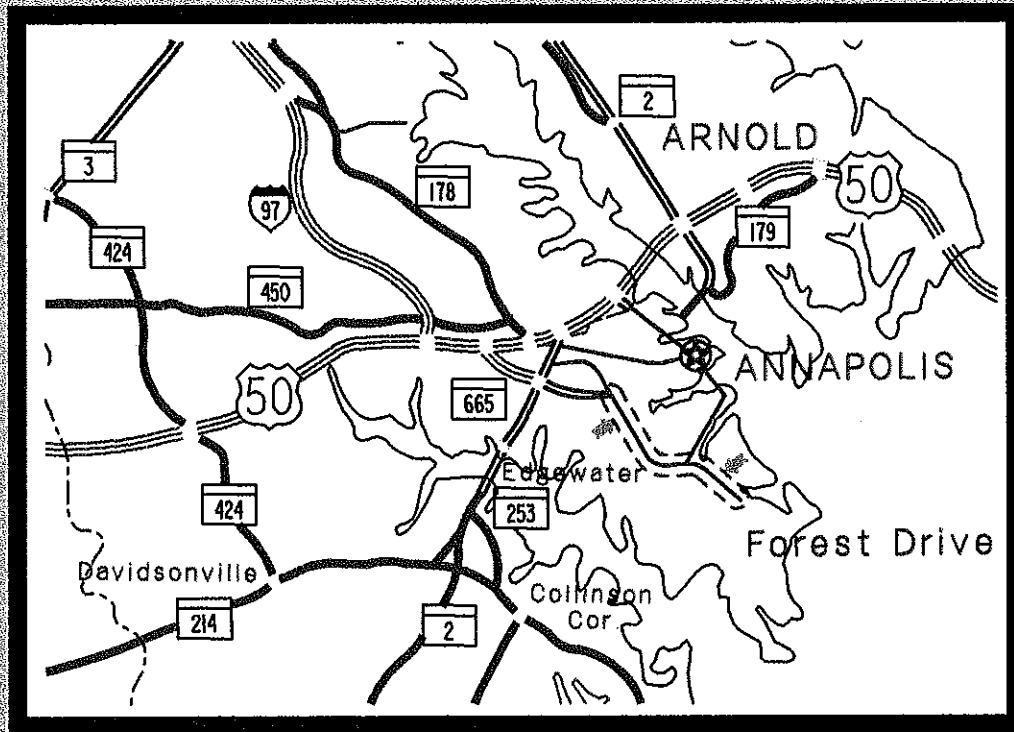




Forest Drive Origin-Destination Study



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Submitted to:
City of Annapolis
Planning and Zoning Department
160 Duke of Gloucester Street
Annapolis, Maryland 21401



Forest Drive Origin-Destination Study
The City of Annapolis, Maryland

PRELIMINARY

MAY 1996

Prepared for:

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The City of Annapolis, Maryland

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Forest Drive Origin-Destination Study

A. INTRODUCTION

An origin-destination (O-D) study was performed as part of the Forest Drive corridor study that was conducted by Whitney, Bailey, Cox & Magnani (WBCM). Forest Drive is a congested arterial that provides access from multiple suburban residential neighborhoods in Annapolis to US 50 and other major thoroughfares. The information gathered from the turning movement counts proves the high level of congestion on Forest Drive. As part of the planning analyses, the City of Annapolis instructed WBCM to perform an O-D study. An O-D study of Forest Drive provides information of where vehicles are coming from, where they are going and supplemental information such as trip purpose and the use of transit. There are multiple types of O-D studies. The most common O-D techniques employed are:

- License-plate studies
- Roadside-interview studies
- Coded card studies
- Mail-Back Questionnaires

A license plate study requires the recording of license plates numbers before vehicles enter the study area (or arterial in this case), and after the vehicles have left the study area. For a study location such as the Forest Drive arterial, a large number of recorders would be necessary to record vehicles entering and exiting all access points to and from Forest Drive. The results of the license-plate studies just give vehicle origin and destination information.

Coded card studies are similar to license-plate studies. However, instead of recording plate numbers, coded index cards are given to motorists at the entrance points to the study area, and returned at the exit points. Disadvantages to each of the techniques are that no information is gathered regarding trip purpose, enroute stops, trip frequency, etc.

Roadside-interview studies are have several negative attributes. These type of studies require motorists to pull off the road and answer multiple questions concerning their trip origin and destination. During peak travel times, motorists are often unwilling to stop their commute to answer questions.





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The City of Annapolis and WBCM decided that a mail-back questionnaire would be the most efficient type of O-D study. It requires short questionnaires to be disseminated to motorists at normal stopping points, such as traffic signals. U.S. postage is affixed to the questionnaires prior to dissemination, so that motorists can fill the survey out at their leisure and return it post-paid. Not only will information such as trip origin and destination be gathered from this survey, but also information such as intermediate stops and public transit preferences can be gathered. An average of 5-15% return rate can be expected from a mail-back questionnaire.

One alternative to the mail-back questionnaire is a mass area wide mailing of questionnaires. This would reduce the need for surveyors to physically give the survey to individual motorists. However, the mail return rate is much lower because a larger number of people to which this survey does not apply receive the survey. Since the City of Annapolis just wanted information concerning traffic on Forest Drive, it was decided to perform a mail-back questionnaire, where the surveys were physically handed out to motorists at signalized intersections.

B. SURVEY FORM DESIGN

The wording and visual presentation of an O-D survey is very important. Survey questions need to be clearly written so that confusion is kept to a minimum. The survey form should not be too long. One page of questions is sufficient. Survey return rates are drastically reduced when individuals are required to fill out multiple pages of questions. The survey that was designed by WBCM and the City contained questions geared towards trip origin, intermediate stops, trip destination, use of public transit, and home address. Spaces were also provided for comments and suggestions. Figure 1 contains the survey form.

C. SURVEY DISTRIBUTION

Employees from both the City of Annapolis and WBCM distributed survey forms at five locations on Wednesday, April 3rd, 1996. Table 1 contains the distribution time periods and locations. Each of the survey distribution intersections is signalized, and the distributors were instructed to hand out survey forms during the signal red phase for the specified approach. Several of the larger intersections required multiple distributors, while the smaller intersections were handled by one distributor. A total of 5463 survey forms were distributed.





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FOREST DRIVE ORIGIN-DESTINATION STUDY

As part of an effort to improve traffic flow along Forest Drive, the City of Annapolis is conducting a study of trip origins and destinations. We need your help! Please complete this brief questionnaire, trifold at the arrowheads, and mail postage paid to the address on the back by next Monday.

SURVEY LOCATION: _____ A.M. Mid P.M.

Please indicate the primary purpose of this trip:

- | | |
|---|--|
| <input type="checkbox"/> Commuting to/from Work | <input type="checkbox"/> Shopping |
| <input type="checkbox"/> Commuting to/from School | <input type="checkbox"/> Business Travel |
| <input type="checkbox"/> Other _____ | |

The following questions relate to stops you made on this trip one way.

- Where did your trip originate? Street Name: _____
Nearest Intersection: _____ Zip Code: _____
- What was your final destination? Street Name: _____
Nearest Intersection: _____ Zip Code: _____
- Did you make any stops in between? If yes, where?
Stop 1: Street Name: _____ Zip Code: _____
Nearest Intersection: _____
Stop 2: Street Name: _____ Zip Code: _____
Nearest Intersection: _____

Does this trip include use of public transit? If so, please note type: _____

What local public transit improvements would you support? _____

Where do you live? Community: _____ Zip Code: _____

Nearest intersection: _____

How often do you travel Forest Drive? (Please answer only one)

___ times per day ___ times per week ___ times per month ___ times per year

Would you use park-n-ride lots if provided in the Forest Drive corridor? ___ Yes ___ No

Comments: _____

THANK YOU FOR YOUR ASSISTANCE!

Figure 1: Origin-Destination Survey Form



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Table 1
Survey Distribution Times and Locations

7:30 - 9:30 AM	10:30 AM - 12:30 PM	3:30 - 5:30 PM
Forest Drive @ South River Road	Forest Drive @ South River Road	Forest Drive @ South River Road
Forest Drive @ Newtowne Drive	Forest Drive @ Newtowne Drive	Forest Drive @ Newtowne Drive
Northbound Spa Road @ Hilltop Lane	Northbound Spa Road @ Hilltop Lane	Southbound Spa Road @ Forest Drive
Northbound Bay Ridge Road @ Tyler Avenue	Southbound Bay Ridge Road @ Forest Drive	Southbound Bay Ridge Road @ Forest Drive
Westbound Forest Drive @ Hillsmere Drive	Eastbound and Westbound Forest Drive @ Hillsmere Drive	Eastbound Forest Drive @ Hillsmere Drive

D. DATA ANALYSIS

The WBCM address was printed on the survey forms as the return address. Survey forms began arriving at WBCM the next day after the distribution. A total of 2041 forms were returned (61 of which were not included in the following analyses due to late arrival), giving a return rate of 37.4%; well above the average expected return rate. The data was entered into a spreadsheet database program. The survey data was sorted to highlight specific travel patterns. Appendix A contains the survey database output for all five locations. Tables 2 through 7 summarize the returned survey data.

Table 2
Number of Returned Surveys by Time of Day

	AM	MID	PM	Unknown	TOTAL
Newtowne	339	113	193	71	716
Hillsmere	255	125	134	3	517
South River	25	39	11	6	81
Spa	193	59	62	51	365
Bay Ridge	165	63	70	3	301
TOTAL	977	399	470	134	1980



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Table 3
Trip Purpose by Time of Day (%)

	AM					MID					PM				
	1	2	3	4	O	1	2	3	4	O	1	2	3	4	O
Newtowne	77.3	5.3	3.2	3.8	10.4	27.4	4.4	25.7	16.8	25.7	54.4	3.6	10.9	7.3	23.8
Hillsmere	76.9	5.5	2.3	2.0	13.3	24.8	6.4	22.4	15.2	31.2	62.7	3.0	12.7	5.9	15.7
South River	52.0	4.0	12.0	12.0	20.0	15.4	0	53.8	10.3	20.5	54.5	0	0	18.2	27.3
Spa	70.5	9.8	3.1	1.0	15.6	20.3	10.2	13.6	15.3	40.6	43.5	4.8	9.7	8.1	33.9
Bay Ridge	71.5	13.3	4.2	3.0	8.0	15.9	3.2	42.9	9.5	28.5	54.3	1.4	18.6	1.4	24.3

1. Commuting to/from Work
2. Commuting to/from School
3. Shopping
4. Business Travel
- O. Other



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Table 4
 % Trips with Origin or Destination in Forest Drive Vicinity
 (Forest Drive Vicinity Zip Codes: 21401, 21403)

	Origin			Destination		
	21401	21403	Other	21401	21403	Other
Newtowne	22.6	37.7	39.7	15.9	59.2	24.9
Hillsmere	22.2	29.4	48.4	9.7	69.8	20.5
South River	46.9	11.1	42.0	42.0	22.2	35.8
Spa	13.7	69.6	16.7	41.9	23.6	34.5
Bay Ridge	8.9	81.1	10.0	28.9	47.5	23.6

Table 5
 % Local Trips

	From 21401 to 21401	From 21401 to 21403	From 21403 to 21401	From 21403 to 21403	Total Internal Trips (#,%)
Newtowne	3.9	8.9	15.7	14.2	306 - 42.7%
Hillsmere	1.2	7.0	20.3	11.0	204 - 39.5%
South River	27.2	3.7	8.6	4.9	36 - 44.4%
Spa	4.1	6.6	37.5	9.6	211 - 57.8%
Bay Ridge	3.0	5.3	25.2	36.5	211 - 70.0%
Total	4.0	7.2	22.1	15.6	968 - 48.9%



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Table 6
% of Intermediate Stops

	AM	MID	PM
Newtowne	17.7	42.5	25.9
Hillsmere	21.2	40.0	33.6
South River	24.0	25.6	45.5
Spa	29.0	30.5	41.9
Bay Ridge	32.1	46.0	40.0

Table 7
% Transit Trips

	Trips that included Public Transit (# - %)	Motorists that would use Park and Ride lots on Forest Drive (# - %)
Newtowne	15 - 2.1%	78 - 10.9%
Hillsmere	3 - 0.01%	58 - 11.2%
South River	2 - 2.5%	8 - 9.9%
Spa	9 - 2.5%	33 - 9.0%
Bay Ridge	2 - 0.01%	28 - 9.3%

E. CONCLUSIONS

The following general points can be made concerning the travel patterns along Forest Drive:

- The high 37.4% return rate shows the high commuter interest in the congestion situation on Forest Drive.
- School traffic is not a major element of the peak period trips; less than 6% of the traffic was school oriented. Spa Road and Bay Ridge Road serve schools; however, the school-related trips accounted for only 13% of the total trips.



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- Commuting trips accounted for the majority of the traffic even during the mid-day.
- Shopping trips are not a major component of the morning and evening trips. Mid-day shopping trips are only significant along Bay Ridge Road heading towards the retail centers along Hillsmere Drive. Shopping trips comprised the majority of trips along South River Road during the mid-day period indicating that "Old" Forest Drive is still perceived as a viable alternative route to Aris T. Allen.
- Roughly 49% of the traffic is internal to the peninsula and could be served by a local transit system. Sixteen percent of the total traffic has origins and destinations east of Spa Road.
- Thirty three percent of the traffic had origins or destinations within the peninsula passing through Forest Drive west of Spa Road. An Alternative route south of Spa Road would be a viable option for the local trips.
- A high percentage (72.8%) of the traffic passing through the Forest Drive/South River Road intersection is through traffic, not originating or destined for the 21401 zip code.
- The traffic to and from areas east of Spa Road include a significant number of intermediate stops with percentages over 40%.
- Newtowne Drive traffic is destination specific with minimal intermediate stops.
- Mid-day traffic includes multiple stops. Such a travel pattern could be supported by a local shuttle bus system.
- Transit is not popular with residents of the peninsula. A maximum of only 2.5% of the respondents included transit as part of their trips. Park-n-Rides, if available would only attract a maximum of 11% of the drivers.

