Statewide Transportation Analysis & Research

STATEWIDE TRAFFIC FORECASTING
MODEL WORKSHOP

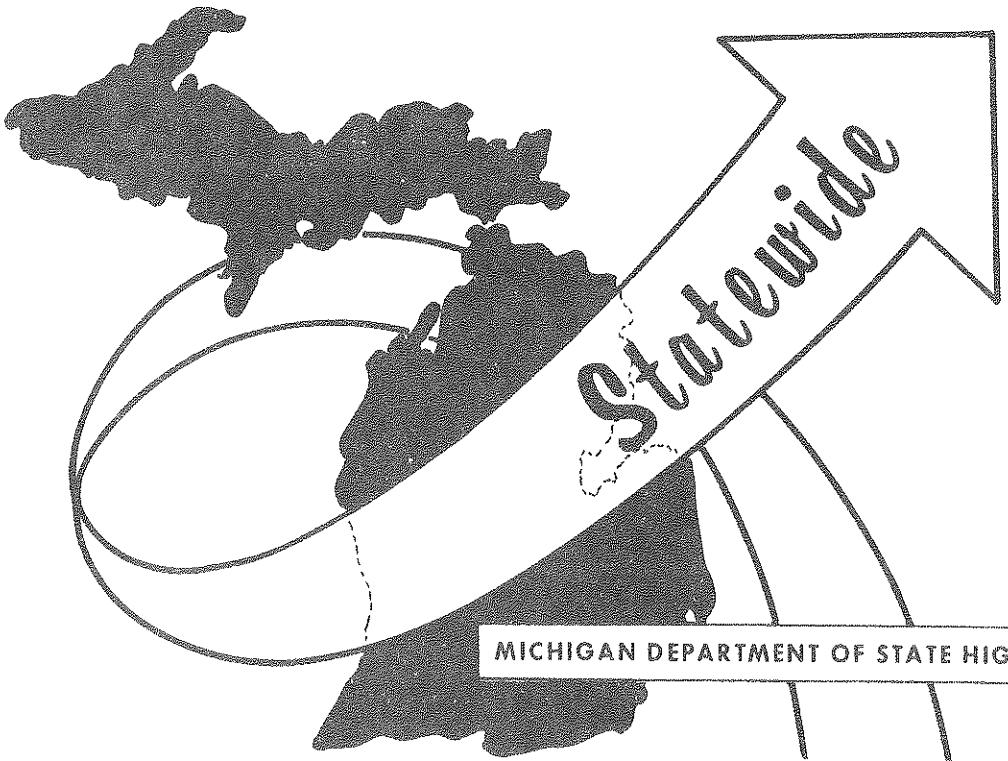
REGION 4

SPONSORED BY MDSH & FHWA

VOLUME I-A

WORKSHOP TOPIC SUMMARIES

JANUARY 1972



MICHIGAN DEPARTMENT OF STATE HIGHWAYS AND TRANSPORTATION

MICHIGAN DEPARTMENT OF STATE HIGHWAYS

in cooperation with

The U.S. Department of Transportation

Federal Highway Administration

Prepared by:

Transportation Planning Division

Transportation Survey & Analysis Section

STATEWIDE TRAFFIC FORECASTING MODEL WORKSHOP

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JANUARY 1972

Statewide Studies Unit

Supervisor Richard E. Esch

Richard E. Esch

ACKNOWLEDGMENTS

We wish to thank the following individuals for their assistance in making this a successful workshop.

Mr. Sam Cryderman	Engineer of Transportation Planning
Mr. Daniel Watt	Division Engineer, Federal Highway Administration
Mr. Keith Bushnell	Engineer of Transportation Survey & Analysis Section
Mr. Gerald Reihsen	Deputy Chief of Planning & Research, Federal Highway Administration
Mr. Harry Krashen	Planning & Research Engineer, Federal Highway Administration
Mr. Fred Hempel	Asst. Planning & Research Engineer, Federal Highway Administration
Mr. Phillip A. Hazen	Highway Engineer of Program Management Division, Federal Highway Administration

We would also like to thank the states of Illinois, Wisconsin, Minnesota and Kentucky for moderating selected sessions of this workshop.

STATE OF MICHIGAN

WILLIAM G. MILLIKEN, GOVERNOR

DEPARTMENT OF STATE HIGHWAYS

STATE HIGHWAYS BUILDING – POST OFFICE DRAWER K – LANSING, MICHIGAN 48904
HENRIK E. STAFSETH, DIRECTOR

February 17, 1972

Mr. Sam F. Cryderman
Engineer of Transportation Planning
Transportation Planning Division

Dear Mr. Cryderman:

The Transportation Survey and Analysis Section of the Transportation Planning Division is pleased to present Volume I-A in a series of reports dealing with "Michigan's Statewide Traffic Forecasting Model". This volume presents a brief summary of the Statewide Traffic Forecasting Model Workshop sponsored by the Michigan Department of State Highways and Federal Highway Administration in November 1971.

Detailed minutes of each days discussion were recorded and are available from Phil Hazen in the Federal Highway Administration, Washington Office.

Respectfully submitted,

Keith E. Bushnell

Keith E. Bushnell, Engineer
Transportation Survey & Analysis

MICHIGAN
THE GREAT LAKE STATE

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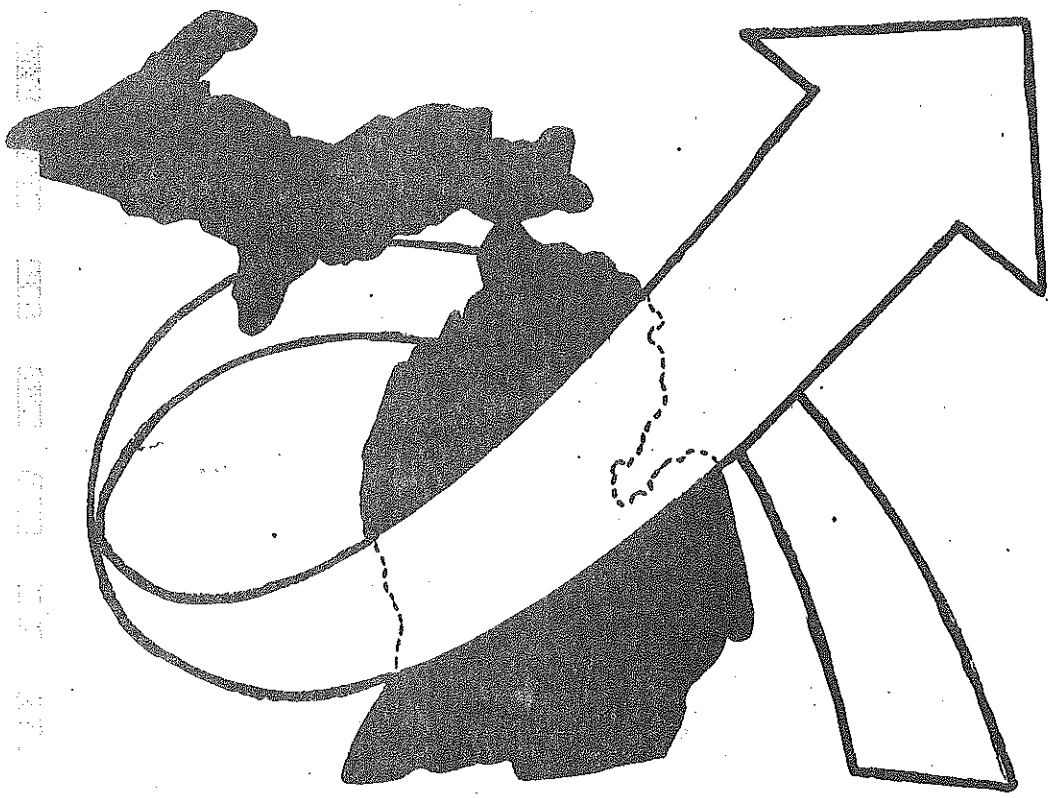
INTRODUCTION



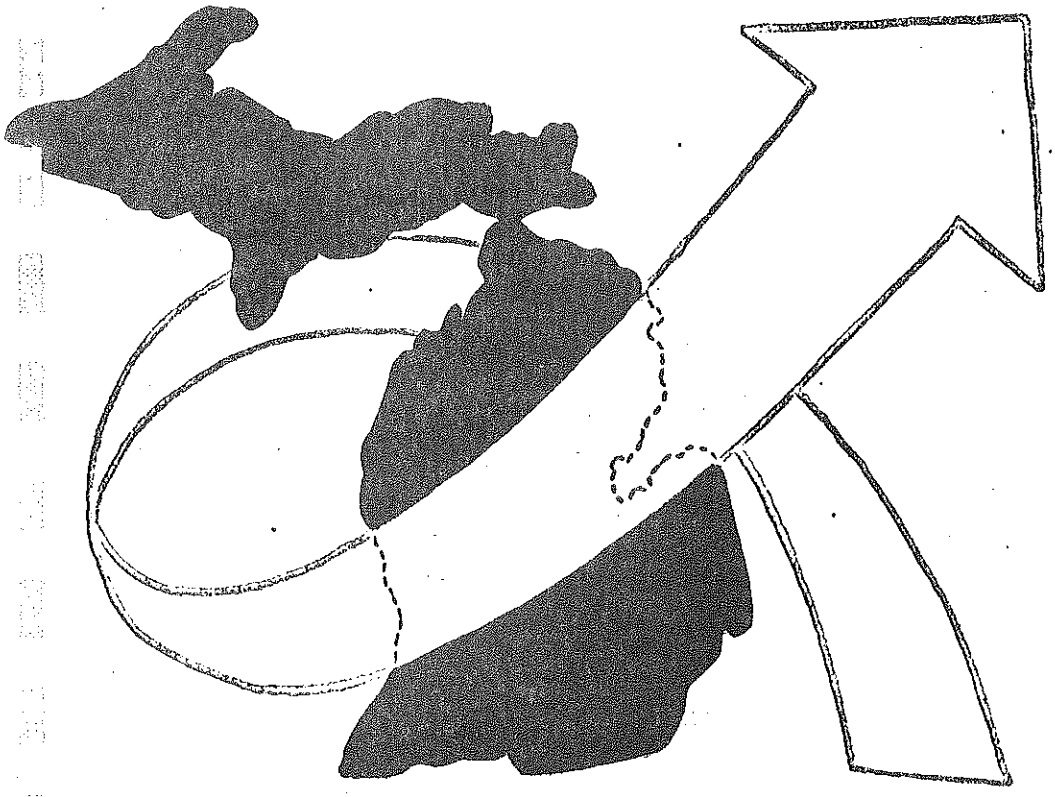
SUMMARY
Statewide Traffic Model Workshop
Kellogg Center, Michigan State University
Lansing, Michigan
November 9-11, 1971

Sponsor: Federal Highway Administration
Host: Michigan Department of State Highways

The workshop began with an introduction by Mr. Sam Cryderman, Engineer of Transportation Planning Division, Michigan Department of State Highways and Mr. Daniel Watt, Division Engineer, Federal Highway Administration. Both Mr. Cryderman and Mr. Watt noted the need for planning on a statewide basis and the importance of workshops such as this for the exchange of information and ideas. They also stressed that planning should be more meaningful and product oriented.

After the introduction, the workshop was divided into several sessions, each concerned with an aspect of statewide modeling, moderated by representatives of the participating states and FHWA. A schedule of the workshop sessions showing the topics together with a list of participants is included in the attachments to this summary.

TOPIC SUMMARIES



Session 1 STATEWIDE MODEL'S POTENTIAL
Moderator: Gerald Reihsen, Federal Highway Administration

Mr. Reihsen noted that the use of statewide traffic models forces a State to look at the ultimate objective of the highway planning program - the planning and building of highways. Since the planning surveys were initiated in the mid 30's we have been undertaking line planning items without maximum integration of data sources. During the 60's there was an influx of planning funds. In developing programs it was not possible to fully ascertain how well they met the ultimate objectives. However, now many States are spending money in addition to matching Federal funds for planning and it is necessary that the planning items be fully integrated and cost effective. This is the reason for the substantial interest at the State and Federal levels in statewide planning models.

In addition, State planning models will give better support to our top administrators in justifying highway programs and could raise the level of input to that of urban studies for use in national needs studies.

During the discussion period each state presented a brief summary of its experience in statewide models.

Wisconsin began its model work in the early 1960's. The first approach was to use existing multiple screenline O-D data and the Fratar technique to obtain 1990 forecasts of statewide travel. However, the results were valid only at the screenlines. The model was used to evaluate alternative networks leading to a State Highway Plan which was accepted by the State Highway Commission on July 7, 1966, and has been used to support the submissions to the Legislature since that date. Current output from the study is useful for a number of functions such as public hearings, route location, initial input for design, the Interstate Cost Estimate, priority planning, etc. The

planning effort is being expanded to include additional transportation modes.

Kentucky became involved with statewide traffic models about 1967. Their efforts have been based on a study design prepared by Alan M. Voorhees and Associates. Although they are still in the preliminary phases of development, the model is expected to have great potential as an aid to the State's political decision makers, e.g., in selection of route locations for toll roads and other highways. They intend to carry out their activities primarily with Department staff and expect to complete work in about 3 years.

Minnesota has been involved in statewide model planning since 1966. The O-D data consisted primarily of data gathered from cordon surveys around their 60 largest cities. Most of these surveys were conducted during the summer of 1966. Travel data have been synthesized for the other non-surveyed cities down to a population of 600. The Fratar techniques, based on zonal growth in population, have been used to develop a preliminary 1990 trip table which has been assigned to the existing system. Commission level status of the model and a State plan stemming from these has not as yet been achieved.

Pennsylvania began statewide planning about 1963 primarily to test the effect of Interstate 80 in diverting traffic away from the Pennsylvania Turnpike and the Philadelphia area. The O-D data were obtained from 12 screenlines conducted in 1962. A consultant developed 149 zones and a corridor highway or spiderweb type of network for assignment. The intervening opportunities model was used for trip distribution. Future assignments included the 1975 and 1990 assignments. Work is presently underway within the Pennsylvania Department of Transportation on refinement of a 1700 zone, 12,000 mile network. A base year trip table is being completed using

existing data from the multiple screenlines, urban cordons, and special studies and with synthesized travel for the remaining zones. It is expected that the Fratar technique will be used to obtain future travel.

Illinois has developed a statewide traffic model in connection with a needs study conducted by Wilbur Smith and Associates. They indicated their study had been used primarily for functional classification but had aided in justifying increased license fees and a bond issue for highways. They see the potential for use in realignment of funding between systems and in alternate route selection.

Michigan's statewide modeling effort has been concentrated on research and development of traffic forecasts for design that are superior to present manual methods. Development has been in-house rather than through a consultant and work has been based on data gathered from urban transportation studies. The present model consists of 540 zones although a 2300 zone version is under development. Possible benefits of the model are in interstate route studies, bypass studies, needs studies and intermodal planning.

Session 2 CURRENT STATE EFFORTS
Moderator: Phil Hazen, Federal Highway Administration

Mr. Hazen began the discussion by citing progress in several statewide studies with which he is familiar. Specific mention was made of the optic sense scanning technique utilized in Minnesota which permits the field survey interviewer to perform the coding function thus eliminating the need for time consuming conversion of field data by special staff.

Connecticut and Rhode Island are presently working on a comprehensive statewide model based on a 1 - 2½% home interview sample. They are conducting attitude surveys through home interviews, legislators and newspaper articles.

There are 23 States that have done some work on statewide transportation studies. The level of effort for the present year varies from New York where $642,000 has been budgeted to study all modes of transportation to Mississippi where $15,000 has been budgeted to initiate a statewide traffic model using urban external cordon data. In California the study group is using the models to cover all areas in the State. A main objective of California is to develop one statewide model that is realistic in combining forecasts of population, employment, and travel for all areas.

Minnesota has noted significant differences between weekday and weekend travel so they feel that different models may be required. The same may be true of urban vs. rural travel. The opinion was expressed, however, that the ratio of weekend to weekday travel for given links has remained constant in most cases.

Session 3 DATA REQUIREMENTS AND DATA BANK ESTABLISHMENT
Moderator: Lowell Markert and Ron Knox, Illinois

The basic needs cited during this session included an inventory of base year travel & facilities, origin-destination data, a physical inventory, and socio-economic data.

Also mentioned was a particular problem associated with data banks - compatibility of data identification. Road inventory data in Illinois are identified according to a linear type reference, that is, the distance in miles that a particular point is from a beginning point on a route. These milepoints can change over time as routes are shortened or lengthened by construction. Land use and demographic data, on the other hand, are locationally identified with coordinates. It is difficult to correlate the two types of identification.

Several solutions were discussed concerning the problem that milepoint identification becomes obsolete because of construction changes. One alternative is to use location reference identification which is not tied directly to the beginning of the route. Rather, a distance from some known reference point is used. True milepoints are retained for the known reference points. Wisconsin does something similar to this as part of the Highway Network Data Information System it has developed. In this system, reference posts along the roadways are used to locate data observations. The posts are not tied to fixed mileages but they are associated with current milepoints of the route, and have coded coordinates associated with them. This will provide for relating linear and areal type data to some extent.

A compatible location reference system is advantageous for storage

and retrieval of different kinds of data such as O-D, volume counts, socio-economic data, accident data, etc., to avoid duplication of effort in collection and storage. Much work still needs to be done since none of the states now have a fully operational system.

Session 4 ZONE-NETWORK SLEECTION AND DEFINITION
Moderator: George Gunderson, Wisconsin

Wisconsin has established, in connection with the multi-state Mississippi Valley O-D effort, multiple screenlines along degree lines creating rectangular "cells" which were numbered east-west and north-south. The system consists of approximately 570 zones. The assignment network contains about 15,000 miles of highways comprising about 95% of the state trunk highway system. Network speeds are determined by functional classification.

Following Mr. Gunderson's presentation, each State was asked to describe its statewide model's zone characteristics including zone size, number of zones, zone boundaries, input data and output data. Also, the networks were compared as to the number of miles on the network, the percentage of total State system, description of routes, and the link information used for the model. A table summarizing this information is attached.

Session 5 TRAFFIC DATA COLLECTION PROCESS
Moderator: Henry Bennett, Kentucky

Mr. Bennett summarized Kentucky's experience in statewide planning. Development of their statewide model has been based on a study design prepared by Alan M. Voorhees & Associates. External travel data was obtained from roadside interviews conducted along a stateline cordon. Screenlines were also established along many geographic barriers to check the data.

After studying the various methods of collecting internal area trip data, Kentucky selected the mail survey technique for both the home interview and the truck interview. The home interview sample will be selected from R. L. Polk's files of car owner households. Their procedure is to follow up the initial questionnaire with a reminder letter timed to arrive a day or two after the initial letter. If there is no response within two weeks a second reminder with a duplicate questionnaire is mailed. For a preselected subsample if there is still no response or if the returned questionnaire needs clarification additional follow up will be made by telephone or by a field visit. In this way they feel certain they will be able to obtain their desired usable sample (minimum of 30 per county). This procedure has an economic advantage over a field O-D collection effort which can be quite expensive on a statewide basis. Preliminary results of their mail survey are attached to this summary.

In a general discussion of data collection two particular areas were identified. Highway-specific O-D data which include that gathered at screenlines, cordon lines or other special locations. Area-specific data, on the other hand include coverage counts and origin-destination trip data from households and trucking firms.

Session 6 SOCIO-ECONOMIC DATA AVAILABILITY AND APPLICATION
Moderator: Lyle Hansen and Bill Hayne, Minnesota

All States in the region are using population as the major independent variable in the generation and distribution of traffic in the statewide traffic models. Wisconsin used the growth in population per zone plus the growth in vehicle-miles per person in its Fratar procedure. Minnesota synthesized travel data for some small non-surveyed cities based on trips per capita for each size of city. They modified their average trip generation equation for certain surveyed cities by multiplying or dividing it by 1.422 since the equation was under-generating trips in recreational areas and over-generating trips in agricultural cities by this amount. Minnesota used the Fratar procedure to develop 1990 travel. It was noted during the discussion that shifts in population may be more significant than absolute population growth. In Michigan the trip generation that was based on population had to be adjusted to reflect the lower trip making per capita in the northern portions of the State.

Independent variables other than population were discussed. In forecasting truck trips, Wisconsin used employment instead of population, but since employment was calculated as a percentage of population it was doubtful if employment was a better variable than population. In its investigation of the recreational trips Michigan plans on using retail trade as a second variable. Pennsylvania plans on using personal income, retail sales, wholesale sales, value added by manufacturer, and agriculture activities by zone as measures to refine its functional classification of highways serving the zones. The conclusion was that population was the main variable being used in statewide traffic models.

Session 7 TRIP GENERATION - DISTRIBUTION MODELS
Moderator: Richard Esch, Michigan

The preliminary model in Michigan was developed by a consultant, Arthur D. Little, Inc., in 1965. Origin and destination data were used from the external cordons of nine urban areas to simulate the trip generation of every zone. After looking at the average trip lengths, the data were grouped for models into auto trips for all purposes except vacation, auto vacation trips, and truck trips. The trip generation part of the model was based on the zonal population plus the ring population within a circle 30 minutes from the central zone. For example, the auto trips from and to zone C = $1.04\ P_c^{0.89}\ (P_c + P_e)^{0.19}$ where P_c and P_e equal the population of zone C and the populations of all zones within 30 minutes driving time of zone C, respectively.

The exponent of travel time varied from 1.0 to 3.0 based on distance (time) from the zone. The conclusion was that the model as developed by the consultant was not calibrated and many shortcuts were taken that later caused trouble.

Session 8 TOTAL MODEL CALIBRATION
Moderator: Richard Nelson, Michigan

Two types of network calibration were mentioned; link specific, used in Michigan; and cutline (screenline analysis). It was noted that, while the cutline method produces good averages, individual link volumes may vary as much as 200% from actual ground counts. A flow chart of the various steps in network calibration is shown on exhibit 23 of the attachments.

The importance of zone size and shape was stressed and several examples of problems Michigan has had in this respect were illustrated. Another problem, overloading of facilities at certain nodes was solved by "backloading" - loading trips on secondary roads and letting them filter onto the main network. This solution resulted in the coding of a supplementary network of roads. Michigan believes that many problems of loading will be solved when they go to a 2300 zone system. Network speeds were also a problem. After correcting the obvious errors of coding, distances, and speeds, the link speeds had to be further adjusted so that trips would be correctly assigned to major alternate cross state routes.

Further calibration after making assignments included applying a factor they call Beta to a zone's total generation when it was obvious that a zone was over generating or under generating trips, and applying "Trip-Mod" which modified a particular interzonal number of trips. The 1966 base assignment was calibrated to within plus or minus 20 percent of the ADT. Exhibit 33 indicates how these adjustments are made in the calibration process.

Michigan stressed the importance of quick turn-around on the computer. They would insure that all their analysis was done during the week and new runs were made on the weekend so the output would be ready for further analysis and calibration the next week. Continuity of personnel was also very important

because the men working on calibration would get to the point where they knew what had been previously tried and what change would yield the highest probable success in the area under calibration. A year was spent in calibration and the men involved now know each area of the State in detail.

Session 9 MODEL DEVELOPMENT COSTS AND PERSONNEL REQUIREMENTS
Moderator: Phil Hazen, Federal Highway Administration

Although the requirements vary significantly from state to state, the following rough approximations were generally agreed upon:

Total Model Development:

In-House	$400,000 - $500,000
Consultant	$1,000,000

Data availability was considered to be the most significant factor in these figures.

Staffing Requirements	4 - 10 persons
Organization, Network development	1 - 4 people
O-D Surveys	Up to 100 people
Model Development, Plans, etc.	3 - 6 people

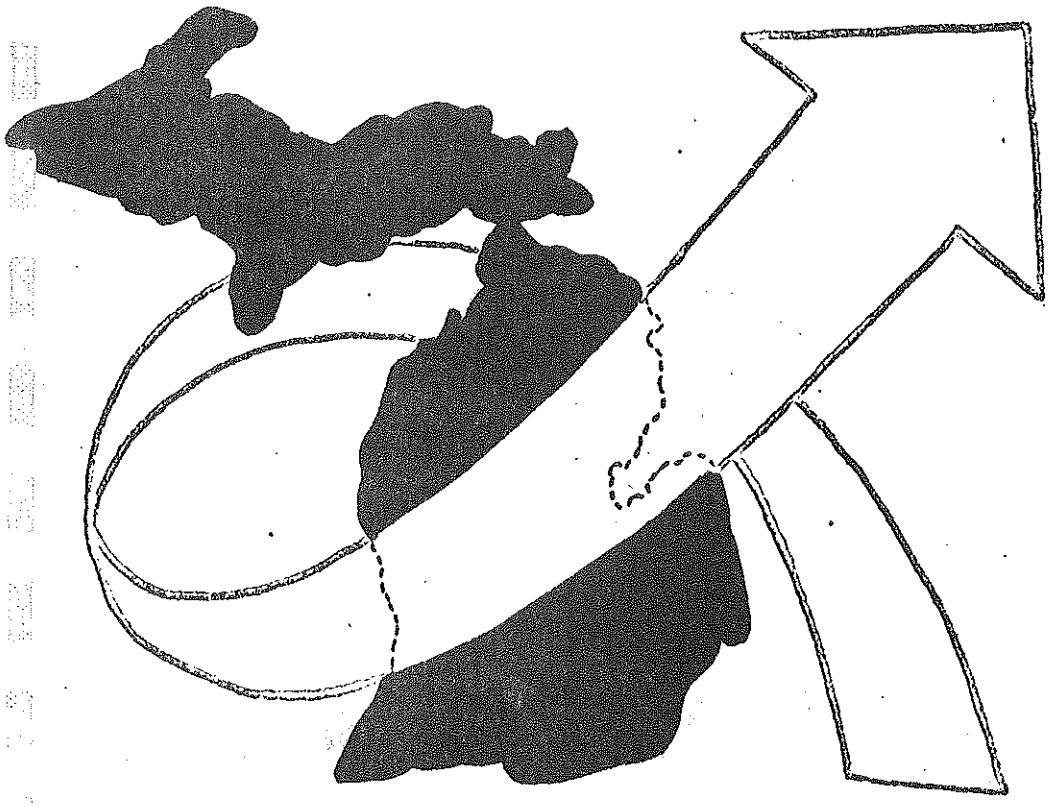
It was the general consensus that a small full time staff was more efficient than a larger part time staff.

In the summary discussion of the workshop several points were brought out:

1. The quality and quantity of available data is the single most important factor to consider in model development.
2. While model development through a consultant is the quickest and most expedient method, in the long run it is likely to be the most expensive and the results less satisfactory than in-house development. The employment of consultants in the preparation of study designs and as a staff resource was highly recommended, however.
3. The employment of staff on a continuing basis in the modeling work rather than intermittently was generally considered desirable.

4. Statewide models should be checked against independent estimates of vehicle miles of travel (VMT), and in general any variance should not exceed 10 percent.

APPENDIX



APPENDIX

The following attachments include those referenced in the summary as well as additional material of general interest:

1. Workshop agenda
2. List of participants
3. Report on Kentucky mail survey
4. Flow charts from the presentation by Michigan
5. Table 1, Classes of Statewide Transportation Studies - Washington Office session
6. Statewide Transportation Studies, Proposed Activities for the Present Calendar or Fiscal Years - Washington Office session
7. Table of data on present statewide planning efforts

DRAFT AGENDA
STATEWIDE TRAFFIC MODEL WORKSHOP
FOR REGION 4 FHWA
HOST STATE MICHIGAN

November 9

9:30 - 10:00 - Welcoming Remarks and Introduction -
Mr. Sam Cryderman, Engineer of
Transportation Planning Division

10:00 - 10:15 - Coffee

10:15 - 12:00 - Statewide Model's Potential
Moderator - FHWA Regional Office

12:00 - 1:00 - Lunch

1:00 - 2:45 - Current State Efforts
Moderator - FHWA Washington Office

2:45 - 3:00 - Coffee

3:00 - 5:00 - Data requirements & Data Bank Establishment
Moderator - Illinois

November 10

8:00 - 8:15 - Announcements

8:15 - 9:45 - Zone-Network Selection and Definition
Moderator - Wisconsin

9:45 - 10:00 - Coffee

10:00 - 12:00 - Traffic Data Collection Process
Moderator - Kentucky

12:00 - 1:00 - Lunch

1:00 - 2:45 - Socio-Economic Data Availability & Application
Moderator - Minnesota

2:45 - 3:00 - Coffee

3:00 - 5:00 - Trip Generation-Distribution Model
Moderator - Michigan

November 11

8:00 - 8:15 - Announcements

8:15 - 9:45 - Total Model Calibration
Moderator - Michigan

9:45 - 10:00 - Coffee

10:00 - 12:00 - Model Development Costs and Personnel Requirements
Moderator - FHWA Washington Office

12:00 - 1:00 - Lunch

1:00 - 2:30 - Discussion by All and Closing Remarks
Moderator - Michigan

NOTE: If your State is moderating a session, it has been suggested that the formal "talk" part of the session be limited to 20-30 minutes and the remainder of the session be allocated to discussion.

LIST OF PARTICIPANTS

STATE HIGHWAY DEPARTMENTS

KENTUCKY:

James W. Fehr
B. J. Sexton
Henry Bennett

INDIANA:

L. R. Scott

MINNESOTA:

Lyle Hansen
Bill Hayne

ILLINOIS:

Lowell Markert
Ron Knox

WISCONSIN:

Mr. Gunderson

OHIO:

Bill Bunkley
Harold Rich
Willard Armstrong
Bill Kuhn

PENNSYLVANIA:

Tom Teneyck

MICHIGAN:

Keith Bushnell
Dick Esch
Larry Swick
Rick Nelson
George Liu

LIST OF PARTICIPANTS

FEDERAL HIGHWAY ADMINISTRATION

ILLINOIS:

Jerry Reihsen
John Sweek
Dick Beaubien

INDIANA:

Tom Ptak
Don Cameron

KENTUCKY:

Pete Slominski

MINNESOTA:

John Ohrn

OHIO:

Bruce Cannon

WISCONSIN:

Marty Monahan

WASHINGTON D.C.

Phil Hazen
Jim Geest

MICHIGAN:

Fred Hempel
Harry Krashen

HOUSEHOLD TRAVEL SURVEY QUESTIONNAIRE PILOT STUDY RESULTS KENTUCKY STATEWIDE TRAFFIC MODEL

December, 1971

by
STAFF
Statewide Traffic Model Section
Division of Planning
Kentucky Department of Highways
In Cooperation With
U.S. Department of Transportation
Federal Highway Administration

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Introduction

The development of a statewide traffic forecasting model is one of the current objectives of the Kentucky Department of Highways. As a result of a review of previous efforts in traffic model development by other states and the joint state-consultant development of a study design entitled "Study Design: Kentucky Statewide Traffic Model" by Alan M. Voorhees and Associates, the need was established for the socio-economic and travel inventory data on a statewide basis similar to that normally used in urban area traffic model development.

The needed travel inventory data could be collected by any one of at least four techniques: (1) the normal personal visit by an interviewer on a random or nth dwelling unit (DU) basis; (2) personal interviews on a cluster sampling basis; (3) a telephone interview; or (4) a mail interview on a random or nth DU basis. The personal interview technique was abandoned due to the organizational and control problems for such a vast area. One of the adjacent states had used the personal interview technique on a cluster sampling basis, but was not completely satisfied with the results, so this technique was not further considered. The telephone technique was considered and abandoned due to the relatively low percentage of the population having telephones in certain areas of the state and the problem of identifying the universe and selecting a representative sample.

Therefore, because of the aforementioned limitations of other techniques and because of its compatibility to our limited staffing situation, the mail technique was tentatively selected for use in collecting the necessary travel inventory data. As this technique has had limited application in collecting this type of transportation planning data, a pilot study was initiated to answer several questions about the mechanics and effectiveness of the technique and to test a proposed questionnaire before moving into the full scale survey. This report documents the Household Travel Survey Questionnaire (HTSQ) pilot study efforts.

Description of Proposed Mail Survey Technique

The proposed mail survey technique that was to be tested in the pilot study is described in this section. The actual pilot study process is described elsewhere in this report. Details of the sample size determination are contained in an appendix to this report.

The sample households to which the questionnaires will be sent are to be selected from an edited file of motor vehicle registrations. As there is no computerized file of motor vehicle registration in Kentucky state government, a file maintained by the R.L. polk Company will be used as the sample universe. This file has been edited so that it is actually a file of car-owning households. The sample will be selected on an nth address basis with a minimum of sixty sample elements per county. All necessary labels for the various mailings described below will be printed directly from the computer and thirty households per county

will be designated as a subsample as a part of the sample selection process. Households in the subsample will be subject to a detailed, data-verification followup procedure.

Each sample household will be mailed a questionnaire along with a letter signed by the Commissioner of Highways appealing for cooperation, an introduction explaining the purpose of the survey, a set of instructions regarding the questionnaire and a return postage paid envelope. Survey Day, a specific day of the week for which trips are to be recorded, will be marked on the questionnaire (a specific week was not designated). This package will be mailed third class so as to arrive 1-2 days before Survey Day so the citizen will have a chance to get prepared to comply with the request. As each mailing is made, the mailing date will be recorded.

A followup letter reminding the citizen to complete the questionnaire will be mailed first class on Survey Day. Using this procedure, the first followup letter will arrive one to two days after Survey Day. The idea behind this procedure is that if the citizen has inadvertently failed to respond, the trips made on Survey Day are still fresh enough in his mind that he can record them fairly accurately.

If there has been no response within two weeks of Survey Day, an additional questionnaire package and another letter appealing for cooperation will be mailed.

Upon receipt of a completed questionnaire by the Division of Planning, a record of its receipt will be made and the responses coded insofar as possible. If the reported information is so incomplete or unclear that reasonable inferences cannot be made and hence coding cannot be completed, a telephone call will be made to clarify the information. (The respondent's telephone number is requested in Item 10 of the questionnaire.) Telephone followups will also be made on each subsample questionnaire to verify the data. This procedure will be followed even if the data appear complete and reasonable.

An equal number of questionnaires are tentatively scheduled to be mailed each weekday over a period of about seven months between January and July to account for seasonal variation. Prior to the beginning of the actual survey, the mailing labels will be sorted so that at the end of each two week mailing period, questionnaires for each Survey Day will have been sent to every county in the state.

Statewide newspaper coverage explaining the project is scheduled just prior to the first week of mailing. Subsequent newspaper coverage will be on a monthly basis to report the response and elicit continued cooperation in the survey. More frequent coverage would be desirable, but the Department's public information specialists have indicated that newspapers will generally not give more frequent coverage to an undertaking of this nature.

Questions to be Answered

As previously stated, the purpose of the HTSQ pilot study was to answer several questions regarding the application and effectiveness of the mail survey technique and to test the design of a proposed questionnaire. While there is the tendency to make many inferences from the pilot study results, the questions that really need to be answered are as follows:

1. What response rate can be expected using the proposed questionnaire and associated followup procedure?
2. What percentage of the returned questionnaires will require a telephone call to clarify or supplement unclear or incomplete responses?
3. Is the proposed questionnaire properly designed? Will the respondent understand the questions?
4. What percentage of the original sample must be sent the second followup letter and questionnaire?
5. Does the second followup letter improve the response rate enough to justify its use?
6. Do the socio-economic data reported via the questionnaire compare favorably with census information?
7. Will the response rate vary significantly by geographic area?
8. Will this technique provide satisfactory results for traffic model development purposes?

Pilot Study Process

The pilot study process was a two phase effort. The first phase was the development of a tentative questionnaire. The second phase was an actual mailing of the tentative questionnaire to one household per county. Phase II results are the basis for answering the questions stated above.

The format of the first draft of the questionnaire was patterned after a telephone survey questionnaire designed by G. H. Johnson, Department of Highways, Ontario, Canada, and B. C. Forest, Recon Research Consultants, Ltd. This work by Johnson and Forest was reported in a paper presented at the 1966 HRB Origin-Destination meeting on Statewide Transportation Studies. A review of the first draft by transportation planning engineers in the Department resulted in several changes and a second draft of the questionnaire.

The second draft was forwarded to the FHWA for review and comments. At the same time, both office and field employees in each of the Department's twelve highway districts were requested to fill out the questionnaire. The responses from Department employees were carefully reviewed in an effort to detect unclear portions of the questionnaire. Based on this review and the comments provided by the FHWA, revisions to the second draft were made. A copy of the third draft is an attachment to this report. The third draft was used in Phase II of the pilot study process.

Phase II of the pilot study process was carried out as described in the section entitled "Description of Proposed Mail Survey Technique" with three exceptions. In Phase II, one auto owner per county was selected randomly by hand from the motor vehicle registration files maintained by the Kentucky Department of Public Safety. No subsample was selected for detailed verification of responses and no newspaper publicity was used in the pilot study process.

Discussion of Results

The tabular results of Phase II of the pilot study process are shown in Tables 1 through 4. The answers to the questions previously proposed can be answered as follows using the data presented in the various tables:

Question #1: Item 2 of Table 1 indicates that the proposed questionnaire and associated followup letters will result in a total response of about 48 percent. Item 3 of Table 1 indicates that the usable response rate will be about 36 percent. Item 4 of Table 1 indicates that the majority of the nonusable responses were due to the addresses being unknown at the given address, i.e. the named person had moved and left no forwarding address.

Question #2: Item 3 of Table 1 indicates that only seven percent of the usable returns required a telephone call to obtain additional information or to clarify the information supplied.

Question #3: Based on the relatively low percentage of returned questionnaires for which a followup telephone call was required, it appears that the proposed questionnaire is reasonably well designed to elicit the maximum usable information.

Question #4: Item 1, Table 2, indicates that within 14 days of Survey Day, 35.6 percent of the questionnaires mailed originally will be accounted for by some type of response. This means that about two-thirds of the original sample must be sent the second followup letter and additional questionnaire.

Question #5: Considerable discussion is in order before concluding whether or not the mailing of the second followup letter improves the response rate enough to justify its use. This discussion is based on the tabular results presented in Table 2. Item 1 shows the number of responses by time period measured from Survey Day. Item 2 shows the tabular results of different interpretations of how effective the second followup letter was.

Question #6: Several items of information in either Table 3 or Table 4 under the columns headed "Total" and "Census" give some insight into whether or not the socio-economic data reported via the questionnaire compares favorably with census information.

Item B indicates that the average persons per household is somewhat less than that reported by the census data. The reason for this difference is largely explained by the data in Item C. These data indicate that the younger people are not adequately represented by the responses. As these younger people are the ones who have the larger families, the difference in persons per household between pilot study results and census results is understandable. At this time, there is no way to determine whether this lack of representation in the younger age groups is due to their failure to respond or due to the fact that they were not adequately represented in the pilot study sample. The natural tendency is to believe that the younger people simply didn't see fit to respond.

More positive compatibility between pilot study and census results is indicated by Item H, the average number of gainfully employed persons per household. pilot study and census results are identical. Further, the daily values of this item do not vary considerably from the average of all weekdays.

Although there is no comparable data from census, the average number of vehicle trips per household from the pilot study can be compared to the range of values found in urban study surveys. The pilot study results show an average of 6.2 vehicle trips per household. This value compares favorably with the range of 6.0 and 9.0 found in urban transportation surveys. The rate would probably be moved nearer the middle of the range had a more representative response been received from the younger age groups.

Question #7: Item A of Table 4 indicates that the response rate probably does not vary greatly by geographic area.

Question #8: As with any other data collection procedure, the mail technique has some problems associated with it. The major problem and the root of most other problems associated with the mail technique is a citizenry too busy with day to day living to respond to a rather lengthy questionnaire. It is hoped that newspaper publicity will help overcome this problem. Without some type of verification procedure, the validity of the responses could be questioned. It is believed that the detailed followup on the subsample will establish the validity of the data. Based on fairly reasonable assumptions concerning methods of accounting for, eliminating or minimizing most of the problem areas, it appears that this technique will produce data from which a reasonably satisfactory traffic model can be developed.

Conclusion

The basic conclusion is that the pilot study results indicate that the proposed technique will be reasonably satisfactory. The results of the actual survey may be improved somewhat by the proposed newspaper coverage.

After careful study of the results of the pilot effort, the decision was made to proceed with the full scale survey with no changes in the questionnaire or the technique.

The effect of the initial mailing and the first followup letter must be combined due to the mailing procedure used. Although the questionnaire mailed with the second followup letter was marked in a special way, there is some difficulty in determining how effective it was.

The most conservative interpretation, i.e., considering only the number of specially marked questionnaires that were returned (see Item 2A), would indicate that it was not very effective. The data indicate that only three of the 76 specially marked questionnaires were returned. These three additional responses improve both the total and usable response rates by about 2.6 percent.

There is reason to believe that as a minimum, a less conservative interpretation (see Item 2B, Table 2) should be made as follows. As it is doubtful that a person would wait until three weeks had elapsed before responding, a reasonable conculsion is that at least the six responses received between 21 and 28 days after survey day were the result of the second followup letter. This interpretation indicates then that the second followup letter improved the response rate by about five percent.

Due to the fact that some locations are closer than others to the central mailing point, it is possible that the second followup letter had some influence on the responses received between 14 and 21 days after Survey Day. It is reasonable to assume for this time period that the second followup letter acted as a reminder, as was intended, and caused some people to return the original questionnaire. The data in Item C of Table 2 are based on such an assumption. Specifically, it has been assumed here that at least one half of the responses received between 14 and 21 days after Survey Day were a result of the second followup letter. Using this interpretation, it appears that the second followup letter improves the usable response rate by about 7.6 percent.

Now, we have the question of whether or not the second followup letter is worth the extra effort and cost associated with it. Considering only the labor and postage cost, an economic analysis indicates that the extra cost is justified if the response rate is improved by between 6.5 percent and 7.0 percent.

As there is an assumption associated with the most logical interpretation of the response to different mailings, perhaps it is in order to point out at least one advantage of proceeding with the use of the second followup letter. Although the response rate is not greatly improved by the second followup letter, it is entirely possible that these few additional responses could mean the difference between success and failure of the survey. Therefore, because the second followup letter improved the usable response rate between 5.1 and 7.6 percent depending on the interpretation used, and the response rate improvement versus increased cost break-even point is between 6.5 and 7.0 percent, it appears reasonable to conclude that the usable response rate is improved enough by the second followup letter to justify the cost of the extra effort associated with it.

TABLE 1. OVERALL RESPONSE RESULTS FOR HTSQ PILOT STUDY KENTUCKY STATEWIDE TRAFFIC MODEL

(The results shown are dated 10/30/71 which is four weeks after the Original Survey Day)

Item Number	Category	Total	Percentage of Total Mailed	Subtotal	Percentage Subtotal is of Total
1.	Total Mailed	118	100%		
2.	Number of Responses	57	48.3%		
	A. Useable			43	75.4%
	B. Non Useable			14	24.6%
3.	Useable Responses	43	36.4%		
	A. No phone call required to clarify or supplement data			40	93.0%
	B. Phone call required to clarify or supplement data			3	7.0%
4.	Non Useable Responses	14	11.9%		
	A. Addressee Unknown			8	57.2%
	B. Addressee Deceased			2	14.3%
	C. Refusals			3	21.4%
	D. No longer Kentucky Resident			1	7.1%

TABLE 2. RESPONSE RESULTS BY ELAPSED TIME AND TO DIFFERENT MAILINGS FOR HTSQ PILOT STUDY KENTUCKY STATEWIDE TRAFFIC MODEL STUDY

(The results shown are dated 10/30/71 which is four weeks after the Original Survey Day)

	Number Useable Responses	Useable Responses as Percentage of Total Mailed *	Total Responses	Total Responses as Percentage of Total Mailed *
1. Response By Elapsed Time After Original Survey Day				
a. Within 7 days	24	20.3%	35	29.7%
b. 8 - 14 days **	7	5.9%	7	5.9%
c. 15 - 21 days	6	5.1%	9	7.6%
d. 22 - 28 days	6	5.1%	6	5.1%
	43	36.4%	57	48.3%
2. Response To Different Mailings				
A. Most Conservative Interpretation (Considering Specially Marked Returns Only)				
1. Initial & First Follow-up	40	33.8%	54	45.7%
2. Second Follow-up	3	2.6%	3	2.6%
	43	36.4%	57	48.3%
B. By a Less Conservative Interpretation ***				
1. Initial & First Follow-up	37	31.3%	51	43.2%
2. Second Follow-up	6	5.1%	6	5.1%
	43	36.4%	57	48.3%
C. By Most Logical Interpretation ****				
1. Initial & First Follow-up	34	28.8%	46	39.0%
2. Second Follow-up	9	7.6%	11	9.3%
	43	36.4%	57	48.3%

* A total of 118 questionnaires were sent out in the original mailing.

** Second reminder and questionnaire mailed at the end of this period to those addresses from which no response has been received within 14 days.

*** This interpretation assumes that only those responses received between 22 and 28 days after Survey Day are a direct result of the second follow-up.

**** This interpretation assumes that at least one-half of the responses received between 14 and 21 days after Survey Day are a direct result of the second follow-up.

TABLE 3. DATA ANALYSIS BY SURVEY DAY
HTSQ PILOT STUDY
KENTUCKY STATEWIDE TRAFFIC MODEL
(The results shown are dated 10/30/71 which is four weeks after original Survey Day)

	M.	T.	W.	T.	F.	Total	Census
A. Response Results							
Number Mailed	22	22	22	25	27	118	–
Number of Useable Responses	6	10	9	7	11	43	–
Useable Response Rate	27.3%	45.5%	40.9%	28.0%	40.7%	36.4%	–
B. Average Number of Persons/Household	2.0	2.6	2.7	3.4	2.5	2.6	3.2
C. Percentage Distribution of Head of Household by Age Group							**
HWF - Under 25 *	–	10.0	11.1	–	–	4.7	6.6
HWF - 25-29	–	–	–	–	9.1	2.3	14.8
HWF - 30-34	–	–	11.1	–	–	2.3	
HWF - 35-44	33.4	–	11.1	–	9.1	9.3	14.8
HWF - 45-64	33.4	80.0	33.4	71.5	27.3	48.8	30.2
HWF - 65 & Over	16.6	–	22.2	28.5	45.4	23.3	18.1
OT - HWF - Under 65	–	–	11.1	–	–	2.3	7.5
OT - HWF - Over 65	16.6	10.0	–	–	9.1	7.0	8.1
	100.0	100.0	100.0	100.0	100.0	100.0	100.0
D. Percentage Distribution of Households by Income Group							
Under $2,000	50.2	–	–	–	9.1	9.3	–
$2,000 - 3,999	–	–	11.1	–	–	2.3	–
$4,000 - 5,999	16.6	20.0	11.1	–	9.1	11.6	–
$6,000 - 7,999	–	10.0	–	14.2	9.1	7.0	–
$8,000 - 9,999	16.6	10.0	11.1	–	–	7.0	–
$10,000 - 11,999	–	10.0	11.1	–	27.3	11.6	–
$12,000 - 14,999	–	20.0	–	28.6	27.3	16.3	–
$15,000 - 24,999	16.6	–	33.4	28.6	18.1	18.6	–
$25,000 & Over	–	30.0	22.2	28.6	–	16.3	–
	100.0	100.0	100.0	100.0	100.0	100.0	–

* HWF = Husband-Wife Family; OT-HWF = Other Than Husband-Wife Family

** Direct comparison is not possible as census data available at this time is not stratified on the HWF and OT-HWF basis. Although the census values are approximations, they are based on reliable data and are believed to be of acceptable accuracy.

TABLE 3 (Continued)

	M.	T.	W.	T.	F.	Total	Census
E. Average Number Vehicles Per Household by Vehicle Type and Total							
Pass. Car & Station Wagon	1.0	1.8	1.6	1.6	1.6	1.6	–
Pickup & Panel	1.0	0.4	0.3	0.4	0.3	0.4	–
Other Single Unit Truck	–	–	–	0.1	–	0.0	–
Tractor - Trailer Comb.	–	–	–	–	–	–	–
Total	2.0	2.2	1.9	2.1	1.9	2.0	–
F. Average Annual Miles Per Vehicle	7375	13690	11117	7860	8695	10106	–
G. Average Number Licensed Drivers Per Household	1.5	2.0	1.8	2.0	2.0	1.9	–
H. Average Number Gainfully Employed Per/Household	1.5	1.0	1.3	1.1	1.3	1.2	1.2
I. Average Number of Vehicle Trips Per Household	4.0	7.4	6.7	4.7	6.8	6.2	–
J. Average Number of Interzonal Vehicle Trips Per Household	1.3	4.6	4.6	1.1	3.5	3.3	–
K. Interzonal Vehicle Trips as Percent of Total Vehicle Trips/Household	33.3	62.1	67.2	23.4	50.7	52.8	–

TABLE 4. DATA ANALYSIS BY GEOGRAPHIC AREA
HTSQ PILOT STUDY
KENTUCKY STATEWIDE TRAFFIC MODEL
(The results shown are dated 10/30/71 which is four weeks after the Original Survey Day.)

	GEOGRAPHIC AREAS *					
	West	West Cent.	N. Cent. & B.G.	East (Mtns)	Total	Census
A. Response Results						
Number Mailed	10	32	34	42	118	–
Number of Useable Responses	4	11	13	15	43	–
Useable Response Rate	40.0%	34.4%	38.2%	35.7%	36.4%	–
B. Average Number of Persons/Household	2.8	2.7	2.6	2.5	2.6	3.2
C. Percentage Distribution of Head of Household by Age Group						***
HWF - Under 25 **	–	–	15.4	–	4.7	6.5
HWF - 25-29	–	–	–	6.7	2.3	14.8
HWF - 30-34	–	9.1	–	–	2.3	
HWF - 35-44	–	9.1	7.7	13.3	9.3	14.8
HWF - 45-64	75.0	45.4	53.8	40.0	48.8	30.2
HWF - 65 & Over	25.0	27.3	15.4	26.6	23.3	18.1
OT-HWF - Under 65	–	–	–	6.7	2.3	7.5
OT-HWF - Over 65	–	9.1	7.7	6.7	7.0	8.1
	100.0	100.0	100.0	100.0	100.0	100.0
D. Percentage Distribution of Households by Income Group						
Under $2000	25.0	9.1	–	13.3	9.3	–
$2000 - 3999	–	–	–	6.7	2.3	–
$4000 - 5999	–	9.1	23.1	6.7	11.6	–
$6000 - 7999	–	–	–	20.0	7.0	–
$8000 - 9999	–	18.2	7.7	–	7.0	–
$10000 - 11999	25.0	9.1	15.4	6.7	11.6	–
$12000 - 14999	25.0	27.2	15.4	6.7	16.3	–
$15000 - 24999	–	18.2	30.7	13.3	18.6	–
$25000 & Over	25.0	9.1	7.7	26.6	16.3	–
	100.0	100.0	100.0	100.0	100.0	–

* West = Highway District #1 (Jackson Purchase area)
West Central = Highway District #2, 3 and 4
North Central and Blue Grass Area = Highway Districts #5, 6 and 7
East (Mtns) = Highway Districts #8, 9, 10, 11 and 12

** HWF = Husband-Wife Family; OT-HWF = Other than Husband-Wife Family

*** Direct comparison is not possible as census data available at this time is not stratified on the HWF and OT-HWF basis. Although the census values are approximations, they are based on reliable data and are believed to be of acceptable accuracy.

TABLE 4 (Continued)

	West	West Cent.	N. Cent. & B.G.	East (Mtns)	Total	Census
E. Average Number Vehicles Per Household by Vehicle Type and Total						
Pass. Car & Station Wagon	1.8	1.7	1.4	1.5	1.6	–
Pickup & Panel	0.5	0.4	0.7	0.3	0.4	–
Other Single Unit Truck	–	–	–	0.1	0.0	–
Tractor-Trailer Comb.	–	–	–	–	–	–
Total	2.3	2.1	2.1	1.9	2.0	–
F. Average Annual Miles Per Vehicle	7500	8748	11556	10660	10106	–
G. Average Number Licensed Drivers Per Household	2.0	1.9	1.8	1.9	1.9	–
H. Average Number Gainfully Employed Per/Household	1.3	1.3	1.5	1.0	1.2	1.2
I. Average Number of Vehicle Trips Per Household	7.0	6.9	6.1	5.6	6.2	–
J. Average Number of Interzonal Vehicle Trips Per Household	3.5	2.0	3.8	3.7	3.3	–
K. Interzonal Vehicle Trips as Percent of Total Vehicle Trips/Household	50.0	28.9	62.0	66.7	52.8	–

APPENDIX

Sample Size Determination

The Study Design specified that the sample should be equivalent to one percent of the motor vehicle registrations with a minimum of 30 sample elements per county. (FHWA statisticians indicated that a minimum of 30 completed questionnaires per county were required in order to assume that the survey results would be normally distributed). An intensive followup procedure is also recommended in the Study Design that would insure the receipt of 30 completed interviews per county. This procedure includes contacting and interviewing as many non-respondents to the mail survey as possible by telephone and interviewing the remainder by personal contact. Based on the response to other mail surveys, it was logical to assume that a sizeable, temporary staff might be necessary to properly execute this intensive followup procedure.

As temporary staffing can be very difficult to arrange, steps were taken relative to the sample size to insure that an acceptable amount of data would result from the survey even if the intensive followup procedure could not be followed on a full scale basis. Assuming that the response to the mail out procedure would be about 50 percent, the minimum number of questionnaires per county was boosted to 60. As an added precaution, the sample size was increased to 1.5 percent. Based on these criteria, the yield was estimated to be between 14,000 and 15,000 households. Therefore, for planning purposes, the high end of the range was used in drafting the sample selection specifications.

At the present time there is no computerized file of motor vehicle registrations in Kentucky state government suitable for sample selection. Consequently, arrangements were made to use a file developed by the R. L. Polk Company of Michigan. (The Polk file is actually a file of car-owning households.) As the work progressed, the Polk representative indicated that the 1.5 percent and 60 elements per county criteria would result in 14,155 names. With a slight change in the nth name factor, the sample size could be raised nearer to 15,000 elements at no extra cost. The decision was made to make the suggested change.

For the actual sample selection, the nth name factor was changed to 1 in 60 (1,67%) for those counties having more than 3,600 car owning households. In those counties having fewer than 3,600 car owning households, the nth name factor was set to yield a minimum of 60 households per county. This action results in a sample rate greater than 1.67 percent in these counties. As a result, the sample rate is 1.82 percent on a statewide basis with a yield of 14,978 names.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT, KENTUCKY 40601

CHARLES PRYOR, Jr.
COMMISSIONER

WENDELL H. FORD
GOVERNOR

KDH 310.HMB

Dear Citizen:

Your kind assistance is hereby requested in this matter of planning a highway program that will best serve your highway transportation needs. The Department of Highways has the need for certain items of information that only you, a citizen of the Commonwealth and user of Kentucky highways, can provide.

The needed information is explained in the enclosed instructions. A questionnaire, similar to that used in the 1970 Census of Population, on which you may record the needed information is enclosed. Also enclosed is a return postage-paid envelope for your use in returning the completed questionnaire to us.

I assure you that the information you supply will be kept strictly confidential. Once we receive your reply, the answers are coded for electronic processing. After that, your name and the information you supplied are permanently separated. From then on, we are dealing only with numbers and averages.

I sincerely urge you to take the time required to read the instructions and fill out the questionnaire. This is an excellent opportunity for you to help us plan better highways for the Commonwealth of Kentucky. Your thoughtful consideration will be greatly appreciated.

Sincerely yours,

Charles Pryor, Jr., Commissioner
Kentucky Department of Highways

Enclosures

INTRODUCTION
Kentucky Statewide Travel Survey

The information below explains the purpose of the survey and the meaning of a few terms.

QUESTION	EXPLANATION
WHAT IS THIS ALL ABOUT?	Briefly, a travel survey is conducted for the purpose of obtaining data that will permit careful planning of highways to meet your transportation needs. Basically, the survey requests certain household data and a record of the beginning and ending location and purpose of each vehicle trip made by members of the household.
WHO ANSWERS SURVEY QUESTIONS?	The Household Travel Survey Questionnaire is divided into two parts: (1) Household Data and (2) Travel Data. The head of the household is asked to supply the answers to the first ten (10) questions which concern the requested Household Data. Each licensed DRIVER who made trips on survey day is asked to record on the Travel Data portion of the questionnaire each of the trips he made that day while he was the DRIVER of a vehicle. The Travel Data portion of the questionnaire is a fold-out sheet.
WHEN IS SURVEY DAY?	Survey day is one specified day of the week for which we request a record of all the vehicle trips made by members of the household at this address. The day for which you are requested to report your trips is marked in the upper right hand corner of the Travel Data portion of the Household Travel Survey Questionnaire which is attached.
WHAT IS A TRIP?	A trip has a beginning called ORIGIN, and an ending called DESTINATION with no stops in between. Let's take an example: You leave home in the morning and drive your two children to school, going from there to your job location. At 5:00 p.m. you leave your job and return home. For our study, this is considered as three trips. Watch! 1. A trip from home to the school; 2. A trip from the school to the job location; 3. A trip from the job location to the home.
WHAT IF YOU HAVE TROUBLE FILLING OUT THE TWO-PART QUESTIONNAIRE?	If you have trouble filling out the two-part questionnaire, we request that you return the questionnaire with as much information on it as you can supply. If you will kindly include your telephone number and indicate a convenient time for us to call, a trained interviewer will call you by phone and help you complete the questionnaire.
AND NOW?	Please read the instructions carefully, fill out the questionnaire, and return it to us in the postage-paid envelope as soon as possible.

INSTRUCTIONS FOR HOUSEHOLD TRAVEL SURVEY QUESTIONNAIRE

1. HOUSEHOLD DATA PORTION

The questions on this portion of the questionnaire are rather straightforward and/or self explanatory; therefore, no additional instructions are provided in this section.

2. TRAVEL DATA PORTION

This portion of the questionnaire is to be completed by recording each vehicle trip made by each licensed driver in the household while he was the DRIVER of the vehicle. Please use the Person Numbers assigned in Item 8 of the Household Data portion of the questionnaire to identify the DRIVER for each trip. IT IS EXTREMELY IMPORTANT THAT YOU RECORD ALL VEHICLE DRIVER TRIPS AS COMPLETELY AS POSSIBLE.

USE A SEPARATE LINE FOR EACH TRIP REPORTED. If the members of this household need to report more trips than there are lines on the two questionnaire sheets, please record the extra trips on another sheet of paper and attach to the questionnaire.

Beginning with the lettered questions along the left margin below is a list of questions that are to be answered in the corresponding lettered columns of the TRAVEL DATA portion of the questionnaire. Immediately following the lettered questions below is an explanation of the type of information that should be supplied in answer to the questions.

An example is given at the end of the instructions to help clarify any questions you may have.

QUESTION	EXPLANATION
A. WHICH PERSON WAS DRIVER FOR THIS TRIP?	In Item Number 8 of the Household Data portion of the questionnaire, you were requested to assign a Person Number to each individual in this household who is at least 16 years of age. This Person Number should be used to identify the DRIVER of each trip reported on the questionnaire. This information will be helpful in identifying problem areas in case we have to contact you by telephone to make clarifications.
B. WHAT IS THE NUMBER OF THIS TRIP?	Each DRIVER reporting trips should assign a number to each reported trip, using one (1) for the first trip, a two (2) for the second trip, etc. This information will also be helpful in identifying problem areas in case we have to contact you by telephone to make clarifications.
C. WHAT TYPE OF VEHICLE DID YOU DRIVE?	For each trip reported, please indicate the type of vehicle driven using the code given below:

TYPE OF VEHICLE	CODE
Passenger Car or Station Wagon	1
Pick-up or Panel (Example: Ford Econoline)	2
Other Single Unit Trucks	3
Tractor - Trailer Combinations	4

D. WHERE DID THIS TRIP BEGIN? (ORIGIN ADDRESS)

and

E. WHERE DID THIS TRIP END? (DESTINATION ADDRESS)

In order to electronically process this data, we have to locate the beginning and end of each of your trips on a map, then assign a numerical code to it. For this reason, we would like you to be as specific as possible.

If the trip begins or ends in an urban area, give the street address, and town or city name. Identification of an intersection nearby the location is also acceptable if the names of both streets and the city name are given.

If the trip begins or ends in a rural area, give the name of the local community. We have a complete list of local place names. The nearest road intersection is also acceptable if the intersecting roads are identified by name and/or number. If you cannot give any of these, give a description. For example: 1 mile west of Beaver Dam on US 62, ½ mile north on Luce Road. A RURAL MAIL DELIVERY ROUTE ADDRESS IS NOT USEABLE.

F. HOW MANY PERSONS WERE IN THE VEHICLE?

Indicate the number of all persons in the vehicle including the driver for each trip.

G. & H. WHAT IS THE PURPOSE OF THIS TRIP?

This question is to be answered in the "going FROM (some purpose) TO (some purpose)" fashion. Referring to the example in the Introduction, the purposes would be as follows:

Purpose From	Purpose To
Home (0)	Serve Passenger (8)
Serve Passenger (8)	Work (1)
Work (1)	Home (0)

The numbers in parentheses are code numbers for the trip purposes. The list of purposes and their codes appear below and on the TRAVEL DATA portion of the questionnaire also.

PLEASE USE THE CODES TO RECORD THE TRIP PURPOSE.

Code	Trip Purpose
0	Home (for all activities at your residence)
1	Work (at a job location)
2	Shop (use this even if you didn't make a purchase)
3	Personal Business Transactions (includes visits to doctor or dentist, to the bank, to pay bills, to post office, etc.)
4	Outdoor Recreation (golfing, fishing, swimming, hiking, camping, etc.)
5	Social-Cultural (visit friends, attend church, civic meetings, movies, bowling, other entertainment, etc.)
6	School (trips by students only, trips by others will be for some other purpose)
7	Eat Meal
8	Serve Passenger (drop off someone at school, pick up someone on the way to work, etc.)

AND NOW ...

Please follow the above instructions and fill out the TRAVEL DATA portion of the questionnaire as shown in the following example.

Remember! The lettered columns on the questionnaire correspond to the lettered questions in these instructions. Please refer to the instructions as required.

Please complete both parts of the questionnaire and mail it to us as soon as possible. A postage-paid envelope has been included for your use. THE INTRODUCTION AND INSTRUCTIONS SHOULD NOT BE RETURNED!

We urgently solicit your cooperation in this endeavor.

Thank You!

EXAMPLE: The Smiths own a passenger car and the Company furnishes a pick-up truck for Mr. Smith to use. Mr. Smith (Person Number 1) made four trips and Mrs. Smith (Person Number 2) made three trips on Survey Day. On his way to work Mr. Smith stops by a service garage to pick-up Mr. Jones whose car needed some repair. From the repair shop, they proceeded to work. At quitting time, Mr. Smith goes to the feed store to pick-up some pellets for his hogs. From the feed store, Mr. Smith goes home.

Mrs. Smith went to the bank to make a deposit and then dropped by to visit her mother for a few minutes. Mrs. Smith proceeds from her mother's residence back to her house.

(These trips are recorded on the next page. The information in parentheses such as home, service garage, feed mill, etc. need not be recorded. They are shown in the example for clarity only.)

TRAVEL DATA

(Please Do Not Write In The Small, Numbered Blocks)

Survey Day: Monday

CARD NO. 2 (1)

SAMPLE NO. (3 4 5 6 7)

EXPANSION FACTOR (9 10 11 12)

DAY OF WEEK (14)

RESIDENCE ZONE (16 17 18 19 20 21)

DATE (23 24 25 26 27 28)

A. Person Number (30 31)	B. Trip Number (33 34)	C. Type of Vehicle (Use Code) (36)	D. ORIGIN ADDRESS (Please write complete address) (38 39 40 41 42 43)	E. DESTINATION ADDRESS (Please write complete address) (45 46 47 48 49 50)	F. Number of Persons (52 53)

CODE — VEHICLE TYPE

1 PASSENGER CAR OR STATION WAGON
2 PICK-UP OR PANEL (EXAMPLE: FORD ECONOLINE)
3 OTHER SINGLE UNIT TRUCKS
4 TRACTOR-TRAILER COMBINATIONS

Code	Trip Purposes	Co
0	HOME	5
1	WORK	6
2	SHOP	7
3	PERSONAL BUSINESS	8
4	OUTDOOR RECREATION	

H Q: 7/8/71

PLEASE DO NOT WRITE IN THIS SPACE

CARD NO.: 1

SAMPLE NO.: ☐☐☐☐☐ (3 4 5 6 7)

☐☐☐☐☐☐ (9 10 11 12 13 14)

☐☐☐☐☐☐ (15 16 17 18 19 20)

☐☐ (21 22)

☐ (23)

KENTUCKY STATEWIDE TRAVEL SURVEY
HOUSEHOLD TRAVEL SURVEY QUESTIONNAIRE

Household Data

1. Please record the date of your Survey Day. (See upper right hand corner of TRAVEL DATA sheet for Survey Day)

   _____
   Mo. Day Yr.

2. Where is your household located?

   a. If it is in a town or city, please record the house number, street name and city.

   b. If it is in a rural area, please record the name of the nearest place or community (no matter how small) or the nearest road intersection. If an intersection is used, please give the name or number of both roads. A RURAL MAIL DELIVERY ADDRESS IS NOT USEABLE IN OUR SURVEY.

   Location: _____
   _____
   _____
   _____

3. How many persons live in this household? (Do not count those who are generally away to school and room away from home.)

   Number _____

4. What is the age of the head of the household? Check appropriate blank.

   a. If husband-wife family:
      1. Under 25 _____ 4. 35-44 _____
      2. 25-29 _____ 5. 45-64 _____
      3. 30-34 _____ 6. 65 and over _____
   b. If other than husband-wife family:
      7. Under 65 _____ 8. Over 65 _____

PLEASE DO NOT WRITE IN THIS SPACE

5. Please indicate the sum of the gross annual income of all persons living in this household. Check the appropriate blank.

1. Under $2,000 _____	6. $10,000 - $11,999 _____
2. $2,000 - $3,999 _____	7. $12,000 - $14,999 _____
3. $4,000 - $5,999 _____	8. $15,000 - $24,999 _____
4. $6,000 - $7,999 _____	9. $25,000 and over _____
5. $8,000 - $9,999 _____	

□ 24

6. For each of the vehicle types listed below, please record the number that are normally available for personal use by the members of this household.

TYPE	NUMBER	
Passenger Cars or Station Wagons	_____	□ 25
Pick-up or Panel (Example: Ford Econoline)	_____	□ 26
Other Single Unit Trucks	_____	□ 27
Tractor - Trailer Combination	_____	□ 28

7. Please estimate the miles driven last year in each of the vehicles mentioned above:

Vehicle #1 _____ miles □□ 29 30
Vehicle #2 _____ miles □□□□□ 31 32 33 34 35
Vehicle #3 _____ miles □□□□□ 36 37 38 39 40
Vehicle #4 _____ miles □□□□□ 41 42 43 44 45
□□□□□ 46 47 48 49 50

8. a. Please assign a Person Number to each person living in this household who is 16 years of age or older; and

b. Indicate with a check mark in the appropriate column those who are licensed drivers and those who drove on Survey Day.

Person Number	Relationship to Head of Household or Initials	Licensed Driver	Drove On Survey Day
1	Head of Household		
2			
3			
4			
5			

□ 51

PLEASE DO NOT WRITE IN THIS SPACE

9. For each person employed full-time and living at this household, please list the location of his job. Refer to Question 2 for instructions on the type of location information that is desired.

Person Number	Location of Job
1	
2	
3	
4	

10. Telephone Number _____

We may need to call you to make sure we understand all your answers. What would be a convenient time? _____

11. Please continue by filling out the TRAVEL DATA portion of the questionnaire

52	53	54	55	56	57
58	59	60	61	62	63
64	65	66	67	68	69
70	71	72	73	74	75

TRAVEL DATA

(Please Do Not Write In The Small, Numbered Blocks)

Survey Day: Monday

CARD NO. [2] (1)

SAMPLE NO. [ ][ ][ ][ ][ ] (3 4 5 6 7)

EXPANSION FACTOR [ ][ ][ ][ ] (9 10 11 12)

DAY OF WEEK [ ] (14)

RESIDENCE ZONE [ ][ ][ ][ ][ ][ ] (16 17 18 19 20 21)

DATE [ ][ ][ ][ ][ ][ ] (23 24 25 26 27 28)

A. Person Number (30 31)	B. Trip Number (33 34)	C. Type of Vehicle (Use Code) (36)	D. ORIGIN ADDRESS (Please write complete address) (38 39 40 41 42 43)	E. DESTINATION ADDRESS (Please write complete address) (45 46 47 48 49 50)	F. Number of Persons (52 53)

CODE	VEHICLE TYPE
1	PASSENGER CAR OR STATION WAGON
2	PICK-UP OR PANEL (EXAMPLE: FORD ECONOLINE)
3	OTHER SINGLE UNIT TRUCKS
4	TRACTOR-TRAILER COMBINATIONS

Code	Trip Purposes	Co
0	HOME	5
1	WORK	6
2	SHOP	7
3	PERSONAL BUSINESS	8
4	OUTDOOR RECREATION	

TSQ: 7/8/71

Person Number A. (30 31)	Trip Number B. (33 34)	Type of Vehicle (Use Code) C. (36)	ORIGIN ADDRESS (Please write complete address) D. (38 39 40 41 42 43)	DESTINATION ADDRESS (Please write complete address) E. (45 46 47 48 49 50)	Number of Persons F. (52 53)	Purpose From (Use Code) G. (55)	Purpose To (Use Code) H. (57)
1	1	2	Peaks Mill, Ky (home)	Second Street & Conway Street, Frankfort, Ky (service garage)	1	0	8
1	2	2	Second Street & Conway Street, Frankfort (service garage)	419 Ann Street Frankfort, Ky (work)	2	8	1
1	3	2	419 Ann Street Frankfort, Ky (work)	Devil's Hollow Road & Taylor Ave, Frankfort, Ky (feed mill)	1	1	2
1	4	2	Devil's Hollow Road & Taylor Avenue, Frankfort (feed mill)	Peaks Mill, Ky (home	1	2	0
2	1	1	Peaks Mill, Ky (home)	Stamping Grounds, Ky (bank)	1	0	3
2	2	1	Stamping Ground, Ky (bank)	215 Bur Oak Drive Frankfort, Ky (visit mother)	1	3	5
2	3	1	215 Bur Oak Drive Frankfort, Ky (visit mother)	Peaks Mill, Ky (home)	1	5	0

"EXAMPLE"

CODE	VEHICLE TYPE
1	PASSENGER CAR OR STATION WAGON
2	PICK-UP OR PANEL (EXAMPLE: FORD ECONOLINE)
3	OTHER SINGLE UNIT TRUCKS
4	TRACTOR-TRAILER COMBINATIONS

Code	Trip Purposes	Code	Trip Purposes
0	HOME	5	SOCIAL - CULTURAL
1	WORK	6	SCHOOL
2	SHOP	7	EAT MEAL
3	PERSONAL BUSINESS	8	SERVE PASSENGER
4	OUTDOOR RECREATION		

HTSQ: 7/8/71

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT, KENTUCKY 40601

CHARLES PRYOR, Jr.
COMMISSIONER

WENDELL H. FORD
GOVERNOR

KDH 310.HMB

Dear Citizen:

A few days ago, the Kentucky Department of Highways mailed you a Household Travel Survey Questionnaire. Included with the questionnaire was a request that you fill it out and return it to us as soon as possible in the return, postage-paid envelope.

If you have filled out and mailed the questionnaire to us, please accept our sincere thanks for your cooperation.

If you have not yet filled out the questionnaire, we respectfully request that you do so and return it to us as soon as possible. As the questionnaire was sent to only 1.5% of the homes in Kentucky, we need your fullest cooperation.

Very truly yours,

Charles Pryor, Jr.
Commissioner
Kentucky Department of Highways

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT, KENTUCKY 40601

CHARLES PRYOR, Jr.
COMMISSIONER

WENDELL H. FORD
GOVERNOR

KDH 310.HMB

Dear Citizen:

The response to the Household Travel Survey Questionnaire has been good. However, we have not received your questionnaire.

If, however, you have already filled out the questionnaire and mailed it to us, please accept our sincere thanks for your cooperation in this endeavor.

If you have misplaced your original questionnaire, another has been enclosed for your convenience. We would appreciate receiving the completed questionnaire as soon as possible. The information you supply will greatly help us in planning a highway program that will best serve your transportation needs. Your cooperation in this endeavor will be greatly appreciated.

Sincerely yours,

Charles Pryor, Jr., Commissioner
Kentucky Department of Highways

Enclosure

KENTUCKY DEPARTMENT OF HIGHWAYS

NEWS RELEASE

FOR IMMEDIATE RELEASE

FRANKFORT, Ky., December 20, 1971--Highway Commissioner Charles Pryor, Jr. today announced plans for a statewide travel survey shortly after the first of the year, to be conducted by the Department of Highways' Division of Planning. The survey is designed to inventory the travel patterns of the citizens of the Commonwealth. Information from the survey will be used in an effort to develop a highway improvement and construction program that best fits the needs of the people in Kentucky.

A total of approximately 15,000 families, selected randomly from each county, will be requested to participate in the survey. The survey will be conducted through the use of a self-administered questionnaire similar to that used in the 1970 census. Those receiving the questionnaire will be requested to keep a record of their travel for one specified day of the week. They will also be requested to provide a limited amount of socio-economic information such as the number of persons in the family and the number of cars owned by the family. A return postage-paid envelope will be enclosed with the questionnaire for the citizens to use in returning the completed questionnaires to the Department of Highways.

Citizens may expect to receive a questionnaire any time between the first of January through the last of July. The survey is being spread

The data collected in the survey will be the basis for the development of a computer based traffic simulation model. Initially, the model will be calibrated to simulate existing traffic patterns. Subsequent use of the model will be in making forecasts of future traffic patterns and volumes. As traffic patterns and volumes have a significant bearing in the process of determining highway improvements, this technique will enhance and improve the process of establishing the highway construction and improvement program.

Commissioner Pryor urges those receiving the questionnaire to fill it out as completely as possible. Prompt return of the questionnaire will be appreciated. "This is an excellent opportunity for you, the citizens of Kentucky, to help us plan, improve and construct better highways for the Commonwealth," Commissioner Pryor stated.

-30-

out over this extended period to account for the seasonal [illegible].

(MORE)

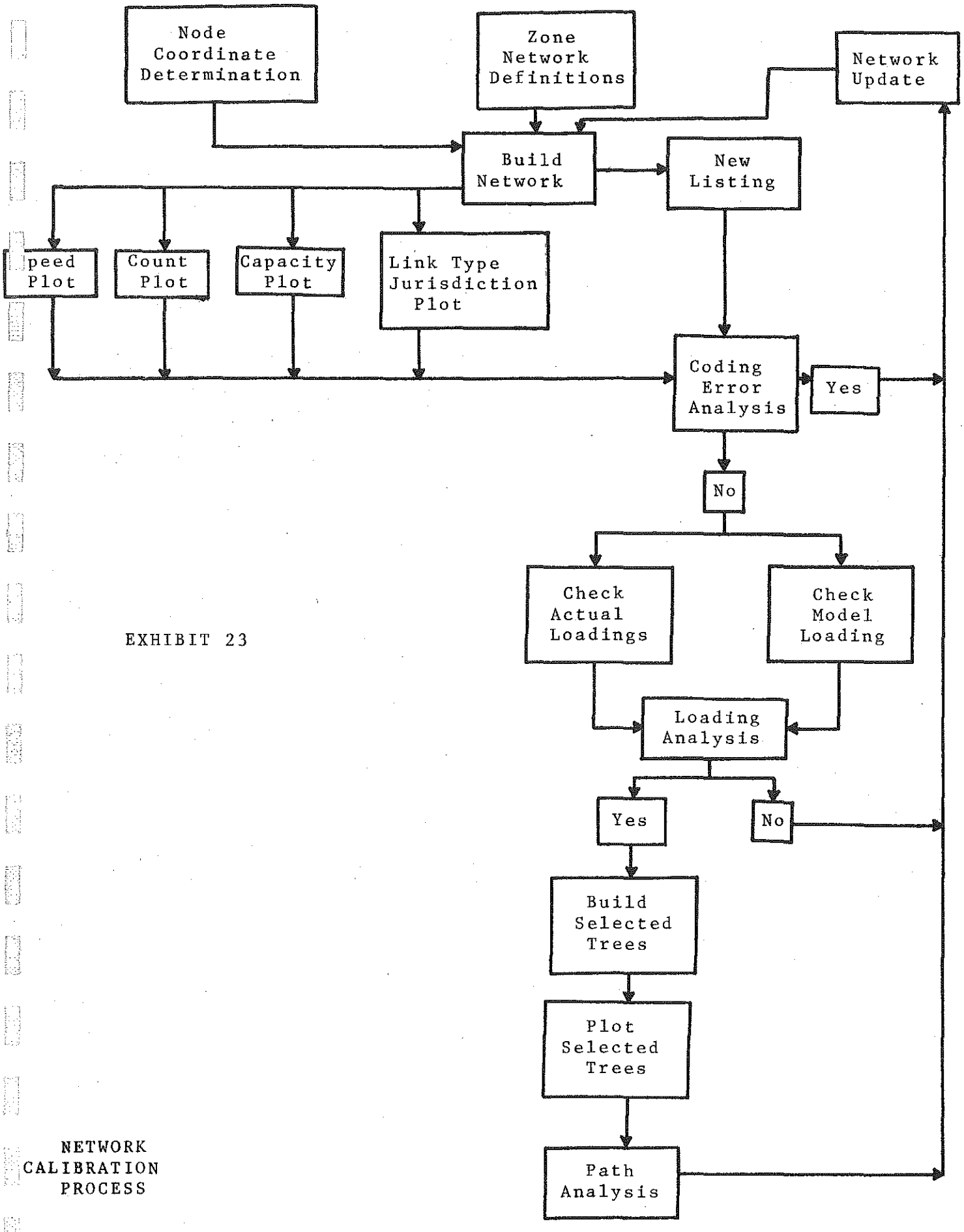

EXHIBIT 23

NETWORK CALIBRATION PROCESS

TOTAL MODEL CALIBRATION

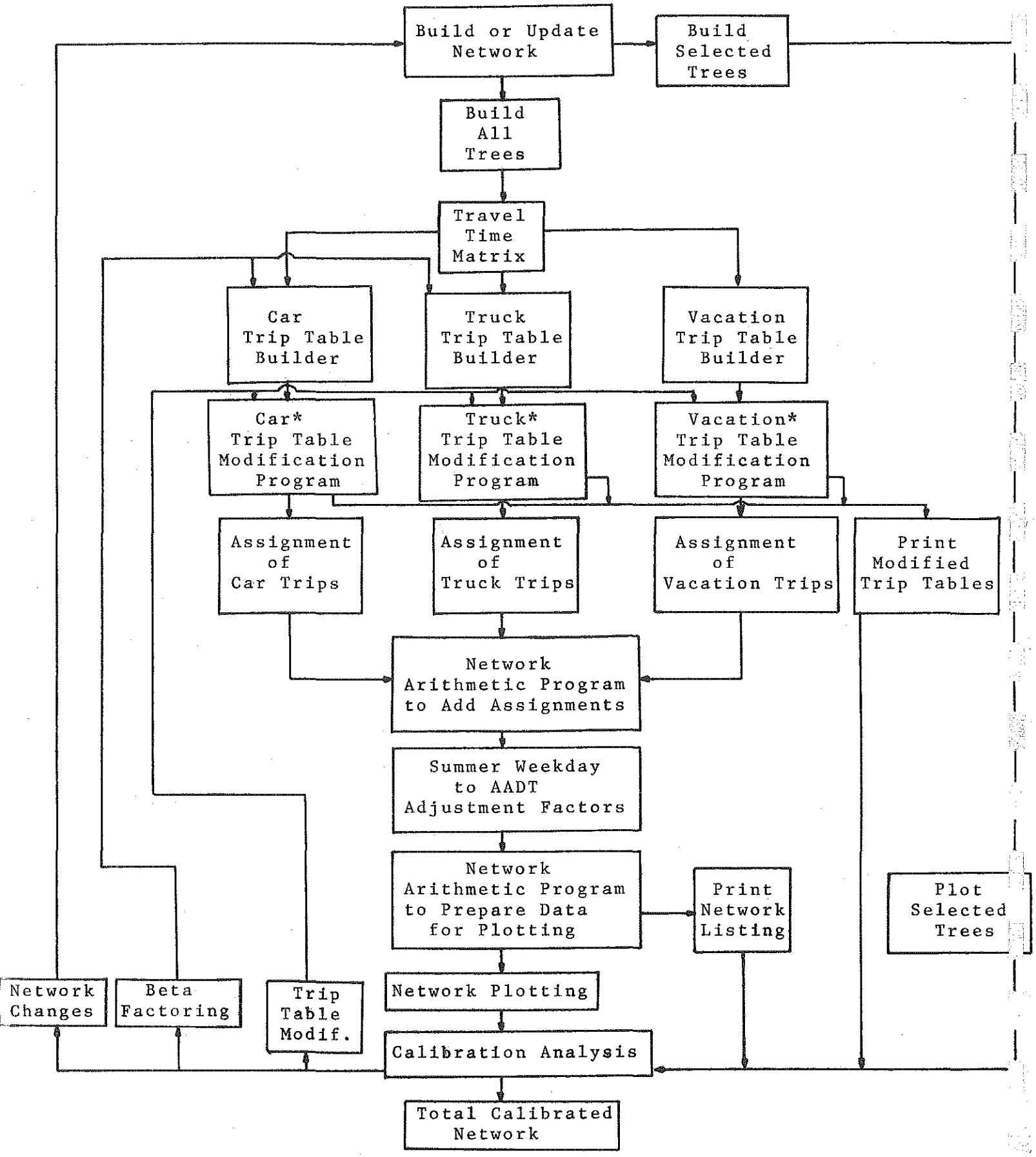

EXHIBIT 33

*OPTIONAL
Program not used during initial run.

Table [illegible]

Classes of Statewide Transportation Studies

Statewide Traffic Model $100,000 or less [illegible] - 18 months	To do system simulation using the computer in order to better understand how the system operates. Results will be used for functional classification and general planning purposes.	Zones and network will be selected and coded using standard procedures. Models for trip generation and distribution will be kept simple: Usually, no trip purpose breakdown, usually, one but not more than three independent socio-economic variables, and minimum O-D data would be utilized.
Statewide Transportation Study (Highway) $[illegible] - $500,000 (usually over $200,000) [illegible] - [illegible] months [illegible] - 12 personnel	To develop an intermediate priced traffic model based on O-D sample design - To obtain good information on trip generation and trip length - To evaluate alternative highway networks - To develop a State highway plan.	O-D sampling for internal trips accomplished by multiple-screenline roadside interviewing, stratified cluster sample of homes, telephone interviewing or comparable procedure. Models developed by trip purpose, usually: Auto (3-5) and Truck (1-2). Comparisons and calibration made against ADT volumes. Development of alternatives will include functional classification, scheme development and testing.
Comprehensive Statewide Transportation Study $500,000 - $1,500,000 24 - 48 months [illegible] - 25 personnel	To develop on a statewide or regional basis the comprehensive transportation planning process - To simulate person movements by mode of transportation - To evaluate alternate modes and networks - To develop a State transportation plan.	Elements and Procedures would be similar to the Comprehensive Urban Transportation Studies. Interviews would be sufficient to develop a trip table of interzonal person movements. Studies would include an Economic Base Model, and Land Use Model. Within budget limitations, goods movements would be obtained and projected.
Integrated Statewide Transportation Study Over $1,500,000 [illegible] - 60 months [illegible] - 50 personnel	To apply the latest techniques in systems analysis and operations research to statewide transportation planning - To study the complete system of person and goods movement from origin to destination - To evaluate alternate sets of policies in regard to the transportation system - To develop a State transportation program.	The procedures would incorporate the latest techniques in systems analysis and operations research. Detail person and goods movements from origin to destination would be studied with emphasis on transfer and terminal points. The models would be iterative with a feedback to account for results of different transportation policies.

STATEWIDE TRANSPORTATION STUDIES

Proposed Activities for the Present
Calendar or Fiscal Years
November 5, 1971

CALIFORNIA

VII. 3. Long-Range Program

1. Statewide Models for Traffic Estimation and Highway Network Analysis — $326,080

Objective

To develop methods for simulation of future year statewide traffic, which will be based on and coordinated with methods currently in use in the various urbanized area transportation studies. This project will require cooperation from all Districts inproviding or reviewing various data items and highway network information necessary to this development.

General Technical Approach

The study will be handled as a two-stage procedure. The first stage will be restricted to trip estimation and network coding to a statewide system of selected routes for a gross zone system of less than 2,000 zones. The second stage will be a series of sub-State studies studies that will utilize standard subarea procedures and more detailed zone and network systems.

1970-71 Fiscal Year Activities Completed:

- A system of 1,488 zones for the 1966 calibration year was finalized.

- A selected network for 1966 was developed, tested, and reviewed by Headquarters and District personnel.

VII.3.1. (Continued)

- Socioeconomic zonal inputs for 1966 were established.

- Traffic inbound to California at various border locations was sampled for trip characteristic determination.

- New digitizing techniques for mapping and display purposes were perfected.

1970-71 Fiscal Year Activities Initiated:

- Review and testing calibration of existing individual transportation study trip models for statewide application.

- Development of a recreation trip model

- Development of a rural trip model.

- Updating the 1966 Network to 1970 levels.

- Review of 1970 Census maps for updating the 1966 zones to 1970 Census reporting unit boundaries.

- Planning for retrieval of 1970 Census data in 1970 statewide zone terms.

1971-72 Fiscal Year Activities:

- Develop zones, networks, and review or develop model input data for statewide level of analysis for the 1995 planning year

- Completion of activities initiated during prior fiscal year.

- Develop procedures to produce data specially designed for input to the various planning and needs studies.

VII.3. (Continued)

2. Substate Traffic Estimation and Highway Network Analysis based on Statewide Model — $ 36,230

In order to provide information suitable for continuing detailed system planning, functional classification and needs studies which will be consistent statewide, it will be necessary to divide the State into a series of substate study areas. These substate studies will use networks which are independent of and more detailed than that used statewide.

The zone systems will be more fine grained and will be formed by splitting statewide zones.

1971-72 Fiscal Year Activities:

Initiate development of zones, networks, and model input data for substate level of analysis for the 1995 planning year. This analysis will emphasize utilization of basic urban area study results and sub-regional study methodology to avoid duplication of effort.

CONNECTICUT INTERREGIONAL PLANNING PROGRAM (Vol.8)

CIPP is a statewide comprehensive land use, resources and transportation planning study. Involved, in addition to the Department of Transportation, is the Office of State Planning, the Department of Agriculture and Natural Resources and active Regional Planning Agencies. The Office of State Planning's efforts are partially funded by HUD and the New England Regional Commission. The program is presently continuing on the operation plan for continuing urban transportation planning approved in January, 1970.

As a result of the 1970 Census, the urbanized areas of Danbury and Bristol have exceeded 50,000 population and the program will initiate memoranda of understanding with those towns in the urbanized areas of Danbury and Bristol. The Statewide transportation planning program will continue its coordination with the Tri-State Transportation Commission with respect to land use and resources plans and projects and transportation needs and programs.

SURVEILLANCE

Highways - The program will continue to update its computerized network files with new ADT and peak hour counts which will be used to determine traffic growths and facility deficiencies and to continue the review, analyzing and updating of the highway plan. Inventory of parking at interchanges and shopping centers will continue to provide data for the development of commuter parking facilities throughout the State. State line roadside origin and destination statistics collected by the three adjacent states will be obtained, if available, to update the external and through data used in the planning process.

Mass Transit - The program will continue to collect bus service data from

the operating transit companies including the equipment that is available. Also it will continue to inventory on and off street parking statistics through the RPA's and city engineering offices to aid in the development of transit plans and will provide surveillance assistance in the collection of data on any new transit facilities such as the Hartford-Bloomfield rail bus demonstration. In addition data will be collected for the development of transit plans for the elderly and low income.

Air -

The program will continue to analyze airport projects in cooperation with the Bureau of Aeronautics to develop ground transportation deficiencies, needs and improvement programs to airports within the State.

Railroad - Rail passenger statistics will be collected primarily from the Penn Central and in some instances through on-street surveys to aid in the development of recommendations for rail service improvements such as parking facilities.

Goods - The existing goods movement data will be updated for all modes of travel including an inventory of rail goods from the Penn Central and truck goods from an on-site survey at the loadometer stations and truck terminals. Air goods will be obtained from the CAB and computerized to aid in the analyzing and projection of goods to the year 2000 and recommendations developed for the improvement of goods movement facilities.

Reappraisal

Socio-Economic Data - The program will continue to develop, analyze and display all data available from the 1970 Census, employment data and car ownership data. This effort will be a continuation of the development of a 1970 base for the statewide transportation planning program.

Land Use Data - This program in cooperation with the Office of State Planning, the Department of Agriculture and Natural Resources and all of the regional planning agencies will continue to computerize and analyze 1970 land use data obtained from the aerial survey. In addition to physical land use statistics the program will be involved in the analyzation of town zone regulations and computerization of water and sewer facilities and plans.

Land Use Plan - This program in cooperation with the Office of State Planning and the regional planning agencies will work towards the adoption of a long range and incremental land use plan similar to a composite of the regional planning agency land use plan. Such a plan will then be used for the development of transportation recommendations.

Models - The socio-economic and land use data will be used for the recalibration of the statewide growth distribution model, trip generation models and trip distribution models.

Networks - A new set of highway and mass transit networks will be constructed for the transportation planning effort utilizing the new U-1106 computer and taking advantage of mass transit network programs that have been previously made available to the Department.

Procedural Development

With the new Univac 1106 computer and new transportation planning programs, model development and research will begin with respect to both networks and the trip distribution model. The network program will have the option of incorperating detailed networks into the 1725 and 804 statewide zone system with very little effort. In addition the trip distribution model will con-

tain the option of using more than one set of travel time factors per purpose and an analysis will be made of various sets depending on the geographical area and population density of the area. Research will continue in the development of land use models and computer displays taking advantage of the computerized 1970 land use file, socio-economic data, quantification by traffic zone and other types of land use data that will be computerized by the Office of State Planning.

The program will continue to provide socio-economic and land use statistics to any agency interested. A special effort will be made to provide such data to the regional planning agencies and state agencies in the State Planning Council. In addition to providing printout statistics the program will utilize both the computer printer and the dataplotter to map statistics in a reproducible form for distribution. As in the past, it is expected that we will be requested to develop information for a variety of studies such as solid waste disposal, air pollution and the location of community colleges, etc. The program, in cooperation with the Office of State Planning intends to develop a manual of statistics that can be distributed to the appropriate programs.

Annual Report

There will be an annual report covering the work accomplishments in the statewide comprehensive transportation planning program.

(1)	Connecticut Transportation Planning Program	
	Surveillance	$ 119,000
	Reappraisal	139,400
	Service*	87,900
	Procedural Development	84,200
	Annual Report	7,000
	Total	$ 437,500

Planning Regions
(Service)

(2)	Capitol	27,100
(3)	Central Connecticut	5,000
(4)	Central Naugatuck	5,000
(5)	Southwestern Connecticut	5,000
(6)	Bridgeport	7,500
(7)	South Central	10,800
(8)	Valley	5,000
(9)	Northwestern	6,400
(10)	Litchfield Hills	5,000
(11)	Mid-State	7,100
(12)	Connecticut River Estuary	2,200
(13)	Southeastern Connecticut	6,200
(14)	Windham	2,200
(15)	Northeastern Connecticut	2,200
(16)	Housatonic Valley	5,000
(17)	Undefined Towns	700
	Total	$ 102,400
	Estimated Grand Total	$ 539,900

* Does not include Planning Regions.

DELAWARE

III. B. 2. Kent and Sussex Study

Objectives:

The continuation and strengthening of cooperative, continuing and comprehensive land use and transportation planning in Kent and Sussex Counties in order to strive for the achievement of an optimum present and future environment as defined by the developmental goals and objectives expressed by the citizens of the Counties.

Accomplishments 1971:

Year 1990 forecast land use allocations were developed, within economic and population contexts for the Kent and Sussex Study. These were submitted for review and comment to State, County, and Municipal agencies. Based on study year trip generations by land use, employment, population and vehicle ownership, regression equations were developed to provide trip productions and attractions per traffic analysis zone for Year 1966 and for Year 1990. The gravity model was calibrated for internal travel and a Fratar distribution model was applied for through and for internal-external travel. Year 1966 travel simulations were distributed on the Year 1966 network description for simulation accuracy evaluation against actual field counts. This comparison proved to be most favorable. Year 1990 travel was then distributed on the Year 1966 highway system description and thus future deficiencies were isolated. Compensation was provided for these deficiencies and forecast Year 1990 highway proposals derived. Two forecast systems were proposed. One incorporated a West Dover bypass and the other an east Dover bypass. Traffic assignment processes were then applied in order to produce Year 1990 traffic loadings and thus forecast travel impacts.

Input to the National Highway Functional Classification and Needs Study (1970-1990), for Kent and Sussex Counties, was completed for submission to the Federal Highway Administration. This study was conducted within a Year 1990 State population control total of 735,000, as designated in Federal Highway Administration Manual "B".

Work has begun on a similar study oriented to a Year 1990 State population control total of 1,084,000. This population is that forecast by the Division of Urban Affairs, University of Delaware, and has been prorated as a control total for most, if not all, planning studies conducted in the State. It is felt that the original study concept was excellent but that it is of little use to Delaware planning and programming unless oriented to State level figures; hence, the necessity for one study to satisfy federal, nationwide, requirements and the need for a second study for practical application to the relatively fine State operations.

DELAWARE Cont.

Close coordination was maintained with, and extensive consultation provided to, the State Planning Office in the course of its development of comprehensive plans for Sussex County and for the cities of Lewes and Rehoboth Beach.

Consultation was provided for the City of Dover plan with particular reference to the transportation component.

Liaison was established with and data provided to Kent County in the initiation of its comprehensive planning study. Assistance was also provided the Department of Public Safety and the Division of Urban Affairs, University of Delaware.

Appreciable efforts were extended to initiate the acceptance of the modified grid - master locational index system (RIMCOR) not only for use in the continuing transportation planning processes, but also so common areal denominators may be established for correlation of data collected by all State, County and Municipal agencies. Such a system avoids duplication of cost and effort in inventory work and makes all agency information available, in usable form, to all other agencies involved in planning surveillance and service activities. Our proposals were received enthusiastically; however, high-level State administrative leadership is required to assure complete implementation and this has not been forthcoming to date.

The modified grid maps were reviewed, corrected and copies made available to all agencies in Kent and Sussex counties so activities could be coded to same as the initial stage in the establishment of the RIMCOR System.

Extensive data was analyzed, interpreted and detailed for mapping presentations at public and interagency hearings and meetings.

Forecast design volumes were submitted to the Project Planning, Road Design and Review Sections.

Work was begun on special traffic generator studies relating development characteristics to traffic generations.

Work Program 1972: ($38,000.00)

Projects:

1. The original forecast land use and transportation planning study having been completed for Kent and Sussex Counties, it now becomes essential to establish a continuing planning process of surveillance, update, and service that will permit the incorporation of any deviations from the original forecasts, upon which the plan is based, that become apparent through the passage of time. In this manner, the plan is kept valid. It is proposed that the modified grid-master locational index system (RIMCOR) be employed as the basic vehicle for the initiation of this continuing planning process. Agencies at

all levels will have to be educated in its techniques and advantages and then be assisted in the implementation stages. (Maps, coding methods, adequate building permits and certificates of occupancy, assessment roll entries, traffic counting cordons etc.) A central data update and surveillance operation will be initiated, hopefully, for all State operations, but, at least, for transportation planning requirements.

2. The Kent and Sussex Study will provide forecast traffic volume and corridor alignment data to those involved in comprehensive road and bridge design in the two Counties.

3. The Kent and Sussex Study will provide input and consultation to the State Development Plan being prepared by the State Planning Office. Similar services will be provided other comprehensive planning studies conducted in the two Counties.

4. Road impact and plan compatability studies, relative to proposed development on the Kent and Sussex Counties land use platform, will be conducted for the benefit of decision makers.

5. The Kent and Sussex Study will do, and/or has done, detailed analysis and mapping for specific design projects as required for public hearings and for interagency meetings.

6. It is proposed that a report be printed detailing the findings and recommendations of the Kent and Sussex Study.

7. The Specific Travel Generator Study is to be completed and a publication of findings issued on same. This study will permit the introduction of more localized detail into the machine-oriented travel forecasting process and will permit more accurate manual analysis of the impact of specific proposed land use developments on the highway system through a very precise knowledge of their travel generation characteristics related to employment, floor area, acreage or type and density of residential area.

8. Input will be provided a Functional Classification and Needs Study (1970-1990) for the two counties. This study will be similar to that conducted in Fiscal Year 1970-1971 for the Federal Highway Administration with the exception that it will be focused toward a prorated Year 1990 State population of 1,084,000, as forecast by the Division of Urban Affairs, University of Delaware, rather than toward a Year 1990 State control total of 735,000 persons as required by the Federal study. The 1,084,000 figure is that employed for all present planning and so, by incorporating same, the Functional Classification and Needs Study can be coordinated with all other Kent and Sussex County thinking.

9. Data input and consultation will be provided in the development of the Kent and Sussex segment of the State Comprehensive Plan Years 1980, 1990, 2000, as being prepared by the State Planning Office.

It is anticipated that there will be a minimum of two Kent and Sussex alternative development plans for each year and a minimum of two alternative transportation network test alternatives for each land use plan, thus requiring a minimum of twelve (12) traffic assignments and analyses.

B. 3. Computer Services for Urban and Rural Comprehensive Transportation Studies

Work Program 1972: ($20,000.00)

Traffic assignments and machine analyses for New Castle County Program Transportation Staff and for the Kent and Sussex Study. This cost involves approximately 60% for the New Castle County Program and 40% for the Kent and Sussex Study.

FLORIDA

7.IV - Statewide Multi-Modal Studies
Item 1 - Statewide Highway Study

Recognizing our responsibility for total transportation planning, the Department will initiate a comprehensive Statewide Highway Study as the first phase of a Statewide Multi-Modal Study. An investigation will be initiated on the travel data currently available from the twelve active comprehensive studies and the applicability of this travel data to a Statewide, inter-city simulation model. Since the base year data collection years differ from one comprehensive study to another an attempt will be made to adjust this data to a compatible base. It is anticipated that external interviews would be obtained at the State line in order to determine the movement of persons entering and leaving the State. The analysis scheduled for this year would include Statewide modeling, 1990 Statewide forecasts, 1990 assignments to a Statewide spider network to determine inter-city corridors and adequate documentation in the form of published reports to describe the technical procedures utilized. Monetary amount includes work to be performed by Department personnel.

Estimated Costs:	Part I Participating	Part III-A Nonparticipating
1971-72	$190,000	---

KENTUCKY

Vol. 7, Chap. 4: Statewide Traffic Forecasting Model

PURPOSE AND SCOPE: To develop and maintain a computerized travel model technique for forecasting and assigning future traffic on a continuing basis for the major rural highways of the state. This travel model technique will be the basis for developing and maintaining a current statewide highway plan that is coordinated with the statewide planning policies of this and other state agencies. This model will also be a source of future highway traffic on a statewide system basis for use in various planning studies such as functional classification, motor vehicle use, highway needs, and programming of improvements.

ACCOMPLISHMENTS DURING 1970-1971: Completed the Study Design. Negotiated a contract for the Model Development phase. Finished the collection of the roadside OD data at the external cordon stations. Obtained control counts to use as the basis for factoring the external cordon, roadside OD data collected in previous years. Obtained control counts on screenlines for use in checking the base year assignment. Completed traffic zone designations and development of coding dictionaries for OD data. Coded, checked and keypunched roadside OD data collected along Kentucky-Tennessee boundary. Developed initial draft of base year traffic assignment network. Began the assembly of traffic assignment network link data such as speeds, distances, leg numbers, systems designations, etc. Monitored and participated in the initial tasks of the Model Development phase.

PROPOSED ACTIVITIES DURING 1971-1972: The Study Design recommended a joint State-Consultant effort with a 60-40 work split, respectively. Recently the Department decided to pursue this project on an "in-house" basis with only limited use of consultant effort. It is intended that during the 1971-1972 fiscal year, work will be continued or initiated on the tasks mentioned below of the Model Development phase as specified in the Study Design. A joint State-Consultant effort is anticipated for items numbered 6, 7, 9 and 12. Technical advice required for successful execution of the remaining tasks is anticipated to be secured from a qualified consultant on a per diem or retainer basis.

1. Household Travel Survey
2. Truck Travel Survey
3. Field OD Surveys (Funded in Chapter 5)
4. Update Cordon OD Surveys
5. Update Rural and Urban OD Surveys
6. Assemble Kentucky Activity Data

Kentucky Cont.

7. Assemble Outstate Activity Data
8. Zone and Network Development (base year)
9. Activity Allocation Model
10. Travel Model Development
11. Survey Data and Network Tuning
12. Prepare Activity Forecasts

PROGRAMMED AMOUNT FOR 1970-1971:

Consultant	$ 58,000
Planning Staff	$ 20,000

ESTIMATED EXPENDITURE FOR 1970-1971:

Consultant	$ 12,000
Planning Staff	$ 29,000

ESTIMATED COST FOR 1971-1972:

Consultant	$ 80,000
Planning Staff	$125,000

ILLINOIS

I.VII Forecasting

On major relocations of highways, traffic assignments will be made on the basis of origin and destination of trips using the roads within the corridor of the proposed facility.

Traffic is usally projected for twenty years based on current information. In making the projections, consideration is given to the Statewide forecast, the system of which the road is to be a part, and any contemplated or likely developments in the area that could affect the traffic flow.

The Statewide forecast by highway system is on a continuing basis and will be a part of the activity in FY 1972. A continuous review will be made of the techniques used to update traffic forecasting procedures. Two concepts of traffic forecasting will be explored to determine their application to Illinois practice. The first concept is the growth factor method which is used almost exclusively outside of urban transportation study areas. Another concept which will be investigated is the traffic model idea which relates the causative factors of travel-population, per capita income, spatial separation of origin and destination, etc., to the traffic volumes. The development of the Highway Record Data Bank can facilitate the development of an inter-city travel model. In the interim, the growth factor concept based on the functional classification will

Illinois Cont.
continue to be our basic tool for traffic forecasting outside of urban transportation planning study areas. The documents which will continue to serve as a basis for forecasting are:

1. Traffic Estimates for Design Purposes - 1958
2. Traffic Estimates for Design Purposes on Supplemental Freeways - 1969
3. Functional Classification Increase Factors - 1990/1968
4. Appendix A - Guide for Forecasting Traffic on the Interstate System - 1972.

Estimated Costs:	Part I Participating
Programmed 1971 FY	$ 75,000
Estimated Expenditures 1971 FY	$ 90,000
Estimated Cost 1972 FY	$100,000

MINNESOTA

7.11. Long Range Program

A. Statewide Highway System Planning

Objective

To prepare a plan for a statewide trunk highway system for inclusion in a future Statewide Comprehensive Plan in coordination with other agencies.

Accomplishments F.Y. 1971

1. A table of base year trip movements between 174 surveyed and synthesized towns and state line crossings was developed.

2. Estimates of future population and trip generation were developed for the 174 locations mentioned in item #1.

3. A 1966 trip table was assigned to the 1966 highway network and evaluated against ground count data for accuracy. Results were satisfactory and substantially validated the basic and functioning of the model.

Minnesota Cont.

4. A year 1990 trip table was developed using trip generation data based on projected population and the "Fratar" process of apportioning future trip interchanges based upon base year data.

5. The 1990 trip table was assigned to the 1966 network and a future "interim service level" network. Total vehicle miles assigned by the model checked closely with other independently derived estimates.

6. An evaluation of the future "interim service level" planned system was begun, utilizing model results.

7. 1990 trips were assigned to a desire-line "spiderweb" network linking all survey and synthesized towns, to aid in analyzing existing and planned systems and determining future needs.

Work Program F.Y. 1972 (210) Est. Cost $47,700

1. Trips generated by an additional 17 towns between 700 and 1000 population will be synthesized and added to the present and future assigned travel to improve assignment accuracy.

2. Testing and revision of proposed future networks based upon evaluation of results obtained previously.

3. Assign 1990 trip table to alternative future networks.

4. Evaluate alternative future networks based upon system evaluation criteria and a detailed segment by segment analysis.

5. Develop a "best" future network based upon a synthesis of the best features of previous networks evaluated.

6. Evaluate the potential for adapting the statewide model to forecast recreation or other types of peak demand travel and for application to regional transportation planning needs.

7. Evaluate the need for additional field data to substantiate and more accurately measure trip generation by small population centers.

MISSOURI

11.B STATE STUDIES

1. State-wide Traffic Model Study

Objective

The objective of this study is to develop a satisfactory procedure for estimating state-wide traffic patterns, utilizing a basic table of movements and socio-economic data for small areas (zones).

Accomplishments FY 1971

The 1960 basic trip data (Mississippi Valley Origin and Destination) was expanded to a trip matrix for 1967. Numerous assignments were made of the 1967 trip matrix to the 1967 Network. The consensus is that the trip data is incomplete. The desired accuracy could not be attained.

Programmed FY 1971	Anticipated Expenditure
$15,000	$24,000

Work Program FY 1972

The major focus of work will center around the development of a more complete trip matrix to the expanded year 1970. A two part program will be needed to complete this trip matrix, (1) exam and fill in base year (1960) data and (2) development of growth factors from base year to 1970, 1980, and 1990.

A contract may be let to update the present socio-economic data based on 1970 census data.

Cost FY 1972

$75,000

MISSISSIPPI

4, VII. Forecasting: Over the past several years we have conducted external cordon interview studies of approximately 40 municipalities. This past year the results of these studies were converted from a card to tape system, formats were standardized, and factors were inserted to equate all trips to a base year 1970. These interviews were used to determine trips between cities and are the basis for our "zone-to-zone" movements in the development of a statewide traffic model.

This year we will summarize base year trip distributions with one trip end or both trip ends out-of-state thus giving us "station-station" and "station-zone" trips. These trips will be determined from cordon stations where available and at special stations we have operated in the past at state line crossings. It is believed that we have enough existing OSD information to develop generation and distribution models. For several years we have planned to accomplish this project but lacked adequate computer and program capability. With the development of the "Urban Transportation Planning Package (PLANPAC)" and in house computer capability it is indicated that we will be able to finalize and use a statewide model under this work program.

NEW YORK

7. C. Statewide Transportation Study

1. Purpose

To prepare long-range plans and policies for transportation in New York State, including all modes, public and private, passenger and freight, and complementing the urban planning programs already underway.

2. Procedure

A revised prospectus for a statewide transportation planning program defining the present and future statewide work programs in detail was completed in 1970-71. The following participating program elements to be accomplished in 1971-72 correspond to the work program set forth in the revised prospectus. Non-participating elements are shown in Part III.

a. Goals, Criteria and Evaluation Guidelines

1) A final report on Rail-Highway Grade Crossing Criteria will be completed. ($4,000).

2) A first draft report and a final report on criteria for the evaluation of Transportation Centers will be completed. ($11,000).

3) A final report on criteria for the evaluation of Rural Transit Needs will be completed. ($7,000).

b. Inventories

1) Person Travel

a) A Regional Home Interview Survey and a Regional Cordon Survey will be conducted in the Genesee-Finger Lakes Region (Rochester area) in the summer of 1971. (Total $370,000) (Field Operations, $155,000: Coding, $155,000: Supervision $60,000).

2) Generalized Files

a) Multi-modal data files for use in analysis and research will be prepared for the goods movement system. ($29,000).

c. Analytical Studies

1) Accessibility-Development -- techniques for estimating the impact of accessibility upon development will be developed. ($16,000).

d. Forecasts

1) Person Movement Forecasts

Procedures to be used in the preparation of long-range estimates of total person travel generation will be developed. ($85,000).

e. Plan Development and Evaluation

1) Bus Passenger

a) A study of intercity bus service will begin. ($10,000)

b) Bus terminal studies will be completed for Rochester and Syracuse. ($10,000)

2) Highways

a) A long-range plan for intercity expressways will be completed. ($58,000).

b) A regional highway plan for a prototype region (Non-urban portion) will be started. ($5,000).

f. Miscellaneous

Statewide Master Plan ($27,000).
Project Reviews ($10,000).

3. Accomplishments in 1970-71

A revised prospectus for a statewide transportation planning program was completed in preliminary report form.

a. Goals, Criteria and Evaluation Guidelines

1) The final draft of the Goals Task Force report was completed, approved, and published. A summary version of this report was also produced.

2) A first draft of Rail-Highway Grade Crossing Criteria was completed.

3) A preliminary report describing criteria for the evaluation of Rural Transit Needs was completed.

b. Inventories

1) Person Travel

a) Supplementary coding, for statewide purposes of several urban area travel files was completed.

b) A state line cordon survey was conducted in the summer of 1970 at forty important crossing of the State border.

c) A Statewide Home Interview Survey of 8,000 New York State households was conducted in the summer of 1970.

d) Intercity Bus Passenger Surveys were conducted in the Capital District and Syracuse regions.

2) Generalized Files

Multi-modal data files required for use in analysis and research have been created for the following subjects:

a) Zone Characteristics: statewide traffic analysis zone summaries of population, land use, and other characteristics.

b) Person Travel System: zone to zone matrices and zone summaries of person movement and system interconnections.

c. Analytical Studies

1) Person Travel Simulation -- methods for estimating intercity automobile travel generation were developed, using existing urban area study data files.

2) Accessibility-Development -- studies to measure the inter-relationships between accessibility and development were initiated.

New York Cont.

d. Plan Development and Evaluation

1) Bus Passenger

Bus terminal studies were initiated in Rochester and Syracuse. The Rochester study is in part funded by UMTA.

2) Highways

An interim plan for intercity expressways was completed.

e. Coordination

1) The Statewide Transportation Coordinating Committee was reorganized in structure, schedule, and agenda.

PENNSYLVANIA

7. SYSTEMS AND PROGRAMMING

IV. SPECIAL STUDIES ($ 48,500)

1. COMPUTER PROGRAMS

Objective:

To provide the total computerization necessary for all Urban and Statewide Transportation Studies.

Accomplishments 1970-71:

The System of Transportation Planning Computer Programs for the Burroughs B-5500 Computer was placed into production with large scale data banks. Several

Pennsylvania Cont.
updates and extensions were made to the existing set of computer programs incorpor. more efficient operation, house-keeping chores and add. capacities needed for the Statewide Transportation Study.

The two manuals describing the Systems of Programs to the user and the analyst were revised.

An initial effort was begun on converting computer programs from the Burroughs B-5500 computer to the B-6500 computer.

1971-72

The cost anticipated to this item allows for work involving the PennDOT force to maintain, upgrade and extend the System of Transportation Planning Computer Programs developed on the Burroughs B-5500 Computer for application in both the Urban and Statewide Planning Studies, as well as, converting this system of programs from the Burroughs B-5500 Computer to the Burroughs B-6500 Computer.

2. COMPUTER PLOT PROGRAMS (CONSULTANT) ($ 22,500)

Objective:

Develop a system of transportation planning computer plot programs for the Burroughs B-6500 Computer.

Accomplishments 1970-71:

The development of a system of transportation planning computer plot programs for the Burroughs B-5500 Computer was deferred to the following year due to the installation of a Burroughs B-6500 Computer which thereby altered the program specifications.

Work Program 1971-72:

Design and develop through a consultant agreement, computer programs to prepare to plot transportation planning data for the B-6500 transportation planning programs.

3. STATEWIDE HIGHWAY PLANS ($ 124,800)

Objective:

Develop short and long range statewide highway plans which are soundly conceived to meet goals and standards of the State.

Accomplishments 1970-71:

During fiscal year 1970-71 work continued on the development of a statewide

Pennsylvania Cont.

highway plan for Pennsylvania. Work completed during the year included the development of a base year(1963) zonal trip table, a base year traffic assignment, and calibration of the 1963 assignment with ground counts, established a coded highway network, forecasts of 1990 socioeconomic data, statement of goals and objectives for transp. planning, and the development of a generalized land use plan.

Work Program 1971-72:

Tasks expected to be performed in fiscal year 1971-72 include the development of a 1990 zonal trip table, estimates of future revenues, consultation with highway districts and local planning commissions, and assignment and evaluation of 1990 traffic on the committed network, and the preparation of one alternate 1990 network.

4. STATEWIDE TRANSPORTATION PLANNING

Consultant ($ 50,000)

Objective:

Develop recommended work programs for Statewide Transportation plans which are soundly conceived to meet goals and standards of the State.

Accomplishments 1970-71:

New program

Work Program 1971-72:

This project, to be completed in fiscal year 1971-72, will produce a detailed ten year work program for statewide transportation planning. This study will include an identification of (1) the relative need and extensiveness required for planning for the various modes, (2) the present procedures used in planning for these modes in Pennsylvania, (3) the present planning procedures used elsewhere, (4) a recommended comprehensive, coordinated, statewide transportation planning process, and (5) detailed work programs to implement the process.

WEST VIRGINIA

(.6) - STATEWIDE TRANSPORTATION STUDY

Objectives:

Organization and development of a statewide transportation study.

Accomplishments 1970

The check list for STAM traffic was reviewed, summarized, and submitted to the technical committee for review and comments.

Modifications in the proposed magnitude and the jurisdictional descriptions of highway links were made to the Base Year Network Program.

A CPM network was prepared for the duration of the Base Year Network Phase.

The Base Year Network Program and Agreement were submitted to the Federal Highway Administration for review and comment. It was decided that the Work Program would have to be revised to utilize the proposed Statewide Link Data File in the network jurisdiction coding.

It was decided that a proposed research project on trip generation and distribution relationships of West Virginia urban centers would be carried under STAM.

A Work Program was prepared for the collection and development of socio-economic data for STAM.

Accomplishments 1971:

The Agreement and Work Program for developing the base year highway network was initiated in July. Completion is scheduled in approximately one year.

The work program for developing a socio-economic and land use data file by statewide traffic zone was discussed extensively, revised, and submitted to the Federal Highway Administration and the Office of Federal-State Relations for review and comment.

An agreement between the Department of Highways and West Virginia University for Planning Project Number 2, West Virginia Trip Generation and Trip Distribution Relationships, was executed and actual work began in May. The project is expected to be completed in 18 month.

A proposal was received from West Virginia University and reviewed by the Department of Highways for a study of trip generation rates of special West Virginia generators.

Work Program 1972:

Efforts will be directed toward the completion of Phase I as outlined in the Prospectus which will consist of the following:

1) Base Network
2) Base + Committed Network
3) Base Trips (Part Universe)
4) Base Socio-Economic Data
5) Traffic Assignment

The research into the trip generation and distribution relationships of West Virginia urban centers will be completed.

A project will be sponsored which investigates and reports on special facility trip generation.

WYOMING

ORIGIN - DESTINATION STUDIES - RURAL (Chapter VI);

Objective: To provide information needed on the location and amount of travel by the various vehicle types, and on such trip characteristics as purpose, length, and time. These travel data are used in projecting future travel and determining highway transportation deficiencies.

160 State Highway Plan - Travel Patterns:

On April 1, 1971, the Wyoming State Highway Department and the Division of Business and Economic Research, University of Wyoming entered into an agreement entitled "Analysis of Transportation Demand in Wyoming". As set forth in this document, the University agreed to undertake investigations and studies for estimating present and projecting future transportation demand as part of the Highway Department's Statewide Highway Transportation Planning Process. This is a two phase study with completion dates scheduled for August 1, 1972 (Phase I) and August 1, 1973 (Phase II), Phase I - Part A entails estimating the total volume of trips occuring within Wyoming and

between Wyoming and other states. Phase I - Part B concerns itself with identifying the effects of air, rail and pipeline transportation on highway transportation in Wyoming. Phase II is concerned with estimating future highway transportation system needs by comparing future demand with present use and relating future highway travel in Wyoming to projected changes in economic activity, population, and changes in demand among the four transportation modes in Wyoming.

The University embarked on this endeavor and has accomplished the following:

A. Phase I - Part A Three types of questionnaires for obtaining origin and destination travel information were developed, printed and distributed. One type of questionnaire is being issued through the permanent driver's license examining stations while the other two are being distributed through the mail. Coding manuals were developed and work began on coding and keypunching the returned questionnaires. A pilot survey was also conducted to compare response rates for questionnaires requesting travel information for the last seven days and the next seven days. The ton-mile reports that are submitted to the Board of Equalization and Tax Commission by the trucking firms are being microfilmed, coded and keypunched and will be used to develop travel information regarding out-of-state and in-state heavy commercial vehicles.

Phase I - Part B Work accomplished consisted primarily of contacts with principal state and federal transportation agencies, compilation of basic historical background data and information, and assembly of information sources into a convenient location for completion of the project.

B. Phase I - Part A Distribution, coding and keypunching of the returned questionnaires will continue. Microfilming, coding

and keypunching of the ton-mile travel information will also continue. Work will commence on updating of the 1963-1964 origin and destination study of out-of-state cars, which was conducted by the Highway Department.

Computer programs will be developed to compile the origin and destination information and to estimate total annual travel by origin and destination. Projections of Wyoming's population will be updated using 1970 census data. Preliminary work will begin on the development of a theoretical model that ultimately will be used to project highway travel in Wyoming by origin and destination.

Phase I - Part B Work will continue on assembly of basic data and information sources, and emphasis will be upon the construction of additional basic tables portraying relevant historical and current information about the structure of the transportation system in Wyoming.

C. Phase I - Part A The University will continue to gather information on travel in Wyoming for a total period of one year with the ending date being March 31, 1972. This information will be compiled into an origin and destination trip table. The Highway Department will develop a traffic analysis zone configuration to be used for assigning highway travel to networks. Screen-lines, automatic and manual classification counts and census population will be used as a basis for expanding the travel information to obtain total volume of highway travel in Wyoming for a 12-month period. The final report of the findings and result of the study under the work phase will be transmitted to the Highway Department on August 1, 1972.

Phase I - Part B The background historical data and information will be summarized to show the development of the modal transportation systems. Within the limitations of existing data, modal

and intermodal trends will be developed for passenger and commodity flows in Wyoming, showing shifts over time in the use of and dependence on various modes. The final report of the findings and results of the study under this work phase will be transmitted to the Highway Department on August 1, 1972.

Phase II The principle focus will be statistical analysis of the results of Phase I and of various socio-economic data to identify characteristics strongly associated with specific types of travel in Wyoming. A model will be developed for each type of travel and future trip tables will be generated. The trips, classified by the various types of travel, will be projected to the year 1995 by five-year intervals, beginning with 1970. The final report of the findings under this work phase will be transmitted to the Highway Department on August 1, 1973.

WORK PROGRAM NARRATIVE - PART III, NON-PARTICIPATING

005 State Highway Plan - Organization: All administrative and other related work pertaining to the organization structure and meetings of the Steering and Technical Review Committees, and Legislative Advisory Group will be done under this account.

056 State Highway Plan - Transportation Facilities: Coding of the geometric data for the physical features file will be completed. All program development to be derived from the physical roadway feature file will also be charged to this account.

161 State Highway Plan - Travel Forecasting: It is planned to complete the development of procedures for making future travel forecasts on a statewide basis. Procedural guides describing this work phase will be completed.

Wyoming Cont.

162 State Highway Plan - Traffic Assignments: It is planned to complete the development of procedures for making mechanical traffic assignments on statewide highway networks. Procedural guides describing this work phase will be completed.

167 Traffic-System Integration: Programming development efforts directed to attain a common index with the Physical Roadway Features and Accident Records Files. The availability of this information is required to perform a comprehensive accident reduction analysis.

256 State Highway Plan - General Systems and Route Planning: All general costs incurred in connection with systems and route planning will be charged to this account. This will include minor route studies, evaluations to determine the scope of major corridor investigations based on a delineated state highway plan, and follow up work on completed studies.

302 State Highway Plan - Systems Planning & Development: It is planned to continue work on delineating systems of highway corridors within the State for use in developing a State Highway Plan. Procedure guides for describing this work will be completed.

303 State Highway Plan - Development of Standards and Evaluation of Highway Transportation Services: It is planned to continue work toward the development of a specific set of standards for a functionally described highway transportation system. Procedural guides describing this work phase will be completed.

304 State Highway Plan - Needs and Cost Estimates: Phase I, "Initial Data Development" and Phase II "Initial Data Evaluation" of the Highway Needs Analysis will be completed and the first draft of the Highway Needs Report will be distributed.

Wyoming Cont...

459 State Highway Plan - Economic Factors: Work will continue on the collection and analysis of economic factors. Procedural guides describing this work phase will be completed and work on developing factors and forecasts in relation to statewide distribution of travel will be undertaken. This line item will be conducted in conjunction with "Analysis of Transportation Demand in Wyoming". (Line item 160 - Part I - Planning).

460 State Highway Plan - Population: Work will continue on the collection and analysis of population data, development of factors and forecasts for distribution of travel, and establishment of traffic analysis zones. Procedural guides for this work phase will be completed. This line item will be conducted in conjunction with "Analysis of Transportation Demand in Wyoming". (Line item 160 - Part I - Planning).

461 State Highway Plan - Land Use: Work will continue on land use collection and analysis of this data will begin. Factors influencing travel forecasts and distribution will be investigated. Procedural guides for this work phase will be completed. This line item will be conducted in conjunction with "Analysis of Transportation Demand in Wyoming". (Line item 160 - Part I - Planning).

STATE	ZONES			NETWORK						
	NUMBER	SIZE	BOUNDARIES	INPUT	OUTPUT	MILES	%	DESCRIPTION	LINK INFO	TYPE MODEL
Wisconsin	570	1000 population	Towns, Cities	MVOD O-D, Pop, Emp., Rec.	1960-1990 Trip Tabs.	15,000	15	Asterisk, Collectors	Miles, Speed, ADT, Sufficiency Capacity	FRATAR
Michigan	510 2300	1000 500 population	Towns Cities Every Twp 4 urb=1 State	9 Urban O-D Pop, Vac 40 Urb O-D	1966-1990	12,000 29,000	10 22	St. Trunk, FAS St. Trunk, 50% FAS	Miles, Speed, ADT Sufficiency Capacity	Gravity
Minnesota	1900	Twp & Cities >2500	Towns Cities	Stateline, O-D 54 Urban, pop. Increased VMT/Capita.	1966-1990	11,000	9	St. Trunk Hwy.	Miles Speed, ADT Control Section	FRATAR (Gravity f missing trips)
Pennsylvania	1600	500 population	MCD Twn Cities	Stateline, 50 Urban Sim. Rural-Rural Pers. income Ret. & Whsle sales Value added by mfg. Agriculture activity	1963-1990	12,000	13	ASF Class 1-5, Functional Cl. R ADT >500 U ADT >800		FRATAR Simulate R-R
Kentucky	663	CCD's	CCD & Some urban zones combined	Stateline Mail 1-2% Urban O-D's	1970 - 1990 or 2000	12,000	16	Prin, Minor Art. Some Collectors	Above, Cap Route, District U/R	Gravity