	242	339	346	321	313	279	327
AAGR 2008-2028	2.26%	1.96%	0.65%	4.93%	0.69%	2.39%	2.50%	2.12%	1.99%	1.40%	2.22%
Change 2008-2028	56.38%	47.52%	13.84%	162.00%	14.84%	60.50%	63.86%	51.99%	48.44%	32.06%	55.14%
ST AAGR	2.70%	1.97%	0.79%	3.90%	0.69%	2.39%	2.50%	1.90%	2.03%	1.40%	2.04%
MT AAGR	2.36%	1.96%	0.70%	4.78%	0.69%	2.39%	2.50%	2.05%	1.97%	1.40%	2.15%
LT AAGR	1.99%	1.96%	0.56%	5.53%	0.69%	2.39%	2.50%	2.26%	1.99%	1.40%	2.34%
Forecast Type	Local	Local	Local	Local	Local	National	Local	Local	State	National	All

Source: St. Lucie County International Airport (FPR) Airport Master Plan, 2009
The LPA Group Incorporated
(1) Since the FAA TAF only forecasts operation to 2025, the growth rates from the TAF were used to project future operations, representing an adjusted forecast.

Aircraft Operations Forecast

Similar to based aircraft, once the most reliable data has been identified for aircraft operations, several of the previously mentioned forecast methodologies should be examined and a preferred methodology should be selected. Typically, an Airport Master Plan will examine at least two methodologies for each forecast element and identify a preferred projection based on calculated or estimated correlation to that element.

Once a preferred methodology has been identified and forecasts for five-, 10-, and 20-year planning horizons have been developed, most Airport Master Plans require a breakdown of projected operations by aircraft type. This typically includes separate projections for local and itinerant operations, as well as GA and commercial operations and operational fleet mix. In some instances, the Master Plan may call for forecasts of daytime and nighttime operations as well. If none of the aforementioned resources provide daytime/nighttime information, anecdotal evidence provided by airport management may suffice. An example of an operations forecast comparison prepared for the Bob Sikes Airport Master Plan is shown in **Table 12**.

TABLE 12. AIRCRAFT OPERATIONS FORECAST FOR BOB SIKES (OKALOOSA COUNTY) AIRPORT

Year	County Population	Airport Operations /County Pop	County Per Capita Income	Airport Operations / Count PCI
2000	170,910	50,256	$26,977	50,256
2001	171,740	51,160	$27,703	51,160
2002	175,240	53,254	$28,835	53,254
2003	177,810	55,352	$30,446	55,352
2004	180,910	57,386	$31,744	57,386
2005	182,170	59,479	$33,410	59,479
2006	188,090	61,111	$34,715	61,111
2007	192,080	62,793	$36,165	62,793
Forecast				
2010	203,960	72,129	$40,962	70,056
2015	224,180	85,586	$50,759	83,948
2020	244,740	99,270	$63,806	102,448
2025	265,850	113,319	$81,306	127,263
2030	287,930	128,015	$103,999	159,441
Average Annual Growth Rate				
2000-2004	1.14%	2.69%	3.31%	2.69%
2005-2007	1.78%	1.82%	2.68%	1.82%
2007-2030	1.70%	3.01%	4.50%	3.96%

Source: Bob Sikes Airport Master Plan Update, 2010
Airport operations forecast conducted by PBS&J, 2008

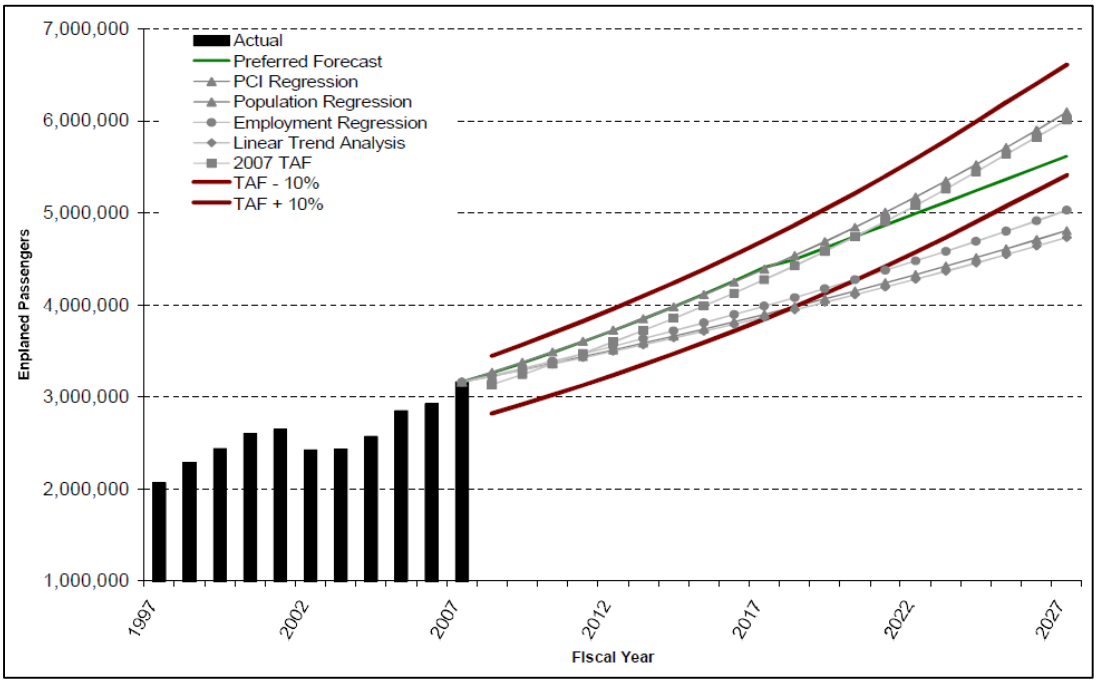
Passenger Enplanement Forecast

At commercial service airports, passenger enplanement forecasts provide the basis for landside facilities such as the passenger terminal, auto parking, rental car facilities, and several others. Fortunately, passenger enplanement data are usually made available from airport personnel via the airlines themselves. Because this data is actual counts, no guesswork or assumptions are required to produce accurate estimates or historical records.

As with all forecasts, passenger enplanement projections should be compared with the FAA TAF and previous forecasts such as the FASP to ensure reasonableness. There may be instances when information that has not been accounted for in other forecasts is made available, such as an airline's plans to expand existing service or add new routes. Conversely, forecasts should include factors such as loss of service or local factors that may inhibit passenger enplanements. When specific instances such as these occur, the proposed forecasts may vary significantly from those identified in the FAA TAF. Proper justification for forecasts submitted to the FAA is important, even if they do fall within the tolerance for FAA approval (10-percent in the five-year forecast period, and 15-percent in the 10-year forecast period). From a planning perspective, it is more important to produce reasonable and accurate forecasts of passenger activity than it is to be within the acceptable range of the FAA TAF. This is particularly important for passenger enplanement forecasts as they often provide justification for significant landside facilities that pertain to passenger terminal buildings, auto parking, etc. Additional information regarding forecasts and landside facility requirements is provided in *ACRP Report 25, Airport Passenger Terminal Planning and Design*. That document can be found here: http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_025v2.pdf

An example of passenger enplanement forecasts prepared for an Airport Master Plan is shown in **Figure 13**.

FIGURE 13. PASSENGER ENPLANEMENT FORECAST FOR JACKSONVILLE INTERNATIONAL AIRPORT



Sources: Jacksonville International Airport Master Plan Update Executive Summary, 2010
FAA Terminal Area Forecast, December 2007; Ricondo and Associates, Inc., February 2008

Peaking Characteristics Forecast

Peak forecasts of passenger activity and aircraft operations are essential for facility planning at both commercial and GA airports. As noted, it is important to base facility requirements on peak activity levels that occur on a regular basis. Peak activity levels should be determined by identifying actual figures of passenger activity and aircraft operations that occur regularly or by applying basic assumptions.

If detailed passenger activity and aircraft operations data are readily available, regularly occurring monthly, daily, and hourly peak characteristics can be identified. These figures can be applied to annual projections of activity and extrapolated for the 20-year planning horizon or analyzed separately if adequate data is available. For example, if scheduled commercial operations by aircraft type are obtained through OAG or a similar database, it may be possible to identify near-term changes in enplanements and adjust long-term peak forecasts accordingly.

As noted previously, a typical Master Plan identifies peak month, peak month average day (PMAD), and peak hour levels of activity for the 20-year projection period. An example of peaking characteristic forecasts prepared for an Airport Master Plan is shown in **Table 13**.

TABLE 13. PEAK OPERATIONS FOR DEFUNIAK SPRINGS AIRPORT

Year	Aircraft Operations	Peak Month Operations	Average Day Peak Month Operations	Peak Hour Operations
2010	15,606	1,561	52	5
2015	17,230	1,723	57	6
2020	19,024	1,902	63	6
2025	21,004	2,100	70	7
2030	23,190	2,319	77	8

Source: DeFuniak Springs Airport Master Plan Update, 2010
URS, 2010

Air Cargo Forecast

As noted, air cargo activity is not necessarily a required forecast element in an Airport Master Plan, however, at facilities that experience significant air cargo activity, adequate analysis should be provided. Forecasts of air cargo operations, equipment, and volume provide insight into apron requirements as well as vehicle access, auto parking, and other facilities. An example of air cargo forecasts prepared for the Tampa International Airport Master Plan is shown in **Table 14**.

TABLE 14. AIR CARGO FORECAST FOR TAMPA INTERNATIONAL AIRPORT (IN TONS)

Year	All-Cargo		Belly		Total		Grand Total
	Enplaned	Deplaned	Enplaned	Deplaned	Enplaned	Deplaned	
2011	33,651	42,870	8,928	10,443	42,579	53,313	**95,892**
2016	37,932	48,173	10,288	13,066	48,220	612,398	**109,459**
2021	41,324	52,482	11,285	14,332	52,609	66,814	**119,423**
2031	49,358	62,684	13,480	17,120	62,838	79,804	**142,642**
Average Annual Growth Factor							
2011-2016	2.42%	2.36%	2.88%	4.58%	2.52%	2.81%	**2.68%**
2011-2021	2.08%	2.04%	2.37%	3.22%	2.14%	2.28%	**2.22%**
2011-2031	1.93%	1.92%	2.08%	2.50%	1.97%	2.04%	**2.01%**

Source: Tampa International Airport Master Plan Update, 2012
HCAA Monthly Report and HNTB Analysis

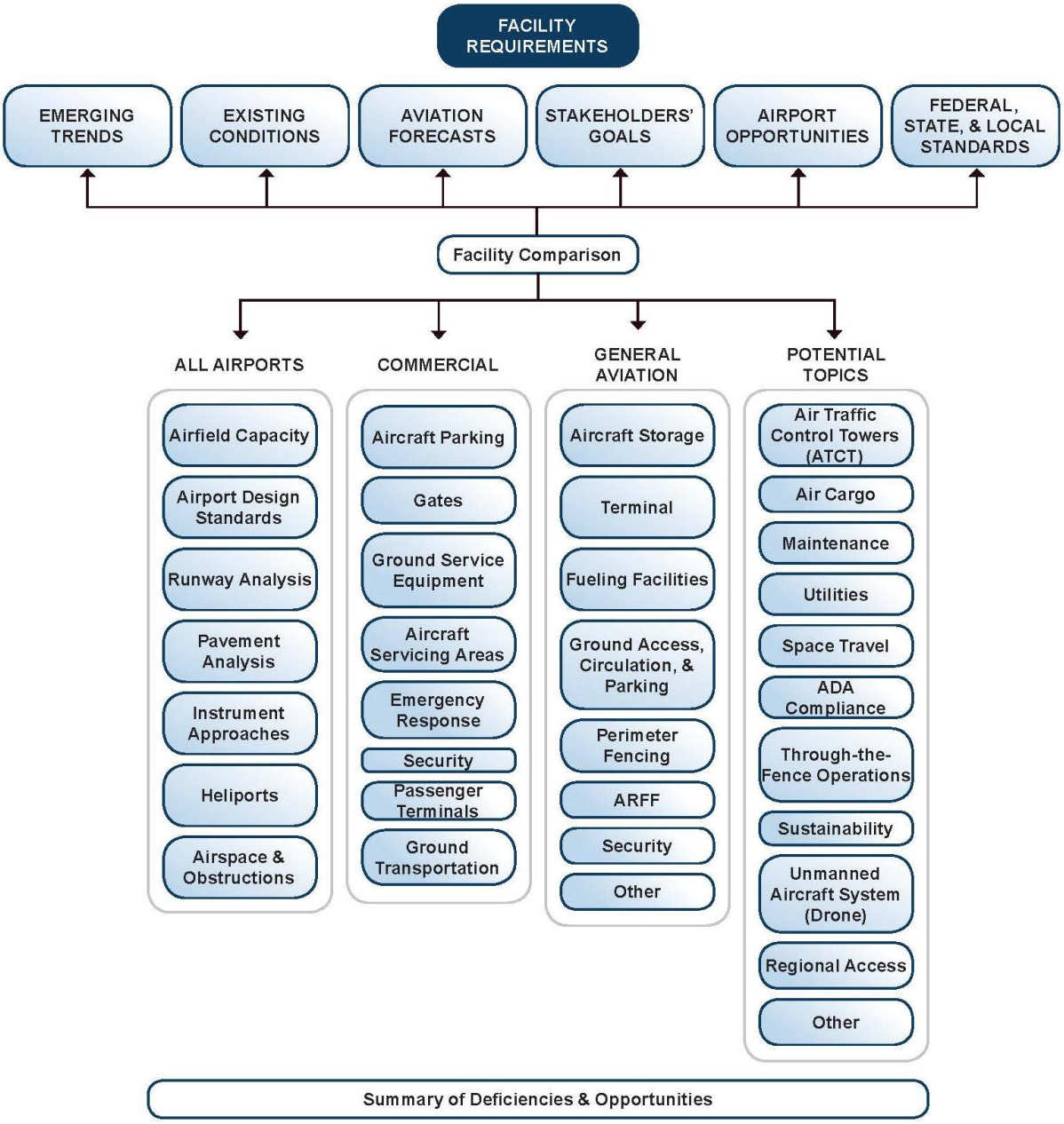
Section 6: Facility Requirements

The previous sections of the Master Plan including stakeholder input, existing conditions, and forecasts come together in the Facility Requirements chapter of the Master Plan (see **Figure 14** on the following page). The Facility Requirements involves the analysis of what additional facilities would be required beyond the existing airport infrastructure to accommodate forecasted aviation activity as well as meet Federal, state, and local regulations, including FAA design standards, as well as incorporate impacts from emerging trends and stakeholder input. This analysis culminates in a summary of deficiencies and opportunities that is used to develop the recommended development plan.

This chapter of the Guidebook identifies the suggested topics and tools for evaluating the airport's facility needs and requirements using FAA, FDOT, and other Federal, state, and industry standards, resulting in the corresponding recommended development plan.

For planning purposes, airport facilities can be divided into two common terms: airside and landside. Airside facilities include areas used for aircraft operations such as runways, taxiways, aprons, ARFF, fueling facilities, and hangars; this area can also be referred to as the airfield. Landside facilities include most other areas such as ground access, employee and customer parking, hotel, and support facilities and equipment. Several planning components, such as security and passenger terminals, can comprise both airside and landside.

FIGURE 14. FACILITY REQUIREMENTS OVERVIEW



Source: Kimley-Horn and Associates, Inc., 2016

There can be a significant difference between the facilities needed for GA service activities versus commercial. For example, commercial service airports are required to be certified under *14 CFR Part 139, Certification of Airports*, which applies to all airports providing scheduled commercial service utilizing aircraft with 10 or more seats. The requirements of Part 139 certification are based on the airport's class and affects the overall facility requirements. A few airports that have a Part 139 certification, but do not have commercial service, still require certain facilities to maintain their certification. In addition, many commercial service airports have GA activities, services, and facilities; however, the extent and size of GA facilities can differ significantly at commercial service airports. While airside standards are more consistent between GA and commercial airports, landside facility requirements and guidance can vary

widely. As such, this Guidebook has been structured to discuss planning standards and regulations applicable to all types of airports and those specific to commercial service versus GA airports separately.

This chapter addresses the following aviation facility requirement topics:

1. Emerging Trends
2. Airport Facility Planning
3. General Aviation Facility Planning
4. Commercial Airport Facility Planning
5. Other Potential Topics

Emerging Trends

Planners should be sure they are reviewing and applying emerging trends with the aviation and related industry. New technologies may affect capacity efficiency, facility geometry, or demand. Some trends may fall short, such as the proposed Very Light Jet (VLJ) revolution in the 2000's that pressed airports to design facilities specific to those type of aircraft. While VLJs are used, the market did not expand as expected and some of the hangars built for these companies sat empty for many years before another tenant took over. Other trends such as Unmanned Aircraft Systems (UAS) or drones have become very popular in the commercial and recreational market. Presented below are a selection of current emerging trends that may need to be considered during the Master Plan process depending on their applicability to the individual airport.

Sustainability

As it relates to airports, sustainability can be considered in the context of administration, procurement, planning, design, construction, maintenance, and operations. The sustainability framework can consist of policies, procedures, and practices that reduce facility and operational costs as a result of better utilization of resources, higher levels of efficiency, and a greater emphasis on planning. As the FAA and FDOT are striving to incorporate sustainability into all projects, a sponsor should determine an appropriate overall sustainability goal(s) and review individual efforts to achieve them. Airports that implement sustainable practices may benefit from reduced resource usage, improved passenger satisfaction, a more strategic use of airport property, and reduced waste generation and increased recycling. As such, facility requirements and future planning should incorporate sustainability initiatives. FDOT has begun developing an Airport Sustainability Guidebook that will provide information and guidance that can be referenced during the Master Planning process. This project is scheduled for completion in February 2017.

Florida Specific Information!

FDOT has begun developing an Airport Sustainability Guidebook that will provide information and guidance that can be referenced during the Master Planning process

The FAA recommends reviewing *Interim Guidance and Lessons Learned for FAA's Sustainable Master Plan Pilot Program* and the *ACRP Synthesis 10, Airport Sustainability Practices*.

NextGen

The National Airspace System (NAS) is being modernized by the Next Generation Air Transportation System (NextGen). Initiatives will affect flight plans and can have noise impacts, as well as impacts to navigation aids, airspace, airfield capacity, and obstruction management. While some initiatives are already being implemented like Performance Based Navigation (PBN) and Automated Dependent Surveillance-Broadcast (ADS-B), more programs are in their initial stages of deployment such as weather,

voice systems, information management, and data communications. Each of these programs is geared towards improving one facet of the safety and efficiency of the aviation transportation system. There are several ACRP Reports on NextGen due to be completed in 2016 that will provide additional information.

Personal Use of Technology

Technology advancements affect every person from the moment they consider taking a flight, whether on a GA or commercial aircraft. The flying experience has been transformed to allow passengers to self-check-in via smart phones, pilots to obtain in flight weather on their tablet, and the community to know when there are construction delays on the roads to the airport via social media. The more an airport can stay connected to its users and utilize technology the stronger its position will be. This is directly connected to the way an airport brands or markets itself and the infrastructure to provide its passengers. *ACRP Report 70: Guidebook for Implementing Intelligent Transportation System Elements to Improve Airport Traveler Access Information* assists airports in how they may provide this information and disseminate to passengers.

Economics

Airports and airlines are under increasingly larger financial stresses and must find creative ways to maintain their market share. This has resulted in tax exemptions on aviation activities to make the state, airport, or company more attractive, consolidation of services and airlines to create an economy of scale and reduce competition, increased advertising methods at the airport, and increasing customer service efforts. These economic factors need to be considered in how they will affect future revenues and space requirements.

Emergency Planning

Emergencies at airports go beyond terrorism concerns to events such as hurricanes that can destroy essential navigation equipment and disrupt services for weeks, the containment of infectious diseases such as the Ebola outbreak in 2014, Zika in 2016, or other events that would impact aircraft travel. Understanding how these events may impact the day-to-day operations and providing appropriate response tools will allow the airport to return to normal operations quicker. This could include identifying training necessities or facilities such as an Emergency Operations Center (EOC). *ACRP Report 12, An Airport Guide for Regional Emergency Planning for Chemical, Biological, Radiological, Nuclear, or Explosive (CBRNE) Events* provides details on how airports should cover hazard and threat assessments. *ACRP Report 94*: *Integrating Web-Based Emergency Management Collaboration Software into Airport Operations* is a primer on how to evaluate and implement tools for emergency response management.

Regional Access/Multi-Modal

Regional access to airports has been identified as a reoccurring problem across the nation as airports are not always considered in the regional transportation planning process. Viable multi-modal transportation options that connect GA and commercial airports to the regional system are needed as populations and flight activity increase and users look for alternative methods to travel.

Unmanned Aircraft Systems (UAS)

UAS, better known as drones, are beneficial to numerous civilian activities such as search and rescue operations, assessing ongoing threats from hostage situations to wildfires, assisting with inspections of hard to reach infrastructure such as bridges, and gathering data on weather and emissions. The use of drones has dramatically increased over the past several years into what many pilots and airport sponsors consider a safety hazard to the national airspace system. While federal regulations restrict drone usage in certain areas and altitudes, these regulations can be difficult to enforce. Further research and trials will be

necessary to determine the best ways to integrate drones into the airspace system, especially when arriving to and departing from airports.

While at this time there is no guidance on the specific facility requirements for UAS on- or off-airport this may be a consideration in the upcoming years, particularly as drones become larger in size and more regulated in use. In 2015, the FAA began reviewing applications for the first "droneport," a facility developed specifically for the use of drones.

Airport Facility Planning

Airfield Capacity

The purpose of an airfield capacity analysis is to determine if the existing airfield facilities are sufficient to meet demand or if changes to these facilities are needed. Airfield capacity can be defined as either a measure of maximum sustainable throughput or as the number of aircraft operations that can be accommodated with a specified maximum average delay. Airfield capacity is determined based on the available airfield system and a range of airport characteristics including the types and numbers of aircraft operations. *FAA AC 150/5060-5, Airport Capacity and Delay* describes how to determine Annual Service Volume (ASV) and use that value to reasonably estimate the airport's annual maximum capacity, accounting for annual changes in weather, runway use, aircraft fleet mix, and other conditions. Hourly airfield capacity is the maximum number of aircraft operations that can take place at the airport in one hour, which is used in evaluating peak activity and is critical to the overall success of an airport. An airport must know their fleet mix and annual operations to determine capacity. For airports with higher operational activity levels or peaking issues, hourly capacity will be more important than ASV.

The FAA's current capacity AC was prepared in 1983; an update is currently underway. Analysis contained in *ACRP Report 79, Evaluating Airfield Capacity* as well as *ACRP Report 104, Defining and Measuring Aircraft Delay and Airport Capacity Thresholds* provide more current information and identify current and newer airfield capacity evaluation tools, including a prototype airfield capacity spreadsheet model. The reports explain how to select the most appropriate airfield capacity tool for the airport's analysis.

The FAA's runwaySimulator, (www.faa.gov/airports/planning_capacity/runwaysimulator/) available from MITRE, can be used to determine airport capacity at major U.S. airports as well as assess capacity impacts of new improvements or flight procedures. RunwaySimulator requires training from the FAA. This software tool will simulate throughput but may not necessarily provide an exact capacity value.

Airport Design Standards

Airport design standards provide direction on how to design airports that promote safe activities. *FAA AC 150/5300-13A, Airport Design* contains extensive information regarding design standards for every airport type based on FAA guidance. Design standards are included for runways, taxiways, safety areas, as well as many others. Due to the number of standards in the AC, planners are advised to review the AC for all topics for the applicability to their planning study. The design guidelines provided in this AC continue to change as additional analysis is completed by the FAA. It is important that the most current version of the AC is reviewed to ensure that the most current design standards are utilized during the facility requirements analysis.

The FAA uses the Aircraft Approach Category (AAC), Airplane Design Group (ADG), and the visibility minimums of an airport's design aircraft to classify individual runways. When combined, these three elements comprise the Runway Design Code (RDC); for example, C-III-1600. The design aircraft, identified as part of the forecasting process, has at least 500 annual operations at the airport. The AAC is

based on the design aircraft's speed during the landing approach. The ADG is based on the wingspan and tail height of the design aircraft, whichever is more restrictive. The visibility is listed as the Runway Visibility Range (RVR) and is based on the lowest approach visibility minimums for that runway. The RDC, minus the visibility component, determines the Airport Reference Code (ARC). The most demanding RDC would be considered the ARC. **Table 15** lists the specifications associated with the RDC from the FAA AC.

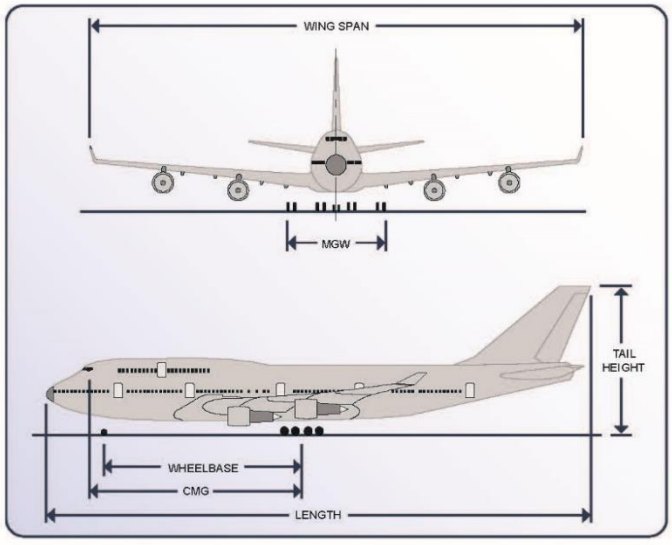
TABLE 15. RUNWAY DESIGN CODES

Runway Design Code (RDC)						
Aircraft Approach Category (AAC)		**Airplane Design Group (ADG)**			**Flight Visibility**	
Category	**Speed (kts)**	**Group**	**Wingspan**	**Tail Height**	**RVR (ft)**	**Approach Minimums (sm)**
A	Less than 91	I	Up to 48'	<2 0'	5000	Not lower than 1 mile
B	91 to 120	II	49' to 78'	20' - < 30'	4000	<1 & > ¾
C	121 to 140	III	79' to 117'	30' - < 45'	2400	< ¾ & > ½
D	141 to 165	IV	118' to 170'	45' - < 60'	1600	< ½ & > ¼
E	166+	V	171' to 213'	60' - < 66'	1200	< ¼
-	-	VI	214' to 261'	66' - <80'	-	-

Source: FAA AC 150/5300-13A, Airport Design

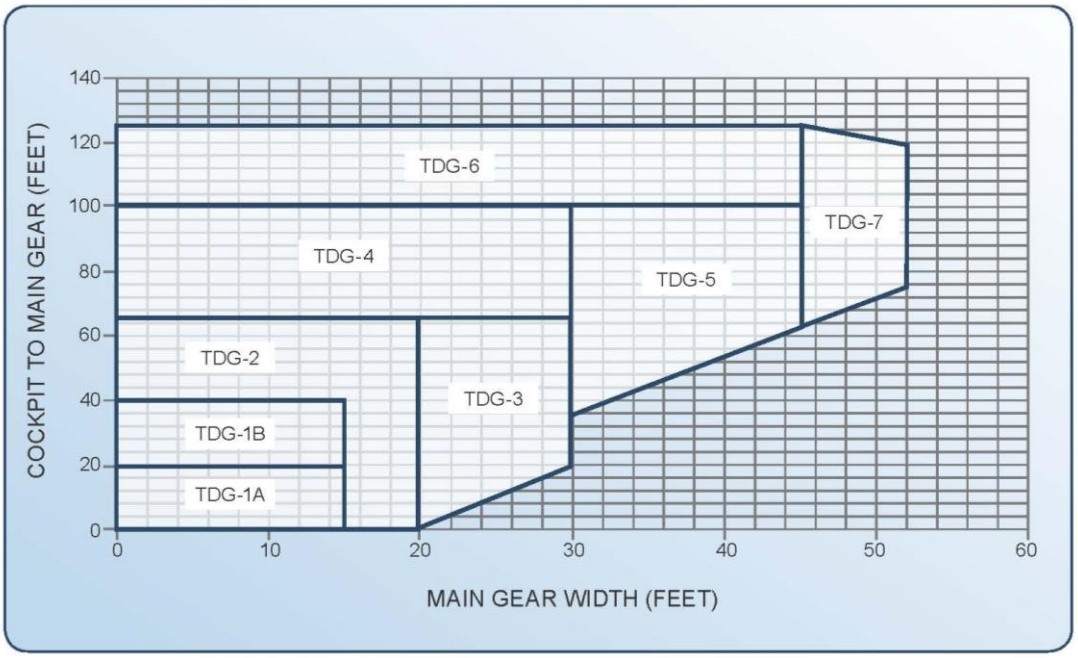
The Taxiway Design Group (TDG) is a classification of the aircraft dimensions—the width of the main gear (MGW) and Cockpit to Main Gear (CMG) distance as shown in **Figure 15** and **Figure 16**, below. CMG is typically used for commercial aircraft when the nose is in front of the nose gear; the wheelbase is used for smaller aircraft when the cockpit is behind the nose gear. Taxiways are designed to allow for oversteering, thus pavement angles and edges (fillets) must provide a large enough margin for safety while turning.

FIGURE 15. AIRCRAFT DIMENSION



Source: FAA AC 150/5300-13A, Airport Design

FIGURE 16. TAXIWAY DESIGN GROUP MEASUREMENTS

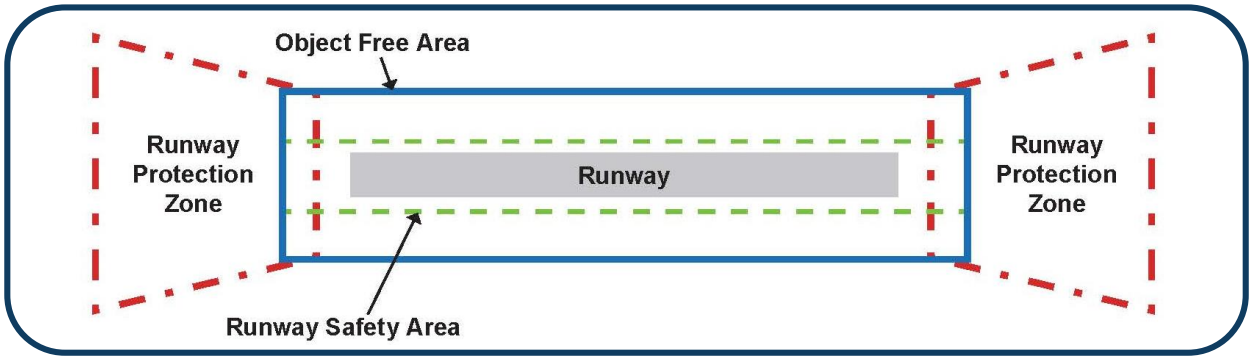


Source: FAA AC 150/5300-13A, Airport Design

Once identified, the RDC and TDG are used to signify the design standards to which the runway should be constructed or maintained. A summary of these design standards are provided below and visually depicted in **Figure 17**. Key design standards include:

- **Object Free Area (OFA)** – An area centered on the ground on a runway (ROFA), taxiway (TOFA), or taxilane (TLOFA) centerline provided to enhance the safety of aircraft operations by remaining clear or objects (roads, buildings, etc.), except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes
- **Obstacle Free Zone (OFZ)** – An area centered on the runway (ROFZ) that extends 200 feet from the runway end and must be cleared during operational use of all objects except those located there due to their function. The ROFZ is based on the approach minimums of the runway end. A Precision OFZ (POFZ) also applies to airports with vertically-guided approaches
- **Runway Protection Zone (RPZ)** – An area at ground level prior to the threshold or beyond the runway end that enhances safety and protects people and property on the ground. The FAA often pursues ownership of this area through title or easements to ensure control. The acreage not controlled or containing obstructions should be evaluated for control
- **Runway Safety Area (RSA)** – A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway. Area must be capable of supporting necessary objects and equipment such as navigational aids (NAVAIDs) and snow removal. FAC Rule 14-60.007, *Airfield Standards for Licensed Airports* also requires airports to adhere to certain design standards for the safety area length and width
- **Centerline Separation** – The required distance between the runway/taxiway/taxilane and other objects including adjacent runways, taxiways, and taxilanes based on the required wingtip clearance

FIGURE 17. KEY DESIGN ELEMENTS



Source: Kimley-Horn and Associates, Inc., 2016

The Runway Design Standards Matrix in Appendix 7 of *FAA AC 150/5300-13A, Airport Design* can be used to determine the dimensions for these standards. Table 6-1 of the AC lists the facilities designated as "fixed-by-function" and thus allowed to be located within the RSA and ROFA.

Other design standards to note include:

- **Runway Visibility Zone (RVZ)** – Is reviewed when there is more than one runway in use. The RVZ is a defined area with a clear line of sight between two intersecting runways and comprises imaginary lines between designated points. This ensures pilots and can safely see both the runway on which they are operating as well as other runway(s)
- **NAVAIDs** – Require certain clearance areas to ensure proper operation. For example, any structures within 500 feet of an automated surface observing system (ASOS) should be at least 15 feet below the antenna height and a segmented circle needs to be visible for pilots to note wind direction. While an Instrument Landing System (ILS) is in use, no vehicles or aircraft may be within the ILS critical area
- **Building Restriction Line (BRL)** – Indicates where airport buildings must not be located, limiting building proximity to aircraft movement areas. The BRL is typically calculated based on the Part 77 Imaginary Surfaces for a 35-foot high building

Runway Analysis

There are several factors of the runway system that need to be analyzed to ensure the airport is able to meet safety and design standards. These include the orientation of the runways, length and width, strength, and navigational aids.

Orientation

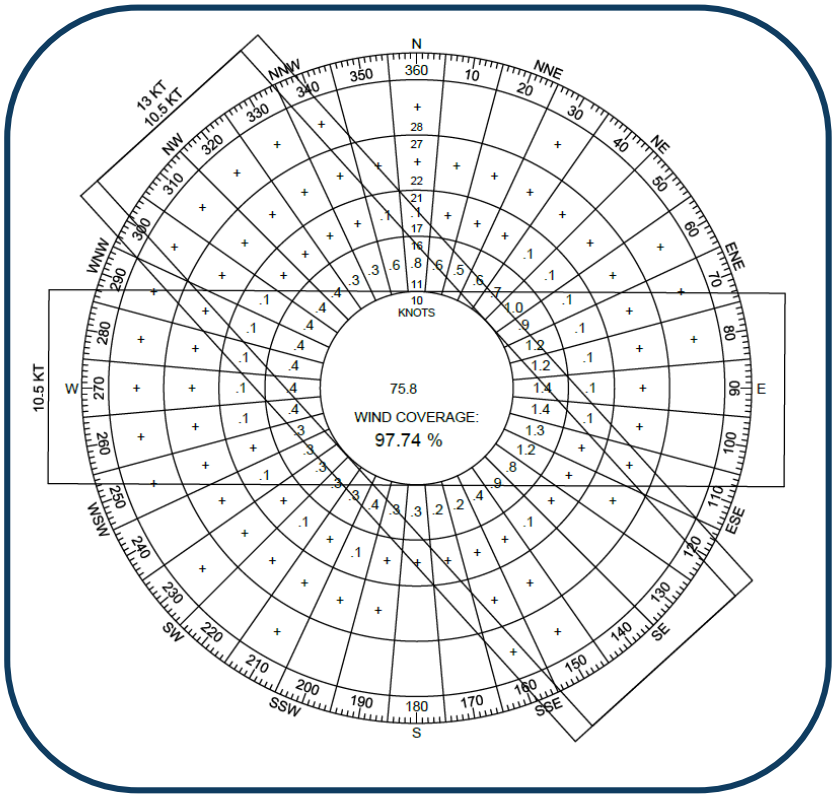
Wind speed and direction are key factors in determining runway orientation and the number of runways at an airport. Runways should ideally be oriented to the direction of the prevailing winds to allow aircraft to take off and land in the direction of the wind. Per *FAA AC 150/5300-13*, *Airport Design*, the FAA's desired wind coverage for an airport is 95-percent between one or multiple runways with the allowable crosswind component based on the RDC. When a single runway cannot provide enough wind coverage, a second runway should be considered.

Per FAA AIP Handbook, only a single runway will be funded at an airport unless the FAA ADO has determined the secondary or crosswind runway is justified

The wind data needed to perform the analysis can be obtained by contacting the National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC). (http://www1.ncdc.noaa.gov/pub/data/noaa/). When the wind data is not available for a specific airport, a discussion regarding using data from nearby airports with similar conditions should be held with the FDOT and FAA ADO. Prevailing winds are typically out of the north from Orlando to the panhandle but vary throughout the rest of the state due to the presence of the Gulf Stream on three sides.

The wind data file can be uploaded into the FAA's Wind Rose program located on the FAA website (https://airports-gis.faa.gov/airportsgis/publicToolbox/windroseForm.jsp). The AC provides information on the calculations and assumptions for the wind analysis behind the software program. The wind roses for the applicable conditions are required to be shown in the ALP. A sample wind rose is shown in **Figure 18**.

FIGURE 18. SAMPLE WIND ROSE



Source: Valkaria Airport Layout Plan, 2015
Hanson Professional Services, Inc.

Pavement Strength

Based on the design aircraft, the airport should determine the required pavement design strength or weight bearing capacity of all pavement areas including runways, taxiways, and aprons. Strength is based on the load distribution of aircraft from their landing gear type and geometry. Pavement strength is determined by aircraft expected to use the airport and not based on a single activity; for example, a heavier aircraft may use a lower strength pavement for limited operations if determined feasible. *FAA AC 150/5320-6, Airport Pavement Design and Evaluation* provides details on design and load distribution.

Length and Width

The design aircraft for each runway determine runway length and width requirements. Runway width is based on the RDC as presented in the Runway Design Standards Matrix in *FAA AC 150/5300-13, Airport Design*. *FAA AC 150/5325-4B, Runway Length Requirements for Airport Design* describes the process

for determining recommended lengths. “Runway Length Curves,” which consider conditions such as airport elevation, average maximum daily temperature, wet or dry conditions, and runway gradient and can be used to determine the recommended length. The Draft *FAA AC 150/5325-4C, Runway Length Recommendations for Airport Design*, proposed in 2013, would remove runway length curves for aircraft under 60,000 pounds and recommends utilizing the aircraft manufacturer’s airport planning manuals. The Draft AC includes background on the calculations and information on how to utilize the manuals with examples of specific aircraft types.

Additionally, aircraft operating under Federal Aviation Regulations (FAR) Part 135, charter operators, or FAR Part 119, air carriers and commercial operators, may have additional mandates imposed by their company for safety reasons. This may include a minimum runway length or approach visibility minimums based on the passenger and fuel loads and meteorological conditions. As such, planners should discuss runway length requirements with airport stakeholders regarding specific requirements for aircraft regularly utilizing the airport.

FAC 14-60 provides the following minimum landing area dimensions (shown in **Table 16)** in addition to the FAA AC guidance.

TABLE 16. LICENSED AIRPORTS MINIMUM LANDING AREA DIMENSIONS

Landing Area Type	Effective Landing Area Length	Minimum Landing Area Width
Runway	2,400 feet	60 feet
Short Field Runway	800 feet	60 feet
Ultralight	300 feet	150 feet
Seaplane*	2,500 feet	200 feet
Helipad	24 feet	24 feet

**Seaplane landing areas shall have a minimum water depth of three feet.*
Source: FAC 14-60

Declared distances, per *FAA AC 150/5300-13, Airport Design*, represent the maximum distances of the runway available and suitable for meeting takeoff, rejected takeoff, and landing distance performance requirements for turbine powered aircraft as approved by the FAA. Declared distances can satisfy design standards without limiting the physical runway length. Declared distances are calculated one runway end at a time by reviewing the existing safety areas beyond the paved runway and the paved runway. The available distances are “reduced” on paper only by utilizing runway pavement to satisfy safety areas; no physical markings are indicated on the pavement. Sponsors may contact the FAA Orlando ADO or FDOT ASO for applicability and assistance on establishing declared distances.

Lighting, Markings, and NAVAIDs

Lighting, markings, and NAVAIDs allow aircraft to operate safer in all weather conditions, especially during nighttime and low visibility conditions. Airport markings should be reviewed to ensure they are up-to-date, compliant with *FAA AC 150/5340-1L, Standards for Airfield Markings* and FAC Rule 14-60.007, and in good condition. FAC Rule 14-60.007 requires at least one windsock to be at the airfield plus additional requirements for segmented circles for non-towered airports.

FAA AC 150-5340-30H, Design and Installation Details for Airport Visual Aids is a non-mandatory guide relating to airport visual aids’ siting requirements, design, installation, and maintenance. The need for additional NAVAIDs and lighting such as Visual Glideslope Indicators (VGSI) or weather systems should be reviewed based on pilot needs and instrument approaches that help pilots identify runway thresholds. Additional ACs are available for details on various NAVAIDs and lighting.

Turf Runways

Specific aircraft, such as taildraggers, prefer turf runways. Some pilots may also prefer turf runways due to reduced cost or mere personal preference. These runways can be used at low volume airports with lightweight aircraft. Turf runways are required to adhere to the same FAA and State design standards and regulations as a paved runway including safety areas and Part 77 surfaces. As such, any analysis or development of a turf runway should comply with *FAA AC 150/5300-13, Airport Design* and FAC 14-60. **Table 17**, provides a list of the Landing and Surfaces Area per FAC 14-60 for a turf runway.

TABLE 17. LICENSED AIRPORTS - LANDING AND SURFACE AREAS

Landing Area		Primary Surface		Approach Surface				Transition Surface	
Surface	Approach	Length	Width	Ratio	Length	Width		Ratio	Distance
						Inner	Outer		
Not Paved	Visual	End of Runway	250 feet	20:1	5,000 feet	250 feet	1,250 feet	N/A	N/A

Pavement Maintenance

While the Federal grant assurances require sponsors to maintain a safe operating airfield including runways, taxiways, and aprons, FDOT has a longstanding initiative to monitor the condition and lifespan of airport pavement. Pavement condition is a major safety component at an airport as it directly impacts the capability of the runway surface to provide a suitable environment for maintaining aircraft directional control. Pavement in poor condition can damage aircraft through prop strikes or foreign object debris (FOD) being swept up from the ground into an aircraft. It is also important to maintain pavement regularly as repairs become costlier the longer maintenance is deferred. The Statewide Pavement Inspection Program schedules inspections on a three-year cycle at no cost to the airport; for more information, visit the FDOT Airfield Pavement Management website: www.dot.state.fl.us/aviation/pavement.shtm.

Federal Grant Assurance #19 states:

The airport and all facilities which are necessary to serve the aeronautical users of the airport, other than facilities owned or controlled by the United States, shall be operated at all times in a safe and serviceable condition and in accordance with the minimum standards as may be required or prescribed by applicable Federal, state and local agencies for maintenance and operation

FAC Rule 14-60.007, *Airfield Standards for Licensed Airports* details the Pavement Condition Index (PCI) that values the condition of the pavement in order to maintain the airport's license (**Table 18** and **Figure 19**). PCI values range from 0 (Failed) to 100 (Excellent). Pavement can be assessed following the American Society of Testing Material ASTM Standard D 5340, *Standard Test Method for Airport Pavement Condition Index Surveys,* avaialble at: www.astm.org/Standards/D5340.htm. The results of the PCI, along with the associated maintenance, rehabilitation needs, and costs, are compiled into the Statewide Airfield Pavement Management Program (SAPMP) Update, available at: www.dot.state.fl.us/aviation/pavementManagement.shtm

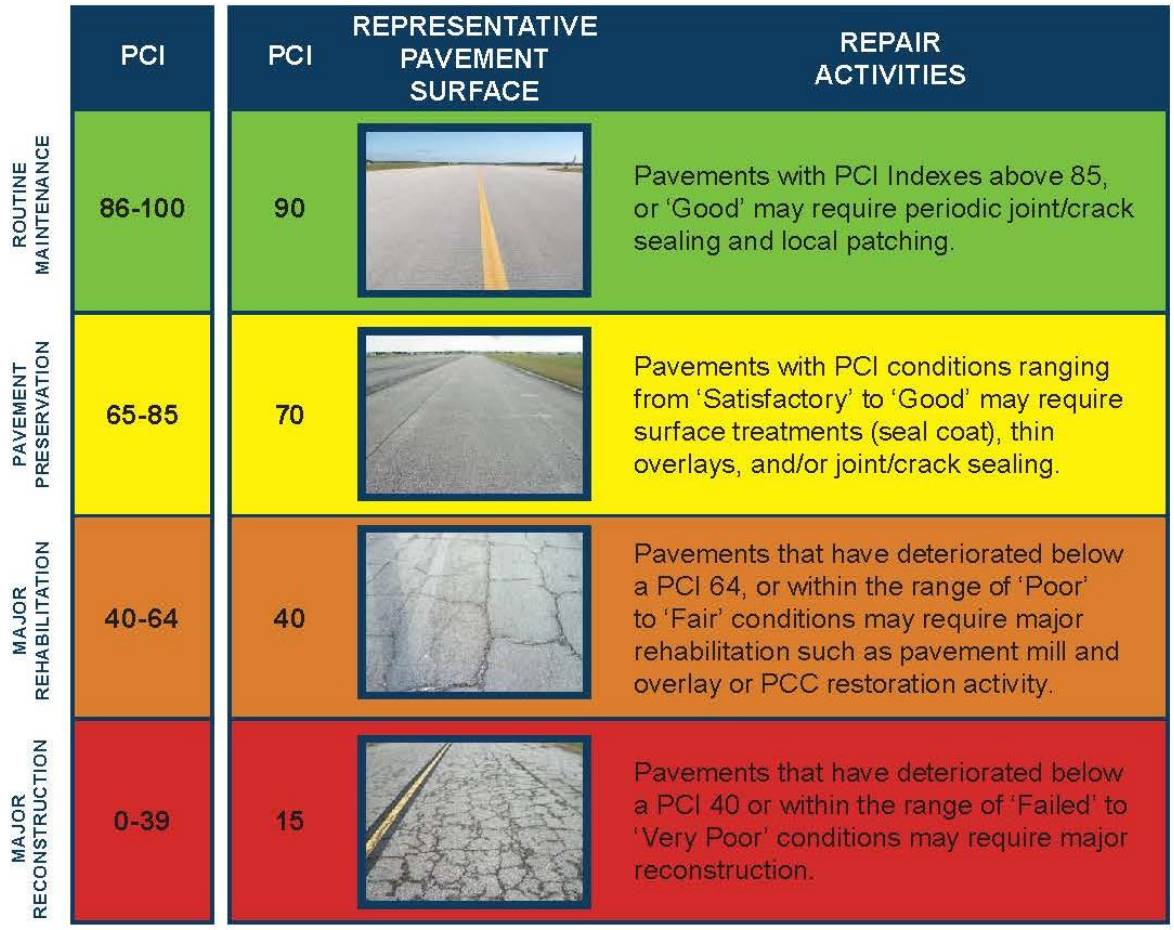
Florida Specific Information!

FAC Rule 14-60.007, *Airfield Standards for Licensed Airports details the Pavement Condition Index (PCI) that values the condition of the pavement in order to maintain the airport's license*

TABLE 18. PAVEMENT CONDITION INDEX

Qualitative Rating	PCI Value	
	Minimum	Maximum
Excellent	86	100
Very Good	71	85
Good	56	70
Fair	41	55
Poor	26	40
Very Poor	11	25
Failed	0	10
Source: FAC Rule 14-60.007, Airfield Standards for Licensed Airports		

FIGURE 19. VISUAL REPRESENATION OF PCI RATINGS FROM THE SAPMP UPDATE



Source: Statewide Airfield Pavement Management Program (SAPMP) Update, 2015

The SAPMP recommends completing a major pavement rehabilitation, such as runway reconstruction or mill and overlay, when a pavement section has deteriorated below the Critical PCI value or when Section PCI has load-related PCI distresses. The objective of a major rehabilitation is to "reset" the PCI value to 100. The level of rehabilitation based on the PCI index and example costs are provided in the Table "Major Rehabilitation by Condition." Maintenance and Repair (M&R) will help extend the life of the pavement and includes activities such as crack sealing and patching.

FDOT has three publications to assist with Pavement Management: *Airfield Pavement Distress Repair Manual*, *Airfield Pavement Inspection Reference Manual*, and *Inspection Methodology for Whitetopping*. These are available at: www.dot.state.fl.us/aviation/flpub.shtm

The Inspection Manual details the different types of distress that can be found in the pavement and how to rate them and includes the survey data sheets for flexible pavement and jointed rigid pavements.

Taxiway System

The taxiway system provides safe access to and from the runways and landside areas. As discussed previously, taxiways are designed for the TDG but the overall system also needs to be reviewed to ensure there are no "hot spots" that could lead to runway incursions and adequate access is provided to all areas. All airfield movement, including aircraft, pedestrians, and vehicles, must be analyzed. As new taxiway and taxiway fillet designs were added with the change to *FAA AC 150/5300-13A, Airport Design* in 2012, all airfields should be reviewed for compliance. The AC provides the following guidance that requires discussion with frequent users of the airport:

- Eliminate "judgmental oversteering" to allow pilots to use a consistent taxi method throughout the airport.
- Design taxiways so nose gear steering angle is no more than 50 degrees.
- Simplify taxiway intersections by ensuring pilots do not have more than three options at any intersection.
- Design turns to be 90 degrees when possible to increase visibility.
- Reduce possibilities of runway incursions by avoiding non-recommended taxiway designs, wide expanses of pavement, and "dual-purpose" pavement; and limiting runway crossings and direct access without turns from an apron to a runway.

GA airports typically have at least one full-length parallel taxiway to reduce "back-taxiing" and runway crossings.

Instrument Approaches

Remember!

Changing adding or changing approaches can result in additional design impacts that could result in unintended consequences.

Standard Instrument Approach Procedures (SIAPs) are established and controlled by the FAA to help aircraft land at specific runway ends, especially during inclement weather. If an airport has no instrument approach, approaches are categorized as visual, although there could be a circling approach that does provide some capability to the airport. Airports considering adding an instrument approach should be aware that doing so may impact other design elements at the airport, such as approach surfaces and the width of the primary surface. Airports considering adding an instrument approach should understand all of the potential impacts to ensure that an instrument approach is appropriate and feasible for their airport. The following three types of instrument approaches are available:

- Precision Approach (PA) – Provides lateral and vertical guidance (ILS and military approaches)
- Approach with Vertical Guidance (APV) – Provides vertical guidance to decision altitude with lateral guidance (Localizer performance with vertical guidance (LPV), Lateral navigation (LNAV)/Vertical navigation (VNAV))
- Non-Precision Approach (NPA) – Provides only lateral guidance (Localizer performance (LP), LNAV, Localizer approach (LOC), Very High Frequency Omni Directional Range (VOR)

Area Navigation (RNAV) is the overall terminology used for approaches that use the GPS Wide Area Augmentation System (WAAS). Due to technological advances, RNAV approaches are now defined specifically as LPV, LP, LNAV, and others. These RNAV approaches are being implemented as part of the NextGen Performance Based Navigation (PBN) initiative.

As precision approaches provide more exact information they are more desirable; however, they also require additional equipment, funding, and larger safety and protection areas for the airport. Approaches with vertical guidance are an option for airports that desire more exact information but are not able to provide a full precision approach with lateral guidance.

Each individual instrument approach procedure at an airport also has an associated visibility minimum. As previously noted, the visibility minimum is also expressed in terms of a runway visual range (RVR) in the identification of a runway design code (RDC). Airports should review the approach procedure needs during the Master Plan and compare them to standards associated with different visibility minimums as identified in *FAA AC 150/5300-13, Airport Design* and in **Table 19**. Typically, as the minimums are reduced, the infrastructure requirements and safety areas such as the RPZ increase.

The full impact of lower minimums should be analyzed prior to a Master Plan recommendation to ensure the airport does not install navigational equipment that cannot be utilized because the RPZ now extends over residential property or the sponsor cannot ensure the approach is clear of obstructions. An FAA memorandum from August 8, 2015 was written to remind the FAA staff and airport sponsors of their responsibility in protecting the approach and departure surfaces by ensuring they remain clear of obstructions.

The need to report weather conditions to the air traffic control system is not listed on the table below. Specific weather system requirements are based on the type of approach and should be discussed with the FAA. The main two systems are the Automated Weather Observing System (AWOS) and the Automated Surface Observing System (ASOS). As newer technology is developed through NextGen and other applications, the approach standards may change. The AC standards should be utilized as a baseline, but it is recommended to discuss current technology and requirements with the FAA and FDOT when recommending a new approach procedure as part of the Master Plan.

TABLE 19. STANDARDS FOR INSTRUMENT APPROACH PROCEDURES

Visibility Minimums[1]	< 3/4 statute mile	3/4 to < 1 statute mile	≥ 1 statute mile straight-in	Circling[2]
HATh[3]	< 250 ft	≥ 250 ft	≥ 250 ft	≥350 ft
TERPS GQS[4]	Clear	Clear	Clear	Not applicable
PA final approach surfaces[5]	Clear	Not Required	Not Required	Not applicable
POFZ (PA& APV only)	Required	Not Required	Not Required	Not applicable
TERPS Chapter 3, Section 3	34:1 clear	20:1 clear	20:1 clear[6]	20:1 clear[6]
ALP[7]	Required	Required	Required	Recommended
Minimum Runway Length	4,200 ft (paved)	3,200 ft[8, 9]	3,200 ft[8, 9]	3,200 ft[8, 9]
Runway Markings (See AC 150/5340-1)	Precision	Non-precision[9]	Non-precision[9]	Visual (Basic)[9]
Holding Position Signs & Markings (See AC 150/5340-01, AC 150/5340-18)	Precision	Non-precision[9]	Non-precision[9]	Visual (Basic)[9]

Visibility Minimums[1]	< 3/4 statute mile	3/4 to < 1 statute mile	≥ 1 statute mile straight-in	Circling[2]
Runway Edge Lights[10]	HIRL/MIRL	HIRL/MIRL	MIRL / LIRL	MIRL /LIRL (Required only for night minimums)
Parallel Taxiway[11]	Required	Required	Recommended	Recommended
Approach Lights[12]	MALSR, SSALR, or ALSF	Recommended[13]	Recommended[13]	Not required
Applicable Runway Design Standards, e.g. OFZ	<3/4-statute mile approach visibility minimums	≥3/4-statute mile approach visibility minimums	≥3/4-statute mile approach visibility minimums	Not required
Threshold Siting Criteria to Be Met (Reference paragraph 303)	Table 3-2 row 7	Table 3-2 row 6	Table 3-2 row 1-5	Table 3-2 row 1-4
Survey Required[14]	VGS	VGS (PA & APV) NVGS	NVGS[15]	NVGS[16]
Source: FAA AC 150/5300-13A, Airport Design				

*Footnotes for **Table 18**.*

1. *Visibility minimums are subject to the application of Order 8260.3 ("TERPS"), and associated orders or this table, whichever is higher. To qualify for each visibility (or circling), all requirements within the same column must be met or exceeded.*
2. *All runways authorized for circling must meet threshold siting (reference paragraph 303), OFZ (reference paragraph 308), and TERPS Chapter 3, Section 3 criteria.*
3. *Height Above Airport (HAA) for circling. The HATh/HAA indicated is for planning purposes; actual obtainable HATh/HAA is determined by TERPS and may be higher due to obstacles or other requirements. HATh less than 250 ft must comply with requirements in < 3/4 statute mile column regardless of published visibility.*
4. *GQS is applicable to PA and APV only. See Table 3-2, row 8.*
5. *Applicable to PA only, as defined by paragraph 102. If not clear, HATh must be increased to 250 ft or greater (as required by TERPS).*
6. *If not clear, obstacles must be lighted (see AC 70/7460-1) or procedure/circling runway restricted to day only. In certain circumstance, a VGSI may be used in lieu of obstruction lighting as defined in TERPS.*
7. *An ALP is only required for obligated airports in the NPIAS; it is recommended for all others.*
8. *Runways less than 3,200 ft are protected by Part 77 to a lesser extent. However, runways as short as 2,400 ft could support an instrument approach provided the lowest HATh is based on clearing any 200-ft (61 m) obstacle within the final approach segment.*
9. *Unpaved runways require case-by-case evaluation by the RAPT.*
10. *Runway edge lighting is required for night approach minimums. High intensity lights are required for RVR-based minimums.*
11. *A full-length parallel taxiway must lead to the threshold.*
12. *To achieve lower visibility minimums based on credit for lighting, a full approach light system (ALSF-1, ALSF-2, SSALR, or MALSR) is required for visibility < 3/4 statute mile. Intermediate (MALSF, MALS, SSALF, SSALS, SALS/SALSF) or Basic (ODALs) systems will result in higher visibility minimums. An ALSF-1 or ALSF-2 is required for CAT II/III ILS.*
13. *ODALS, MALS, SSALS, and SALS are acceptable.*
14. *See AC 150/5300-18 for Vertically Guided Survey (VGS) and non-Vertically Guided Survey (NVGS) requirements.*
15. *For PA and APV only, the NVGS must be supplemented with the first 10,200 ft of the Vertically Guided Approach Surface.*
16. *Absence of the indicated survey*

Heliports

Heliports are designed for rotary aircraft operations and can be stand-alone entities or located at an airport. On-airport heliports may have their own dedicated apron and facilities or be located on the GA apron area. *FAA AC 150/5390-2C, Heliport Design* and FAC 14-60, *Airfield Standards for Licensed Airports* provides design standards for heliports. While these basic concepts can be applied to helicopters with tandem or dual rotors, the standards apply only to single rotor.

The dimensions of the heliports and helicopter parking locations are based on the diameter of the rotors and utilize similar procedures of takeoff, landing, and taxiing as fixed wing aircraft. The heliport consists of an inner, square area referred to as the Touchdown and Liftoff (TLOF) and an outer, square known as the Final Approach and Takeoff Area (FATO); the minimum landing area should be 24 feet by 24 feet. Heliports must also adhere to Part 77 surfaces and pavement standards. **Table 20**, provides a list of the Landing and Surfaces Area per FAC 14-60 for helipads.

TABLE 20. LICENSED AIRPORTS - LANDING AND SURFACE AREAS

Landing Area		Primary Surface		Approach Surface				Transition Surface	
Surface	Approach	Length	Width	Ratio	Length	Width		Ratio	Distance
						Inner	Outer		
Helicopter Final Approach and Takeoff Area (FATO)	Visual	42 feet	42 feet	8:1	4,000 feet	42 feet	500 feet	2:1	250 feet Vertical
	Non Precision	500 feet	500 feet	34:1	10,000 feet	500 feet	5,000 feet	4:1	350 feet Vertical
	Precision	1,000 feet	1,000 feet	50:1	25,000 feet	1,000 feet	6,000 feet	7:1	350 feet Vertical

Source: FAC 14-60

Engaging helicopter users during the Master Plan is especially important as they typically offer more specialized services such as emergency response, which can have additional requirements such as quick roadway access for ambulances or close access to firefighting water buckets.

Airspace and Obstructions

The *14 CFR FAR Part 77 Safe, Efficient Use, and Preservation of the Navigable Airspace* requires FAA notice for certain proposed construction or alteration of existing structures, establishes standards and processes used to determine obstructions, and identifies the process to petition the FAA to review determinations. The FAA utilizes Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) to conduct aeronautical studies to administer this CFR through the use of *FAA Form 7460-1, Notice of Proposed Construction or Alteration.*

Part 77 standards are commonly referred to as “Imaginary Surfaces” and include the Primary Surface, Horizontal Surface, Conical Surface, Transitional Surface, and Approach Surface. Dimensions are based on the type of runway and approaches to the runway ends (**Table 21** and **Figure 20)**. These surfaces should be evaluated for penetrations and detailed findings included in the ALP drawing set. TRB’s *ACRP Report 38, Understanding Airspace, Objects, and Their Effects on Airports* provides additional information on the regulations, standards, evaluation criteria, and processes associated with Part 77.

Order 8260.3, *U.S. Standard for Terminal Instrument Procedures (TERPS)* provides details on formulating, reviewing, approving, and publishing procedures for instrument flight operations. Modifications or requests for new instrument approaches should be handled through the FAA. The TERPS includes other surfaces to be considered such as the Threshold Siting Surface (TSS) and the Glidepath Qualification Surface (GQS).

The August 8, 2015 FAA Memorandum was released to remind FAA staff and airport sponsors their responsibility for protecting approach and departure surfaces per FAA AC 150/5300-13, Airport Design, FAA Order 8260.3 TERPS, and Grant Assurances 19 (Operations and Maintenance), 20 (Hazard Removal), 21 (Compatible Land Use), and 29 (ALP). The FAA ADO should provide assistance to the sponsor to plan and implement projects for obstruction removal as well as proactively remind sponsor of their obligation.

Remember!

Obstacle Action Plan (OAP)

The airport sponsor is ultimately responsible for ensuring clear runway approach and departure surfaces. As such, the FAA is starting to require airport sponsors to develop an Obstacle Action Plan (OAP) that address the sponsor's action plan to maintain clear surfaces per FAA Memorandum dated August 18, 2015

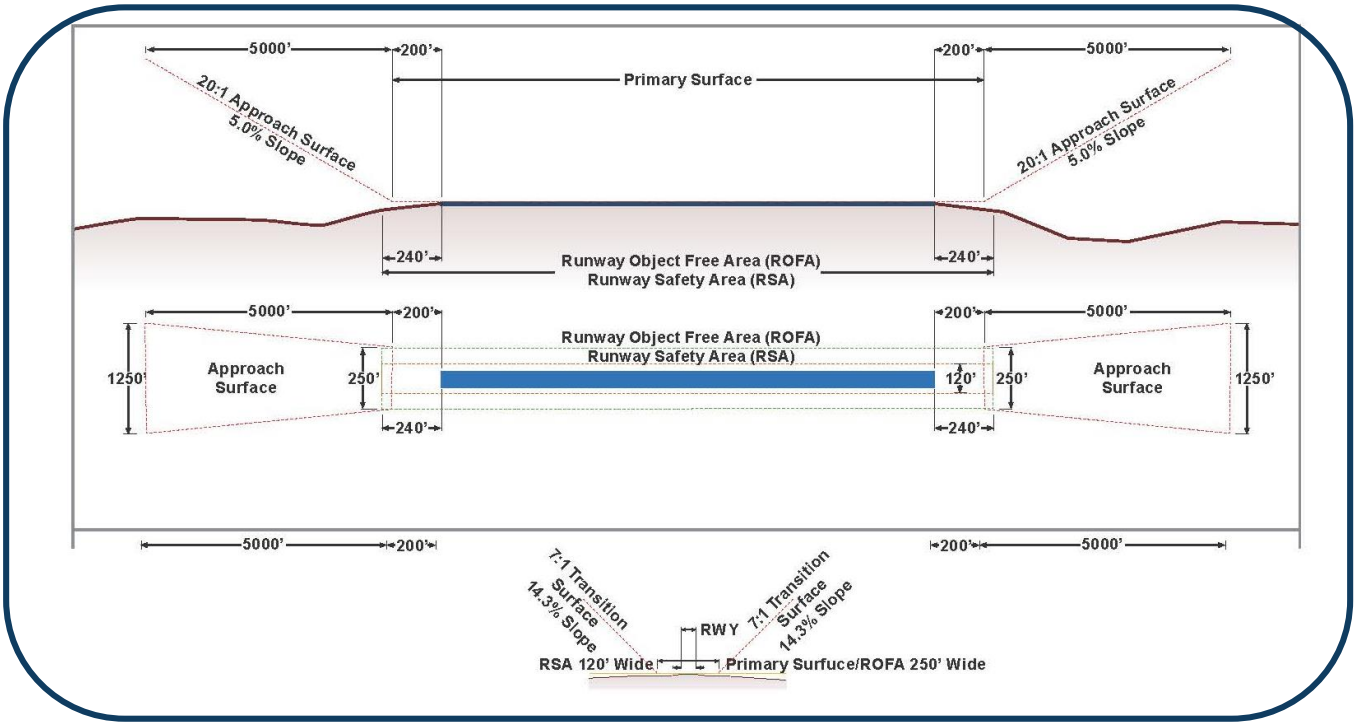
FAA AC 70/7460-1, Obstruction Marking and Lighting includes the standards for marking and lighting structures to promote aviation safety. Additional information provided by the FDOT on airspace obstructions, notification, and marking can be found at: www.dot.state.fl.us/aviation/flpub.shtm, including Chapter 333 F.S. *Airport Zoning* and Rule 14-60.009 FAC *Airspace Protection*.

TABLE 21. PART 77 SURFACE DIMENSIONS

Item	Dimensional Standards (Feet)					
	Visual Runway		Non-Precision Instrument Runway			Precision Instrument Runway
	Utility	Non-Utility	Utility	Non-Utility		
				>3/4 Vis	<3/4 Vis	
Width of Primary Surface and Approach Surface Width at Inner End	250	500	500	500	1,000	1,000
Radius of Horizontal Surface	5,000	5,000	5,000	10,000	10,000	10,000
	Visual Approach		Non-Precision Instrument Approach			Precision Instrument Approach
			Utility	Non-Utility		
	Utility	Non-Utility		>3/4 Vis	<3/4 Vis	
Approach Surface Width at End	1,250	1,500	2,000	3,500	4,000	16,000
Approach Surface Length	5,000	5,000	5,000	10,000	10,000	*
Approach Slope	20:01	20:01	20:01	34:01	34:01	*

**Precision Instrument Approach Slope is 50:1 for inner 10,000 feet and 40:1 for an additional 40,000 feet*
Source: www.ngs.noaa.gov/AERO/oisspec.html

FIGURE 20. FAA DEFINED SAFETY AREAS AND IMAGINARY SURFACES



Source: Adapted from the Trinity County Pilots Association, 2016

General Aviation Facility Planning

As landside guidance and regulations can vary widely between commercial and GA airports, it is best to examine the need for landside facilities as two separate components. In many cases, GA activity is located in a separate area from commercial activity at the same airport to reduce confusion for passengers, ensure adherence to TSA safety regulations, and maintain aircraft safety due to different sizes and limitations. GA airports also only need to address their specific needs, which will differ greatly depending on airport size and activity type.

There are several resources providing guidance for GA landside facilities including *FAA AC 150/5300-13A, Airport Design, Appendix 5, General Aviation Aprons and Hangars*, TRB's *ACRP Report 113, Guidebook on General Aviation Facility Planning*, and various industry standards.

Aircraft Storage

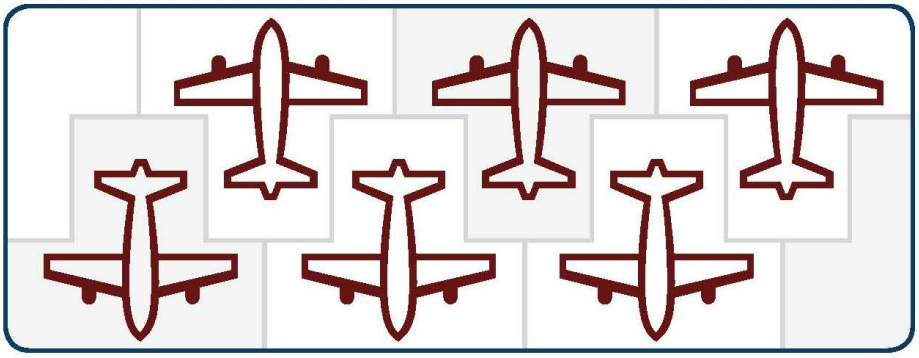
Aircraft storage is typically provided either outdoors, such as an apron with tie-downs, or in a type of hangar facility. Generally, every based aircraft needs a storage space. Additional storage is needed for itinerant aircraft that arrive and need to be accommodated short-term (e.g., hours) or long-term (e.g., several weeks or months). Storage needs can be estimated based on the current and forecasted aircraft fleet mix as well as through discussions with airport users. Aircraft owners may have different storage preferences based on the value of the aircraft, hangar rental costs, security requirements, weather, and other needs. Inclement weather such as hurricanes, thunderstorms, and hail along with long periods of heat and sun exposure can lead to problems such as airframe damage, faded paint, and damaged avionics. When planning for aircraft storage, sponsors should plan for flexibility to accommodate potential future clients and not just existing tenants. TRB's *ACRP Report 113, Guidebook on General Aviation Facility Planning provides extensive* information on sizing, spacing, and typical layouts of aircraft storage.

The National Fire Prevention Association (NFPA) 409, *Standard on Aircraft Hangars* should also be consulted for any applicable requirements such fire suppression and clearance distances.

Aircraft storage options include:

- **Conventional Hangar**
  - Also known as box, corporate, storage, or executive hangars depending on the exact configuration and amenities. Conventional hangars can be built to any size needed, for one or multiple aircraft of various sizes, with amenities such as office space or sleeping quarters. They are most commonly used by FBOs, corporate operators, and maintenance providers. Turboprop and jet aircraft are almost exclusively stored in conventional hangars along with multi-engine aircraft and helicopters.
- **T-Hangar**
  - The two most common types of T-Hangars are standard and nested. Standard T-Hangars tend to be longer, narrower, and one-sided and are appropriate when available property is limited. Nested T-Hangars can optimize the developable space and reduce pavement needs (**Figure 21**). Either type can be built in any size or any quantity based on the needs and development constraints of the airport. Single-engine aircraft are most commonly found in T-Hangars, with the occasional multi-engine aircraft. FDOT released the *Design Guidelines and Minimum Standard Requirements for T-Hangar Projects* in 2013, available at: www.dot.state.fl.us/aviation/flpub.shtm

FIGURE 21. NESTED T-HANGAR DESIGN



Source: Kimley-Horn and Associates, Inc., 2016

- **Tiedowns/Aircraft Apron**
- Landside aprons are used for parking aircraft based at the airport, transient aircraft, as well as staging areas for other hangars. Tiedown locations must be examined using airside requirements such as taxiway/taxilane safety areas or centerline separation standards. Tiedowns are most commonly used by single-engine aircraft but can be designed for any aircraft size or use, including helicopters. Discussions with airport staff and users will help determine the number of based aircraft that would utilize tiedowns.

  The number of tiedowns required for transient GA aircraft should be based on the itinerant operations forecast and fleet mix. From this forecast, the average number of daily itinerant landings is calculated and 10-percent of these are assumed to represent a busy day. Typically, it is estimated that 25-percent of these landings will need apron tiedown parking. Transient tiedowns should be planned for the different sizes of aircraft in the forecasted fleet mix.

Terminal

At GA airports, the terminal may be located at an FBO building, a separate passenger terminal building, and/or an administrative building depending on airport size, facilities, and users. Amenities may include restrooms, pilot lounges and planning areas, shopping, vending, restaurants, conference rooms, administration offices, rental or courtesy cars, and passenger facilities. *ACRP Report 113*, *Guidebook on General Aviation Facility Planning* provides the following formula for planning the size for a GA terminal building and initial-cost estimating:

(peak-hour operations) x 2.5 x (110 sf to 150 sf) = building square footage

The 2.5 considers an average number of pilots and passengers per peak-hour operation. This calculation does not consider other needs (e.g., sidewalks, patios, landscaping, and parking) and thus yields merely an estimate. Each airport must consider its GA terminal needs based on existing and projected activities.

Fueling Facilities

The type of fuel an airport needs and the capacity of its fuel facilities is dependent on the aircraft utilizing and projected to operate at the airport in the future. A standard recommendation for fueling facilities at a GA airport with some corporate jet activity is at least one 10,000-gallon tank of both Jet-A and 100 Low-Lead (LL), also referred to as AvGas. If there are high levels of operational activity, additional tanks may be necessary. Depending on the airport, the FBO may be tasked with providing fuel. If this is the case, airport management may dictate specific requirements or allow the FBO to determine fueling needs. Airport management should ensure user needs are being met.

It is also important to examine the location of the fuel facilities to ensure delivery trucks can access the tanks and aircraft can access the pumps. NFPA 407, *Standard for Aircraft Fuel Services* and *FAA AC 150/5230-4B, Aircraft Fuel Storage, Handling, Training, and Dispensing on Airports* provide Federal regulations on aircraft fueling*. ACRP Report 113*, *Guidebook on General Aviation Facility Planning* also provides additional information on location and typical layouts of fueling facilities.

Other considerations for fueling needs include self-service fueling, which allows for 24-hour a day fueling capabilities via a credit card system, and changing fuel requirements based on the removal of lead and possibly new fuel types such as biofuels or automobile fuels (MoGas).

The EPA highly recommends Spill Response Plans or Spill Prevention Control and Countermeasure (SPCC) plans and training for GA airports to prevent fuel and oil from reaching waters under the Clean Water Act. Typical measures include training for fuel trucks and installing containment pavement areas at self-fueling facilities. Above-ground tanks are also recommended to prevent fuel from potentially seeping into the ground.

Ground Access, Circulation, and Parking

It is important to consider ground access at all airports and how to best coordinate airport access into local and regional transportation planning. As airports are also utilized for special events and emergency response, adequate and efficient access is necessary.

Roadways are also necessary to ensure users can reach all applicable locations on the airfield without entering airfield movement areas. Automobile parking should also be provided near hangar areas and terminal facilities based on customer needs and activity levels. While an airport may review the total number of automobile parking spaces available on the airport compared to the peak daily operations, automobile parking should be available at all aircraft storage and business locations. If roadways and parking are not available nearby for users, there is an increased chance of vehicles and pedestrians in

undesirable locations. Local guidance or regulations such as spaces per square foot of building space, size of spaces, or number of handicapped spaces should be reviewed for parking guidelines.

TRB's *ACRP Report 113, Guidebook on General Aviation Facility Planning* provides additional information on recommended number of parking spaces by facility type and typical layouts.

Perimeter Fencing

GA airports are not required to have a perimeter fence; however, it is recommended because it enhances safety for pilots and passengers by limiting pedestrian and vehicle access to the runway through a clear boundary. A perimeter fence can also help reduce wildlife on the airfield. Federal and FDOT funding is becoming increasingly available for perimeter fences. The Master Plan may evaluate specific locations, height of the fence, and the need for additional features such as skirts or barbed wire. These features are based on the fence's primary purpose (e.g., deterring wildlife or security). If the fence is for deterring wildlife, the type of wildlife will affect the features needed. The fence's location can be dictated on safety areas, utilities, topography, or environmental conditions.

Airport Rescue and Fire Fighting Facilities (ARFF)

While only airports with a Part 139 are required to have ARFF facilities; all airports should address the need for rescue and firefighting including how to appropriately handle aircraft accidents. This may include discussions with local emergency service providers on their ability to handle aircraft rescues and knowledge of airport operations such as tower frequencies and location of access gates. More information on ARFF planning can be found below in the Commercial Airport Facility Planning section.

Security

The U.S. aviation security system involves the government, airports, and aircraft operators, each of which is regulated by numerous agencies. The TSA is the main source of regulation and guidance for security of airports as of 2001 through the Title 49 CFR Part 1500 series, the *Transportation Security Regulations*. Airports are required to follow numerous regulations depending on the role and services provided.

49 CFR Part 1554 requires each FAA certificated repair station comply with security measures issued by TSA if they are located on or adjacent to an airport or service aircraft greater than 12,500 pounds maximum take-off weight (MTOW).

In 2008, TSA proposed the Large Aircraft Security Program (LASP) that would require all U.S. operators with aircraft exceeding 12,500 pounds MTOW to implement security programs subject to TSA compliance audits. While this regulation has still not been passed, TSA continues to push for additional security measures for larger aircraft. There are other security programs in place for larger aircraft operating for hire (Parts 121, 125, and 135) such as the Twelve-Five Standard Security Program (TFSSP) and Private Charter Standard Security Program (PCSSP). More stringent requirements may translate to additional security facilities for operators and airports.

Additionally, for GA airports TSA developed the *Security Guidelines for General Aviation Airports* (May 2004) that contains guidance on which enhancements are most appropriate based on an Airport Characteristics Measurement Tool. Airports closer to major cities or with multiple larger aircraft have more robust recommendations than an airport with a turf runway and very few and small aircraft. FDOT expanded on this document with the *Security Planning for General Aviation Airports* and asked airports to develop, at minimum, a rudimentary security plan if they did not already have one in place. *ACRP Synthesis 3, General Aviation Safety and Security Practices* examines resources and strategies used within the GA community.

Commercial Airport Facility Planning

Commercial service airports are subject to additional regulations and have additional landside needs that must be addressed due to larger-scale passenger activities. For planning purposes, the commercial service passenger terminal area is typically divided into landside (access to terminal), terminal (the terminal facility), and airside (access to the aircraft). Some airports define the landside terminal area as all areas prior to the security checkpoint and airside terminal area after the security checkpoint. Passenger terminal facilities are typically planned for and designed outside of the master planning process due to each airport's unique role within the transportation system. The Master Plan should review the basic capacity needs of the commercial service terminal. FAA provides commercial terminal planning guidance in *FAA AC 150/5360-13, Planning and Design Guidelines for Airport Terminal Facilities* and *FAA AC 150/5360-9*, *Planning and Design of Airport Terminal Facilities at Non-Hub Locations.* It should be noted these documents are from the 1980s and newer ACRP guidance is available as listed below.

Airside Facilities

As the efficiency of airfield operations can affect the efficiency of the passenger terminal, the planning and layout of the gates, aircraft parking, ground vehicle lanes, and taxiway system are extremely important at commercial service airports. Billions of dollars in damage happen every year between aircraft and buildings or equipment due to poor design of airside terminal facilities, lack of training, and failure to pay attention. The Master Plan should review:

- **Aircraft apron parking (daily and overnight)**
  - Locations to park aircraft on apron areas at the terminal or remote locations during the day between flights and requirements for overnight parking
- **Quantity and type of gates**
  - Number, type, and spacing of the gates to accommodate the commercial airline fleet mix
- **Ground service equipment**
  - Staging, storing, and moving vehicles and equipment such as tugs, baggage carts, and fuel trucks should be addressed to ensure adequate separation and safety for users and pilots
- **Aircraft servicing areas**
  - Activities occurring while passengers are enplaning and deplaning may include fueling, lavatory servicing, baggage handling, catering, ground power, and maintenance
- **Emergency response and security**
  - Providing adequate access for emergency response times and ensuring all required security measures are followed

The location of these facilities should be reviewed to ensure they do not become obstructions to the Part 77 Surfaces or are placed within safety areas.

TRB's *ACRP Report 96, Apron Planning and Design Guidebook* provides additional information on apron planning at commercial airports.

Passenger Terminal Facilities

The Master Plan may review the space requirements and elements necessary in the terminal such as:

- Ticket counters (including consideration of kiosks and whether there are common use technologies)
- Security checkpoints
- Departure and arrival seating and waiting areas

- Concessions
- Vendor office space (including airlines and other vendors)
- Baggage handling (including bag makeup and claim)
- Restrooms
- Federal Inspection Services (FIS) such as customs and immigration
- Concessions
- Wayfinding
- Mechanical space for elevators and other electrical needs
- Other services such as Wi-Fi, people movers, and electrical charging areas

While a full terminal plan could be part of a Master Plan or a separate study, the terminal analysis comprises a detailed review of each functional component including the circulation of passengers within the terminal facility. New technologies for terminal planning and integrating these technologies into the building should be reviewed and considered.

Landside Facilities (Ground Transportation)

Ground transportation is an important element of the Master Plan; however, for commercial airports with large terminal facilities, the terminal planning study should assess this topic in detail. As with GA airports, commercial service airports should be integrated within the regional transportation planning efforts to ensure adequate access is provided for all modes of transportation. While the FAA will typically only fund projects within the airport boundary, the regional plans need to address ground access to and from the airport for vehicles and other modes of public transportation such as buses or rail.

Items to be discussed in landside terminal facility planning may include:

- **Curbfront**
  - The curbfront serves as the access point to the terminal area for both pedestrians and vehicles. Curbfront facility needs are determined by examining vehicle volumes, vehicle classification (automobile, taxi, limousine, bus, hotel/motel shuttle, rental car shuttle, off-airport parking shuttle), rideshare vehicles, and dwell times. Needs are also identified by determining the appropriate configuration of the terminal entry for the airport (single level, two level, double level, inner and outer curbs)
- **Public transportation**
  - Public transportation to the airport can increase convenience for originating and departing passengers, decrease traffic congestion, and improve sustainability. A Master Plan should address current options and what could be done to increase services. *ACRP Report 4, Ground Access to Major Airports by Public Transportation* provides a six-step market-based strategy for improving the quality of public mode services Under Grant Assurance 36, the airport sponsor is required to permit to the maximum extent practicable, intercity buses or other modes of transportation to have access to the airport.
- **Delivery trucks for concessionaires and air cargo facilities**
  - Ensure adequate roadway infrastructure (e.g., lane widths, pavement strength, loading and unloading areas) is provided to the appropriate locations on the airport
- **Employee and tenant parking**
  - As airports may be staffed all day, ample and convenient employee and tenant parking must be available. Implementing commuting incentives can reduce the number of vehicles parked onsite by increasing the use of public transportation and thus contributing to sustainability. This may in turn allow for more of that area to be utilized for revenue-producing activities

- **Cell phone waiting lots**
  - These lots allow drivers to wait near the arriving passenger pickup area without adding to curbfront congestion. This also increases overall safety by reducing the number of vehicles parked for extended periods of time in front of the terminal
- **Staging areas for taxis, rideshare vehicles, limos, charter buses, and courtesy vans**
  - An airport may need areas where these vehicles can be staged on- or off-airport and dispatched as needed to pick up passengers at the terminal curbfront. Additional concerns such as wildlife being attracted to food trash or security in these staging areas should be reviewed. Dedicated curbfronts can be made for these providers at the terminal for the convenience of passengers. Charter buses may need passenger staging areas within the terminal as they may require passengers to check-in and wait for their bus
- **Ride sharing**
  - Companies such as Uber and Lyft are working with airports across the country to ensure they adhere to local requirements and operate legally. Agreements with these companies should be addressed so no unfair advantage is given to a single airport provider and the airport is not losing potential revenue
- **Rental car facilities**
  - Facilities may range in size depending on airport activity levels and may include a consolidated rental car operation within the airport. The airport should compare existing capacity of operators to peak passenger operations to ensure adequate supply. The impact of other rental car facilities activities such as washing, fueling, and maintenance on the vehicles should also be analyzed
- **Signage**
  - Adequate signage at an airport can reduce congestion and increase passenger satisfaction. *FAA AC 150/5360-12, Airport Signing and Graphics* provides guidance on wayfinding, signing, and graphics focusing on roadways, parking, curbside and ground transportation, and terminal. The latest version incorporates recommendations from the TRB's *ACRP Report 52, Wayfinding and Signing Guidelines for Airport Terminals and Landside*

Numerous TRB resources are available for commercial airport landside planning including:

- *ACRP Report 146, Commercial Ground Transportation at Airports: Best Practices*
- *ACRP Report 40, Airport Curbside and Terminal Area Roadway Operations*
- *ACRP Report 55, Passenger Level of Service and Spatial Planning for Airport Terminals*
- *ACRP Airport Passenger Terminal Planning and Design, Volume 1: Guidebook and Volume 2: Spreadsheet Models and User's Guide*
- *ACRP Report 109, Improving Terminal Design to Increase Revenue Generation Related to Customer Satisfaction*
- *ACRP Report 10, Innovations for Airport Terminal Facilities*

Airport Rescue and Fire Fighting Facilities (ARFF)

Only airports with a Part 139 are required to have ARFF facilities; however, all airports should address the need for rescue and firefighting, including how to appropriately handle aircraft accidents. Part 139 airports are assigned an ARFF index that ranges from Index A to E and is based on the length of the airline's aircraft and the average number of daily departures by the airline. Aviation forecasts should be reviewed to determine the ARFF index and any changes needed during the planning period. The index, located in

14 CFR Part 139, *Certification of Airports* (sections 139.315 to 139.319), also determines the specific equipment requirements. *FAA AC 150/5210-15, Airport Rescue and Firefighting Station Building Design* contains information for the design of the ARFF station.

Security

As discussed in the GA security section, the TSA is the main source of regulation and guidance for security of airports as of 2001 through the Title 49 CFR Part 1500 series, the *Transportation Security Regulations*. Airports are required to follow numerous regulations depending on the role and services provided.

49 CFR Part 1542, Airport Security lists the regulations governing commercial service airports in the U.S. such use of security areas, identification systems, security coordinators, inspections, training, and drafting an Airport Security Program (ASP). While commercial airports will most likely have higher security measures in place already, they should ensure any GA and charter activity at the airport adheres to the 49 CFR Part 1554 repair station requirements, TSA LASP, the TFSSP, the PCSSP, and FAC Rule 14-60.007 as discussed above.

Other Potential Topics

There are additional topics that may need to be addressed on a case-by-case basis for some airports; the FAA Advisory Circulars and Airport Cooperative Research Program (ACRP) provides information on such topics.

Air Traffic Control Tower (ATCT)

FAA Order 6480.4, Airport Traffic Control Tower Siting Criteria provides guidance on the optimal location and height of new and replacement ATCT. Controllers must have adequate airfield visibility in an ATCT to ensure safe operations. Orientation based on sun or lighting glare, weather patterns, look-down and look-up angles, site access, security, and cost are all considerations when selecting an ATCT site.

Prior to new airfield development, airports should review the line-of-sight from the tower to ensure controllers can adequately view all movement areas and potentially determine any currently obscured areas. This analysis can be completed using 3-D technology.

If an airport does not have an ATCT and wishes to establish one, the FAA must be involved. *FAR Part 170, Establishment and Discontinuance Criteria for Air Traffic Control Services and Navigational Facilities* provides the authority to the Federal government to establish an ATCT. This FAR lists the following minimum criteria: open to the public, within the NPIAS, assurance that airport will remain open, available land to place ATCT, and meet the benefit-cost ratio (B/C).

The B/C is based on the annual traffic counts and provides a quantifiable number to assist with determining whether the airport should be supported with an ATCT. Benefits include collisions avoided, preventable accidents, flight efficiencies and cost is of the annual cost of operating the ATCT. The FAA may choose to provide an ATCT at that FAA fully funds or cost-sharing through a contract tower. Contract towers are monitored by the FAA and all controllers are certified, but provide services at costs substantially lower than if provided directly through the Federal government.

Air Cargo

Air cargo can range from fresh flowers to appliances and in size from small local deliveries to large global carriers. The *Florida Air Cargo System Plan Updates* and Brochure (www.dot.state.fl.us/aviation/cargo.shtm) provides details on the air cargo activities in Florida including the importance of supporting airports within the overall transportation network to ensure cargo can be moved from aircraft to vehicles.

Florida's Strategic Intermodal System (SIS) airports moved 2.5 million tons of air cargo internationally in 2011, serving 41 domestic and 94 international destinations. Reviewing operations and facilities on-airport and in surrounding areas ensures necessities are being met and growth opportunities are considered. This review may include an air cargo terminal, apron space, overnight parking spaces, ground access, and additional security. *ACRP Report 143, Guidebook for Air Cargo Facility Planning and Development* explores tools and techniques for the sizing of air cargo facilities.

Maintenance and Rehabilitation of Facilities

Facilities such as hangars, support buildings, roads, fences, parking lots, must be maintained and periodically rehabilitated to ensure their full lifespan. This becomes especially important at an airport where limited funding and constant use can lead to a facility being used beyond its originally estimated lifespan. Understanding the potential impacts to a facility improves the planning process for these types of projects. Reviewing of the existing conditions of all facilities should result in the determination of good, fair, or poor (see *ACRP Report 138 Volume 1 and Volume 2, Preventive Maintenance at General Aviation Airports*).

Surplus Property

In certain cases, the master planning process may determine that there is a surplus of land within the airport boundary that may have more valuable, non-aviation use. Per Grant Assurance 31, no airport sponsor may sell or dispose of acquired property without FAA approval. Per Grant Assurance 29, non-aeronautical use must be shown on the ALP, which is subject to FAA approval. The property must be justified that it truly is surplus and not be necessary for future aviation activity. The FAA would prefer that surplus property be leased rather than sold and will require contingencies that any future use will adhere to airport compatible land use requirements. The property must be sold at Fair Market Value (FMV) and any revenue from the sale must be utilize at the airport or used to repay the FAA for any federal grants tied to the property. More information on the required documentation may be found on the FAA website at: www.faa.gov/airports/central/airport_compliance/release/.

Utilities

The existing and future needs for utilities such as electricity, communications, water, sewer, internet, and drainage should be evaluated within the airport boundary and adjacent property. As airports move towards self-sufficiency, providing basic needs for compatible development is key. While the FAA does not typically fund utility extensions, more and more states are providing funding for such projects to spur economic growth.

Space Travel

Given Florida's history of space travel with the Kennedy Space Center at Cape Canaveral and new prospects for commercial space travel within the U.S., planning for space facilities should be considered. The *2015 Florida Spaceports Project Handbook* provides an overview on how to obtain funding from the FDOT for spaceport projects. More information can be found at: www.dot.state.fl.us/aviation/spaceports.shtm

Americans with Disabilities Act (ADA) Compliance

The FAA provides guidance through Section 504 *Airport Disability Compliance Program* regarding ADA requirements. The *2010 ADA Standards for Accessible Design* should be considered as it relates to facility planning.

Through-the-Fence (TTF) Operations

Through-the-fence (TTF) operations occur when airport sponsors provide access to airside facilities (e.g., runway) to operators that have facilities adjacent to, but not within, airport property limits. TTFs have been controversial as they can interfere with a sponsor's ability to meet its Federal obligations as a federally assisted public-use airport. *FAA Grant Assurance 5, Preserving Rights and Powers,* includes provisions that prohibit TTF access to any location at an airport. Further, the *FAA's 78 Federal Regulation 42419* prohibits new residential TTF activities and states that, to receive further Federal funding, a plan must be in place to show how potential TTF issues will be mitigated. TRB's *ACRP Report 114, Guidebook for Through-the-Fence Operations* provides information on these types of operations and how to assess them. Additional information on TTF operations is provided by the FAA at: www.faa.gov/airports/airport_compliance/residential_through_the_fence/

Energy

To increase sustainability both environmentally and economically, more airports are reviewing their energy uses. This may include reviewing new lighting technologies or installing solar farms and wind turbines. Numerous airport design characteristics and Federal regulations must be reviewed as part of this effort. More information can be found in TRB's *ACRP Report 141, Renewable Energy as an Airport Revenue Source* and *ACRP Report 108, Guidebook for Energy Facilities Compatibility with Airports and Airspace.*

Cyber Security

As society moves to a more digital infrastructure, more airport systems are vulnerable to a cyber-attack. It is prudent for airport management to understand threats to systems like airfield lighting, baggage systems, or weather stations and how to reduce their risk. Additional information can be found at TRB's *ACRP Report 140, Guidebook on Best Practices for Airport Cybersecurity.*

Safety Management System (SMS)

SMS is the formal approach to managing safety risks and comprises safety policy, safety risk management, safety assurance, and safety promotion. SMS development is currently a voluntary program. FAA provides a SMS Quick Reference Guide (www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs900/sms/media/newsletter/sms_qr_guide.pdf) that gives an overview as well as additional Federal resources to review. TRB's *ACRP Safety Management Systems for Airports Volume 1 and Volume 2* provide additional information on the components of SMS and implementation (www.trb.org/Publications/PubsACRPProjectReports.aspx). The International Civil Aviation Organization (ICAO) also has published guidance related to SMSs, it can be found at: www.icao.int/safety/safetymanagement/pages/annex-19,-1st-edition---executive-summary.aspx

Snow Removal Equipment and Deicing

Florida's geographic location and climate result in less extreme winter conditions. However, airports in North Florida such as Tallahassee International Airport keep deicing equipment on site. If appropriate for a specific airport based on weather patterns or user needs, snow removal containment and storage facilities need to be reviewed. *FAA AC 150/5300-14*, *Design of Aircraft Deicing Facilities* and *FAA AC 120-60, Ground Deicing and Anti-icing Program* provide information on deicing programs. *FAA AC 150-5220-20, Airport Snow and Ice Control Equipment* and FAA *AC 150/5220-18, Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials* should also be reviewed to ensure that proper processes are being followed with regards to snow removal equipment and deicing.

Documentation

A summary of the facility requirements, typically a table or bullet point list, will assist in quickly clarifying the needs of the airport. Planners can utilize this list to determine potential development scenarios in the Alternatives Development. It can also serve as a validation of the recommended development plan to ensure all topics have been addressed.

Section 7: Alternatives Development

The alternatives development process of the Master Plan resolves the deficiencies and builds on the opportunities identified in the Facility Requirements chapter. As there is typically more than one solution available, the alternatives must be evaluated to arrive at the most appropriate recommendation. The Facility Requirements chapter of this Guidebook provides information and reference materials on the physical development requirements to meet future demand and standards; this chapter focuses on developing and analyzing the alternatives. The ultimate goal of analyzing alternatives is to identify and evaluate all of the alternatives that are designed to meet the current and future needs of all airport users as well as keeping within the strategic vision of the airport sponsor. Based on this process, a final recommended development plan is developed and illustrated in the ALP and estimated costs for the plan are detailed in the CIP.

The alternatives analysis process should follow the tasks outlined in the Master Plan scope which likely referenced specific issues the sponsor recognized as key. In some cases, additional planning such as researching specific information for an environmental issue like a wetland delineation or conducting a ground survey may be included in the alternatives analysis task or a prior task. This may result in a more accurate evaluation of the alternatives and ultimately lead to a recommended plan that can be implemented successfully. Such additional tasks should be specified in the scope during the planning process or discussed with the FAA and FDOT prior to completion. This is especially critical for environmental approvals that may be necessary prior to development.

This chapter addresses the following aviation alternatives development topics:

1. Analysis Process
2. Identifying Alternatives
3. Evaluating Alternatives
4. Selecting Recommended Alternative

Analysis Process

The *FAA AC 150/5070-6, Airport Master Plans* defines the process for identifying and analyzing the alternatives (**Figure 22**). The alternatives analysis is considered iterative and is often initiated during the development of the Facility Requirements as deficiencies are identified and potential resolutions are discussed. The process can be adapted as necessary for the airport size, specific components, and complexity of the plan. The process should be defined during the scoping effort to include the elements to be analyzed, types and depth of analysis, and level of documentation to ensure all stakeholders reach consensus that the alternatives are evaluated appropriately. Only elements relevant to the airport's deficiencies as identified within the Facility Requirements should be addressed in the alternatives analysis. Additionally, certain topics may be discussed further in depth or have a higher number of potential alternatives available for consideration based on the airport and element. Elements that have been controversial to the public should be documented in detail to ensure full transparency and include public input into the decision-making process to select the preferred or recommended alternative.

The steps below and shown in **Figure 22** outline the process for identifying, analyzing, and recommending alternatives, as prescribed in *FAA AC 150/5070-6B, Airport Master Plans*. This list is exhaustive, and, as such, all identified steps may not be needed for every Master Plan, depending on the needs of the airport.

Step 1 – Determine Primary and Secondary Elements

Determine which functional elements (e.g., airside, terminal, GA, cargo, etc.) are the highest priority and which are secondary that can be modified based on the recommended development plans for the primary elements.

Step 2 – Identify Preliminary Primary Element Alternatives

Identify preliminary alternatives for each primary element. This may be accomplished through a brainstorming session.

Steps 3 & 4 – Screen Alternatives for Intermediate List of Primary Element Alternatives

Using subjective and qualitative analysis, narrow down the preliminary list of alternatives using a screening process. Provide justification for any eliminated or newly identified alternatives. This list is referred to as the "Intermediate List." More details on the evaluation process are provided later in this chapter. Eliminated alternatives need to be mentioned only briefly in the Master Plan; however, this information may be important to subsequent environmental documentation.

Steps 5 & 6 – Quantitative Analysis for Short List of Primary Element Alternatives

Perform a more detailed quantitative analysis on the "Intermediate List" to reduce it to a "Short List." The Master Plan should include a detailed analysis of the "Short List" of alternatives. More details on the evaluation process are provided later in this chapter.

Steps 7 & 8 – Combine and Analyze Primary Element Alternatives

Review the "Short List" of all primary elements and perform a quantitative analysis of the projects to ensure compatibility.

Step 9 – Select Preferred Primary Element Alternative

Select and document the preferred or recommended alternative for each primary element based on previous analysis.

Step 10 – Identify Alternatives for the Secondary Elements

Select preliminary alternatives for each secondary element.

Steps 11 & 12 – Evaluate and Select Recommended Alternatives for Secondary Elements

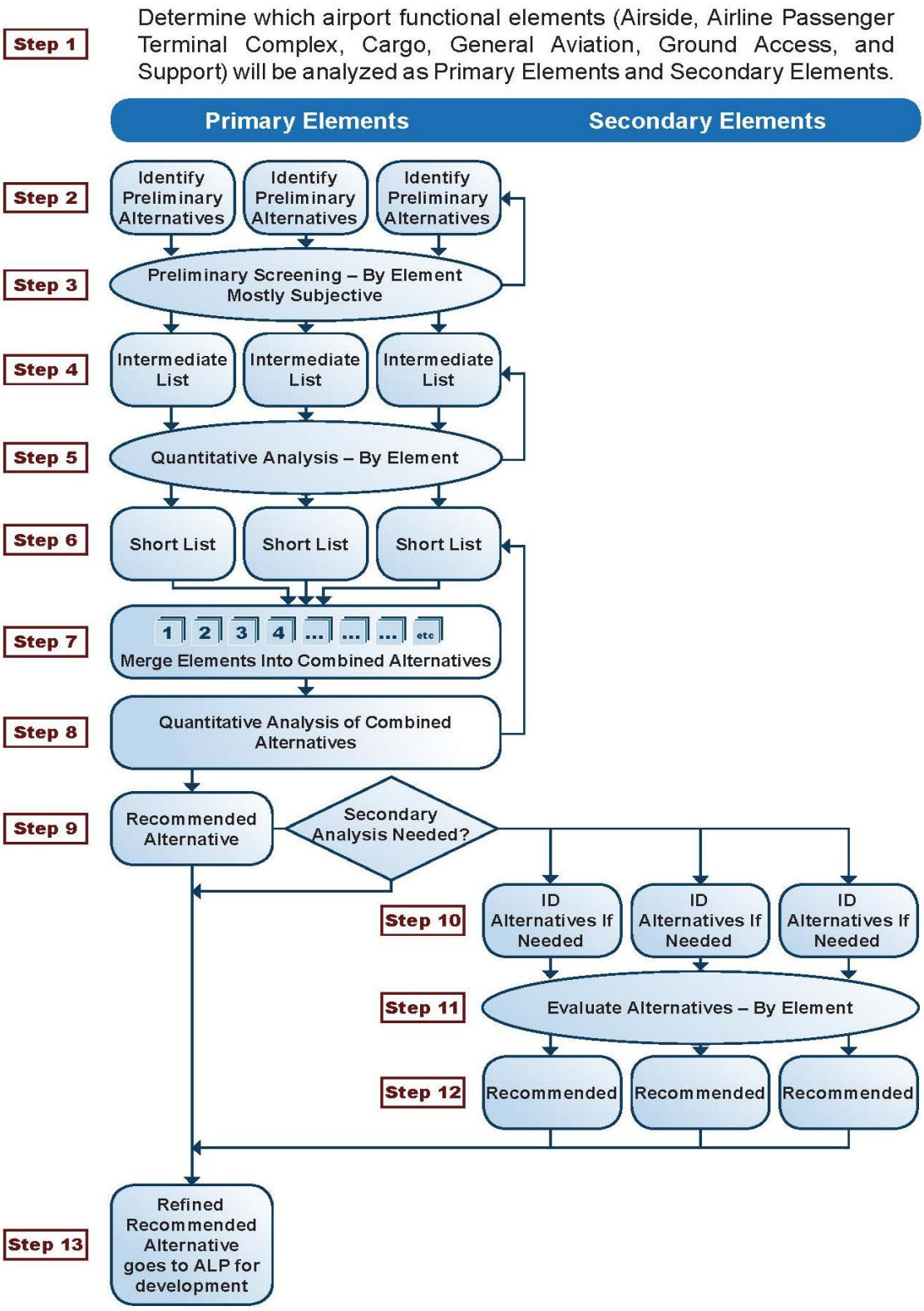
Perform qualitative and quantitative analysis on all alternatives individually and as a whole. Document any alternatives that are eliminated and provide justification for those that are recommended.

Step 13 – Prepare Refined Recommended Alternative

Combine and analyze the primary and secondary element alternatives to present a single recommended development plan for the airport. Summarize final justification of the recommended plan.

These 13 steps are shown graphically in **Figure 22**.

FIGURE 22. ALTERNATIVES ANALYSIS PROCESS EXAMPLE



Source: FAA AC 150/5070-6B, Airport Master Plans

Identifying Alternatives

A primary consideration in identifying alternatives is ensuring that they are aligned with the airport's goals, including serving demand and meeting design standards. When identifying alternatives, it is prudent to only consider those that address facility requirements and can be implemented.

A recommended number of alternatives cannot be defined numerically as there are too many factors that can influence the number of alternatives that should be evaluated. Instead, the number of alternatives should be kept to sensible amount to ensure there are no alternatives that have the same basic concept with only minor differences that would be configured during the design phase of a project. An alternative may be later refined during the master planning process. The preliminary list may be compiled and then reduced to a short list. Documentation including the justification for recommending or eliminating each alternative should be provided in the Master Plan; this is especially critical for any environmentally sensitive areas where an alternative avoids the area or requires a high level of mitigation to implement.

Planners should at minimum review each alternative's financial feasibility, aviation use, and technical feasibility.

This documentation may help justify why an alternative should not be used in an environmental analysis such as an EA. It should be noted that a "do-nothing" alternative may be applicable in some instances, even if only to highlight the potential impact to the airport if no action is taken; for example, a lack of Federal funding for other projects if the non-standard RSA is not addressed or the need to reduce the runway length because tree obstructions cannot be removed in a wetland area.

Multiple or extensive alternatives may not be necessary for secondary elements as these elements may be able to seamlessly integrate into the primary element recommendations. This should be analyzed on a case-by-case basis.

Characteristics of appropriate alternatives include:

- Have a base case (existing condition) to compare
- Address the deficiency and add value to the airport
- Are based on technical knowledge and research
- Able to be compared by the criteria
- Have input or review from multiple stakeholders
- Are clearly defined

Alternatives may be identified through collaborative work sessions within the technical team or with stakeholders. Depending on the framework of the brainstorming session, it may yield an abundance of alternatives. Team members with technical knowledge should be on hand to ensure suggested alternatives are feasible. The reference documents discussed in the Facility Requirements chapter provide numerous alternatives and details for the sizing, layout, and location of various elements.

Evaluating Alternatives

As with all steps of developing alternatives, the evaluation must be tailored to the airport to ensure the individual airport's goals are met while still following generally accepted planning practices. The initial evaluation of the alternatives will most likely be subjective and qualitative utilizing simpler calculations and good judgement.

A set list of selection criteria or influencing factors should be identified to help evaluate and select the recommended plan. These criteria should align with the overall airport goals. There are four broad categories of criteria identified by the FAA:

- **Operational Performance**
  - An airport's functionality as a system including capacity, capability, and efficiency
- **Best Planning Tenets and Other Factors**
  - The relative pros and cons or attributes and constraints of the alternative such as safety, design standards, and flexibility
- **Environmental Factors**
  - Potential environmental impacts of each alternative
- **Fiscal Factors**
  - Rough cost estimates, preliminary financial feasibility, or benefit/cost analysis (BCA) of the alternatives

These broad categories serve as options that the airport can consider. Typically, specific criteria within these categories that align with the airport's alternatives and issues are established. Several examples of such specific criteria include:

- **Safety**
  - Improving the airfield while meeting Federal, state, and local standards, recommendations, priorities, and grant assurances
- **Consistency**
  - Confirming development plan is in line with overall airport goals, activity forecasts, or compatible land use
- **Economics**
  - Reasonableness of cost and ability to fund
- **Flexibility**
  - Meeting short-term needs while remaining flexible for the long-term
- **Engineering**
  - Considering constraints and feasibility of the design and construction of the project
- **Public**
  - Input and agreement from the public and other stakeholders

- **Access**
  - Ensuring the development is accessible to users
- **Airspace**
  - Does not impact or improves the airspace surfaces
- **Sustainable**
  - Project aligns with sustainability goals

The evaluation criteria should be discussed early in the process and should consider criteria that help differentiate between alternatives. Criteria are usually explained in the documentation and the evaluation scoring results are summarized and clearly presented in a matrix. The "scoring" of the criteria is not dictated by the FAA or FDOT and the most appropriate method should be developed and selected by the airport. The scoring may be a numerical scale such as from 1 to 10; a yes/no response; a grading system of low, moderate, and high impacts; or any other method that is applicable to the subject element. Specific criteria may be given weights to highlight the priority of individual criteria. The alternatives may also be ranked within the matrix for clarity.

The "scoring" of the criteria is not dictated by the FAA or FDOT and the most appropriate method should be selected by the airport.

An example matrix is shown in **Table 22**.

TABLE 22. PRIMARY ELEMENT TOPICS

Primary Element Topic				
Criteria	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
Criteria 1	Yes	Yes	Yes	No
Criteria 2	Low	High	Low	Moderate
Criteria 3	5	9	2	8
Rank	2	1	4	3

Source: Kimley-Horn and Associates, Inc., 2016

It should be noted that while airport planning is geared towards enhancing the existing airport, it is not always feasible to develop the airport to handle forecasted demand. In cases such as this, a new airport site may be identified as an alternative. *FAA AC 150/5070-6, Airport Master Plans*, *Appendix E* provides additional guidance on this process. FAA approval on the new location is required if Federal funding will be requested.

Selecting Recommended Alternative

A summary of the alternatives analysis along with any justifying documentation should be presented to the stakeholders for input before selecting the final recommended alternative for both primary and secondary elements. This is critical to ensuring study participants, including the public, can understand the process employed to identify and evaluate the alternatives and how the recommended alternatives were selected. The level of complexity in determining the recommended plan and compiling the alternatives into a recommended plan will be based on the individual airport.

Depending on the airport and number of elements evaluated in the alternatives analysis, the recommended alternative may require combining various elements into a single recommended plan. For

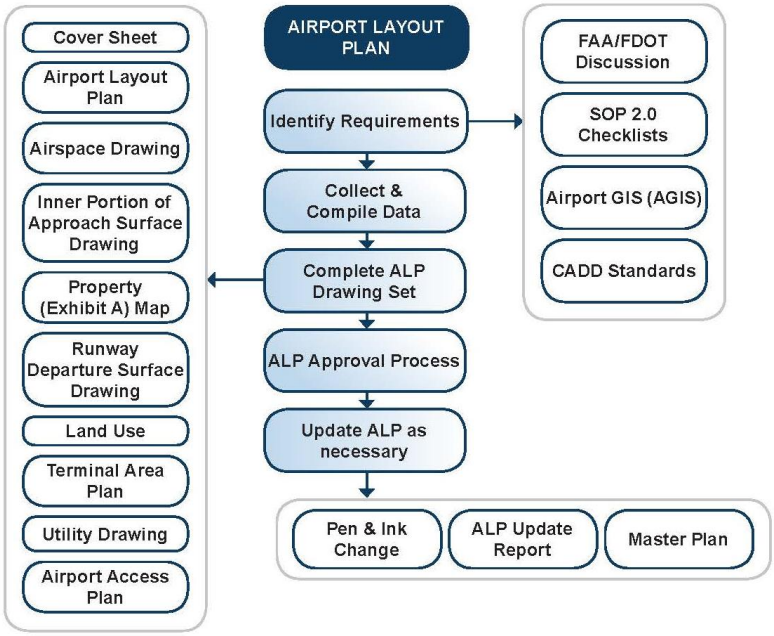
example, if there are separate airfield, terminal, and GA alternatives evaluated in the process, the preferred alternative for each of these components must be combined to represent the recommended plan. This process may require additional refinement once the projects are selected and the preferred alternatives are considered in totality. At this stage of the Master Plan, comments from airport stakeholders on the proposed recommended plan should be solicited as part of the public involvement requirement.

Once the final recommended plan is determined, it is illustrated in the ALP as discussed in the ALP section. Concurrent with the ALP effort, the Facilities Implementation Plan expands on information of the individual projects in the recommended plan to evaluate interdependencies and requirements. This effort results in the CIP, which presents cost estimates and phasing. The Financial Feasibility Analysis then compares the proposed CIP to the sponsor's projected cash flow and availability of outside funding sources to ensure the projects can be funded and provide value to the airport.

Section 8: Airport Layout Plans

The ALP is the guiding development document for an airport and is usually approved by the airport sponsor, FDOT ASO, and the FAA. The ALP is developed based on either a Master Plan's analysis of needs determined by reviewing the forecasts, facility requirements, and alternatives evaluation, or through other evaluations that support the ALP's depiction of future development. An ALP is also referred to as an ALP drawing set and graphically illustrates the existing airport infrastructure and proposed projects in a series of sheets or drawings. The ALP serves as a "communication" and "agreement" tool between the airport owner and the FAA. Coordination between the FAA and sponsor during the scoping process will determine which elements are to be included in the ALP drawing set. The ALP drawing set is considered a set of planning drawings and is not intended to be used for design engineering.

FIGURE 23. AIRPORT LAYOUT PLAN PROCESS



Source: Kimley-Horn, 2016

As shown in **Figure 23**, this chapter provides details on identifying the ALP requirements, preparing the individual sheets that comprise the drawings set, and obtaining approval. This chapter also provides details on developing ALPs without a full-scale Master Plan.

Computer-Aided Drafting and Design (CADD) Standards

While new ALPs require GIS, airports may still create them using CADD software such as AutoCAD or MicroStation. Specific industry design standards reduce the potential for drawings to be misread and allow different agencies to utilize them to suit their specific needs. FDOT provides a CADD Manual to facilitate this process, this manual is available at: www.dot.state.fl.us/ecso/downloads/publications/Manual/default.shtm.

Airports GIS (AGIS)

To support NextGen, the FAA now requires airports to utilize GIS when developing and maintaining ALPs. The information contained in the ALP sets is more accurate as a result of utilizing aeronautical surveys. In the future, the FAA will require electronic submissions through AGIS to further improve accuracy and information sharing. Other benefits of developing an ALP using AGIS that airports may experience include better asset management capabilities, improved operations and maintenance management, and streamlined future data collection.

Additionally, when a project is considered to be Safety-Critical at a NPIAS airport, the airport is required to incorporate AGIS immediately per the 2012 AGIS Transition Policy for Non-Safety Critical Data Memo (www.faa.gov/airports/planning_capacity/airports_gis_electronic_alp/media/airportsGISTransitionPolicy.pdf). Per this memo, projects involving safety critical data (**Table 23**), all NPIAS airports are required to incorporate AGIS immediately. Master Plans or ALP updates that include aerial photography or obstruction surveys must be in conformance with the current version of *FAA AC 150/5300-17 and 18*. If AGIS data is collected as part of the Master Plan or ALP study, the airport will have the data necessary to begin designing the project. Safety-Critical Projects include projects relating to runway thresholds, changes in runway dimensions, modification of declared distances, changes to instrument approaches and NAVAIDs, changes to airport elevation or reference point, and airport needing Surface Movement Guidance and Control System (SMGCS) charts. All airports certified under Part 139 or with an ATCT are required to have the non-safety-critical data collected through AGIS by Fiscal Year 2015. All other non-primary airports within NPIAS were exempted from the requirements for non-safety-critical projects until further notice.

TABLE 23. SAFETY CRITICAL PROJECTS – ACTIVITIES THAT MUST IMMEDIATELY COMPLY AT ALL AIRPORTS

Description	Comment
Relocate / move a runway end or threshold	If the runway end is relocated, moved, or discovered to be more than 1 foot longitudinal, 1-foot transverse, or 6 inches vertical from its existing position
Displace threshold	
Extend / shorten / shift runway	
Widen / runway	
Add / modify stopway, clearway, or EMAS	
Modify declared distances	
New / revised Instrument Approach Procedures	
Install / relocate NAVAID (electronic or visual)	
Changes to airport elevation or airport reference point	
Airports currently listed as needing Surface Movement Guidance and Control System (SMGCS) charts	

Source: FAA Memorandum titled AGIS Transition Policy for Non-Safety Critical Data, 2012

Airport-related data must be collected and submitted to the FAA to support satellite-based approach procedures and better manage the overall National Airspace System (NAS). This information can also be useful for the airport itself by gathering precise locational information. This data can then be tied into the local and regional level systems as appropriate. The FAA's overall guidance and documentation for AGIS can be found at: www.faa.gov/airports/planning_capacity/airports_gis_electronic_alp/

The FAA Airports GIS Program provides additional information and includes the portal for submitting project data (https://airports-gis.faa.gov/public/index.html).

Specific ACs related to aeronautical surveys include the following:

- *FAA AC 150/5300-16, General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey* (NGS) – Explains the specifications for establishing geodetic control and how to submit the information to the NGS/FAA.

- *FAA AC 150/5300-17, Standards for Using Remote Sensing Technologies in Airport Surveys* – Provides guidance on the use of remote sensing technologies in collecting the data.
- *FAA AC 150/5300-18, Survey and Data Standards for Submission of Aeronautical Data Using Airports GIS* – Provides the specifications and technical requirements for data collection.

The first major step in AGIS is to establish the Primary and Secondary Airport Control Station (PACS and SACS). The FAA's guidelines for setting up a project in the AGIS Portal and submitting data can be found at: https://airports-gis.faa.gov/public/OnlineHelp/contents/pacsandsacs.html

Narrative Report

A narrative report typically accompanies the ALP set when a full Master Plan is not completed. The narrative report should include a basic aviation forecast, facility requirements, and alternatives analysis as justification for the proposed development to be shown in the ALP. When the ALP set is completed as part of a Master Plan, the review of the above drawings is typically listed in its own chapter or part of the Recommended Development Chapter.

Reviewing the required ALP checklists is an important element of the scoping process to determine which drawings and individual components will be required and are recommended.

ALP Drawing Set

As the Federal grant assurances require the airport sponsor to maintain the ALP, FAA ACs, Orders, and guidance along with FDOT and airport sponsor standards must be followed when developing the ALP drawings. *SOP 2.00, Standard Procedure for FAA Review and Approval of Airport Layout Plans* (ALPs) (www.faa.gov/airports/resources/sops/) provides checklists for reviewing the ALP drawing set including required sheets, size and scale, and required data to be shown. Reviewing the required checklists is an important element of the scoping process to determine which drawings and individual components will be required and are recommended, as well as identify several details of what the drawings will depict. The SOP 2.00 states it should be used in lieu of *FAA AC 150/5070-6B, Airport Master Plans, Appendix F* for the checklist. The sponsor should discuss ALP requirements with the FDOT ASO and FAA ADO and ensure the SOP 2.00 checklist notes which specific elements are to be completed during the scoping process. FAA approval of the ALP drawing is important as the FAA will not provide Federal funding for a development project that is not shown in the ALP. As such, the ALP is considered a legally binding document.

The ALP set typically includes the following drawings or sheets:

- Cover Sheet and Drawing Index
- ALP
- Airport Airspace Drawing
- Inner Portion of the Approach Surface Drawings
- Runway Departure Surface Drawings
- Property (Exhibit 'A') Map

Other sheets that may be required include:

- Land Use
- Terminal Area Plan
- Utility Drawing
- Airport Access Plan

The airport sponsor, FDOT ASO, and the FAA typically coordinate to identify other sheets that may need to be included in the ALP drawing set. A general description of each sheet is provided below.

Cover Sheet and Drawing Index

The cover sheet provides basic details such as the airport name, sponsor, location, and signature blocks for FDOT and the FAA. There may also be a separate Drawing Index sheet or the index may be included on the cover sheet.

ALP

The ALP sheet illustrates existing and ultimate facilities and design standards corresponding with the master planning findings. Future development may be shown by phasing. Examples of required data points include: wind rose, Airport Reference Point, ground contours, runway end and other building elevations, runway and taxiway details, and safety areas. Depending on the airport complexity, the data table may be located on this sheet or on a secondary sheet. The ALP sheet is approved by the FAA, FDOT, and airport sponsor.

The "existing" ALP sheet, illustrates the airport in its current state and identifies key FAA design standards and existing airside and landside facilities. It may be helpful to have this sheet separate to help clarify what is existing and what is proposed as depicted in the ALP. If an existing ALP sheet is used it should be listed prior to the ALP sheet.

Florida Specific Information!

Per FDOT Procedure, as part of the ALP set, the following sheets will be included as separate sheets within the set:

1. *A separate Airport Data sheet*
2. *A separate Existing ALP drawing sheet*
3. *A separate Future ALP drawing sheet*
4. *A separate Ultimate ALP drawing sheet (if different from the future sheet)*
5. *A separate sheet(s), similar in scale and layout to the ALP Drawing Sheet, showing existing, future, and ultimate 14 CFR Part 77 surfaces only*

Airport Airspace Drawing

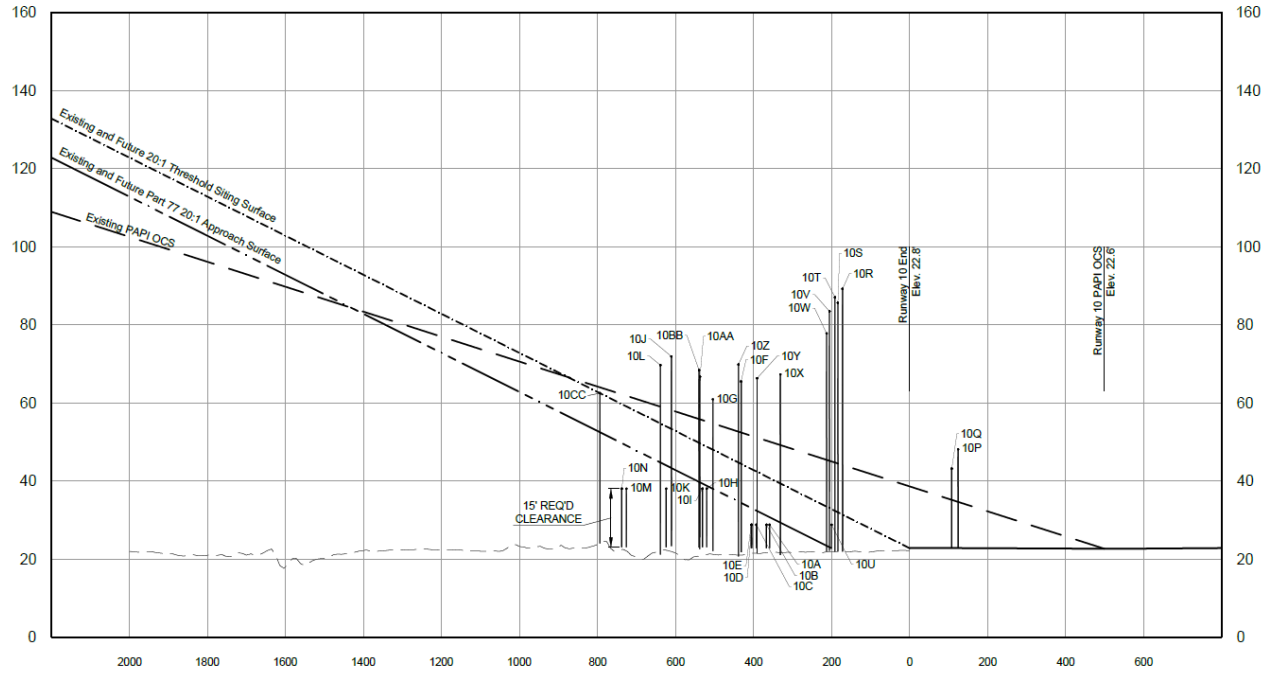
The airspace sheet is required to show the plan view of the Part 77 surfaces in its entirety for the ultimate airfield. Surfaces include horizontal, conical, transitional, primary, and approach. Obstructions are identified and listed by type, penetration to the surface in feet, and recommended action or disposition of the obstruction.

Inner Portion of the Approach Surface Drawings

The inner approach surface sheets contain the plan and profile views of the inner portion of the approach surface to each runway end along with the penetrations based on the Part 77 analysis, as shown in **Figures 24 and 25**. Penetrations are identified by location along with type, penetration to the approach surface in feet, and recommended action. Other surfaces may be included as applicable such as the threshold siting surface (TSS), glideslope qualification surface (GQS), or U.S. Standards for Instrument Procedures (TERPS). Depending on the information required for illustration, only one runway end may be shown per page due to size constraints.

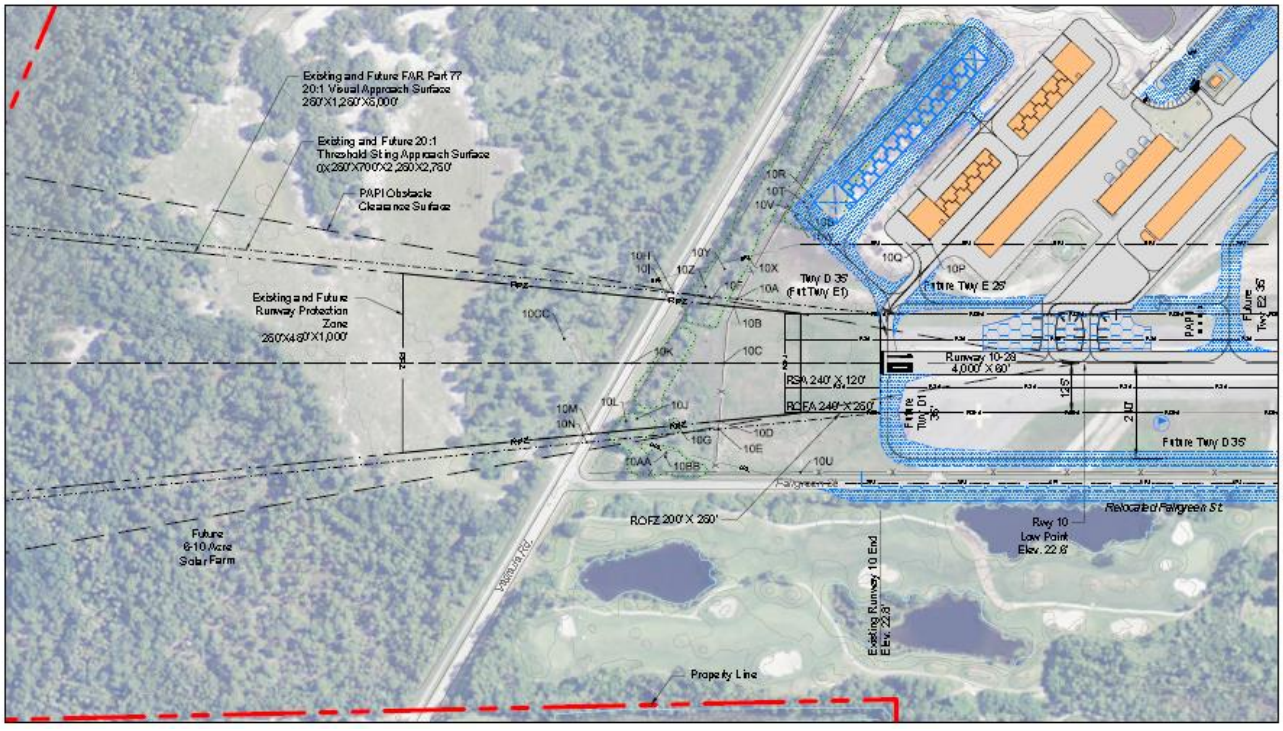
*Developing graphics that are clear and easy to understand, such as those shown in **Figure 24** and **Figure 25**, will assist the FAA and FDOT when reviewing the ALP, which will ultimately help keep the project on schedule.*

FIGURE 24. SAMPLE INNER APPROACH SURFACE PROFILE



Source: Valkaria Airport Layout Plan, 2015
Hanson Professional Services, Inc.

FIGURE 25. SAMPLE INNER APPROACH SURFACE PROFILE



Source: Valkaria Airport Layout Plan, 2015
Hanson Professional Services, Inc.

Runway Departure Surface Drawing(s)

The runway departure surface sheet(s) depicts the applicable departure surfaces for runway end(s) designated for instrument departures per *FAA AC 150/5300-13*, *Airport Design*. Penetrations are identified by location along with type, penetration to the appropriate departure surface in feet, and recommended action. Depending on the information required for illustration, only one runway end may be shown per page. While this drawing may be required where applicable, the depiction of the One Engine Inoperative (OEI) surface is optional and is not currently required.

Exhibit 'A' Property Map

The property map sheet depicts the control and history of the existing airport property and plans for future land acquisition. For airports receiving federal assistance for airport development projects, having a current property map will help to ensure compliance with FAA Grant Assurance 4, Good Title, which states that airports must "hold good title, satisfactory to the Secretary, for the landing area of the airport." Exhibit 'A' property maps are also tied to FDOT Aviation Program Assurance 2, Good Title, which has similar provisions to FAA Grant Assurance 4. Exhibit 'A' maps display when and how the property was acquired, if the information is available (e.g., acquired in 1997 utilizing FAA Airport Improvement Program [AIP] funding), and the type of control—whether it is fee-simple title, easements, or leases; and if there are any restrictions, such as donated for conservancy.

An Exhibit A must be prepared in accordance with *FAA AC 150/5100-17, Land Acquisition and Relocation Assistance for Airport Improvement Program Assisted Projects* and utilized the checklist in *SOP 3.00, FAA Review of Exhibit 'A' Airport Property Inventory Maps* (www.faa.gov/airports/resources/sops/). The FAA emphasizes the importance of having a current and accurate Exhibit 'A' drawing on file prior to issuing a grant, as required in FAA grant agreements. The submission of an Exhibit 'A' requires the backup documentation in addition to the sheet.

In the unlikely event an Exhibit 'A' is not required for the airport, a property map that does not serve as the legally binding Exhibit 'A' may be utilized. This property map may use the SOP 2.00 checklist and has less stringent requirements on depiction of parcels and the data required. For example, the Exhibit 'A' requires the metes and bounds for the parcel boundary and displaying all safety areas, but a property map is not listed as requiring this. The primary purpose of a property map compared to an Exhibit A, is to provide a basic overview of the ownership, control, and obligations of each parcel that makes up the airport property; an Exhibit 'A' can be used for legal proceedings.

Land Use

The land use sheet may be split into on- and off-airport, as necessary, depending on the level of detail and complexity of information. This sheet depicts the existing and ultimate development areas within the airport property and surrounding community, including zoning information. Noise contours on the drawing allow for a quick view of airport compatibility with the surrounding community. While optional, this sheet is typically encouraged and sometimes required by the FAA and FDOT.

Terminal Area Plan

For larger or more complex airports, this sheet(s) provides a large-scale illustration of significant terminal area development, both for commercial and GA terminal areas. The terminal area may include aprons, buildings, hangars, parking lots, and roads that are part of the area accessed by the general public. This drawing is typically not needed at every airport type and is therefore considered optional.

Utility Drawing

The utility drawing is an optional sheet depicting the airport's various utilities. This information may not be shown or included in the ALP. While listed in the SOP and *FAA AC 150/5070-6B, Airport Master Plans*, there is no checklist for this sheet.

Airport Access Plan

The airport access plan is a sheet depicting major routes of the various transportation modes that provide service to the airport should access become an issue. The sheet should show both existing and ultimate infrastructure. While listed in the SOP and *FAA AC 150/5070-6B, Airport Master Plans*, there is no checklist for this sheet and it is considered optional depending on the airport type. However, if a future terminal project is being considered as part of the Master Plan Update, then this sheet should be included as part of the ALP set.

Obstacle Action Plan (OAP)

As part of the FAA's mission to maintain and enhance the safety, capacity and efficiency of airports, the FAA is starting to require airports to develop an Obstacle Action Plan (OAP) with a focus on the approach and departure surfaces identified by *FAA AC 150/5300-13A, Airport Design* and *FAA Order 8260.3B, The United States Standard for Terminal Instruments Procedures (TERPS).* Per the FAA Policy, "Reminder of Responsibilities for FAA Personnel and Airport Sponsors for Protecting Approach and Departure Surfaces," the OAP can vary in size and complexity based on the airport. However, the OAP must address the sponsor's action plan to maintain clear surfaces.

ALP Submittal and Approval Process

As illustrated in **Figure 26**, the ALP will be reviewed and approved through multiple submissions as outlined by the FAA and FDOT during the scoping process. Submittals may include:

- **Preliminary ALP Submittal**
  - Possibly submitted only to the sponsor to ensure the ALP includes the proper sheets and projects before submission to the FAA and FDOT
- **Draft ALP Submittal**
  - Submitted to the FAA ADO and FDOT for review and comment along with the ALP checklists. The FAA ADO will submit the draft ALP to multiple internal offices as discussed below
- **Final ALP Submittal**
  - Revised based on the FAA, FDOT, and any additional airport sponsor comments and submitted to the sponsor, FDOT, and the FAA with the associated documentation (e.g., Narrative Report, Master Plan) for distribution.

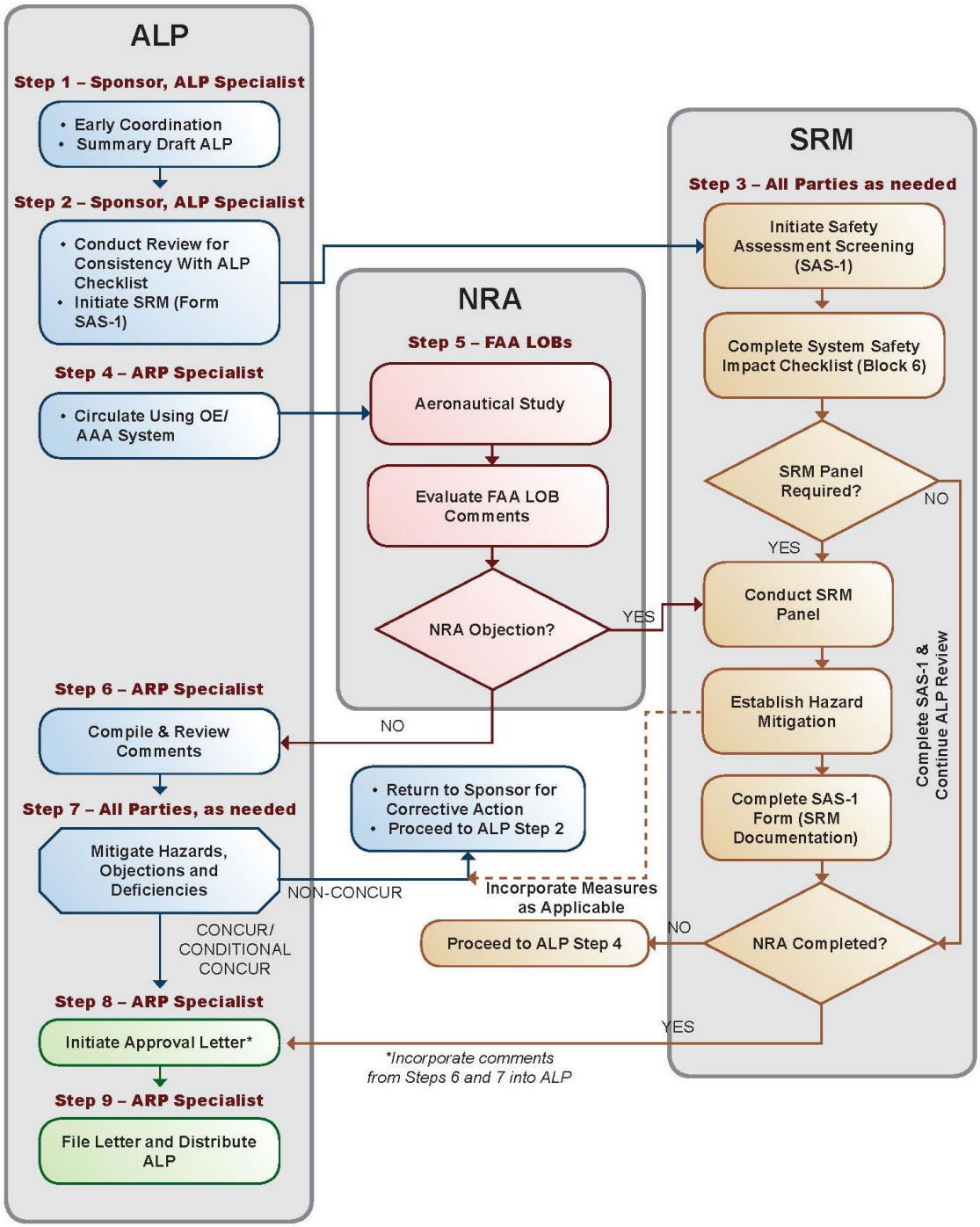
Florida Specific Information!

"The proposed development depicted in this plan does not inherently represent the official views and policies of FDOT. Conditional approval of this plan does not constitute a commitment on the part of FDOT to participate in the funding of any development depicted in the plan or any project listed within the Capital Improvement Plan (CIP) element, nor does it indicate that the proposed development and/or associated projects are environmentally acceptable or economically feasible in accordance with appropriate public law."

SOP 2.00 discusses the general process the ALP will follow after submission. After receiving the documents, the FAA will circulate them via the OE/AAA system. The OE/AAA system allows various offices within the FAA to comment in the ALP, which the ADO will also review. The ADO will communicate

the appropriate comments and questions to the airport sponsor. Once the comments are resolved, the FAA will issue an approval letter that includes an airspace determination. After receiving the approval letter, the airport sponsor must stamp and sign the ALP. Once approved, the ALP becomes a legal document and the sponsor should consider placing security controls on the ALP drawing set to prevent unauthorized changes to the drawings.

FIGURE 26. FAA ALP SUBMITTAL AND REVIEW PROCESS



Source: Adapted from FAA SOP No. 2.00

FAA approval of the ALP is coordinated through *FAA SOP 2.00, Standard Procedure for FAA Review and ALPs*, which references two FAA Orders that guide approval of ALPs: *FAA Order 5050.4B* which deals with environmental requirements and *FAA JO 7400.2* which deals with airspace matters. FAA SOP 2.00 provides detailed information on the requirements that are provided in both Orders. As stated, there are three types of approvals that an ALP can receive:

- Conditional ALP approval
- Unconditional ALP approval
- "Mixed" ALP approval

Since many projects shown on an ALP have not received formal environmental or airspace approval, the ALP may be approved as "conditional." Conditional approval is typical for an ALP as it includes long-term plans that are likely beyond the horizon of environmental (three years) and airspace review. Conditional approval also includes noting that development not yet shown in the ALP is subject to FAA environmental and airspace approval as well. The FAA may also provide an unconditional approval, which is unlikely, or a mixed approval, which identifies specific projects that receive unconditional approval.

It should be noted that the FAA and FDOT do not own the airport so it may not dictate what development the ALP shows. The ADO provides leadership and guidance through the ALP review and approval process to ensure the FAA's interests are considered, design standards are adhered to, and realistic planning is utilized. The FAA may choose to not fund a project on the basis that the proposal development must be fully justified to eligible for AIP or Passenger Facility Charge (PFC) funding.

Updates to the ALP

ALPs may need to be updated periodically to ensure they represent proposed development and reflect the current status of the airport. ALPs become outdated when they do not provide for future needs, conform to current airport design standards, accurately reflect existing features, or represent critical land use changes that may affect the airport's navigable airspace or ability to expand.

Grouping together ALP changes and making them at once is much more cost-efficient than implementing them individually. Interim changes, referred to as "Pen-and-Ink" changes, are where only the ALP sheet is modified. These changes are typically noted in the Revisions section of the title block. Pen-and-Ink changes should be made as needed or required by the FAA.

ALP updates may be completed as solely the ALP Update with the Narrative Report or as part of a Master Plan Update. This is typically completed every five to ten years depending on the airport, its role, and complexity.

Section 9: Facilities Implementation Plan

A facilities implementation plan translates the recommended development plan, developed in the Alternatives Analysis, into a series of projects that comprise the CIP. *FAA AC 150/5070-6, Airport Master Plans* describes the facilities implementation plan as the component that provides guidance on how to implement the findings and recommendations of the planning effort. **Figure 27** shows the key steps in developing a CIP from gathering information on the individual projects to scheduling the projects to sharing the plan with funding sources to secure future funding. The final CIP will be reviewed in a Financial Feasibility Analysis to determine the ability to fund each of the projects in the proposed schedule.

FIGURE 27. FACILITIES IMPLEMENTATION PLAN

Source: Kimley-Horn and Associates, Inc., 2016

Based on all of the information that is gathered throughout the life of the project, including considerations from the public as part of the stakeholder outreach process, the facilities implementation plan consolidates that information and identifies how and when projects will be completed. The complexity of the plan depends on the size, type, and role of the airport. In some cases, a very simple plan capturing required items may be all that is needed, whereas other situations may call for a more detailed and comprehensive plan information.

The scope of work is the key document that determines the detail needed for various plan elements. Thus, the sponsor should discuss what the minimum requirements are to complete their internal plans as

well as coordinate with FAA and FDOT for verification and validation of specific plan elements. The implementation plan should encompass all development projects at the airport, including ongoing projects and maintenance and repair, regardless of their eligibility for FDOT or Federal funding. Documenting the implementation plan is important to ensure stakeholders understand the recommendations and general intended timing from the Master Plan as well as any other airport projects in progress.

The FAA considers project funding requests through the CIP process. A three- to five-year CIP is typically created by each airport on a rolling basis and based on the airport's Master Plan recommendations, as available. Each airport typically conducts an annual review to update the CIP based on anticipated plans for project priorities, funding sources, environmental and authority approvals, or estimated costs. As such, a more robust CIP is provided for a three- to five-year period, with the 10- and 20-year Master Plan CIP representing basic planning-level cost estimates and phasing. The short-term CIP may be used for planning and programming funds with the FAA and FDOT and determining which projects may require environmental approvals. It is important that the CIP developed in the implementation plan is realistic and that the sponsor has considered the timing of actions needed to start the project such as relevant and necessary approvals, environmental documentation, and if the local share of funding is expected to be available when needed.

This chapter addresses the following facilities implementation topics:

1. Project Attributes
2. Scheduling
3. Documentation
4. Joint Automated Capital Improvement Program (JACIP)

Project Attributes

Depending on the airport sponsor, different attributes should be included in the CIP documented in the facilities implementation plan. A minimalistic plan may only list the projects by name along with their estimated cost, anticipated project start, and the expected funding sources. Funding sources and their applicability are discussed further in Financial Feasibility Analysis chapter. A more robust plan may also include the below items. **Table 24** displays a specific project sheet that would cover an individual project more in depth. **Tables 25 and 26** show examples of a minimalistic and more robust CIPs.

TABLE 24. EXAMPLE OF A PROJECT ATTRIBUTE SHEET

Project	Taxiway A Rehabilitation
Identification	Airport Project #1B
Description	Complete Mill & Overlay and remarking of Taxiway A.
Justification	Pavement is in disrepair and has numerous cracks, which have resulted in FOD.
Est. Start Date	February 2020
Est. End Date	June 2020
Quantity	8,000 Linear Feet
Est. Cost	$2,700,000
Prerequisites/ Interdependencies	None
Environmental Requirements	Environmental Assessment (EA); expected approval in 2019.
Responsible Parties	Consultant is lead agency for design and construction administration and airport advisory committee is support and operations implementation.
Special Considerations	Must be phased to ensure aircraft can still access runway. Existing lighting and signage will need to be reinstalled following rehabilitation.
Key Milestones	Engineering Plans & Specs Completion, Bid Opening, Job Mix Formula Approval, Passing of Test Strip, Substantial Completion, Reopening of Taxiway.
Source: Kimley-Horn and Associates, Inc., 2016	

Broad projects illustrated in the ALP may be broken down into smaller projects based on the project stage or phase—such as environmental, design, and construction—or specific phases of a single construction project (i.e., Phase I – Taxiway A1 and Phase II – Taxiway A2). The project description should list which components are included with the specific project and the cost estimate. For example, the project titled "Relocation of Air Cargo Facilities" may be listed to include all associated projects (e.g., site selection study, design and construction of new facility, road relocation, new taxiways and aprons) or could be divided into smaller, individual projects. Descriptions should follow the FAA's SOAR planning module when submitted to FAA for funding consideration. Appendices to the Master Plan may be used as necessary to provide all documentation requested by the sponsor.

Scheduling

As the projects included in the facilities implementation plan may be complex, a review of the interrelationships between the projects and the sponsor's opportunities and constraints should be conducted and an achievable sequence that minimizes conflicts defined. The airport's financial, environmental, and strategic plans should be examined to determine how the airport will use the Master Plan's implementation plan. An unrealistic or unusable plan can cause the airport to fall behind schedule quickly, which may jeopardize priority projects or future funding. The FAA and FDOT should also be consulted during this phase to determine the priorities of projects within the overall transportation system. Additional information on project priorities is discussed in the Financial Feasibility Analysis section.

The Master CIP should span the same years as the forecasts with detailed information for the short-term projects. It is recommended that the airport identify triggers, sometimes referred to as planning activity levels (PALs) or trigger points, to alert the planning team as to when projects should be begin, as activity rarely results exactly as forecasted. The CIP may list these triggers or PALs under the prerequisites or key activities to identify when the project is needed based on activity as opposed to a specific timeframe, especially for large and expensive projects that are tied directly to a certain activity level.

The FAA ADOs recommend the following when scheduling projects in the CIP:

- Obtain environmental approval prior to completing the design, especially when seeking discretionary funding.
- Design the project the year prior to the construction. This allows for the construction project to be based on the bid pricing and ensures the bid pricing can be held.
- Prioritize the projects within each year or term.
- Make note of the Federal share requested, especially when the state or local share will be higher than expected. A higher than required local share may assist with obtaining Federal funding.
- Plan for submitting pre-application packages to alert the FAA of intent to submit a grant application. Pre-application packages help the FAA ensure the project will have the proper documentation and approvals when the grant application is submitted and allows the FAA to review funding availability.

Documentation

As a review of the ability to fund the individual projects of the recommended plan is included in the Financial Feasibility Analysis, the facilities implementation plan should include an CIP that can be used as a standalone document and clearly presents the airport's ongoing and future projects. The CIP element should also clarify that it is a requested project plan and does not constitute an agreement to fund the projects by any source. As discussed, the CIP may be more detailed depending on the sponsor and their needs. **Table 25** provides an example of a more simplistic CIP that may be included in a Master Plan Update for the 20-year planning horizon while **Table 26** displays a more robust CIP that may be used for the short-term planning.

It is important to document the plan in such a way it can be updated regularly to reflect new goals, priorities, opportunities, and constraints. This document may also assist other funding agencies by providing them information to determine their funding allocation and involvement. As such, the CIP should be reviewed regularly by FAA ADO, FDOT, and the sponsor to confirm project eligibility and funding availability. It is recommended that the airport sponsor also incorporate the local funding authority and FDOT into these reviews.

Joint Automated Capital Improvement Program

To better assist with implementing the CIPs from a plan to a physical project, FDOT and FAA have collaborated in a process referred to as the Joint Automated Capital Improvement Program, or JACIP. Airports take the information in their CIP and input it electronically into the JACIP. Funds must be "programmed" through this system for the grant funds to be made available to the sponsor. The process is designed to be an ongoing collaboration between the sponsor, FAA, and FDOT so all parties understand how to effectively fund projects to allow the airport to meet its goals. Ideally, the sponsor will be programming the CIP five or more years in advance as funds are scarce, but in high demand. It is important that the CIP from the Master Plan is presented in a format that allows it to be entered into the JACIP.

The first step of JACIP is to update the CIP through the online portal annually, when the Airport Master Plan is updated, or when requested by FDOT or the FAA. The sponsor should input the projects listed on their CIP for the planning horizon, including expected funding sources. This process helps transmit realistic, up-to-date funding needs so the FAA and FDOT can adequately plan and have a list of projects that are awaiting funding if additional funds become available. More details on funding sources and agency priorities is available in the Financial Analysis chapter of this Guidebook.

The FAA ADO and FDOT are able to review and evaluate projects inputted into JACIP and identify projects most likely to be funded based on funding priorities and availability. The projects identified by the FAA ADO are then entered into the FAA's SOAR. The FDOT uses the JACIP and the subsequent FAA inputs to develop the statewide aviation work program.

Additional guidance on the JACIP process is available once the sponsor is logged into the portal or through discussions with the FAA ADO or FDOT.

TABLE 25. BASIC CIP EXAMPLE

Capital Improvement Plan					
Project	**Estimated Cost**	**Federal**	**State**	**Local**	**Other**
Short-Term (0 - 5 years)					
Runway 13 Reconstruction (Design and Construction)	$950,000	$855,000	$76,000	$19,000	$-
Environmental Assessment (Tree Removal and Taxiway)	$150,000	$135,000	$12,000	$3,000	$-
Tree Removal (Design and Construction)	$125,000	$112,500	$10,000	$2,500	$-
Lighting Upgrades	$50,000	$-	$25,000	$25,000	$-
Conventional Hangar (200' x 200')	$990,000	$-	$-	$-	$990,000
Westside T-Hangar (12 Bay)	$500,000	$-	$-	$500,000	$-
Total Short-Term	$2,765,000	$1,102,500	$123,000	$549,500	$990,000
Mid-Term (5 to 10 years)					
Taxiway K Design & Construction	$1,100,000	$990,000	$88,000	$22,000	$-
Conventional Hangar (100' x 100')	$550,000	$-	$-	$-	$550,000
Replace Windows in Terminal	$12,000	$-	$-	$12,000	$-
Runway 2 RPZ Avigation Easement	$120,000	$108,000	$9,600	$2,400	$-
Total Mid-Term	$1,782,000	$1,098,000	$97,600	$36,400	$550,000
Long-Term (10 to 20 years)					
Westside T-Hangar (24 Bay)	$900,000	$-	$-	$900,000	$-
Pavement Rehabilitation (Taxiways A, B, C, & Eastside Apron)	$3,500,000	$3,150,000	$280,000	$70,000	$-
Pavement Rehabilitation (Taxiways D & E)	$850,000	$765,000	$68,000	$17,000	$-
Conventional Hangar (100' x 100')	$550,000	$-	$-	$550,000	$-
Total Long-Term	$5,800,000	$3,915,000	$348,000	$1,537,000	$-
Grand Total	$10,347,000	$6,115,500	$568,600	$2,122,900	$1,540,000

Source: Kimley-Horn and Associates, Inc., 2016

TABLE 26. ROBUST CIP EXAMPLE

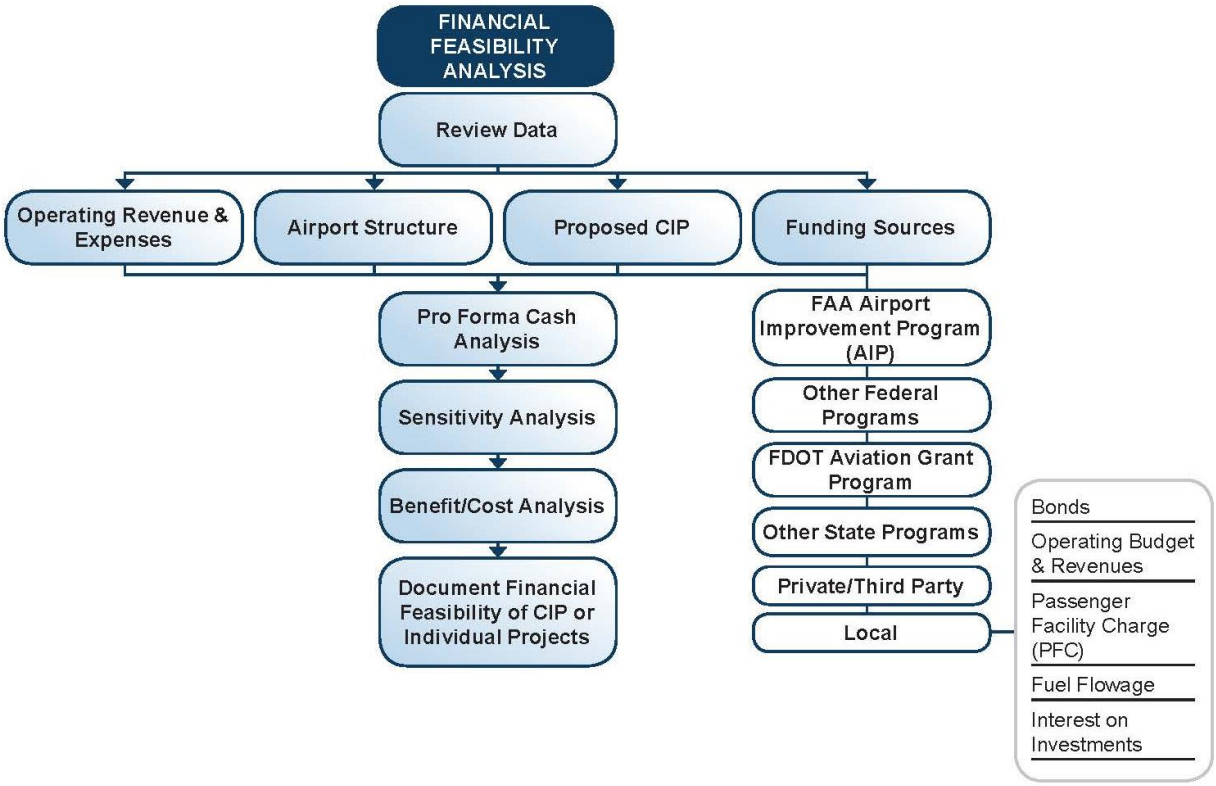
AIRPORT NAME										
AIRPORT CAPITAL IMPROVEMENT PROGRAM (20XX-20XX)										
									DATE: MM/DD/YY	
Fiscal Year	1. Airport:	2. State: FL					3. NPIAS No:	36-XXX		
	Project Description	Federal Funds		State Funds	Sponsor/Local Funds	Private Funds	Total Funds	Environ. Status	Start Date	Comp. Date
		Non-Primary Entitlement	Discret. Funds							
On-Going Projects	Westside Apron Rehabilitation (FAA AIP Project Number)	$150,000	$30,000	$10,000	$10,000		$200,000	Environ. Assessment	MM/YY	MM/YY
	North T-Hangar Rehabilitation (State Project Number)			$37,500	$37,500		$75,000	CATEX	MM/YY	MM/YY
	Parking Lot Resurfacing (Airport Project Number)				$15,000		$15,000	CATEX	MM/YY	MM/YY
	Total On-Going	$150,000	$30,000	$47,500	$62,500	$0	$290,000			
20XX	Runway 13 Reconstruction Design	$103,500		$5,750	$5,750		$115,000	Environ. Assessment	MM/YY	MM/YY
	Environmental Assessment (Tree Removal & Taxiway)	$46,500	$88,500	$7,500	$7,500		$150,000	CATEX	MM/YY	MM/YY
	Westside T-Hangar (12 Bay) Design and Construction					$500,000	$500,000	Environ. Assessment	MM/YY	MM/YY
	Totals 20XX	$150,000	$88,500	$13,250	$13,250	$500,000	$765,000			
20XX	Runway 13 Reconstruction Phase I Construction	$150,000	$413,625	$31,313	$31,313		$626,250	Environ. Assessment	MM/YY	MM/YY
	Lighting Upgrades			$25,000	$25,000		$50,000	Short EA	MM/YY	MM/YY
	Totals 20XX	$150,000	$413,625	$56,313	$56,313	$0	$676,250			
20XX	Runway 13 Reconstruction Phase II Construction	$150,000	$37,875	$10,438	$10,438		$208,750	Environ. Assessment	MM/YY	MM/YY
	Terminal Maintenance				$12,000		$12,000	-	MM/YY	MM/YY
	Tree Removal Design		$22,500	$1,250	$1,250		$25,000	Environ. Assessment	MM/YY	MM/YY
	Totals 20XX	$150,000	$60,375	$11,688	$23,688	$0	$245,750			
20XX	Tree Removal Construction	$90,000		$5,000	$5,000		$100,000	Environ. Assessment	MM/YY	MM/YY
	Conventional Hangar (200' x 200')					$990,000	$990,000	Short EA	MM/YY	MM/YY
	Totals 20XX	$90,000	$0	$5,000	$5,000	$990,000	$1,090,000			
20XX	Parallel Taxiway - Design	$198,000		$11,000	$11,000		$220,000	Environ. Assessment	MM/YY	MM/YY
	TOTALS 20XX-20XX		$738,000	$562,500	$97,250	$109,250	$1,490,000			

Source: Kimley-Horn and Associates, Inc., 2016

Section 10: Financial Feasibility Analysis

The purpose of the financial feasibility task is to ensure the projects identified in the CIP, as a result of the Master Plan's analysis, are in line with anticipated available funding. The information contained in this chapter, as well as the information contained in *FAA AC 150/5070-6, Airport Master Plans*, identifies what is required to demonstrate an airport's ability to fund projects identified in a Master Plan. As shown in **Figure 28** the financial feasibility analysis identifies funding sources based on the airport's financial position and role and provides a plan for funding projects in both the short and long term time frames. This step is important to ensure the CIP is realistic as it demonstrates an ability to fund the local share of the project. The CIP is typically utilized by several entities beyond the sponsor, such as the FDOT and FAA, to plan their funding allocations. As projects may be eligible for non-local funding, obtaining project funding will be competitive and sponsors need to strategically position the airport to receive and utilize non-local funds. Preparing the financial analysis is the first step in proving the airport is ready and able to begin projects.

FIGURE 28. FINANCIAL FEASIBILITY ANALYSIS



Source: Kimley-Horn, 2016

It is important to determine in the scoping process if the analysis needs to be a stand-alone chapter or if the CIP and facilities implementation plan provides enough information on how CIP projects will be funded. It is important that the analysis provides the information necessary for the sponsor to make informed decisions regarding the airport's future development needs and funding requirements.

This chapter addresses the following aviation financial feasibility analysis topics:

1. Funding Sources
2. Financial Feasibility Analysis

Funding Sources

Airport sponsors need to review all sources of available funding when identifying, prioritizing, and pursuing project implementation. Innovative and alternative funding sources should be analyzed for applicability and to assist with fulfilling funding needs beyond local sources. This may include Federal, state, regional, local, or private funds, as described below.

Federal

The FAA AIP provides grants to public agencies for the planning and development of public-use airports that are included in the NPIAS through the Airport and Airway Trust Fund. FAA grants typically cover 75-percent of eligible costs for large and medium primary commercial hub airports and 90-percent of eligible costs for small primary, reliever, and GA airports, based on statutory requirements. The current NPIAS report contains airport categorizations.

As funding is almost always limited, the FAA determines which projects will be funded based on current national priorities through its national prioritization system. Highest priority is given to projects that improve safety, security, reconstruction, capacity, and standards.

There are two basic types of funding available directly to airports: Apportionments (called entitlements) and discretionary. Major entitlement categories consist of primary, cargo, and non-primary—which typically are for GA airports—as well as state apportionment. After all entitlement obligations are met, the remaining funds are considered discretionary. The airport noise and military airport programs typically receive first priority from discretionary funds.

Discretionary funding is offered only if there are funds available after entitlements are apportioned. Additionally, entitlement funds must be used first for projects when asking for discretionary funds.

Passenger entitlements for commercial service airports are calculated based on the number of passenger boardings at an airport in the prior year and the amount of AIP funding available in that year as determined based on the authorization level from Congress. Cargo entitlements are based on the airport's share of total U.S. landed cargo weight but may not exceed more than eight-percent of the total available apportionments. To qualify, the airport must have more than 100 million pounds of total annual landed weight from cargo-only aircraft. These calculations can be found in *FAA Order 5100.38, Airport Improvement Program Handbook*.

Non-primary entitlements (NPE) funds, typically identified as $150,000 annually (but it can be less), are specifically provided to airports listed in the NPIAS as GA airports, including relievers. Entitlements may be carried over for up to three years but expire after four years. This is useful when there is no Federal project to complete in a specific year or a larger sum of Federal funds is needed for a project than the annual NPE amount, such as a runway reconstruction.

As discussed earlier, discretionary funds can be used for projects, however, the airport sponsor must apply directly to the FAA to request discretionary funding.

A sponsor can use these grants on most airfield capital improvement projects (e.g., runway rehabilitation, taxiway improvements, drainage improvements, ALP or ALP updates, and navigational aids). Regular operational costs such as training, marketing plans, art installations, mowing, or salaries and some revenue-producing projects, such as parking facilities, are ineligible. When determining whether a specific project is eligible, the FAA Order 5100.38 should be referenced or discussed with the FAA ADO.

The FAA also requires the airport sponsor to ensure the following regarding the airport and project:

- Airport is in the NPIAS
- Is depicted on the currently approved ALP
- Involves more than $25,000 in AIP funds
- Is consistent with regional development plans when applying for AIP funding (When a single project cannot meet the $25,000 minimum threshold, it may be combined with another related project and can then be eligible for NPE eligibility)
- Sponsorship requirements have been met
- Has sufficient and available funds for the local and/or state matching shares
- Will be completed without undo delay

Airport sponsors are obligated through grant assurances once a grant offer is accepted. There are currently 39 grant assurances that range from operating and maintaining the airport in a safe and serviceable condition, not granting exclusive rights, mitigating hazards to airspace, to using airport revenue properly. These assurances typically last 20 years, but their lifespan may depend on the type of recipient, useful life of the facility, and other conditions. Grant assurances are indefinite when Federal funds are used to acquire land for the airport.

The FAA has several programs geared toward specific topics that utilize AIP funding; several examples are included below:

- **Noise Compatibility Program**
  - Funding for projects related to the study of the noise levels and mitigating the noise derived directly from airports. Typically, 80-percent of a noise program implementation cost is covered by the FAA (www.faa.gov/airports/environmental/airport_noise/)
- **Acquiring Land for Airports and Relocation Assistance**
  - Assistance with acquiring property for development projects or noise compatibility programs and helping the private property owners relocate (www.faa.gov/airports/environmental/relocation_assistance/)
- **Military Airport Program (MAP)**
  - Grants to civil sponsors of military airfields for the development of aviation facilities for the public and to assist in converting former military airfields to public use to add system capacity. Funds may be used for typically ineligible projects such as parking lots, hangars, and roads (www.faa.gov/airports/aip/military_airport_program/)

Other non-FAA Federal programs are also available and may be reviewed at www.grants.gov; several examples include:

- **U.S. Fish and Wildlife Service (USFWS)**
  - Provides several programs to assist with habitat conservation and restoration, treatment of invasive species, and conservation of endangered and threatened species.
- **Department of Homeland Security (DHS) Security Grants**
  - Provides grants to enhance the ability of authorities to prepare, prevent, and respond to terrorist attacks and other disasters. Grants may be provided for FEMA disaster assistance, FEMA non-disaster preparedness, and research of new technologies
- **U.S. Department of Agriculture (USDA)**
  - Provides assistance with water quality improvements, wetland restoration, endangered species habitat, and developing renewable energy in rural areas
- **Environmental Protection Agency (EPA)**
  - Provides grants to increase energy efficiency and reduce harm on the environment such as retrofitting vehicles to reduce emissions and rebates for energy star appliances
- **Historical Preservation Fund (HPF)**
  - Provides grants to preserve historical sites. Sites must typically be listed on the National Register of Historic Places

State

FDOT established the Aviation Grant Program to provide for a safe, efficient, and cost-effective statewide aviation transportation systems. The program is funded through the State Transportation Trust Fund, which receives funds from the state's aviation fuel tax and discretionary capacity funding. The program funds projects for planning, designing, constructing, and maintaining public use aviation facilities in the areas of safety, security, preservation, capacity improvement, land acquisition, and economic development. FDOT project priorities include maximizing allocation of Federal funds, state licensing standards, safety, security, preservation, and increasing capacity.

Florida Specific Information!

FDOT established the Aviation Grant Program *to provide for a safe, efficient, and cost-effective statewide aviation transportation systems. The program funds projects for planning, designing, constructing, and maintaining public use aviation facilities in the areas of safety, security, preservation, capacity improvement, land acquisition, and economic development. FDOT project priorities include maximizing allocation of Federal funds, state licensing standards, safety, security, preservation, and increasing capacity*

To receive state funding, an airport must be included in the FASP. Airport and Spaceport project eligibility can be found in the *Florida Aviation Project Handbook* and *Florida Spaceport Improvement Program Project Handbook.* When a project is federally funded, FDOT will provide a certain amount of the non-Federal share match depending on the category of airport. Commercial service airports may receive up to 50-percent share and GA up to 80-percent of the remaining project cost that is not funded by the FAA. When no Federal funding is available, these percentages may be the same for the entire project cost. For economic development projects—projects that encourage the airport to become self-supporting financially such as an industrial park or

hangars/buildings that will be leased—FDOT may cover up to 50-percent of the project cost at general aviation airports. Specific project eligibility should be discussed with FDOT.

In special cases, FDOT may provide up to 100-percent funding for strategic airport investment projects. These projects must provide important access and on-airport capacity improvements; maximize opportunities in international trade, logistics, and the aviation industry; achieve state intermodal transportation goals; and demonstrate the feasibility and availability of matching funds.

Additionally, pursuant to Section 288.0656 (2) FS, the state can provide counties and communities funding through the Rural Economic Development Initiative (REDI). The applicant must meet the statutory definition of "rural" per Section 288.0656 (2)(e) and must have three or more of the "economic distress" conditions per Section 288.0656 (2)(c). The initiative is meant to assist communities that are facing extraordinary challenges while attempting to improve their economies in terms of personal income, job creation, average wages, and strong tax bases. Simply being eligible as a rural county does not eliminate the need to provide local funds all together. Municipalities eligible for REDI funding must apply for the opportunity to receive a waiver or reduction in funding match needed. This program does not provide a new source of funding to municipalities, it is intended to minimize the local match to eligible counties and communities.

Florida Specific Information!

There are 19 airports included in the SIS as of January 2016. For these airports, SIS funds can be used for facilities in need of capacity improvements. The Florida Aviation Project Handbook, available for download using the link below, provides detailed information on eligible projects and airports, funding priorities, and SIS project funding levels

There are a variety of other funding options available to Florida's airports. Some funding programs, such as the SIS, have certain eligibility and project specific requirements that must be met in order for funding to be available. Understanding the existing funding sources as well as their availability and applicability to a specific airport or airport project is a critical element of the financial analysis portion of an Airport Master Plan. State programs applicable to airports include:

- **Florida Fish and Wildlife Conservation Commission (FWC)**
  - Projects that address conservation needs as identified in the Florida's State Wildlife Action Plan
- **Energy and Climate Commission (ECC)**
  - Projects for energy efficiency and renewable energy technology
- **Florida Department of Environmental Protection (DEP)**
  - Projects that improve water quality
- **Florida Division of Historical Resources**
  - Projects for historical preservation
- **State Infrastructure Bank (SIB)**
  - Provides loans to help local share of project
- **Strategic Intermodal System (SIS)**
  - Once an airport is included in the SIS, funds are available for capacity projects associated with ground transportation, and airside, landside, and terminal connections

- For additional information, visit the 2014 SIS Funding Eligibility Guidance Document: www.dot.state.fl.us/planning/systems/programs/mspi/pdf/SIS%20Funding%20Guidance.pdf

- **Transportation Regional Incentive Program (TRIP)**
  - Projects that will generate additional capacity through growth in the transportation program

Sponsors should continue to look for other state grants to fund projects specific to their airport. Grants may be available for art installations, utility extensions, tourism, research, and economic development. As part of the financial analysis portion of a Master Plan, the consultant team should identify what projects in the CIP are eligible for certain funding options. Identifying eligible funding and matching it with CIP projects will help ensure that the projects identified in the CIP have adequate funding.

Metropolitan Planning Organization (MPO)

In accordance with s. 339.175, F.S., the state's 26 metropolitan planning organizations, referred to in this section as MPOs, shall develop a transportation improvement program (TIP) for the area within the jurisdiction of the MPO. The plans and programs for each metropolitan area must provide for the development and integrated management and operation of transportation systems and facilities.

Each MPO is responsible for developing, annually, a list of project priorities and a transportation improvement program and shall submit the list to the appropriate FDOT district by October 1 of each year. This list of project priorities must be used by the district in developing the district work program and the MPO in developing its transportation improvement program. These priorities are to be funded with state or Federal funds (includes specific urban funds allocated to the MPO) within the time period of the TIP and enhance the integration and connectivity of the transportation system, across and between modes for people and freight.

Local

Depending on the airport sponsor, a variety of local municipal funding opportunities are available. Whether these funding mechanisms are available for an airport to use will need to be determined when reviewing the airport's financial structure; privately-owned airports may be limited in the type of municipal funding mechanisms.

- **Bonds**
  - A financial mechanism commonly used by municipalities to finance long-term capital projects. There are several types of bonds available to some airport sponsors:
    - **General Obligation (GO)** – Backed by the creditworthiness and taxing power of the sponsor that usually require voter approval. GO bonds typically have lower interest rates due to their high level of security.
    - **General Airport Revenue Bonds (GARB)** – Usually used at larger commercial service airports. The bond is based on the sponsor's revenues to repay the debt. GARBs are popular choices when revenue is available as they do not place debt on the taxpayers or affect the bonding capacity of the sponsor. Interest rates may be higher than GO bonds due to their higher risk.
    - **Special Facility Revenue Bonds (SFB)** – Customarily issued for construction of a facility and backed by the future revenue generated at the facility. SFBs are useful in developing special use or revenue producing not eligible for Federal funding.
    - **Industrial Development** – Issued to construct an airport industrial park or facilities that may attract non-aeronautical revenue opportunities such as a Foreign Trade Zone (FTZ)

- **Hybrid Source Bonds** – The bonds are airport revenue bonds combined with a secondary bon type/fund source such as PFCs, CFCs, GO bonds, or another funding pledge for the specific project. Hybrid source bonds are backed by two or more independent revenue streams. Revenues generated from the facility are intended to meet all bond repayment obligations, though the credit of the bond issuer serves as an additional commitment to the debt.

- **Airport/Sponsor Customer Facility Charge (CFC)**
  - Charges assessed to airport customers for the use of a non-aeronautical service at the airport. Typically paid by rental car customers based on the number of days the user has rented the vehicle or service fee for a taxi to or from the airport. FAA approval is not required, but an agreement between the airport and the company is required

- **FAA-Approved Passenger Facility Charges (PFC)**
  - Authorized through *14 CFR Part 158, Passenger Facility Charge*s, PFCs are gathered through airlines operating at a commercial airport. As of 2015, the current cap per a flight segment is $4.50 with a maximum of $18 per passenger on a round trip. The PFC collected repay FAA approved project costs.
    Projects must be approved by the FAA and preserve, enhance, or make a significant contribution to the safety, security, or capacity of the national air transportation system, reduce noise or mitigate noise impacts from the airport, enhance competition between air carriers, or reduce congestion. Additional projects may be eligible based on discussions with the FAA ADO.

    FAA Order 5500.1, Passenger Facility Charge provides guidance and procedures on establishing, implementing, and managing a PFC program. The FAA also provides additional information, guides, and tools to PFC stakeholders here.

Private

Private funds include parties that are outside of the airport's governing body. This may be a company or an individual looking to partner with or do business at the airport or aviation advocates hoping to assist the airport. Before accepting private funds, it is recommended to discuss any implications or restrictions with the FAA ADO and FDOT to avoid any potential complications. It is important to note that the airport must still adhere to all Federal and state regulations and standards when using these funds.

- **Third Party**
  - Funds provided by a third-party such as a developer or a tenant to finance a construction project. Typically, the third-party would lease the facility for a period of years in lieu of fees as they provided the funding for the project. It is important that the airport sponsor retains ownership of the underlying property if on-airport and the facility ownership reverts to the airport sponsor upon expiration of the lease. It should be noted that FDOT will not provide reimbursements to third-parties, only the airport sponsor. Examples of this type of funding include corporate hangars, terminals, and cargo facilities

- **Charitable**
  - Charitable donations may be made to the airport for overall operations and matching share fund or for specific projects. In some cases, charitable donations were made by the original founders of an airport or pilots associations

Additional information on funding may be found in TRB's *ACRP Synthesis 1, Innovative Finance and Alternative Sources of Revenue for Airports* examines capital funding and revenue sources and TRB's

ACRP Report 121, Innovative Revenue Strategies – An Airport Guide provides tools to improve airport revenue streams, recover costs, and achieve operational efficiencies.

Financial Feasibility Analysis

Airport Sponsor Financial Structure

The financial feasibility analysis should focus on short-term projects with more general information regarding the mid- and long-term projects as these may shift in priority and funding is less certain. It is likely than a larger commercial service airport would complete a more in-depth analysis than a rural GA airport.

The airport sponsor may be an authority, local municipality, combined counties, state, another entity, or a privately owned entity. The airport may operate as an enterprise fund that is separated from the municipalities' general fund but is overseen by the board, or may be run by an authority that is an entirely separate entity from the local municipality. The differences between these structures may greatly impact the funding sources and method for accepting funds. As such, the airport's financial structure is typically reviewed first to ascertain the factors that may influence the operating budget and cash flow.

The structure will also provide the budgeting and finance processes to ensure the analysis can be properly integrated. Additional constraints such as Bond Ordinances, Airline Use and Lease Agreement (AULA), and existing lease documents also need to be analyzed. These legal documents may place constraints on the sponsor such as the amount of additional debt that can be issued, the rental rates that can be placed on vendors and airlines, and necessary approvals. This is important to consider prior to reviewing the financial capability or feasibility of the recommended airport development.

Components of Analysis

A financial feasibility analysis includes reviewing airport revenues and expenses and applying the data to a pro forma cash flow analysis, also referred to as a "what-if scenario." Revenues include those listed above under the airport/sponsor sources of funding. Expenses can include:

- Salaries and benefits
- Insurance
- Legal/professional fees
- Consulting fees
- Utilities
- Office expenses
- Advertising
- Travel/conference expenses
- Training
- Fuel
- Maintenance and repairs
- Bad debts
- Capital improvement projects and equipment purchases
- Bond repayments

Pro Forma Cash Flow Analysis

While not required, the pro forma cash flow analysis would reveal if the local share of each project can be funded with the anticipated available revenue. The analysis applies the capital costs, and potentially the future operating and maintenance costs of those projects, listed in the CIP to the airport cash flow to determine the financial feasibility of implementing a project. The current year dollars, inflation factor, or only include specific types of expenses used in the current operating model of the sponsor can be modified to fit the individual characteristics of the airport. These circumstances are typically determined when reviewing the airport's financial structure. The analysis should accurately account for the annual anticipated level of external funding from FAA entitlement, FDOT, or other sources.

Any funding shortfalls identified through the analysis will need to be further analyzed to determine if additional funds may be obtained or how the project schedule can be revised. These findings will help

sponsors make informed decisions on which projects to fund and when, how to overcome constraints, and what level of financial support will be needed in the planning horizon. Lower activity airports should recognize that, if they are dependent on outside funding sources to complete many of the projects, funding may not always be available on the desired timeline. This is especially true if the outside funding source includes FAA discretionary funding. Sponsors should look for alternative and innovative funding sources along with ways to increase revenue to become more self-sufficient if the desired projects identified in the Master Plan appear to be at risk due to anticipated financial conditions.

Sensitivity Analysis

As applicable, a sensitivity analysis may also be conducted to determine financial risk and help the planning process by reviewing future funding levels for different planning scenarios. The Master Plan forecasts are a planning tool and do not guarantee a certain rate of growth. A sensitivity analysis will help determine how sensitive the plan is to specific revenue sources such as PFCs, which are based on the number of passenger enplanements. This would allow the airport to understand the impacts of reduced operations or revenue. As with the forecasts, the financial feasibility analysis should be treated as a planning tool and not a concrete plan.

Benefit/Cost Analysis

A BCA examines all costs related to the construction and operation of a project. The FAA uses BCA to assess the benefits of the proposed project against the costs to aviation users. A BCA is required for capacity-related airport projects receiving more than $10 million in AIP discretionary grants over the life of the project and all airport capacity projects requesting letters of intent (LOIs). The BCA must show that the total benefits outweigh the total costs. The FAA's Airport Benefit-Cost Analysis Guidance (www.faa.gov/regulations_policies/policy_guidance/benefit_cost\) provides more details on specific methodology, benefits, and costs to be utilized in the calculations.

Return on Investment (ROI) and Internal Rate of Return (IRR)

Return on Investment (ROI) is used to measure the efficiency of an investment compared to other investments by measuring the return against the cost of the investment. It has a similar premise as the BCA, though it is documented as a ratio or percentage whereas BCA is a dollar value. A ROI of 1 is the "break even" point and implies that 100-percent of what was invested in the project will be returned. ROI can be limited by the fact that the time period of the investment is not factored into the calculation, which can skew the comparison between projects. Internal Rate of Return (IRR) is used in capital budgeting to measure and compare the profitability of a project. The investment is considered acceptable if the IRR is greater than the cost of capital as it implies that the project would add value to the airport. Typically, the higher IRR, the more desirable the project is to complete. IRR should not be used to calculate projects with different durations.

Documentation

At a minimum, the financial analysis should include a summary of historical cash flow and existing and future debt service requirements along with the expected funding source of each project in the short-term. Airports with commercial service may include rates and charges of airlines, concessionaires, and other pertinent factors. If a BCA has been conducted, it should be included in the documentation along with any electronic spreadsheets utilized in the analysis for future reference. The final documentation will be utilized by the airport as well as outside funding agencies to demonstrate the ability to fund the projects identified on the CIP.

Appendix 1

Documents Referenced in this Guidebook

FAA ADVISORY CIRCULARS

www.faa.gov/regulations_policies/advisory_circulars/

- FAA AC 70/7460-1, Obstruction Marking and Lighting
- FAA AC 120-60, Ground Deicing and Anti-icing Program
- FAA AC 150/5000-XX, Critical Aircraft and Regular Use Determination
- FAA AC 150/5050-4, Citizen Participation in Airport Planning
- FAA AC 150/5060-5, Airport Capacity and Delay
- FAA AC 150/5070-6B, Airport Master Plans
- FAA AC 150/5070-7, The Airport System Planning Process
- FAA Draft AC 150/5100-XX, Guidance on the Extraction of Oil and Gas on Federally Obligated Airports
- FAA AC 150/5100-14, Architectural, Engineering and Planning Consultant Services for Airport Grant Projects
- FAA AC 150/5100-17, Land Acquisition and Relocation Assistance for Airport Improvement Program Assisted Projects
- FAA AC 150/5220-18, Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials
- FAA AC 150-5220-20, Airport Snow and Ice Control Equipment
- FAA AC 150/5300-13A, Airport Design
- FAA AC 150/5300-14, Design of Aircraft Deicing Facilities
- FAA AC 150/5300-16, General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey (NGS)
- FAA AC 150/5300-17, Standards for Using Remote Sensing Technologies in Airport Surveys
- FAA AC 150/5300-18, General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards
- FAA AC 150/5300-19, Airport Data and Information Program
- FAA AC 150/5325-4B, Runway Length Requirements for Airport Design
- FAA AC 150/5325-4C, Runway Length Recommendations for Airport Design,
- FAA AC 150/5360-9, Planning and Design of Airport Terminal Facilities at Non-Hub Locations
- FAA AC 150/5360-13, Planning and Design Guidelines for Airport Terminal Facilities

ACRP REPORTS

www.trb.org/Publications/PubsACRPProjectReportsAll.aspx

- ACRP Synthesis 1, Innovative Finance and Alternative Sources of Revenue for Airports
- ACRP Synthesis 10, Airport Sustainability Practices
- ACRP Report 4, Ground Access to Major Airports by Public Transportation
- ACRP Report 10, Innovations for Airport Terminal Facilities
- ACRP Report 12, An Airport Guide for Regional Emergency Planning for CBRNE Events
- ACRP Report 20, Strategic Planning in the Airport Industry
- ACRP Report 25, Airport Passenger Terminal Planning and Design, Volume 1: Guidebook and Volume 2: Spreadsheet Models and User's Guide
- ACRP Report 38, Understanding Airspace, Objects, and Their Effects on Airports
- ACRP Report 40, Airport Curbside and Terminal Area Roadway Operations
- ACRP Report 52, Wayfinding and Signing Guidelines for Airport Terminals and Landside
- ACRP Report 55, Passenger Level of Service and Spatial Planning for Airport Terminals
- ACRP Report 69, Asset and Infrastructure Management for Airports
- ACRP Report 70, Guidebook for Implementing Intelligent Transportation System Elements to Improve Airport Traveler Access Information
- ACRP Report 77, Guidebook for Developing General Aviation Airport Business Plans
- ACRP Report 79, Evaluating Airfield Capacity
- ACRP Report 94, Integrating Web-Based Emergency Management Collaboration Software into Airport Operations
- ACRP Report 96, Apron Planning and Design Guidebook
- ACRP Report 104, Defining and Measuring Aircraft Delay and Airport Capacity Thresholds
- ACRP Report 108, Guidebook for Energy Facilities Compatibility with Airports and Airspace.
- ACRP Report 109, Improving Terminal Design to Increase Revenue Generation Related to Customer Satisfaction
- ACRP Report 113, Guidebook on General Aviation Facility Planning
- ACRP Report 114, Guidebook for Through-the-Fence Operations
- ACRP Report 121, Innovative Revenue Strategies – An Airport Guide
- ACRP Report 129, Evaluating Methods for Counting Aircraft Operations at Non-Towered Airports
- ACRP Report 140, Guidebook on Best Practices for Airport Cybersecurity.
- ACRP Report 141, Renewable Energy as an Airport Revenue Source
- ACRP Report 143, Guidebook for Air Cargo Facility Planning and Development
- ACRP Report 146, Commercial Ground Transportation at Airports: Best Practices

STANDARD OPERATING PROCEDURES (SOP)

www.faa.gov/airports/resources/sops/

- Standard Operating Procedure (SOP) 2.00, Standard Procedure for FAA Review and Approval of Airport Layout Plans (ALPs)
- Standard Operating Procedure (SOP) 3.00, FAA Review of Exhibit 'A' Airport Property Inventory Maps
- Standard Operating Procedure (SOP) 8.00 Standard Operating Procedure for Runway Safety Area Determination

CODE OF FEDERAL REGULATIONS (CFR)

www.faa.gov/regulations_policies/faa_regulations/

- 14 CFR Part 77, Safe, Efficient Use, And Preservation of the Navigable Airspace
- 14 CFR Part 139, Certification of Airports
- 49 CFR Part 1540, Civil Aviation Security: General Rules
- 49 CFR Part 1542, Airport Security

FAA ORDERS & NOTICES

www.faa.gov/regulations_policies/orders_notices/

- FAA Order 1050.1F, Environmental Impacts: Policies and Procedures
- FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions
- FAA Order 5190.3C, Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)
- FAA Order 5100.38D, Airport Improvement Program Handbook

ADDITIONAL FAA RESOURCES

- FAA's Runway Simulator
  - www.faa.gov/airports/planning_capacity/runwaysimulator/
- Recycling, Reuse, and Waste Reduction at Airports: A Synthesis Document
  - www.faa.gov/airports/resources/publications/reports/#Environmental
- NPIAS Airports
  - www.faa.gov/airports/planning_capacity/npias /
- FAA Terminal Area Forecast (TAF)
  - https://aspm.faa.gov/main/taf.asp
- FAA Operations and Performance Data
  - https://aspm.faa.gov /
- FAA Aerospace Forecast Fiscal Years 2016-2036
  - www.faa.gov/data_research/aviation/
- Forecasting Aviation Activity by Airport
  - www.faa.gov/data_research/aviation_data_statistics/
- Aviation Block Grant Program
  - www.faa.gov/airports/aip/grant_assurances/
- *Airport Sponsors*
  - www.faa.gov/airports/aip/grant_assurances/
- *Non-Airport Sponsors Undertaking Noise Compatibility Program Projects*
  - www.faa.gov/airports/aip/grant_assurances/
- *Planning Agency Sponsors*
  - www.faa.gov/airports/aip/grant_assurances/
- Sustainability Pilot Program
  - www.faa.gov/airports/environmental/sustainability/
- Aviation System Performance Metrics (ASPM) Data Systems
  - www.apo.data.faa.gov
- FAA Recycling, Reuse, and Waste Reduction at Airports: A Synthesis Document
- www.faa.gov/airports/resources/publications/reports/environmental/media/RecyclingSynthesis2013.pdf FAA Passenger Facility Charge (PFC) Program
  - www.faa.gov/airports/pfc/

STATE RESOURCES

- Title XXV, Aviation, Florida Statutes (F.S.)
  - www.leg.state.fl.us/STATUTES/
- Rule 14-60, Airport Licensing, Registration, and Airspace Protection, Florida Administrative Code (FAC)
  - www.flrules.org/gateway/ChapterHome.asp?Chapter=14-60
- FDOT's Florida Aviation System Plan (FASP)
  - www.dot.state.fl.us/aviation/FASP_details.shtm
- FDOT Aviation Procedures and Forms
  - Topic No: 725-040-040 - Aviation Program Management
  - Topic No: 725-040-100 - Airport Master Plans
  - Topic No: 725-000-005 - Public Transportation Joint Partnership Agreement
  - Form No: 725-040-15 - Exhibit 'C' Aviation Program Assurances
  - www.dot.state.fl.us/proceduraldocuments/
- Pavement Management: *Airfield Pavement Distress Repair Manual*
  - www.dot.state.fl.us/aviation/pavement.shtm
- *Airfield Pavement Inspection Reference Manual*
  - www.dot.state.fl.us/aviation/pavement.shtm
- *Inspection Methodology for Whitetopping*
  - www.dot.state.fl.us/aviation/pavement.shtm
- FDOT Data and Forecasts[1]
  - www.dot.state.fl.us/aviation/dataforecasts.shtm
- The Continuing Florida Aviation System Planning Process (CFASPP)
  - www.cfaspp.com/
- *FDOT Project Development and Environment (PD&E) Manual – Non-Federal Projects*
  - www.dot.state.fl.us/emo/pubs/pdeman/pdeman1.shtm

OTHER RESOURCES

- 5010-1 Airport Master Record
  - www.gcr1.com/5010web/default.cfm

[1] Note: More up to date forecast data on operations, enplanements, and based aircraft is available than the posted 2013 PDFs on this site.

Appendix 2

State, Federal, and Regulatory Requirements and Guidelines

FEDERAL MASTER PLAN GUIDANCE

AC 150/5070-6 (Series) – Airport Master Plans (Update planned for 2016)

What is it?

The Airport Master Plans AC is the primary Federal resource for the preparation and development of all Airport Master Plans. This resource document includes details on the entire master planning effort, from inception to final approval, and allows for airports completing a Master Plan to select specific elements that are applicable to their airport. Currently, this AC is in version Change 2, dated January 27, 2015. When developing a Master Plan, the most up to date version of this AC should be used. Consultants must determine the most up to date version and be aware of any draft changes that are likely to occur during the master planning process.

What is it for?

This document was developed to provide flexible guidance throughout the master planning process while still focusing on the critical issues that all Master Plans need to address for FAA approval. Every Florida airport has their own set of goals for their master planning process. However, this AC provides the framework for an airport of any size to tailor their Airport Master Plan to the distinctive conditions that are present at their airport while remaining compliant with FAA requirements.

Why is it important?

This document provides information on all elements of a Master Plan, including aviation forecasts and ALPs. It is imperative that all airports completing a Master Plan review this to ensure consideration of all elements and suggestions prescribed by the FAA. Depending on the type and scope of a Master Plan (ex: standard update or initial, “from scratch” Master Plan), not all sections may be pertinent to every airport. Each airport should determine which sections of the AC and the level of analysis needed to support their master planning efforts.

This AC also includes several supplemental appendices such as:

- Useful Reference Materials
- Suggested Potential Stakeholders
- Consideration of Environmental Factors in Airport Master Planning
- Guidance on preparing an Airport Layout Plan Drawing Set
- Standard Operating Procedures (SOPs) for the development of the ALP

AC 150/5300-13 (Series) – Airport Design

What is it?

The Airport Design AC contains airport design standards and recommendations as formulated by the FAA for use in the design of airports. These standards are a critical and necessary component in the master planning process; it is imperative that the entity completing a Master Plan understands the facility needs and the appropriate standards for design. Additionally, the standards contained in this AC are **mandatory** for all federally-obligated airports and should be referenced throughout the project to understand the implications of proposed design elements. This document is updated frequently; therefore, it is important to confirm that the most recent version is used. Currently, this AC is in version Change 1, dated February 26, 2014.

What is it for?

This AC provides details on the standards for developing facilities on an airport. This includes standards for runway design, taxiway design, and the geometry of an airport. This document provides recommended design standards based on the type of aircraft currently operating and projected to operate at the airport. This AC is also the key design source for the ALP and the standards contained within it are used by the FAA to determine compliance.

Why is it important?

Airport projects receiving Federal grant assistance through the AIP are required to comply with the design standards outlined in the AC. Additionally, at Part 139 certificated airports, the standards and recommendations are used to satisfy specific requirements of the Code of Federal Regulations (CFR). It is recommended that, to the extent feasible, development proposed as part of a Master Plan be in accordance with this AC to facilitate and maximize funding options for the airport.

AC 150/5060-5 (Series) – Airport Capacity and Delay

What is it?

The Airport Capacity and Delay AC is a comprehensive resource on determining airport capacity and aircraft delay for airport planning and design. The most current version of this AC incorporates Changes 1 and 2, dated September 23, 1983. While the current version of AC 150/5060-5 is dated and an update is underway, it is important to ensure that the most recent version is used during the master planning effort.

What is it for?

This AC explains how to estimate airport capacity and aircraft delays for airport planning and design. Hourly airport capacities and annual aircraft delay computations are needed to design and evaluate airport development and improvement projects. Airport sponsors should be familiar with demand, delay, and capacity as changes can greatly impact airport operations. Since delay, demand, and capacity are vital to airport operations, proposed operational and facility improvements justified through the master planning process will support demand, reduce aircraft delays and increase airport capacity throughput.

Why is it important?

This AC provides detailed guidance on the calculation process and the resulting impact on delay. It also is directly tied to aviation forecasts. Since these computations can change due to variations in

runway use, aircraft mix, and air traffic control (ATC) rules, more than one calculation may be needed to estimate existing and future capacity.

FAA Standard Operating Procedures (SOPs)

The FAA has recently developed SOPs to standardize activities, create efficiency, increase quality control, and ensure consistency in program administration across all FAA regions. A total of eight (8) SOPs have been developed to date. While all of the SOPs apply to airports, there are three that are pertinent to the master planning process:

- SOP Number 2.00: Standard Operating Procedure for FAA Review and Approval of Airport Layout Plans (ALPs)
- SOP Number 3.00: Standard Operating Procedure for FAA Review of Exhibit 'A' Airport Property Inventory Maps
- SOP Number 8.00: Standard Operating Procedure for Runway Safety Area Determination

These SOPs are explained in detail below. It should be noted that the FAA is developing additional SOPs for a variety of different topics. For more information on any of the SOPs, and to ensure that the current version is used, visit: www.faa.gov/airports/resources/sops/

SOP Number 2.00 - Standard Operating Procedure for FAA Review and Approval of Airport Layout Plans

What is it?

SOP Number 2.00, issued October 1, 2013, contains standardized information that provides uniform procedures for the FAA's review and approval of ALP sets. The ALP drawings in a set graphically illustrate the existing and future airport facilities and consist of: cover sheet, Airport Layout Plan drawing, data sheet, facilities layout plan, as well as other drawings and exhibit documents.

What is it for?

This SOP is limited to providing information on the standardized ALP set review and approval processes and is not meant to provide step-by-step instructions on developing an ALP. This SOP should be used as a guide to ensure that items reviewed by the FAA are addressed in an airport's ALP set. This SOP is used by the FAA to ensure that ALPs are developed in accordance with current FAA standards.

Why is it important?

SOP 2.00 provides an ALP review checklist, standard ALP approval letters, and a general ALP process chart that to be used when developing an ALP set. These resources include an item-by-item checklist of the information that needs to be included in each sheet of an ALP set. Additionally, this SOP should be used during the scoping process to identify what elements will and will not be included in the ALP set. This SOP does not provide information on electronic ALPs or eALPs. Standards for ALP set sheets are also provided in AC 150/5070-6B, Airport Master Plans.

SOP Number 3.00 - Standard Operating Procedure for FAA Review of Exhibit 'A' Airport Property Inventory Maps

What is it?

SOP Number 3.00, issued October 1, 2013, establishes uniform procedures for the FAA's review and acceptance of Exhibit 'A' Airport Property Inventory Maps (Exhibit 'A'). This SOP is limited to the

review and acceptance of Exhibit 'A,' which is restricted to elements that will assist in the identification of property. To supplement this document, the SOP provides an Exhibit 'A' Review Process Chart and Checklist to assist with tracking the completion of an acceptable Exhibit 'A'. An Exhibit 'A' is typically updated as part of a Master Plan but can also be done on its own, separate from the Master Plan.

What is it for?

This SOP provides standards for the maintenance and update of the Exhibit 'A' document for airport sponsors. An Exhibit 'A' map is used to identify airport property, providing an inventory of all land parcels that make up the airport and a summary of encumbered property, which includes how parcels were acquired, funding source, how land was conveyed, prior property owner, etc. This is different from an airport property map. This SOP is used by the FAA to review and accept Exhibit 'A' documents and should be referenced to ensure consistency. Further, this SOP includes information on when to submit documents and provides guidance on the Exhibit 'A' review process.

Why is it important?

Airports have a Federal obligation to submit accurate Exhibit 'A' maps to be eligible for certain Federal grants. Airports also have a duty to obtain FAA consent to delete any land described and shown in the Exhibit 'A'. To assist airports, SOP 3.00 provides step-by-step instruction on the process. This instruction is provided in the form of an Exhibit 'A' Review Process Chart and Exhibit 'A' Review Checklist. Finally, and most important, an updated Exhibit 'A' and encumbrance report is **required** for all Airport Master Plans.

SOP Number 8.00 - Standard Operating Procedure for Runway Safety Area Determinations

What is it?

SOP Number 8.00, provides a uniform procedure for documenting Runway Safety Area Determinations (RSADs). The SOP also assists the FAA in determining when to assess or reassess the Runway Safety Area (RSA).

What is it for?

This SOP identifies procedures for writing or amending RSADs and supporting documents, as required by specific FAA orders. The FAA uses this SOP as reference when reviewing existing or proposed RSADs and when conducting supporting studies for all federally obligated airports, including airports in block grant states.

Why is it important?

This SOP also describes triggering actions that may require updated or new RSADs along with the determination categories used by the FAA. Though discussed later in this Guidebook, revisions to Master Plans or ALPs may trigger a RSAD. So it is important to understand these triggering events when developing Master Plans. The SOP also provides an excellent process flow chart used in identifying appropriate actions and types of documentation necessary to support the existing or expected RSAD. Note that Modifications of Standard (MOS) do not apply to RSAs.

FAA Order 5100.38D - Airport Improvement Program Handbook

What is it?

The AIP Handbook, issued September 30, 2014, provides guidance on the administration and eligibility requirements of the AIP. As defined in Federal statute, the AIP "provides grants to public agencies for the planning and development of public-use airports that are included in the National Plan of Integrated Airport Systems (NPIAS)." The Handbook includes information on the overall grant process, eligible grant recipients, and projects eligible for grants under the AIP.

What is it for?

The AIP Handbook provides guidance, policy, and procedures for the administration of the AIP and AIP funding. The purpose of the guidebook is to assist airports and the agencies to determine AIP funding eligibility for proposed projects. AIP-eligible projects include airport planning, airport development, noise compatibility planning, and noise compatibility projects at AIP-eligible airports, seaplane bases, and heliports.

Why is it important?

Use of the AIP Handbook is mandatory as it is the published policy for AIP, as codified under 49 USC. Additionally, the statute does not provide the authority to fund an action or an item that cannot be funded under AIP. Thus, prior to beginning a Master Plan or ALP Update project, this document should be reviewed as part of the initial scope development process to ensure compliance and understanding of eligibility requirements.

Code of Federal Regulations, Part 77 – Safe, Efficient Use, and Preservation of Navigable Airspace

What is it?

14 CFR Part 77 is a Federal aviation regulation that establishes standards and notification requirements for obstructions affecting air navigation. This regulation defines 3-dimensional imaginary surfaces and critical areas around public-use airports and military airfields that require protection from tall structures, both manmade and natural, that may pose a hazard to safe airport operations and/or navigable airspace. Part 77 also provides guidance related to activities within the airport and airspace that could compromise safe operations.

What is it for?

Part 77 identifies an airport's "imaginary surfaces" which include both height and distance requirements associated with a runway which must remain clear to support safe operations. Part 77 also identifies Federal obstruction standards associated with structures, trees and other potential hazards that may impact airport operations.

Why is it important?

Compliance with Part 77 is required by Federal law. Airports sometimes run into issues where an existing or proposed obstruction located outside of the airport property may impact safe operations. However, Part 77 applies to all obstructions regardless of its location. Additionally, compliance with Part 77 surfaces and obstruction standards is also required as part of Chapter 333. Thus, any activity or development that is proposed as part of a Master Plan must be evaluated in accordance with Part 77 standards. Additionally, a Part 77 drawing is required as part of the ALP set.

FAA Forecasting Aviation Activity by Airport

What is it?

This document details the aviation forecasting process with step-by-step instructions. The FAA developed this report as a guide for preparing and reviewing aviation forecasts. The information provided promotes consistency in the development of aviation forecasts regardless of the airport.

What is it for?

This document was developed to provide specific instructions on how to develop aviation forecasts, and covers the steps required for developing aviation forecasts that are:

- Realistic
- Based on the latest available data
- Reflect the current conditions at the airport
- Supported by information in the study
- Provide adequate justification for the airport planning and development

Additionally, the document's appendices provide templates to facilitate the FAA's forecasting review process.

Why is it important?

As discussed earlier, forecasts are approved by the FAA as part of any Master Plan process. While the scope of a forecast will be dependent on an airport's level of activity, any activity that creates a facility need should be justified by the forecast. Using this document helps ensure consistency in forecasts regardless of the airport developing them. Because this document was developed by the FAA, who is responsible for reviewing forecasts, use of this document can confirm that forecasts are in accordance with current FAA standards, lending to approval of the forecasts which is an FAA requirement of the process.

FAA Recycling, Reuse and Waste Reduction at Airports: A Synthesis Document

What is it?

The FAA developed this document, effective April 24, 2013, to fulfill legislative requirements related to recycling and waste reduction and as a means to incorporate sustainable practices into airport planning. Sustainable practices at airports benefit airports in a multitude of way, including economically, socially, and environmentally. This document includes guidance on airport recycling, reduction, and waste reuse programs to further waste minimization initiatives.

What is it for?

This document is a guide for users to increase sustainability in airports by creating programs for recycling, reduction and reuse of materials, and reduction of energy consumption. It also includes lessons-learned and case studies around the country on recycling programs as well as reuse and waste reduction programs.

Why is it important?

Airport sponsors can use this document when evaluating recycling or waste reduction processes as part of their Airport Master Plan. Consulting this document is important since recycling program evaluation is an FAA Master Plan requirement. Detailed information is included on the steps to

design and implement these programs, as well as recommendations on what to consider. For example, steps to establishing a recycling program to divert municipal solid waste (MSW) from airports from landfills are included. There is also guidance on other non-MSW waste streams (how the input of waste flows from generation into full removal).

This document also provides a list of resources, including a tool to establish the programs mentioned above, the EPA's document 'Developing and Implementing an Airport Recycling Program' found here: www.epa.gov/wastes/conserve/tools/rogo/documents/airport-recycling-guide.pdf

STATE/FDOT GUIDELINES AND GUIDANCE

Chapter 332, Florida Statutes

What is it?

Chapter 332 dictates FDOT's obligations related to the funding of the Florida airport system to promote and further the development and improvement of airports.

What is it for?

Chapter 332 outlines FDOT's duties and responsibilities relating to the aviation system of Florida and all related matters, including the administration and financing of aviation and airport programs and projects. This document also includes restrictions on FDOT's power. For example, FDOT cannot regulate commercial air carriers.

Why is it important?

When developing a Master Plan, this statute will help the airport sponsor understand the type and funding assistance that FDOT is authorized to provide for airport projects. This statute also contains information with regard to property acquisition, which should be used as part of the master planning process.

FDOT Topic No. 725-040-040-k, Aviation Program Management

What is it?

This procedure provides guidance on the process and standards for planning, approving, and monitoring FDOT funding for airport projects. This includes the eligibility requirements for receiving funding, funding amounts, as well as management requirements for programmed funds.

What is it for?

This procedure was developed to explicitly describe FDOT's involvement in funding projects at Florida's public-use airports. This includes FDOT's funding allowance for different project types, FDOT's funding share, and coordination with the District Work Program.

Why is it important?

This procedure provides information on state funding eligibility for projects and method and share of the available funding. This procedure will assist airports by helping them understand the steps and requirements needed to be programmed for and receive funding for projects at their airport.

FDOT Topic No. 725-040-100-h, Airport Master Plans

What is it?

This document outlines FDOT's role in the master planning process, including their role in scope development, funding, and final approvals. This document not only defines FDOT's role but also outlines state and Federal requirements with regard to FDOT's participation/involvement and FAA's role within the master planning process. Per FDOT Procedure, this document guides FDOT's participation in the preparation, funding, review, and approval of Airport Master Plans prepared by local airport sponsors. This document can be found at: www.dot.state.fl.us/proceduraldocuments/

What is it for?

This document was developed to clarify FDOT's role in the master planning process, as well as provide coordination guidance with all required entities and agencies. For airports developing a Master Plan, this document is useful in understanding the process and timing of FDOT's and FAA's participation in the planning process.

Why is it important?

This procedure clearly identifies the documentation compliance requirements for Airport Master Plans. These instructions are important as they allow for a more standardized and systematic approach to the preparation, funding, review, and approval of Master Plans. As stated in this procedure, to be eligible for FDOT funding, the airport must have a FDOT approved Master Plan and ALP that has been developed consistent with this procedure.

FDOT Form 725-030-06, Public Transportation Joint Partnership Agreements;

FDOT Form 725-040-15, Exhibit 'C' Aviation Program Assurances

What is it?

FDOT Public Transportation Joint Partnership Agreements (JPA) are agreements between an agency and FDOT that establish a public transportation project and responsibilities related to the project. A JPA defines the scope, budget, funding source and any legal provision necessary for the project. Additionally, FDOT has Aviation Program Assurances that all public-use airports must follow when entering into a JPA with FDOT. These assurances delineate the obligations of all parties to confirm their commitment and compliance.

What is it for?

These documents form the basis of the grant agreement, or contract, between the airport sponsor, FDOT, and the State of Florida.

Why is it important?

All of the provisions contained within JPA and Aviation Program Assurances are required to be followed if FDOT funds are used for **any** airport project. Non-compliance may absolve FDOT's financial commitment to the airport and could jeopardize future funding. When developing recommendations as part of a Master Plan, the ability to comply with the requirements and assurances should be reviewed so that future funding is not at risk.

Florida Aviation System Plan

What is it?

The Florida Aviation System Plan (FASP) is FDOT's strategic 20-year plan for developing the state's public airports. The FASP incorporates traditional aviation planning techniques that identify future air traffic demands and the facilities required to meet them on a macro, statewide level. It also includes a strategic planning element that allows FDOT to respond to changing aviation and economic trends, including emerging technologies, projected funding shortfalls, and shifting priorities. This document is currently being updated to the FASP 2035.

What is it for?

To accommodate population and development changes in Florida, it is necessary to take a long-term look at the entire aviation system. To accomplish this, the FASP establishes the framework for considering how each individual airport fits into the overall state aviation system. It also investigates issues such as intermodal transportation networking, the economic impact of airports on their local communities and the state, and development of long-range strategies to meet future aviation needs. Additionally, similar to the purpose of a Master Plan, the FASP identifies trends in aviation statewide in hopes to mitigate potential problems and identify potential areas for growth.

Why is it important?

Chapter 332 requires a statewide aviation system plan to be developed and periodically updated which summarizes 5-year, 10-year, and 20-year airport and aviation needs within the state. The statewide aviation system plan shall also "be consistent with the goals of the Florida Transportation Plan." Thus, in order for airport improvements to be eligible for state funding, Airport Master Plans must be consistent with the aviation system role for the airport described in the FASP. So prior to beginning the master planning process, it is recommended that the airport understand its role as it relates to the FASP to ensure that recommendations contained in the Airport Master Plan support the overall goals of the FASP. In addition, the FASP can also be helpful to the airport to better understand how the airport can grow and expand its operation and function within its role in the regional and state aviation system.

Chapter 333, Florida Statutes

What is it?

Chapter 333 was developed to protect the health, safety, and welfare of airports, airspace, people, and contiguous property by preventing the creation or establishment of hazards that would negatively impact safe airport operations. This statute aims to protect public investment in aviation facilities and promote the sustainability of airports as transportation resources. Chapter 333 provides municipalities within an airport hazard area the power to administer and enforce airport zoning regulations, and establishes minimum zoning ordinance requirements.

What is it for?

In accordance with Chapter 333, local governments and political subdivisions are required to adopt, administer, and enforce airport zoning regulations for airport hazard areas.

Why is it important?

Compliance with Chapter 333 is mandatory under Florida law. Specifically:

> "It is hereby found that an airport hazard endangers the lives and property of users of the airport and of occupants of land in its vicinity and also, if of the obstruction type, in effect reduces the size of the area available for the taking off, maneuvering, or landing of aircraft, thus tending to destroy or impair the utility of the airport and the public investment therein."

Under the provisions of Chapter 333, and in accordance with Title 14 CFR Part 77, changes that alter the character of an airport's operations and which are identified on an ALP approved by the FAA are subject to the same zoning protection as existing facilities. When conducting an Airport Master Plan, an analysis of existing incompatible land uses must occur as such uses may result in negative impacts for both the airport and for the activities associated with the incompatible use.

As development is recommended or proposed in an Airport Master Plan, it is important to review all proposed development to ensure it is in accordance with Chapter 333 and the local airport zoning regulations.

Rule 14-60, Florida Administrative Code

What is it?

Rule 14-60 of the Florida Administrative Code (F.A.C.), effective October 10, 2004, provides standards for airports, airport markings, and airport lighting, as well as airspace protection with respect to the licensing of Florida airports. Rule 14-60, F.A.C. was developed to ensure safe airport operation and promote aviation safety by providing airspace protection in accordance with Chapter 333.

What is it for?

Rule 14-60 F.A.C. provides both the licensing standards and minimum standards that all airports licensed by the state of Florida must comply with.

Why is it important?

Rule 14-60 F.A.C. is supported by Chapter 330. This statute governs the licensing of airports in Florida. Thus, when developing an Airport Master Plan, special consideration must be given to ensure that the development recommendations are in accordance with Rule 14-60, F.A.C. It is also recommended that those developing a Master Plan understand the allowed development limits for variances or permits so that resources are not spent developing recommendations that are infeasible. Because development at an airport will be depicted in the Airport Master Plan and ALP, 14-60 F.A.C. should be reviewed to ensure that proposed developments are in compliance with the prescribed standards.

Chapter 163, Florida Statutes

What is it?

Chapter 163, requires all counties and municipalities in Florida to adopt a local government comprehensive plan (LGCP). This chapter also addresses the relationship between LGCPs and Airport Master Plans.

What is it for?

Chapter 163, as it relates to airports and Airport Master Plans, primarily requires the coordination and integration of airport facilities and planning efforts with the planning efforts (LGCPs) of the local municipality. LGCPs provide a top-level view of the entire municipality, including transportation, land

use, and intergovernmental coordination. In most instances, Airport Master Plans are incorporated into the LGCP as the aviation component. Because of this, there are requirements for the development of an Airport Master Plan to ensure compatibility with the LGCP.

Why is it important?

Components of Chapter 163 have direct effects on airport planning and development, of which, compliance is mandated by law. Within Chapter 163, it requires that the Local government future land use plan element "shall include criteria to be used to ensure the compatibility of uses on lands adjacent to an airport as defined in Chapter 330 and consistent with Chapter 333." Additionally, Local governments located within an area designated as a Metropolitan Planning Organization (MPO) shall also address airports, projected airport and aviation development, and land use compatibility around airports as defined by statute. Also, an Airport Master Plan and any subsequent amendments to the plan prepared for a publicly owned, operated, and licensed airport in accordance with Chapter 333 may be incorporated into the LGCP. Thus, when developing an Airport Master Plan, the existing LGCP must be reviewed to ensure that all proposed development is in accordance with its provisions. It is recommended that the entity completing the Airport Master Plan meet with local officials to review proposed development and recommendations to ensure that consistency with the LGCP.

ADDITIONAL FAA GUIDANCE AND REGULATION

In addition to the primary FAA resource documents, the following ACs are also recommended to be reviewed based on the scope of a Master Plan. Following this section, **Table 3** provides a summary of the additional Federal Master Plan Guidance as well as suggestions on the individual sections of a Master Plan where the guidance should be utilized. The most current version of all FAA ACs that are referenced below can be accessed at: https://www.faa.gov/regulations_policies/advisory_circulars/

FAA AC 150/5070-7 – The Airport System Planning Process (Dated: January 15, 2015)

This AC provides guidance on the development of an airport system plan. System plans are developed to preserve and enhance an airport system to meet current and future demand. Rather than define specifics of how a system plan must be developed, this AC was developed to provide flexible recommendations on how to develop a system plan.

FAA AC 150/5100-14E – Architectural, Engineering, and Planning Consultant Services for Airport Grant Projects (Dated: September 30, 2014)

This AC provides guidance for users in selecting consultants for planning, architectural, and engineering consultant services. The AC also provides information on services that would be included in an airport grant project including types of contracts, contract format, and guidelines for determining consultant fees. This guidance is important since unless an airport projects is fully funded by passenger facility charges (PFC), sponsors are required to follow these regulations when awarding each contract.

FAA AC 150/5300-16A – General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey (Dated: September 15, 2007)

This AC is a tool for engineers and surveyors who have contracted with an airport or aviation agencies that perform aeronautical information surveys. This AC provides information on how to establish geodetic control on or near an airport, how to submit information to the National Geodetic Survey (NGS) and the National Spatial Reference System (NSRS). This AC is not a regulation and therefore not mandatory; however, surveys that are funded with Federal grant assistance are required to use the guidelines in this AC.

FAA AC 150/5300-17C – Standards for Using Remote Sensing Technologies in Airport Surveys (Dated: September 30, 2011)

This AC provides guidance on the use of remote sensing technologies when collecting and analyzing data related to the physical infrastructure of an airport. This AC should be utilized when remote sensing technology is being used for airport surveying and as a reference on the standards for utilizing remote sensing technology. Use of this AC is not mandatory, but projects funded through the AIP or with PFCs are required to follow its guidance.

FAA AC 150/5300-18B – General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards (Dated: February 24, 2014)

This AC provides the requirements for data collection in support of the FAA Airport Surveying – Geographic Information System (GIS) Program. Use of this AC is not mandatory, however, for projects funded under Federal grant assistance programs, these guidelines and specifications are required.

FAA AC 150/5300-19 – Airport Data and Information Program (Dated: September 30, 2015)

This AC provides general guidance and information for users in data collection, submission, and management of data relating to the physical infrastructure and services of their airport within Airports GIS. This AC also describes the schedule, frequency, and standards for airport inspections. Data collected related to this AC is given to the FAA for their aeronautical information databases. Data collection requirements based on the instrument flight rules approaches associated with an individual airport.

FAA AC 150/5325-4B – Runway Length Requirements for Airport Design (Dated: July 1, 2005)

This AC provides guidelines on lengths for new runways or runway extensions. The standards and guidelines contained in this AC are recommended in the design of civil airports. The use of this AC is mandatory for airport projects receiving Federal funding.

FAA Draft AC 150/5100-(Version Update Number To Be Determined) – Guidance on the Extraction of Oil and Gas on Federally Obligated Airports

This AC addresses oil and gas development on federally obligated airport land. It describes existing FAA policy, guidance, standards, and obligations, for airport sponsors to apply to proposed on-airport oil and gas development activities (including any drilling that penetrates the property's surface and subsurface). This AC applies to airport sponsors with federally obligated airport land that are considering on-airport oil and gas production, particularly with hydraulic fracturing.

Title IX of the Federal Property and Administrative Services Act of 1949 (The Brooks Act)

This Federal law provides guidance to the Government procurement policy, ensuring that it is economical and efficient. This applies to the FAA and airports since it extends to airport property and airway property (used by the airport as property). It is important for users to be familiar with this since it is also applicable to related functions including contracting, inspection, storage, issue, specifications, and others.

SECURITY GUIDANCE AND REGULATION

Chapter 330, Florida Statutes

This chapter outlines the regulation of aircrafts, pilots, and airports through licensing, zoning, enforcement, and registration approved by FDOT. Site approvals and licensing for an airport are contingent on the airport maintaining a safe and secure property. Based on Chapter 330, FDOT may revoke or refuse to allow a license, renewal, or site approval if a public use GA airport with a runway greater than 4,999 feet lacks an approved security plan. Further, the security plan must conform to Florida Airports Council guidelines and it is required that an airport submit an updated plan once every two years for approval from FDOT. Security plans must also be submitted to the Department of Law Enforcement for use in protecting the critical infrastructure of the state.

Recommended Security Guidelines for Airport Planning, Design, and Constructions (Dated: May 2011)

This document was developed by the Transportation Security Administration (TSA) in conjunction with other government and aviation/airport professionals. The information provided in this document outlines the standards for the design and implementation of security systems for both landside and airside elements of airports. Six (6) appendices are also included that provide additional tools and resources for assessing and mitigating security threats.

Title 49 – Code of Federal Regulations, Part 1542 – Airport Security

This document ensures that airports are operating security programs that are in compliance with the TSA. It provides guidance to general requirements of airport security programs, operations, and contingency measures. Compliance to these requirements is mandated for airports regularly serving aircraft and foreign air carrier operations. Title 49 of the Code of Federal Regulations can be found

at: http://www.ecfr.gov/cgibin/textidx?SID=0d1454d48f321d5d030aaa3c566269ce&mc=true&tpl=/ecfrbrowse/Title49/49CXIIsubchapC.tpl

Title 49 – Code of Federal Regulations, Part 1540 – Civil Aviation Security: General Rules

This document provides the Federal regulations that govern persons engaged in aviation related activities. This document relates only to security measures at airports. Specifics of the document include security responsibilities for employees, procedures for a security threat assessment, and submission to screening and inspections. Though this document will not necessarily be used as part of the master planning process, understanding its implications is beneficial. Title 49 of the Code of Federal Regulations can be found at: www.ecfr.gov

Appendix 3

Airport Sponsor Checklist

Master Plan and Airport Layout Plan (ALP) Approvals		
	Approved by	
What is the date of the last approved:	FAA	FDOT
a. Airport Master Plan		
b. ALP drawing set		

Project Justification and Scope Meeting	YES	NO
Has a justification and scope meeting been scheduled with the District Office, Aviation Office, the airport sponsor, and the FAA (if applicable)?		
Are any additional studies needed to support the goals and objectives of the proposed master plan?		
Were SOP 2.00 and 3.00 (if applicable) used to scope the ALP?		
Have the contents of the proposed ALP been reviewed and agreed upon by the airport sponsor, FDOT, and the FAA (if applicable)?		
Are the five (5) sheets shown below specifically identified in the ALP scope?		
1. A separate Airport Data sheet.		
2. A separate Existing ALP drawing sheet.		
3. A separate Future ALP drawing sheet.		
4. A separate Ultimate ALP drawing sheet (if different from the future sheet).		
5. A separate sheet(s), similar in scale and layout to the ALP Drawing Sheet, showing existing, future, and ultimate 14 CFR Part 77 surfaces only.		

FDOT Scope Review and Approval		
	YES	NO
Have the following items been completed and delivered to the FDOT District Office? Note: These items must be completed and delivered prior to FDOT issuing a planning grant.		
1. Type of study		
2. Statement of project needs, goals and objectives, and identified special issues		
3. Proposed scope of work		
4. A copy of the completed FAA ARP SOP 2.00 (include ARP SOP 3.00 if applicable)		
5. Project schedule		
6. Cost estimates and requested state funds		
Has the proposed final scope of work and cost estimate been forwarded to the FDOT Aviation Office for review?		
Has the final scope of work and cost estimate been approved by the FDOT Aviation Office?		
Has the final scope of work and cost estimate been approved by the FAA ADO?		
Does the scope of services include the following statement? "*Invoices will be paid based on the deliverables received by the Department. Invoices should be submitted for payment only after the deliverables have been reviewed and accepted by the Airport Sponsor, the FDOT District Office, FDOT Aviation Office, and, if required, the FAA ADO.*"		

Review and Approval of Draft Deliverables		
	YES	NO
Has a copy of the draft deliverables been sent to the FAA ADO, FDOT District Office, and Aviation Office for review and comment?		
Have draft deliverables been accepted by the Airport Sponsor, FDOT District Office and Aviation Office?		
Have comments been received from the FAA?		
Have comments been received from FDOT?		

Final Project Reviews		
	YES	NO
Have one copy of all computer files and two copies of the final draft narrative and ALP been submitted to the FDOT District Office for review?		
Has a copy of the final draft narrative and ALP, including all computer files, been sent to the Aviation Office for review?		
Has the airport sponsor sent copies of the final draft narrative and ALP to the FAA, Orlando ADO for approval?		
Have the following been approved by the FAA, Orlando ADO?		
1. Forecast		
2. Critical Aircraft		
3. ALP		
Have comments been received from the FAA?		
Have comments been received from FDOT?		

Final Project Reviews (continued)		
Has the below disclaimer been added to each of the ALP sheets? *"The proposed development depicted in this plan does not inherently represent the official views and policies of FDOT. Conditional approval of this plan does not constitute a commitment on the part of FDOT to participate in the funding of any development depicted in the plan or any project listed within the Capital Improvement Plan (CIP) element, nor does it indicate that the proposed development and/or associated projects are environmentally acceptable or economically feasible in accordance with appropriate public law."*		

Final Project Approvals		
	YES	NO
Do the final Airport Master Plan and ALP incorporate the review comments of FDOT and the FAA, Orlando ADO?		
Has the FDOT District Office accepted the final deliverables?		
Has the FDOT District Office submitted an official correspondence to the airport sponsor conditionally approving the Airport Master Plan and ALP?		
Have copies of all final deliverables been presented to the FDOT District Office?		
Has a copy of the FAA-approved ALP set been sent to both the FDOT District and Aviation Offices? (Applicable to federally obligated airports)		
Has final written approval been received by the FAA?		
Has Final written approval been received by FDOT?		

Implementation of the Airport Master Plan		
	YES	NO
Have development projects listed in the new Facilities Implementation Plan Element of the Master Plan been entered and updated in the JACIP by the airport sponsor?		
Have projects from the Facilitates Implementation Plan Element of the previous Airport Master Plan been deleted, as appropriate, from the JACIP by the airport sponsor?		

Appendix 4

Airport Inventory and Data Survey

What is it?

The following Appendix consists of an airport inventory and data survey form. This form was developed to assist airports in collecting and understanding their airport's facilities and services when preparing for, scoping discussions and when completing an airport master plan. The form provides an organized overview of multiple facets of an airport to display basic and relevant information pertinent to the master planning process. The form includes topic areas such as landside facilities, runway information, based aircraft counts, as well as general airport information. This inventory form is intended to help airports collect information pertinent to the master planning process and assist them in categorizing and understanding their current conditions.

How to Use it?

The inventory form is in a simple format allowing airports to go through each section and fill in information about their facilities and operations. Information can be gathered from multiple sources including the existing Airport Layout Plan (ALP), previous Master Plans, facility information records, the Florida Aviation Database, 5010s, as well as any other relevant sources. Certain aspects of the inventory form may not be applicable depending on an airport's size and role. As such, user of the form are encouraged to only complete the form to the extent that it is beneficial to project being completed. Airports should consult appropriate documentation when filling out this form to ensure accurateness to the highest degree possible.

Benefits

This form will prove beneficial to all airport-related employees, including consultants, in working to enhance the airport. By having all basic information laid out in a simplified overview format, those coordinating with an airport can gain an easy understanding of the existing facilities and uses. This form will also be helpful in familiarizing airport staff with the specifications of the airport. Completion of this form will help to facilitate an accurate collection of information readily available for reference as needed.

Disclaimer

This document is in no way required by either the FAA or FDOT. It is provided solely as a reference to catalog facilities at airports. It does not need to be completed at any phase of a planning study and should be utilized only if the airport sponsor desires to do so.

AIRPORT INVENTORY AND DATA SURVEY

Airport Name:	3-letter Identifier:

GENERAL AIRPORT INFORMATION	
Airport Owner	
Airport Owner Address	
Airport Manager	
Airport Mailing Address	
County	
Phone Number	
Fax Number	
Airport Website URL	
Current FAA designated Airport Reference Code (ARC) and Runway Design Code (RDC):	
Airport Acreage:	

Runway/Taxiway	Primary Runway	Secondary Runway	Other	Other
Orientation (RWY designators)				
Length				
Width				
Surface Type				
Gross Weight (000s)				
Runway Markings Type-Condition				
Taxiway Type[1] (associated with RWY)				
Taxiway Width				
Declared Distances?				
Reason for Declared Distances:				
Displaced Threshold (Dist. In ft.)				
Reason for Displaced Threshold:				
Runway Safety Area (RSA) Issues				

Lighting/NAVAIDs				
Runway Lighting[2]				
Taxiway Lighting[3]				
PAPI or VASI – which end(s)[4]				
REIL	Yes ❒ No ❒	Yes ❒ No ❒	Yes ❒ No ❒	Yes ❒ No ❒
Approach Lighting System[5]	None			

NAVAIDs	YES	NO	
Rotating Beacon	❒	❒	
Wind Indicator	❒	❒	Lighted? Yes ❒ No ❒
Segmented Circle	❒	❒	
Weather Reporting Equip.	❒	❒	

Notes:
[1] Full Parallel, Partial Parallel, Turnaround, Stub, none
[2] HIGH, MED, LOW for Runways. Please note if lighting is non-standard
[3] MED, LOW, REFL (Reflectors). Please note if lighting is non-standard
[4] P= PAPI, V= VASI
[5] MALS, MALSR, MALSF, ALSF, etc.

Instrument Approaches			
	Runway End	**Instrument(s)**	**Lowest Approach Minimums**
Runway			
Runway			
Other			
Other			

Considering the Airport's current ARC and approach minima, are FAA separation standards being met for:

Separation Criteria	YES	NO	Separation Distance (ft.)
Runway Centerline to Parallel Taxiway Centerline	❒	❒	
Runway Centerline to Aircraft Parking Area	❒	❒	
Taxiway\Taxilane Centerline to Fixed or Moveable Object	❒	❒	

For Runway Protection Zones (RPZs), does the Airport have controlling interest (land ownership or easements) over the RPZs for each runway end? ❒ No Control ❒ Partial ❒ Complete Control

Notes:

_____

_____

_____

AIRCRAFT HANGARS AND PARKING APRONS

Hangars	Number	% Occupied	Total Square Footage
T-hangars			
Conventional			
Portables/Other			
Transient Hangar			
TOTAL			
Hangar Waiting List	Yes ❒	No ❒	# of A/C on list _____

Tie-downs	Paved	Grass	Total Square Yards
How many tie-downs does the Airport provide?			
How many are provided for based aircraft?			
How many are for provided for transient aircraft?			
TOTAL			
Tie-down Waiting List	Yes ❒ No ❒		# of A/C on list _____

LANDSIDE FACILITIES		
Terminal Building	**YES**	**NO**
Does the Airport have a terminal building?	❒	❒
Terminal building owner		
Date Constructed/Modified or Updated?		
Approximate Square Footage		
Terminal Occupants (i.e., FBO, Administration, Flight School, etc.)		
Pilot Lounge?	❒	❒
Conference Room?	❒	❒
Flight Planning Room?	❒	❒
Fire Protection/ARFF	**YES**	**NO**
Does the airport have a mutual aid agreement?	❒	❒
Equipment Buildings	**YES**	**NO**
Does the Airport have an SRE building?	❒	❒
Does the Airport have a maintenance building?	❒	❒

AIRPORT SECURITY/ACCESS

Airport Security	YES	NO	Date Adopted
Does the Airport have a General Aviation Security Plan?	❒	❒	
Is the Airport equipped with an access control system to the Airport operating areas?	❒	❒	
Is the Airport equipped with CCTV?	❒	❒	
Airport Access	**Complete**	**Partial**	**None**
Does the Airport have a perimeter road?	❒	❒	❒
Does the Airport have security fencing?	❒	❒	❒
What type of fencing?			

AUTOMOBILE PARKING

Does the Airport have sufficient automobile parking in all areas of the Airport? Yes ❒ No ❒

How many dedicated spaces near the terminal building? _____

AIRPORT FUELING INFRASTRUCTURE AND SERVICES

Airport Fueling	AvGas	Jet A
What types of fuel does the Airport provide?	❒	❒
What is the storage capacity? (in gallons)		
	YES	**NO**
Does the Airport offer self-fueling?	❒	❒
Are fueling services offered 24 hours a day?	❒	❒
If not, what are the hours that aircraft fueling is available?		
Does the Airport have active underground fuel storage?	❒	❒

HISTORICAL AIRPORT FUEL SALES

Year	AvGAS Gallons	JetA Gallons
2016		
2015		
2014		
2013		
2012		
2011		

AIRPORT SERVICES AND ACCOMMODATIONS

Check the services/accommodations that the Airport offers.

Service	YES	NO
Fixed Base Operator (FBO) How Many? _____	❒	❒
Courtesy Car	❒	❒
Flight Instruction	❒	❒
Full Time Flight School	❒	❒
Aircraft Maintenance Services	❒	❒
Airframe Repairs	❒	❒
Power Plant Repairs	❒	❒
Avionics Repair Shop	❒	❒
FAA Part 145 Repair Station	❒	❒
Aircraft and/or Avionics Sales	❒	❒
Snow Removal Operations	❒	❒
Aircraft Deicing	❒	❒
Aircraft Oxygen (Bottled Oxygen)	❒	❒
Catering Services	❒	❒
Aircraft Lavatory Disposal Services	❒	❒

ENVIRONMENTAL STEWARDSHIP

Please check all that apply to the Airport.

❒ In compliance with EPA's SPCC (Spill Prevention, Spill Control, Spill Countermeasure) requirements.

❒ In compliance with EPA's SWPPP (Stormwater Pollution Prevention Plan) requirements.

❒ Alternative fuel vehicles or other alternative fuel equipment at the Airport.

❒ Recycling Program in place at the Airport.

AIRCRAFT OPERATIONS ACTIVITY TYPES

Operation	YES	NO	Operation Based at the Airport?
Air Taxi	❒	❒	Yes ❒ No ❒
Aircraft Charter	❒	❒	Yes ❒ No ❒
Air Cargo Operations	❒	❒	Yes ❒ No ❒
Emergency Medical Aircraft Operations	❒	❒	Yes ❒ No ❒

Angel Flight	❒	❒	Yes ❒ No ❒
Operation	**YES**	**NO**	**Operation Based at the Airport**
Agricultural Aircraft Operations	❒	❒	Yes ❒ No ❒
Law Enforcement Aircraft Operations	❒	❒	Yes ❒ No ❒
Pipeline Control Aircraft Operations	❒	❒	Yes ❒ No ❒
Military Exercises/Training	❒	❒	Yes ❒ No ❒
Skydiving Operations	❒	❒	Yes ❒ No ❒
Other:	❒	❒	Yes ❒ No ❒
Other:	❒	❒	Yes ❒ No ❒
Other:	❒	❒	Yes ❒ No ❒

EXISTING AIRPORT PLANS

Plan/Study/Policy	**YES**	**NO**	**Date Completed**
Airport Master Plan	❒	❒	
Airport Layout Plan	❒	❒	
Capital Improvement Plan	❒	❒	
Airport Business Plan	❒	❒	
Airport Minimum Standards	❒	❒	
Airport Rules and Regulation Policy	❒	❒	
Aeronautical Obstruction Survey	❒	❒	
Obstruction/Approach Analysis	❒	❒	
Airport Noise Study (Part 150)	❒	❒	
Airport Noise Contours	❒	❒	
Established Airport Noise Abatement Procedures	❒	❒	
Wildlife Management Plan	❒	❒	
Airport Emergency Plan	❒	❒	
Snow and Ice Control Plan/Winter Operations Plan	❒	❒	
Airport Pavement Management Plan	❒	❒	
Environmental Plans	**Yes**	**No**	**Date Completed**
Environmental Assessment/Environmental Impact Statement	❒	❒	
Comprehensive Solid Waste Management Plan	❒	❒	

LAND USES AND EXPANSION POTENTIAL

Does the Airport have land available for future development? Yes ❒ No ❒ **If YES:**
Is electric power available to the site? Yes ❒ No ❒
Is water available to the site? Yes ❒ No ❒
Is wastewater treatment available to the site? Yes ❒ No ❒
Is natural gas available at the site? Yes ❒ No ❒
Is a communication transmission medium available to the site? Yes ❒ No ❒
Is this land depicted on the current ALP? Yes ❒ No ❒
Approximate Acreage: _____

Additional explanation: _____

_____

_____

Who has the local zoning authority for the area around the airport? ___

_____

Has height zoning that follows FAR Part 77 and Ch. 333 guidelines been adopted? Yes ❒ No ❒

Does the community have airport compatible land use zoning in the area surrounding the airport?
Yes ❒ No ❒ If yes, is this zoning adequately enforced? Please discuss.

_____

AIRPORT BUSINESSES

Identify major or unique users of the Airport or businesses dependent on the Airport.

Airport User Firm or Group	Aircraft Type(s)	Aircraft Based at Airport (Y/N)?	Contact Information

HISTORICAL BASED AIRCRAFT AND OPERATIONS DATA

10 Year Based Aircraft Data

Year	Single-engine		Multi-engine		Jet	Helo	Glider	Ultra-light	Military	Total
	Piston	Turbine	Piston	Turbine						
2015										
2014										
2013										
2012										
2011										
2010										
2009										
2008										
2007										
2006										

Source:_____

Indicate the most demanding airplane (critical aircraft) that operates at the Airport on a regular basis (at least 500 takeoffs/landings per year). _____

10 Year Aircraft Operations Data

Year	Air Taxi	General Aviation (Local)	General Aviation (Itinerant)	Military	Total
2015					
2014					
2013					
2012					
2011					
2010					
2009					
2008					
2007					
2006					

Source:_____

What is the typical split between daytime and nighttime operations (nighttime is defined as 10PM to 7AM)?

_____

What percentage of the local operations is considered touch-and-go or training? _____%

How many annual instrument approaches were conducted in 2015? _____