Michigan Department of TRANSPORTATION

PROGRAM EVALUATIONS
OF
URBAN TRANSPORTATION PLANNING
IN MICHIGAN

September, 1982

BUREAU OF TRANSPORTATION PLANNING
Multi-Regional Planning Division

MICHIGAN DEPARTMENT
OF
TRANSPORTATION

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This report represents the findings
and or professional opinions of the
Michigan Department of Transportation
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State Transportation Commission.

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OFFICE MEMORANDUM

DATÉ:

TO: Sam F. Cryderman, Deputy Director
      Bureau of Transportation Planning

FROM: Gloria J. Jeff, Administrator
        Multi-Regional Planning Division

SUBJECT: Program Evaluations of Urban Transportation
           Planning in Michigan

The Multi-Regional Planning Division is pleased to present the report,
Program Evaluations of Urban Transportation Planning in Michigan. This docu-
ment was prepared in response to an FHWA Region 5 Field Review conducted in
the spring of 1982, and a Field Review Report, issued in the summer of 1982.

The subject document has five parts:

1. An Executive Summary.
2. An analysis of the overall cost effectiveness of our outstate (non-SEMCOG)
    3C urban transportation planning process.
3. An evaluation of urban transportation planning TSM corridor studies in 3C
    areas.
4. An analysis of the annual cost for maintaining and updating 3C area trans-
    portation plans.
5. A discussion of other concerns and issues.

This report was jointly developed by BTP and FHWA Division staffs.

Administrator

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I. EXECUTIVE SUMMARY

One of the requests made by FHWA during their Michigan Field Process Review of the out-state (non-SEMCOG) areas, was for MDOT to determine the cost effectiveness of our urban transportation planning program. FHWA wanted a cost comparison of HPR and PL funds as a percentage of programmed highway construction dollars. Using the formulas in the Highway Trust Fund legislation as a general guideline, urban transportation planning funds should be no more than 2.5 percent of highway construction funds. The methodology which we chose, in Part II, compared HPR, PL, and their respective local matches from either final audited dollars, or the out-state 3C area UWP's to programmed highway construction projects in the respective Annual Elements of the TIP. The overall findings for the nine 3C urbanized areas analyzed show that since FY 1978 we've spent $6.45 million in planning funds and have programmed $654 million in highway construction monies. This yields a cost-effective percentage of 0.99 percent, significantly below the 2.5 percent target.

An important sub-issue involved the cost-effectiveness of urban transportation planning transportation systems management (TSM) corridor studies in Michigan 3C areas, outside of Detroit. These studies either define a problem corridor or take an already defined problem corridor (both in terms of level of service problems) and seek alternative TSM solutions to improve the traffic flow through the corridor. The proposed solutions involve Measures of Effectiveness geared toward alleviating congestion and improving the LOS in the corridor. TSM, by its very nature, should be cost-effective. Therefore, the urban transportation planning TSM corridor studies should be an excellent "test case" for the cost-effectiveness charge of FHWA. BTP staff and local planners had direct input into the recommended TSM solutions of the studies. These solutions amounted to considerable dollar savings for MDOT and local units of government. The methodology employed in Part III compared HPR, PL, Section 8 dollars and their respective local matches from the four corridor study work elements in the UWP's to recommend TSM alternative solutions and high capital (HC) alternatives, as presented in the studies. We again used the general guideline that urban transportation planning funds should not exceed 2.5 percent of the capital improvement funds (either TSM or HC). The overall findings for the four representative studies chosen, show that we can achieve a 64 percent savings in dollars by using recommended TSM solutions over HC ones. Also, total transportation planning funds amount to less than 1 percent of the recommended TSM solution, a very cost-effective ratio, well below the stipulated 2.5 percent.

FHWA also inquired about the cost of annually maintaining and updating 3C transportation plans, particularly how much the BTP spent annually on model maintenance (MM) for the 3C area transportation models. We have defined MM as those activities which are routinely (annually) undertaken to monitor developing conditions. MM should indicate when, and to what extent, major updates of the transportation plan are necessary. MM, as defined here, includes maintenance outside of major updates (major updates encompass model verification or recalibration, plan development or reevaluation, etc.). We estimate that MM is 20 percent of Data Management and all of Annual Review (Table 11). These figures were gleaned from final audit figures of PL, Section 8, HPR, local match, and state match and non-match dollars, for the outstate 3C areas. Where final audited dollars were not available, program category or element totals from approved UWP documents were used. The overall findings reveal that the average annual weighted cost for maintaining and updating transportation plans in Michigan's outstate areas is $41,600. Maintenance of the plans costs about $15,900 annually (6.8 percent of the total average annual 3C budget) while updating the plans costs about $25,700 annually (11 percent of the total average annual 3C budget). The

total weighted average annual cost for maintaining and updating transportation plans, as a percentage of the total average annual 3C budget is 17.8 percent. This annual percentage is comparatively inexpensive for protecting the considerable investment (sunken costs) of the process.

In Section V we address some of the concerns that we have with the Field Report, and raise some issues which the BTP feels should be examined by FHWA Region. We felt that overall the Field Report was well done, concise, accurate, and professionally beneficial. It was an excellent effort, and we are generally pleased with it. However, the bureau disputes some of the report's cost figures. Also, there is a notable absence of certain issues that should have been addressed in the document. The average annual cost of the transportation plan process in Michigan's out-state area is $41,600, 24 percent below the Field Report's figure of $55,000. Likewise, our figure for the annual statewide process is $374,400. This is almost 38 percent below the Field Report's figure of $600,000. The report states that our data-gathering efforts are fairly expensive. However, only $7,500 on the average is being expended annually for MM data collection which is 18 percent of the average annual cost of the transportation plan process ($7,500/$41,600). This is certainly a reasonable, cost-effective figure for MM. Finally, FHWA raises the question of Quick Response techniques and cost cutting measures. We have refined our system model process to the point where quicker turn-around time is often achieved using the systems model instead of manual quick response techniques. Where quick response techniques are merited, we utilize them. As noted in the Field Report, in an effort to achieve a more rapid response time, we have computerized some of the procedures outlined in NCHRP Report #187. MDOT and the MPOs continue to examine ways which our organizations can cut costs. There are also some issues which we felt the Field Report should have addressed. Many of them are based on the program review outline, which was used as a guide to conduct the Field Review. They are:

1. Is our level of effort adequate or excessive?

2. Is the process adequate? Has its usefulness been demonstrated? Do the costs justify the products?

3. Even if FHWA Region feels that MDOT has spent too many dollars in the past on the plan process, is current and future direction correct? Is the process adequate? Is there still heavy emphasis on systems model development?

4. Is FHWA Region examining cost-effectiveness as the only measure to judge process adequacy and needs? What about other qualitative or costable benefits received by MDOT and the MPOs?

5. How is MDOT adhering to federal DOT policy on more short-range planning and quick response (simplified planning) techniques?

6. Are the simplest planning techniques being used? How is simplest defined? In dollars expended? By cost-effectiveness measures? By resources used? By east of operation? By turn-around time?

In summary, the major findings are listed below:

1. Since 1978, in the nine outstate 3C urbanized areas, we've spent $6.45 million in planning funds, and have programmed $654 million in highway construction monies. This yields a cost effective percentage of 0.99 percent, significantly below the 2.5 percent target.

2. Since 1977, in a representative sample of urban TSM corridor studies, total transportation planning funds amounted to less than one percent of the recommended TSM solutions, well below the 2.5 percent target. Additionally, these studies show that we can achieve a 64 percent savings in dollars by using recommended TSM solutions over high-capital solutions.

3. The average annual weighted cost for maintaining and updating transportation plans in the outstate 3C areas is $41,600 (17.8 percent of the total average annual 3C budget). Plan maintenance costs $15,900 annually (6.8 percent), while plan update costs $25,700 annually (11 percent). We feel that 17.8 percent is comparatively inexpensive for protecting the considerable investments (sunken costs) of the process.

4. As noted in #3 above, the average annual cost of the transportation plan process in Michigan's out-state areas is $41,600. This is 24 percent below the field report's figure of $55,000. Our figure for the annual state-wide process is $374,400. This is almost 38 percent below the field report's figure of $600,000. On the average, only $7,500 is being expended annually for model maintenance data collection which is 18 percent of the average annual cost of the transportation plan process ($7,500/$41,600). Each of these are comparatively reasonable, cost-effective figures.

This document was developed by the Multi-Regional Planning Division, Bureau of Transportation Planning, in cooperation with the Metro Regional Planning Division, Bureau of Transportation Planning; the Federal Planning Programs Unit, Bureau of Transportation Planning; and the Planning and Research Section of the FHWA Michigan Division office.

II. PROGRAM EVALUATION OF THE URBAN TRANSPORTATION PLANNING PROCESS IN THE OUT-STATE 3C AREAS OF MICHIGAN

Charge

One of the requests made by FHWA during their Michigan Field Process Review of the out-state (non-SEMCOG) areas, was for MDOT to determine the cost-effectiveness of our urban transportation planning program. FHWA wanted a cost comparison of HPR and PL funds vs. programmed highway construction dollars; in other words, what percentage are the HPR/PL planning funds of the programmed highway construction monies? Dollar-wise, are we using our planning funds efficiently? The Highway Trust Fund allows 1 1/2% and 1/2% off the top for HPR and PL, respectively. Add the 20% local match to this 2% figure, and you get a 2.5% total. As a general guideline, urban transportation planning funds should be no more than 2.5% of highway construction funds.

Methodology

The methodology which we chose compared HPR, PL and their respective local matches from either final audited planning dollars, or the out-state 3C area UWPs' to programmed highway construction projects in the respective Annual Elements of the TIP. We analyzed a 5 year window, FY78 to FY82. Projects programmed in more than one year (double counting) were counted only once. No UMTA funds, local match or Section 3/ 5 projects were evaluated. As noted above, final audited planning dollars were used, where available. UWP totals were used if audited dollars were not available.

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For at least the last 4 years, the HPR/MDOT match ratio has been 55%/45%, instead of 80%/20%. Niles was not included in our evaluation, because they are part of the South Bend, Indiana 3C Study area. Also, the new urbanized areas (Benton Harbor/St. Joe and Port Huron) were not included because their history was not readily available.

Findings

Tables 1-9 show the findings for each of the 9 remaining out-state 3C areas. The matrices compare transportation planning funds and programmed construction dollars. Columns 1-5 represent HPR, MDOT, PL, local match and total planning dollars, respectively. Columns 6-8 delineate Federal, non-Federal (match and non-match), and total programmed highway construction dollars, respectively. Column 9 displays total HPR, PL and local match planning funds as a percentage of total programmed highway construction dollars. Columns 6-9 are cost per $1,000.

The overall findings for the nine 3C areas analyzed are found at the bottom of Table 9. Overall, since FY 78, we've spent $6.45 million in planning funds and have programmed $654 million in highway construction monies. This yields a cost-effective percentage of 0.99%, significantly below the 2.5% target.

In looking at the individual 3C area studies, the cost-effective percentage ranges from 10.42% in Jackson (see the note on the Jackson chart) to 0.36% in Saginaw, with a median of 1.61% (Battle Creek). Seven of the 9 3C areas have percentages below 2.5%. Muskegon's is 3.10%. If Jackson is discounted, the overall percentage drops even further from 0.99% to 0.90%.

In sum, the data demonstrates that out-state Michigan has a very cost-effective urban transportation planning process.

III. PROGRAM EVALUATION OF URBAN TRANSPORTATION PLANNING TSM CORRIDOR STUDIES IN MICHIGAN 3C AREAS

Charge

This was actually a subcharge which developed out of FHWA's Program Evaluation request in Part I. As noted in Part I, one of the requests made by FHWA during their Michigan Field Process Review of the out-state areas, was for MDOT to determine the cost-effectiveness of our Urban Transportation Planning (UTP) program. FHWA wanted a cost comparison of HPR & PL funds vs. programmed highway construction dollars; in other words, how cost-effective is our UTP process?

A sub-issue involved the cost-effectiveness of UTP TSM Corridor Studies in Michigan 3C areas, outside of Detroit. UTP TSM Corridor Studies are a relatively new genre; to date, approximately six have been completed in Michigan (see Table 10). A representative sample of four were chosen, covering the period FY 77-81. Two of the four were done over a two year period. Ballenger Highway, Davison Road, and 5th Avenue were selected from the Flint 3C area. The Huron Valley Corridor Study (Ann Arbor) was also chosen.

These studies either define a problem corridor or take an already defined problem corridor (both in terms of Level-of-Service problems) and seek alternative TSM solutions to improve the traffic flow through the corridor. The proposed solutions involve Measures-of-Effectiveness (MOEs) geared toward alleviating congestion and improving the L.O.S. in the corridor.

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TSM, by its nature, should be cost-effective. Since TSM attempts to better manage the supply and direct the demand for transportation facilities through more efficient use of existing road space, UTP TSM corridor studies are an excellent "test case" for the cost-effectiveness charge in Part I. Also, BTP staff and local planners had direct imput into the recommended TSM solutions which came out of these studies. These TSM solutions, as can be seen in Table 10, amounted to considerable dollar-savings for MDOT and local units of government.

A methodology similar to that used in Part I was employed. We looked at HPR, PL, Section 8 and their respective local matches from either the four Corridor Study work elements in the UWP's, or from final billings. These figures were then compared against recommended TSM alternative solutions and High-Capital (HC) alternatives, as presented in the corridor studies. We established that, as a general guideline, UTP funds should not exceed 2.5% of the capital improvement funds (either TSM or HC). This guideline is consistent with the one established in Part I.

Findings

Table 10 presents the findings over 13 columns. Columns 1-5 display HPR, MDOT, PL, Section 8 and local match, respectively, as either programmed in the UWP work element, or final billed dollars. Column 6 shows total planning funds.

Columns 7-9 show different capital improvement solutions. Column 7 represents the recommended TSM alternative solutions (dollars) as presented in the respective studies. Column 8 portrays the HC alternative as shown in the respective studies. Column 9 depicts the

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difference in dollars between the HC alternative and the recommended TSM alternative solution. This figure is actually the dollars saved by utilizing the proposed TSM solution.

Column 10 presents this saving in another format; percent savings using the TSM alternative. The dollar difference between TSM and HC is divided by the HC dollars. As noted by the total, there is a 64% savings in dollars by using TSM solutions over HC ones. This is a substantial savings, both in percentage and dollars. It appears to be significantly cost-effective on this basis alone.

Columns 11-13 represent different methods of calculating cost-effectiveness measures. They show the percentage that total transportation planning funds are of capital improvement monies. Column 11 displays total transportation planning funds as a percentage of the recommended TSM alternative solution. Since this was the adopted alternative package, a cost-effective ratio calculation is appropriate. Again, a meaningful percentage is achieved (0.8%), well below the stipulated 2.5% guideline. However, the lower the dollar figure of the recommended TSM solution, the greater the percentage in Column 11 (a higher figure). Therefore, columns 12 and 13 were developed. Column 12 represents total transportation planning funds as a percentage of the high-capital solution, if the HC had been chosen. Although this figure is for illustrative purposes only, a notable cost-effective percentage

(0.3%) is achieved. Column 13 depicts total transportation planning

funds divided by the difference between the HC and TSM alternatives.

Once again, a significant overall cost-effective percentage is achieved

(0.4%), considerably below the 2.5% guideline.

In sum, the data collected and analyzed for the four representative

studies demonstrates that the UTP TSM Corridor Studies, which are being

conducted in the out-state 3C areas, are highly cost-effective.

IV. Program Evaluation of The Annual Cost
    for Maintenance and Update of the
    Transportation Plans

One of the inquiries made by FHWA during their Michigan Field Process

Review concerned the cost of annually maintaining and updating 3C

Transportation Plans. As part of this effort, FHWA wanted to know how

much the BTP spent on model maintenance (MM) for the 3C area transporta-

tion models (sometimes referred to as the Systems Models). There are

currently 13 3C urbanized areas in Michigan and the Bureau operates trans-

portation models in all except SEMCOG, which is operated at the local

level. Additional smaller urban area systems models are operational. The

level of development, inventory and data base, maintenance, and application

of these models varies between urban areas depending on the growth, activi-

ties, adequacy of the transportation facilities, local participation, and

available staff. No established guidelines or required annual MM

process currently exists. MM assumes that almost all needed information is

collected for other purposes and therefore minimal efforts are necessary to

utilize the information in the maintenance process. Model maintenance is

embedded in the overall, ongoing 3C process.

Professionally, we differentiate between model maintenance and model

development or application. Model Maintenance involves those activities

which are routinely (annually) undertaken to monitor developing

conditions. MM also encompasses implementing the data gathered under

these activities to reflect current facility and service levels. Two

other facets of MM are providing a basis for measuring the impacts of

implemented actions, and maintaining a uniform base in all 3C areas. Finally, MM should indicate when and to what extent major updates are necessary. MM, as defined here, includs maintenance outside of major updates (major updates encompass model verification or recalibration, plan development or reevaluation, etc.). MM does not impact (cause to change) the traditional certification documents (Transportation Plan, TIP/AE, UWP, TSM Plan). That is, the impact of MM does not necessitate changing these documents. The impact of a major update would necessitate changing these documents.

Because MM is embedded in the 3C process, it necessarily overlaps generic cost categories. As presented in Table 11, MM is 20% of Data Management and all of Annual Review. These figures were gleaned from final audit figures of PL, Section 8, HPR, local match, and state match and non-match dollars, for the outstate 3C areas. Where final audited dollars were not available, program category or element totals from approved UWP documents were used. The figures were taken from the most recent 4-year period and expanded to 10 years for consistency with the Field Review Report.

As Table 11 shows, the average annual weighted cost range for maintaining and updating a Transportation Plan in the outstate 3C areas is $32,400 - $60,100. The weighted average is $41,600. Maintenance of the plan costs about $15,900 annually. Plan development costs about $25,700 per year. According to Table 12, the average UWP expenditure

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range, by listed program categories, is $160,000 - $380,000. The

Weighted average is $233,300. Therefore, 6.8 percent of the total

average annual 3C budget ($15,900/233,300) is expended in maintaining

transportation plans and operational traffic forecasting models, while

11% ($25,700/233,3000) goes toward preparing transportation plans. The

total weighted average is 17.8 percent ($41,600/$233,300). In our judge-

ment, this 17.8 percent annual figure is inexpensive and relatively cost-

effective for protecting the considerable investment (sunken costs)

of the process. Furthermore, this figure of $41,600 (which is the

weighted, average annual cost of the Transportation Plan process over

a 10-year period) is 0.03% of the average annual programmed highway

construction dollars from Table 9 ($41,600/$130,873,400)[1]

The Bureau recognizes the importance of developing and implementing a

standardized annual MM procedure to improve the quality and continuity

of our planning process. This will provide a uniform base of informa-

tion for all urban areas across the state and when integrated with the

statewide model, allow the Bureau to respond rapidly to questions raised

by management and the legislature without sacrificing quality or uni-

formity of effort. Efficiency, quality, and better integration of

urban and statewide models are all primary concerns of this process.

[1]Total programmed highway construction dollars FY 78-82 was
$654,367,000. To obtain the annual average, this figure was divided
by 5.

V. Other Concerns and Issues

In this section, we would like to address some of the concerns that we
have with the Field Report, and raise some issues which the BTP feels
should be examined by FHWA Region. We felt that overall the Field Report
was well done, concise, accurate, and professionally beneficial. It was an
excellent effort, and we are generally pleased with it. However, the
Bureau disputes some of the report's cost figures. Also, there is a
notable absence of certain issues that should have been addressed in the
field report.

A. Cost Figures

The Field Report estimates that "....the total annual cost for
maintenance and update of the transportation long-range plan (is)
about $55,000 per year in an average urbanized area." First, we
feel that a range is more appropriate based on large (200,000+)
areas and small areas. The difference in study area size dictates
different levels of effort. This is apparent from Table 11. The
range of the total annual average cost is $32,400-$60,100.
Secondly, we feel that a weighted average is more statistically
valid (and gives a more accurate picture) than a simple mean. The
weighted average in Table 11 for the average annual cost of the
Transportation Plan process is $41,600 (six small urbanized areas,
three large urbanized areas). This is 24 percent below the Field
Report's figure of $55,000.

In Section IV of the Field Report, it is estimated that this entire process costs about $600,000 annually statewide. Our calculations show considerably less than that. Our figure of $374,400 ($41,600 x 9) is almost a 38 percent reduction over the sum in the Field Report. Also, we would note that no new major O&D's are planned. We are now able to synthesize any necessary O&D data using technical transferability and Quick Response techniques.

We also disagree with the Field Report's statement in Section IV (last page) that our data-gathering efforts are fairly expensive. Fairly expensive compared to what? Again, based on the figures from Table 11, only $7,500 on the average is being expended annually for MM data collection, or 18 percent of the total $41,600. We noted on page 8 that MM accounts for only 20% of the data management costs. A significant portion of the data collected is for other purposes. We feel that 18% is certainly within the bounds of reasonableness, and for data collection, is quite cost effective.

Section IV also contains a recommendation that MDOT "....investigate the possibility of reducing costs by not using (the) systems models in .... small urbanized areas, relying instead on synthetic models and default data for the limited number of times it will be desir-able to use models in analysis of problems." There are several points to be made here. To begin with, the statement is directly related to the preceding sentence in Section IV concerning data

gathering being "fairly expensive". As previously noted, our estimates show that only $7,500 is being expended annually for MM data gathering (18 percent of the average annual cost of the Transportation Plan process). Secondly, we repeatedly stressed during the Region's Field Review that we have developed our systems models to the point where they are just as "quick" as Quick Response techniques. In many cases, for analytical problems (traffic impacts), quicker "turn-around time" is achieved by using the systems model package (often overnight). For example, during the Field Review, we demonstrated the application of a new interactive system modeling process which is "Quick-Response". We used our NETEDIT program to show the traffic impacts of opening a bridge across Lake Cadillac. Finally, where Quick Response techniques are merited, we use them (e.g., to determine the local impacts of a neighborhood shopping center). As the Field Report notes on page 6, in an effort to achieve a more rapid response time, we have computerized some of the procedures outlined in NCHRP Report #187. MDOT and the MPO's continue to examine ways in which our organizations can cut costs.

Finally, the Field Report notes that local planners should be made fully aware of MDOT's capability (last page). We agree. The Multi-Regional Planning Division has recently undergone a re-organization. One of the reorganization's goals is to promote a better working relationship with the local areas through increased communication. As part of this increased communication we intend to fully educate the local area staffs in our capabilities, and to make them aware of the state-of-the-art tools which they can utilize.

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B. Issues

There are some issues which we felt the Field Report should have
addressed. Many of them are based on the Program Review outline,
which was used as a guide to conduct the Field Review. We have
discussed these with FHWA Division, and they are listed below.

1. Is our level of effort adequate or excessive?

2. Is the process adequate? Has its usefulness been demonstrated?
    Do the costs justify the products?

3. Even if FHWA Region feels that MDOT has spent too many dollars in
    the past on the plan process, is current and future direction
    correct? Is the process adequate? Is there still heavy emphasis
    on systems model development?

4. Is FHWA Region examining cost-effectiveness as the only measure
    to judge process adequacy and needs? What about other qualita-
    tive or costable benefits received by MDOT and the MPO's?

5. How is MDOT adhering to federal DOT policy on more short-range
    planning and Quick Response (simplified planning) techniques?

6. Are the simplest planning techniques being used? How is
    simplest defined? In dollars expended? By cost-effectiveness
    measures? By resources used? By ease of operation? By turn-
    around time?

As noted in the opening paragraph of this section, we are pleased
overall with the Field Report. It contains many complimentary state-
ments about Michigan's transportation plan process. However, we felt
it necessary to set the record straight concerning the cost figures
contained in the report.

In summary, the average annual cost of the Transportation Plan process in
Michigan's out-state area is $41,600, 24% below the Field Report's figure
of $55,000. Likewise, our figure for the entire process is $374,400
annually statewide. This is almost 38% below the Field Report's figure
of $600,000. Also, only $7,500 on the average is being expended annually
for MM data collection; this is certainly a reasonable, cost-effective
figure. Finally, as to the issue of Quick-Response techniques and cost
cutting measures, we have refined our System model process to the point
where quicker "turn-around time" is often achieved using the Systems Model
instead of Manual Quick-Response techniques. Where Quick-Response tech-
niques are merited, we utilize them. We continue to examine ways which our
organization can cut costs.

Finally, we would like FHWA Region to address the 6 issues listed
above. Many of these issues were taken from the Program Review Outline.

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BATTLE CREEK

MDOT 1721 (8/79)

	PLANNING (ACTUAL $)					CONSTRUCTION ($1,000)						
	1	2	3	4	5		6	7	8	9			
	HPR	MDOT	P.L.	LOCAL MATCH	TOTAL (1-4)		FED.	NON-FED	TOTAL	5/8%			
FY 82	42,735	34,965	78,995	19,748	176,443		4,288	11,207	15,495	1.14			
81	33,630	27,516	78,350	19,588	159,084		2,289	5,295	7,584	2.09			
80	37,777	30,909	44,000	11,000	123,686		5,292	2,012	7,304	1.69			
79	25,494	20,859	37,000	9,250	92,603		4,780	2,268	7,048	1.31			
78	24,670	20,185	62,025	15,506	122,386		2,814	1,750	4,565	2.68			
TOTAL	164,306	134,434	300,370	75,092	674,202		19,463	22,532	41,995	1.61			

NOTE: In tables 1-9, the average HPR/MDOT match
split is 55%/45%, instead of 80%/20%.

TABLE 1

BAY CITY   PLANNING (ACTUAL $)   CONSTRUCTION ($1,000)

MDOT 1721 (8/79)	1	2	3	4	5		6	7	8	9			
	HPR	MDOT	P.L.	LOCAL MATCH	TOTAL (1-4)		FED.	NON-FED	TOTAL	5/8 %			
FY 82	19,250	15,750	47,823	11,955	94,778		4,249	1,289	5,538	1.71			
81	19,825	16,220	61,628	15,408	113,081		4,303	1,556	5,859	1.93			
80	21,474	17,570	25,000	6,250	70,294		2,454	1,448	3,902	1.80			
79	19,705	16,122	37,000	9,250	82,077		2,914	553	3,467	2.37			
78	N.A.	N.A.	N.A.	N.A.	N.A.		N.A.	N.A.	N.A.	N.A.			
TOTAL	80,254	65,662	171,451	42,863	360,230		13,920	4,846	18,766	1.92			

TABLE 2

	PLANNING (ACTUAL $)						CONSTRUCTION ($1,000)						
MDOT 1721 (8/79)	1	2	3	4	5		6	7	8	9			
	HPR	MDOT	P.L.	LOCAL MATCH	TOTAL (1-4)		FED	NON-FED	TOTAL	5/8%			
FY 82	57,640	47,160	89,500	22,375	216,675		5,620	23,860	29,480	0.73			
81	51,360	42,020	80,300	20,075	193,755		14,474	18,136	32,610	0.59			
80	56,950	46,596	153,960	38,491	295,997		8,982	17,383	26,365	1.12			
79	38,640	31,615	209,405	52,351	332,011		19,964	13,818	33,782	0.98			
78	32,398	26,508	138,988	34,747	232,641		42,061	12,421	54,482	0.43			
TOTAL	236,988	193,899	672,153	168,039	1,271,079		91,101	85,618	176,719	0.72			

TABLE 3

GRAND RAPIDS   PLANNING (ACTUAL $)   CONSTRUCTION ($1,000)

MDOT 1721 (8/79)	1	2	3	4	5		6	7	8	9			
	HPR	MDOT	P.L.	LOCAL MATCH	TOTAL (1-4)		FED	NON-FED	TOTAL	5/8%			
FY 82	38,170	31,230	199,289	49,822	318,511		6,707	6,091	12,798	2.49			
81	15,760	12,895	152,544	38,136	219,335		5,715	8,538	14,253	1.54			
80	22,834	18,682	73,976	18,494	133,986		3,953	434	4,387	3.05			
79	17,367	14,209	75,364	18,841	125,781		4,020	4,649	8,669	1.45			
78	13,027	10,659	62,871	15,717	102,274		1,697	9,696	11,393	0.89			
TOTAL	107,158	87,675	564,044	141,010	899,887		22,092	29,408	51,500	1.75			

TABLE 4

JACKSON PLANNING (ACTUAL $) CONSTRUCTION ($1,000)

MDOT 1721 (8/79)	1	2	3	4	5		6	7	8	9			
	HPR	MDOT	P.L.	LOCAL MATCH	TOTAL (1-4)		FED	NON-FED	TOTAL	5/8%			
FY 82	28,765	23,535	50,000	12,500	114,800		1,588.5	661.5	2,250	5.10			
81	32,982	26,985	62,500	15,625	138,092		800	267	1,145	12.06			
80	33,558	27,456	32,000	8,000	101,014		363	141	504	20.04			
79	29,594	24,213	80,000	20,000	153,807		1,330	516	1,846	8.33			
78	18,380	15,039	46,000	11,500	90,919		–	NONE*	–				
TOTAL	143,279	117,228	270,500	67,625	598,632		4,162	1,586	5,745	10.4			

NOTE: Because Jackson's FAUS allocation is so small ($400,000/yr.), they generally bank their money for 2-3 yr. cycles, hence the high $ figure (20%) in FY 80.

TABLE 5

KALAMAZOO PLANNING (ACTUAL $) CONSTRUCTION ($1,000)

MDOT 1721 (8/79)	1	2	3	4	5		6	7	8	9			
	HPR	MDOT	P.L.	LOCAL MATCH	TOTAL (1-4)		FED	NON-FED	6-7 TOTAL	5/8%			
FY 82	13,860	11,340	74,667	18,666	118,533		5,624	6,454	12,078	0.98			
81	21,596	17,670	77,227	19,307	135,800		10,852	6,623	17,475	0.78			
80	18,668	15,274	62,000	15,500	111,442		6,443	3,531	9,974	1.12			
79	22,480	18,393	72,611	18,152	131,636		5,714	5,538	11,252	1.17			
78	20,077	16,426	83,742	20,935	141,180		11,490	6,098	17,588	0.80			
TOTAL	96,681	79,103	370,247	92,560	638,591		40,123	28,244	68,367	0.93			

TABLE 6

LANSING PLANNING (ACTUAL $) CONSTRUCTION ($1,000)

MDOT 1721 (8/79)	1	2	3	4	5		6	7	8	9			
	HPR	MDOT	P.L.	LOCAL MATCH	TOTAL (1-4)		FED	NON-FED	TOTAL	5/8%			
FY 82	59,840	48,960	72,873	18,219	199,892		19,888	5,933	25,821	0.77			
81	44,739	36,604	75,000	18,750	175,093		20,032	4,542	24,574	0.71			
80	45,190	36,973	74,293	18,573	175,029		3,578	5,935	9,513	1.84			
79	39,893	32,640	81,974	20,493	175,000		5,121	4,043	9,153	1.91			
78	34,860	28,521	87,583	21,895	172,859		5,024	6,024	11,048	1.56			
TOTAL	224,522	183,698	391,723	97,930	897,873		53,643	26,477	80,119	1.12			

TABLE 7

MUSKEGON   PLANNING (ACTUAL $)   CONSTRUCTION ($1,000)

MDOT 1721 (8/79)	1	2	3	4	5		6	7	8	9			
	HPR	MDOT	P.L.	LOCAL MATCH	TOTAL (1-4)		FED	NON-FED	TOTAL	5/8%			
FY 82	8,250	6,750	55,000	13,750	83,750		2,501	2,127	4,628	1.81			
81	8,291	6,783	51,378	12,844	79,296		1,400	1,780	3,180	2.49			
80	16,614	13,594	50,000	12,500	92,708		489	1,033	1,522	6.09			
79	20,192	16,520	34,500	8,625	79,837		552	748	1,300	6.14			
78	18,330	14,997	28,107	7,026	68,460		1,551	832	2,383	2.87			
TOTAL	71,677	58,644	218,985	54,745	404,051		6,493	6,520	13,013	3.10			

TABLE 8

SAGINAW   PLANNING (ACTUAL $)   CONSTRUCTION ($1,000)

MDOT 1721 (8/79)	1 HPR	2 MDOT	3 P.L.	4 LOCAL MATCH	5 TOTAL		6 FED	7 NON-FED	8 TOTAL	9 5/8%			
FY 82	46,200	37,800	67,152	16,788	167,940		N.A.	N.A.	15,298	1.10			
81	35,156	28,764	75,825	18,957	158,702		N.A.	N.A.	20,896	0.76			
80	21,131	17,284	49,400	12,350	100,170		N.A.	N.A.	15,671	0.64			
79	22,602	18,542	75,000	18,750	134,894		N.A.	N.A.	75,745	0.18			
78	36,026	29,476	63,600	15,900	145,002		N.A.	N.A.	70,533	0.21			
TOTAL	161,115	131,871	330,977	82,745	706,708				198,143	0.36			
GRAND TOTAL	1,285,980	1,052,214	3,290,450	822,609	6,451,253				654,367	0.99			
			Exclude	Jackson	5,852,621				648,622	0.90			

TABLE 9

TABLE 10	PLANNING $ 1	2	3	4	5	6	CONSTRUCTION $ 7	8	9	% SAVINGS USING TSM 10	% PLANNI... FUNDS OF CAPITAL IMPROVEMENT FUNDS 11	12	13
	HPR	MDOT	P.L.	SEC. 8	LOCAL MATCH	TOTAL 1-5	RECMND TSM ALT.	HI-CAP ALT.	8-7	9/8	6/7	6/8	6/9
(FLINT) FY81 BALLENGER C.S.	7,644	1,911	8,221	3,408	2,325	23,509	2860000	2,000,000	1,714,000	85.7	8.2	1.2	1.4
(FLINT) FY80 DAVISON C.S.	15,576	3,894	14,581	1,992	3,314	39,357	2,514,000	3,715,000	1,201,000	8.7	0.3	0.3	3.3
(FLINT) FY78-79 5th AVE.C.S.	NA	NA	NA	NA	NA	55,000	495,000	4,555,000	4,060,000	89.1	11.1	1.2	1.3
C.S. (ANN ARBOR) FY77-78 HURON VALLEY	5,680	1,420	52,880	0	13,220	73,200	10,000,000	44,784,000	34,784,000	77.6	0.7	0.1	0.2
TOTAL						191,066	23,295,000	65,054,000	41,759,000	64.2	0.8	0.3	0.4

TABLE 10

TABLE 11

AVERAGE ANNUAL COST[1]
OF THE TRANSPORTATION PLAN PROCESS
OVER A 10-YEAR PERIOD
(Dollars)

ACTIVITY	SMALL URBAN AREA (200,000 POPULATION)	LARGE URBAN AREA (200,000 POPULATION)	WEIGHTED AVERAGE FOR ALL URBAN AREAS
Annual Reviews (Data Management)	$ 7,000 (3,400) $10,140	$18,900 (8,000) $26,900	$15,900
Major Updates (Data Management)	$20,400 (1,600) $22,000	$28,800 (4,400) $33,200	$25,700
Total	$32,400	$60,100	$41,600

Note: Excludes SEMCOG

[1]Includes the following funding expenditures: PL, Section 8, Local Match, HPR, State Match, and State Non-Match. A more detailed breakdown is available upon request. All figures have been discussed with FHWA division.

TABLE 12

AVERAGE ANNUAL EXPENDITURES[1]
(Dollars)

FUNDING SOURCE	SMALL URBAN AREA (200,000 POPULATION)	LARGE URBAN AREA (200,000 POPULATION)	WEIGHTED AVERAGE[2]
PL	$ 50,000	$120,000	$ 73,300
UMTA (Est. Section 8)	25,00	100,00	50,000
Local & State Match	20,000	60,000	33,300
HPR & State (Match & Non-Match)[3]	65,000	100,000	76,700
Total	$160,000	$380,000	$233,000

Note: Excludes SEMCOG

[1]Based on funding levels in annual urban area work programs. All figures have been discussed with FHWA division.
[2]Assumes 6 small urban areas and 3 large urban areas.
[3]Assumes State non-match is equal to HPR.