

NCDOA Statement Regarding Review and Approval of Master Plans and Airport Layout Plans, Including Determination of Critical Aircraft, Airport Reference Codes, and Runway Design Codes

NOVEMBER 2020

Current review of airport master plans and airport layout plans (ALPs) (including updates) submitted to the North Carolina Department of Transportation Division of Aviation (NCDOA) has revealed a need to clarify certain procedures, particularly in regard to the approval of master plans and ALPs (including forecasts) for local and basic airports with few based aircraft and/or limited operations. It is crucial that NCDOA be clear in its direction to airport sponsors and consultants regarding identification of based aircraft, determination of current and future critical aircraft, use of Traffic Flow Management System Counts (TFMSC), and identification of Airport Reference Codes (ARC) and Runway Design Codes (RDC).

According to FAA Order 5090.5, the FAA's authorizing legislation (codified in 49 U.S.C. Chapter 471) states that "it is the policy of the United States that the safe operation of the airport and airway system is the highest aviation priority." In accordance with statutory requirements, the FAA has established a planning process that emphasizes the following key areas to fulfill this policy:

- Preserve existing airport infrastructure in a safe and functional operational condition (if indeed that infrastructure is still needed to meet aeronautical demand).
- Bring airport facilities into conformity with current standards (for facilities built before current standards were in place).
- Construct, modify, or expand facilities as necessary to meet demonstrated aeronautical demand.

NCDOA, in carrying out its responsibilities as agent for the FAA under the State Block Grant Program (SBGP), strives to follow a planning process that is in keeping with FAA statutory requirements. In so doing, NCDOA must apply three basic tests to determine if an airport improvement project is justified.

NCDOA must not use federal funds for projects or project elements under provisions of the FAA Airport Improvement Program (AIP) that are not justified based on the following three tests.

- The Project Advances an AIP Policy. The NCDOA must verify that the project advances at least one of the AIP policies contained in 49 USC § 47101. The basic goals and objectives in these policies include airport safety, airport security, airport capacity, meeting an FAA standard, preserving airport infrastructure through reconstruction or rehabilitation, protecting and enhancing the environment, minimizing aircraft noise impacts, and airport planning. AIP funds must not be used for a project that does not specifically advance one of the AIP policies. The first and most important goal stated in 49 USC § 47101 is, "It is the policy of the United States that the safe operation of the airport and airway system is the highest aviation priority."
- There is an Actual Need. Per FAA policy, NCDOA must determine if there is an actual need for the project at the airport within the next five years (per the definition of near-term development in the current version of Advisory Circular 150/5070-6, Airport Master Plans). This includes all subcomponents of the project.

- The Project Scope is Appropriate. NCDOA must determine that only the elements that are required to obtain the full benefit of the project are included in the project scope. Any elements that do not meet these criteria must stand on their own separate merit and justification. The current version of FAA Order 5100.39, Airports Capital Improvement Plan, discusses this concept in further detail in the discussions on overall development objective.

Examples of projects not meeting the tests of basic justification include:

- A sponsor has a runway shown on their ALP and would like to build it to increase capacity. However, the airport already has adequate capacity and will continue to have adequate capacity in the foreseeable future. This project is not justified because it does not advance an AIP policy. The actual need does not exist.
- A sponsor would like to build a runway extension to attract a new class of aircraft or for marketing purposes. In this case, the need is speculative and not based on documented future need. The actual need does not exist. From FAA Order 5100.38D, Change 1.

Airport master plans and ALPs are prepared to support the modernization or expansion of existing airports. **To be eligible for AIP funding, an airport improvement project must be shown on an approved ALP drawing set, which is a component of a master plan or an ALP Update.** The master plan or ALP Update must also include a capital improvement plan (CIP).

Aviation activity forecasts provide the basis for justifying the planning and proposed development identified in the airport sponsor's CIP. Forecasts should be realistic, based on the most recent data available, and reflect the current and anticipated future conditions at the airport. Planning for airport improvement requires forecasts of airport operations and fleet mix, since these define the runway and taxiway requirements. Establishment of a common, uniform definition of and methodology for determining based aircraft, existing critical aircraft, and future critical aircraft is fundamental for all deliberations of the FAA Office of Airports and of NCDOA, inclusive of planning and environmental, design and engineering, and financial decision making. Therefore, NCDOA has adopted the following procedures regarding definition and determination of key planning terms.

Procedure on Based Aircraft

A fundamental step in the airport planning process is identification of based aircraft, which are defined as aircraft that are "operational and airworthy" and are based on the airport for most of the year. Nonprimary airports are required to provide this information on at least an annual basis to the FAA supported website, www.basedaircraft.com (National Based Aircraft Inventory Program which is related to the Airport Master Record (FAA Form 5010-1)). These aircraft are validated against the FAA Aircraft Registry to ensure accurate counts are used to categorize airports and in aviation forecasts. These validated counts are referred to as validated based aircraft.

Having accurate based aircraft information will help the FAA and NCDOA in planning and forecasting the growth in the general aviation community, especially as the FAA and NCDOA look at runway approaches and other system-wide improvements. Based aircraft counts are one of the criteria used to determine eligibility for inclusion in the NPIAS, which is a requirement to receive Federal funds.

It is NCDOA procedure that validated based aircraft counts, as reported in the National Based Aircraft Inventory Program, provide NCDOA with the most consistent and verifiable count of based aircraft for NPIAS planning. Aircraft counts that do not match validated aircraft counts, or which have not been confirmed by the airport sponsor in the last year, will not be accepted. (Note: Although based aircraft counts are important, they are rarely if ever the sole criteria in decision making and shouldn't cause the airport operator undue concern if a single aircraft isn't considered to be "validated.")

Procedure on Existing and Future Critical Aircraft

For most projects, NCDOA must determine if a project is justified based on the applicable critical aircraft for the project. "Critical aircraft" is defined as the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of the airport. Regular use is defined as 500 annual operations or more, including both itinerant and local operations but excluding touch-and-go operations. An operation is either a takeoff or landing.

Also called "design aircraft" or "critical design aircraft," the defined critical aircraft is that aircraft that planners and others use to determine the airport design standards for a specific runway, taxiway, taxilane, apron, or other facility. This aircraft can be a specific aircraft model or a composite of several aircraft with "similar characteristics" using or expected to make regular use at the airport or part of the airport. The specific rules and guidelines for determining the applicable critical aircraft is contained in the current version of Advisory Circular 150/5000-17, Critical Aircraft and Regular Use Determination, which must be used by NCDOA to determine the critical aircraft for specific projects and airport types. Use of the "similar characteristics" definition allows the grouping of aircraft with similar wingspans or tail heights to determine the most demanding Aircraft Approach Category (AAC), and the grouping of aircraft with similar approach speeds to determine the most demanding Airplane Design Group (ADG). Examples of this methodology are provided in AC 150/5000-17.

It should be noted that it is appropriate to combine all ADG "B" aircraft operations (including all B-I and B-II), and all AAC "II" operations (including all B-II and C-II) to establish that the critical aircraft is the B-II aircraft, but it is not appropriate to combine all AAC operations of B or faster aircraft (including C, D and E) and all ADG operations of II or greater dimensional aircraft (including III, IV, V and VI) to establish B-II as the critical aircraft. Doing so could tend to skew the count by inclusion of larger and faster aircraft that do not make regular use of the airport, thus inappropriately supporting designs and improvement plans for which there is no actual need. According to FAA AC 150/5000-17, the critical aircraft determination cannot be applied to any aircraft or grouping of aircraft that does not regularly use the airport.

NCDOA has the option to determine that a project is justified based on existing activity at the airport or activity that is projected to be at the airport within the next five years. NCDOA requires the sponsor to submit letters of support from airport users if the justification is based on projected activity. The letter must describe the airport user's plans or anticipated activity by the most demanding airplane, or critical aircraft.

The critical aircraft determination is an important aspect of airport planning and design for federally obligated airports. An accurate critical aircraft determination helps to ensure the proper development of airport facilities and appropriate federal investment in airport facilities. Therefore, the Airport Reference

Code and Runway Design Code shown on the ALP drawing set should reflect the critical aircraft determination in the master plan or ALP Update forecast, with certain exceptions, as provided below.

At airports without an airport traffic control tower (ATCT) or other means to track aviation activity, methods for estimating total aircraft operations may include (among others):

- Traffic Flow Management System Counts (TFMSC). Completed Instrument Flight Rules (IFR) flight plan data is available for most airports, either towered or non-towered, from the FAA's Aviation System Performance Metrics web site. IFR counts of jet and turboprop operations, once normalized, are considered representative of the total operations of these aircraft characteristics, which nearly always operate on IFR flight plans. This is useful for critical aircraft determinations, since jets and turboprops can often be the most demanding aircraft types operating at a general aviation airport.
- Airport or aircraft operator reports. Aircraft landing fee reports, fuel sale records, aircraft operator logs, etc., may be used if developed with a reliable and consistent methodology for data collection. To be useful, the logs would need to record the aircraft make and model.

In draft reports submitted to NCDOA, many airport sponsor/consultants have expressed doubt concerning the usefulness and accuracy of TFMS data for critical aircraft determinations and operational forecasts. Draft master plan and ALP reports note that instrument flight rule (IFR) operations are sometimes cancelled in flight by pilots after departure, or before arrival. It is sometimes assumed, therefore, that TFMS data is unreliable.

It is true that flights that file IFR after departing or cancel on approach can be not counted in TFMS, but the real question is how often does that happen? The anecdotal data suggests it is less than <9% normally at general aviation airports. Overall, TFMS captures better than 95% of the IFR traffic in the system. Any statement in a master plan or ALP report to the effect that "a large portion" of IFR operations are not accounted for in TFMS, without being supported with specific information about local conditions at the airport, is speculative.

NCDOA has received direction in this regard from FAA, as follows.

TFMS is an operations count which uses a synthesis of the radar track and then the flight plan information to validate that the operation occurred (via the track) and then links that operation to the aircraft type, origin/destination, etc., that is in the flight plan. Because this provides a reliable count of IFR operations, FAA references it as a preferred methodology in the Critical Aircraft AC for the purpose of determining the existing critical aircraft -- since the business jet and large turboprops that are often the critical aircraft normally fly IFR.

But, using TFMS to generate an annual operations forecast is a much different question. FAA does not have a single recommended methodology to estimate annual operations from TFMS. At general aviation (GA) towered airports, about 25%-27% of operations are IFR. But it is not clear if the towered IFR to VFR ratios extend to lower activity at non-towered GA airports.

So, this is a key distinction -- TFMS is directly useful to the existing critical aircraft determination, but it is just one of several inputs into the annual operations count. Normalized TFMS provides a credible estimate of IFR counts. But that leaves VFR still to be estimated. Except with installation of validated operations counters, the methodologies to develop VFR counts all have significant

shortcomings. Airport or operator logs/records of operations can help. Local and basic airports (only) can use operations per based aircraft to calculate total ops, and then subtract IFR ops by type to get VFR ops. But operations per based aircraft cannot be used for the critical aircraft determination.

For purposes of AIP funding, getting the critical aircraft determination correct is usually more important than annual operations. But there can be exceptions to this – new towers, runways, etc., that have a capacity purpose. So, the question is, can the TFMSC database be used for operations forecasting at a GA airport, knowing that some, but not a critical number, of operations will be mis-counted? Answer: TFMSC can be used like this for the existing critical aircraft determination, but is not reliable, by itself, for the annual operations forecast.

In the case of some basic or local airports, which may be designated as “green” airports in the North Carolina Airport System Plan, the most recently approved ALP may show an Airport Reference Code (ARC) or Runway Design Code (RDC) that is not supported by documented critical aircraft counts. Commonly, these airports have an ARC or RDC of B-II, but can only document B-I operations, or cannot document 500 or more annual operations for all aircraft operations based on the TFMSC. In the absence of any documented and verifiable airport or aircraft operator reports, NCDOA will presume that these airports do not have the number of existing critical aircraft operations to support a B-II designation for purposes of airport improvement funding, even when these airports can document the location of a B-II based aircraft on the airport, or substantial operations by B-II (or greater) itinerant aircraft.

In keeping with statutory requirements for preservation of existing airport infrastructure in a safe and functional operational condition, NCDOA considers airports with Airport Reference Code (ARC) and Runway Design Code (RDC) of B-II or B-I that do not have documented aircraft operations meeting the FAA definition of critical aircraft will be allowed to retain the ARC and/or RDC code shown on its most recently approved ALP drawing set for the next forecast period, which is 1-5 years. This will allow for maintenance of the facility to an existing standard. However, in also keeping with statutory requirements that funding may only be justified to construct, modify, or expand facilities as necessary to meet demonstrated aeronautical demand, no expansion or improvement will be approved for projects not meeting basic justification tests of FAA Order 5100.38D, Change 1.

It should be noted that the ARC is an airport designation that signifies the airport’s highest Runway Design Code (RDC), minus the third (visibility) component of the RDC. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on the airport. The RDC is code signifying the design standards to which the runway is to be built. The designation of ultimate ARCs and RDCs on ALP drawing sets must reflect the documentation of future critical aircraft using approved methodologies in FAA Advisory Circulars. Moreover, although the critical aircraft determination is a key consideration in FAA and NCDOA decision making on project justification, neither FAA AC 150/5000-17 Critical Aircraft and Regular Use, nor this NCDOA statement, establish project justification for Airport Improvement Program or state funding.