Abridgment

GEORGIA'S CRITICAL RURAL PUBLIC TRANSPORTATION NEEDS (1)

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This analysis is designed to identify public transportation needs of Georgia's rural transportation disadvantaged including elderly Georgians 60 years of age and older, and the handicapped under Section 16(b)(2) and Section 147. Approximately 12 percent or a half million of Georgia's population are over 60 years of age. One fourth of this group is handicapped numbering around 130 thousand. It is estimated that 1.5 percent of Georgia's under 60 population, or 60 thousand, are handicapped. Georgia's rural population approximates two million people. The rural target population, this study's focus, slightly exceeds 400 thousand of which 34 percent are transportation deficient. Subsequently, rural Georgians require 611.3 thousand trips to satisfy 135.4 thousand rural transportation deficient citizens. This analysis provides a cursory view by use of a broad-brush sketch plan. Many data gaps exist; the estimates are crude! Therefore, reliance on a professional "best-judgment" to identify Georgia's transport needy predominates.

This analysis intends to identify the critical needs of Georgia's transportation disadvantaged primarily in the rural areas of the State. Georgia's population was grouped into four age intervals where the elderly were defined as inhabitants 60 years of age and older. This definition comports with the lower limit used by Georgia's Office of Aging. (2) For the non-elderly category, only the handicapped portion was addressed. Since a significant portion of the elderly is also handicapped, careful analysis was necessary to delineate those who were over 60 and non-handicapped from those who were handicapped, in order to avoid double counting.

Target Population

The short time allowed for this analysis directed the focus to a target population which has lent itself to exploring the State's program for the "handicapped" and the "elderly" as the major components of Georgia's transportation disadvantaged. These components comport to the definition as proposed in studies conducted by Kimley-Horn and Associates. (3) In the interest of brevity, coefficients that were developed in their methodology were borrowed and applied to the Georgia condition. Extrapolations were made for transportation needs pertinent to trip number, time, length, and required vehicles to operate over the State of Georgia. Cost estimates relating to manpower, operations, and capital costs were also reviewed.

Values were derived for the partially mobile under 60 population from a percentage reported in a U.S. Department of Transportation report (4) using a ratio of 1.5 percent applied to find Georgia's under 60 handicapped population. The derived estimate approximates 60.7 thousand. Applying the same ratio to rural non-elderly, results in 19.2 thousand handicapped. Georgia's rural elderly number 227 thousand. (5)

Thus, the derived transit dependent target population is:

Table 1. Number of handicapped and elderly for all ages in rural Georgia:1970.

Physical Condition	Inhabitants	Share
Rural Elderly	226.9	92.2%
Rural Non-Elderly Handicapped	19.2	7.8%
Total Target Population	246.1	100.0%

While some of the rural population do suffer from total immobility, others do not. Using Kimley-Horn's model, travel demand was derived by using computations based upon the responses of the transportation sufficient. The trips were the product of the total number of trips required and desired in selected categories by various respondents. The deficient trips per week were identified then as those of met travel demand for the sufficient minus unmet demand by the transportation deficient. Based upon the Kimley-Horn Analysis, an average percentage for various essential life support trips was computed. These trips were derived from this ratio which is shown in Table 2. It is based upon the bare essential trip needs for grocery shopping, health care, and work education, which totalled 42.0 percent. (6)

Table 2. Percent of trips generating travel demand.

Trip Generator	Percent	Round-Trip Average Distance
Grocery shopping	31.4	19.2 Km (12.0 mi.)
Other shopping	16.2	19.2 Km (12.0 mi.)
Health care	5.0	34.6 Km (21.6 mi.)
Personal business	15.7	26.9 Km (16.8 mi.)
Social recreation and religious	24.5	19.2 Km (12.0 mi.)
Work-education	5.6	30.7 Km (19.2 mi.)
Other	1.7	26.9 Km (16.8 mi.)
Total:	100.0	21.9 Km (13.7 mi.)

Aggregated travel demand for the 246 thousand rural transportation deficient Georgians generated into approximately 293.0 million desired trips, while the 135 thousand rural transportation deficient population requiring bare essential life-support trips per week is as follows:(7)

Table 3. Trip demand for transportation deficient.

	Transportation Deficient (000)	Desired Trips (000,000)
Desired	246.1	293.000
Essential	135.4	0.611

Required Vehicles

Once the total distance (mileage) was computed, it became relatively simple to compute the number of vehicles required to service a 100 percent demand-satisfaction level. The rural desired level, approximating 384 million kilometers (240 million miles) annually requires around 8,100 vehicles. A similar technique was used for deriving the rural essential life-support travel demand. The demand for 168 million kilometers (105 million annual miles) generates a requirement of around 3,500 bus-vans to satisfy 100 percent of the essential trip needs for Georgia's rural transportation disadvantaged.

Cost Estimates

The operating cost for this service amounts to $64.48 million to provide essential life-support demand for one passenger per vehicle at 100 percent level of satisfaction. The initial capital cost outlay amounts to $52.44 million for financing 3,500 vehicles. Total maximum cost sums to $116.92 million for providing service for 100 percent of essential demand-satisfaction assuming various load factor levels (see Table 4).(8)

Recognizing that the massive amount of funds necessary to finance such an undertaking is not feasible in the immediate or near future, several levels of effort were computed to indicate the various amounts of money required including the level of effort given the present budget program. In all cases, to derive the values for the various load factors, vehicle costs, operating costs, and total costs, the criteria were set based upon the assumptions listed below.

Table 4. Annual cost estimates with selected vehicle load factors for desired and life-support trips by the State's transportation disadvantaged at 100 percent demand satisfaction in rural Georgia.

Vehicle Load Factor	Resources Required 12=100%	9=75%	6=50%	3=25%	1=8%
	Vehicles Required				
Rural Essential	292	389	583	1,167	3,496
Rural Desired	674	899	1,349	2,698	8,093
Vehicle Cost:	Initial Capital ($000,000)				
Rural Essential	4.3	5.8	8.7	17.5	52.4
Rural Desired	10.1	13.5	20.2	40.5	121.4
	System Operating Cost ($000,000)				
Rural Essential	5.4	7.2	10.8	21.6	64.5
Rural Desired	12.5	16.7	25.1	50.2	150.5
	System Total Cost ($000,000)				
Rural Essential	9.7	13.0	19.5	39.1	116.9
Rural Desired	22.6	30.2	45.3	90.7	271.9

Assumptions:
1. All vehicles = 12 passenger capacity vans.
2. Vehicle price = $15,000 per unit.
3. Rural vehicles average 48,000 kilometers (30,000 miles) per year.
4. System Operations average 99.2¢ per kilometer (62¢ per mile).

It is unrealistic to assume that the load factor would total 100 percent at all times for every trip, even with the reported demand in rural regions, for 12-passenger vehicles. Therefore, it was assumed that a 75 percent load factor obtains a more realistic approximation. Using this load factor for 100 percent demand-satisfaction, the service for rural essential only would require $13 million.

Since the State is budgeted currently for on-going capital programs at approximately $750,000, the level of service possible approximates 17 percent for the 100 percent load factor. The same funding for the 75 percent load factor permits less than 13 percent of the rural demand-satisfaction. In any case, to operate effectively at these levels of effort, less than $1 million is required from the State to meet only one-half to two-thirds of the 25 percent bare minimum rural transportation demand (see Table 5).(9) Figure 1 graphically illustrates the cost function of the various resource factors.(10)

The low level of service indicated above illustrates the dire need for a total in-depth analysis of what Georgia's actual transit requirements will be in the future for Georgia's rural transportation disadvantaged. This analysis omitted the economically deprived. In both load factor cases, it is apparent that only a minute proportion of Georgia's transportation disadvantaged is addressed. In no way does the above analysis provide for programs necessary to cover any specific region or target population. It also does not assess the existing systems and their lack of interfaces between the modal splits required to transport passengers over separate systems.

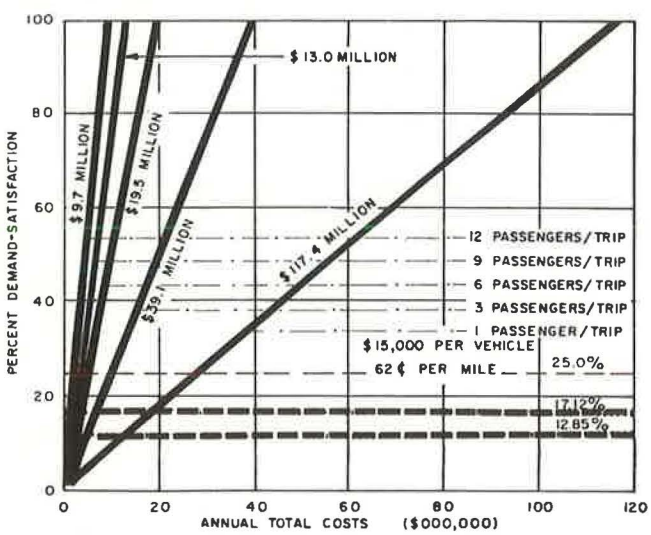
Table 5. Estimated annual total costs, 12-passenger vehicles required, and effective trip demand served of selected essential service levels on rural life support travel.

Passenger Load Factor	Effort Level	Vehicles Required	Per Vehicle Cost	Capital Cost ($000)	Operating Cost ($000)*	Total Cost ($000)*
	Current GDOT Capital Funds Program					
12 = 100%	17.12%	50	$15,000	$750.0	$924.5	$1,674.5
9 = 75%	12.85%	50	$15,000	$750.0	$925.2	$1,675.2

	$644,800 Per 1% Per Vehicle Demand Satisfaction For One Passenger		Person-Trips Served	Vehicle-Trips Required	Cost Per Trip Person	Cost Per Trip Vehicle
12 = 100%	17.12%	$54.2 ($000)	1,273.0	106,085	$1.32	$15.78
9 = 75%	12.85%	$72.2 ($000)	955.5	106,167	$1.75	$15.78
12 = 100%	25.00%	N/A	1,859.0	154,913	$1.29	$15.48
9 = 75%	25.00%	N/A	1,859.0	206,551	$1.77	$15.48

Note: Detail may not sum to total due to rounding.

Figure 1. Annual total cost estimates for rural life support trips made by Georgia's transportation disadvantaged in 12-passenger vehicles at selected load factors.



References

1. The findings in this paper were extracted from the research performed during a special project for the Georgia Department of Transportation Planning and Programming Director in which the author, on loan from the Systems Research Group, served as Project Manager.
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4. U.S. Urban Mass Transportation Administration. The Transportation Handicapped Population, Definition, and Counts. Vol. I Report, August, 1975, p. 63.
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7. Georgia Public Transportation Bureau. November, 1976, Derived Estimates.
8. Ibid.
9. Ibid.
10. Ibid.