

# flying into turbulence: the raleigh-durham airport expansion controversy

The Raleigh-Durham Airport Authority (RDUAA) is in the process of expanding its facilities to accommodate current and projected air carrier operations. Five alternative plans have been drawn up by consultants, only one of which is seen as sufficient by the Airport Authority. This alternative, known as Plan B, would send aircraft directly over Umstead Park and a considerable number of homes and businesses. For this reason, Plan B is opposed by many area residents. Strenuous arguments for and against the various alternatives have come from all sides, yet the debate seems bogged down because of a failure to reach a consensus on area needs and desires and a general lack of information on the costs and benefits of the various plans.

Is expansion necessary in the first place or is this merely an attempt on the part of RDUAA to keep pace with competing facilities in Greensboro and Charlotte? Is Plan B clearly superior to the other alternatives? The most significant conclusion is that no one has presented the detailed information necessary to make an intelligent choice between these plans. However, in-depth research suggests that an alternative other than Plan B offers a more modest but totally adequate solution. This article will briefly review the struggle over expansion of Raleigh-Durham Airport and follow with a detailed account of the benefits and drawbacks of each plan as seen by the author.

## current history of rdu airport

The Raleigh Durham Airport Authority (RDUAA) originated in 1939 after Durham and Wake Counties together with the cities of Durham and Raleigh successfully petitioned the state legislature to provide enabling legislation for a four-party aviation facility.<sup>1</sup> This legislation allowed each governmental body to be assessed one-fourth of the cost when any bond issues were floated. It also allowed the jurisdiction most directly affected by the airport facility to have a say in its future growth.

By 1968, the RDUAA had documented its need for expansion. The only question was where. Initially, the Airport Authority endorsed a proposal known as Plan A. This scheme called for a new 10,000 foot

runway 5000 feet southeast of the existing runway (#5-23) with both runways operating simultaneously. A new terminal would be located between the two runways, and primary access would be from N.C. 54. A controversy ensued, however, when it was learned that the plan would involve an exchange of 350 acres of airport land for 264 acres from Umstead State Park. Local attention focused on this when a newspaper ran a Sunday feature article on a North Carolina State University scientist conducting habitat studies of gray squirrels in that area. The expansion plan would end the research effort when the Park land was traded. The prospect of a land exchange incensed many people, spurring the initiation of a group, Citizens to Save Umstead Park, specifically organized to oppose the Authority's plan. Their claim was that Plan A would require cutting easements on 230 acres of the Park's land with other rights for low level flyovers given on an additional 620 acres.<sup>2</sup> Noise pollution was alleged to affect 1100 of the Park's 5200 acres. The RDUAA justified the plan as its least cost proposal.

The ultimate test for Plan A came in a \$20 million bond vote on November 5, 1968. Its failure to pass was attributed to a possible tax increase, the RDUAA/Umstead Park land exchange and a lack of data supporting the Airport's expansion plans.<sup>3</sup>

After modifying Plan A, the RDUAA again tried to arrange a land exchange with Umstead Park in 1970.<sup>4</sup> But the North Carolina State Board of Conservation and Development, along with the National Park Service, refused,<sup>5</sup> forcing the reconsideration of priorities. The RDUAA developed 11 alternate schemes with the aid of a consultant, J. E. Greiner, and the Federal Aviation Administration (FAA). Each of these were discussed by all parties mentioned above. Four were decided to be worthy of

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*Charles Pattison graduated from the Department of City and Regional Planning at the University of North Carolina, Chapel Hill, in May, 1976. While at the University he majored in transportation planning. He served as an intern with the Guilford County Planning Department in the summer of 1975.*



*Air traffic controllers monitor flights at Raleigh-Durham Airport*

*Courtesy of Raleigh News and Observer.*

more in depth study. They were coined Plan B, Plan C, and Plan C-1. Plan A was retained for comparative purposes only. Plan D, which stretched the existing runway to 10,000 feet was also developed. A subsequent proposal, C-2, has now emerged, and is being endorsed by the airlines through a trade organization, the Air Transport Association of America (ATA).

The Airport Authority has endorsed Plan B and successfully petitioned the Wake County Board of Commissioners to rezone 2000 acres in Wake County in anticipation of the plan's approval.<sup>8</sup> A public hearing scheduled for November, 1973, drew little public response. Shortly thereafter, the FAA offered tentative approval following further documentation based on the environmental impact assessment due in 1974. These findings were presented with other documents (Physical Development Plan and Financial Report) at a public hearing in December, 1974. A revised impact statement is past due but is still to be released. Although some objections were raised - these will be examined later in detail - the RDUAA felt confident enough to send all the necessary documents on to Washington, urging the FAA's prompt approval of Plan B.

### expansion requirements

The Raleigh-Durham Airport is responsible for the aviation needs of the Research Triangle Region, which includes the metropolitan areas of Raleigh, Durham, and Chapel Hill. In the period from 1950-

1970, Raleigh's population increased 84% while Durham's grew by 44%.<sup>7</sup> As a regional airport, this facility's expansion is an attempt to keep pace with population growth in order to preserve the economic vitality of the area. The underlying premise here is that added population means increased airport use.

Market studies prepared by two consultants in 1970 and 1972 showed that passenger facilities at RDU were inadequate and that demand for long-haul (1500 miles) non-stop carrier service was increasing.<sup>8</sup> In the period from 1966-1972, enplaned passengers increased by 107% and enplaned cargo tonnage increased by 178%.<sup>9</sup> Enplaned passengers are expected to rise from 712,300 in 1975 to 2,287,600 by 1995.<sup>10</sup> Total airport operations (landings and takeoffs) will increase from 192,300 in 1975 to 450,000 by 1995.<sup>11</sup> One problem arising from this increase is that the existing terminal cannot accommodate more passengers and existing runways cannot meet the loads presented by heavier aircraft soon to be operating from the airport. In fact, the principal instrument runway will need to be rebuilt in order to handle higher traffic volumes and heavier weight aircraft. Further, increased passenger volumes can only be accommodated through construction of a new terminal. A second problem arises from the fact that the airport has only one fully instrumented runway. Should this runway require major repairs, the entire facility would be shut down. A crash would create the same result. In either case,

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all passenger traffic would have to be rerouted to Greensboro where passengers would take a bus to Raleigh-Durham. (In each of the alternatives a back-up runway is provided to solve this difficulty.)

### criteria

The criteria adopted as a means of evaluating the alternatives agreed upon by the RDUAA and the FAA are: amount and cost of land to be acquired, operational and safety feasibility of the facilities, development costs, environmental impacts, land use compatibility, and access on and off the airport.<sup>12</sup>

Unfortunately, a proper evaluation of the alternatives has been made difficult due to a lack of information. The Airport Authority has only provided a limited amount of data on the alternatives it rejected, whereas complete documentation was offered for the alternative they selected. Operational and safety feasibility evaluations were done only for one scheme since the others embodied the same



requirements as specified by the FAA. Cost factors considering site preparation, drainage, relocations, and airfield pavements were developed in detailed financial estimates only for the alternatives deemed feasible by the Airport Authority.

Environmental criteria consisted of community noise, air pollution, water pollution (including soil erosion), natural phenomena characteristic of each area, and noise to Umstead Park. Sewage and industrial wastes for all comparisons were found

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“The question of reducing general aviation operations out of Raleigh-Durham is important since these flights account for over half of the projected growth through 1995.”

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minimal and not considered in detail. Potential land use conflicts were evaluated with respect to impacts on Umstead State Park and the Research Triangle Park. Secondary consideration was given to the number of homes and institutions that might be affected by the expansion.

Criticisms about the airport's measurement of noise contours and the actual cost savings among the alternatives are being considered in the final draft of the environmental impact statement. Although due in October, 1975, this report was postponed to January, 1976. At this time, the impact statement still has not been released.

## alternatives

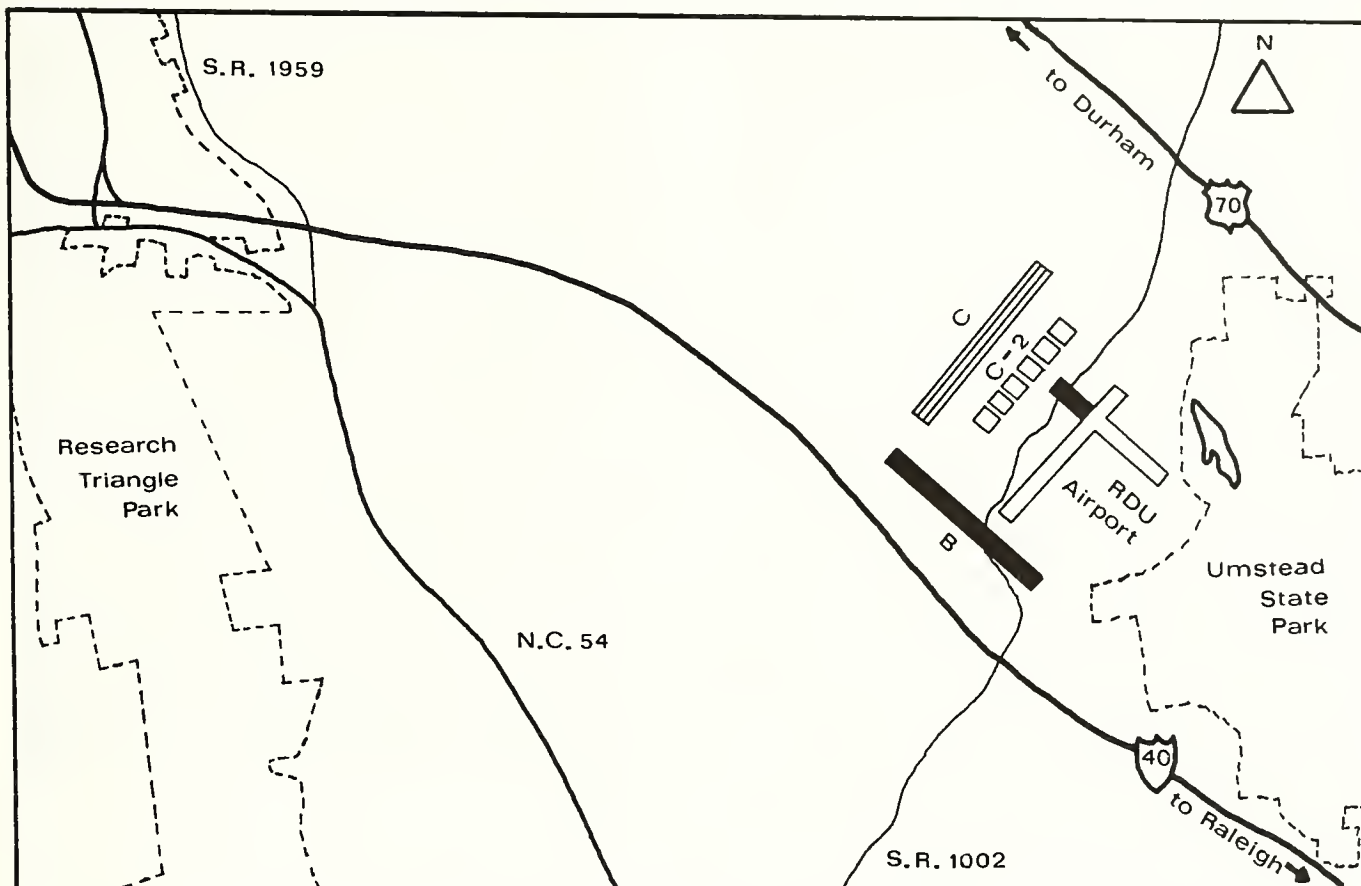
The consultant preparing the Airport Master Plan developed three alternatives to accommodate the airport's projected expansion. These include (1) the removal of air carrier service from the existing site to an unspecified new location, (2) the removal of some or all of the general aviation operations so no additional runways would be required, and (3) the development of the existing site to its maximum potential by the addition of new runways and other facilities as they are required.<sup>13</sup> A search for new air carrier sites was conducted. However, the nearest suitable location was found to be 40 miles from the present site, outside the jurisdiction of the RDUAA. Subsequent discussions with the FAA about this site concluded that its distance from the present facility would unduly alter the air trade of the area because of its inconvenience, and the investment loss incurred in making such a move would be unacceptable.<sup>14</sup> The removal of general aviation (non-commercial) operations was discussed and found to be possible.

The question of reducing the general aviation operations out of Raleigh-Durham is important since these flights account for over half of the projected growth through 1995 (see the following section, Question 6). However, the consultant felt it

was “inappropriate” to make any proposals with regard to this as North Carolina is presently working on recommendations for general aviation facilities for the entire state. Such action eliminated all but the last alternative - developing the present site to its maximum potential. As noted previously, this resulted in 12 scheme layouts, of which three were suggested by the FAA, two by RDUAA, six by the consultant, and one by the airlines. The five acceptable plans plus the now defunct Plan A appear in Figure 1.

Fig. 1

- PLAN A: Runway 5R-23L, the existing 7500-foot runway, would be rebuilt. A new 10,000-foot runway, 5L-23R, would be built 5000 feet southeast of the existing 7500-foot runway. Runway 14-32 would be lengthened from 4500 feet to 6500 feet. (This is the plan that was rejected in 1968 because it required a land exchange with Umstead Park.)
- PLAN B: The existing 7500-foot runway would be rebuilt. Existing runway 32R-14L would be lengthened to 6500 feet. A new 10,000-foot runway, 32L-14R, would be constructed. New terminal facilities would be required. (This is the plan supported by the RDUAA.)
- PLAN C: A new 10,000-foot runway, 5L-23R, would be developed 5000 feet northwest and parallel to runway 5-23. Runway 5R-23L, 7500 feet, would be rebuilt. Runway 32R-14L would be lengthened to 6500 feet. Terminal facilities would be similar to the ones above. This alternative requires the most fill, would remove the greatest amount of vegetation, has the greatest erosion hazard, and incurs the greatest cost. Runway layouts would expose more residents to noise levels of 30 NEF than any other plan.
- PLAN C-1 Runway 5R-23L would be the same as in Plan C. Runway 5L-23R of 10,000 feet would be re-oriented slightly from C in order to reduce the land-fill requirements. This layout would lengthen the glide approach paths which, in turn, would require the airport to buy more land, including added industrial and residential property, one motel, and two cemeteries.



Map showing layout of existing runway and alternatives B, C, and C-2.

**PLAN C-2:** Runway 5R-23L would be rebuilt and lengthened 750 feet for a new length of 8,250 feet. A new runway designed to serve general aviation (private) operations would be constructed at a length of 6000 feet. This runway, 5L-23R, would be 1000 feet closer to 5R-23L than in C. Although it could serve as a backup runway, future expansion would be limited. (This plan is supported by the airlines.)

**PLAN D:** Runway 5-23 would be rebuilt and a 2500-foot addition would be made to give it a 10,000-foot length. This is the do-nothing alternative as it represents the minimum action required to meet FAA safety requirements. Such activity work would require the airport to be closed for an indefinite period of time. However, even the rebuilding would not allow the airport to service the predicted demand increases.

costs for the other alternatives is not possible. No figures for various runway configurations mentioned in the above plans are given. Accepting this limitation, speculation about benefits and costs for the other alternatives is the only method left for comparison.

### effects of the alternative plans

The lack of precise information for the schemes not supported by RDUAA make it difficult to analyze and compare the alternatives. The Master Plan presented to various groups and displayed at public hearings contained detailed estimates for Plan B alone. Research by the author eventually resulted in more detailed figures. These findings are outlined below.

**Amount/Cost of Land to be Acquired:** No costs are provided except for Plan B. This is critical since the land costs vary depending on where and from whom it is purchased. However, the amount purchased under each alternative is listed, and a rough comparison of costs might be deduced from this.

**Operational and Safety Feasibility:** This criterion provides no basis of comparison since all alternatives had to meet FAA specified minimum requirements.

**Development Costs:** As indicated, there are no detailed cost figures except for Plan B. Apparently RDUAA made these calculations although they are

Only total project costs are available for the alternatives. Detailed cost figures are provided only for Plan B. For this reason, detailed estimation of

not included in the Master Plan. One can assume that the minimum cost of each alternative's terminal facilities is the same. Table 1 presents the construction and variable costs associated with each alternative (land required, fill, homes displaced, etc.).

Some question might be raised about the preceding cost figures. A more exact estimate appears in the following (Table 2) which examines each component of the various alternatives. Note that all plans are cheaper except B. The new table indicates C-2 could cost up to \$17,000,000 less than the figure given to the *Raleigh News and Observer*.

*Environmental Impacts:* Air pollution estimates for 1980 indicate no real advantage for any one alternative although all fall below the 1975 levels due to expected future restrictions on aircraft engines. Likewise, estimates for 1995 again reveal no actual advantage for any alternative.

With design controls taken into account, the impact of the various alternatives on local water quality is also seen as minimal. All projects would provide erosion controls and be designed to minimize petroleum waste and stormwater runoff. Costs were not given for the control systems under each alternative, thus no real advantage is apparent for any plan.<sup>15</sup> It should be pointed out, however, that Plan C-2's costs would be \$5,000,000 greater than the others because its 6000 foot runway would cause the airport sewage treatment plant to be relocated.

Noise measurements for the various alternatives were based on what is known as the Noise Exposure Forecast (NEF) system. NEF levels are calculated from aircraft noise expressed in EPNdb (effective perceived noise measured in decibels) together with the number of operations occurring during daytime and night-time periods.<sup>16</sup>

The FAA has published guidelines indicating land-use activities which are compatible with the various NEF levels. Within the NEF 30-40 range, activities where uninterrupted communication is essential should consider sound in design. Generally, residential development is not considered a suitable use, although multi-family developments where sound control features have been incorporated might be considered. Open-air activities and outdoor living will be "affected" by aircraft sound. The construction of auditoriums, schools, churches, hospitals, and theaters is not recommended in this zone.

At or above the NEF 40 range, FAA guidelines urge that land be reserved for activities that can tolerate a high level of sound exposure such as some agricultural, industrial, and commercial uses. No residential developments of any type are recommended. Sound sensitive activities such as schools, offices hospitals, churches, and the like should not be constructed in this area if at all possible.

Table 1  
COST OVERVIEW AND REQUIREMENTS

	\$ Cost (1973) X 10 <sup>6</sup>	Environmental Consequences <sup>(b)</sup>			
		Land in acres	fill requirements in cubic yards	selective clearing required in acres	buildings (all types) exposed to NEF 40 or higher contours
PLAN A	105	1595	11,006,000	309	not given
PLAN B	100	1929	17,073,000	333	62
PLAN C	117	1923	23,022,924	294	11
PLAN C-1	120	2245	15,483,694	488	11
PLAN C-2*	110	760	13,367,100		00
PLAN D	75	545	3,280,000	36	00

(a) Cost figures were taken from a *Raleigh News and Observer* article dated 2/20/76. There is some question as to whether these numbers represent the total cost or just the construction cost. A telephone conversation with the newspaper reporter, Rick Nichols, and the Airport Director, Henry Boyd (4/20/76), failed to clarify this. Costs include each environmental consequence listed except the NEF contours.

(b) Air pollution was minimal for each alternative and not included (see *RDU Airport Master Plan. Environmental Impact Assessment Report*, p. 67, pp. 99-104). Stormwater runoff values are also minimal and not listed (same as above, p. 92).

\*Except for cost, all figures are taken from the Greiner Engineering Sciences' report, *Analysis for the FAA of a Runway Orientation Scheme Proposed by the ATA*, May, 1975.

NOTE: Unless otherwise documented, all figures appear in the *Raleigh-Durham Airport Master Plan. Environmental Impact Assessment Report*.



Table 3 gives project alternatives and the number of residences or institutions that are within NEF 30-40 contour range. The effect of a given NEF level on surrounding land has been previously noted.

These measurements indicate that while Plan B subjects fewer residences to a combined NEF 30-40 contour, it subjects more to the higher noise level than the four other alternatives combined. There is a significant increase in noise between these two contours since the NEF scale is logarithmic. In fact, the NEF chart suggest that no residential construction be allowed in an area exposed to more than 30

NEF. The Master Plan does not mention damage payments due to noise, but it would seem to be RDUAA's responsibility to offer some compensation to these homeowners if Plan B is approved. It should be noted that Plan C-2 was not submitted in time to be considered in the *Environmental Impact Assessment Report*. However, given its similar but smaller scale relative to Plan D, smaller NEF contours could be expected.

*Land Use Compatibility:* The principle measurement used in determining land-use compatibility was the number of homes and/or institutions that

Table 2  
COSTS DERIVED USING  
COMPONENT ESTIMATION\*  
(1973 Million Dollars)

	Plan A	Plan B	Plan C	Plan C-1	Plan C-2	Plan D
Embankment	14	22	29	19.7	17	4.2
Airfield	22	22	22	22	13	10
Land	3.5	4	5	6	2	1.5
Roads	2	4	4	4	2	2
Drainage Structure/ Miscellaneous Costs	0	1	0	0	5	0
Terminal	30.2	30.2	30.2	30.2	30.2	30.2
Power Line Relocation	0	0	2	2	0	0
Sub total	71.7	83.2	92.2	83.9	69.2	47.9
Contingencies, Engineering, Administration	15.8	18.3	20.3	18.5	15.2	10.5
TOTAL	87.5	101.5	112.5	102.4	84.4	58.4

\*These are the author's estimates as derived from the *RDU Airport Master Plan* and the Greiner Engineering Sciences' *Analysis for the FAA of a Runway Orientation Scheme Proposed by the ATA*.

- (1) The cost here is \$1.27/cubic yard of fill versus .75/cubic yard used in earlier estimated.
- (2) Costs assumed equal except for C-2 and D which have less extensive runways.
- (3) All schemes have the same terminal requirements.
- (4) Allows for a 22% underestimate of project costs.
- (5) Does not include possible relocation of eight industries.
- (6) Does not include cost noted in (5) and two taxiways @ \$1,000,000 each.

would have to be acquired by RDUAA in order to implement each alternative plan. These figures are summarized in Table 4.<sup>17</sup>

Table 4

PLAN	RESIDENCES	BUSINESSES	CHURCHES
A	2	0	0
B	18	2	0
C	13	7	0
C-1	47	8	1
C-2	not given	not given	not given
D	0	0	0

**Airport Access:** No figures for road relocation exist except for those previously noted. Total road relocation and access costs for B in 1973 dollars are \$5,065,340.<sup>18</sup> Although the roads to be relocated or improved for each alternative are developed, no specific costs are presented except for Plans B and C-2.

### questions on the airport plan

Following is a series of questions addressing the most serious shortcomings of RDUAA's support for Plan B.

**Are the NEF forecasts accurate?** It appears that they are technically correct, although the contours for Plan B are distorted. Forecasts show takeoffs occurring on the 10,000 foot runway **away** from Umstead Park (toward Durham). Landings would take place from the opposite direction bringing aircraft in over Umstead Park. Under normal conditions greater noise levels occur on takeoff than on landing. However, if these landing patterns were reversed, the Park area would be subjected to substantially higher noise levels. It is very difficult to justify the expense of the 10,000 foot runway if planes are only allowed to takeoff and land in specified directions. It appears more likely that no such restriction would be imposed with subsequently higher NEF levels occurring over the Park. Another possible bias is found in the NEF contour measurement itself. Under the NEF system, noise levels are arrived at by averaging the highest peak

frequencies recorded during both a day and night period, a practical approach for most large airports where flights occur around the clock. At Raleigh-Durham, however, most of the flights occur only during daylight hours. Thus, when the lower nighttime figures are averaged with the daylight operations, a much lower noise contour is indicated than would appear under other measurement systems. Considering the fact that those facilities most seriously affected by the proposed expansion (Research Triangle Park and Umstead State Park) operate only during the day, the NEF contour measurement system does not give an accurate indication of the annoyance one is likely to experience.



Courtesy of Raleigh News and Observer.

*Existing terminal facilities at RDU cannot handle the expected increase in passenger use*

Table 3

PLAN	NEF 30	NEF 40
A	not given	not given
B <sup>19</sup>	44 homes, 1 church	61 homes, 1 church
C <sup>20</sup>	208 homes, 2 churches	11 homes
C-1 <sup>21</sup>	228 homes, 2 churches	11 homes
C-2	not given	not given
D <sup>22</sup>	258 homes, 2 churches	no exposure

Why are no projects costs given for the alternatives? This appears to be in keeping with FAA policy which only requires cost documentation for the endorsed plan. No specific statement explaining this policy was found. However, the policy for developing environmental impact statements allows only detailed evaluation for the proposed plan.<sup>23</sup> Supposedly, time and cost factors would preclude extensive documentation for each alternative, although this is what is required for accurate and objective judgments.

Did the public hearing afford the opportunity for adequate public input? Apparently, the Airport Authority revealed very little about the expansion schemes except Plan B. As evidenced by the sample survey, the Northwest Community Task Force felt there was inadequate citizen input due to a lack of knowledge about the hearings.<sup>24</sup> Excessive and incomplete data were also cited as contributing to the frustration and confusion of trying to interpret the airport's Master Plan.<sup>25</sup> It was noted that the local planning agencies and public libraries given data by RDUAA did not have a copy of the Financial Plan which is crucial in understanding the overall proposal. Citizens felt the Airport Authority merely went through the motions of conducting a public hearing, "complying with the form of public hearing requirements set out in FAA regulations - on a plan to which the Authority was already committed."<sup>26</sup> In addition, the chairman of the hearing only allowed each speaker five minutes, and even then the remarks had to be limited to Plan B alone.<sup>27</sup>

Are there inherent biases in the Environmental Impact Statement (the same firm that prepared the physical plan recommending Plan B was employed to examine its environmental impact)? This possibility does exist and cannot be excluded. It appears very unlikely that the same firm recommending a specific plan would find fault with it in a subsequent report. Although the FAA has no guidelines which prevent this from happening, it is obvious that the final statement would appear more valid if a disinterested third party were to carry out the evaluation.

How much consideration was given to relocating the general aviation sector to another facility? This course of action was acknowledged by the Airport Authority, but it does not appear to have been given much serious thought. In fact, RDUAA played down the role of general aviation in future airport forecasts. For example, consider future airport operations (Table 5).<sup>29</sup>

The present facilities are said to be operating at maximum capacity now, which is 192,300 operations/yr. Looking at the last column below would seem to indicate the general aviation sector constitutes a large majority of the airport's operation. In fact, if the general aviation portion of the airport's operations could be completely eliminated, there would be no need for any new runways.

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" . . . (I)t is obvious that the final (environmental impact) statement would appear more valid if a disinterested third party were to carry out the evaluation"

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Does Plan C-2 offer any cost advantages over Plan B? It appears that Plan C-2 could be up to \$17,000,-000 cheaper than B. Its shorter runways provide adequate and efficient service for both commercial and private aircraft. This means less maintenance, land, and land fill costs than B. Safety is also improved by placing general aviation operations on one runway and commercial flights on another. It should be mentioned that RDUAA has developed a modified Plan B which incorporates the same features presented by C-2. Such a plan would give B lower costs.<sup>30</sup> However, the FAA has evaluated both of these modified plans and feels neither represents good planning.<sup>31</sup>

What is the justification for the 10,000 foot runway required in the other alternatives, and can C-2's shorter (8,250 foot) length provide adequate ser-

Table 5

YEAR	AIR CARRIER OPERATIONS	GENERAL AVIATION OPERATIONS	MILITARY OPERATIONS	TOTAL	TOTAL without general aviation operations
1975	40,200	138,100	14,000	192,300	54,200
1980	47,400	189,700	14,000	251,100	61,400
1985	55,000	254,200	14,000	323,200	69,000
1990	65,800	327,100	14,000	406,900	79,000
1995	70,800	365,200	14,000	450,000	84,800





*The need for expanded facilities at RDU is largely the result of increasing general aviation activities*  
 Courtesy of Raleigh News and Observer.

vice? Originally, the 10,000 foot runway was justified by consultants who described the need as based on future enplanement forecasts. RDU was projected to have substantial increases in long distance flights to the Midwest and West coast. These flights would require longer and stronger runways of up to 10,000 feet in order to compensate for heavier aircraft weights due to added fuel requirements. It now appears that C-2's length would offer more than adequate service since the new generation of wide-bodied jets require less takeoff distance than existing models. The Air Transport Association of America (ATA) which supports C-2, has argued that RDUAA is trying to cope with general aviation increases by developing a top of the line runway for long-haul carriers. The Association further states that commercial flights are not expected to increase significantly in the next 25 years into RDU and that general aviation operations have more modest requirements.

Table 5 clearly shows that if general aviation operations were removed from the main runway (as C-2 suggests), the existing facility would be adequate for the period through 1995. Although ATA acknowledges that the main runway would have to be rebuilt and lengthened, it makes a good argument for eliminating B's 10,000 foot strip. By forcing private planes onto a new 6500 foot runway, C-2 would eliminate congestion and promote safety simultaneously. On the other hand, B overbuilds for the projected demand by providing a 10,000 foot runway which is unnecessarily long, and two second-

dary runways of 7500 and 6500 feet which (when combined) are excessive for the demands presented by the general aviation sector.

RDUAA has accepted the idea that the best way to maximize the development of the present site is to provide a 10,000 foot runway for the occasional (only several times a year) West Coast or European charter flight. As ATA noted, these are the only flights that would require such a long runway, and all other commercial flights could be accommodated on the shorter and less costly main runway of C-2. It seems difficult to believe that B's higher cost can be justified simply by RDUAA's desire to offer a more complete but seldom used service.

*What type of NEF contours does C-2 have?* The contours would be similar to Plan D.<sup>32</sup> NEF contours 30 and 40 would be extended slightly on the southwestern end of runway 5R-23L due to the 750 foot addition. More importantly, runway 5L-23R would be shortened from C's 10,000 feet to 6000 feet, and would be moved closer to 5R-23L by 1000 feet. Both of these factors would substantially reduce the noise produced. In addition, since runway 5L-23R would only be used for general aviation operations, one could expect the noise levels above the 30 NEF range would not be generated.

Although the Airport Authority suggests that C-2 would have twice the noise impact of B, it gives no indication what NEF levels would be experienced. It should be noted that since C-2 is similar to D in its NEF contours, no home or business would experience the very loud 40 NEF level generated by Plan B.

*How accurate are the total cost figures?* The new 1973 construction cost figure for Plan B was \$101,000,000. Assuming an inflation rate of 8%/year for each year since then, Plan B would now cost approximately \$126,000,000. The accuracy of the other figures is difficult to ascertain given variable land and fill costs which are not documented in the Master Plan. There is also the problem of social costs which have not been documented. How does one transform the higher noise levels of B into monetary losses? Is there some method for estimating the number and cost of law suits which might be forthcoming from property owners (public and private)? These considerations were not made by RDUAA and can only be estimated in relative terms.

## conclusions

A few conclusions can summarize the findings of this article:

1. The RDUAA has not maintained close contact with the public. Until it does so, it must expect continued conflicts.
2. The Airport Authority should adopt an attitude that appears more open and willing to accept criticisms and suggestions. A refusal to do so will result in another failure like the one in 1968.

3. The above might best be achieved by allowing some of the community groups to participate more directly in airport plans and decisions.
4. The FAA needs to be urged to alter its public hearing policy so as not to present a closed mind to various alternatives. The existing format allows the Airport Authority to make its choice in the absence of citizen input.
5. FAA guidelines should be developed which prevent one consultant from preparing more than one part of an airport master plan. This could help eliminate possible conflicts of interest.
6. The NEF contour approach to noise measurement does not seem particularly suited to the case at hand. An average of daytime and nighttime noise levels tends to result in a value which underestimates actual noise levels during the most critical part of RDUAA's operational activity (daytime). Such an underestimate could have serious consequences for the Research Triangle Park as well as Umstead State Park.
7. Detailed financial estimates should be required for each alternative rather than only for the one the Airport Authority is endorsing. Comparisons are difficult and almost impossible without this information. This requirement should be developed regardless of the FAA's policy.
8. Sufficient information has not been provided to determine which alternative is best. No action should be taken until this information becomes available. It does appear that Plan B, which is being offered as the 'best' alternative by RDUAA, would tend to lose any advantages it might now have when more complete data is available.

Using the data that is available suggests that C-2 might be a 'better' alternative than B for several reasons. The cost section of the paper noted that although Plan B is being called the least-cost alternative, Plan C-2 is clearly less expensive. The higher noise levels associated with B have been noted. The question of runway lengths seem to imply that C-2's shorter, cheaper, and totally adequate runway is to be preferred to B's more costly and noisy 10,000 foot structure. Similarly, the 6000 foot general aviation runway offered by C-2 appears to present an added safety feature in separating commercial and private aircraft. Whether or not this runway could serve as a back-up for the main commercial strip was not answered.

A basic policy question appears to be the real issue. Does the Raleigh-Durham Airport need a facility which would seldom be used with respect to its designed potential (Plan B), or is a more modest, but totally adequate alternative (Plan C-2) the answer? Although complete documentation is lacking, the author's research suggests that C-2 offers the best solution at this time.

The conflict which has developed over the alternate to be selected seems to be tied to RDUAA's insistence on supporting Plan B. Notes from the

public hearings have suggested that Plan B was more or less selected prior to these meetings. Subsequent papers and reports have attempted to discredit the other alternatives and embellish B. Such a policy seems destined for more conflict, and the final result can only be a voter rejection of any referendum designed to help implement Plan B.

#### Footnotes

- <sup>1</sup>Durham Herald Sun, February 22, 1942.
- <sup>2</sup>Raleigh News and Observer, October 27, 1968.
- <sup>3</sup>Ibid., November 7, 1968.
- <sup>4</sup>Ibid., April 25, 1970.
- <sup>5</sup>Ibid., June 14, 1970.
- <sup>6</sup>Raleigh-Durham Airport Master Plan. Environmental Impact Assessment Report, prepared by J.E. Greiner Co., Inc., March, 1974, p. 10 (hereinafter referred to as *E.I.A. Report*).
- <sup>7</sup>Ibid., p. 6.
- <sup>8</sup>Ibid., p. 7.
- <sup>9</sup>Ibid., p. 6.
- <sup>10</sup>Raleigh-Durham Airport Master Plan. Financial Development Plan, prepared by Landrum and Brown, October, 1974, p. 24 (hereinafter referred to as *Financial Plan*).
- <sup>11</sup>Ibid., p. 42.
- <sup>12</sup>Raleigh-Durham Airport Master Plan. Interim Final Physical/Technical Development Plan, prepared by Greiner Engineering Sciences, Inc., October, 1974, p. F-2 (hereinafter referred to as *Physical Plan*).
- <sup>13</sup>Ibid.
- <sup>14</sup>Ibid.
- <sup>15</sup>E.I.A. Report, p. 93.
- <sup>16</sup>Letter to Regional Directors, Section E, Noise Impact Assessment in Airports Environmental Seminar conducted in Washington, D.C., May 8, 1975, by the FAA, p. 4 (hereinafter referred to as *Seminar*).
- <sup>17</sup>E.I.A. Report, pp. 107-108.
- <sup>18</sup>Ibid., p. 135.
- <sup>19</sup>Ibid.
- <sup>20</sup>Ibid.
- <sup>21</sup>Ibid., p. 137.
- <sup>22</sup>Physical Plan, p. J-7.
- <sup>23</sup>Seminar, Section C, Guidelines for Organization and/or Review of Environmental Documentation, p. 2.
- <sup>24</sup>Community Report, p. 30.
- <sup>25</sup>Ibid., p. 3.
- <sup>26</sup>Ibid., p. 7.
- <sup>27</sup>Ibid., p. 11.
- <sup>28</sup>Financial Plan, p. 42.
- <sup>29</sup>Physical Plan, p. H-2.
- <sup>30</sup>Raleigh-Durham Airport Authority. Analysis for the Federal Aviation Administration of a Runway Orientation Scheme Proposed by the Air Transport Association of America, prepared by Greiner Engineering Sciences, Inc., May, 1975, p. 14.
- <sup>31</sup>Ibid., p. 12.
- <sup>32</sup>Ibid., p. 8.