Oakland Co., Mich.
Planning Commission.

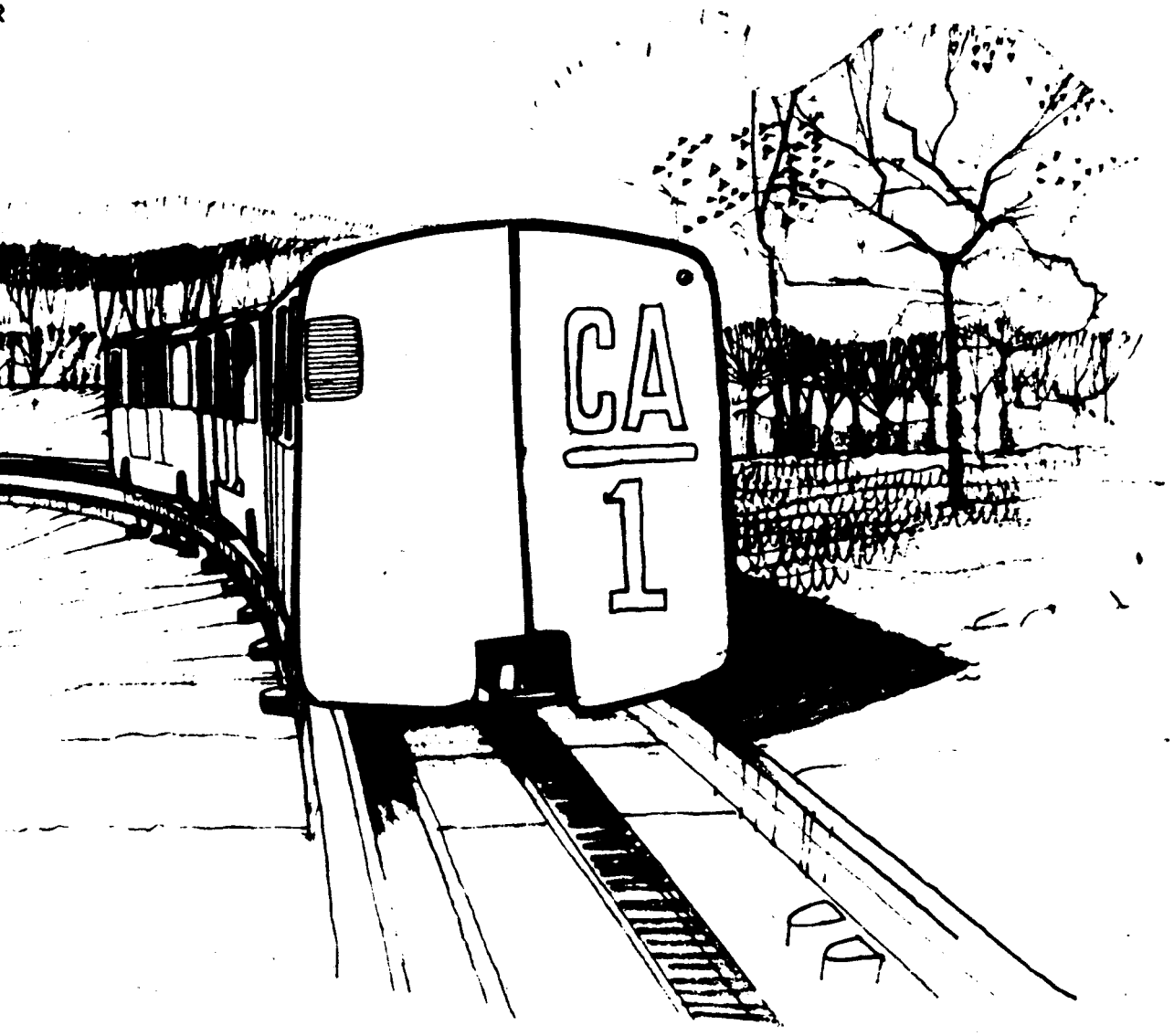
Transit data: Oakland County.

TRANSIT DATA

OAKLAND COUNTY 1971

REVISED JUNE 1971

OAKLAND COUNTY PLANNING COMMISSION



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TRANSIT DATE OAKLAND COUNTY - 1971

OAKLAND COUNTY PLANNING COMMISSION

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REVIEW OF TRANSPORTATION PLANNING

RELATED TO

OAKLAND COUNTY

Reid, Cool & Michalski, Inc.
Traffic Engineering Consultants
Southfield, Michigan

January 15, 1971

REID, COOL & MICHALSKI, INC.
Traffic Engineering Consultants

Suite 115
16400 W. Twelve Mile Road
Southfield, Michigan 48075
Telephone: 313/353-3050

LLOYD B. REID, P.E.
STANLEY D. COOL, P.E.
CHARLES S. MICHALSKI, P.E.
ROGER J. SMITH, P.E.

January 18, 1971

Mr. George N. Skrubb, Director
Planning Department
Oakland County Planning Commission
1200 North Telegraph Road
Pontiac, Michigan 48054

Dear Mr. Skrubb:

We are herewith presenting a review of transportation planning related to Oakland County. From the review we find that four areas need additional study:

1. Highway planning--There appears to be a certain amount of disagreement between the Oakland County Road Commission and the Transportation and Land Use Study (TALUS) findings to warrant a review of the differences. This review should also cover the divergence of Dr. Doxiadis' plan from others.

2. Mass transportation--Further study is needed to determine need for and probable impact of mass transportation facilities. The logical agency for such a study is the Southeastern Michigan Transportation Authority (SEMTA).

3. Aviation--The last regional study was conducted in 1959. This study should be updated, probably by SEMCOG.

4. Other transportation modes--Modes of transportation that appear to need study include freight railroading, trucking, and petroleum pipelines. All three of these modes have regional aspects and probably would be best considered by some regional agency.

During the course of the review I had occasion to consult with Mr. Dondero of your staff, staff members of the Oakland County Road Commission, Mr. Franklin Meyers, Executive Director of the Intercounty Highway Commission, and members of the staff of SEMCOG. I also

discussed the review with Mr. Vander Veen, Manager of the Oakland Pontiac Airport. The cooperation that I received was very gratifying.

Very truly yours,

REID, COOL & MICHALSKI, INC.
Traffic Engineering Consultants

Charles S. Michalski

Charles S. Michalski

CSM:mjj
Attach.

REVIEW OF TRANSPORTATION PLANNING

RELATED TO

OAKLAND COUNTY

Introduction

This review was undertaken at the request of the Oakland County Planning Commission for the purpose of evaluating studies that were conducted to delineate the transportation requirements of the Detroit Metropolitan area and to provide an analysis of the adequacies and inadequacies of these studies to enable the County of Oakland to complete its preparation of Phase I of its County Comprehensive Plan relating to transportation. Specific purposes of the review are:

1. Determination of what is lacking from the point of view of Oakland County to enable the county to prepare a comprehensive transportation plan.
2. Identification of what additional transportation information is needed to help Oakland County.
3. Identification of obvious unresolved discrepancies among major thoroughfare alignments as they affect local communities.
4. Description of all modes of transportation that have been inadequately studied and recommendations regarding remedies available.

The review covers the following studies:

1. Transportation and Land Use Study (TALUS). Now being continued by SEMCOG.
2. The Urban Detroit Area (UDA) Study sponsored by The Detroit Edison Company and conducted by Doxiadis, Associates.
3. The Michigan Department of State Highways, Periodic Highway Needs Study currently nearing completion and route location studies.
4. The Intercounty Highway Commission planning for a consistent pattern of regional highway rights-of-way and conformance of intercounty alignments.
5. The Oakland County Road Commission's highway plans for county rights-of-way.
6. Individual city thoroughfare and parking studies conducted by Reid, Cool & Michalski, Inc.
7. Transit and bus system studies for SEMTA.
8. A small number of airport studies mostly for general aviation.

Background

Time allotted for this review did not permit a thorough research of past transportation planning for Oakland County. One of the early plans that had a profound and still visible effect on the Detroit Metropolitan area was the Master Plan for Detroit and Environs prepared in 1925 by the City Planning Commission and the Rapid Transit Commission of the City of Detroit in collaboration with the road commissions of Wayne, Oakland and Macomb Counties. This plan called for a system of super highways in 204-foot rights-of-way superimposed on a grid of major thoroughfares in 120-foot rights-of-way spaced at two mile intervals and secondary thoroughfares in 86-foot rights-of-way at intervening one mile points.

The plan covered only that part of Oakland County within a 15 mile radius of Detroit's City Hall but it set the pattern for 204-foot super highways in the county including Grand River Avenue, Northwestern Highway, Telegraph Road, Woodward Avenue, Stephenson Highway, and Eight Mile Road. However, two of the super highways that did not materialize in the county were Sunset, which was to be located midway between Woodward Avenue and Northwestern Highway, and Eleven Mile Road. Had Eleven Mile Road developed as a 204-foot super highway, it is quite probable that the alignment of the I-696 Freeway could have been resolved with far less pain than was experienced during the recent long and arduous proceedings.

The next most significant highway traffic plan that affected Oakland County was the Detroit Metropolitan Area Traffic Study which was undertaken in 1953 and completed in 1955. In 1957 Congress enacted a law establishing the national system of interstate and defense highways which initially called for construction of 42,000 miles of freeways and was to be financed out of a special trust fund from wnich states would be imbursed to the extent of 90 per cent of costs incurred in construction of the highways. As a result of this law, the process of establishing alignments for and programming construction of freeways was greatly accelerated. The I-75, I-96, and I-696 Freeways are visible results of the new program.

Current Highway Planning

Highway planning activity relating to Oakland County is currently being carried on in at least six identifiable levels of governmental hierarchy. Basic highway planning as it relates to the county is the responsibility of the Oakland County Road Commission. The Commission has developed a master right-of-way plan which is being implemented through a cooperative venture of municipal, township, intercounty, and state agencies. The master plan has been submitted to and approved by the Intercounty Highway Commission of Southeastern Michigan. The plan includes inputs from the Michigan Department of State Highways with respect to state trunkline routes and freeways. In order to effectuate the plan the Road Commission is seeking endorsements from local governments in form of official resolutions.

The master plan calls for a highway network that would be accommodated to a substantial extent in 120-foot rights-of-way. In corridors where traffic demands are at high levels or expected to be at high levels, 204-foot rights-of-way are indicated. The 204-foot rights-of-way is also indicated in the northern and western fringes of the county to permit development of parkway-like settings for the roadways. Presumably these highways would serve the needs of recreational travel.

In 1965 the Detroit Regional Transportation and Land Use Study (TALUS) was initiated. This study covered six counties in the Detroit Metropolitan area, including Oakland County. In August 1969 TALUS published a preliminary plan which included several test highway networks. These test networks included varying mileages of recommended freeway construction, ranging from mileage to which the Michigan Department of State Highways is committed to the year 1980 (approximately 600 miles in the TALUS region) to approximately 800 miles in the region. Test Highway Network IIA which is a modification of Test Highway Network II appears to be favored at the present time and is the basis for further discussion. This network includes 177 miles of freeway and 189 miles of major arterials in Oakland County.

In a letter of December 15, 1969 the planning engineer of the Oakland County Road Commission detailed a number of challenges to the findings of TALUS as presented in Volume 2, "Growth, Change, and a Choice for 1990." Questions were raised about the extent of urbanization of Oakland County projected by TALUS for the year 1990. The basis for these questions was the apparent oversight of the Fenton sewer system which serves the northwestern portion of the county. Another question pertained to statements regarding level of service assigned to the highway network. According to TALUS, "From the highway inventory data, only minor pockets of localized congestion were noticable in outlying cities of the region." In thoroughfare studies conducted by the firm of Reid, Cool & Michalski, Inc. for several municipalities in Oakland County, findings tend to support the position of the Commission's planning engineer. In the City of Southfield, for example, there were a number of highway sections on which average of vehicular speeds were less than ten miles per hour during peak hours. In the City of Troy, analyses showed that traffic volumes exceeded design capacity by more than 50 per cent on many of the roads south of Big Beaver Road. Another sympton of traffic congestion is manifested in high volumes of by-pass traffic that were found on residential streets in the Cities of Ferndale and Royal Oak.

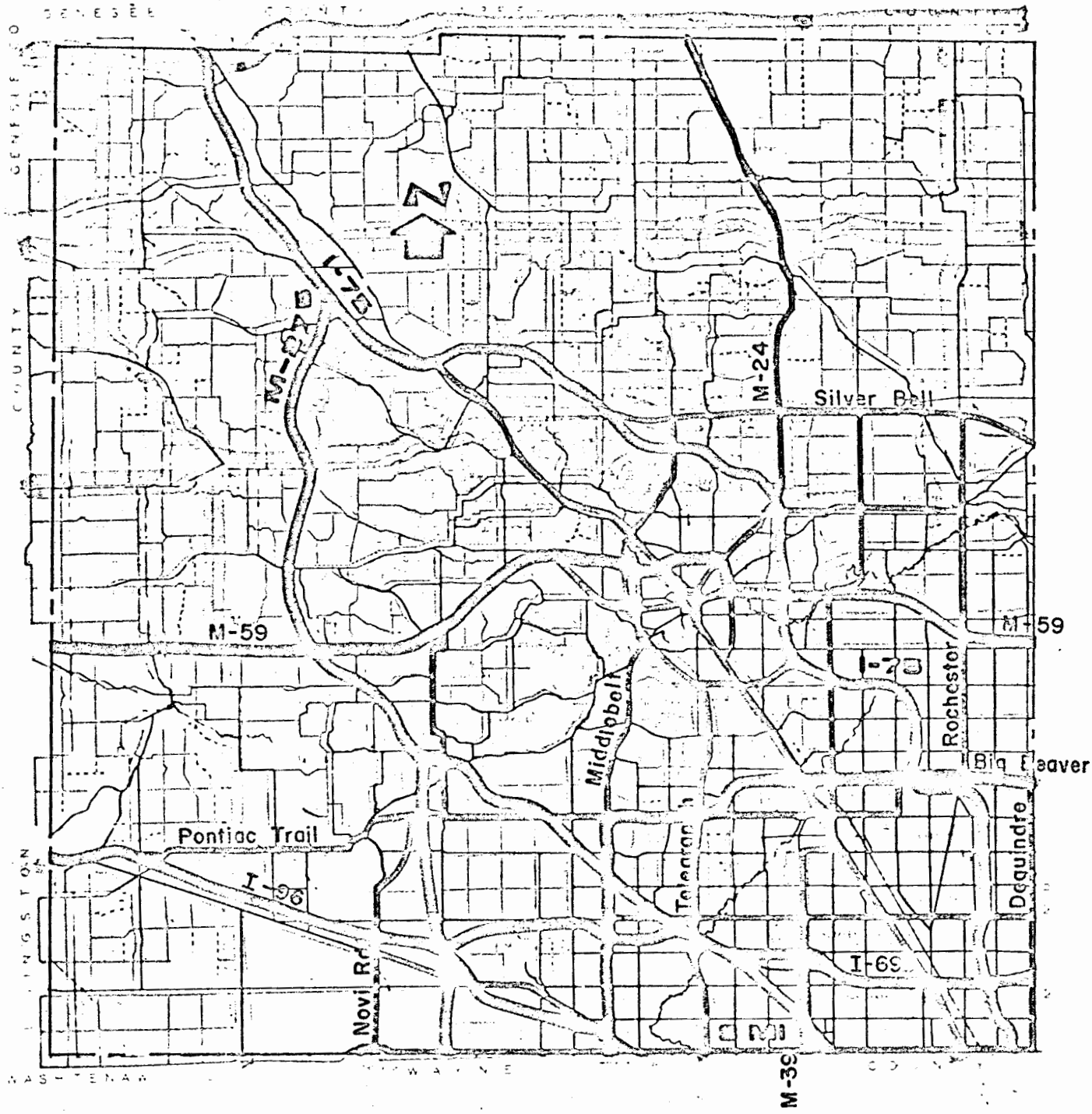
The Oakland County Road Commission planning engineer also raised questions about the prospects of rapid rail transit for providing significant relief of highway congestion.

Following this page is a two-part exhibit which shows by means of overlay the differences between the Master Right-of-way Plan developed by the Oakland County Road Commission and Test Network IIA

OAKLAND COUNTY ROAD COMMISSION
MASTER RIGHT-OF-WAY PLAN

FREEWAYS

204-FOOT SUPER HIGHWAY



FROM
1990 TALUS TEST
HIGHWAY NETWORK II-A

FREEWAYS

MAJOR ARTERIALS

OTHER ARTERIALS

which was produced by TALUS. In view of the fact that the TALUS plan was designed for 1990, it would naturally include some freeways that are not on the Oakland County Road Commission plan. These freeways include one in the Big Beaver Road corridor which would begin at I-94 in Macomb County and connect with the new freeway in the Middlebelt Road corridor which would extend southward into Wayne County and terminate in the vicinity of the Detroit Metropolitan Airport. Although Test Network IIA is said to include 189 miles of major arterials in Oakland County, for some reason only a fraction of the arterials mileage is actually displayed in the TALUS map. The most conspicuous discrepancy between the two plans is in the areas where Oakland County Road Commission shows 204-foot rights-of-way.

Michigan Department of State Highways Planning

At the present time the Michigan Department of State Highways is conducting a highway needs study. Thus far there has been no output from the study. The Oakland County Road Commission planning engineer reports that he had just received a printout of Oakland County input to the study. This input was framed largely along the lines of the Commission's master plan.

The Michigan Department of State Highways releases a highway construction program each year during the late spring. The last such release included a three year construction program covering the years July 1, 1969 to June 30, 1974 which included construction along I-696 from Lahser Road to the Macomb County line and construction of three miles of the M-59 Freeway. During the following three years, 1974 to 1977, the State proposes to undertake construction of the M-275 Freeway from a point south of Twelve Mile Road to a junction with I-75 Freeway northwest of Plymouth. There is also included extension of the Northwest Highway to a connection with the M-275 Freeway. All the aforesaid improvements are in line with the freeways shown in the Oakland County Road Commission master plan map.

Urban Detroit Area Study

A 3 Volume of study, "Emergence and Growth of Urban Region" was undertaken by Constantinos A. Doxiadis under the sponsorship of The Detroit Edison Company. In this study Dr. Doxiadis has analyzed the problems of the urban Detroit area and after discarding some 49,000,000 alternatives for future development, one plan turned out to be the best for the future development of the urban Detroit area. This plan (alternative 120) envisions a twin urban center in the vicinity of Port Huron and a grid type transportation network featuring high speed regional and national facilities at 18 mile intervals, freeways at six mile intervals, expressways at two mile intervals, and arterials at 2/3 mile intervals. The plan also features electronic guideways which in many instances would follow the urban expressways. Dr. Doxiadis did not describe the urban expressways, except in terms of operating speeds which would be on the order of 45 miles per hour. It would appear that some grade separations would be necessary to sustain such speeds.

Guideways would be in form of roadways in which electronic guidance systems would be installed to permit small vehicles equipped with special equipment to travel at relatively close headways and high speeds. The figure of 10,000 vehicles per lane per hour appeared in the report. This would mean a separation of vehicles would be only 1/3 of a second, a headway that is hard to accept at this stage of transportation technology.

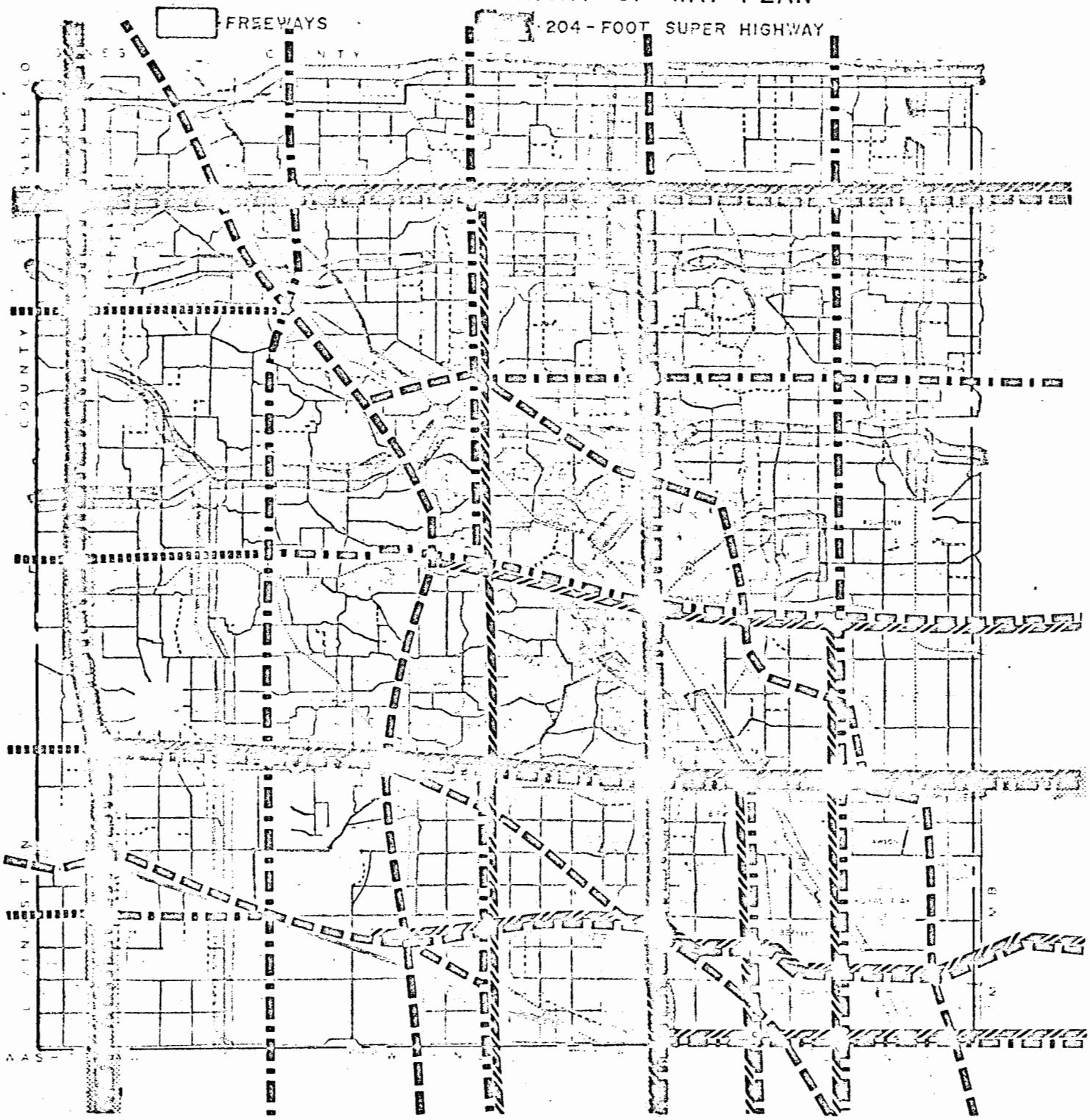
Following this page is a two-part exhibit which shows the Doxiadis plan superimposed upon the Oakland County master plan. While the freeways in Dr. Doxiadis' plan coincide to some degree to the freeway plan of the Michigan Department of State Highways, the urban expressways do not coincide with any of the 204-foot rights-of-way designated by the Oakland County Road Commission. However, a better match could be obtained in this respect by shifting the Doxiadis plan northward and westward. At the present time there is insufficient description to determine what right-of-way requirements might be to implement the Doxiadis plan if that should be the objective of transportation planners.

Another two-part exhibit shows the Doxiadis plan superimposed upon TALUS Test Network IIA. In this comparison the plans are in general agreement insofar as freeways are concerned but bear little resemblance insofar as urban expressways, guideways, and arterials are involved.

Spacing of Freeways

When the freeway plan for the Detroit Metropolitan area was in an embrionic stage, most of the freeways that were envisioned for the area radiated from the Detroit CBD. However, as the freeway system extended outward beyond the boundaries of Detroit it began to take on the appearance of a grid. TALUS Test Network IIA furthers this trend. A number of researchers have made studies of optimum spacing of freeways in a grid system. Dr. Doxiadis has concluded that six mile spacing would be acceptable. Another researcher has found that a four mile spacing would be the optimum. In his book entitled, "Urban Transportation Planning", Roger L. Creighton has included a formula for optimum grid spacing. His formula was a product of some of his research which appeared in Highway Research Bulletin 253. In essence the formula indicates that where construction and right-of-way costs are high, freeways should be farther apart and, where the number of trip destinations per square mile is greater, that freeways should be closer together. In applying the formula to the Chicago area, Creighton found that at a mean distance of 16 miles from the Chicago loop (areas somewhat similar to southeastern Oakland County) where the population density is about six families per acre, the freeways should be spaced about six miles apart. Except for some gaps in the system, the TALUS Test Network IIA has freeways approximately six miles apart in the more densely populated sections of Oakland County.

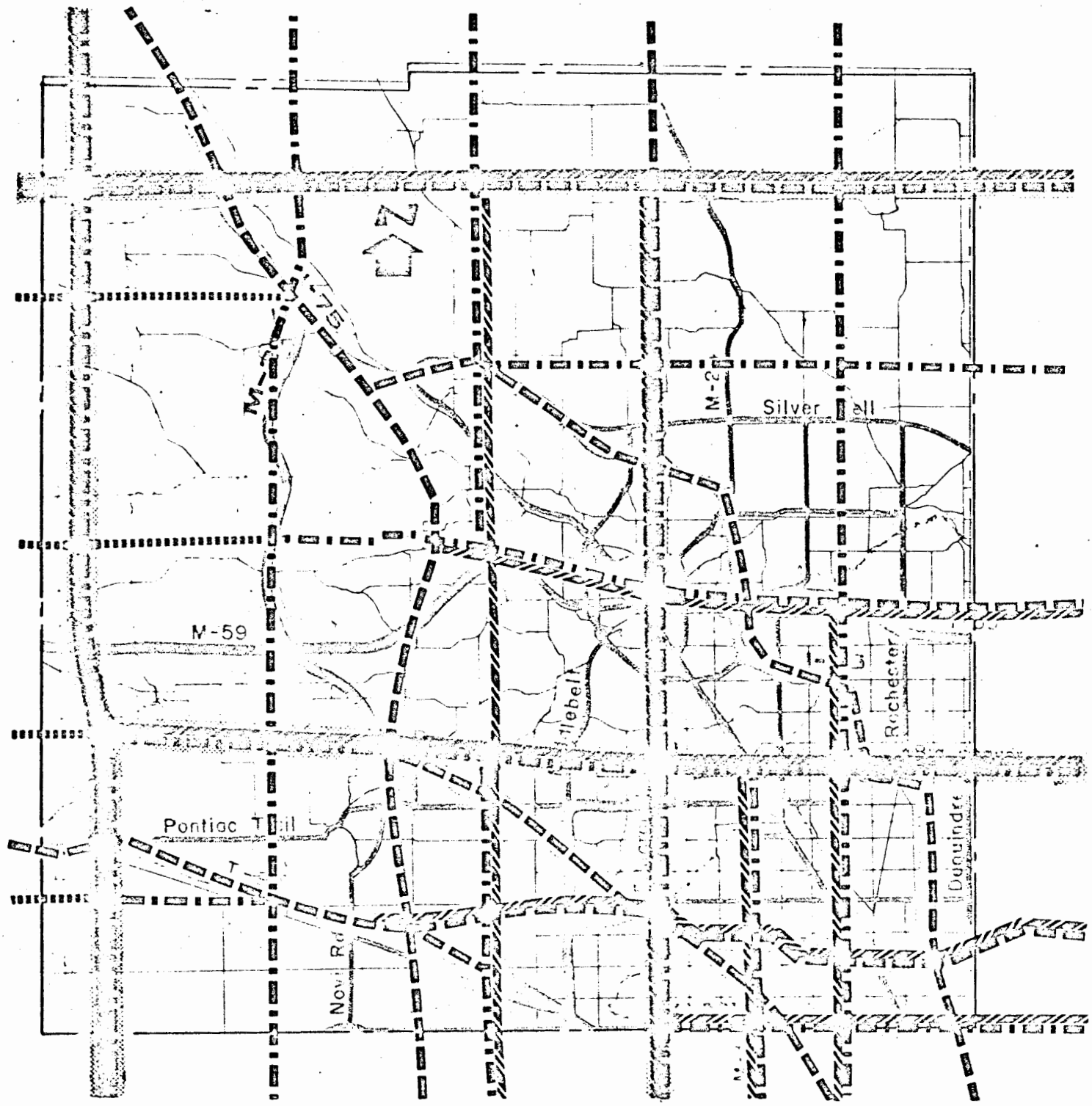
OAKLAND COUNTY ROAD COMMISSION
MASTER RIGHT-OF-WAY PLAN



FROM
VOL. 3 UDA, A CONCEPT FOR FUTURE DEVELOPMENT
BY CONSTANTINOS A. DOXIADIS

CONCEPT OF THE TRANSPORATION SYSTEM - YEAR 2000

- RURAL HIGHWAYS
- URBAN EXPRESSWAYS
- RURAL OR URBAN FREEWAY
- METROPOLITAN GUIDEWAY
- REGIONAL AND NATIONAL HIGH SPEED GROUND TRANSPORT



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FROM
1990 TALUS TEST
HIGHWAY NETWORK II -

FREEWAYS
MAJOR ARTERIALS
OTHER ARTERIALS

Mass Transportation Facilities

At the present time the DSR, Great Lakes Transit Corporation, Martin Lines, Inc. and the Pontiac Transit Corporation operate buses in Oakland County. DSR is limited to operations within ten miles of the Detroit City limits by state statute. Much of the DSR service in Oakland County converges on Northland Center. Most of the service of the Great Lakes Transit Corporation is concentrated on Woodward Avenue. However, there is some service west of Woodward mostly in the City of Southfield. The main route of Martin Lines, Inc. is on Rochester Road.

The Southeastern Michigan Transportation Authorities (SEMTA) was created by the Michigan legislature in 1967 to provide a coordinated system of public transportation for the six counties in the Detroit Metropolitan area. One of the Authorities immediate objectives is the unification of bus service in the area for the purpose of achieving better service and economics in operation. TALUS findings relative to public transportation have been transmitted to SEMTA for further analysis and action.

In its preliminary plan, TALUS had recommended rapid rail transit on several routes in the Detroit Metropolitan area including one in the Woodward Avenue corridor. The route in this corridor would follow tracks of the Grand Trunk Railroad in Oakland County to Pontiac. The strongest argument raised in favor of rapid rail transit is that it would permit the low income residents of the inner-city to reverse-commute to outlying areas where business and industry are relocating. Insofar as attracting residents of outlying areas to use rapid rail transit, there seems to be a great deal of speculation. In a recent statement the Chief of Engineering Research and Development Division, Office of High Speed Ground Transportation of the U. S. Department of Transportation declared that the automobile will remain as the predominant mode of transportation in the country but will change because of the present concern of air pollution. There are many in the transportation field in the area who share this view and do not see much diversion of passengers to public facilities in spite of the glowing accounts of subway operations in Toronto and the promises made for the San Francisco - Oakland Bay area.

Airports

The most recent regional airport study was conducted in 1959 by Landrum and Brown (Cincinnati, Ohio) for the Supervisors Intercounty Committee, Michigan Department of Aeronautics, Greater Detroit Board of Commerce. Recommendations of this study, covering the period 1960 to 1975, included a second major inter-area airport located in the vicinity of Pontiac or in the vicinity of East Detroit, pending outcome of military planning for the Selfridge Air Force Base. Secondary inter-area airports were recommended for Ann Arbor (Ypsilanti),

Detroit City Airport, Pontiac, Port Huron and Monroe. Intra-area services (heliports) were indicated for Grosse Pointe, Northwest Detroit, Birmingham and Bloomfield Hills, Dearborn (west) and Ann Arbor. The intra-area services were to be completed by 1970.

Since 1959, Oakland County has had studies performed by Leigh Fisher Associates in 1964--Air Trade Study and Development Evaluation of a Major Oakland County Air Terminal and the Allen Airport Site. This study was concerned with the Oakland-Pontiac Airport and the Oakland-Orion Airport. Subsequent studies on the Pontiac and Orion sites were made by Peckham Engineering in 1967. In 1970 the Oakland County Board of Auditors completed an engineering study for development of the Oakland-Orion Airport. However, the project was not approved by Oakland County Board of Commissioners.

At least two authorities (Landrum and Brown, Doxiadis Associates) have found need for a second major airport in the Detroit Metropolitan area. Dr. Doxiadis recommends that such an airport be located near the new urban center near Port Huron. While it is possible to continue some planning for non-instrumented airports for general aviation, the problem of airspace allocations becomes a critical factor in planning for airports with electronic guidance systems. It would appear at this time that the Landrum and Brown study should be updated, possibly by SEMCOG.

Other Modes of Transportation

Modes of transportation for which studies were not available include:

1. Freight railroading
2. Trucking
3. Petroleum products pipelines

The above modes are related to each other and are expected to become increasingly more important as the population of Oakland County increases. If permitted to expand in absence of a master plan, terminals and heavy trucking movements could develop in unwanted places. Efficiency in movements of goods could suffer because of lack of opportunities for consolidating or coordinating loads for distribution by truck. An in-depth study might well indicate need for zoning land for specific uses such as truck terminals, railroad freight forwarding yards and pipeline terminals.

Needs for Further Studies

In earlier paragraphs, it was pointed out that some disagreement existed between the Oakland County Road Commission and TALUS. It was also shown that Dr. Doxiadis' plan differs substantially from the Road Commission and TALUS plans. A study should be undertaken to determine if differences are significant enough to warrant changes in planning on the part of Oakland County and what the changes should be.

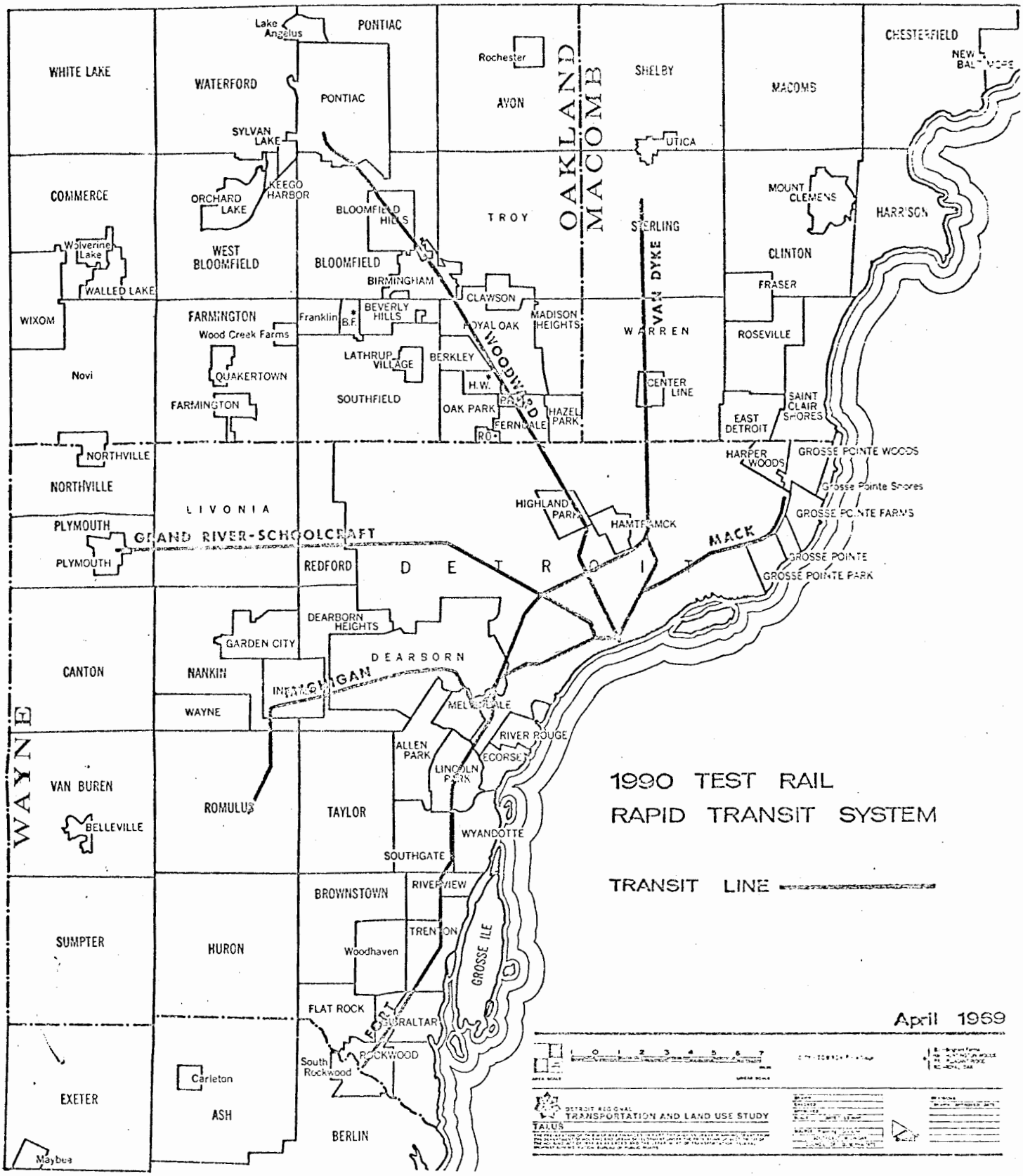
Mass transportation study data and analyses presented by TALUS did not appear to be definitive enough to determine what the probable impact of changes in the public transportation would be in terms of effects on travel by Oakland County residents and visitors to Oakland County. In view of the fact that mass transportation in this context is best treated as a regional problem, the Southeastern Michigan Transportation Authority is the logical agency to rely upon to produce the kind of study that is necessary for planning guidance in Oakland County.

Aviation is another mode of transportation that is best viewed as a regional facility. The 1959 study conducted by Landrum and Brown should be updated, possibly by SEMCOG.

Modes of transportation that appear to be covered inadequately in available study material are:

1. Freight railroading
2. Trucking
3. Petroleum pipelines

The three preceding modes of transportation have regional aspects. Only local distribution and collection of goods can be studied on a local level. However, a better overview would be obtained in a regional study.


WHITE LAKE
WATERFORD
PONTIAC
Lake Angelus
Rochester
AVON
SHELBY
MACOMB
CHESTERFIELD
NEW BALTIMORE
SYLVAN LAKE
UTICA
COMMERCE
ORCHARD LAKE
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HAMTRAMCK
GROSSE POINTE FARMS
PLYMOUTH
GRAND RIVER-SCHOOLCRAFT
MACK
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PLYMOUTH
REDFORD
D E T R O I T
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DEARBORN
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TAYLOR
BELLEVILLE
WYANDOTTE
SOUTHGATE
RIVERVIEW
BROWNSTOWN
SUMPTER
HURON
TRENTON
Woodhaven
GROSSE ILE
FLAT ROCK
FORT GIBRALTAR
South Rockwood
ROCKWOOD
Carleton
EXETER
ASH
BERLIN
Maybee
1990 TEST RAIL
RAPID TRANSIT SYSTEM
TRANSIT LINE
April 1969
DETROIT REGIONAL
TRANSPORTATION AND LAND USE STUDY
TALUS

III. GOALS AND OBJECTIVES

A. GENERAL

The major objective of the transportation elements of the TALUS project is good transportation, which is defined as an integrated system of facilities that can provide successfully for the movement of people and goods with a minimum of delay. Both private and mass transportation must be provided. Good transportation can be achieved only with adequate facilities placed at optimum locations. To compromise on either is to compromise the benefits to be expected.

Increasing accessibility widens the choice of residence and work opportunities. For employers, this means enlarging the size of the available labor pool: for the employee, a broadened choice of job opportunities for his skills, because existing and new areas would be brought within reasonable commuting time. Good transportation will increase the mobility of people affording greater opportunities to avail themselves of a wider selection of goods and services. This will increase both the volume and variety of demands for these goods and services.

Good transportation is safe transportation. By eliminating congestion and reducing conflicts among vehicles, it reduces both the enormous costs of policing traffic and the human and financial costs of traffic accidents. Good transportation must be capable of safely moving a large number of people in a short amount of time.

Good transportation is essential to the welfare of a metropolitan area. It then becomes a matter of identifying the most desirable means of achieving this end. To achieve this end, the following major criteria must be reviewed:

- A combination of all appropriate facility types and routes must be selected in order to satisfy total transportation requirements, within the constraints that people still have a choice of mode.

- The total pattern of transportation facilities must be so integrated that each type is most efficiently used.

- The economic justification for the extent and types of transportation facilities provided must lie in the accessibility, safety, economy and consistency with broader regional goals of the total transportation system, rather than the direct financial return from operating each element of the system as a fiscal entity.

- The amount of land required for circulation facilities and the storage of vehicles must be kept at a minimum especially where land costs are high, and substantial demands exist for other types of more directly productive activities.

In formulating a solution to the total regional transportation problem, the appropriate roles of automobiles, buses and rail rapid transit must be identified by comparing the ability of each to best meet the needs of the travelers who create the over-all demand for transportation. Travelers can initially be classified into three fundamental categories: (1) Those to whom a private car is not available and who must use public transportation; (2) Those for whom no other transportation will do; such as doctors, traveling salesmen, service industry workers -- the entire category of those for whom the sustained use of the private motor vehicle is essential in their daily business. Also included are operators of trucks and other commercial vehicles; (3) Those to whom a private car is available, but whose requirements are simple round trips, such as home-to-work-to-home or home-to-shopping-to-home. These have the option of choosing either their private cars or public transit if available, depending upon the levels of service provided, and the relative importance the trip-maker attaches to cost, convenience and flexibility.

1. Requirement: A Regional Freeway Network

Currently, the majority of trip-makers in the region fall into the second and third groups; people whose travel needs require the auto; and people who choose the auto because they regard available public transportation as less satisfactory. This dictates an extensive and effective highway system as the first requirement in meeting over-all transportation demand. The known size of this group makes essential, as the first transportation requirement, a regional arterial highway system based on an extensive network of freeways. Construction, programming and planning of such regional freeways in the Southeast Michigan area is already well advanced. Plans to carry these to completion and supplement the system are strongly supported.

In measuring the ability of highways to meet the full demand for urban and interurban transportation, the level of highway service is not the single determinant. If highways are to function successfully, terminal facilities such as bus terminal and auto parking facilities must be so located and connected by high-capacity feeder streets to the arterial system that traffic flows freely to its final destination.

Home-based work trips comprise almost 25% of all weekday travel. The concentration of these trips during the morning and evening peak hours critically taxes highway facilities and periodically overwhelms local distribution streets and parking or bus station facilities in major centers of employment and commerce. This phenomenon is observable twice daily in the rush-hour congestion on city streets and freeway approaches in major urban centers. It is evident, too, in the seemingly insatiable demands for parking.

2. Requirement: Rapid Transit

The compatibility of inter-city and intra-city rapid transit service with commuting trips to commercial and work activity centers has been noted. Improvements in the public transportation system, including rapid transit can aid in relieving congestion generated by handling most of these trips on highways, on their approaches at downtown centers, and in the terminal facilities of these urban areas. It is clear that public transportation improvements including a rapid transit component can efficiently penetrate urban concentrations with the transportation and terminal capacity required for commuters and other patrons.

The total transportation system should comprise a comprehensive network, so combining automobile and transit facilities that each can serve that part of the total demand for which it's best suited. It is equally important that each portion of the transportation demand be served by the type of facility that can be most economically constructed to the required capacity, both present and future. Designed and operated as an integral part of the total network, rapid transit must have adequate capacity and service to meet the rush-hour demands of commuters and other travelers to urban centers and subcenters. The regional highway system must have the capacity to serve those transportation demands which will continue to require use of the private automobile.

As a general policy, the total transportation plan should be designed to best serve the proposed land use plan. Major consideration, however, must be given to minimizing the effects of the plan on community values. Among the most important of these considerations are:

- Disruption of neighborhoods and displacement of homes and business facilities
- Noise
- Air Pollution
- Disturbance of historical sites

The passenger capacities of alternative types of transportation facilities are shown on Table III-A-1. Table III-A-2 indicates some characteristics of these alternative systems.

B. HIGHWAYS

The private automobile and the highway system is the major factor in meeting the total transportation demand. A major part of meeting this demand is the construction of freeway facilities with system continuity. This requires continuity of route as well as capacity. The system must:

1. Provide for all turning movements at freeway junctions.

2. Maintain land balance concept.

3. Connect to the external highway network.

4. Provide arterial streets of equal capacity at stub ends of freeways.

5. Provide access to freeways at 1 to 3 mile intervals in the urban area.

Additionally, transit must be complemented in providing continuity of people capacity rather than vehicles. Facilities are to be constructed consistent with AASHO standards or higher standards where they have been adopted by the responsible agency. The level of service provided to the highway user is an aggregate measure of speed, safety, comfort and convenience. It is desirable to provide level of service C as defined in the 1965 edition of the Highway Capacity Manual. Terminal facilities are provided to accommodate the total short and long term demands generated by trips to the CBD. Additional parking spaces are to be provided to accommodate the total parking demand generated by change mode trips.

C. TRANSIT STANDARDS AND CRITERIA

Standards for rapid transit service that can attract sufficient numbers of commuters away from automobiles, so as to free highways and urban centers of peak-hour congestion, are difficult to establish since each system must be tailored to local conditions. It is important, however, that the quality of service make mass transportation a desirable alternative for travelers whose destinations are along its route. During off peak hours, when highway congestion poses fewer problems, effective mass transportation is still vital to those without automobiles or drivers licenses, or who do not want to cope with the problems of local street congestion and parking at their destinations.

Essentially, standards for such a regional rapid transit system must equal or improve upon the performance of the private automobile on an uncongested highway, providing comparable or better door-to-door travel times. This requires a system with average scheduled speeds of at least 40-45 miles per hour, including station stops. By comparison, the average speed of the Grand Trunk Western commuter trains is 26 miles per hour; suburban bus lines about 15-18 miles per hour; DSR surface buses about 10-13 miles per hour; and of the existing eastern United States rapid transit systems, about 20 miles per hour. Present peak-hour average speeds of automobile travel in the Detroit area range from 16 to 30 miles per hour.

Headways for a rapid transit system must be the minimum physically and economically possible. For rush-hour service, the headways could be as short as 90 seconds. During off-peak hours, when success of a rapid transit system depends primarily on frequency of service, these headways can be increased to not more than 15 minutes.

Fares, or out-of-pocket costs to travelers, should be competitive with the perceived out-of-pocket costs of operating an automobile. These automobile costs include gas, oil and parking fees. It is equally essential that the transit passenger be as comfortable or more comfortable than he would be in the modern automobile. This can be provided for in the vehicle design, the operating characteristics of acceleration and deceleration. Safety is the first consideration in system design and fail-safe features must be incorporated in all elements of design. A rapid transit vehicle on its own private right-of-way is subject to far fewer hazards than individually operated vehicles on a highway.

Equally important in a system, stations must be located at points which can be conveniently reached by potential travelers. In suburban residential areas, stations must be related to the surrounding area by good local street and highway networks, providing easy access by local feeder transit and private auto. Ample park-ride and kiss-ride facilities must be provided as an integral part of the station installation. At centers of commerce and employment, stations should be within walking distance of major concentrations of commuter and shopper destinations. These standards influence the basic physical plan of the system. To achieve necessary speeds, the number of station stops should be minimized. Spacing between stations must be at a maximum, consistent with adequate service. Collection and delivery stations should be as close as possible to patrons' actual origins and destinations, however, rapid transit can never compete with the door-to-door capabilities of the automobile, because it can operate economically only when it can reach large groups of people at central collecting points.

1. Basic Criteria for Testing Rail Rapid Transit System Network

In order to attract patronage, a rapid transit system must be capable of equaling or bettering the travel times of the modern automobile. The system must provide:

- safety
- speed
- comfort
- convenience
- high quality heating and air conditioning
- low internal and external noise

Rapid transit construction generally falls into three categories: at-grade, aerial or underground. At-grade of graded construction involves track on the surface of the ground, on embankments, or depressed in cuts, completely fenced. Other traffic, such as motor vehicle, railroad or pedestrian, which crosses the right-of-way, are carried on special structures over or under the rapid transit roadbed. This type of construction is appropriate over routes where intersecting traffic is at a minimum and usually is the least costly.

Aerial or overhead construction involves track elevated above the ground on continuous structure, permitting surface traffic to pass underneath. This type of construction is generally more costly than at-grade construction, in the ratio of 2.5 to 1. It is generally acceptable in all industrial areas, and in commercial and residential areas where a minimum of 125 feet separates the property lines.

Underground construction is used where the cost of right-of-way is prohibitive, and where elevated or at-grade construction is unacceptable in the environment. These conditions usually prevail in major CBD's and high value areas. Underground structures are constructed by tunnelling or by cut and cover methods.

Tunnelling is generally used where the transit system passes beneath streets, rivers, buildings or ground surface. Deep tunnelling does not disturb streets, utilities or ground surface and is usually less costly. Cut and cover construction is usually undertaken where the transit system is planned at shallow depths under city streets.

It involves high costs for removal and underpinning of utilities, for street restoration, and for traffic maintenance. Underground construction is generally the most expensive. The cost ratio in relation to at-grade construction is at least 10 to 1; depending on depth and soils conditions it can be much higher.

For estimating and forecast purposes, the proven steel wheel on steel rail electrified system will be used incorporating the following criteria:

Roadway - 100 lb ARA-B rail continuously welded on rubber pads at-grade on concrete ties and ballast. Third rail - 150 lb Bethlehem high conductor alloy.

Right-of-Way:

Switches - trailing except at terminals and yards.

Turnouts - Number 20, except at terminals and yards.

Maximum Grades - mainline, except at station approaches - 3 percent, absolute 6 percent.

Minimum Radius - mainline, except at station approaches and yards, 2° (2,800 ft), absolute 500 ft.

At-Grade - 40 ft. minimum.

Aerial - as required.

Subway or tunnel - minimum inside diameter 15 ft. 6 in.

Stations:

Platforms - 750 ft.

Subway Stations - 2-level mezzanine.

Outlying pick-up stations to provide access and facilities for park-ride and kiss-ride, plus feeder bus delivery.

Power - 1000 VDC, Silicon rectifier substations.

Maximum Speed - 80 mph.

Balancing Speed - 75 mph.

Average Scheduled Speed - 45 mph.

Acceleration - 3.5 mph/sec.

Deceleration - 3.0 mph/sec.

Maximum Station Dwell - 20 sec.

Vehicle:

Length - 75 ft.

Width at belt line - 10 ft. 6 in.

Heigth above top of rail - 10 ft. 6 in.

Seating Capacity - 80.

Air Conditioned.

Propulsion - 4 @ 150 hp rated motors @ 1000 VDC.

Maximum Train - 10 cars, 800 passengers.

System Capacity - 32,000 seated pass/hr, one direction.

Peak Hour Headways - 90 sec.

Signalling and Communications:

Autcmatic train control computerized.

Two-way radio communication.

Intercom system.

Automatic fare collection.

Fare Structure - Point to point fares based on mileage rate.

2. Basic Criteria for Surface Bus Operations

Surface bus operations are more flexible than fixed forms of rapid transit since use is made of existing street and highway systems. While this flexibility is desirable from the standpoint of reoirenting service as travel habits change, the surface operation suffers the same disadvantages as the auto during peak hour traffic, and can move no faster than surrounding auto traffic, particularly at congestion points. This same disadvantage occurs on freeways unless exclusive bus lanes are set aside for peak hour operation. Such an operation does not appear practical for existing Detroit freeways.

Many transit systems operate express service during the morning and evening peaks generally dropping back to local service during the base period. As with rail rapid transit, headways are frequent during these peak hours.

A wide range of bus vehicles are available for use, depending on level of service, line and route. Seating capacities range from the small mini-bus to the large 51-seat bus. Selection of the propulsion system is based upon engine horsepower and gear ratio alternatives. One manufacturer is now developing a prototype gas turbine propelled bus which may be available in two or three years. Another company is developing a prototype articulated bus which would probably seat 70 to 75 passengers. Two transit properties are experimenting with steam propelled buses, under government sponsorship. Air conditioning is available on almost all models and is recommended as an added incentive for increasing patronage.

Fare structures are based upon level of service, patronage, distance and operation and maintenance costs.

3. Basic Criteria for Feeder Bus Operations

The same criteria for surface operations apply to feeder bus service and supplemental surface operations in connection with rapid transit. Joint fares for feeder lines and rapid transit service are highly desirable.

PASSENGER CAPACITIES PER LANE OR TRACK*
Based on "Capacities and Limitations of Urban Transportation Modes",
Institute of Traffic Engineers, Washington, D.C., 1965

	Facility	Vehicles Per Lane per Hour		Effective Passenger Capacity at Average Occupancy Rate of:		
				1.25	1.75	2.00
PRIVATE AUTOMOBILE	City Street, Design Flow Rate	600		800	1,050	1,200
	City Street, Capacity	800		1,000	1,400	1,600
	Freeway, Design Flow Rate	1,600		2,000	2,800	3,200
	Freeway, Capacity	2,000		2,500	3,500	4,000
	Facility	Vehicles Per Lane per Hour	Headway (Min)	Effective Passenger Capacity at Average Loading Ratio of:		
				100%	125%	150%
TRANSIT BUS (50 Seats)	City Street	60	1.00	-	3,750	4,500
	City Street	90	0.67	-	5,750	6,750
	City Street or Expressway	120**	0.50	6,000	7,500	9,000
	Freeway	180**	0.33	9,000	-	-
	Type of Train	Trains per Hour	Headway (Min)	Seated Passenger Capacity		
RAIL-RAPID TRANSIT TRAIN	6-Car Train (80 Seats/Car)	20	3.00	9,600		
		30	2.00	14,400		
		40	1.50	19,200		
	10-Car Train (80 Seats/Car)	20	3.00	16,000		
		30	2.00	24,000		
		40	1.50	32,000		

*One direction. This table provides the elements necessary to determine the number of persons that may be accommocated per facility. This table considers capacity only. A more complete comparison must consider demand and level of service which reflect convenience, flexibility of use, comfort and many other factors.

**Capacity would be limited by design of bus turn outs and type of operation.

TRANSPORTATION SYSTEMS - COMPARISON OF CHARACTERISTICS*

ITEM OF COMPARISON	PRIVATE AUTOMOBILES	BUS RAPID TRANSIT	RAIL-RAPID TRANSIT TRAIN
1. For moving workers to and from CBD.	Requires expensive parking or long walk at CBD	Excellent for workers living near lines	Excellent for workers living near lines
2. For workers traveling on business	Essential	Not satisfactory for most such travel	Not satisfactory for most such travel
3. For movement of goods	Essential	Not satisfactory for most goods	Not satisfactory for most goods
4. For recreational travel	Essential for travel outside city	Not satisfactory in most cases	Not satisfactory in most cases
5. Coverage of area	Complete, with freeways, arterials	Good in medium-density areas - provides own feeders	Inferior in low-density areas
6. Travel time, door-to door, non-CBD trips	Best for most non-CBD trips	Poor except for trips along lines	Poor for most trips; requires transfers
7. Travel time, door-to-door, for CBD and large employment centers	Good to poor, dependent on congestion, distance to parking	Good for trips from zones near shops; fewer transfers	Good, for those trips from zones near transit stations only
8. Vehicle comfort	Excellent-private cars; driver cannot relax	Poorer, with less smooth operation	Superior, with passengers able to read newspapers, etc.
9. Effect on CBD development	Requires parking and would be impractical as only mode in large cities	Requires much more space than rail-rapid transit, for central area loading	Permits more compact development by not requiring parking in CBD

*Prepared by Parsons, Brinckerhoff, Quade & Douglas for Metropolitan Transit Authority of Maryland, Baltimore.

TOTAL SCOPE
Johnson & Anderson, Inc. Consulting Engineers
2300 DIXIE HIGHWAY PONTIAC, MICHIGAN 48055 PHONE 334-9901

April 27, 1971

Oakland County Planning Commission
1200 North Telegraph Road
Pontiac, Michigan

Attn: Mr. George Skrubb, Director

Dear Sir:

We are most appreciative of your inquiry regarding the proposed rapid transit system in Oakland County as an extension of SEMTA'S proposal to use the Woodward Corridor between downtown Detroit and Pontiac. We made a preliminary study of such a program in 1964-1966 which we have updated and modified to include those items that you requested in your conversation with Mr. Clancy and Mr. Ek.

We have included, herewith, the following information for your review.

I. A description of the type of tunnel and the route.

II. An engineering analysis including the sub-surface geology.

III. An estimate of the construction time and cost.

We are prepared to discuss your program with you and your associates, as well as with the Planning Commission, at your convenience. We have staff to design and supervise the construction within any reasonable time frame.

We await your further inquiry.

Very truly yours,

JOHNSON & ANDERSON, INC.

Clair L. Johnson
Chairman of the Board

CLJ/mp

DESCRIPTION OF ROUTE

I. A double twelve foot diameter tube with a single track each, starting at a terminal at Eight Mile Road at the Michigan State Fair Grounds going northerly to a terminal south of Square Lake Road along the Woodward Corridor with a sub-station every half mile.

II. A single twelve foot diameter tube with a single track on a circle with a two mile interior radius around the City of Pontiac starting at the terminal at Square Lake Road to the proposed stadium site, then northwesterly on circle to a second terminal located near the Oakland County Service Center and then southeasterly on the circle to the Square Lake Terminal. In addition there would be three sub-stations at strategic points along the circle route.

III. At the proposed stadium site there would be installed a combination terminal, operations and maintenance center which could be on the surface of the ground and adjacent to the principal facilities of the stadium.

IV. Spurs would be installed during the initial construction phase to provide for future development as follows:

A. At the Terminal at Eight Mile Road and the Michigan State Fair Grounds, one spur to the west to include Farmington, Southfield, Novi, Walled Lake areas, etc. and one spur to the east to include Warren, Mt. Clemens areas, etc.

B. At the Terminal, at the Stadium site, one spur through downtown Pontiac to the Oakland County Service Center and one spur to the northeast to include Oakland University, Avon, Rochester areas, etc.

C. At the Terminal at the Oakland County Service Center, one spur through downtown Pontiac to the Stadium site; one spur to the north to include Drayton Plains, Waterford, Oxford areas, etc., and one spur to the west to include Union Lake, Highland, Milford areas, etc.

Alternate #1

II. A double twelve foot diameter type with a single track each, to the combination terminal operations and maintenance center at the proposed stadium site, then west through the center of downtown Pontiac to a terminal located at the Oakland County Service Center.

ENGINEERING

I. Sub-Surface Geology

Previous investigations of the Geology were made through 1964 to 1966 at which time an intensive study was made of the water- bearing soils, the various stratifications of clay, hard pan sand and gravel, and bedrock, using Mr. A. J. Mazola's paper "The Hydrologic Units in Oakland County", as well as, test borings by Raymond International and others and also the established historical records of wells along the Woodward Corridor Route. A profile has been prepared and updated and is enclosed herewith, showing a possible location of a tube in hard clay or in bedrock.

Kindly note as follows:

A. With the exception of 2 small areas located south of Bloomfield Hills and east of Telegraph Road near the Miracle Mile Shopping Center, the stratification is generally as indicated below:

1) A water bearing surface layer of sand and gravel of 25 to 50 feet in depth.

2) A very hard layer of clay below this surface layer from 80 to 120 feet in thickness.

3) Below the clay a hard pan to bedrock which is very brittle and not good for tunneling.

4) The bedrock is located between 200 and 350 feet below the surface of the ground as shown in the profile drawing.

II. Tunnel Tubes

In our previous investigation, 1964-1966, we made a recommendation of a twelve foot diameter tube with a single track, one direction, with by-passes, as required, for local or express runs and an occasional cross-over to facilitate maintenance. We have included in our estimate sufficient number of by-passes and cross-overs, but have not located them pending a population and traffic study.

We have included the cost of spurs to a point 200 feet from the terminals to allow for storage of extra train sections for peak traffic demand.

III. General Engineering

We have included in our analysis the time and cost of all of the construction, including the following:

A. The basic tube as described
B. The by-passes and cross-overs
C. The sub-station approximately every half mile
D. Three terminals and one combination operations and maintenance center
E. All costs related to installation of track, including the electrical work and the controls to operate the power equipment
F. The ventilation equipment

IV. We have not included in our engineering analysis, at this time, the following items because they require updating and evaluation, and may also be in conflict with the system as a whole:

A. Easements or property acquisitions
B. Legal or administration costs
C. Operating equipment such as the trains, ticket dispensing, television monitoring.
D. Electronic instrumentation
E. Escalators or elevators

ESTIMATE OF CONSTRUCTION TIME AND COST

I. Time

A. We estimate it would require 16 months to complete the design and the final construction drawings after the route alignment had been determined, and the legal requirements were met authorizing us to proceed with test borings. If, on a preliminary basis, we were authorized to take test borings on a selective basis, we could expedite the final plans.

B. We have divided the double tunnel into four contracts, including their respective sub-stations, by-passes, etc.

C. We divided the single tunnel into two contracts, including their respective sub-stations, by-passes, etc.

D. We separated each terminal and the combination terminal, operations and maintenance center, into four separate contracts.

E. In this manner as described in "B" thru "D" above, we believe the construction work can be completed in two years with each contractor averaging 100 feet per day per tunnel.

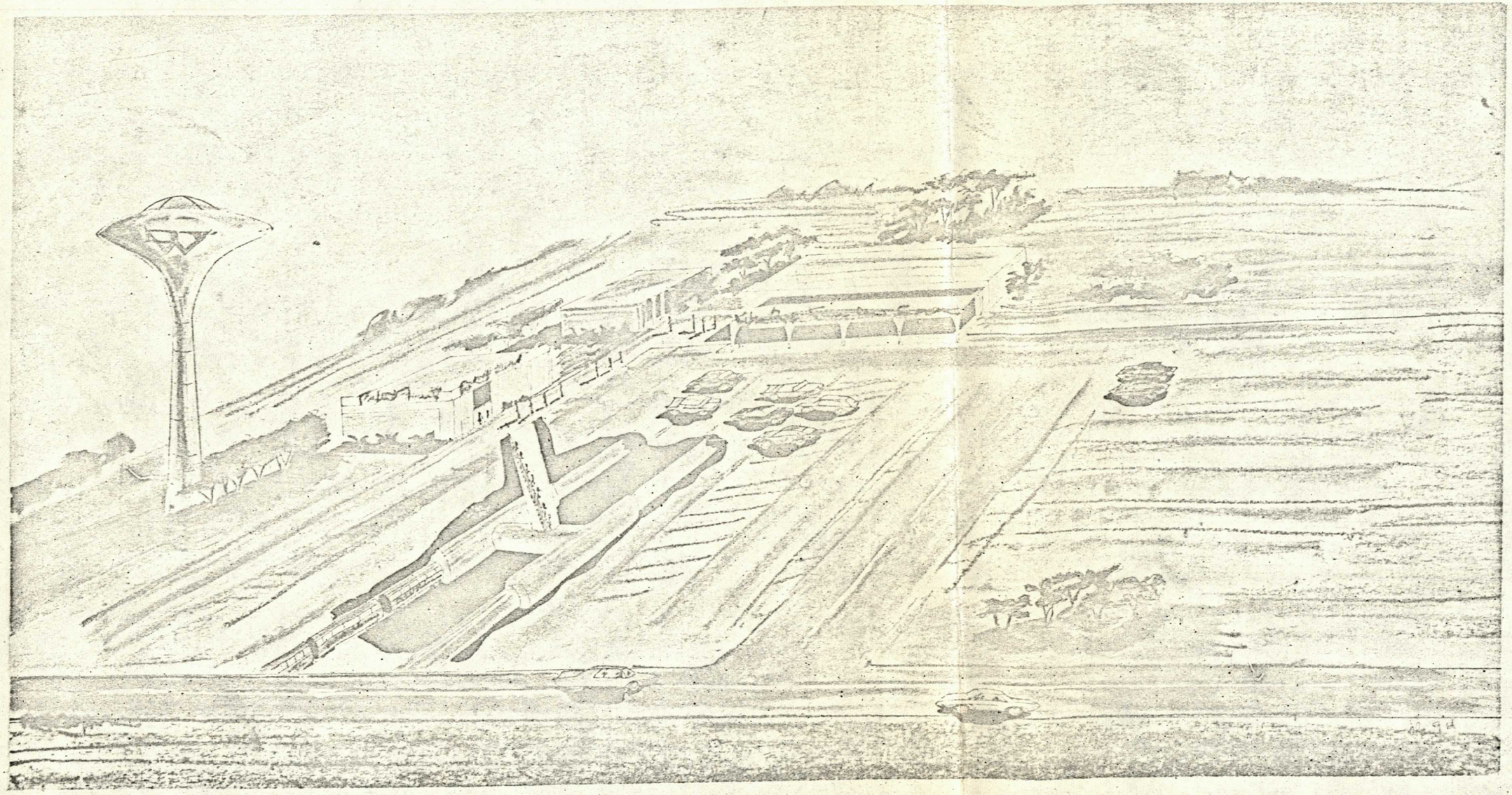
II. Estimate

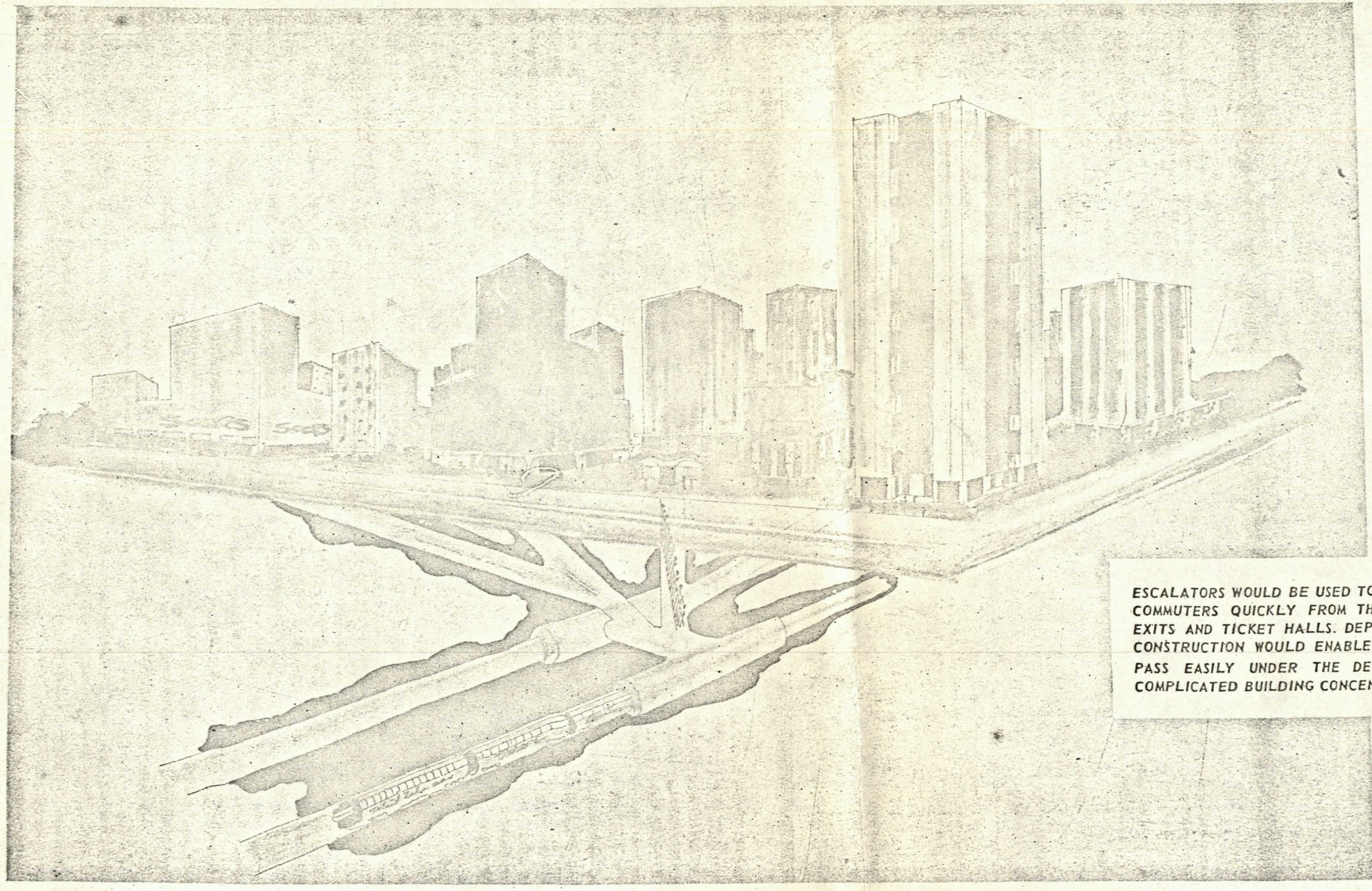
We have prepared an estimate showing the approximate mileage, the unit cost per mile, and the total cost for the construction of the tunnels in both clay and bedrock as illustrated by our plan and profile drawing as follows:

COST ESTIMATE

Location	Mileage	Construction in Clay		Construction in Bedrock	
		Unit Cost	Total Cost	Unit Cost	Total Cost
Mainline	13.5	$11,000,000	$150,000,000	$16,750,000	$226,000,000
Circleline	12.5	5,000,000	62,500,000	7,536,000	94,200,000
	TOTAL COST		$212,500,000		$320,200,000
Alternate	20	10,000,000	200,000,000	15,000,000	300,000,000

MODERN COMMUTER STATIONS WITH ADEQUATE CONVENIENT PARKING FACILITIES WILL ATTRACT PATRONAGE AND RELIEVE HIGHWAY CONGESTION.





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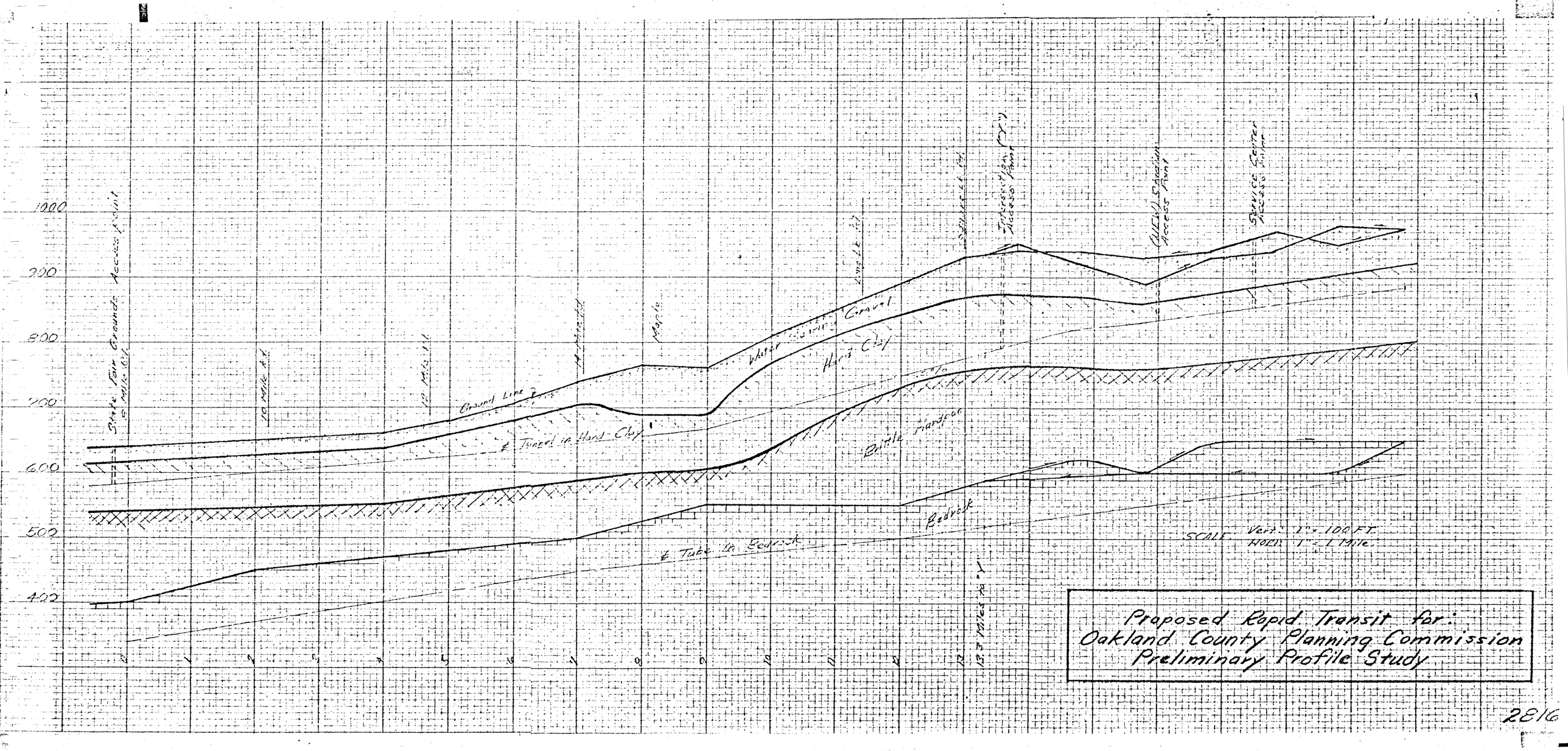
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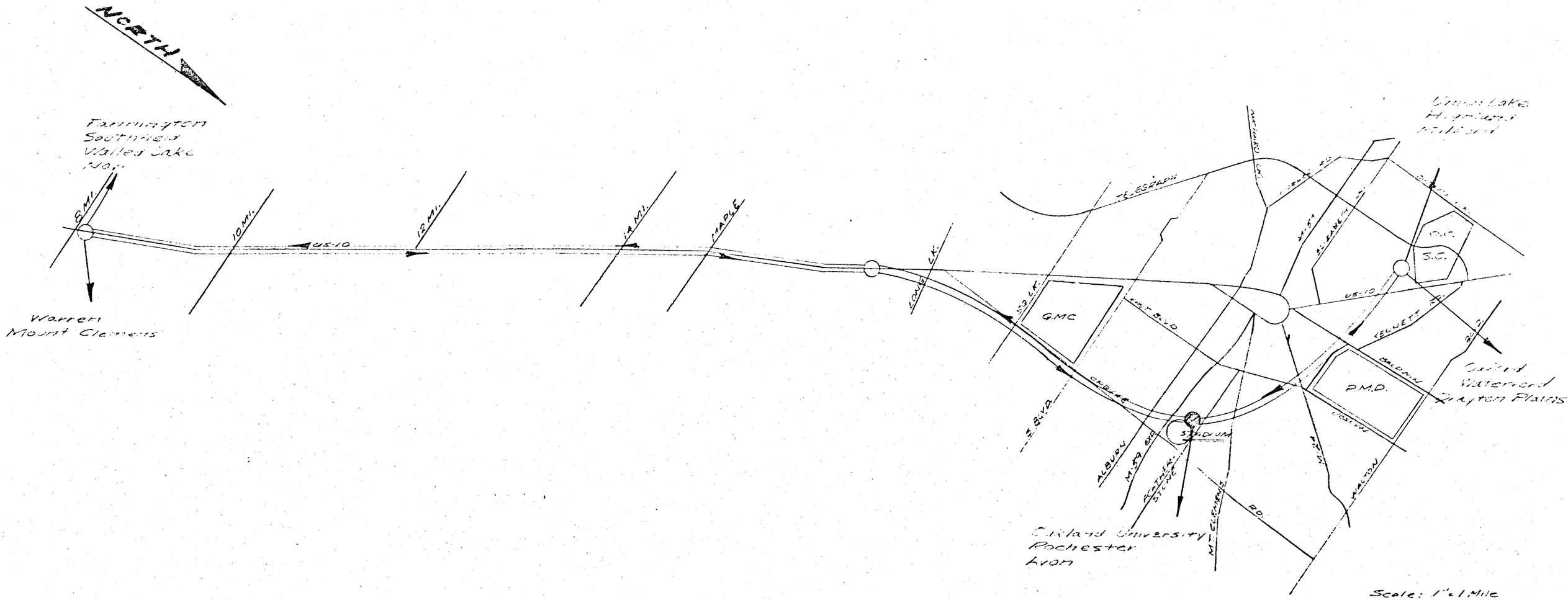
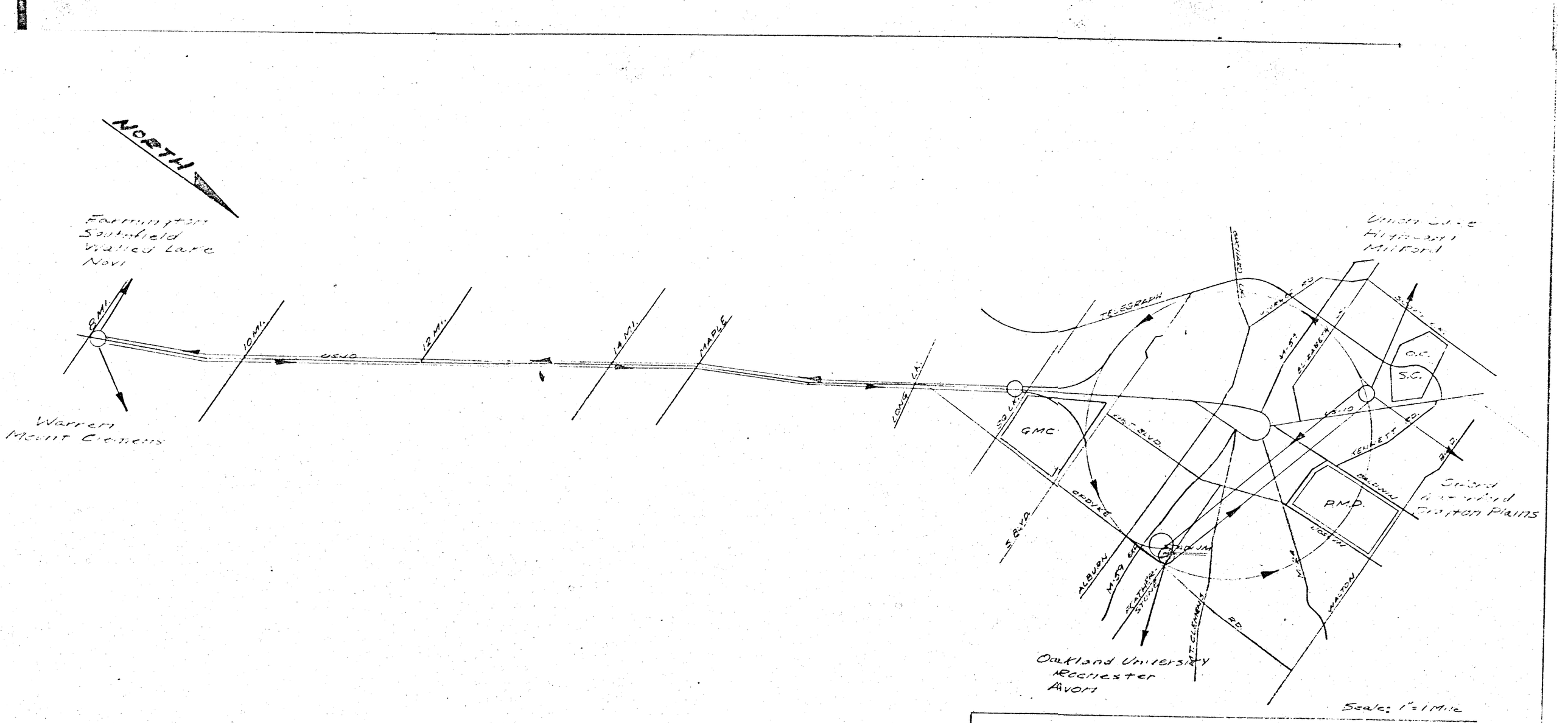
State Fair Grounds Access Point
6 Mile Rd.
10 Mile Rd.
12 Mile Rd.
Main St.
Ground Line
Water Bearing Gravel
Hard Clay
℄ Tunnel in Hard Clay
Bedrock
℄ Tube in Bedrock
Southfield Fwy.
Southfield Fwy. Access Point
Auburn Station Access Point
Spruce Center Access Point
SCALE Vert. 1" = 100 FT.
Horiz. 1" = 1 Mile
12.7 Miles to Y
Proposed Rapid Transit for:
Oakland County Planning Commission
Preliminary Profile Study
2816



Proposed Rapid Transit for:
Oakland County Planning Commission
Alternate #1



Scale: 1" = 1 Mile

Proposed Rapid Transit for: Oakland County Planning Commission Proposed Route Alignment

SOUTHEASTERN
MICHIGAN
TRANSPORTATION
AUTHORITY

SEMTA

1705 INDUSTRIAL BUILDING, 232 W. GRAND RIVER, DETROIT, MICHIGAN 48226 (313) 224-3620

April 2, 1971

Mr. George H. Skrubb
Director
Oakland County Planning Commission
1200 North Telegraph Road
Pontiac, Michigan 48053

Dear George:

I was most pleased to receive your recent letter expressing strong support for the Woodward Corridor Preliminary Engineering Project, as well as for our other needed programs which will lead to long awaited transit improvements in the region.

I've enclosed two copies of our full application for your review and comments, in accordance with the "204" procedures. Please don't hesitate to contact me at the earliest opportunity if you have any additional comments, so that we may expedite the Federal application procedures as quickly as possible.

Again, thanks for your continued help and support.

Sincerely,

T.H. Lipscomb
General Manager

THL:mew

Enclosure

SOUTHEASTERN MICHIGAN

TRANSPORTATION AUTHORITY

A PRELIMINARY APPLICATION

OF THE

SOUTHEASTERN MICHIGAN TRANSPORTATION AUTHORITY

FOR

A

MASS TRANSPORTATION TECHNICAL STUDIES GRANT

UNDER THE

URBAN MASS TRANSPORTATION ACT OF 1964

MARCH 24, 1971

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SOUTHEASTERN
MICHIGAN
TRANSPORTATION
AUTHORITY

SEMTA

1705 INDUSTRIAL BUILDING, 232 W. GRAND RIVER, DETROIT, MICHIGAN 48226 (313) 224-3620

March 24, 1971

Mr. Carlos C. Villarreal, Administrator
Urban Mass Transportation Administration
U.S. Department of Transportation
Nassif Building, Room 9324
400 7th Street, S.W.
Washington, D.C. 20591

Dear Mr. Villarreal:

The Southeastern Michigan Transportation Authority hereby applies for a grant of $950,000 under the Urban Mass Transportation Act of 1964 to assist in financing a technical study which will accomplish three major tasks:

1. Initiation and completion of preliminary engineering for the Woodward Corridor rapid transit project.

2. Preparation of a staged regional rapid transit implementation program in coordination with construction of the Woodward Corridor rapid transit route.

3. Development of detailed Bus Service Improvement program, which will allow initiation of improved bus service prior to and after Authority acquisition of the region's bus carriers.

The applicant represents that the data submitted to the Department of Transportation in support of this application are true and correct.

The three program elements will be key to the Authority's on-going efforts to acquire, modernize and implement construction for an improved regional transit system. The work to be accomplished will utilize all previous Authority studies wherever applicable, as well as conform to the regional plan as developed by the Southeast Michigan Council of Governments.

Sincerely yours,

Thomas H. Lipscomb
General Manager

THL:mew

I. IDENTIFYING DATA

A. Applicant

Southeastern Michigan Transportation Authority

B. Address of Applicant

1705 Industrial Building
232 West Grand River
Detroit, Michigan 48226

C. Authorized Representative

Thomas H. Lipscomb
General Manager
1705 Industrial Building
232 West Grand River
Detroit, Michigan 48226
(313) 224-3620

DICKINSON, WRIGHT, McKEAN & CUDLIP
COUNSELLORS AT LAW
600 FIRST NATIONAL BUILDING
DETROIT, MICHIGAN 48226
TELEPHONE (313) 962-5860

ROBERT E. McKEAN
EDGAR C. HOWBERT
WILLIAM ROGERS
DONALD WADE
CHARLES R. MOON
B. COURTNEY RANKIN
WILLIAM G. LERCHEN, JR.
ERNEST GETZ
W. GERALD WARREN
BENJAMIN O. SCHWENDENER, JR.
MILTON M. THOMPSON
WARD RANDOL, JR.
RUSSELL A. McNAIR, JR.
GEORGE B. MARTIN, JR.
HERBERT G. SPARROW, III
JUDSON WERBELOW
JOHN R. AXE
JOHN A. EVERHARDUS
ROBERT V. PETERSON
PETER S. SHELDON
JOYCE Q. LOWER
THOMAS G. KIENBAUM
LAWRENCE G. CAMPBELL
CHARLES T. HARRIS
ROBERT F. MAGILL, JR.
WILLIAM B. CUDLIP
AUGUSTUS C. LEDYARD
JOHN G. GARLINGHOUSE
WILLIAM A. WALKER
DONALD P. FLINTERMANN
DANIEL J. TINDALL, JR.
FRED W. FREEMAN
FREDERICK K. PLUMB
PATRICK J. LEDWIDGE
GEORGE E. McKEAN
VERNE C. HAMPTON, II
CHARLES F. CLIPPERT
LAWRENCE M. KELLY
JOHN E. S. SCOTT
JOHN C. O'MEARA
JOHN A. KRSUL, JR.
DOUGLAS D. ROCHE
THOMAS E. OWEN
EDGAR C. HOWBERT, JR.
ROBERT S. KRAUSE
ROBERT P. HURLBERT
WILLIAM F. DAVINGER, III
J. THOMAS CARROLL, JR.
RALPH S. RUHSEY

CLAUDE H. STEVENS
OF COUNSEL
EDWARD L. WEBER

LANSING OFFICE
117 WEST ALLEGAN STREET
LANSING, MICHIGAN 48933
TELEPHONE (517) 371-1730

OAKLAND COUNTY OFFICE
1700 NORTH WOODWARD AVENUE
P. O. BOX 509
BLOOMFIELD HILLS, MICHIGAN 48013
TELEPHONE (313) 646-4300

March 15, 1971

Southeastern Michigan
Transportation Authority
1705 Industrial Building
232 West Grand River
Detroit, Michigan 48226

Dear Sirs:

We have examined the record of proceedings taken by the Authority concerning the application for a federal grant for projects designated as follows:

A. Woodward Corridor preliminary engineering

B. Bus improvement program

C. Study of additional rapid transit needs and corridors

including the resolution adopted by the Southeastern Michigan Transportation Authority authorizing and approving such application. From such examination, it is our opinion that such proceedings have been properly taken by the Authority as authorized by law, and that such resolution is in full force and effect.

Further, we know of no litigation or legislation which would adversely affect such application.

Very truly yours,

Dickinson, Wright, McKean & Cudlip

George E. McKean

RESOLUTION BY THE SOUTHEASTERN MICHIGAN TRANSPORTATION AUTHORITY

Resolution authorizing the filing of an application with the Department of Transportation, United States of America, for a grant under the Urban Mass Transportation Act of 1964, as Amended.

WHEREAS, the Secretary of Transportation is authorized to make grants for technical studies necessary for improvement of public transportation systems; and

WHEREAS, the Southeastern Michigan Transportation Authority requires continued technical analyses leading to improved methods of operating and modernizing a unified and coordinated regional bus system, and further analysis of ridership and routing is necessary for the staging of an expanded regional rapid transit system, and that preliminary engineering for the Woodward Corridor rapid transit line should start at the earliest possible date so as to meet the region's growing needs for greatly improved public transportation, and

WHEREAS, the contract for financial assistance will impose certain obligations upon the applicant, including provision by it of the local share of project costs; and

WHEREAS, it is required by the U.S. Department of Transportation, in connection with the filing of an application for assistance under the Urban Mass Transportation Act of 1964, as Amended, that the applicant agree it will comply with the provisions of Title VI of the Civil Rights Act of 1964 and the U.S. Department of Transportation requirements thereunder:

NOW, THEREFORE BE IT RESOLVED BY the Board:

1. That the General Manager is authorized to execute and file, on behalf of the Southeastern Michigan Transportation Authority, an application for $950,000 with the U.S. Department of Transportation in order that the Authority may continue to maintain and accelerate its efforts to improve the regional bus system and construct a rapid transit network.

2. That the General Manager is also authorized to execute and file with such application any and all documents required by the U.S. Department of Transportation effectuating the purposes of Title VI of the Civil Rights Act of 1964.

3. That Thomas H. Lipscomb, General Manager of said Authority is authorized to provide such additional information as the U.S. Department of Transportation may require in connection with said application or said project.

CERTIFICATE

The undersigned duly qualified General Manager of the Southeastern Michigan Transportation Authority certifies that the foregoing is a true and correct copy of a resolution, adopted at a legally convened meeting of the Board held on March 15, 1971.

Thomas H. Lipscomb
General Manager

Date

ASSURANCE OF COMPLIANCE WITH
TITLE VI OF THE CIVIL RIGHTS
ACT OF 1964 (DEPARTMENT OF TRANSPORTATION)

(SOUTHEASTERN MICHIGAN TRANSPORTATION AUTHORITY)
(hereinafter called the "Recipient")

EREBY AGREES THAT it will comply with Title VI of the Civil Rights Act of 1964 (P.L. 88-352) and all requirements imposed by the U. S. Department of Transportation, to the end that, in accordance with Title VI of that Act, no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Recipient receives Federal financial assistance from the Department under Federal urban mass transportation programs; and HEREBY GIVES ASSURANCE THAT it will immediately take any measures necessary to effectuate this agreement.

If any real property or structure thereon is provided or improved with the aid of Federal financial assistance extended to the Recipient by the Department under Federal urban mass transportation programs, this assurance shall obligate the Recipient, or in the case of any transfer of such property, any transferee, for the period during which the real property or structure is used for a purpose for which the Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits. If any personal property is so provided, this assurance shall obligate the Recipient for the period during which it retains ownership or posession of the property. In all other cases, this assurance shall obligate the Recipient for the period during which the Federal financial assistance is extended to it by the Department under Federal urban mass transportation programs.

IS ASSURANCE is given in consideration of and for the purpose of obtaining any and all Federal grants, loans, contracts, property, discounts or other Federal financial assistance extended after the date hereof to the Recipient by the Department under Federal urban mass transportation programs. The Recipient recognizes and agrees that such Federal financial assistance will be extended in reliance on the representations and agreements made in this assurance, and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Recipient, its successors, transferees, and assignees. The person or persons whose signatures appear below are authorized to sign this assurance on behalf of the Recipient.

Dated 3/24/71

Southeastern Michigan Transportation Authority

BY 

David F. Breck
Chairman of the Board

SOUTHEAST MICHIGAN
COUNCIL OF GOVERNMENTS
a voluntary association of local governments

March 25, 1971

Mr. T. H. Lipscomb
General Manager
Southeastern Michigan Transportation Authority
1705 Industrial Building
232 W. Grand River
Detroit, Michigan 48226

Re: Letter of Intent on three project proposals

Dear Mr. Lipscomb:

This is in regard to the letter of intent of March 9, 1971 on the part of SEMTA to submit to the Urban Mass Transportation Administration grant requests for three related transit programs.

In accord with our review procedures, the proposals were first reviewed by the respective County Planning Commission offices. The clearances of the Oakland and Wayne County Planning offices are enclosed.

Our Technical Advisory Team, in its role as the technical review body for our agency and also for SEMTA, considered the letter of intent and other material presented by the SEMTA Staff at its March 10, 1971, meeting. Based on the presentation, no objections were raised to the grant request proposals. The Team expressed its concern for the opportunity to review the full, formal application, once it is prepared.

Our agency finds that the preliminary engineering project on the Woodward corridor, the bus improvement project, and the ridership and routing development proposal are all consistent with regional plans developed and those being further refined. These efforts should bring to closer realization the goal of an adequate public transportation system for southeastern Michigan.

6th FLOOR BOOK BLDG. - 1249 WASHINGTON BLVD. - DETROIT, MICHIGAN 48226 - (313) 961-4266

The next step for the applicant would be the preparation and submittal of the full, formal project application to our agency for review-and-comment under the provisions of Section 204 of the Demonstration Cities and Metropolitan Development Act. To expedite project consideration, copies should be sent at the same time to the involved County Planning offices.

Yours sincerely,

Paul M. Reid, AIP, PCP
Director, Planning Division
SEMCOG

c.c. Francis Bennett
George Skrubb
Gaylord Yund

PMR/bp

encl.

Wayne County Planning Commission

2331 WEST FORT STREET, DETROIT, MICHIGAN 48216

PHONE (313) 224-5018 -- 5019 -- 5020

FRANCIS P. BENNETT
DIRECTOR

MAURICE W. ROACH, JR.
ASSISTANT DIRECTOR

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CLYDE L. PALMER
WILLIAM T. PATRICK, JR.
MALCOLM R. STIRTON

March 25, 1971

Mr. Paul Reid, Director
Planning Division of SEMCOG
810 Book Building
Detroit, Michigan 48226

Dear Mr. Reid:

Reference is made to the Letter of Intent submitted by SEMTA, relative to Federal Funding for studies in connection with their operations.

The Wayne County Planning Commission, at its meeting of March 10, 1971, took action recommending approval of these programs, subject to obtaining written approval from the local communities involved.

You will find attached copies of the letters from the City of Detroit and City of Hamtramck. The Highland Park letter is in the mail and will be forwarded to you as soon as it is received. Approval has been given by Highland Park. All approve the program as being in the interests of better public transportation in this County.

Very truly yours,

Francis P. Bennett

Francis P. Bennett, Director
Wayne County Planning Commission

FPB/c

Enclosures

cc: Mr. T. H. Lipscomb
General Manager of SEMTA

OAKLAND COUNTY PLANNING COMMISSION
1200 NORTH TELEGRAPH ROAD • PONTIAC, MICHIGAN 48053

March 23, 1971

Mr. T. H. Lipscomb
General Manager
Southeast Michigan
Transportation Authority
1705 Industrial Building
2325 West Grand Boulevard
Detroit, Michigan 48226

Dear Mr. Lipscomb:

I have reviewed the letter dated March 19, 1971 addressed to me regarding your intention to proceed with a $1,425,000 engineering project for rapid transit in the Woodward corridor and other supplementary studies. I find this request to be fully in accordance with our planning program and am supportive of the conceptual purposes and nature of this study and am so advising Messrs. Turner and Reid at SEMCOG on this date.

Very truly yours,

George N. Skrubb
Director

gns/jac

cc: Mr. Paul Reid
Mr. E. Robert Turner

III. STATUS OF COMPREHENSIVE PLANNING AND TRANSPORTATION PLANNING

A. Comprehensive Planning

1. General

A long-range comprehensive planning process exists in the six-county southeastern Michigan region which includes the counties of Wayne, Oakland, Macomb, Washtenaw, Monroe and St. Clair. This regional planning process is carried out by the Planning Division of the Southeast Michigan Council of Governments (SEMCOG). SEMCOG is a voluntary association of local governmental agencies including counties, cities, villages, school districts and special purpose districts.

Through a project of the Planning Division of SEMCOG, the Detroit Regional Transportation and Land Use Study (TALUS), a comprehensive 1990 regional development plan was developed and presented in August, 1969. Since that date, the plan has received continuing review, refinement, and updating from the staff of SEMCOG's Planning Division. The regional plan includes allocations of land use for transportation, industrial, residential, commercial, governmental, recreational and other activities to the year 1990.

SEMCOG is the area-wide planning body responsible for the regional plan and the on-going continuing Planning Process, and also serves as the regional data bank. These data files include such existing and projected data as population and land use forecasts, the regional transportation ridership files and 1970-Census tapes for the six-county region.

SEMCOG has been certified by the Bureau of the Budget as the metropolitan clearinghouse under Bureau of the Budget Circular A-95. SEMCOG is also the areawide agency which performs review functions under Section 204 of the Demonstration Cities and Metropolitan Development Act of 1966.

The policy directive's of SEMCOG's General Assembly, which includes a local elected official from each member county, community or district, is carried through by the monthly meetings of the 35-seat executive committee, and the Executive Director.

The policies and programs of the Planning Division are guided by two bodies, the Advisory Council on Regional Planning and the Technical Advisory Team.

The Advisory Council is concerned with the identification of regional planning issues, the development and recommendation of policies in relation to these issues and the merging of governmental, civic, and private interests on policy and development issues. Membership in this body consists primarily of policy representatives of county, regional and state agencies that are related to, or involved in, planning, and of representatives of manufacturing, utility, labor, architecture, engineering and university institutions. The Advisory Council has 32 members, including the Authority.

The Technical Advisory Team serves in a technical advisory capacity to the Planning Division staff and to the Advisory Council on Regional Planning. The Team's major role is to carry on active participation in the development and maintenance of an effective system of functional and comprehensive planning throughout the Region, relating local, county, regional and state levels of planning. Membership consists of representatives from county planning commissions, county road commissions, the City of Detroit, regional recreation, highway, water and transit agencies, related state agencies, as well as liaison officials from certain state and federal agencies.

The Southeastern Michigan Transportation Authority is a participant on the Technical Advisory Team, as well as on the Technical Advisory Team's Transportation Subcommittee.

A. (Continued)

2. Formal Regional Cooperation

The Authority's statute provides that six of the nine Authority Board members will be appointed by SEMCOG, effective June 30, 1971. Thus, two of the three annual Board appointments (each for a three year term) will be appointed by SEMCOG, with the Governor of Michigan appointing the other Board member.

The Authority's statute also requires that its plans and program be submitted to SEMCOG for review and comment.

In addition, the Authority holds a non-voting seat on SEMCOG's Executive Committee.

These formal links between the two agencies, in addition to the Authority's continuous active participation as a member of SEMCOG's Advisory Council on Regional Planning and its Operations Committee, as well as SEMCOG's Technical Advisory Team and its Transportation Subcommittee, have fostered an unusually strong working relationship between the two agencies, to the benefit of the region.

3. Authority Activities

The Southeastern Michigan Transportation Authority's major activities include the Technical, Administrative, Fund Raising and Public Information tasks which are required to develop the unified, coordinated and modernized bus system, and implement the regional rapid transit system, under the twin mandates of its enabling legislation, and in concert with the land use and transportation policies of the regional planning process, as outlined by SEMCOG.

During the relatively brief existence of the Authority, substantial public and press recognition of the great needs for improved public transportation, and SEMTA's role as the regional implementing agency, has developed. For the first time in recent history joint city, county and state funding for public transportation has been developed. The Michigan Legislature approved Governor Milliken's public transportation program in 1970, thus bringing about for the first time strong state support of this vital urban need.

The Authority has developed, and will continue at a more intensified level, close liaison with SEMCOG, county and local planning bodies. An informal Woodward Avenue planning group, representing the county and community planners from the Woodward Corridor, has met twice concerning current Authority plans for the Woodward Corridor rapid transit line. The Authority will continue to meet with these and other interested groups, so as to benefit from their experience and needs, and incorporate the most desirable inter-relationship between community and land-use planning into its transit line planning and engineering.

The Authority has recently expanded its professional staff, in recognition of its increasing level of technical and other work elements. There are now nine professional staff members, including an engineer and an architect, compared with four only one year ago. In addition, the Authority retained Thomas H. Lipscomb as its first General Manager, in February, 1971. Total staff now includes 14 persons, compared with 2 persons when the Authority received its first technical study, MICH T-9-1.

B. Transportation Planning

The comprehensive long-range transportation planning process is, as mentioned earlier, a part of the comprehensive planning program of the Southeast Michigan Council of Governments.

The transportation plan submitted in August of 1969 is under review and refinement by the transportation planning staff of SEMCOG.

The Long Range Transportation Plan includes 1990 Highway and Transit networks. The Transit Network encompasses the proposed rapid transportation corridors upon which the Southeastern Michigan Transportation Authority is basing its engineering, traffic refinement and revenue projection, and staging.

Continued cooperation with the Region's land use and transportation goals will be carried out through close cooperation between the Authority and the Continuing Regional Planning Program located in the Planning Division of the Southeast Michigan Council of Governments.

The Southeastern Michigan Transportation Authority was created by the State of Michigan in 1967, under Public Act 204, the "Metropolitan Transportation Authorities Act of 1967". Under this legislation the Authority is mandated to consolidate and improve public transportation facilities in Southeastern Michigan through acquisition and coordination of existing bus operations, as well as through the construction, operation and maintenance of other transit facilities where and as necessary.

The Act, in defining the powers of the Transportation Authority, granted certain powers and duties especially pertinent to this study including:

Sec. 6. Any authority in addition to its other powers and duties, may:

> (b) Plan, acquire, construct, operate, maintain, replace, improve, extend and contract for transportation facilities within the area . . .

B. (Continued)

In August, 1968, the Authority retained Coverdale and Colpitts, Consulting Engineers, to develop capital requirements for, and the economic aspects of, the acquisition, unification and improved operation of bus systems within the jurisdiction of the Authority. Volume I of this report, published on April 1, 1969, recommended consolidation of bus lines into one six-county regional system. These included: The City of Detroit's Department of Street Railways; Great Lakes Transit Corporation; Metropolitan Transit, Inc.; Lake Shore Coach Lines, Inc.; Martin Lines, Inc.; Pontiac Transit, Inc. and the Bee Line, Inc.

The report went on to identify broad areas of improvement which would accrue to the Region as a result of acquisition and unification of the bus lines. Also identified in the report were estimated operating revenues and expenses which would result from the combined system. Volume II of the report, published on December 10, 1969, recommended financial and broad operating guidelines for the unified six-county regional bus system. A $25,068,000 two-year program for getting the proposed new system underway was specified in Coverdale and Colpitts' report. The program includes an annualized schedule for bus replacement and upgrading; (400 buses over a two-year period) and a description of other major initial capital improvements needed to modernize, replace, and bring to firstclass condition the plant, equipment and appurtenances required by the Authority to meet other needs incident to unification.

The Authority has moved to implement this recommended plan for bus system improvements, and recently submitted an application to the Urban Mass Transportation Administration of the U.S. Department of Transportation for 160 air-conditioned, radio equipped buses. This capital program development and valuation project was partially funded by a Technical Studies Grant (MICH T-9-1).

During early 1970, the Authority contracted with Louis T. Klauder and Associates of Philadelphia to evaluate system cost and performance standards of several rapid transit modes, using as a base the SEMCOG six-corridor rapid transit network. The Technical Advisory Team of SEMCOG served as

B. (Continued)

an advisory body to the Authority, and has been asked to review the draft final report, which the Authority received from its consultant during January, 1971. The preparation of this report was partially funded by an UMTA Technical Studies Grant (MICH T-9-3).

On February 2, 1971, the Board of Directors of the Southeastern Michigan Transportation Authority announced that it would construct its first rapid transit line in the Woodward Corridor, which is the most heavily built up and most densely travelled corridor in the Southeastern Michigan region. The same day, the Board also announced the selection of a duo-rail mode for the Woodward Corridor. This selection was based on the review of alternative modes evaluated for the Board by the firm of Louis T. Klauder and Associates, and the data described therein.

During February, 1971, the Authority submitted a letter to the Planning Division of SEMCOG, in which it described its intent to apply for federal funds to assist in carrying out a preliminary engineering study of the Woodward Corridor

This letter was later revised to include two additional work elements (Development of a staged ridership and routing program for corridors other than Woodward; and a bus service improvement action program), and was reviewed by SEMCOG's Technical Advisory Team, at its March 10, 1971 meeting. Soon after, the Planning Division of SEMCOG expressed its strong support for the entire three part program, as it would contribute to the implementation of the general policies of the regional planning process.

Under the term of a grant from the Michigan State Department of Commerce's Bureau of Transportation, the Authority is undertaking a project definition for the Woodward Corridor rapid transit line. This grant provides for the general determination of alternative alignments, station locations, above - and below-grade sections of route, shop locations, parking requirements, fare systems and gross ridership projections. The data generated by this $90,000 grant will serve as the direct input to the Preliminary Engineering determination in June, 1971, from which will be developed

B. (Continued)

engineering criteria for electrical, signal, fare, and other equipment; foundations; shop layout; real estate requirements; detail layouts of major intersections, and center city passenger distribution systems.

The following chart describes the timing and relationship of all major Authority work efforts during the past three years.

1968 1969 1970 1971 1972 1973

PROJECT MICH T-9-3
$181,500 ($121,000 Federal)
($ 35,000 State)
($ 25,500 Regional)
1) PERFORMANCE EVALUATION AND COST OF ALTERNATIVE TRANSIT MODES
2) DEVELOPMENT OF REFINED RIDERSHIP ESTIMATING PROCEDURES FOR RAPID TRANSIT

CONSULTANT: Peat, Marwick, Mitchell & Company ($ 53,000)
Development of Additional Techniques and Models for Procedures to Estimate Ridership Based on Service Improvements

CONSULTANT: Louis T. Klauder & Assoc. Assisted by Coverdale & Colpitts ($ 80,000)

PERFORMANCE EVALUATION: Cost, Speed, Comfort, Convenience
Modal Alternatives (Input to Board--Board Decision on Mode to be Used on Woodward Corridor)

AMENDMENT TO MICH T-9-3
$40,000 ($40,000 State Funds)

EXPANSION OF T-9-3
To Cover Work Items Not Originally Funded
Development of Procedures For Rapid
Review of Consultant Reports

RAPID TRANSIT PROJECT DEFINITION-WOODWARD CORRIDOR
$120,000 ($ 90,000 State Funds)
($ 30,000 Regional)

Route Alignment, Stations, Above or Below Grade, Shops, Parking Needs, Fare Systems, Ridership

RAPID TRANSIT PRELIMINARY ENGINEERING - Woodward Corridor
$900,000 ($593,334 Federal)
($222,500 State)
($ 74,166 Regional)

Foundation-Layout-Real Estate, Boundaries and Requirements- Shop Layout-Engineering Criteria of Electrical, Signal, Fare, Other Equipment - Detail Layout of Major Intersections--Center City Passenger Distribution Systems

RIDERSHIP AND ROUTING DEVELOPMENT FOR RAPID TRANSIT IN CORRIDORS OTHER THAN WOODWARD
$225,000 ($150,000 Federal)
($ 55,000 State)
($ 20,000 Regional)

Parallel Rapid Transit System Development In Other Corridors

FINAL DESIGN - WOODWARD CORRIDOR

Detail Engineering Drawings

CONSTRUCTION - WOODWARD CORRIDOR

First Operative Section: 1976

1968 1969 1970 1971 1972 1973 19

PROJECT MICH T-9-1
valuation of Regional
us Systems
$180,000 ($120,000 Federal)
($ 40,000 State)
($ 20,000 Regional)

ACQUISITION OF NEW BUSES
6,663,000
($4,442,000 Federal)
($ 921,000 State)
($ 1,300,000 Regional)

BUS SERVICE IMPROVEMENT PROGRAM
300,000 ($200,000 Federal)
($ 50,000 State)
($ 50,000 Regional)

BUS SYSTEM ACQUISITION

CONSULTANT:
Coverdale & Colpitts, Inc.
Evaluation, Description of Operations at Present Operating Plan, Financial Results

ACQUISITION OF 160 New Buses for Use on DSR and Suburban Carriers

SEMTA REGIONAL SYSTEM:
Marketing, Routing, Scheduling, Public Information Systems, Coordination with Privately-owned Vehicles as to Highway Use. Terminal and Transfer Facilities. Administrative Cost Reduction

Creation of Unified SEMTA Regional Bus System

IV PROJECT DESCRIPTION AND SCOPE

This application for a technical studies grant has been structured to include three essential program elements of the Southeastern Michigan Transportation Authority,(SEMTA) which are critical to the improvement of public transportation facilities in southeastern Michigan.

These three program elements include the:

- Preliminary Engineering Program (Woodward Corridor)
- Ridership and Routing Development Program (Corridors other than Woodward)
- Bus Service Improvement Program

The work to be performed under each of these elements constitutes a continuation of previous efforts in the planning and implementation of improved public transportation facilities in the SEMTA region.

The Woodward Corridor, which is delineated elsewhere in this application, was identified in a comprehensive transportation and land use study of the region as a first priority route for the development of rapid transit facilities. Progress on this particular element of the S.E.M.T.A. program has included the evaluation of various modal technologies with respect to their ability to serve anticipated travel demands. This work was performed with the assistance of a technical studies grant from the Urban Mass Transportation Administration (MICH T-9-3).

1. Our current work efforts concerning the Woodward Corridor are proceeding under a state-supported program which will review alternative corridor alignments, station locations, recommendations on elevated or subsurface construction, parking requirements, fare systems, ridership estimates and financing. The work that is proposed for funding under this application will produce the necessary groundwork for the Authority to initiate design and construction drawings. This work will include geological investigations; foundation locations; topographic mapping; station layouts; real estate requirements and boundaries; utility relocation planning potential for adjacent or joint development; engineering criteria for electrical, signal, fare and other equipment; detailed layouts of major intersections; analysis of center city passenger distribution systems; ridership estimates by station; time, direction and modal interchange; and equipment requirements.

The extent of the work to be accomplished under this program encompasses the Woodward Avenue Corridor, which extends for 26-miles between Pontiac and Detroit, and includes the intermediate cities of Birmingham, Royal Oak, Ferndale, Pleasant Ridge and Highland Park. The implementation of this project has received strong

support from the Wayne and Oakland County Planning Commissions, as well as from other planning groups.

It is expected that special emphasis will be placed on the section between Ten Mile Road and Detroit's Central Business District, as this portion of the route is expected to include the first stage of operations. In addition, the current plans of the Michigan Department of State Highways for its I-696 freeway presents the Authority with the need for detailed engineering, jointly with the Highway Department, at the Ten Mile Road and Woodward Avenue interchange of the I-696 facility. This major three level roadway facility, and its proximity to the Detroit Zoo, presents the region with a most valuable and timely opportunity for a coordinated multi-modal development, including parking, bus facilities, inter-modal transfer facilities and other joint development potential.

2. Once preliminary engineering work has begun on the first phase of the Woodward Corridor it will be necessary to proceed with a second program element involving the analysis of ridership levels and route alignment alternatives in regional corridors other than Woodward. The objective of this program will be to establish a priority schedule for the development of additional rapid transit facilities in the region, based on objective standards of projected system development costs and estimated revenues. This project will provide for the simultaneous evaluation of all transit corridors from the standpoint of developing patronage in a specific corridor and also on the overall system including the Woodward Corridor transit line. A procedure will be developed to evaluate the potential for new or refined technologies in developing transit facilities in additional corridors. A strong emphasis will be placed on investigating the use of capital-light modes, including reserved or special bus lanes and limited tram facilities.

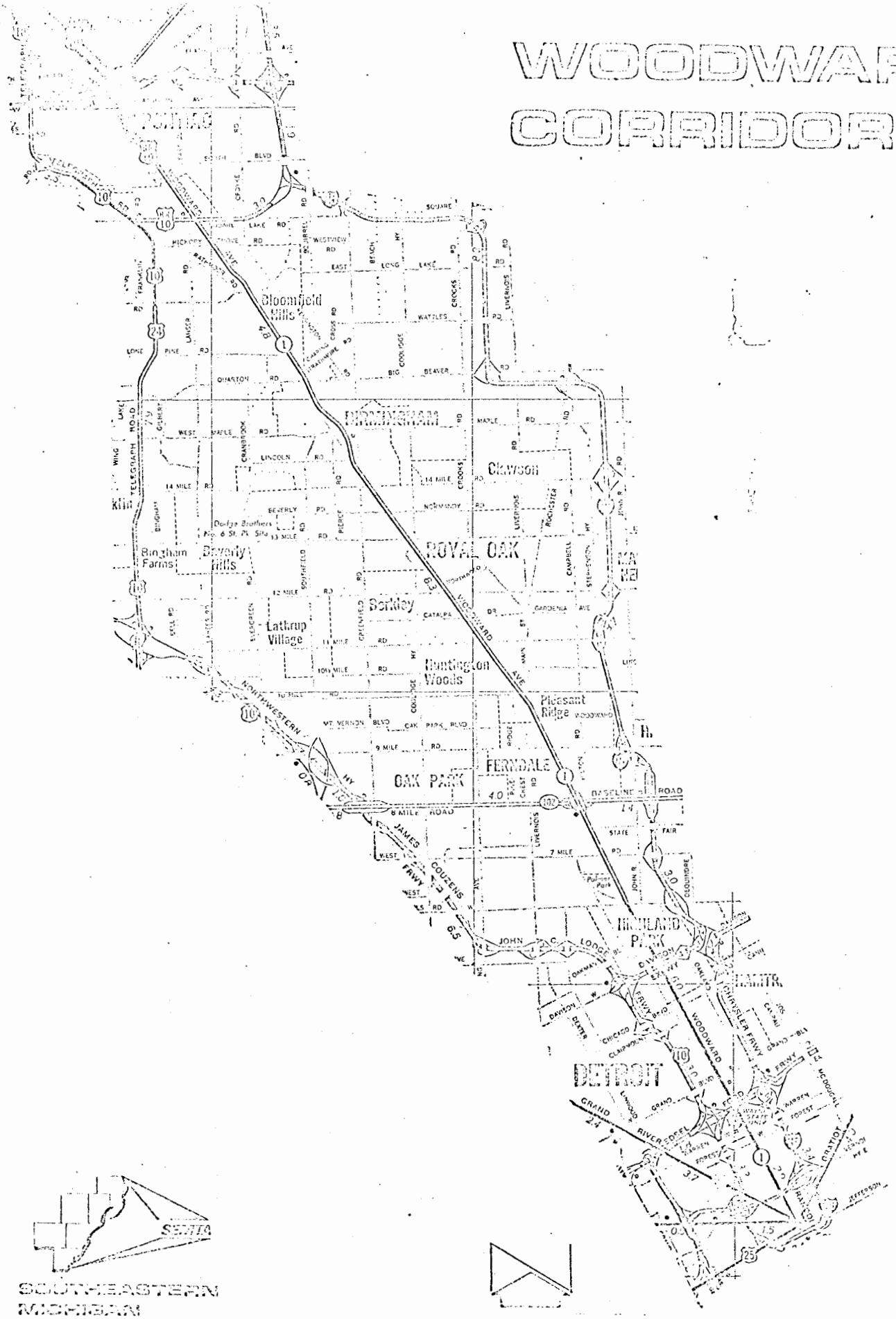
   Procedures developed in connection with traffic and market analyses, performed under UMTA project MICH T-9-3, will be used to prepare estimates of ridership by origin and destination in order to establish station requirements, equipment requirements and manpower requirements necessary for the development of rapid transit facilities in the corridor.

3. The third program element that will be covered under this application involves the structuring of a bus service improvement program. The desirability of coordinating public transportation facilities in southeastern Michigan was documented as a result of the work done under project MICH T-9-1 by the firm of Coverdale and Colpitts. It was further determined that this coordination can best be achieved by means of a regional transportation authority which can provide the necessary broad approach

toward the operation of a comprehensive system devoted to the public interest, responsive to changing needs, financially stable and capable of providing the "best attainable measure of service to the community." In order to accomplish the objectives of the SEMTA program with respect to bus operations in the region it is necessary at this time to establish in detail the administrative, fiscal, operational and policy changes that must be effectuated. The bus service improvement program has been structured to include work in the areas of administrative and fiscal planning, operational planning, public relations and business development and labor relations.

The three program elements described above have been defined more completely in the following section of this application where specific work tasks are described. A detailed work program for each of the program elements will be the initial work performed under this application, so as to detail the work input, output and schedule for each of the projects.

WOODWARD CORRIDOR



SEMTA

SOUTHEASTERN MICHIGAN TRANSPORTATION AUTHORITY

SCALE OF MILES

0 1 2 3 4

ONE INCH EQUALS APPROXIMATELY 2.5 MILES

A. Preliminary Engineering For Woodward Corridor

The work to be accomplished under the Federal Financial Assistance Grant requested in this application represents a continuation of the on-going mass transportation implementation program in the southeastern Michigan area.

The Woodward Corridor has been selected as the first route for the construction of rapid transit. In an on-going, state-supported project, alignment, station locations, above and below-grade construction, parking requirements, ridership and fare systems are being developed. The program for which funding is being requested in this application will finalize alignment and station location, determine foundations and layout, real estate boundaries and requirements for acquisition, determine shop layout, determine engineering criteria for electrical signal, fare, and other equipment, provide for detailed layout of major intersections, and investigate center city passenger distribution systems.

The preliminary engineering will cover the entire 26-mile route, but special emphasis will be placed on the section between downtown Detroit and the Ten-Mile Road Woodward Avenue location. This program will produce the necessary ground work for the Authority to initiate design and construction drawings as the next phase of the Woodward Corridor Program. It is the intention of the Authority to request Federal assistance in later phases of rapid transit development leading toward the completion of a mass transportation system for southeastern Michigan.

The work elements included within this program are:

1. Community and SEMCOG Liaison
2. Topographic mapping
3. Geological investigations
4. Right-of-way and impact planning
5. Station site planning
6. Route alignment and control survey
7. Utility relocation planning
8. Engineering criteria
9. Center city passenger distribution system
10. Public Hearings and Project Reports

1. Community and SEMCOG Liaison

The guidance of the project will be carried out by the staff of the Southeastern Michigan Transportation Authority with the cooperation of other transportation-oriented agencies within the southeastern Michigan area. This cooperation will be coordinated through the Southeast Michigan Council of Governments.

2. Topographic Mapping

Using aerial photographs prepared for the Southeast Michigan Council of Governments, controlled photogrammetric maps of the Woodward Corridor will be prepared. Scale of the maps and contour interval will be determined such that materials developed will be compatible with other available mapping materials in southeast Michigan.

3. Geological Investigations

Surface and sub-surface conditions in the corridor will be evaluated. Test borings will be made where current information is unavailable or incomplete. This will include both station site conditions and route alignment.

4. Right-of-way Impact Planning

Strip maps will be prepared showing right-of-way for each route segment. The maps will also show property owners, property boundaries, and acreage. Estimated property acquisitions will be listed for future right-of-way work.

A policy of future joint development along the rapid transit alignment will be pursued. The Authority is presently investigating possibilities for joint utility use with the utility companies in the Detroit area.

A methodology will be established and implemented for cooperative planning with the various jurisdictions along the route of the Woodward Corridor rapid transit line. This methodology will be directed toward lessening and solving problems arising during pre-construction and construction phases of the system. This will be oriented primarily toward other public agencies, and conducted under the auspices of the Southeast Michigan Council of Governments.

5. Station Site Planning

Utilizing results of the state-funded Project Definition Program, alternative station site plans will be developed and internal feasibility and efficiency of the alternative plans for the initial route segments will be determined. Schematics will be prepared, in cooperation with other appropriate public agencies, for accessibility, traffic distribution, along with estimates for necessary improvements to station areas. Further planning and development of bus feeder systems will be coordinated with station planning.

Necessary alternates for station locations and their effect on the route alignment and traffic will be prepared.

6. Route alignment and control survey

Immediate aid and assistance will be provided on critical sections of the initial segments of the Woodward Corridor line where right-of-way is shared with another mode, such as the case in those portions under existing roadway. Final location of horizontal and vertical alignment will be established, where necessary, alternatives to critical segments will be prepared and investigated. The system will be set up for controlled survey. Necessary controls will be located and established both on paper and in the field to complete readiness for survey.

7. Utility Relocation Planning

A policy will be established for the relocation of the various utility facilities encountered in construction, after a review of legal requirements relating to relocation expenses. This policy will also reflect the requirements of the utility agencies for their relocation. Relocation plans will be prepared for those systems deemed critical along the initial segments.

8. Engineering Criteria

Requirements for signal, fare, electrical, and other equipment will be developed relative to operating characteristics of the system. Engineering criteria for equipment needs will be developed for these characteristics including cars, work trains, and shops.

9. Center City Passenger Distribution Systems

As part of the center city network, alternative passenger distribution systems will be planned. Feasibility and efficiency of alternative systems will be determined. Schematics will be prepared, and equipment needs will be developed for alternatives. Center City passenger distribution systems development will be coordinated with appropriate public agencies.

10. Public Hearings and Project Reports

Public hearings will be held to advise the affected public of the results of investigations undertaken within the above work items and to solicit public reactions. Public reports and a final report will be provided for the work items in this portion of the requested Grant.

PRELIMINARY ENGINEERING PROGRAM: BUDGET

ITEM		STAFF	CONSULTANT	TOTAL
1.	Community and SEMCOG Liaison	$16,000	$	$16,000
2.	Topographic Mapping	1,000	92,500	93,500
3.	Geological Investigation	500	24,000	24,500
4.	Right-of-way and Impact Planning	8,000	118,000	126,000
5.	Station Site Planning	70,000	100,000	170,000
6.	Route Alignment and Control Survey	6,500	112,000	118,500
7.	Utility Relocation Planning	800	38,500	39,300
8.	Engineering Criteria	4,500	92,500	97,000
9.	Center City Passenger Distribution System	13,000	84,000	97,000
10.	Public Hearings and Project Reports	39,700	24,000	63,700
		160,000	685,500	845,500
	Contingency			45,500
	TOTAL			890,000

B. Transit Systems for Regional Travel Corridors

A regional system for rapid transit trunklines in major corridors of the region, recommended by TALUS will be refined and expanded to develop a comprehensive system of transit trunklines that would best serve the region.

Travel corridors identified recently by SEMCOG in its detailing of the TALUS work will be examined for purposes of staged implementation. In addition, other corridors with currently increasing traffic density will be studied for need of trunkline or other transit corridor route services, including reserved lane bus or rapid tramway modal systems. These two modal alternatives will also be reviewed for their application to the SEMCOG corridors. Trunkline routes so identified will have cost estimates prepared on the basis of the most feasible modal system to be used - if developed now - to establish a benchmark prior to staging for implementation.

The most recent SEMCOG transportation systems plan analysis will be used as a basis for corridor ridership forecasts. A procedure for simultaneous analysis of all transit corridors will be applied by a traffic research consultant with expertise in forecasting demand on modal systems. Sensitivities of travel markets to new transit modal systems which are attractive and competitive with private vehicles, developed by T-9-3 traffic research work, will be applied. Estimates of riding by station location will be made to size required vehicle fleet, feeder bus services, and station parking facilities, in order to complete cost estimates for capital and operating program.

Project cost would be $225,000. See the following for description of work program.

Description of Work Program

Detailed forecast demand for all arterial travel corridors in the region will be analyzed in order to determine the staging for providing several types and transit service styles in corridors that will not be provided with heavy duty rapid transit trunkline, while a staging of rapid transit trunklines recommended by SEMCOG will be prepared. In addition, recognizing the high system cost for the current SEMCOG transit network, capital-light alternatives will also be tested for these corridors.

Four stages of work will be completed during a one year period. In brief, these are:

1. Preparation of Small Area Travel Forecasts

   Recent projections of land uses and travel made by TALUS and SEMCOG will be utilized to produce required analysis of travel. Procedures necessary to yield data for small area analysis will be developed. Work will be done by SEMCOG, with the aid of SEMTA in determining data requirements.

   One analysis will describe all travel corridors with significant travel demand volume, in which a transit trunkline system may be of service as a complementary mode of travel to the use of automobiles. Travel characteristics by auto mode will be described, as an indication of transit requirements that may present an attractive alternative.

   Evaluation of this set of findings will be made by SEMTA to consider the potential utility of transit service in each corridor, and the type of transit technological system and service operation that would be an attractive alternative to sole reliance on auto use. The output would be a comprehensive description of potential regional transit trunkline system.

   These recommendations would be formulated in consultation with staff of SEMCOG in response to the regional land use planning work. The rapid transit trunkline system previously tested by TALUS would be re-evaluated in the light of the current SEMCOG Continuing Planning Program and this fresh analysis of overall requirements for transit trunklines.

A second set of analyses will evaluate projected travel based on the rapid transit system tested by TALUS, in such manner that data is prepared for use in a corridor-level transit forecast model described below. Data requirements will be determined by the traffic research consultant in order that it may produce detailed forecasts of station activities (demand for parking spaces, car fleet required and such capital items), ridership and revenues.

The small-area travel forecast work will be completed within ten weeks. About 50 man-days will be required by SEMTA, and about 16 man-days, mostly programming time, of SEMCOG. A contract with SEMCOG for $9,800 is included in an estimated cost of $15,000.

2. Rapid Transit Corridor Ridership Forecasts

A consultant will be retained by SEMTA which has the ready capability of applying to travel forecasts a multiple corridor small-area-level transit usage forecast model by a simultaneous solution, employing machine processing of data where necessary to reduce overall time and cost. A successful application of the model will be considered a requisite qualification in selecting the consultant.

The transit trunkline system will be retested with detailed ridership forecasts by the consultant. Six corridor trunklines will be tested, including the Crosstown line and four radial lines.

One point in time (1990) will be analyzed, using basic travel forecasts prepared by SEMCOG in Stage 1. One route alignment and service operation will be used. This will be the median of alternatives or the "most likely" design configuration, selected strictly for test of market and engineering feasibility, preliminary to more detailed design of corridor systems. An adequate feeder bus system and adequate parking facilities at commuter stations will be assumed.

Professional staff of SEMTA will assist in developing required descriptive data and in providing input assumptions relating to patron response to selected system service variables. Systems analysis capability will be generated that will be useful in later elaborations of a refined

regional plan for rapid transit, including design of transit service in corridors that would not require conventional heavy (BART or Lindenwold type) transit, yet requires better service than conventional bus routes operated in lanes open to all common traffic.

The work will be completed nine months after the start of the overall project, and would be carried on mainly from the eighth to the fortieth week. Work assigned to staff of SEMTA would require about 260 man-days. Work done by the consultant would require about $85,000. Including SEMTA costs, this stage would cost $112,500.

3. Development of Corridor Cost Parameters

A consultant would be asked to examine other corridors than Woodward for cost analysis and staging of the proposed corridor trunklines, applying findings and procedures developed recently for T-9-3. In addition, likely transit modal technologies that would match demand in corridors where a "heavy" transit system is not the optimal solution, would be described for corridors so identified as a result of State One work.

The designation of a "most likely" trunkline route for each corridor would be the starting point for engineering analysis. A system development plan for the "most likely" route would be designed that is feasible and is median to likely alternative treatments as to alignment and mode where such may become apparent.

Detail would be adequate for generalized analysis of a route to serve the corridor, prior to the preliminary phase of design engineering undertaken for actual development of a trunkline. The output would be a description of a refined plan for a multi-corridor rapid transit system, with development and operating costs based on present cost levels.

A second phase of the work would consider the available transit technological systems that would be ideal for use in those corridors where full-scale heavy transit service is not justified. Besides identifying available systems, such as European light transit, some consideration would be given to timing when other concepts would be operational widespread use, and probable cost levels in comparison with the duo-rail mode chosen for the Woodward Corridor.

Work would commence when the "most likely" routes are designated, and would include the period from the tenth to the fortieth weeks of the overall program. Work by the consultant would cost $70,000. About 25 man-days would be required by staff of SEMTA to coordinate the work program and assist the consultant. The total cost for Stage 3 is estimated at $72,800.

4. Evaluation of Findings

During the last quarter of the year the findings will be reviewed and discussed with SEMCOG and other concerned agencies. Impacts of the findings will be sought and reported in general terms. A final report by the Authority will be prepared after receipt of reports from consultants with description of findings of feasibility analysis for the regional rapid transit system. Numerous directions for follow-on work by the Authority would be presented for consideration especially in regards to light rapid transit service concepts. A cost of $13,700 is estimated for the final stage, including $4,200 for costs of consultants and SEMCOG.

Cost for the overall program includes contingency of $11,000, for a total cost of $225,000.

Contracts would be required with SEMCOG for $11,000; and with consultants for $158,000. Authority staff and other costs are estimated at $45,000.

TRANSIT SYSTEMS FOR REGIONAL TRAVEL CORRIDORS: BUDGET

ITEM	STAFF	CONSULTANT	TOTAL
1. Preparation of Small Area Travel Forecasts	$ 5,200	$ 9,800	$ 15,000
2. Rapid Transit Corridor Ridership Forecasts	27,500	85,000	112,500
3. Development of Corridor Cost Parameters	2,800	70,000	72,800
4. Evaluation of Findings	9,500	4,200	13,700
	$45,000	$169,000	$ 214,000
CONTINGENCY			$ 11,000
TOTAL			$ 225,000

C. Bus Service Improvement Program

Excluding the interurban service provided by long haul carriers, approximately 125,000,000 bus passenger trips were made in the Southeastern Michigan region during 1970. This level of ridership has decreased from approximately 150,000,000 bus trips made in 1960. The response by the Michigan Legislature and the Governor was the "Metropolitan Transportation Authorities Act of 1967" which provided for the creation of regional authorities capable of maintaining and upgrading public transit operations. These authorities are intended to provide the necessary broad approach toward operation of a comprehensive transit system devoted to the public interest, responsive to changing needs, financially stable, and capable of attaining the highest measure of transit service for the community. The Southeastern Michigan Transportation Authority was created under the provisions of the above legislation and has been charged with conducting initial studies.... "necessary for the development of plans and recommendations necessary for the acquisition, improvement and operation of existing bus systems and the implementation of such recommendations and plans..."

The initial phase of this task has been completed with the assistance of a technical studies grant awarded to the Authority in 1968 by UMTA, under a contract identified as T-9-1. Work performed under this contract included an analysis of capital requirements for the economic aspects of the acquisition, and a broad description for improved operation of the several regional bus carriers within the jurisdiction of the Authority. This work has allowed the Authority to progress to a point where a detailed program for operations and administration must be prepared in order to successfully implement the program of consolidation for transit properties in the region. It is the intention of the Authority to develop a bus service improvement program which will be coordinated with the process of consolidation and allow for immediate and meaningful improvements in the service offered by SEMTA to transit riders in this region. This bus service improvement program has been structured to include work in four primary areas, including the development of:

- An Administrative and Fiscal Planning Program
- An Operations Improvement Program
- A Public Relations and Ridership Development Program
- A Facilities Improvement Program

A more detailed description of the work to be accomplished under each of these project areas is set forth below:

C. (Continued)

1. Administrative and Fiscal Planning Program

Prior to the consolidation of existing transit operations in the southeastern Michigan region it will be necessary for the Authority to develop a specific program for the administration and financing of an improved system of regional bus operations. The major inputs to this work program will include inventory work performed by the firm of Coverdale and Colpitts, which has furnished background data on the existing transit operations, including:

- Inventory and Review of Present Bus Operations
- Preparation of Estimates of Fair Acquisition Price of Bus Systems Assumed to be Included in the Unified System
- Development of the requirements for a Unified System
- Preliminary Estimates of Earning Potential and Financial Requirements of Unified System
- Transit Development Program Elements

This data will be supplemented with additional information relative to existing labor agreements, work practices, operating revenue, operating costs, and other fiscal information necessary for the preparation of a short and long range financial program.

The specific work tasks to be accomplished under the administrative and fiscal planning program will include:

a. Structuring of Management Objectives

Prior to the actual design of an administrative structure or the preparation of a financial program, it will be necessary to determine and define the basic management objectives of the SEMTA program with respect to the operation of bus service in the region.

Work performed under this project will include the evaluation of various management alternatives as they may ultimately influence the level of bus service in the region as well as the economic consequences of each alternative.

In addition to the analysis of the tradeoffs between service and costs, this project will address the considerations of phased acquisition and develop a sequential program for consolidation utilizing inputs from the projects addressing areas of personnel, administration, legal issues and financing.

C. (Continued)

b. Development of Personnel Policies and Administrative Structure

In advance of the acquisition of any transit property it would be desirable for SEMTA to have developed a comprehensive personnel program including but not limited to wage rates, work rules, pension plans, insurance programs, and other management details necessary for the Authority to design an administrative framework which will be flexible enough to accommodate additional transit operations as they are acquired. It is anticipated that extensive negotiation will be required between the Authority management and both the unions and the management teams of the various properties.

c. Development of Short and Long Term Fiscal Programs

A key element of the consolidation program, as well as continuing service programs, will be the accurate identification and allocation of monetary resources available to the Authority. Given costs of the acquisition of the existing transit properties in addition to the initial costs of consolidation it will be necessary to establish a sophisticated budgetary process to assure that cash and credit resources are available to match program expenditures. As in the case of structuring an administrative framework, the budgetary process selected will need to be designed to accommodate expansions in the system as properties are acquired. Work performed under this project will also include the establishment of those accounting and auditing procedures necessary to the proper functioning of the Authority.

TOTAL PROJECT COST: $45,000

Work Element	Staff	Consultant
Management Objectives	$ 4,000	$ 1,000
Personnel Program	2,000	13,000
Fiscal Program	20,000	5,000
	$26,000	$19,000

C. (Continued)

2. Operations Improvement Program

A basic justification for undertaking a program for consolidating regional transit operations involves the potential for achieving operational improvements in the bus system by restructuring existing routes and scheduling to provide fast, direct and convenient bus service. The tasks involved in integrating the eight transit operations in the Southeastern Michigan Transportation Authority region will be extensive considering there are approximately 1,500 vehicles involved in the operation of over 50,000,000 service miles annually. It is proposed that the Authority detail a comprehensive program of operational improvements prior to the acquisition of individual properties so that immediate and significant service improvements will occur as the individual operations are incorporated into one regional system. The following major work elements are proposed for inclusion in this program:

a. Prepare Service Evaluation Techniques

A first step in the analysis of existing transit services will be the formulation of uniform and consistent criteria for the evaluation of transit services. The evaluation techniques established in conjunction with this work element will provide the basis for establishing priorities for service improvements. They will also allow for the development of a hierarchy of bus styles, including shuttle, medium and long range regional service models. This element will tie in with the management objectives section of part one.

b. Perform Market Analysis for Transit Services

In order to properly restructure transit services it will be necessary to perform an analysis of the existing demand for transportation services based on available information dealing with present and projected travel patterns. Trip origin and destination information was gathered in 1965 for use in a major revision to the regional transportation and land use plan. This work element will include an analysis of this 1965 data, as structured through T-9-3, to provide small area forecasts of travel demand in addition to evaluating alternative transit systems for meeting this demand. This element considers, as did the

C. (Continued)

T-9-3 Peat, Marwick, Mitchell work, the individual trip maker; the broader analysis of travel markets, as described in section B (other corridor analysis) uses the standard home interview data in its household aggregation form, for relatively gross corridor magnitudes.

c. Prepare Areawide Service Improvement Proposal

Once service criteria have been established and a market analysis program has been carried out it will be necessary to establish a program for improving regional transit operations that can be coordinated with a program of consolidation. The improvement proposal to be prepared as a portion of this work element will include specific route revisions that will be desirable from the stand-point of improved operating efficiencies and improved quality of service. This is actually detailed schedule making, building upon the conceptual framework for bus systems consolidation suggested to the Authority in Coverdale and Colpitts report in T-9-1.

d. Develop Improved Scheduling Techniques

Scheduling as a strong marketing variable can be adjusted depending on the management objectives of any given operator. Because the several operations in the region vary their scheduling practices, it will be a necessary element of the Authority's pre-consolidation program to develop an efficient method of scheduling which will coincide with the restructuring of routes. It is proposed that computer assisted routing techniques be developed for continued use as a part of the Authority's on-going program. As part of this work element, the Authority will review opportunities for reduced cost and improved service offered by realignment of school hours, where heavy student demands are placed on the transit system during peak periods.

e. Develop Vehicle Monitoring System

Because of the large number of vehicles that will be involved in the operation of a regional bus system it will be necessary to improve the current methods of monitoring transit vehicles. Because of the substantial portion of supervisory time required to insure schedule adherence it is necessary to obtain the highest level of efficency in performing this task.

C. (Continued)

Recent developments in the area of automatic vehicle monitoring hold promise for significantly reducing the cost and manpower required for this task. It is therefore the objective of this work element to develop a system of automatic vehicle monitoring which will adequately meet the needs of a consolidated bus operation.

TOTAL PROJECT COST: $145,000

Work Element	Staff	Consultant
Prepare Service Evaluation Techniques	$ 1,000	$ 7,000
Perform Market Analysis for Transit	18,000	50,000
Prepare Areawide Service Improvement Program	14,000	20,000
Develop Improved Scheduling Techniques	5,000	10,000
Develop Vehicle Monitoring System	3,000	17,000
	$41,000	$104,000

3. Public Information and Ridership Development Program

Crucial to the success of the Southeastern Michigan Transportation Authority program is the development of a growth pattern in transit ridership. Traditionally any reduction in transit services have resulted in reductions in the level of ridership. It is anticipated that if the benefits of improved service are to be reflected in the level of ridership these service changes will need to be accompanied by a vigourous program of public information and ridership development. Consequently it is proposed that prior to the restructuring of existing services SEMTA undertake a program which will include the following elements:

a. Public Information Program

This element will develop a detailed program of public information including, but not limited to,

c. (Continued)

printed schedules, telephone information services, informative route markers, information displays at major terminals and transfer points and information displays in major buildings and traffic generators. A review will be made of all appropriate literature and experience concerning these items.

b. Ridership Promotion Program

A ridership promotion program is aimed primarily at attracting new riders to the fixed route transit system. This program would utilize both conventional advertising media as well as innovative promotional techniques.

c. Special Marketing Program

A marketing program aimed exclusively at the development of special bus operations for both public and private groups will be undertaken.

TOTAL PROJECT COST: $60,000

Work Element	Staff	Consultant
a	$15,000	$14,000
b	1,000	19,000
c	1,000	10,000
	$17,000	$43,000

4. Transit Facilities Improvement Program

In addition to the operation of transit service the Authority will be responsible for upgrading the overall image of transit riding and improving the facilities associated with transit riding. These facilities include terminal facilities, transfer facilities, information centers and street "furniture." The objective of this work program will be to address the need for a comprehensive program to upgrade and develop these facilities in a manner that will facilitate safe, comfortable and convenient transit ridership. The work elements involved in meeting this objective include:

a. Development of Passenger Boarding Facilities Plant

This project will involve the analysis of available data on major boarding and departure points on the

C. (Continued)

system to establish the demand for route terminal facilities, as well as to evaluate the adequacy of existing facilities. A further element of this work item will involve the design of prototype structures which will lead directly into the detailed design of passenger-related structures.

b. Development of Transfer Facilities Plan

Although one of the objectives of the consolidation program will be the provision of direct transit service to the greatest extent possible, it is certain that a substantial level of transfer activity will still take place on the unified system. It is proposed that a comprehensive plan for the development of transfer facilities be initiated to provide for these transfers.

c. Evaluation of Parking Requirements

One area that is seldom considered by transit operators is the availability of adequate parking facilities, both on and off street for use by their patrons. Because of the relatively low density development that characterizes the outlaying areas in the region, it is necessary to give full consideration to the automobile as a collector-distributor system. Work accomplished under this project will lead to considerably expanded parking facilities being made available to transit riders, including existing facilities such as drive-in movie, shopping center, and church parking lots, as well as new facilities where necessary and practicable.

d. Maintenance Facility Planning

In addition to the planning of passenger facilities it will be necessary to develop a coordinated program for incorporating maintenance facilities. Not only will it be necessary to integrate the bus fleets but also the maintenance staffs. Work performed under this work element will result in a comprehensive program for intergrating all maintenance activity, as recommended in the Coverdale and Colpitts report.

C. (Continued)

TOTAL PROJECT COST: $50,000

Work Element	Staff	Consultant
Terminal Facilities Planning	$1,000	$17,000
Transfer Facilities Planning	5,000	
Evaluation of Parking Requirements	1,000	15,000
Maintainance Facility Planning	1,000	10,000
	$8,000	$42,000

Special Work Item

A special work element for $10,000 has been included to assist the authority in the development of a detailed work program for each of the three major work items. A detailed project budget will be prepared as part of this element.

Full regional and state clearinghouse review of the application will be secured prior to submittal of the detailed work program to UMTA. No other funds for staff or consulting work will be committed prior to UMTA approval of the detailed work program.

D. Source of Funds

Federal	$950,000
State	330,000
Regional	145,000
TOTAL PROJECT COST	$1,425,000

E. Project Budget

Special work item (Preparation of detailed work program)	$ 10,000
Preliminary Engineering	890,000
Transit Systems for Regional Travel Corridors	225,000
Bus Service Improvement Program	300,000
TOTAL	$1,425,000

VI ABILITY TO CARRY OUT STUDY

The Applicant will devote staff resources to successfully complete the project in a timely manner.

Selection of primary consultants will be made by the Applicant after submission of a formal proposal and history by each of the firms under review. Selection of all consultants will be based on experience, competence and interest. The work will be accomplished by third-party contracts to the Applicant.

The Applicant's General Manager will be responsible for the overall conduct of the Study.

ORIGINS OF THE STUDY

The Southeastern Michigan Transportation Authority was created by the Michigan Legislature in 1967, for the purpose of consolidating transit service in southeastern Michigan under a central management accountable to the public. In the three years of its life, the Authority, which has no taxing powers, raised funds from local, state and federal sources for the following purposes:

(1) to conduct detailed studies of the requirements and costs of coordinated bus service for the metropolitan region;

(2) to begin a bus demonstration project;

(3) to review commuter rail alternatives; and

(4) to initiate rapid transit development.

In late 1969, assisted with a grant of funds from the Urban Mass Transportation Administration, the Authority decided that its first step in the rapid transit implementation process should be a general evaluation, including system costs, externalities and performance capabilities, of those alternative rapid transit technologies that seem most nearly suited to the region's needs. This report presents the results of that study.

SCOPE

The analyses presented in this report are based upon a set of premises established early in 1970 by the Board of the Authority and its staff, so as to best reflect the highest standards of transit service in use anywhere in the World. These premises were delineated in a set of characteristics considered necessary and desirable for effective rapid transit service in the region. In addition, the Authority reviewed recent developments in rapid transit and selected several specific technologies for the evaluations presented here.

Using the established premises, general descriptions of the facilities each selected technology would require were prepared, along with their operating characteristics. From these assumptions, estimated costs were developed for areas of interest in which significant differences among the modes could be anticipated. These included:

1) Investment costs, for alignments and profiles as nearly identical for all modes as possible.

2) Annual costs of operation for each system.

3) User costs reflecting differences in downtown delivery, speeds, headways, and transfer time.

4) Costs reflecting induced arterial congestion in the rapid transit corridors.

5) Costs resulting from air pollution.

The estimated costs in each of these areas are tabulated in the final chapter of this report. Supporting details are developed in the text.

LIMITATIONS

Being a general evaluation of costs and performance, this analysis cannot be regarded as a feasibility study, on the basis of which final decisions could be made to proceed with the design and construction of rapid transit facilities. Detailed analyses of rapid transit markets and fares have not accompanied our work here. Moreover, large areas of public benefit where differences among selected technologies were not expected are ignored.

Further work remains for the Authority in determining such matters as precise route and station locations for any corridor or corridors under consideration for the first stage of implementation, and fare revenues which would accrue from such locational decisions.

Our conclusions rest on an assumption that patronage would be the same for the alternative systems studied, which SEMTA has found necessary in the absence of detailed information regarding market potentialities. However, since our analyses show that the different modes would offer strikingly different characteristics of speed and convenience, the number of riders each would attract probably would vary.

Although these facts must be considered in any interpretation of our results, they by no means weaken the general conclusions we have reached. In fact, since the Detroit Transportation and Land Use Study reports anticipate serious congestion on the region's highways by 1990, any smaller patronage which lower-performance modes might achieve would actually represent a failure on the part of the region to solve its transportation problems.

Unless high-speed, convenient transportation service, that would attract large volumes of daily riders, can be introduced in southeastern Michigan, the intolerable congestion that the TALUS reports foresee would become almost a certainty.

A word on the reliability of our figures is in order.

Although in analyses of this kind residual uncertainties must be assumed to exist, our estimates of costs associated with building and operating the alternative systems are within the normal bounds for engineering estimating of this type. All amounts include sufficient allowances to cover normal contingencies and owner overheads.

Our estimates of user and external costs are somewhat less certain, but we believe they are as reliable as can be obtained within reasonable limitations of time and expense.

In this study we have been given a set of service characteristics and passenger volumes to be satisfied, and the selected technologies to be considered.

Although we cannot, as part of this assignment, offer recommendations which involve matters such as regional developmental policy, project financing, and revenue analysis, we hope that our conclusions will serve to clarify the measurable consequences of the Authority's decisions regarding modal technology.

Supporting discussions and details appear in the chapters to follow. Our results are summarized below.

	Estimated Annual System Costs ($Million)
Steel rail	226
Light-weight rubber traction	242
Suspended monorail	270
Buses on exclusive busways	253
Buses in reserved freeway lanes	257
Buses in freeway traffic	230

Our comparative evaluations incorporate the direct costs of construction and operation, plus measurable differences regarding user and external effects.

USER COSTS

Four elements of user benefit regarding which discernable differences occur can be identified. These are travel time, time required for transfers at stations, time spent awaiting the arrival of vehicles, and downtown delivery time.

Travel Time

Our estimate of the cost associated with travel time derives from the differences in average speeds which each of the modes studied could provide. The average speeds are:

Steel rail	44 mph
Monorail	41 mph
Light-weight rubber traction	35 mph
Buses on busways	30 mph
Buses in reserved freeway lanes	30 mph
Buses in freeway traffic	20 mph

User benefit "losses" for each mode derive from the differences between the average speed each could provide and the 45 mph average speed premised by the Authority.

Assuming an average trip length of 12 miles and applying a value for rider time of $1.50 per hour, the estimated user costs associated with travel time are as follows:

Steel rail	$ 1.59 million
Monorail	6.13 million
Light-weight rubber traction	17.48 million
Buses on busways	30.4 million
Buses in reserved freeway lanes	34.1 million
Buses in freeway traffic	85.0 million

Transfer Time

Quantifiable transfer time differences follow from the fact that the bus options provide some opportunity for riders to complete trips without need for transfer to the rapid transit line at stations.

To avoid unreasonable operating costs and preserve high service frequency, the Authority directed that the Coverdale & Colpitts analysis not assume that all feeder buses would operate through stations onto the corridor guideways. In addition, the Authority assumed that local area needs also prevent all feeder buses from operating as trunk line vehicles, without a great amount of duplication.

For the bus operating plan used, the SEMTA staff has advised that approximately 12% of riders could be carried to their destination stations without transferring from a feeder mode at a boarding station. The 12% estimate is based on marketing procedures which account for persons who would walk to the trunk line bus station, persons who would drive to the station, as well as those who would ride local area buses to the station.

Applying these instructions to the typical headway differences that would exist between rapid transit modes and feeder bus lines in outlying areas, we estimate that $2.72 million per year farily represents the transfer advantage for bus options. This amount is incorporated in our calculations as a cost assigned to all non-bus alternatives.

Waiting Time

Waiting time differences among modes also derive from characteristic headways. We have determined that headway differences among the non-bus modes would not exist because all of them would provide adequate capacity at the headways specified in the Authority's premises.

The Coverdale & Colpitts analysis makes clear, however, that high capacities would require very short headways between buses, which would provide an advantage for riders in reduced waiting times at stations.

Working from the differences between the estimated bus headways and the Authority's premises, we estimate that the waiting time differences amount to $9.00 million per year. This amount is assigned as a cost to all of the non-bus alternatives.

Downtown Delivery

Options using buses on freeways are at a disadvantage regarding distribution of riders in downtown areas.

To avoid completely unacceptable street congestion and degredation of service speed, our estimates of capital and operating cost for buses on freeways include a major off-street terminal in downtown Detroit. Since land needs and surface movement disruptions would preclude placing it at grade, we have estimated the costs of a tunnel connecting freeway exit ramps at Michigan and Gratiot Avenues. The tunnel would accommodate 480 buses per hour and would have underground stations at three points along its length. Buses serving all corridors entering the central business district would pass through these stations.

The arrangement would bring the buses into the heart of downtown Detroit at John F. Kennedy Square. But it would not provide as good distributional coverage in the central business district as would the fixed guideway alternatives. Working from Transportation and Land Use Study projections of the distribution of 1990 transit destinations, we conservatively estimate that distribution deficiencies of buses on freeways would introduce differential time costs for users of $8.49 million per year.

Arterial Congestion

The traffic assignments of automotive traffic to the 1990 regional highway network prepared by the Transportation and Land Use Study indicate that serious congestion is likely to exist. The congestion would be particularly serious during peak hours of movement. Thus, construction of a rapid transit system of any type offers prospects for large benefits to the traveling public in southeastern Michigan by easing projected congestion.

Since patronage on the rapid transit systems has been assumed uniform for purposes of this review, there would be no differences among the modes regarding the benefits of highway relief each one would bring. However, since two of the alternatives would provide rapid transit service by placing buses on the freeways themselves, these alternatives would complicate the congestion which TALUS predicts. We have recognized these effects in our comparative evaluations.

Placing rapid transit buses in the stream of freeway traffic would cause diversion of many motorists to already congested arterial streets. Average speed for the displaced motorists would fall from 30 mph to 18 mph. In addition, the motorists already using the arterials would experience a reduction in speed from 19 mph to 18 mph. Finally, we estimate that even during off-peak hours, freeway speed would be reduced approximately ½ mph. We estimate that the total annual costs associated with these effects would be approximately $12.66 million per year, over the entire southeastern Michigan region.

If, on the other hand, two freeway lanes in each of the TALUS rapid transit corridors were reserved for the exclusive use of rapid transit buses, the congestion would be considerably more severe than that resulting from having rapid transit buses in the stream of traffic. Again, the effects would include diversion of peak period motorists to already congested arterials and reduction in freeway average speeds during off-peak periods. We estimate that these combined effects would cost approximately $93.76 million per year in additional delay for southeastern Michigan motorists.

Air Pollution

Auxiliary power requirements would be equal in all cases. Thus the only differences among modes derive from differing propulsion characteristics.

Using information on power generating equipment and fuels presently used in southeastern Michigan (supplied by the Detroit Edison Company), general mass-rate emission factors (published by the U.S. Public Health Service from national averages), and approximate total annual emissions in Wayne County (supplied by the Wayne County Department of Health), we have estimated the proportionate increase in regional emission load that would follow institution of electrically powered rapid transit service in the region.

Similarly, we have derived the proportionate increase in regional pollution load that would accompany diesel bus rapid transit. In this, we use the Coverdale & Colpitts estimates of annual bus-miles and average speeds, without considering the details of bus running cycle speed variations.

Converting the proportionate increases to annual dollar amounts on a pollutant-specific basis is impossible in the absence of detailed information concerning individual cost effects. We therefore have used a general average of economically measurable atmospheric pollution costs, based on national averages.

Estimating the annual cost per capita of existing pollution in southeastern Michigan at approximately $50, we have developed the following increase for each of the modes under study.

	Increased Annual Regional Costs
Steel Rail	$ 3,300
Monorail	3,500
Light-weight rubber traction	2,300
Buses on busways	849,000
Buses in reserved freeway lanes	1,187,000
Buses in freeway traffic	1,329,000

Although these figures indicate substantial differences between modes powered with electrical energy and modes driven by diesel engines, the amounts themselves, have negligible effect in our comparative evaluations.

SUMMARY OF ESTIMATED COSTS

A tabular summary of estimated costs for each of the modes considered in all of the categories discussed appears on the following page.

FEEDER SERVICE

The SEMTA staff has defined areas of coverage, routes and service standards for bus feeder and distributor lines to serve the TALUS rapid transit corridors.

THE NATIONAL URBAN COALITION

COUNTERBUDGET

A Blueprint for Changing National Priorities 1971–1976

Robert S. Benson *and* Harold Wolman, *editors*

Foreword by
SOL M. LINOWITZ

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federal support for transportation has become heavily balanced in favor of highways and aviation. Other sectors—particularly mass transit and railroads—have suffered by comparison. (See Table 10:1.)

TABLE 10:1
FEDERAL AID TO TRANSPORTATION, 1971
(In millions of dollars)

	Outlays	*Per Cent of Transportation Outlays*
Mass Transit	215	2.8
Highways	4,880	62.9
Aviation	1,620	20.9
Railroads	43	0.6
Water	1,000	12.8
TOTAL	7,763	100.0

The heaviest transportation needs are now appearing in the sectors receiving the least federal funding, with the most critical and insufficiently met needs in urban areas, where the greatest number of persons suffer from the most severe problems deriving from transportation. These include pollution and congestion.

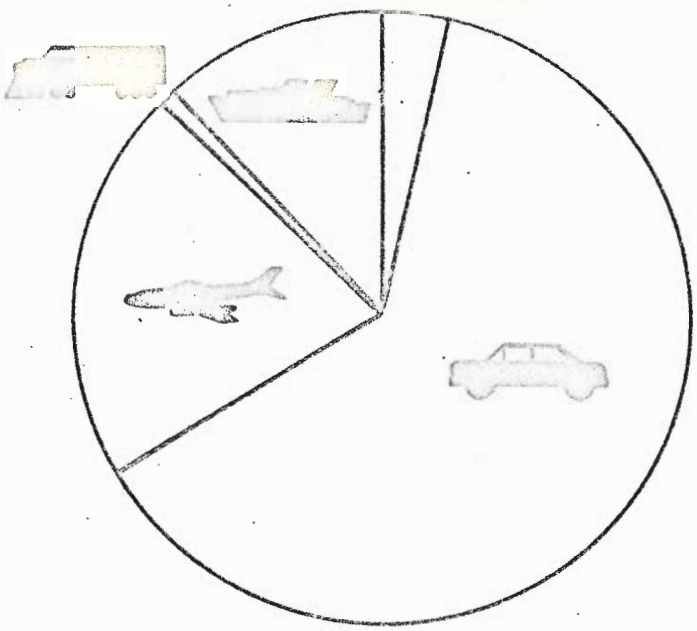
A greater portion of government transportation funding should go to urban areas. Moreover, the present allocation of resources within urban transportation, which greatly favors urban highways as opposed to urban mass transportation, needs to be drastically changed. A reallocation in favor of mass transport is critical if we are to make a serious effort to overcome traffic congestion and to provide urban residents, particularly those with low incomes, the mobility that they need to adjust to the exodus of jobs from the central city to the suburbs.

It should be noted that nearly 63 per cent of the transportation outlays during 1971 was for highway construction and improvement, most of it to be spent in nonurban areas. Although private automobile owners derive some benefit from these expenditures, the chief beneficiary is the trucking industry, inasmuch as highways are designed and constructed—at considerable additional expense—to meet truck use standards. And programs such as the supersonic transport (SST), airport development, Coast Guard aid to shipping and recreational boating, and Corps of Engineers navigation expenditures almost exclusively accrue to a prosperous, generally

Transportation Funding Priorities

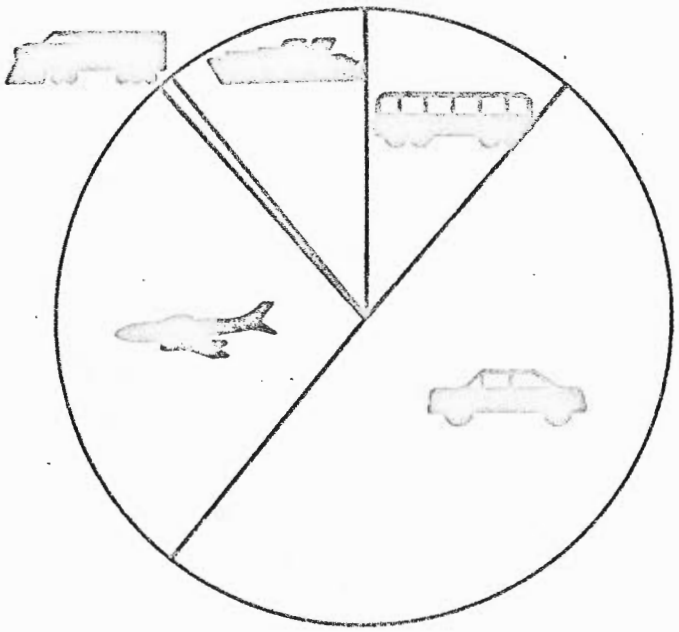
1971

Mass Transit	2.8%
Highways	62.9%
Aviation	20.9%
Railroads	0.6%
Water	12.8%



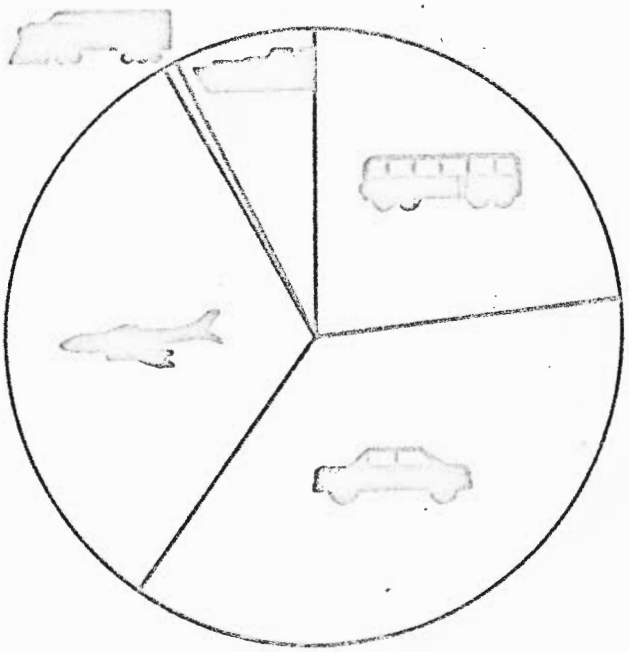
1973

Mass Transit	11.1%
Highways	49.2%
Aviation	27.6%
Railroads	0.5%
Water	11.6%



1975

Mass Transit	23.0%
Highways	36.1%
Aviation	32.4%
Railroads	0.7%
Water	7.8%



upper-income clientele groups rather than a broad spectrum of the population.

Federal participation in transportation is necessary and justified to assure transportation services deemed in the national interest. Direct subsidies to transportation can be economically justifiable if the marginal benefit to society as a whole exceeds the marginal public investment cost. However, user charges rather than a subsidy are called for when the beneficiaries can afford to support the service themselves or when the service is not considered socially important.

Highways

Federal expenditures for highways in 1971 amounted to about $3.0 billion for the interstate program (cost shared 90 per cent federal, 10 per cent state and local), and another $1.9 billion for other federal aid programs, such as the ABC system of primary and secondary highways (costs shared, 50:50 with state and local governments) Traffic Operations Program to Increase Capacity and Safety (TOPICS), and highway beautification. Most of these expenditures are paid out of the Highway Trust Fund, which receives its revenues through federal highway fuel taxes.

Up to a point, highway construction is a major contributor to society's welfare. Today, however, we have by far the world's finest network of highways, while many of our other forms of transportation go crying for funds. As of October, 1970, approximately 30,595 miles of an originally proposed 42,500-mile interstate highway system were completed, and a good portion of the remaining part was in various states of progress, so that only 1,659 miles of the initial system remained to be initiated.

We therefore *recommend setting back the target date for completion of the interstate highway system from 1977 to 1980.* The system would eventually be completed as planned, but with smaller annual outlays. The first deferrals should be of those parts of the interstate system slated to pass through cities. In the past, these links have been built with disregard of community needs and often with wide-scale destruction of residences and property, particularly in low-income areas. Clearly, more time and effort are necessary to

plan these routes, with participation of all interests, including the citizens whose neighborhoods are to be destroyed. As a result of this slow-down, total federal highway outlays (including the ABC system) should decrease from their present level of $4.9 billion to $3.1 billion in 1976. As outlays are divided nearly evenly between rural and nonrural interstate highway construction, the postponing of one-half of the urban construction would effect a $1 billion savings, in addition to providing additional planning time for consideration of urban social needs. A further result of these steps would be the growth of a large surplus in the Highway Trust Fund, should it continue to collect revenue under present laws.

Ideally, the Highway Trust Fund itself should be scrapped and all future highway funding should occur through direct appropriations. When it was inaugurated during the 1950's, the Highway Trust Fund provided a timely response to an overdue public investment need. The need has now been overtaken in priority by other, more pressing requirements, but since the monies are sheltered in a trust fund it is legally impossible to transfer them.

If it is not politically possible to end the Highway Trust Fund, we recommend that the law be amended to authorize the use of trust fund monies for mass transit and other urban transportation improvements. This broadened use of highway funds would not be a redirection of funds into unrelated areas. It would permit the federal government to obtain the maximum benefit from highway expenditures in the urban areas by funding transportation improvements, which will relieve traffic pressures on and promote more efficient use of federal highways.

Mass Transit

Many urban transportation problems still await a concerted effort at solution. These include commuter problems (both getting people from the suburbs into the city and some city dwellers out to the suburbs), coordination between transportation systems, pedestrian circulation, the improvement of city streets, and goods movement.

A critical part of the solution to these problems will be improved and enlarged urban mass transit, both bus and rail.

Since World War II, public transportation has suffered from increasing operating expenses, decreasing profits, and a diminishing clientele. Fares have risen dramatically, driving away more customers, and operating income has turned to deficit. Private enterprise is withdrawing from transit as it perceives new capital and retained earnings to be inadequate for replacement of machinery and equipment. In 1969, at a time when the public transit system was certainly less than self-sufficient, the federal government spent thirty times more on roads than on all types of mass transit.

Federal outlays for mass transit programs have not yet begun to approach their needed size. They represent less than 3 per cent of 1971 federal aid to transportation. Estimated need over the next decade, according to the Rapid Transit Institute and the American Transit Association, is $20 billion—$17.5 billion of which is for rail transit. *A federal government program now exists to provide 60 per cent matching funds for capital outlays to mass transit systems, but less than $600 million has been spent on this program since 1965; we recommend that these grants increase from $215 million in 1971 to $2 billion in 1976—and we anticipate that outlays should increase further during the latter part of the decade. From 1971 to 1974, we recommend that outlays be used primarily for improvements in existing bus, rail, and commuter facilities and for planning and research* of the kind discussed below. We wish to avoid duplicating the mistake of poorly planning the location of highways in our metropolitan areas. From 1974 to 1975 and beyond, we envision most of the mass transit funds being spent for hardware and installation of new rail systems or extensions of existing systems.

Expenditures on research and development for mass transportation have been negligible. Among the topics needing further study are: appropriate use of the various transportation modes, means of cost reduction, improvements in vehicle comfort, reducing the emission of pollutants, transportation land use, and factors affecting transportation demand.

The federal government should expand research, training, and technological development in all its urban transportation programs. Rigorous attention needs to be directed to inadequacies in human

edge, technology, and trained personnel—all of which seriously impede transportation improvement.

TABLE 10:2

TRANSPORTATION

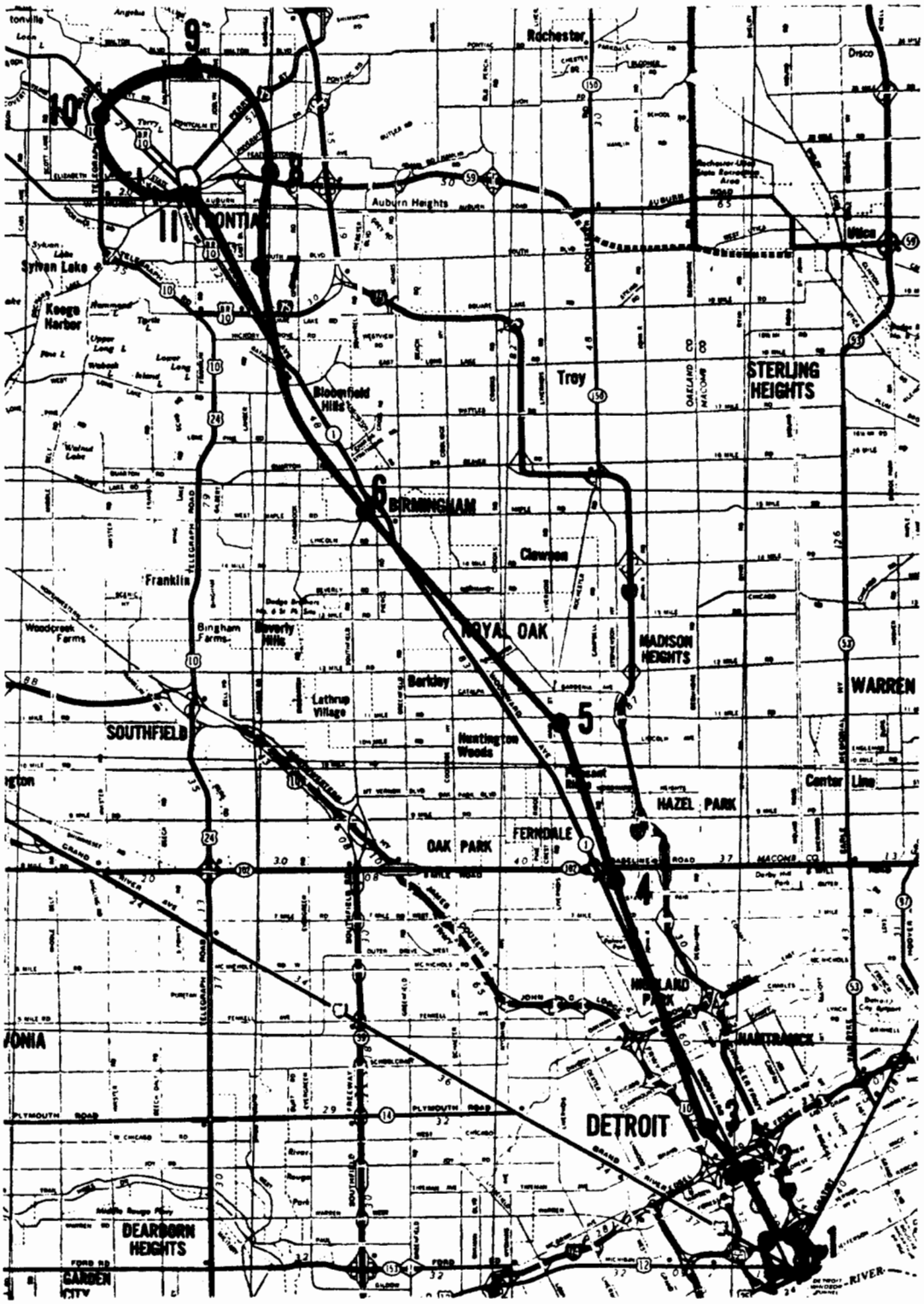
(Outlays, in millions of current dollars)

	Administration		*Urban Coalition Recommendations*				
	Estimated *1971*	Proposed *1972*	*1972*	*1973*	*1974*	*1975*	*1976*
Mass Transit Capital Grants[1]							
Buses			160	154	129	134	139
Improvement of Existing Rail Transit Facilities			189	264	225	233	242
Extension of Existing Rail Transit Systems			120	162	196	233	103
New Transit Systems					281	1,166	1,413
Commuter Railroads			194	169	112	58	61
Research and Development			70	100	100	75	50
Subtotal	215	327	733	849	1,043	1,899	2,008
Highways	4,880	4,923	4,100	3,765	3,445	2,980	3,070
Civil Aviation	1,387	1,553	1,850	2,115	2,380	2,680	3,010
Supersonic Transport	233	281	10	0	0	0	0
Other[2]							
Coast Guard[3]	233	243	243	243	258	273	288
Merchant Marine	356	467	315	282	225	147	125
Inland Navigation (Corps of Army Engineers)	411	428	386	349	306	224	169
Railroads	48	57	70	42	50	60	65
TOTAL	7,763	8,279	7,707	7,645	7,707	8,263	8,735

[1] The breakdown of Administration costs was not available.

[2] These figures are gross outlays not offset by revenues from recommended user charges.

[3] Includes Coast Guard search and rescue, aids to navigation, and safety components.



Subway route proposed by George N. Skrubb, Oakland County planning director, shows stops at (1.) Detroit's downtown area, (2.) Wayne State University, (3.) New Center, (4.) Fairgrounds, (5.) Royal Oak business district, (6.) Birmingham business district, (7.) General Motors Truck and Coach Division, (8.) proposed Pontiac Stadium, (9.) General Motors Pontiac Plant, (10.) Oakland County Service Center and (11.) Pontiac business district.