Regional Transportation Plan

Transportation Modeling Scenarios Evaluation

Maricopa Association of Governments

May 22, 2003

CONTENTS

Page #

INTRODUCTION **1**

DESCRIPTION OF MODELING SCENARIOS **3**

ANALYSIS OF MODELING SCENARIOS **6**

CONCLUSIONS **13**

EXHIBITS

Exhibit 1 - Evaluation and Phasing Process **1**
Exhibit 2 - Chart Of Regional Revenue Sources **2**
Exhibit 3 - Modeling Scenarios Description/Funding **4**
Exhibit 4 - Total Vehicle Crashes Per Year **7**
Exhibit 5 - PM Peak Period Person Hours of Travel Per Capita **8**
Exhibit 6 - Average PM Peak Period Delay Per Capita (Minutes) **9**
Exhibit 7 - Daily Transit Ridership **11**
Exhibit 8 - Daily VMT Per Capita **12**

APPENDICES

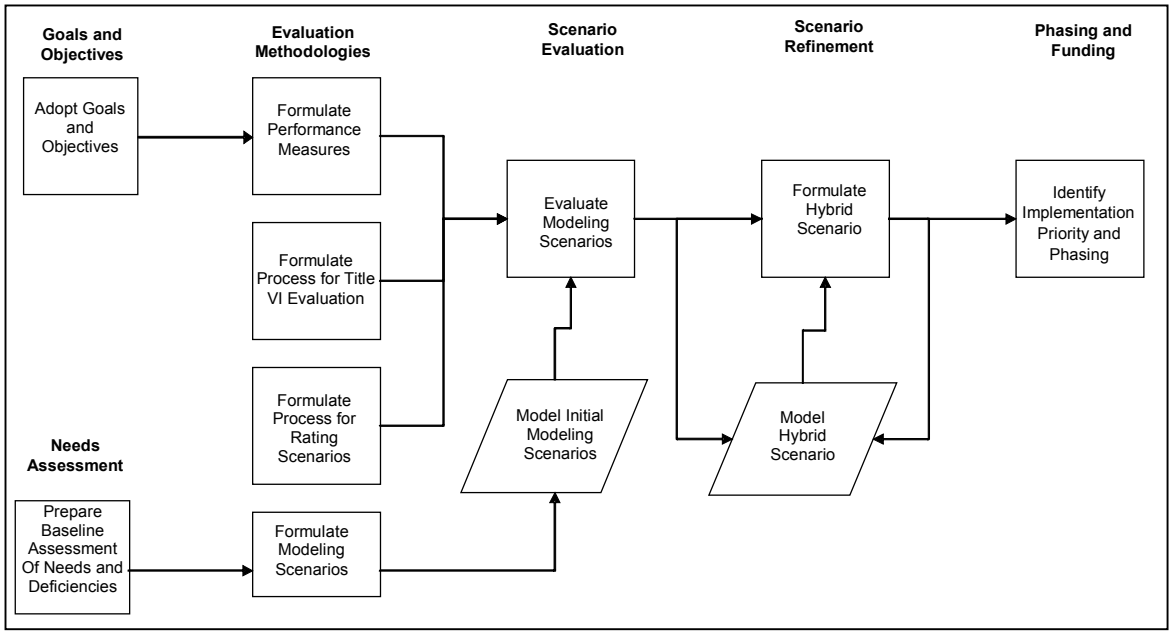
Appendix A- Maps of Scenarios A, B, and C
Appendix B- Cost Summaries for Scenarios A, B, and C
Appendix C- Evaluation Maps
Appendix D- Performance Measure Tables

INTRODUCTION

The purpose of this working paper is to report the results of the regional transportation system modeling scenarios evaluation. These scenarios, which were prepared as part of the process to develop a new MAG Regional Transportation Plan (RTP), are described in detail in an earlier working paper dated April 8, 2003. The analysis of the scenarios is intended to help provide insights into the tradeoffs associated with different transportation investment strategies and how different project components perform. Based on the assessment of the scenarios, the Transportation Policy Committee will be asked to develop a hybrid modeling scenario for analysis, which will provide the basis for a plan for adoption.

The evaluation and phasing process that is being used in the preparation of the RTP is depicted in Exhibit 1. This approach is distinguished by the use of performance-based planning and the application of performance measures in the evaluation of the modeling scenarios. The methodology includes six major components: 1) goals and objectives, 2) needs assessment, 3) evaluation methodologies, 4) scenario evaluation, 5) scenario refinement, and 6) phasing and funding. This working paper addresses the "scenario evaluation" step.

Exhibit 1 - Evaluation and Phasing Process



The modeling scenarios developed for the RTP process have been constrained to reflect specific levels of future funding from these sources for the 20-year period covering 2006-2025. A total of $17.1 billion (in 2002 dollars) has been projected to be available from these regional revenue sources for the 20-year period. Exhibit 2 summarizes estimated future revenues from regional transportation sources (in 2002 dollars) and the types of projects to which they may be applied.

Exhibit 2

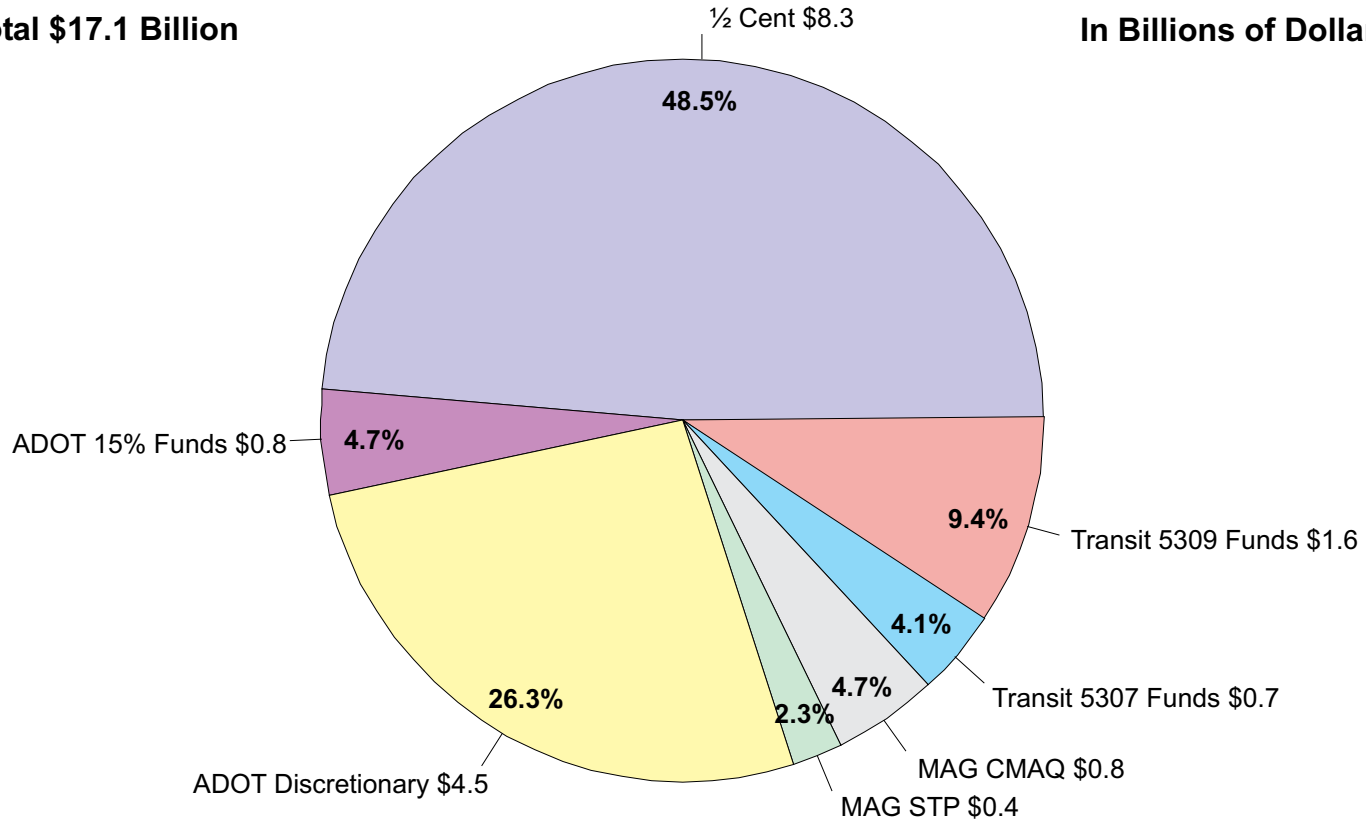
Major Regional Revenue Sources (2006-2025)*

REGIONAL TRANSPORTATION PLAN
MARICOPA ASSOCIATION of GOVERNMENTS

½ Cent Sales Tax Extension	ADOT 15% Funds - Legislated - Board Policy	ADOT Discretionary Funds - Federal - State	Phoenix/ RPTA Federal Sub-allocated 5307 Funds	Phoenix/ RPTA Federal Discretionary 5309 Funds	MAG Federal Sub-allocated Surface Transportation Funds (STP)	MAG Federal Congestion Mitigation Air Quality Funds (CMAQ)
Sales Tax **$8.3 Billion**	Gas Tax **$0.8 Billion**	Gas Tax **$4.5 Billion**	**$0.7 Billion**	(Requested) **$1.6 Billion**	**$0.4 Billion**	**$0.8 Billion**
◆ Highways ◆ Arterial Streets ◆ Transit	◆ Controlled Access State Highways	◆ State Highway Improvements	◆ Bus - Capital	◆ Light Rail - Capital ◆ Bus - Capital	◆ Streets and Highways ◆ Transit - Capital	◆ Air Quality and Congestion Relief Projects ◆ Transit - Capital

Total $17.1 Billion

In Billions of Dollars



*** Preliminary Estimate (3/12/03)**

DESCRIPTION OF MODELING SCENARIOS

Three transportation modeling scenarios were identified for analysis. The scenarios have been structured generally to reflect the estimated levels of future funding and project eligibility described above. Exhibit 3 presents a comparison of the scenarios including the level of investment of regional revenue sources by major modal category. These categories include freeways, major arterial streets, transit and other regional programs. Scenario A places an emphasis on investments in freeways, Scenario B shifts resources toward major arterial streets, and Scenario C has the highest level of investment in transit. Maps and cost summaries of the scenarios are included in Appendices A and B, respectively.

Exhibit 3 - Modeling Scenarios Description/Funding

	SCENARIO A	SCENARIO B	SCENARIO C
	Emphasis on investments in freeways	***Shifts resources toward major alternate streets***	***Highest level of investment in transit***
Freeways	$11,049	$8,906	$6,450
Major Arterial Streets	$1,600	$3,701	$1,600
Transit	$3,984	$4,027	$8,384
Other Regional Programs	$602	$602	$602
Total	**$17,235**	**$17,236**	**$17,036**
Freeways	New freeway corridors include: 1) Loop 303 from I-10 Reliever to I-17 2) Loop 202 from I-10 (west) to I-10 (east) 3) Extension of Loop 303 from I-10 Reliever to Riggs Road 4) I-10 Reliever from I-17 to SR 85 5) Williams Gateway Freeway from Loop 202 to Meridian Road 6) New River Corridor from Loop 303 to I-17. New general purpose lane capacity is provided along most existing and soon-to-be-completed freeways. Freeway bottleneck improvement projects and arterial/freeway interchanges are provided. Significant block of funding is identified for freeway maintenance and operations.	The new freeway corridors include: 1) Loop 303 from I-10 Reliever to I-17 2) Loop 202 from I-10 (west) to I-10 (east) 3) I-10 Reliever from Loop 202 to SR 85 4) Williams Gateway Freeway from Loop 202 to Meridian Road Freeway bottleneck improvement projects are retained but no new arterial/freeway interchanges are provided New HOV lanes and HOV interchange ramps are included but no new general purpose lane capacity is added to existing freeways Arterial roadway corridor improvements are included Significant block of funding is identified for freeway maintenance and operations	The new freeway corridors include: 1) Loop 303 from MC 85 to I-17 2) Loop 202 from I-10 (west) to I-10 (east) New HOV lanes and HOV interchange ramps are included Some funding is retained for freeway maintenance and operations New general purpose lane capacity is provided along most existing and soon-to-be-completed freeways

	SCENARIO A	SCENARIO B	SCENARIO C
	Emphasis on investments in freeways	***Shifts resources toward major alternate streets***	***Highest level of investment in transit***
Major Arterial Streets	$1.6 billion has been provided for capacity improvements on major arterial streets	$1.6 billion has been provided for capacity improvements on major arterial streets Additional funds for a series of specific projects for new/improved arterial roadway corridors has been included	$1.6 billion has been provided for capacity improvements on major arterial streets
Transit	A basic regional bus grid is provided 10 percent more bus-miles per person than the 2002 bus network. Includes local circulator/shuttle service, dial-a-ride, some rural transit and required ADA service 17.6 million bus-miles per year of skip-stop service and express/BRT service is included The 20-mile LRT minimum operating system (MOS) plus approximately 10 miles of LRT extension are included	A basic regional bus grid is provided 10 percent more bus-miles per person than the 2002 bus network. Includes local circulator/shuttle service, dial-a-ride, some rural transit and required ADA service 17.6 million bus-miles per year of skip-stop service and express/BRT service is included The 20-mile LRT minimum operating system (MOS) plus approximately 10 miles of LRT extension are included	A significantly expanded regional bus grid is provided, nearly double the bus-miles included in Scenarios "A" and "B" 80 percent more bus-miles per person than the 2002 bus network. Includes local circulator/shuttle service, dial-a-ride, rural transit and required ADA service 16.5 million bus-miles per year of skip-stop service and express/BRT service is included The 20-mile LRT minimum operating system (MOS) plus approximately 10 miles of LRT extension are included Includes a major expansion of the high capacity transit component assuming that 50 miles of BRT/LRT would be added Includes 32 miles of commuter rail
Other Regional Programs	Funding is included for bicycle/ pedestrian projects, transportation demand management / transportation system management projects, and air quality/mitigation projects	Funding is included for bicycle/ pedestrian projects, transportation demand management / transportation system management projects, and air quality/mitigation projects	Funding is included for bicycle/ pedestrian projects, transportation demand management / transportation system management projects, and air quality/mitigation projects

ANALYSIS OF MODELING SCENARIOS

The modeling scenarios described above were evaluated using a set of transportation performance measures. These performance measures were used to provide information regarding the advantages and disadvantages of various approaches to meeting future travel demand needs and assess the relative strengths and weaknesses of the modeling scenarios. To ensure that the evaluation process reflects key regional issues and concerns, each of the performance measures was linked with a specific RTP goal and objective. These goals and objectives were developed earlier in the RTP process and were approved, subject to refinement as the process continues, by the Transportation Policy Committee at their meeting of February 19, 2003.

Values for the transportation performance measures were estimated using the MAG regional transportation demand modeling system. The MAG model was applied to a base network and the scenarios utilizing population, employment, and land use projections for the year 2025. The results of the modeling process are depicted, in part, in a series of maps included in Appendix C. These maps provide information on freeway traffic volumes and level of service, intersection level of service, and transit volumes.

The three scenarios were evaluated using the full set of performance measures defined for the Evaluation Methodology. The results for individual performance measures are tabulated in Appendix D. A discussion of the results is presented by major goal in the remainder of this section. Only the first three goals of the RTP process are covered below. The fourth goal, "Accountability and Planning", will be addressed later as part of the assessment of plan development and implementation.

Goal # 1: Maintenance & Safety

Transportation infrastructure that is well maintained and safe

Maintenance

ADOT reports that the average annual cost to maintain urban freeways is $125,000 per centerline mile. This covers items such as sweeping, litter pick-up, landscaping maintenance, lighting, striping and the freeway management system. Currently none of the regional funding sources are directed toward this need. Each of the modeling scenarios (A, B, and C) includes funding at approximately a level representing full funding of freeway maintenance for the 20-year period. The level of funding applied to freeway maintenance from a potential extension of the half-cent sales tax will be a TPC policy decision.

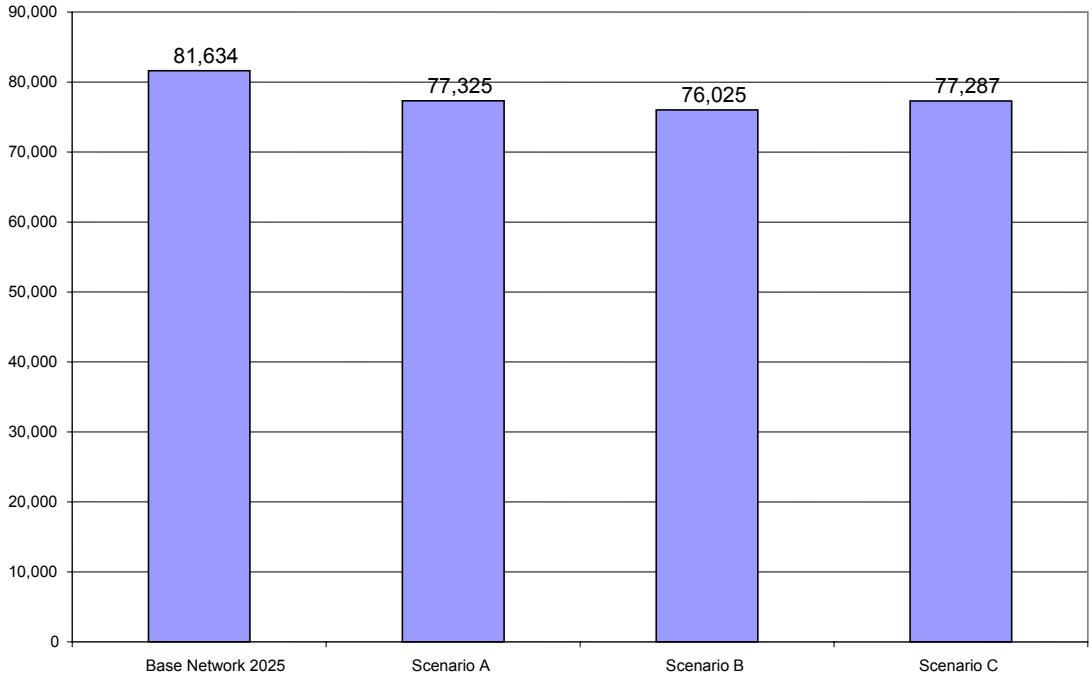
Travel Safety

Safety in the travel environment is a concern of every motorist in terms of preventing property damage and injury. Avoiding traffic incidents is also a major factor in maintaining a smooth flow of traffic on freeways and arterials, as well as ensuring reliable point-to-point travel times in the transportation network.

Vehicular-accident levels in the transportation network depend on a range of factors. One of the most important factors is the mix of travel performed on the various types of highway facilities, i.e. freeways, arterials, locals. Each facility type has a different historical accident rate. Simulations were conducted for each of the scenarios and the

amount of travel by highway facility-type was estimated, as well as volumes of traffic entering arterial intersections. The estimated total number of crashes (PM period) per year for each of the scenarios is provided in Exhibit 4. Although the values for all three investmnet scenarios are fairly close, they do each provide a small reduction of 5% to 7% from the base network. Of the three investment scenarios, Scenario B has the lowest overall estimated crash total.

Exhibit 4
Total Vehicle Crashes Per Year



Based on these estimates, the number of annual crashes per million vehicle miles traveled for each of the scenarios was also estimated. These rates are listed below:

Base Network:	1.06
Scenario A:	0.95
Scenario B:	0.95
Scenario C:	0.97

As may be observed, Scenarios A, B, and C are clustered fairly closely in terms of the crash rates and have rates that are approximately 10% less than the base network. Having the lowest share of travel on freeways, the base network experiences the highest crash rate. Among Scenarios A, B, and C, Scenario C has the greatest amount of travel on arterials and experiences a slightly higher rate than A or B.

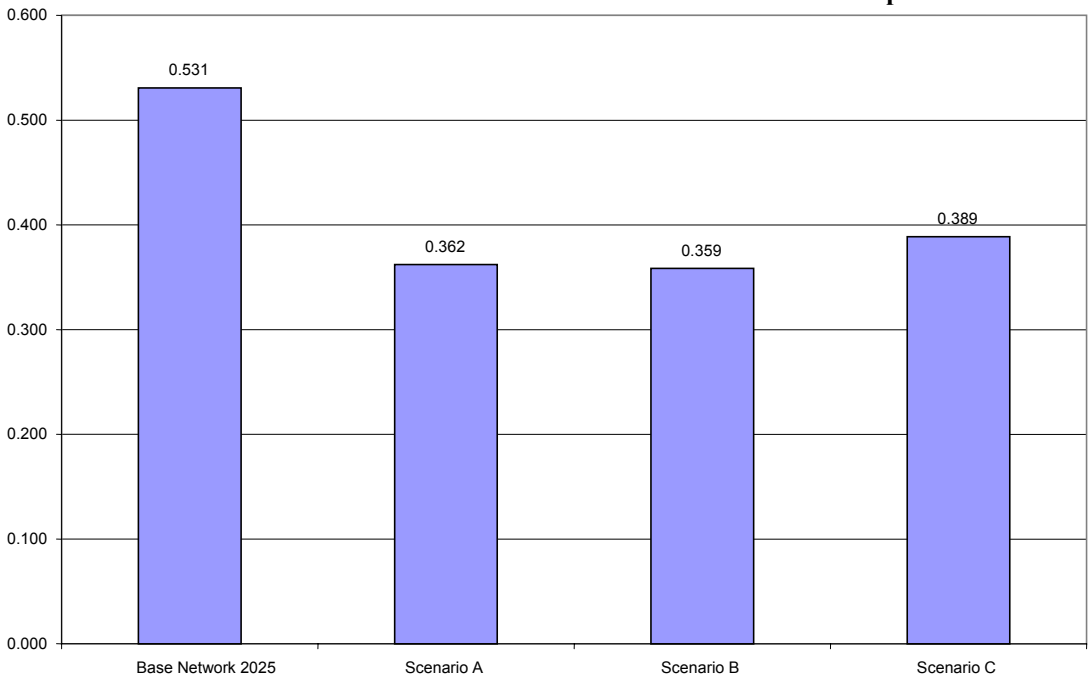
Goal # 2: Access & Mobility

Affordable transportation services that provide accessibility and mobility for everyone

Time Devoted to Traveling

Overall PM peak-period per-capita person hours of travel by all modes is almost the same between Scenarios A and B as indicated in Exhibit 5. Scenario A is about 1% higher than Scenario B. Lacking significant improvements to the freeway system in the central part of the region, Scenario C is roughly 8% higher than Scenarios A and B in person hours of travel by auto as well as by all modes.

Exhibit 5
PM Peak Period Person Hours of Travel Per Capita

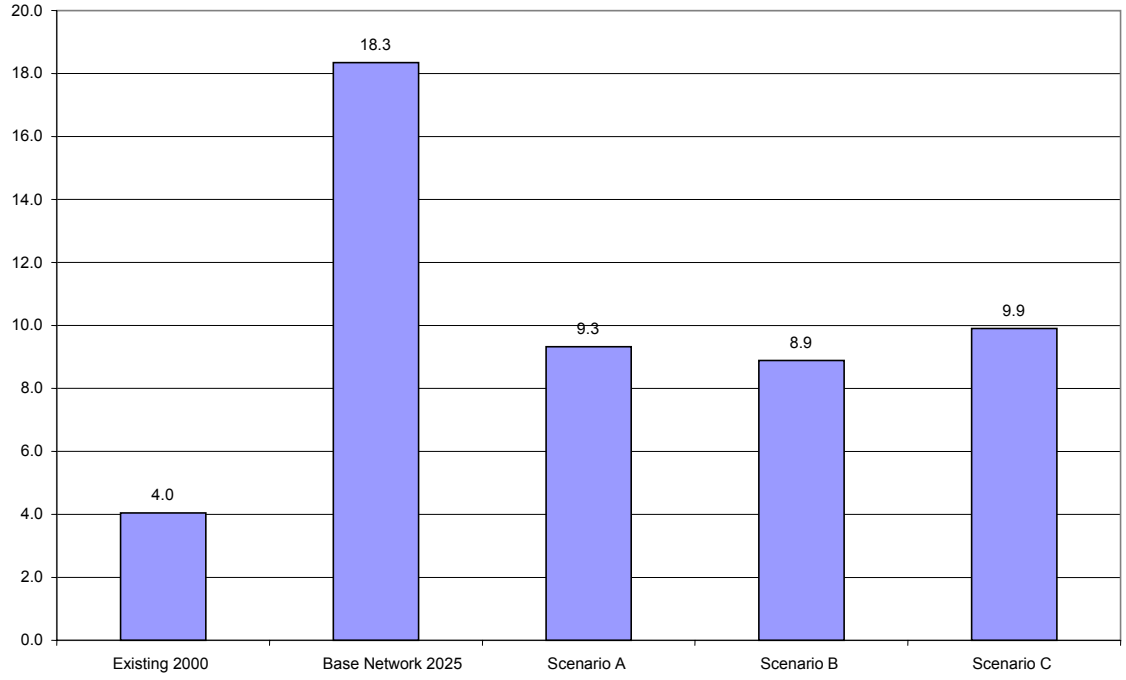


Travel Delays and Congestion

Poor levels of service and congestion in the transportation system result in costly delays and unreliable travel times. These conditions affect the ability of businesses in the region to operate efficiently and can cost the individual travel precious minutes on the way to work or in accomplishing personal errands.

Without improvements beyond the base network scenario, congestion and delay would increase significantly. Per capita PM peak-period delay would increase by almost 350% compared to year 2000 levels as indicated in Exhibit 6. With the investments of Scenarios A, B and C, the future increase in per capita delay would be considerably less, increasing by 130%, 120% and 145% for Scenarios A, B and C respectively.

Exhibit 6
Average PM Peak Period Delay Per Capita (Minutes)



The total PM peak-period delay for the base network and Scenarios A, B and C is as follows:

Base Network	- 1,754,851 hours
Scenario A	- 891,739 hours
Scenario B	- 850,259 hours
Scenario C	- 947,509 hours

Scenario B produces the lowest amount of total peak-period delay. It produces 5% less PM peak delay than Scenario A and 10% less than Scenario C. Scenario A has significantly greater total delay on freeways, and Scenario C has significantly greater delay on arterials. However, in terms of delay per lane mile, Scenario A has the lowest levels of delay for arterials and Scenario C has the lowest level for freeways. In the case of Scenario A, the extensive freeway mileage additions provide relief for the arterial system, while in the case of Scenario C, both general-purpose and HOV lane additions to existing facilities provide congestion relief on those facilities.

The amount of delay appears to be a function of how auto trips are routed in each scenario and not just a function of the average speeds. Scenario A has the highest average weighted freeway speed and Scenario C has an arterial speed only one mile per hour less than Scenarios A and B. The average weighted speeds by facility are all reasonably similar across the three investment scenarios except for HOV lanes which has speeds in Scenarios B and C that are significantly better than in Scenario A. Among the scenarios, Scenario A has the least additional HOV mileage.

In terms of level of service, Scenario A has significantly more lane miles of freeway at level of service F at 1183 lane miles. This is 19% greater than Scenario B and 17% greater than Scenario C. Scenario C has the worst level of service on arterials with almost 21% operating at level of service F. Scenario C has the least investment in arterial improvements.

Goal # 3: Sustaining The Environment

Transportation improvements that help sustain our environment and quality of life

Transit Mobility

The availability of modal options for travel in the region is a major concern to many sectors of the population. This includes a variety of transit dependent groups, as well as individuals who want to take advantage of the lower cost of commuting by transit. In addition, transit service options make a greater variety of land use concepts available for development in the region.

Scenario C provides the best access to transit of the three investment options. Expansion of the bus and rail networks beyond what is included in Scenarios A and B increases the number of jobs within one-quarter mile of transit service by roughly 13% and the number of household with one-quarter of a mile of transit by 26%. In addition, Scenario C increases the number of households with five miles of a park & ride lot or transit center by 34%.

As indicated in Exhibit 7, transit ridership is higher in Scenario C than in either Scenario A or B, which are almost the same. Scenario C ridership is 24% higher than Scenarios A and B and 172% higher than the base network. The number of route miles by scenario is as follows:

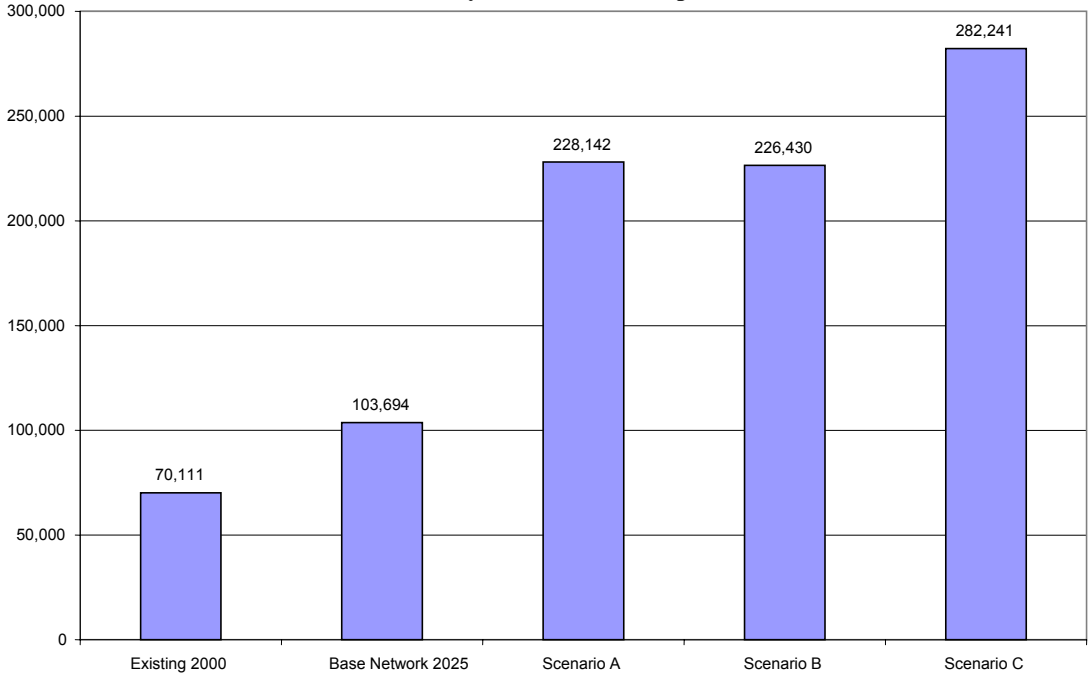
Base Network - 121,758 route miles

Scenario A - 261,990 route miles

Scenario B - 259,744 route miles

Scenario C - 387,039 route miles

Exhibit 7
Daily Transit Ridership



In Scenario C Transit carries 1.26% of all regional trips. Of this 70% is on local bus service 30% is on express bus/BRT/LRT. Scenarios A and B each carry roughly 1% of the regions trips on transit.

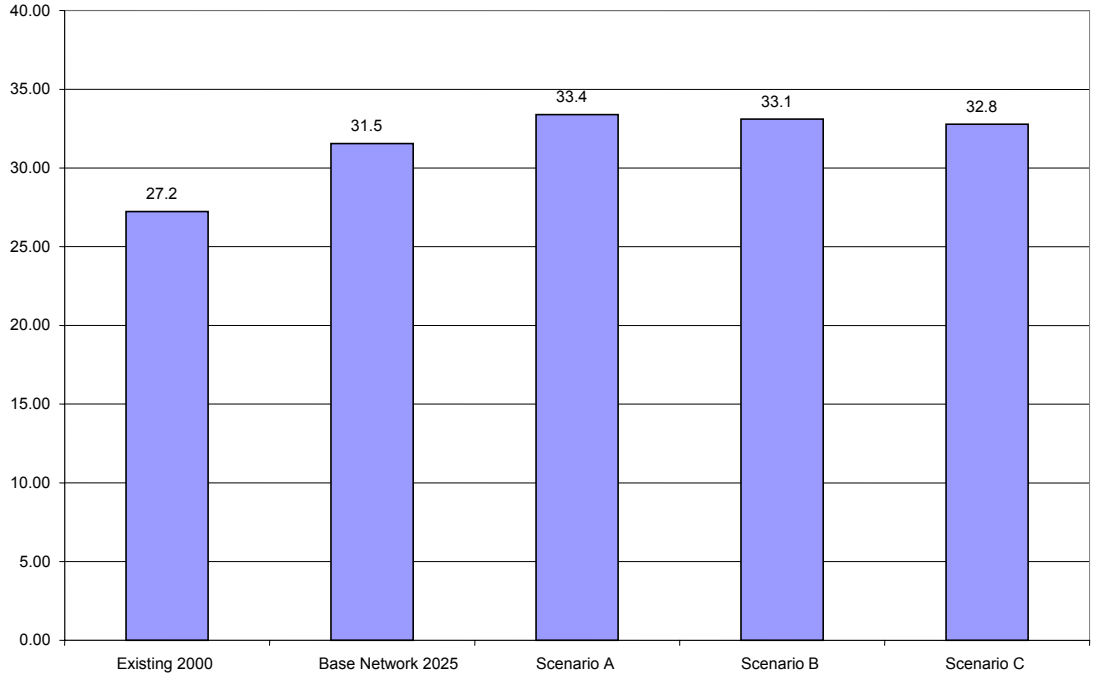
As may be observed in the Exhibit 7, the most significant increase in ridership is obtained through the route-mile additions in Scenarios A and B. The added route mileage in Scenario C, over and above A and B, results in considerably less of an increase in ridership.

Amount of Travel Performed

The amount of travel performed in the region is significant as a reflection of energy and other resources consumed. It also potentially reflects the level of impacts travel may be having on neighborhoods and the environment.

As indicated in Exhibit 8, Scenario A, which has the highest number of new freeway miles, produces the highest level of VMT per capita at 33.4 miles per person. Scenarios B and C produce nearly the same levels of VMT per capita at 33.1 and 32.8 respectively. Having the greatest investment in transit services, Scenario C has the lowest rate among the three scenarios. Scenario B has lower freeway VMT per capita than either A or C, and has lower arterial VMT per capita than B. Although the base network has the lowest total VMT, this is more than offset by tremendous congestion due to the lack of capacity improvements to the system.

Exhibit 8
Daily VMT Per Capita



Total daily VMT for the base network and the three scenarios is as follows:

Base Network: 210.0 million vehicle miles

Scenario A: 223.3 million vehicle miles

Scenario B: 219. 2 million vehicle miles

Scenario C: 218.6 million vehicle miles

Air Quality

While VMT influences the amount of pollutants emitted by transportation activities, it is not the only determinant of emission levels. The speed at which vehicles travel is also an important determinant. Despite having a lower daily VMT than any of the three investment scenarios, the base network would produce a higher emission level than Scenarios B and C because of the speeds at which travel would occur. Congested travel results in higher emissions on a per-mile basis. Scenario B would produce the lowest emission, 7.3% less than the base network, and Scenario C would produce 5.8% less than the base network. The estimate for Scenario A is virtually the same as the base network.

CONCLUSIONS

Based upon the evaluation of the three modeling scenarios presented in the previous section and policy discussions at the May 21 TPC meeting, a draft Hybrid Scenario will be defined. The draft Hybrid Scenario is the next step in the development of the Regional Transportation Plan.

General conclusions drawn from the modeling scenarios evaluation were:

The $17 billion that will be invested in transportation improvements with the extension of the half-cent sales tax and other available funding will potentially reduce regional delay to half or less of what it would be without the investment.

A number of freeways in Scenario A address future congestion and mobility in developing areas of the region, while others in this scenario provide future growth areas with links to the regional transportation network.

To deal directly with existing congestion, bottleneck and other capacity improvements on the existing freeway system will be important.

The addition of High Occupancy Vehicle (HOV) lanes and freeway-to-freeway HOV ramp connections have a positive impact on congestion by both providing additional capacity for all vehicles and by improving express transit operations, thus improving its competitive position with the private automobile.

Compared to the base network, the transit system provided in Scenarios A and B resulted in a percent increase in ridership about equal to the percent increase in service, while the percent increase in ridership between Scenarios B and C was about half the percent increase in service.

Scenario B, the most balanced combination of freeway, major arterial, and transit improvements resulted in 5 percent less delay than the freeway emphasis scenario and 10 percent less delay than the transit emphasis scenario.

There is the potential for strong transit demand in a number of corridors in the valley.

APPENDIX A

MAPS OF SCENARIOS A, B, AND C

A-1 Roadway System Improvements Modeling Scenario A

A-2 Roadway System Improvements Modeling Scenario B

A-3 Roadway System Improvements Modeling Scenario C

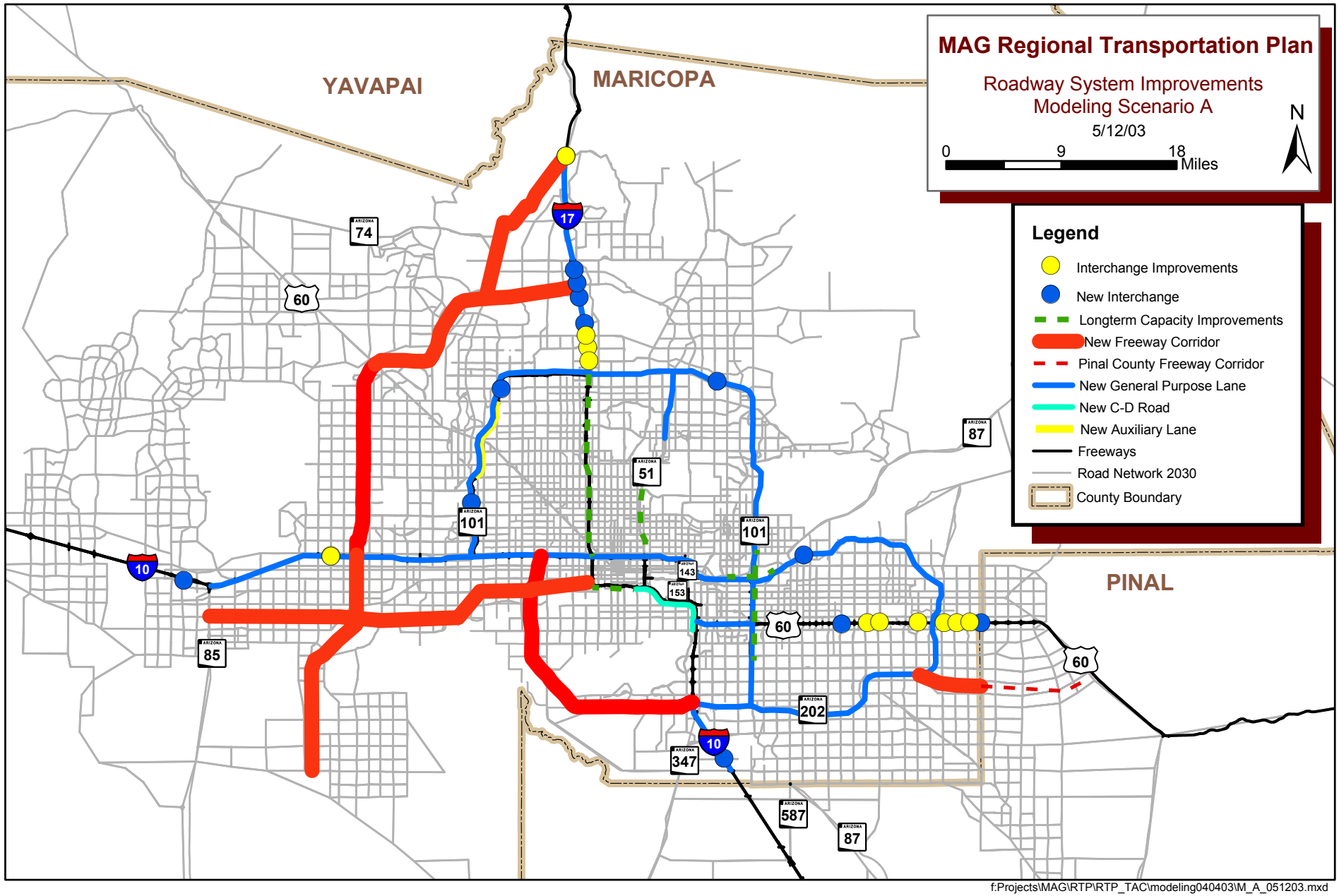
A-4 Regional Bus Grid Modeling Scenarios A & B

A-5 Regional Bus Grid Modeling Scenario C

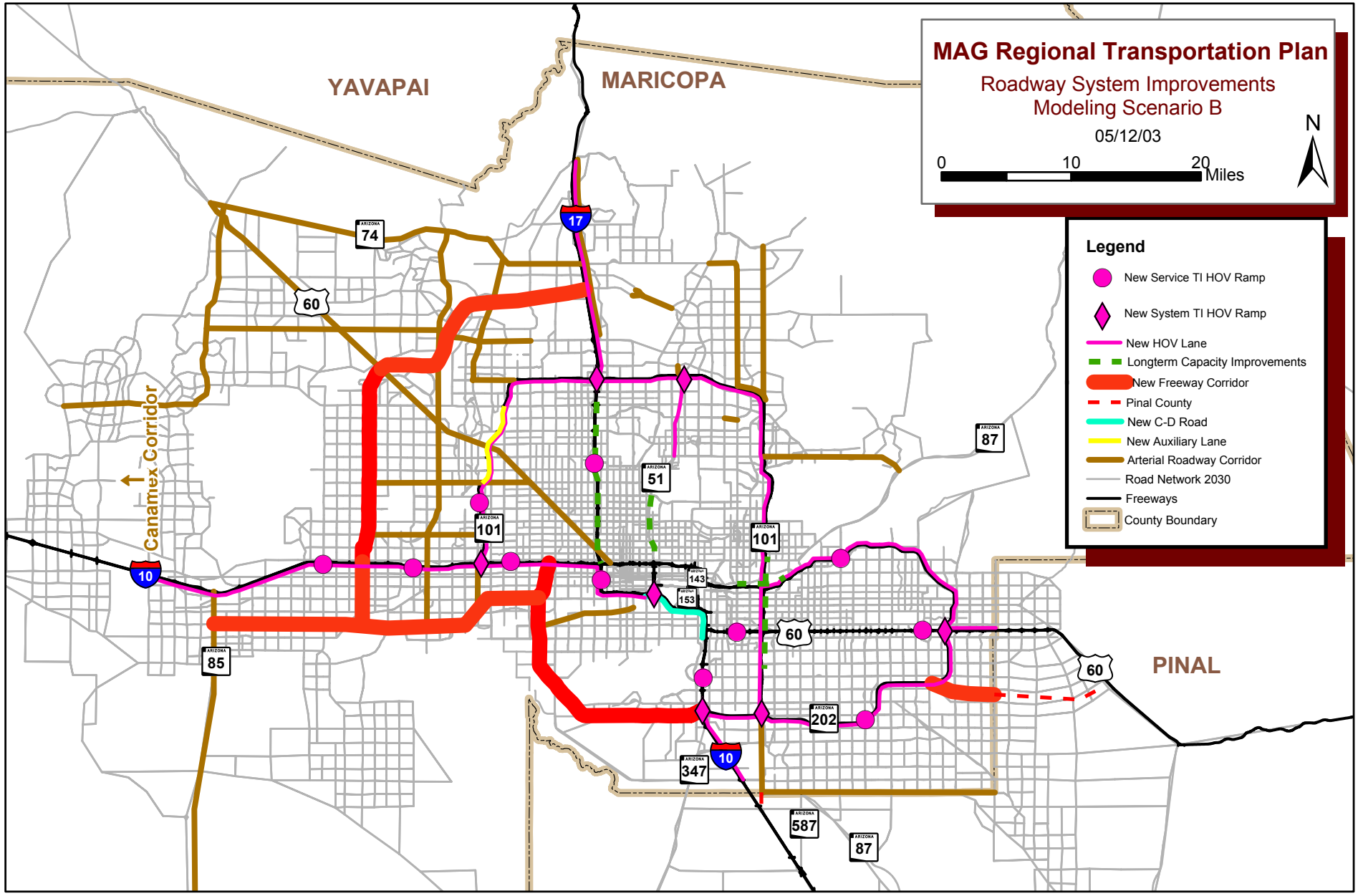
A-6 Express Bus and High Capacity Transit Corridors Modeling Scenarios A, B, C

A-7 Roadway System Improvements Modeling Scenario B (County Wide)

A-1. Roadway System Improvements Modeling Scenario A

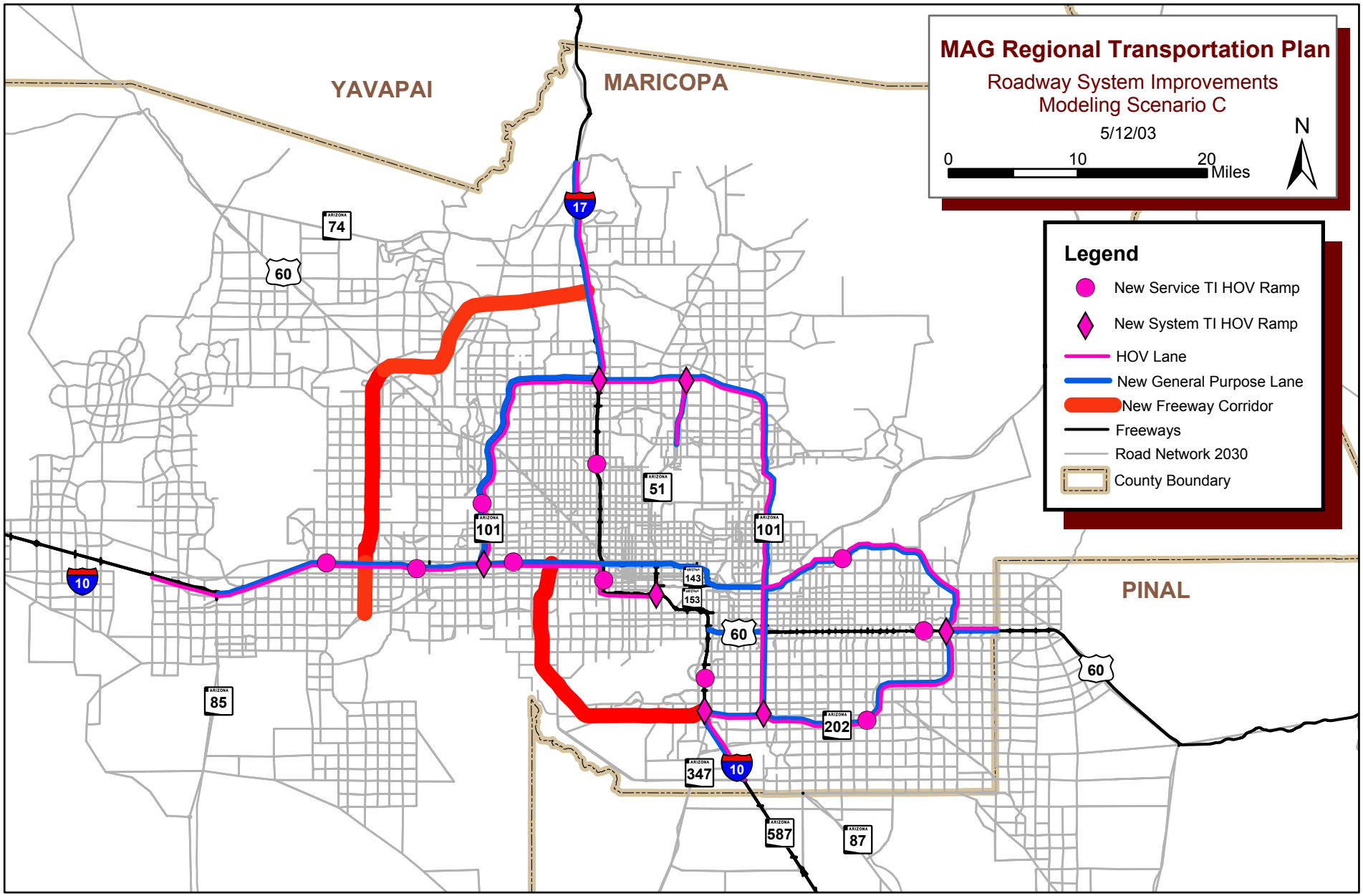


A-2. Roadway System Improvements Modeling Scenario B

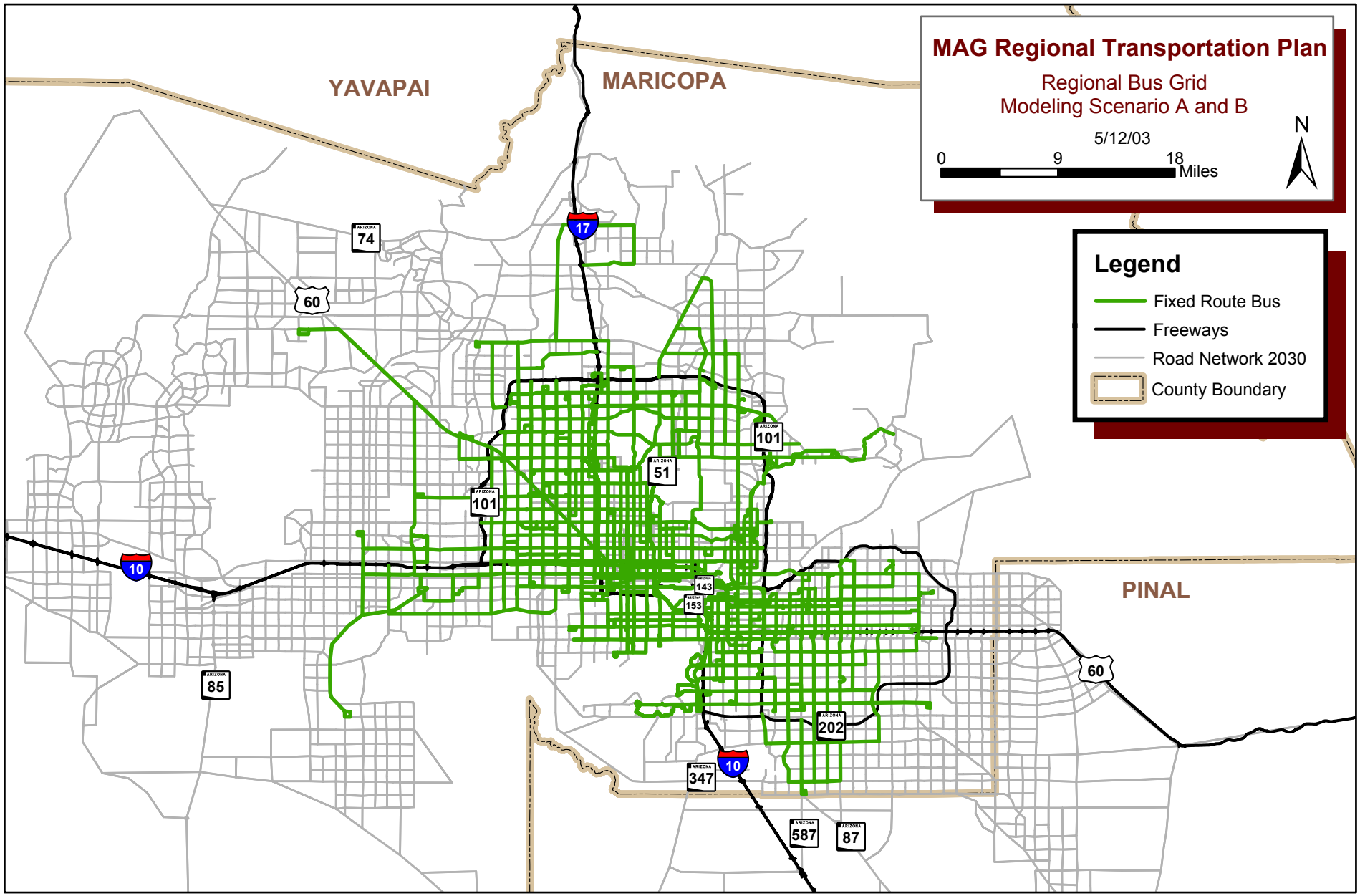


f:Projects\MAG\RTP\RTP_TAC\Modeling\M_B_051203.mxd

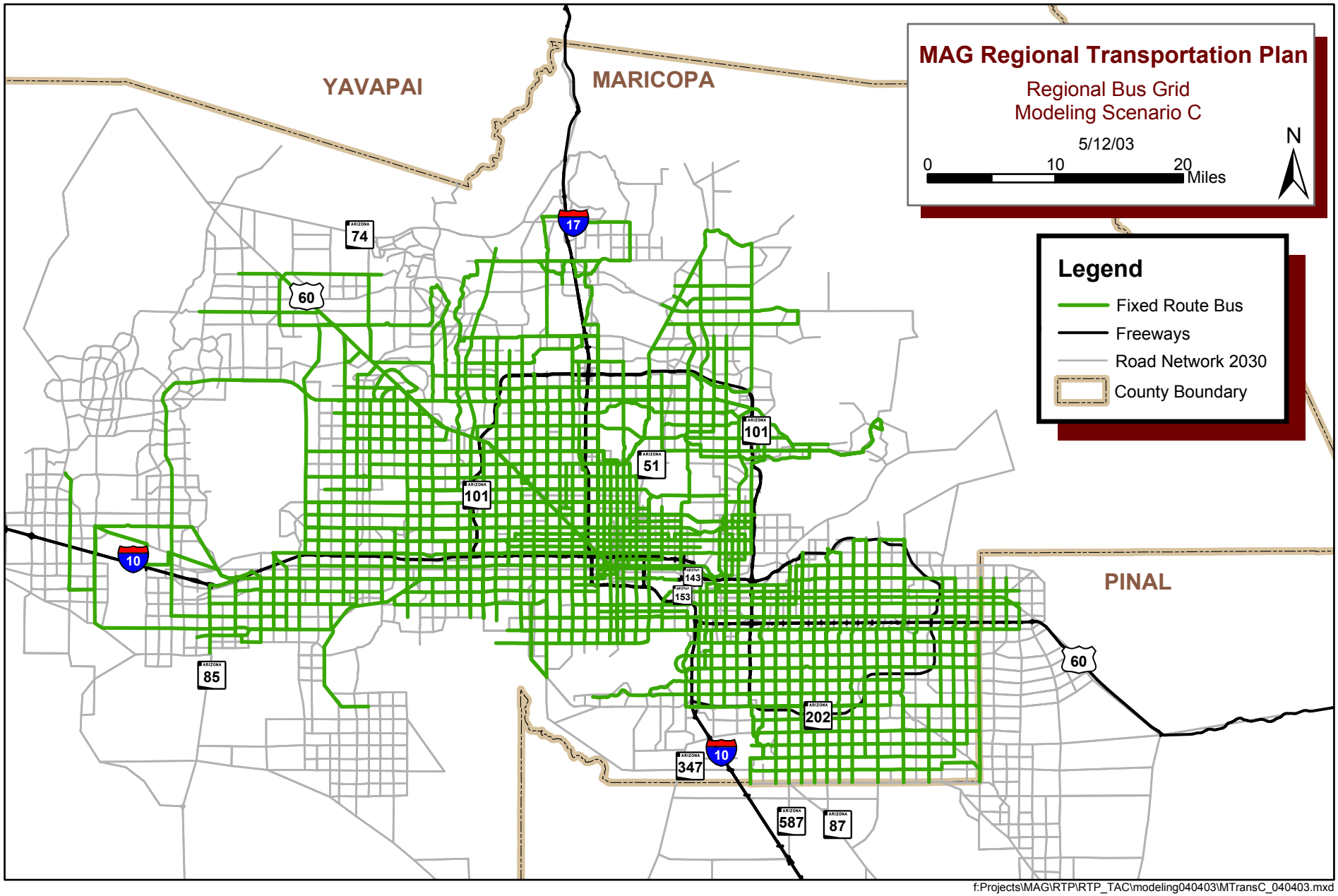
A-3. Roadway System Improvements Modeling Scenario C



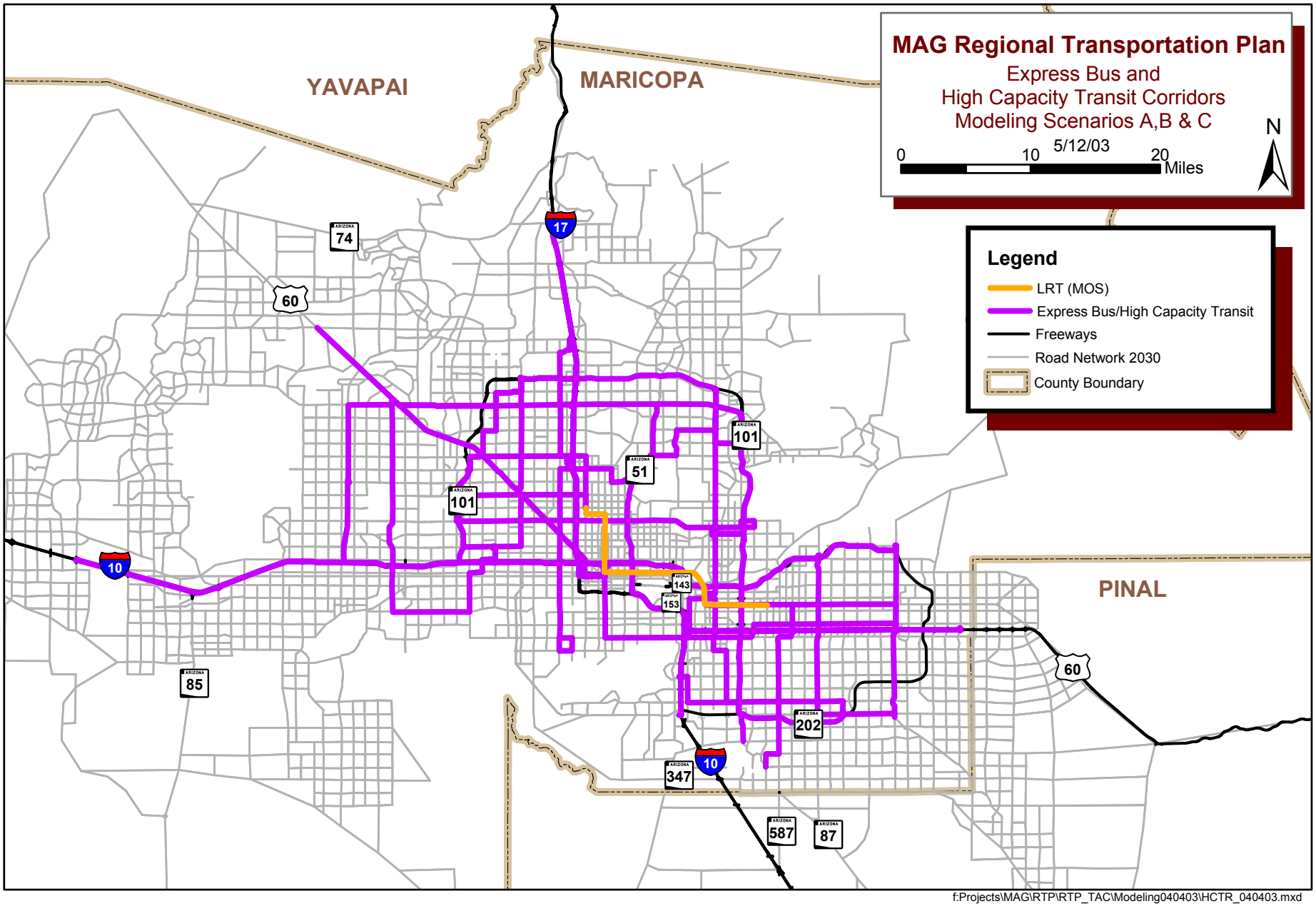
A-4. Regional Bus Grid Modeling Scenarios A & B



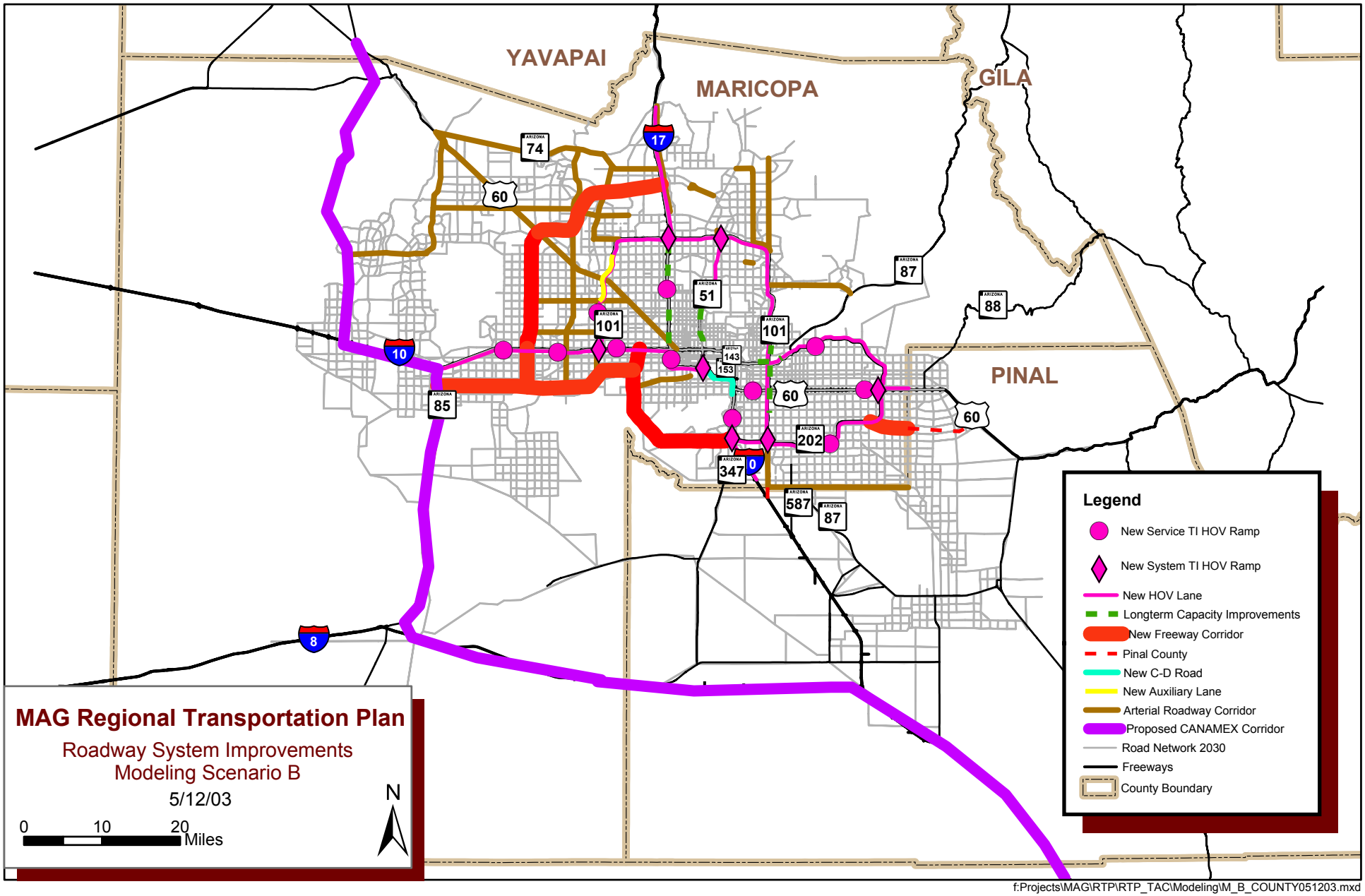
A-5. Regional Bus Grid Modeling Scenario C



A-6. Express Bus and High Capacity Transit Corridors Modeling Scenarios A,B,C



A-7. Roadway System Improvements Modeling Scenario B (County Wide)



APPENDIX B

COST SUMMARIES FOR SCENARIOS A, B, AND C

B-1 Modeling Scenario Summary – Regional Funding by Project Type

B-2 Modeling Scenario A – Funding by Project Type

B-3 Modeling Scenario B – Funding by Project Type

B-4 Modeling Scenario C – Funding by Project Type

Modeling Scenario Summary-
Regional Funding by Project Type
(millions of 2002 dollars)

Ref. #	Project Type	Scenario A Regional Funding (millions)	Scenario B Regional Funding (millions)	Scenario C Regional Funding (millions)
FREEWAYS		**$11,049**	**$8,906**	**$6,450**
A-1	**New Freeway Corridors**	**$5,420**	**$4,130**	**$3,000**
	Widening	**$1,532**	**$898**	**$2,430**
A-2	New General Purpose Lanes	$1,532	$0	$1,532
A-3	New HOV Lanes	$0	$898	$898
	Interchanges	**$177**	**$576**	**$576**
A-4	New Service Interchanges	$88	$0	$0
A-5	Service Interchange Improvements	$89	$0	$0
A-6	New Service Interchange HOV Ramps	$0	$265	$265
A-7	New System Interchange HOV Ramps	$0	$311	$311
A-8	**Bottleneck Improvements**	**$2,990**	**$2,622**	**$0**
A-9	**Maintenance**	**$480**	**$480**	**$444**
A-10	**Mitigation**	**$200**	**$200**	**$0**
A-11	**FMS/ITS**	**$250**	**$0**	**$0**
MAJOR ARTERIAL STREETS		**$1,600**	**$3,701**	**$1,600**
B	**Arterial Roadway Corridors**	**$0**	**$2,101**	**$0**
C	**Regional Arterial Grid**	**$1,600**	**$1,600**	**$1,600**
TRANSIT		**$3,984**	**$4,027**	**$8,384**
Regional Bus Grid		***$2,179***	***$2,179***	***$3,626***
	Fixed Route	**$1,389**	**$1,389**	**$2,518**
D-1	Capital	$629	$629	$1,040
D-2	Operating	$760	$760	$1,478
	Circulator/Shuttle	**$241**	**$241**	**$238**
D-3	Capital	$104	$104	$102
D-4	Operating	$137	$137	$136
	Rural Transit	**$75**	**$75**	**$151**
D-5	Capital	$47	$47	$48
D-6	Operating	$28	$28	$103
	ADA Paratransit	**$99**	**$99**	**$109**
D-7	Capital	$40	$40	$48
D-8	Operating	$59	$59	$61
	Elderly Paratransit	**$121**	**$121**	**$125**
D-9	Capital	$43	$43	$54
D-10	Operating	$78	$78	$71
D-11	**ITS/VMS**	**$72**	**$72**	**$140**
D-12	**O&M Facilities/Transit Centers/Park-and-Ride**	**$182**	**$182**	**$345**
Express/BRT Bus		***$929***	***$972***	***$822***
	Express/BRT Freeway	**$410**	**$437**	**$194**
E-1	Capital	$86	$92	$104
E-2	Operating	$324	$345	$90
	Skip-Stop Service	**$467**	**$483**	**$418**
E-3	Capital	$86	$102	$178
E-4	Operating	$381	$381	$240
E-5	**ITS/VMS**	**$10**	**$10**	**$80**
E-6	**O&M Facilities/Transit Centers/Park-and-Ride**	**$42**	**$42**	**$130**
Enhanced BRT/LRT		***$0***	***$0***	***$2,911***
	Enhanced BRT/LRT	**$0**	**$0**	**$2,511**
F-1	Capital	$0	$0	$1,391
F-2	Operating	$0	$0	$1,120
F-3	**ITS/VMS**	**$0**	**$0**	**$59**
F-4	**O&M Facilities/Transit Centers/Park-and-Ride**	**$0**	**$0**	**$341**
Light Rail		***$876***	***$876***	***$876***
	Minimum Operating System (MOS)	**$589**	**$589**	**$589**
G-1	Capital	$589	$589	$589
G-2	Operating	$0	$0	$0
	MOS Extensions	**$225**	**$225**	**$225**
G-3	Capital	$225	$225	$225
G-4	Operating	$0	$0	$0
G-5	**ITS/VMS**	**$27**	**$27**	**$27**
G-6	**O&M Facilities/Transit Centers/Park-and-Ride**	**$35**	**$35**	**$35**
Commuter Rail		***$0***	***$0***	***$149***
	New Corridors	**$0**	**$0**	**$122**
H-1	Capital	$0	$0	$94
H-2	Operating	$0	$0	$28
H-3	**ITS**	**$0**	**$0**	**$3**
H-4	**O&M Facilities/Transit Centers/Park-and-Ride**	**$0**	**$0**	**$24**
OTHER REGIONAL PROGRAMS		**$602**	**$602**	**$602**
I-1	**Bike/Pedestrian**	**$120**	**$120**	**$120**
I-2	**Vanpool**	**$144**	**$144**	**$144**
I-3	**Rideshare/Transportation Demand Management**	**$98**	**$98**	**$98**
I-4	**Air Quality/Mitigation**	**$160**	**$160**	**$160**
I-5	**Regional Arterial ITS**	**$80**	**$80**	**$80**
		$17,235	***$17,236***	***$17,036***

Modeling Scenario A-
Funding by Project Type
(millions of 2002 dollars)

Ref. #	Project Type	Regional Funding (millions) (1)	Local Contribution (4) (6)	Total Program
FREEWAYS		**$11,049**	**$88**	**$11,137**
A-1	**New Freeway Corridors**	**$5,420**	**$0**	**$5,420**
	Widening	**$1,532**	**$0**	**$1,532**
A-2	New General Purpose Lanes	$1,532	$0	$1,532
A-3	New HOV Lanes	$0	$0	$0
	Interchanges	**$177**	**$88**	**$265**
A-4	New Service Interchanges (3)	$88	$88	$176
A-5	Service Interchange Improvements	$89	$0	$89
A-6	New Service Interchange HOV Ramps	$0	$0	$0
A-7	New System Interchange HOV Ramps	$0	$0	$0
A-8	**Bottleneck Improvements**	**$2,990**	**$0**	**$2,990**
A-9	**Maintenance**	**$480**	**$0**	**$480**
A-10	**Mitigation**	**$200**	**$0**	**$200**
A-11	**FMS/ITS**	**$250**	**$0**	**$250**
MAJOR ARTERIAL STREETS		**$1,600**	**$400**	**$2,000**
B	**Arterial Roadway Corridors**	**$0**	**$0**	**$0**
C	**Regional Arterial Grid (2)**	**$1,600**	**$400**	**$2,000**
TRANSIT		**$3,984**	**$3,676**	**$7,660**
Regional Bus Grid		***$2,179***	***$2,221***	***$4,400***
	Fixed Route	**$1,389**	**$1,566**	**$2,955**
D-1	Capital (2)	$629	$157	$786
D-2	Operating	$760	$1,409	$2,169
	Circulator/Shuttle	**$241**	**$279**	**$520**
D-3	Capital (2)	$104	$26	$130
D-4	Operating	$137	$253	$390
	Rural Transit	**$75**	**$38**	**$113**
D-5	Capital (2)	$47	$11	$58
D-6	Operating	$28	$27	$55
	ADA Paratransit	**$99**	**$119**	**$218**
D-7	Capital(2)	$40	$10	$50
D-8	Operating	$59	$109	$168
	Elderly Paratransit	**$121**	**$156**	**$277**
D-9	Capital (2)	$43	$10	$53
D-10	Operating	$78	$146	$224
D-11	**ITS/VMS (2)**	**$72**	**$18**	**$90**
D-12	**O&M Facilities/Transit Centers/Park-and-Ride (2)**	**$182**	**$45**	**$227**
Express/BRT Bus		***$929***	***$55***	***$984***
	Express/BRT Freeway	**$410**	**$22**	**$432**
E-1	Capital (2)	$86	$22	$108
E-2	Operating	$324	$0	$324
	Skip-Stop Service	**$467**	**$21**	**$488**
E-3	Capital (2)	$86	$21	$107
E-4	Operating	$381	$0	$381
E-5	**ITS/VMS (2)**	**$10**	**$2**	**$12**
E-6	**O&M Facilities/Transit Centers/Park-and-Ride (2)**	**$42**	**$10**	**$52**
Enhanced BRT/LRT		***$0***	***$0***	***$0***
	Enhanced BRT/LRT	**$0**	**$0**	**$0**
F-1	Capital	$0	$0	$0
F-2	Operating	$0	$0	$0
F-3	**ITS/VMS**	**$0**	**$0**	**$0**
F-4	**O&M Facilities/Transit Centers/Park-and-Ride**	**$0**	**$0**	**$0**
Light Rail		***$876***	***$1,400***	***$2,276***
	Minimum Operating System (MOS)	**$589**	**$1,039**	**$1,628**
G-1	Capital (3)	$589	$589	$1,178
G-2	Operating	$0	$450	$450
	MOS Extensions (5)	**$225**	**$345**	**$570**
G-3	Capital (3)	$225	$225	$450
G-4	Operating	$0	$120	$120
G-5	**ITS/VMS (2)**	**$27**	**$7**	**$34**
G-6	**O&M Facilities/Transit Centers/Park-and-Ride (2)**	**$35**	**$9**	**$44**
OTHER REGIONAL PROGRAMS		**$602**	**$150**	**$752**
I-1	**Bike/Pedestrian (2)**	**$120**	**$30**	**$150**
I-2	**Vanpool (2)**	**$144**	**$36**	**$180**
I-3	**Rideshare/Transportation Demand Management (2)**	**$98**	**$24**	**$122**
I-4	**Air Quality/Mitigation (2)**	**$160**	**$40**	**$200**
I-5	**Regional Arterial ITS (2)**	**$80**	**$20**	**$100**
		$17,235	***$4,314***	***$21,549***

(1) All regional sources including 1/2 cent extension, ADOT 15%, ADOT Discretionary, FTA 5307, FTA 5309, STP, and CMAQ
(2) Assumes a 20 percent local contribution
(3) Assumes a 50 percent local contribution
(4) Local contribution includes fare recovery, LTAF, Local Sales Tax, General Fund Contributions, advertising, etc.
(5) Assumes 10 miles of line extensions.
(8) Assumes current local contribution adjusted for population growth for base service. The 1/2 cent extension assumes 50 percent local match for expanded regional bus grid operating costs with no funding for capital or operating expenses applied to LRT MOS or 10-mile extension. In addition, no local match requirement for new regional transit service operating cost (Express bus, BRT, LRT) was assumed.

Modeling Scenario B-
Funding by Project Type
(millions of 2002 dollars)

Ref. #	Project Type	Regional Funding (millions) (1)	Local Contribution (4)	Total Program
FREEWAYS		**$8,906**	**$0**	**$8,906**
A-1	**New Freeway Corridors**	**$4,130**	**$0**	**$4,130**
	Widening	**$898**	**$0**	**$898**
A-2	New General Purpose Lanes	$0	$0	$0
A-3	New HOV Lanes	$898	$0	$898
	Interchanges	**$576**		**$576**
A-4	New Service Interchanges	$0	$0	$0
A-5	Service Interchange Improvements	$0	$0	$0
A-6	New Service Interchange HOV Ramps	$265	$0	$265
A-7	New System Interchange HOV Ramps	$311	$0	$311
A-8	**Bottleneck Improvements**	**$2,622**	**$0**	**$2,622**
A-9	**Maintenance**	**$480**	**$0**	**$480**
A-10	**Mitigation**	**$200**	**$0**	**$200**
A-11	**FMS/ITS**	**$0**	**$0**	**$0**
MAJOR ARTERIAL STREETS		**$3,701**	**$926**	**$4,627**
B	**Arterial Roadway Corridors**	**$2,101**	**$526**	**$2,627**
C	**Regional Arterial Grid (2)**	**$1,600**	**$400**	**$2,000**
TRANSIT		**$4,027**	**$3,681**	**$7,708**
Regional Bus Grid		***$2,179***	***$2,221***	***$4,400***
	Fixed Route	**$1,389**	**$1,566**	**$2,955**
D-1	Capital (2)	$629	$157	$786
D-2	Operating	$760	$1,409	$2,169
	Circulator/Shuttle	**$241**	**$279**	**$520**
D-3	Capital (2)	$104	$26	$130
D-4	Operating	$137	$253	$390
	Rural Transit	**$75**	**$38**	**$113**
D-5	Capital (2)	$47	$11	$58
D-6	Operating	$28	$27	$55
	ADA Paratransit	**$99**	**$119**	**$218**
D-7	Capital (2)	$40	$10	$50
D-8	Operating	$59	$109	$168
	Elderly Paratransit	**$121**	**$156**	**$277**
D-9	Capital (2)	$43	$10	$53
D-10	Operating	$78	$146	$224
D-11	**ITS/VMS (2)**	**$72**	**$18**	**$90**
D-12	**O&M Facilities/Transit Centers/Park-and-Ride (2)**	**$182**	**$45**	**$227**
Express/BRT Bus		***$972***	***$60***	***$1,032***
	Express/BRT Freeway	**$437**	**$23**	**$460**
E-1	Capital (2)	$92	$23	$115
E-2	Operating	$345	$0	$345
	Skip-Stop Service	**$483**	**$25**	**$508**
E-3	Capital (2)	$102	$25	$127
E-4	Operating	$381	$0	$381
E-5	**ITS/VMS (2)**	**$10**	**$2**	**$12**
E-6	**O&M Facilities/Transit Centers/Park-and-Ride (2)**	**$42**	**$10**	**$52**
Enhanced BRT/LRT		***$0***	***$0***	***$0***
	Enhanced BRT/LRT	**$0**	**$0**	**$0**
F-1	Capital	$0	$0	$0
F-2	Operating	$0	$0	$0
F-3	**ITS/VMS**	**$0**	**$0**	**$0**
F-4	**O&M Facilities/Transit Centers/Park-and-Ride**	**$0**	**$0**	**$0**
Light Rail		***$876***	***$1,400***	***$2,276***
	Minimum Operating System (MOS)	**$589**	**$1,039**	**$1,628**
G-1	Capital (3)	$589	$589	$1,178
G-2	Operating	$0	$450	$450
	MOS Extensions (5)	**$225**	**$345**	**$570**
G-3	Capital (3)	$225	$225	$450
G-4	Operating	$0	$120	$120
G-5	**ITS/VMS (2)**	**$27**	**$7**	**$34**
G-6	**O&M Facilities/Transit Centers/Park-and-Ride (2)**	**$35**	**$9**	**$44**
OTHER REGIONAL PROGRAMS		**$602**	**$150**	**$752**
I-1	**Bike/Pedestrian (2)**	**$120**	**$30**	**$150**
I-2	**Vanpool (2)**	**$144**	**$36**	**$180**
I-3	**Rideshare/Transportation Demand Management (2)**	**$98**	**$24**	**$122**
I-4	**Air Quality/Mitigation (2)**	**$160**	**$40**	**$200**
I-5	**Regional Arterial ITS (2)**	**$80**	**$20**	**$100**
		$17,236	***$4,757***	***$21,993***

(1) All regional sources including 1/2 cent extension, ADOT 15%, ADOT Discretionary, FTA 5307, FTA 5309, STP, and CMAQ
(2) Assumes a 20 percent local contribution
(3) Assumes a 50 percent local contribution
(4) Local contribution includes fare recovery, LTAF, Local Sales Tax, General Fund Contributions, advertising, etc.
(5) Assumes 10 miles of line extensions.
(8) Assumes current local contribution adjusted for population growth for base service. The 1/2 cent extension assumes 50 percent local match for expanded regional bus grid operating costs with no funding for capital or operating expenses applied to LRT MOS or 10-mile extension. In addition, no local match requirement for new regional transit service operating cost (Express bus, BRT, LRT) was assumed.

Modeling Scenario C-
Funding by Project Type
(millions of 2002 dollars)

Ref. #	Project Type	Regional Funding (millions) (1)	Local Contribution (4) (8) (9)	Total Program
FREEWAYS		**$6,450**	**$0**	**$6,450**
A-1	**New Freeway Corridors**	**$3,000**	**$0**	**$3,000**
	Widening	**$2,430**	**$0**	**$2,430**
A-2	New General Purpose Lanes	$1,532	$0	$1,532
A-3	New HOV Lanes	$898	$0	$898
	Interchanges	**$576**	**$0**	**$576**
A-4	New Service Interchanges	$0	$0	$0
A-5	Service Interchange Improvements	$0	$0	$0
A-6	New Service Interchange HOV Ramps	$265	$0	$265
A-7	New System Interchange HOV Ramps	$311	$0	$311
A-8	**Bottleneck Improvements**	**$0**	**$0**	**$0**
A-9	**Maintenance**	**$444**	**$0**	**$444**
A-10	**Mitigation**	**$0**	**$0**	**$0**
A-11	**FMS/ITS**	**$0**	**$0**	**$0**
MAJOR ARTERIAL STREETS		**$1,600**	**$400**	**$2,000**
B	**Arterial Roadway Corridors**	**$0**	**$0**	**$0**
C	**Regional Arterial Grid (2)**	**$1,600**	**400**	**$2,000**
TRANSIT		**$8,384**	**$5,272**	**$13,656**
Regional Bus Grid		***$3,626***	***$3,279***	***$6,905***
	Fixed Route	**$2,518**	**$2,466**	**$4,984**
D-1	Capital (2)	$1,040	$260	$1,300
D-2	Operating	$1,478	$2,206	$3,684
	Circulator/Shuttle	**$238**	**$306**	**$544**
D-3	Capital (2)	$102	$36	$138
D-4	Operating	$136	$270	$406
	Rural Transit	**$151**	**$115**	**$266**
D-5	Capital (2)	$48	$12	$60
D-6	Operating	$103	$103	$206
	ADA Paratransit	**$109**	**$125**	**$234**
D-7	Capital (2)	$48	$12	$60
D-8	Operating	$61	$113	$174
	Elderly Paratransit	**$125**	**$146**	**$271**
D-9	Capital (2)	$54	$13	$67
D-10	Operating	$71	$133	$204
D-11	**ITS/VMS (2)**	**$140**	**$35**	**$175**
D-12	**O&M Facilities/Transit Centers/Park-and-Ride (2)**	**$345**	**$86**	**$431**
Express/BRT Bus		***$822***	***$122***	***$944***
	Express/BRT Freeway	**$194**	**$26**	**$220**
E-1	Capital (2)	$104	$26	$130
E-2	Operating	$90	$0	$90
	Skip-Stop Service	**$418**	**$44**	**$462**
E-3	Capital (2)	$178	$44	$222
E-4	Operating	$240	$0	$240
E-5	**ITS/VMS (2)**	**$80**	**$20**	**$100**
E-6	**O&M Facilities/Transit Centers/Park-and-Ride (2)**	**$130**	**$32**	**$162**
Enhanced BRT/LRT		***$2,911***	***$447***	***$3,358***
	Enhanced BRT/LRT (5)	**$2,511**	**$348**	**$2,859**
F-1	Capital (2)	$1,391	$348	$1,739
F-2	Operating	$1,120	$0	$1,120
F-3	**ITS/VMS**	**$59**	**$14**	**$73**
F-4	**O&M Facilities/Transit Centers/Park-and-Ride**	**$341**	**$85**	**$426**
Light Rail		***$876***	***$1,400***	***$2,276***
	Minimum Operating System (MOS)	**$589**	**$1,039**	**$1,628**
G-1	Capital (3)	$589	$589	$1,178
G-2	Operating	$0	$450	$450
	MOS Extensions (6)	**$225**	**$345**	**$570**
G-3	Capital (3)	$225	$225	$450
G-4	Operating	$0	$120	$120
G-5	**ITS/VMS (2)**	**$27**	**$7**	**$34**
G-6	**O&M Facilities/Transit Centers/Park-and-Ride (2)**	**$35**	**$9**	**$44**
Commuter Rail		***$149***	***$24***	***$173***
	New Corridors (7)	**$122**	**$24**	**$146**
H-1	Capital (2)	$94	$24	$118
H-2	Operating	$28	$0	$28
H-3	**ITS**	**$3**	**$0**	**$3**
H-4	**O&M Facilities/Transit Centers/Park-and-Ride**	**$24**	**$0**	**$24**
OTHER REGIONAL PROGRAMS		**$602**	**$150**	**$752**
I-1	**Bike/Pedestrian (2)**	**$120**	**$30**	**$150**
I-2	**Vanpool (2)**	**$144**	**$36**	**$180**
I-3	**Rideshare/Transportation Demand Management (2)**	**$98**	**$24**	**$122**
I-4	**Air Quality/Mitigation (2)**	**$160**	**$40**	**$200**
I-5	**Regional Arterial ITS (2)**	**$80**	**$20**	**$100**
		$17,036	***$5,822***	***$22,858***

(1) All regional sources including 1/2 cent extension, ADOT 15%, ADOT Discretionary, FTA 5307, FTA 5309, STP, and CMAQ
(2) Assumes a 20 percent local contribution
(3) Assumes a 50 percent local contribution
(4) Local contribution includes fare recovery, LTAF, Local Sales Tax, General Fund Contributions, advertising, etc.
(5) Assumes 50 miles of BRT/LRT (23 miles of LRT and 27 miles of BRT, or 30 miles of LRT)
(6) Assumes 10 miles of line extensions off of MOS
(7) Assumes 32 miles of commuter rail
(8) Assumes current local contribution adjusted for population growth for base service. The 1/2 cent extension assumes 50 percent local match for expanded regional bus grid operating costs with no funding for capital or operating expenses applied to LRT MOS or 10-mile extension. In addition, no local match requirement for new regional transit service operating cost (Express bus, BRT, LRT) was assumed.
(9) Approximately one third of the total local contribution represents new local sources.

APPENDIX C

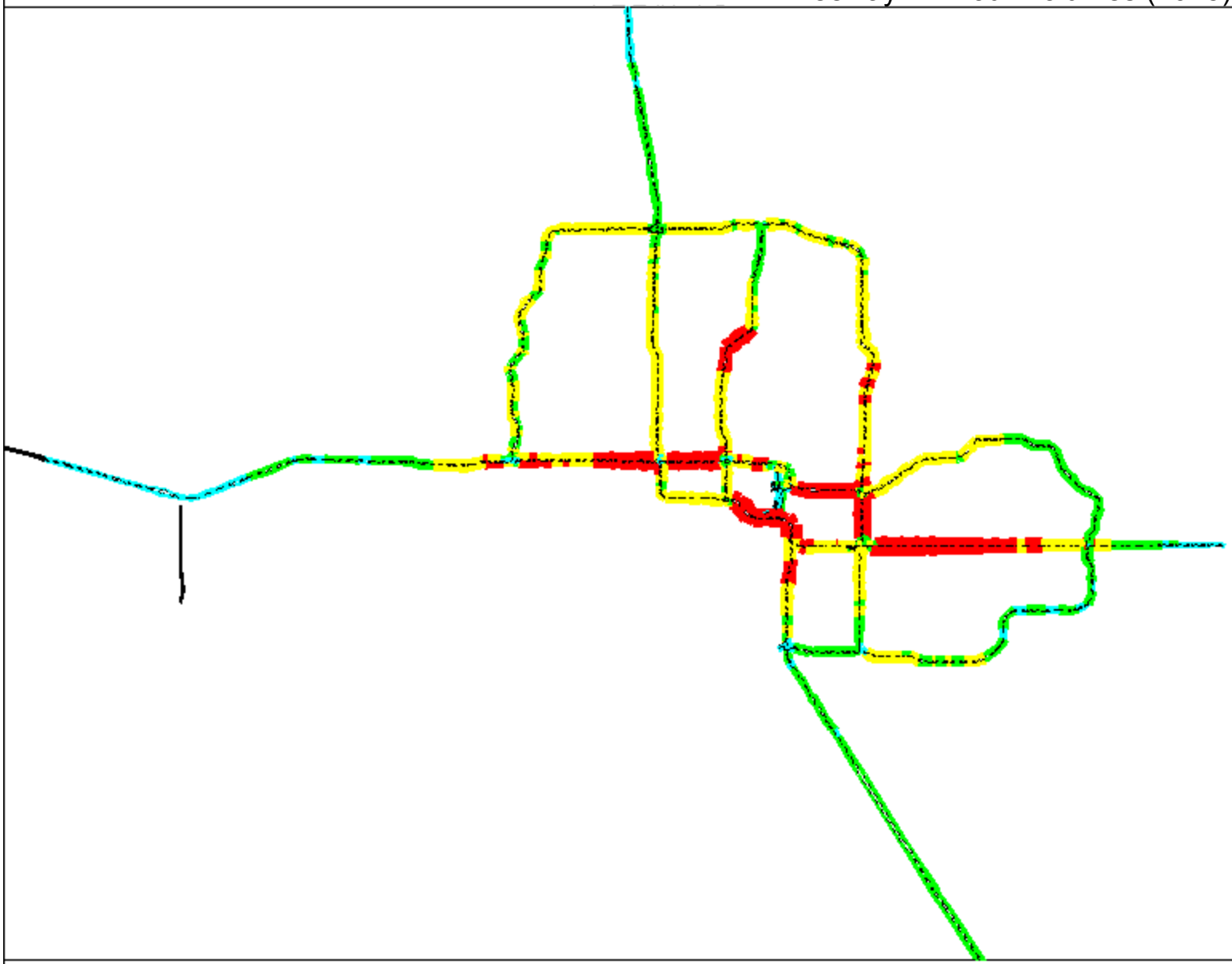
EVALUATION MAPS

C-1 Base Network Freeway 24-Hour Volumes (2025)
C-2 Scenario A Freeway 24-Hour Volumes (2025)
C-3 Scenario B Freeway 24-Hour Volumes (2025)
C-4 Scenario C Freeway 24-Hour Volumes (2025)
C-5 Base Network HOV 24-Hour Volumes (2025)
C-6 Scenario A HOV 24-Hour Volumes (2025)
C-7 Scenario B HOV 24-Hour Volumes (2025)
C-8 Scenario C HOV 24-Hour Volumes (2025)
C-9 Base Network Freeway PM Level of Service (2025)
C-10 Scenario A Freeway PM Level of Service (2025)
C-11 Scenario B Freeway PM Level of Service (2025)
C-12 Scenario C Freeway PM Level of Service (2025)
C-13 Base Network HOV PM Peak Level of Service (2025)
C-14 Scenario A HOV PM Peak Level of Service (2025)
C-15 Scenario B HOV PM Peak Level of Service (2025)
C-16 Scenario C HOV PM Peak Level of Service (2025)
C-17 Base Network PM Peak Intersection LOS (2025)
C-18 Scenario A. PM Peak Intersection LOS (2025)
C-19 Scenario B PM Peak Intersection LOS (2025)
C-20 Scenario C PM Peak Intersection LOS (2025)
C-21 Base Network Transit AM Peak Period Volumes (2025)
C-22 Scenario A Transit AM Peak Period Volumes (2025)
C-23 Scenario B Transit AM Peak Period Volumes (2025)
C-24 Scenario C Transit AM Peak Period Volumes (2025)

MARICOPA ASSOCIATION of GOVERNMENTS

Base Network
Freeway 24-Hour Volumes (2025)

emme/2



LINKS:
vdf=11,51,10
COL-IND:@fwyc
THRESHOLD:
LOWER: -*****
UPPER: 999999

24-Hour Volumes *

- 0 – 25k
- 25 – 50k
- 50 - 75k
- 75 – 100k
- 100k +

*volume each direction

WINDOW:
425062/ 733558
836883/1042423

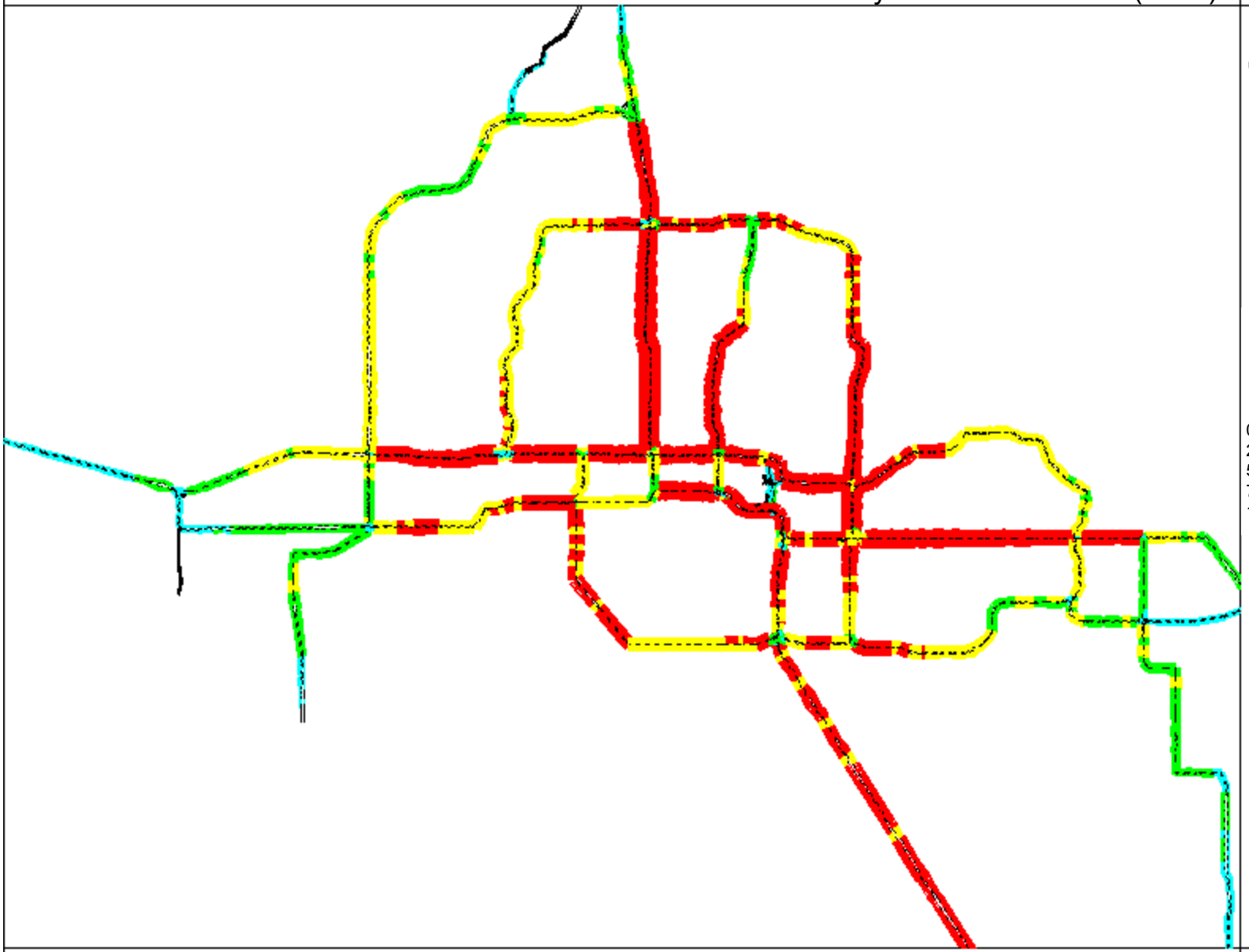
EMME/2 PROJECT: BASE
SCENARIO 7: 24-HR Hwy Assignment (validation)
ATTRIB. @fwyv: freeway volume (thousands)

03-05-12 15:18
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario A
Freeway 24-Hour Volumes (2025)

emme/2



LINKS:
vdf=11,51,10
COL-IND: @fwyc
THRESHOLD:
UPPER: 999999

24-Hour Volumes *

- 0 – 25k
- 25 – 50k
- 50 - 75k
- 75 – 100k
- 100k +

*volume each direction

WINDOW:
425062/ 733558
836883/1042423

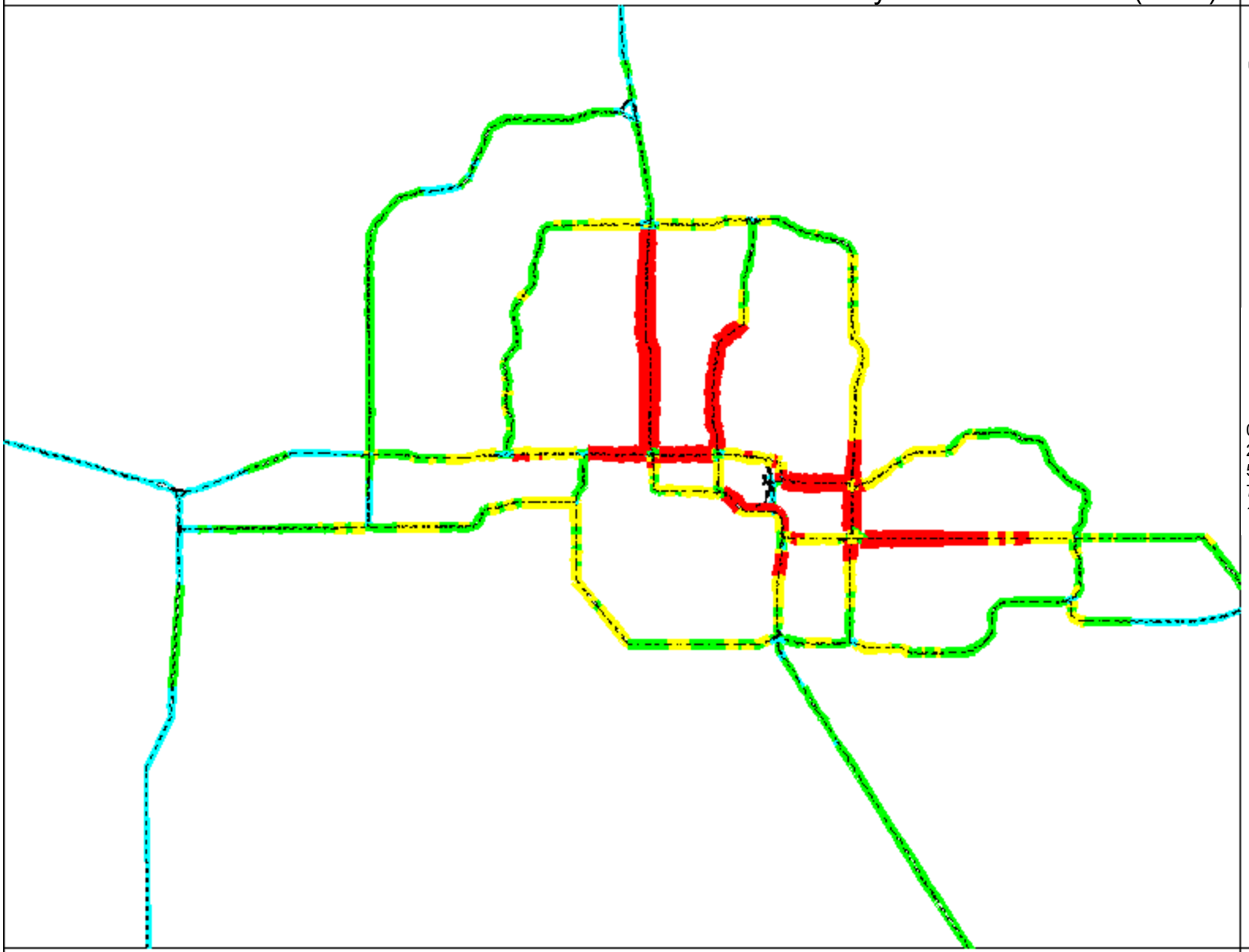
EMME/2 PROJECT: "RTS Option A with i03 transit 05.05.03"
SCENARIO 7: 24-HR Hwy Assignment (validation)
ATTRIB. @fwyv: freeway volume (thousands)

03-05-12 15:23
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario B
Freeway 24-Hour Volumes (2025)

emme/2



LINKS:
vdf=11,51,10
COL-IND: @fwyc
THRESHOLD:
UPPER: 999999

24-Hour Volumes *

- 0 – 25k
- 25 – 50k
- 50 - 75k
- 75 – 100k
- 100k +

*volume each direction

WINDOW:
425062/ 733558
836883/1042423

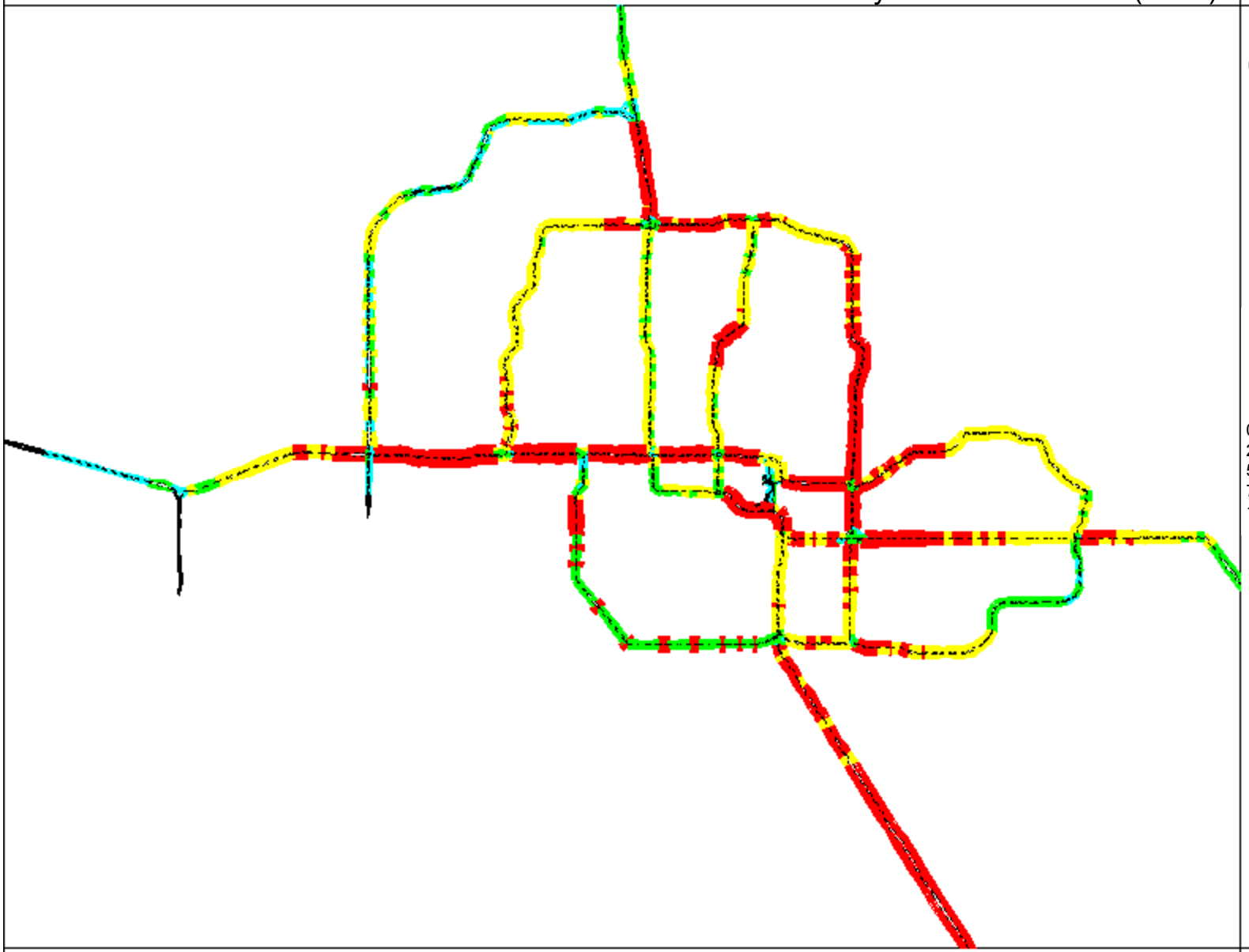
EMME/2 PROJECT: "RTS Option B with i03 05.02.03"
SCENARIO 7: 24-HR Hwy Assignment (validation)
ATTRIB. @fwyv: freeway volume (thousands)

03-05-12 16:45
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario C
Freeway 24-Hour Volumes (2025)

emme/2



LINKS:
vdf=11,51,10
COL-IND:@fwyc
THRESHOLD:
LOWER: -*****
UPPER: 999999

24-Hour Volumes *

- 0 – 25k
- 25 – 50k
- 50 - 75k
- 75 – 100k
- 100k +

*volume each direction

WINDOW:
425062/ 733558
836883/1042423

EMME/2 PROJECT: "RTS Option C with i03 05.09.03"
SCENARIO 7: 24-HR Hwy Assignment (validation)
ATTRIB. @fwyv: freeway volume (thousands)

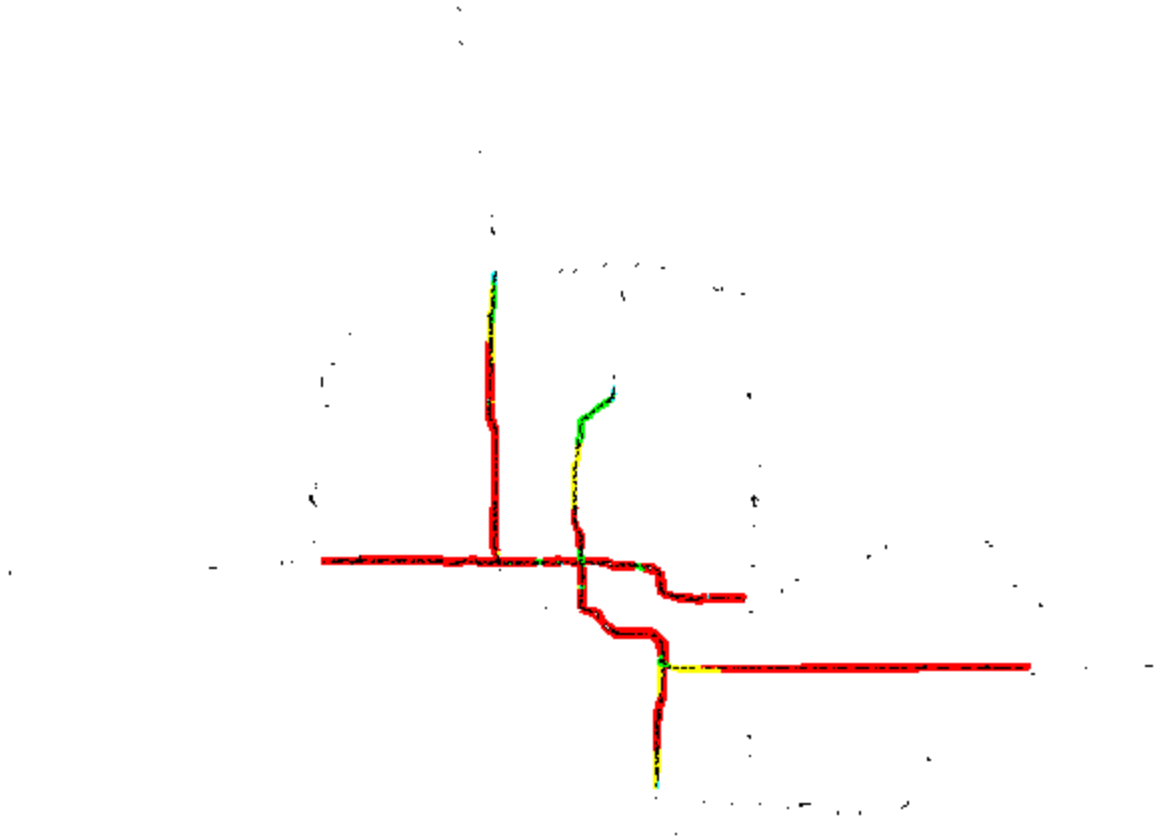
<w<

03-05-12 17:28
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Base Network
HOV 24-Hour Volumes (2025)

emme/2



LINKS:
vdf=10,50,10
COL-IND: @hovc
THRESHOLD:
LOWER: -*****
UPPER: 999999

24-Hour Volumes *

- 0 – 5k
- 5 – 10k
- 10 - 15k
- 15 – 20k
- 20k +

*volume each direction

WINDOW:
425062/ 733558
836883/1042423

EMME/2 PROJECT: BASE
SCENARIO 7: 24-HR Hwy Assignment (validation)
ATTRIB. @hovv: hov volumes (thousands)

<w<

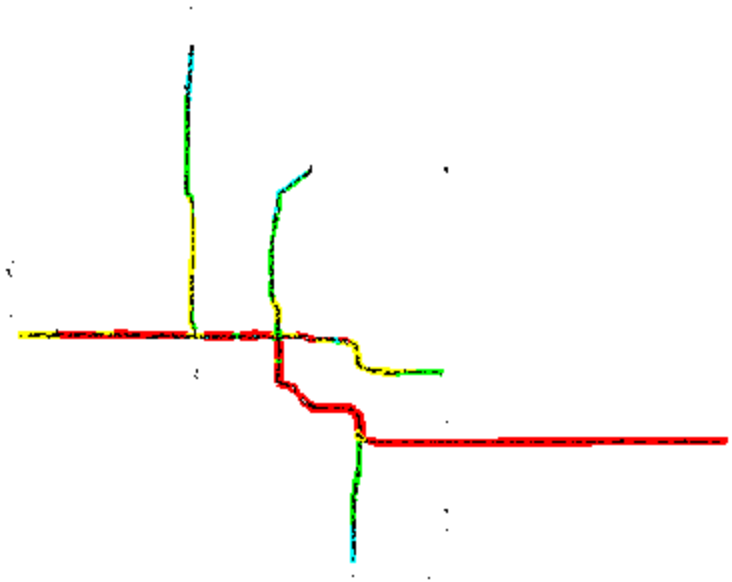
03-05-12 17:55
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario A
HOV 24-Hour Volumes (2025)

emme/2

LINKS:
vdf=10,50,10
COL-IND: @hovc
THRESHOLD:
LOWER: -*****
UPPER: 999999



24-Hour Volumes *

- 0 – 5k
- 5 – 10k
- 10 - 15k
- 15 – 20k
- 20k +

*volume each direction

WINDOW:
425062/ 733558
836883/1042423

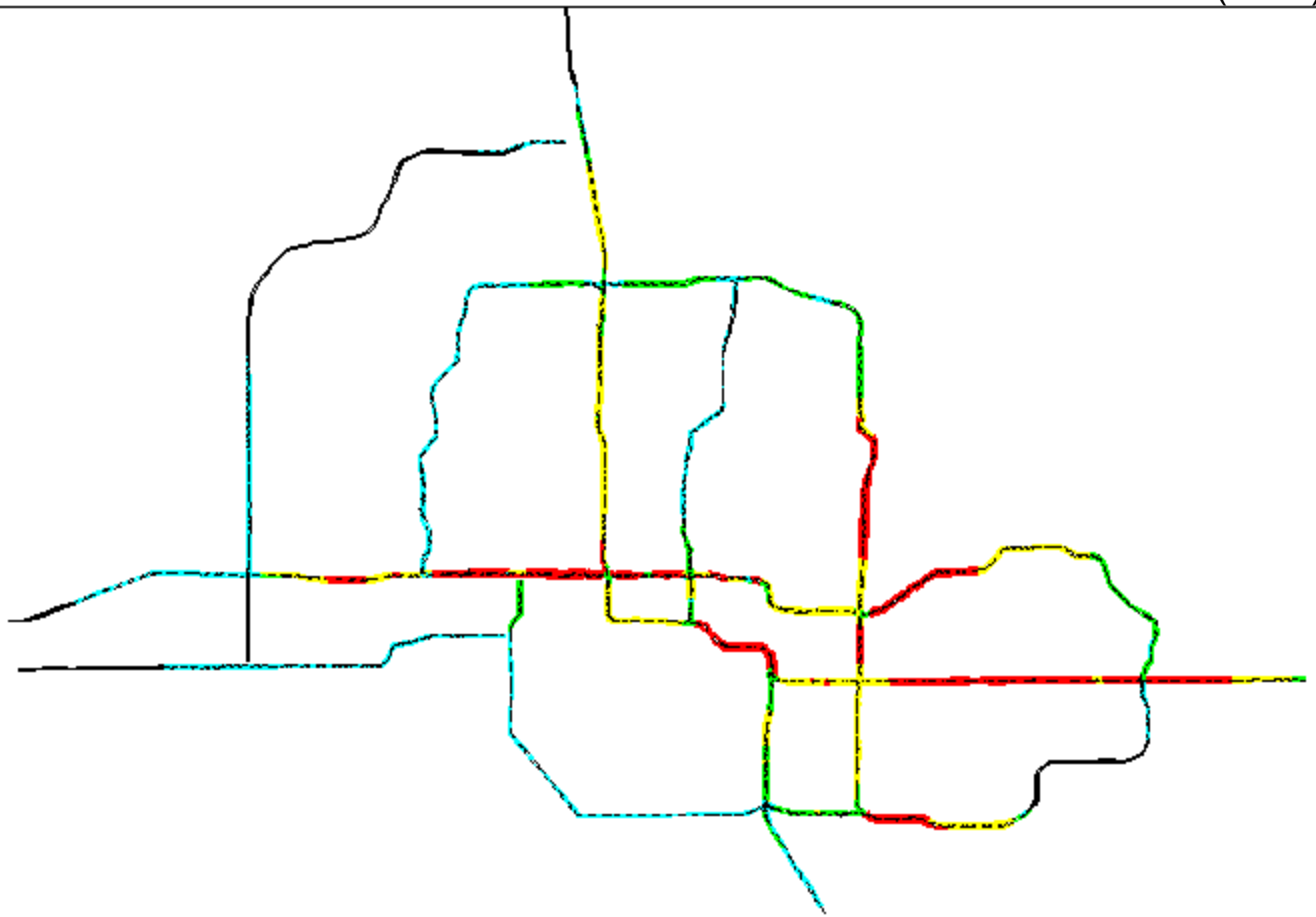
EMME/2 PROJECT: "RTS Option A with i03 transit 05.05.03"
SCENARIO 7: 24-HR Hwy Assignment (validation)
ATTRIB. @hovv: hov volumes (thousands)

03-05-12 17:53
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario B
HOV 24-Hour Volumes (2025)

emme/2



LINKS:
vdf=10,50,10
COL-IND: @hovc
THRESHOLD:
LOWER: -*****
UPPER: 999999

24-Hour Volumes *

- 0 – 5k
- 5 – 10k
- 10 - 15k
- 15 – 20k
- 20k +

*volume each direction

WINDOW:
425062/ 733558
836883/1042423

EMME/2 PROJECT: "RTS Option B with i03 05.02.03"
SCENARIO 7: 24-HR Hwy Assignment (validation)
ATTRIB. @hovv: hov volumes (thousands)

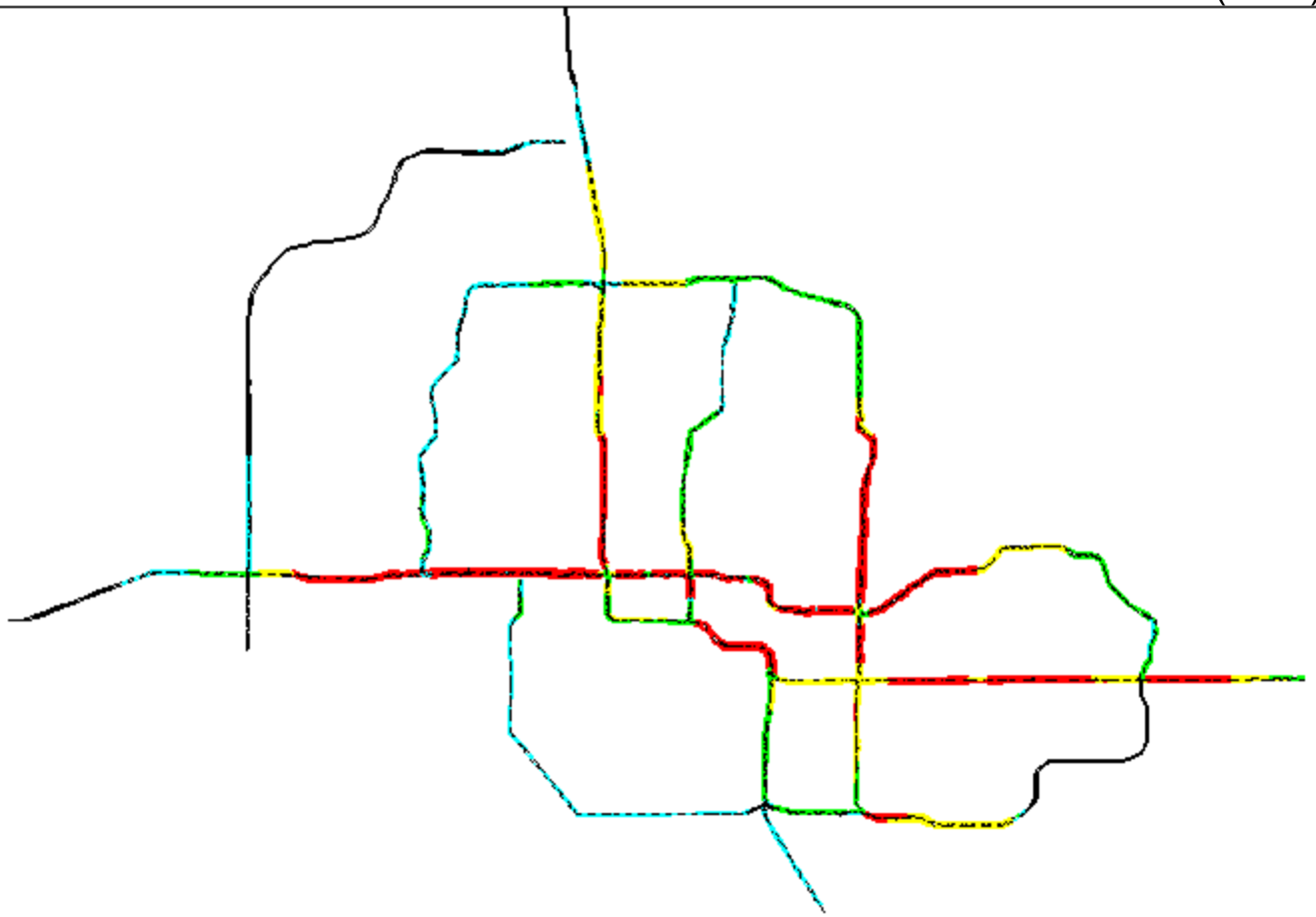
<w<

03-05-12 17:50
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario C
HOV 24-Hour Volumes (2025)

emme/2



LINKS:
vdf=10,50,10
COL-IND:@hovc
THRESHOLD:
LOWER: -*****
UPPER: 999999

24-Hour Volumes *

- 0 – 5k
- 5 – 10k
- 10 - 15k
- 15 – 20k
- 20k +

*volume each direction

WINDOW:
425062/ 733558
836883/1042423

EMME/2 PROJECT: "RTS Option C with i03 05.09.03"
SCENARIO 7: 24-HR Hwy Assignment (validation)
ATTRIB. @hovv: hov volumes (thousands)

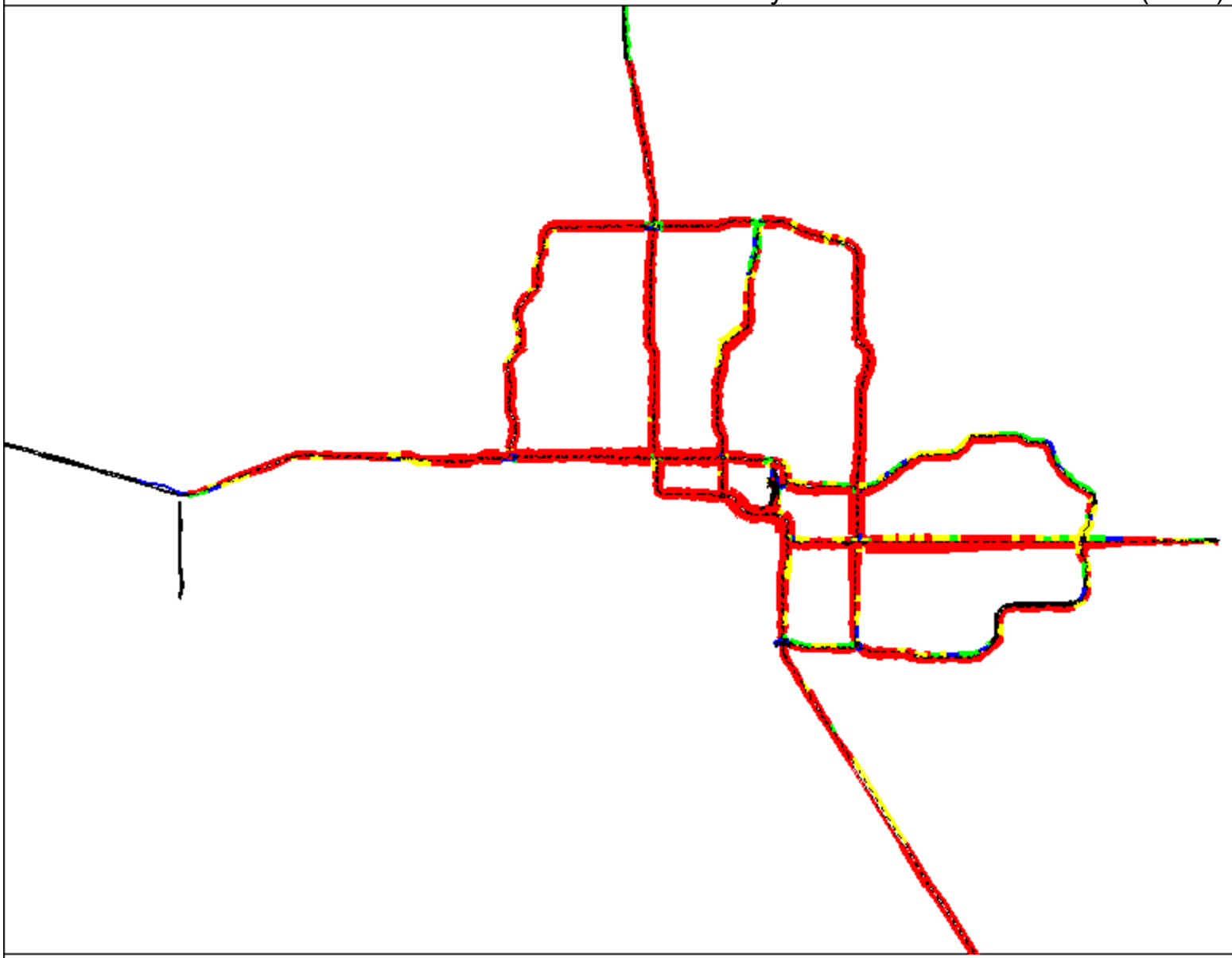
<w<

03-05-12 17:47
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Base Network
Freeway PM Peak Level of Service (2025)

emme/2



LINKS:
vdf=11,51,10
COL-IND:@vcidx
THRESHOLD:
LOWER: -*****
UPPER: 999999

LEVEL OF SERVICE
A
B
C
D
F-F

WINDOW:
425062/ 733558
836883/1042423

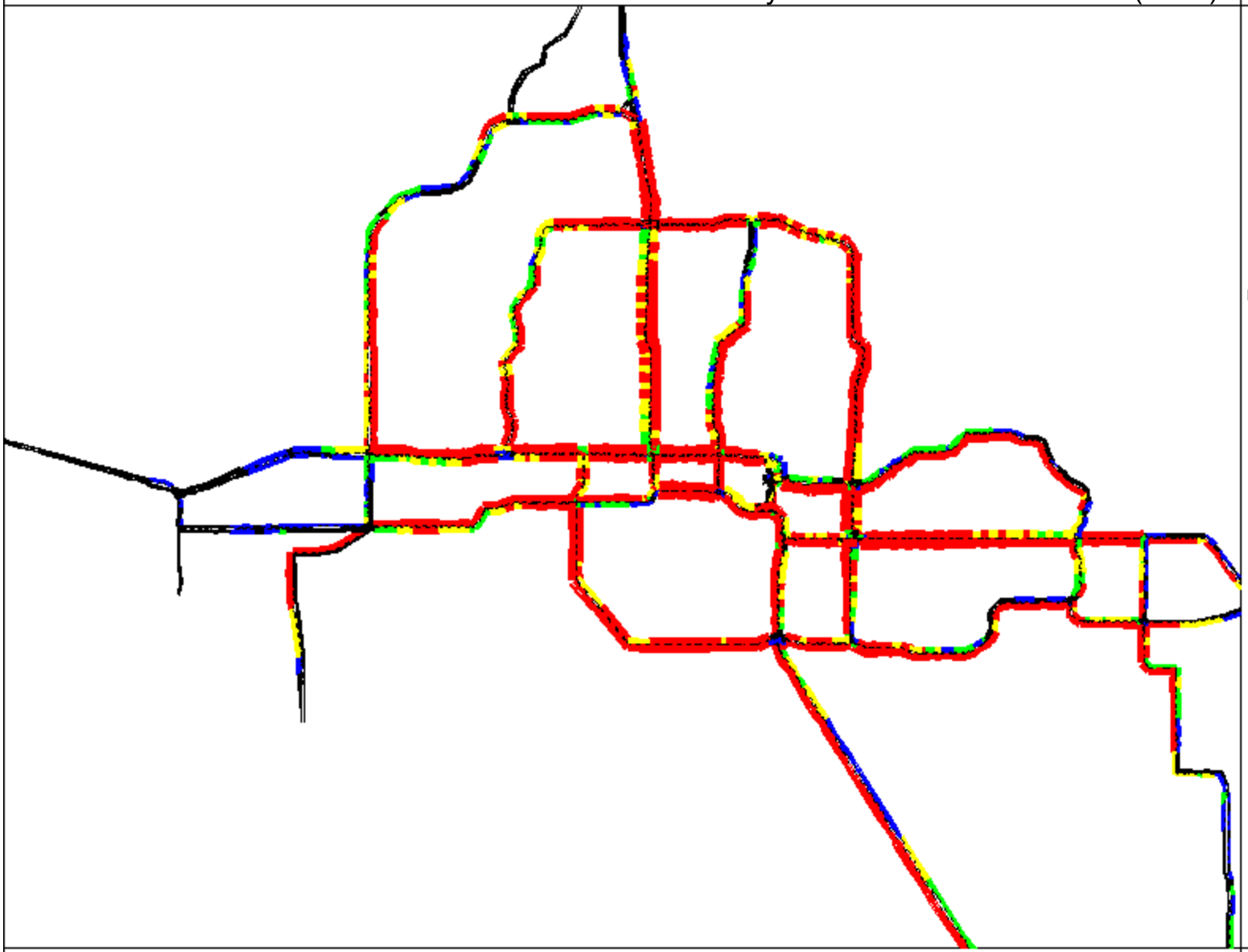
EMME/2 PROJECT: BASE
SCENARIO 6: PM Hwy Assignment (validation)
ATTRIBUTE @vol: vol (in thousands)

03-05-12 15:09
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario A
Freeway PM Peak Level of Service (2025)

emme/2



EMME/2 PROJECT: "RTS Option A with i03 transit 05.05.03"
SCENARIO 6: PM Hwy Assignment (validation)
ATTRIBUTE @vol: vol (in thousands)

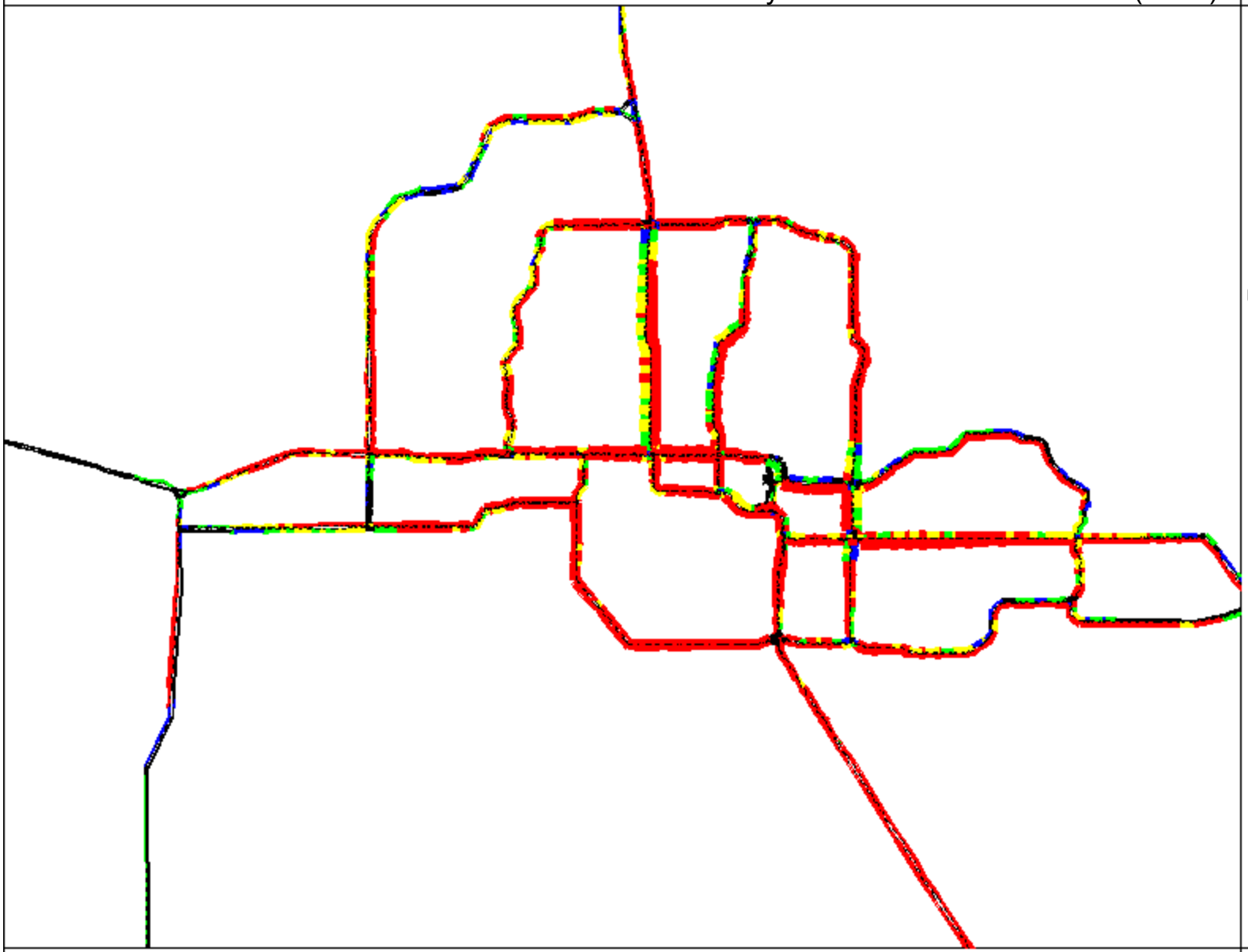
<<<

03-05-12 15:37
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario B
Freeway PM Peak Level of Service (2025)

emme/2



LINKS:
vdf=11,51,10
COL-IND:@vcidx
THRESHOLD:
LOWER: -*****
UPPER: 999999

LEVEL OF SERVICE
A
B
C
D
F-F

WINDOW:
425062/ 733558
836883/1042423

EMME/2 PROJECT: "RTS Option B with i03 05.02.03"
SCENARIO 600: PMPK HOUR ASGMT
ATTRIBUTE @vol: vol (in thousands)

03-05-12 17:14
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario C
Freeway PM Peak Level of Service (2025)

emme/2

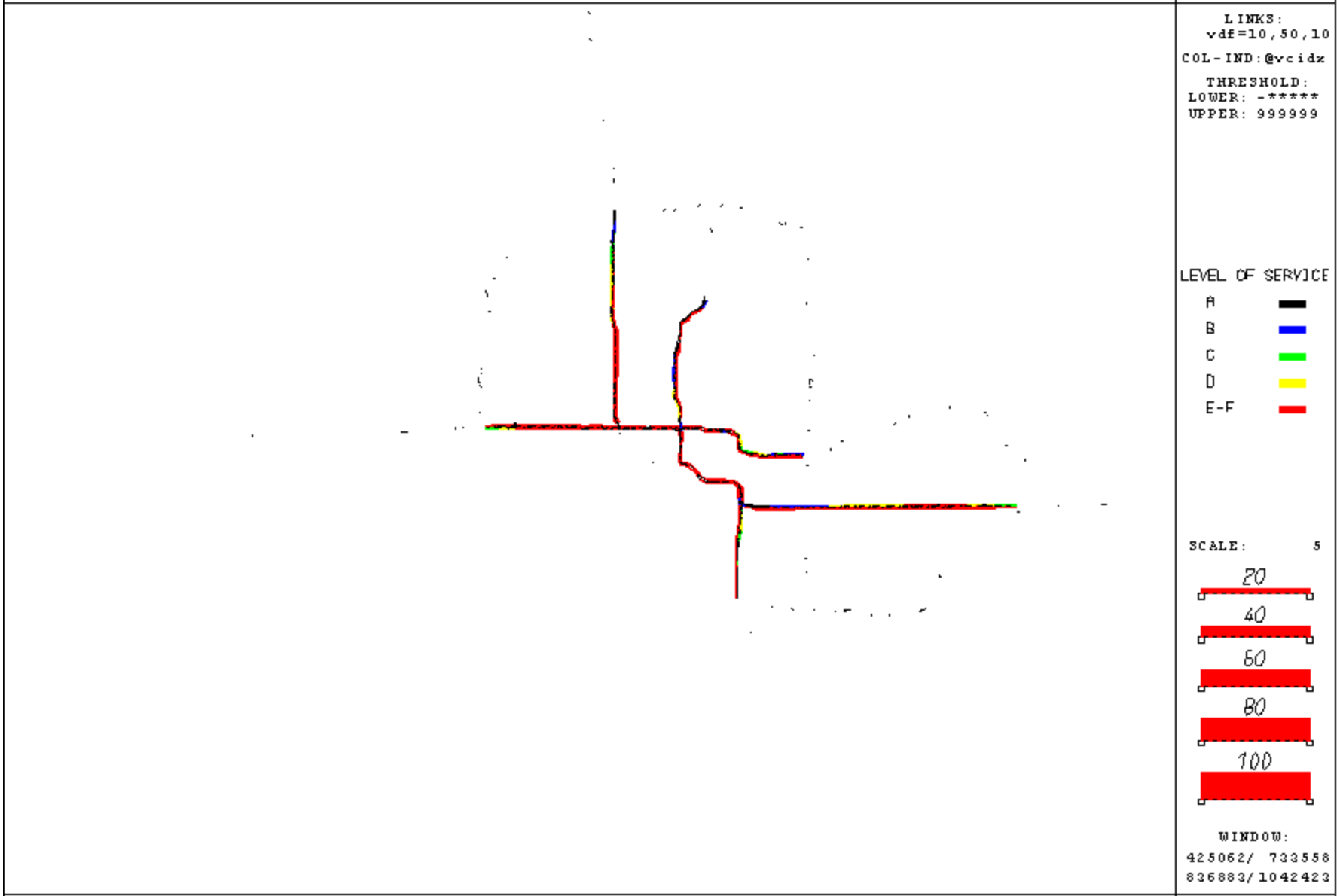
EMME/2 PROJECT: "RTS Option C with i03 05.09.03"
SCENARIO 6: PM Hwy Assignment (validation)
ATTRIBUTE @vol: vol (in thousands)

03-05-12 17:24
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Base Network
HOV PM Peak Level of Service (2025)

emme/2



EMME/2 PROJECT: BASE
SCENARIO 6: PM Hwy Assignment (validation)
ATTRIBUTE @vol: vol (in thousands)

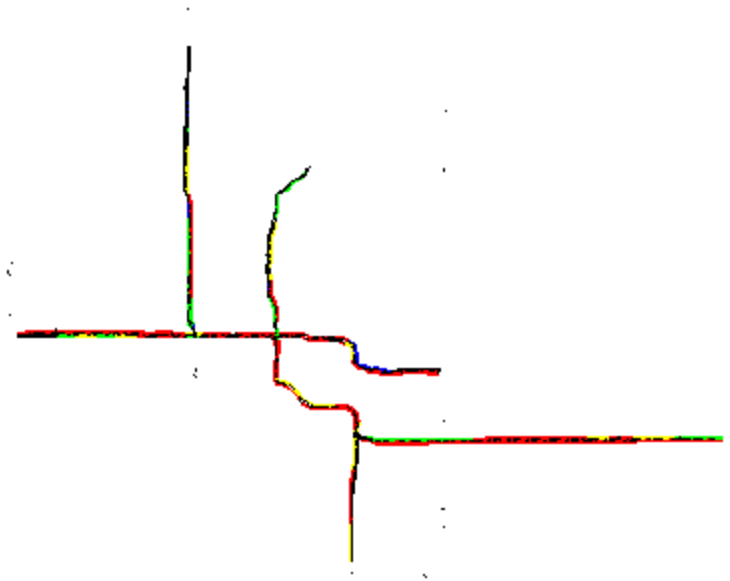
<<<

03-05-14 16:29
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario A
HOV PM Peak Level of Service (2025)

emme/2



LINKS:
vdf=10,50,10

COL-IND:@vcidx

THRESHOLD:
LOWER: -*****
UPPER: 999999

LEVEL OF SERVICE

A	
B	
C	
D	
E-F	

SCALE: 5

20
40
60
80
100

WINDOW:
425062/ 733558
836883/1042423

EMME/2 PROJECT: "RTS Option A with i03 transit 05.05.03"
SCENARIO 6: PM Hwy Assignment (validation)
ATTRIBUTE @vol: vol (in thousands)

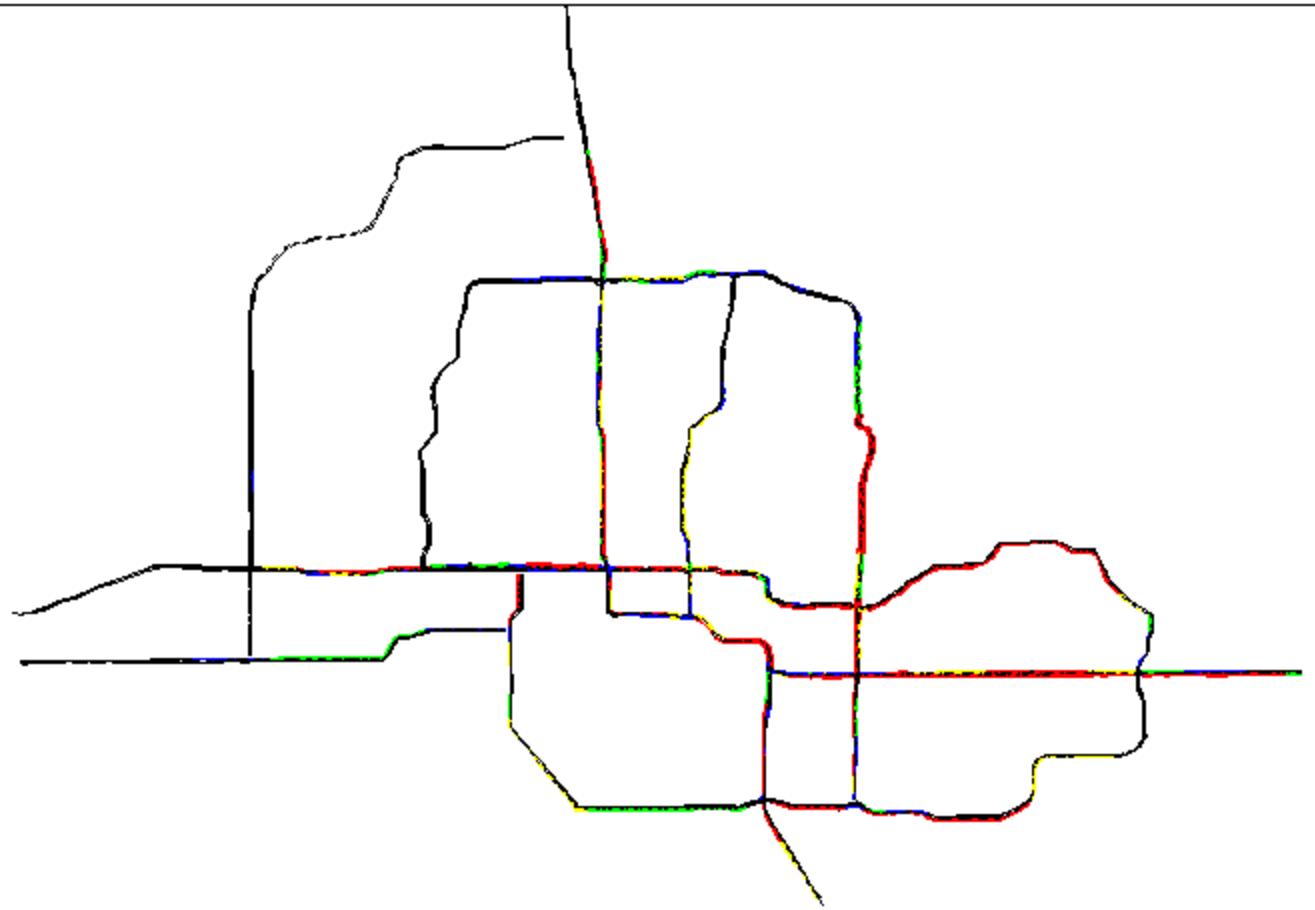
<w<

03-05-14 16:34
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario B
HOV PM Peak Level of Service (2025)

emme/2



LINKS:
vdf=10,50,10

COL-IND:@vcidx

THRESHOLD:
LOWER: -*****
UPPER: 999999

LEVEL OF SERVICE

A	0	.6
B	.61	.7
C	.71	.8
D	.81	.9
E-F	.81	up

WINDOW:
425062/ 733558
836883/1042423

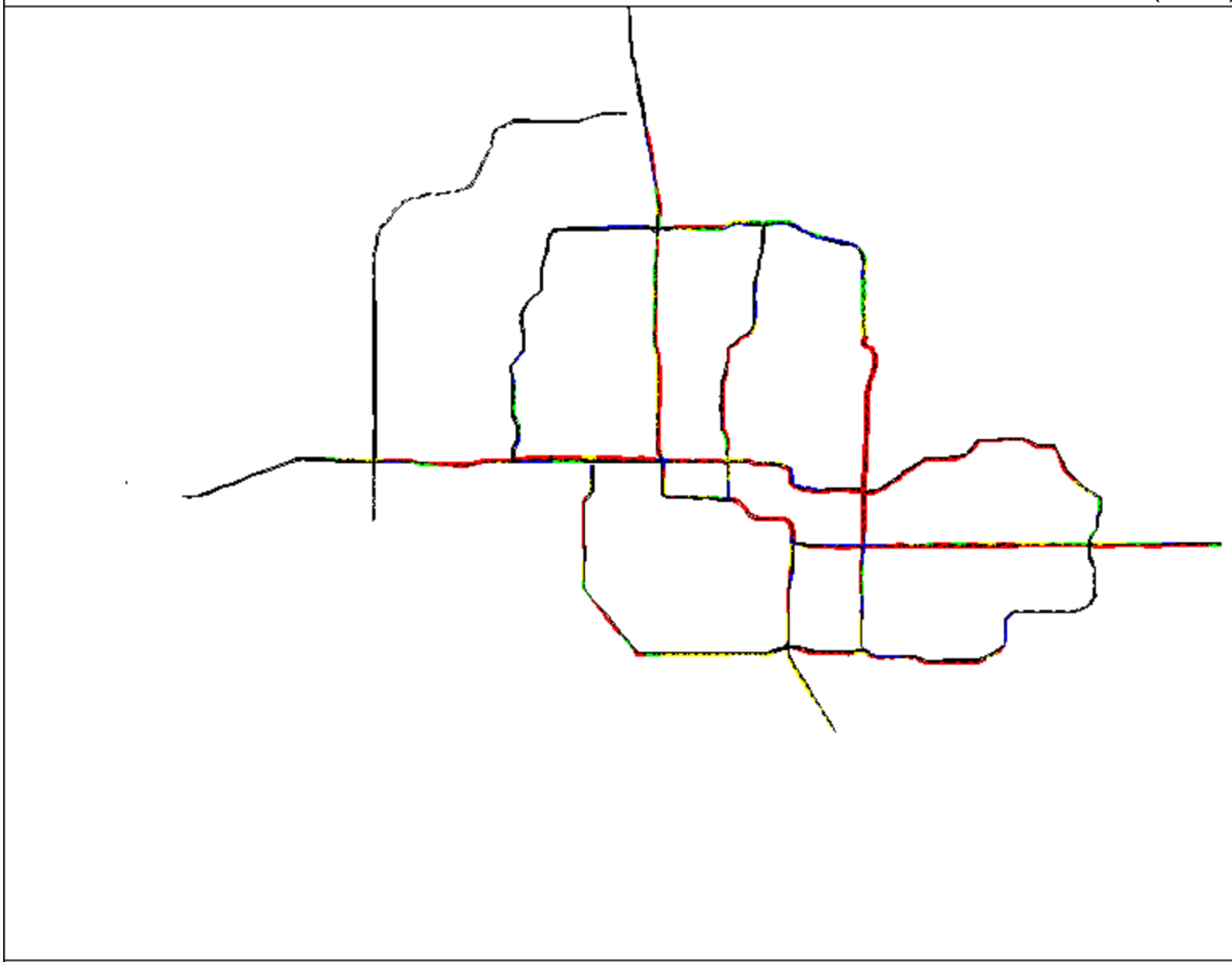
EMME/2 PROJECT: "RTS Option B with i03 05.02.03"
SCENARIO 6: PM Hwy Assignment (validation)
ATTRIBUTE @vol: vol (in thousands)

03-05-14 17:13
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario C
HOV PM Peak Level of Service (2025)

emme/2



EMME/2 PROJECT: "RTS Option C with i03 05.09.03"
SCENARIO 6: PM Hwy Assignment (validation)
ATTRIBUTE @vol: vol (in thousands)

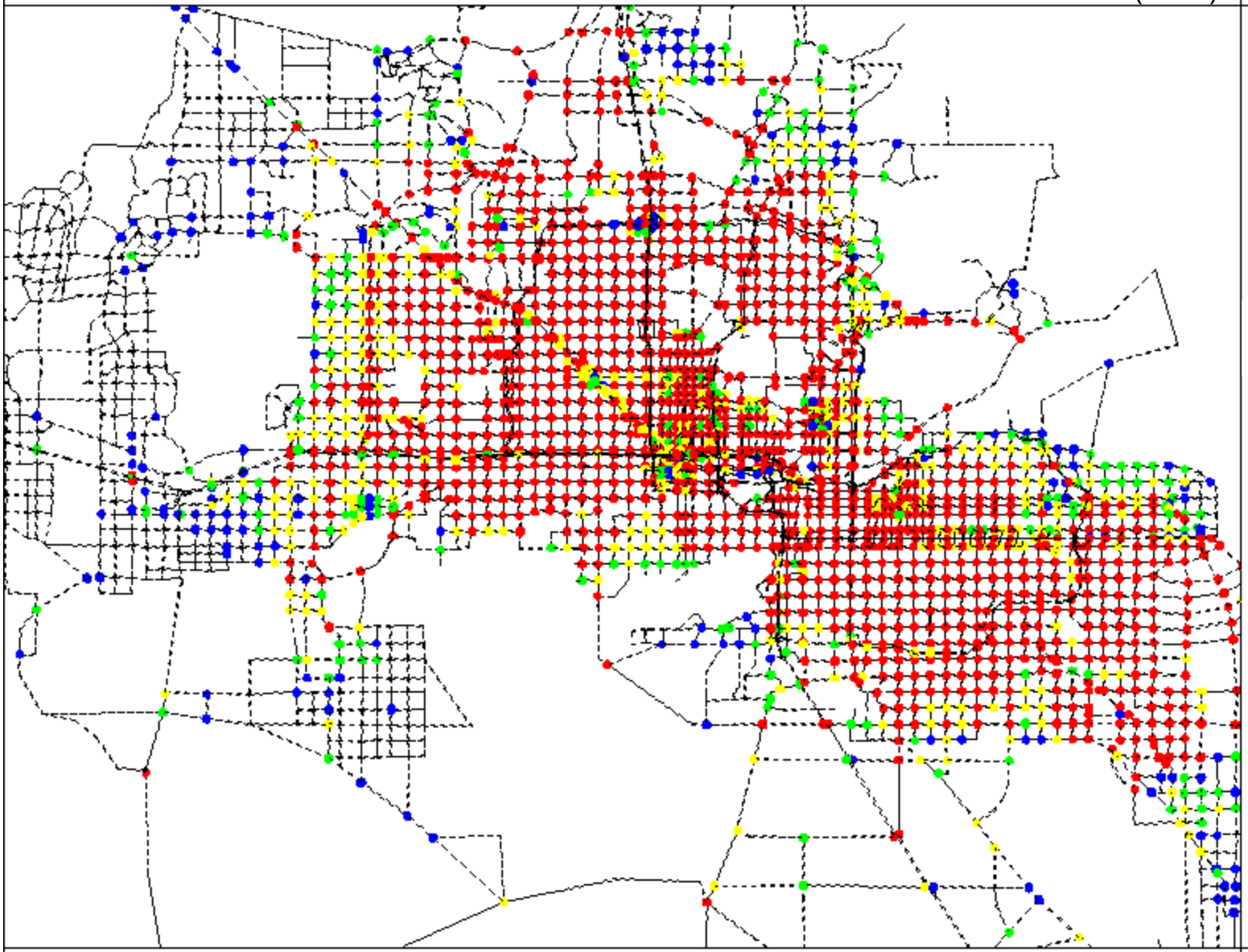
<<<

03-05-14 16:32
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Base Network
PM Peak Intersection LOS (2025)

emme/2



LINKS:
mod=a
&!vdf=15,55,10

COL-IND:UI2

THRESHOLD:
LOWER: -*****
UPPER: 999999

Level of Service

A	(blank)
B	
C	
D	
E or F	

WINDOW:
425062/ 733558
836883/1042423

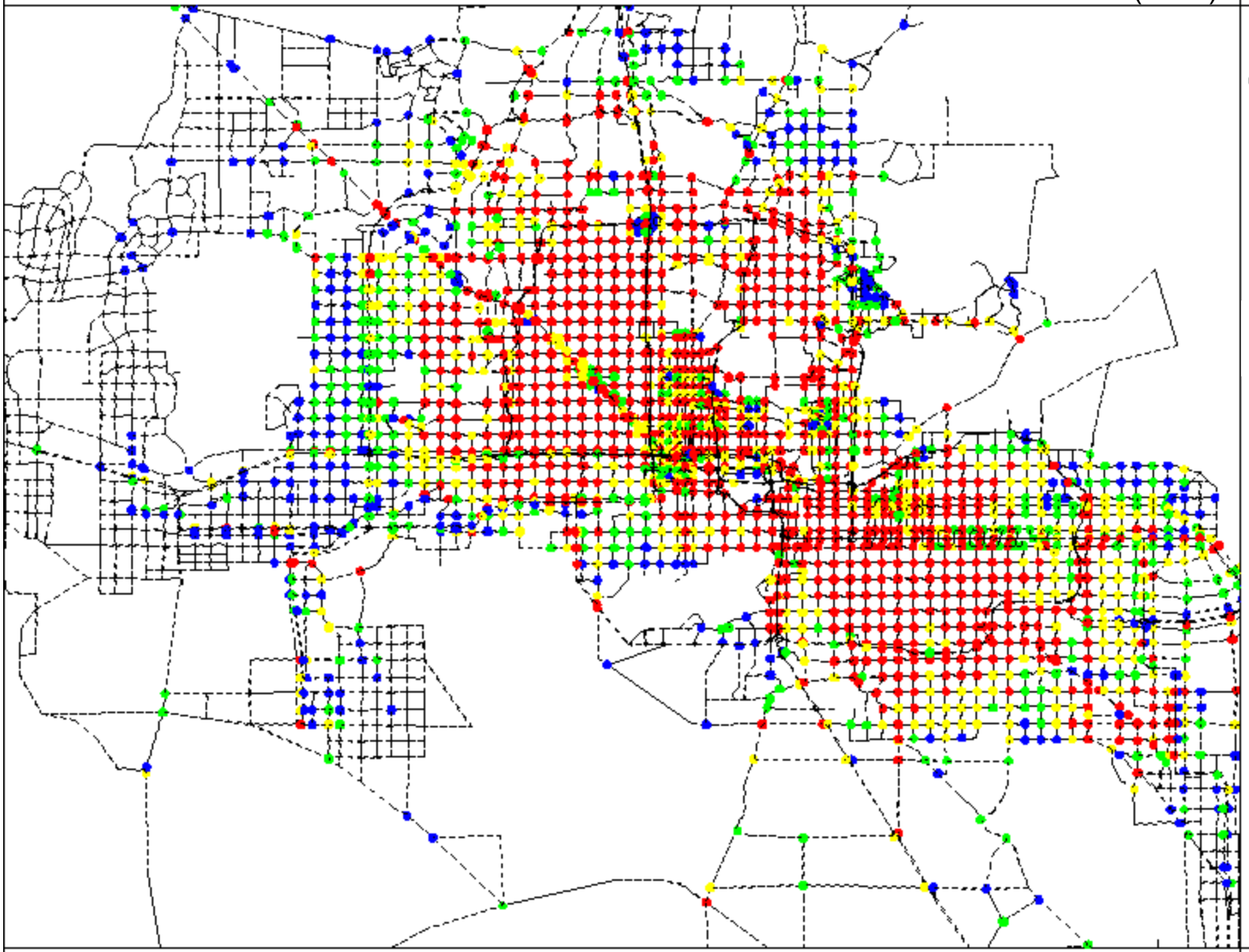
EMME/2 PROJECT: BASE
SCENARIO 600: PMPK HOUR ASGMT
836883,1014953

03-05-12 15:13
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario A
PM Peak Intersection LOS (2025)

emme/2



LINKS:
mod=a
&!vdf=15,55,10
COL-IND:UI2
THRESHOLD:
LOWER: -*****
UPPER: 999999

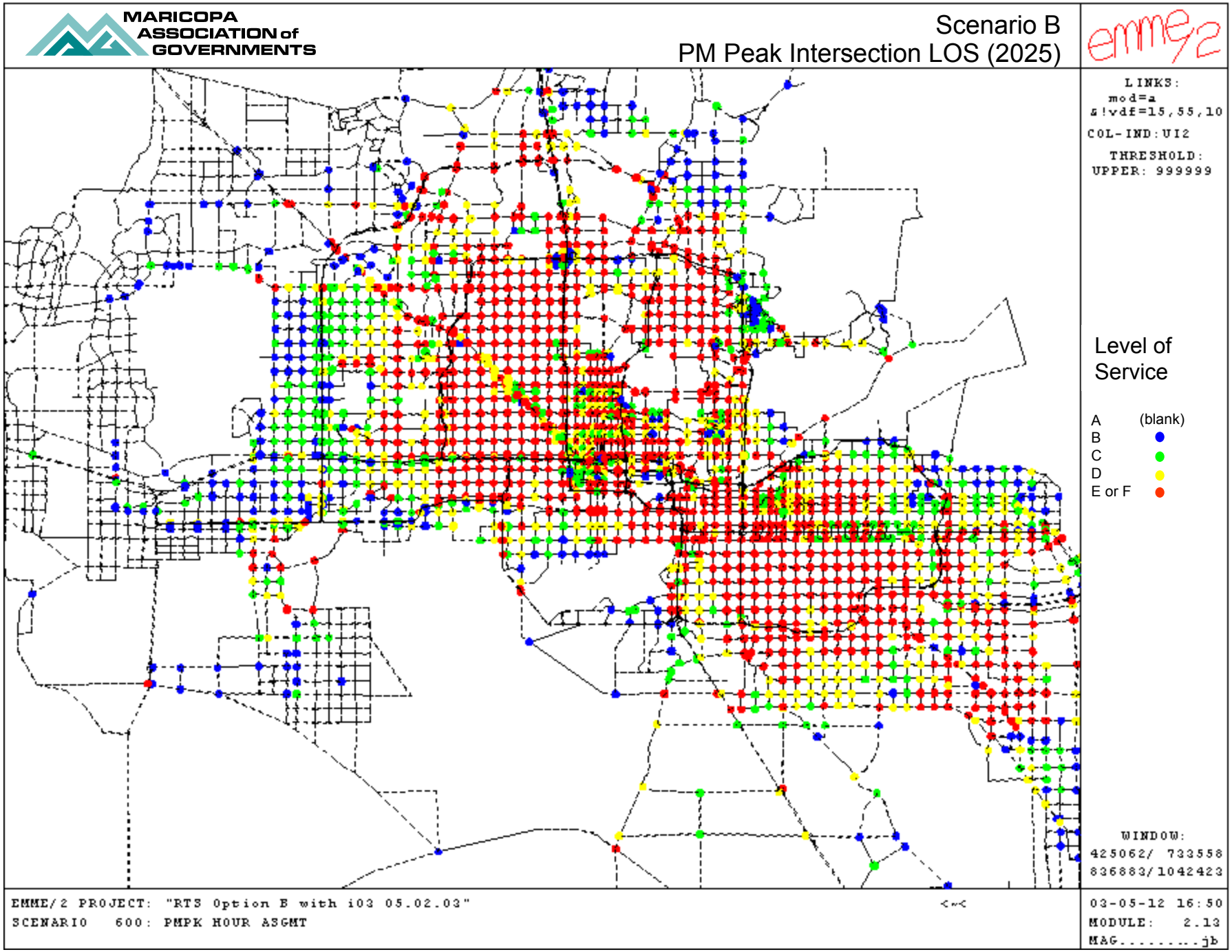
Level of Service

A	(blank)
B	
C	
D	
E or F	

WINDOW:
425062/ 733558
836883/1042423

EMME/2 PROJECT: "RTS Option A with i03 transit 05.05.03"
SCENARIO 600: PK HR Assignment

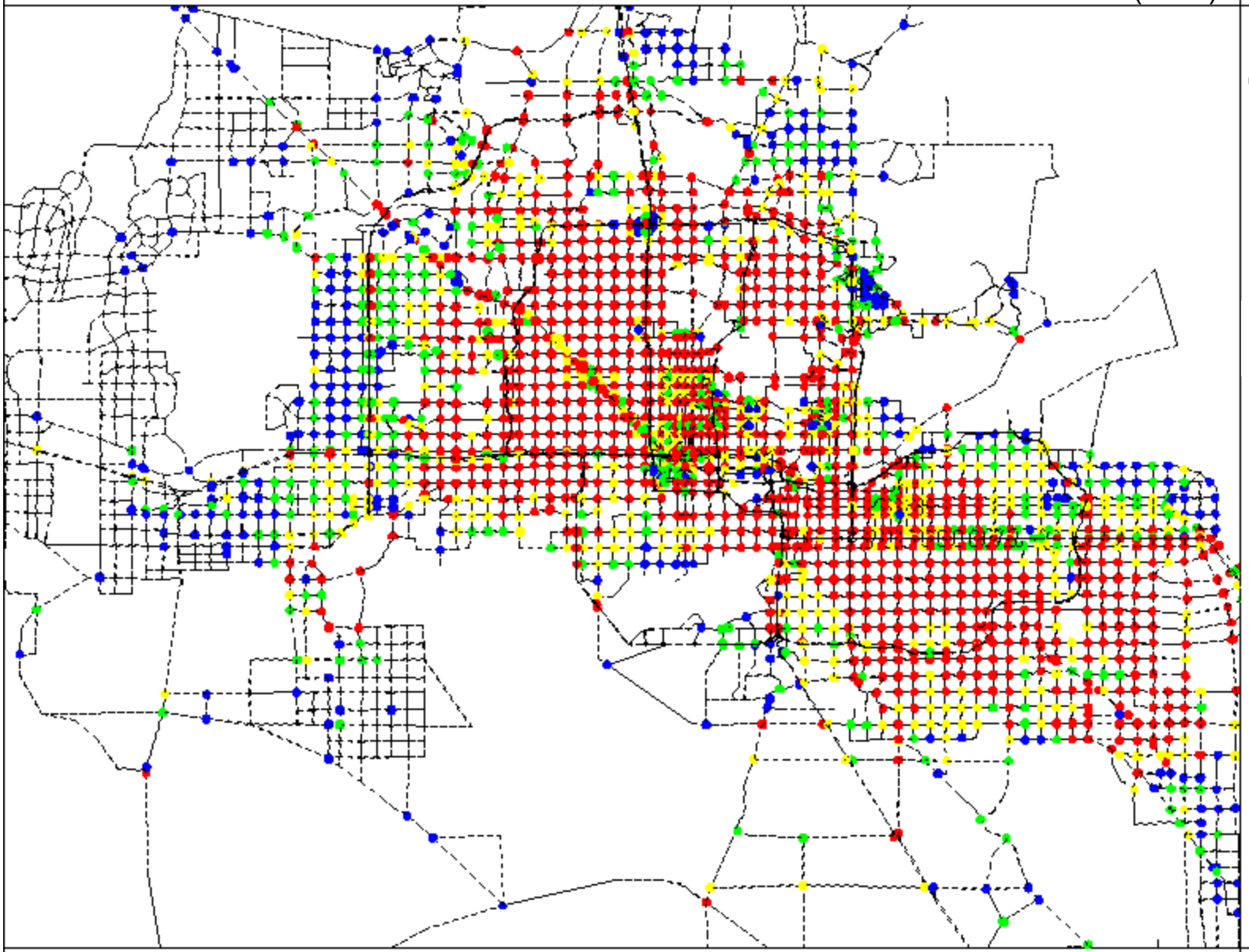
03-05-12 16:39
MODULE: 2.13
MAG.....jb


MARICOPA ASSOCIATION of GOVERNMENTS
Scenario B
PM Peak Intersection LOS (2025)
emme/2
LINKS:
mod=a
&!vdf=15,55,10
COL-IND:UI2
THRESHOLD:
UPPER: 999999
Level of Service
A
B
C
D
E or F
(blank)
WINDOW:
425062/ 733558
836883/1042423
EMME/2 PROJECT: "RTS Option B with i03 05.02.03"
SCENARIO 600: PMPK HOUR ASGMT
03-05-12 16:50
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario C
PM Peak Intersection LOS (2025)

emme/2



LINKS:
mod=a
&!vdf=15,55,10
COL-IND:UI2
THRESHOLD:
LOWER: -*****
UPPER: 999999

Level of Service

A	(blank)
B	
C	
D	
E or F	

WINDOW:
425062/ 733558
836883/1042423

EMME/2 PROJECT: "RTS Option C with i03 05.09.03"
SCENARIO 600: PMPK HOUR ASGMT

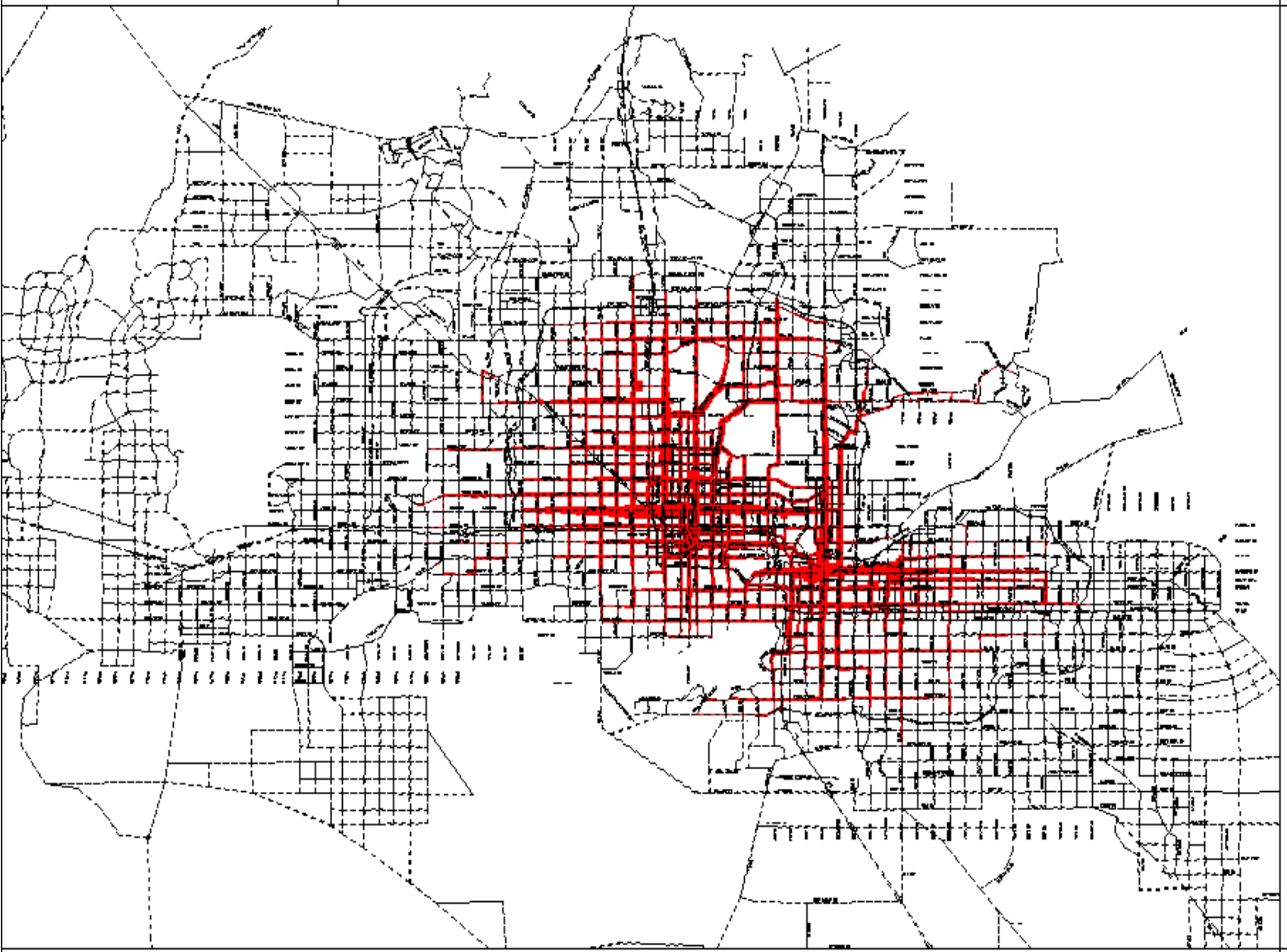
<-<

03-05-12 17:26
MODULE: 2.13
MAG.....jb

MARICOPA ASSOCIATION of GOVERNMENTS

Base Network Transit AM Peak Period Volumes (2025)

emme/2



LINKS:
!vdf=15,55,10

TRANSIT LINES:
ALL LINES

THRESHOLD:
LOWER: -99999
UPPER: 99999

SCALE: 250

500
1000
1500
2000
2500

WINDOW:
423553/ 753988
848390/1072616

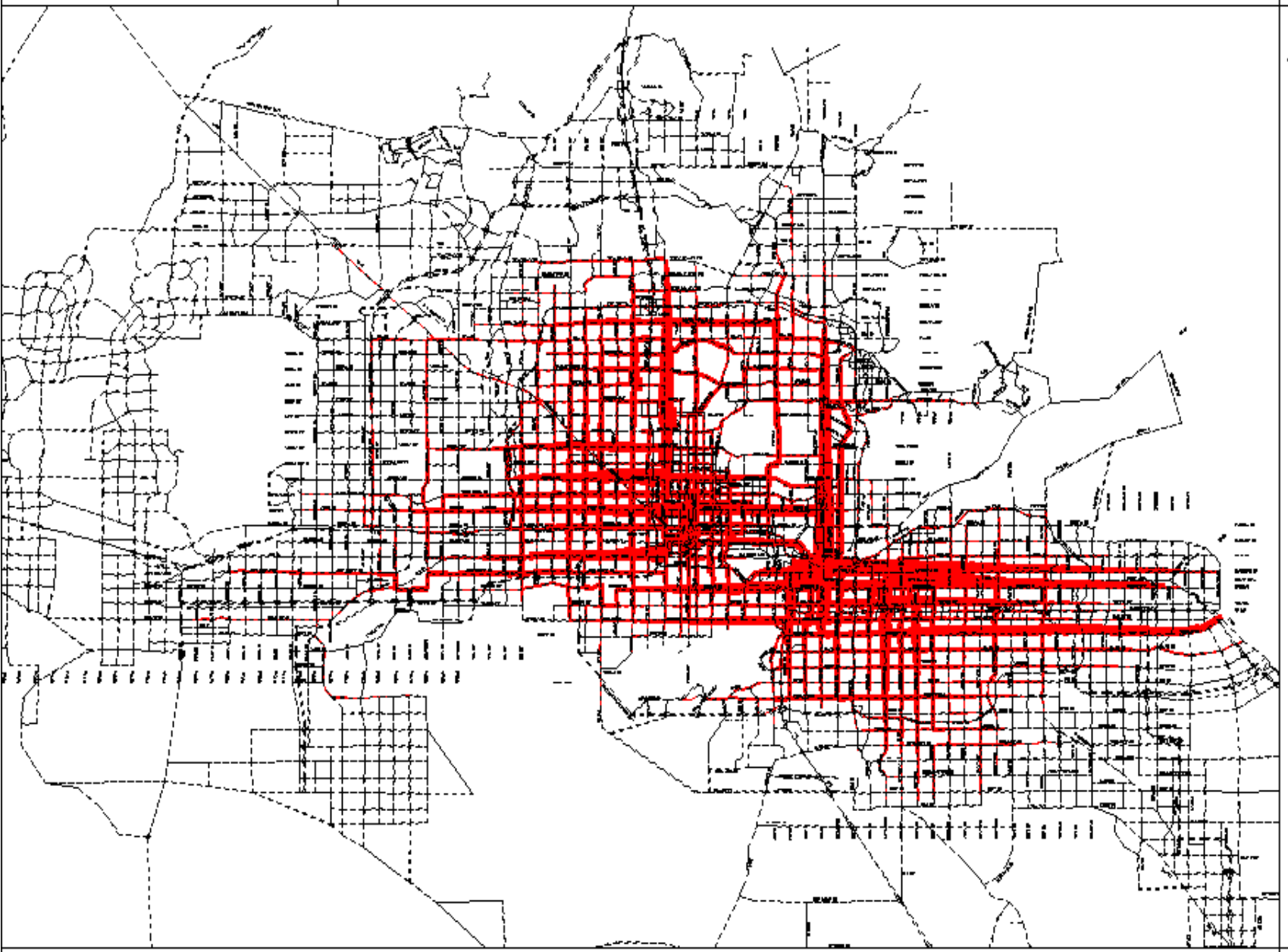
EMME/2 PROJECT: BASE
SCENARIO 15: Peak Walk-Transit Network

03-05-15 14:50
MODULE: 6.22
MAG.....VL

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario A Transit AM Peak Period Volumes (2025)

emme/2



LINKS:
!vdf=15,55,10

TRANSIT LINES:
ALL LINES

THRESHOLD:
LOWER: -99999
UPPER: 99999

SCALE: 250

500
1000
1500
2000
2500

WINDOW:
423553/ 753988
648390/1072616

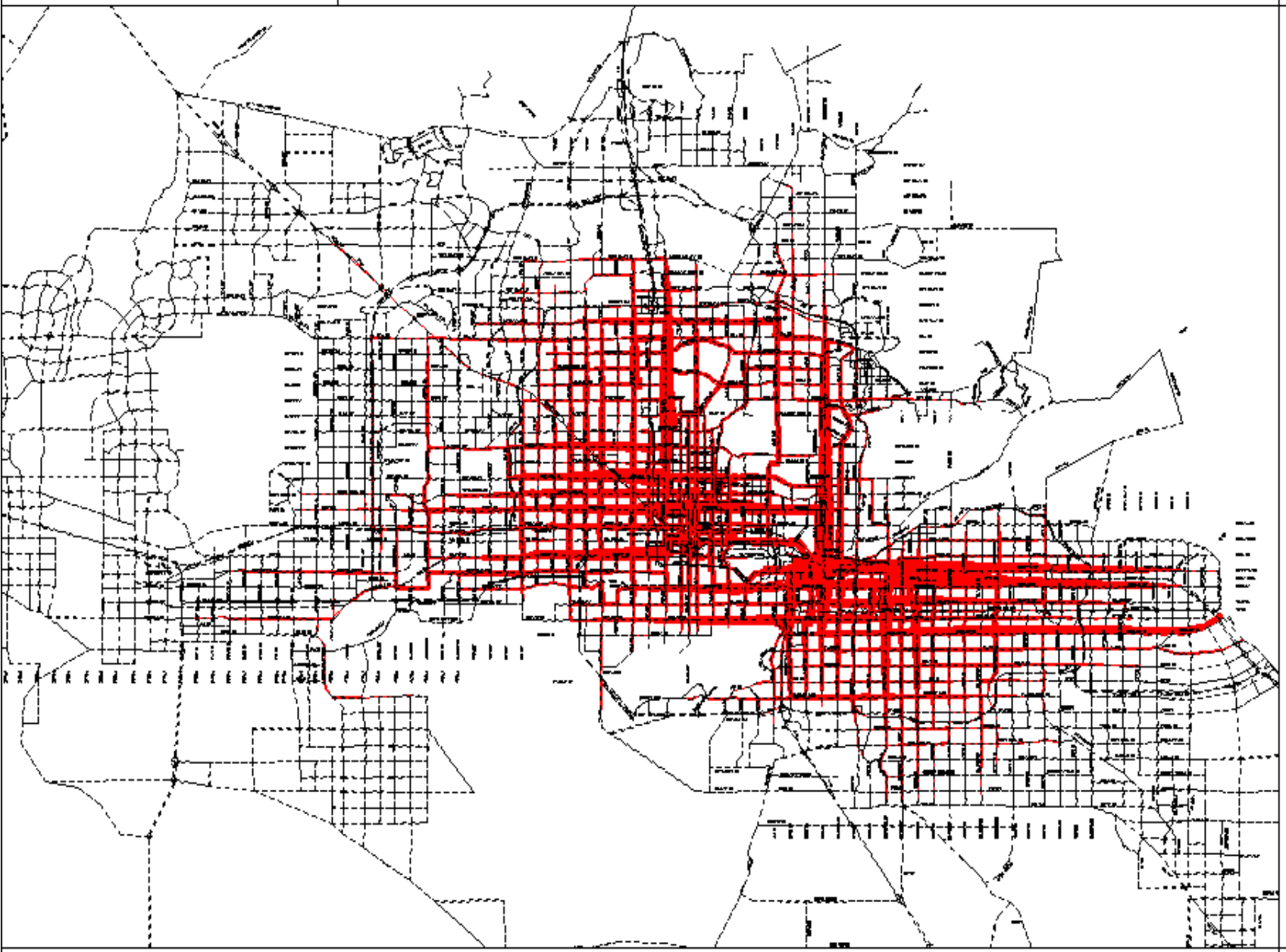
EMME/2 PROJECT: "RTS Option A with i03 transit 05.05.03"
SCENARIO 15: Peak Walk-Transit Network

03-05-15 14:53
MODULE: 6.22
MAG.....VL

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario B Transit AM Peak Period Volumes (2025)

emme/2



LINKS:
!vdf=15.55.10
TRANSIT LINES:
ALL LINES
THRESHOLD:
LOWER: -99999
UPPER: 99999

SCALE: 250
500
1000
1500
2000
2500

WINDOW:
423553/ 753988
848390/1072616

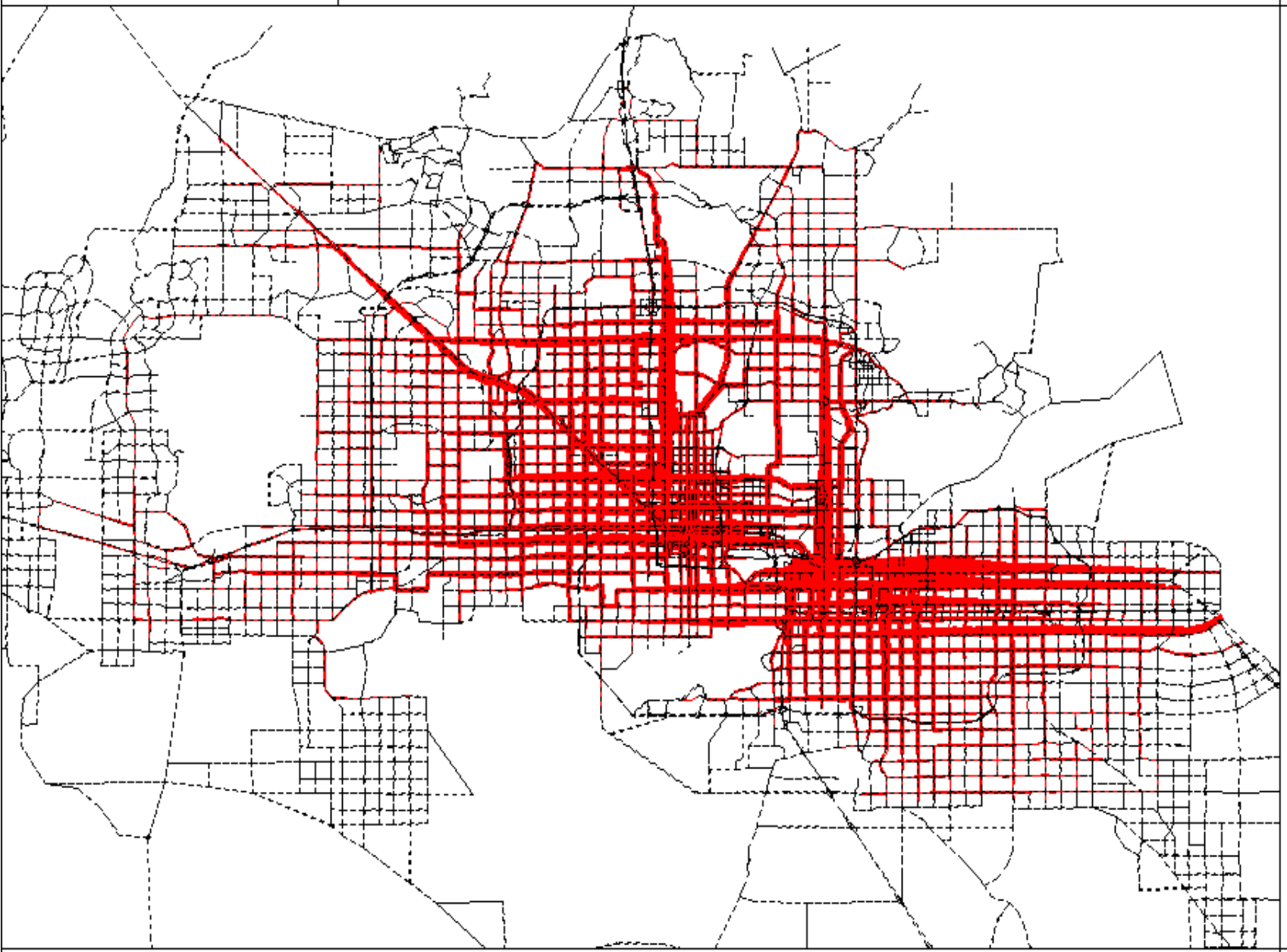
EMME/2 PROJECT: "RTS Option B with i03 05.02.03"
SCENARIO 15: Peak Walk-Transit Network

03-05-14 11:29
MODULE: 6.22
MAG VL

MARICOPA ASSOCIATION of GOVERNMENTS

Scenario C Transit AM Peak Period Volumes (2025)

emme/2



LINKS:
!vdf=15,55,10

TRANSIT LINES:
ALL LINES

THRESHOLD:
LOWER: -99999
UPPER: 99999

SCALE: 250

500
1000
1500
2000
2500

WINDOW:
423553/ 753988
648390/1072616

EMME/2 PROJECT: "RTS Option C with i03 05.09.03"
SCENARIO 15: Peak Walk-Transit Network

03-05-15 14:58
MODULE: 6.22
MAG.....VL

APPENDIX D

PERFORMANCE MEASURE TABLE

D-1 Performance Measure Evaluation for the Region

Performance Measure Evaluation for the Region

Objective	Performance Measure	Modeling Scenario				
		2000	Base	A	B	C
Goal 1: System Preservation and Safety						
1A: Provide for the continuing preservation and maintenance needs of transportation facilities and services in the region, eliminating maintenance backlogs.	Percent of freeway maintenance and preservation needs funded	*	0%	100%	100%	100%
1B: Provide a safe and secure environment for the traveling public, addressing roadway hazards, pedestrian and bicycle safety, and transit security.	Number of Predicted Total Annual Accidents					
	- Total	*	81,634	77,325	76,025	77,287
	- Freeway	*	8,759	16,184	12,327	12,843
	- Arterial	*	67,452	56,107	58,662	59,393
	- Accidents/Million VMT	*	1.06	0.95	0.95	0.97
Goal 2: Access and Mobility						
2A: Maintain an acceptable and reliable level of service on transportation and mobility systems serving the region, taking into account performance by mode and facility type.	PM peak period Travel time between selected origins and destinations					
	- Peoria to Goodyear/Avondale	*	*	*	*	*
	- Sun City to Scottsdale Airpark	*	*	*	*	*
	- Glendale to Tempe	*	*	*	*	*
	- Phoenix to Mesa	*	*	*	*	*
	- Gilbert to Sky Harbor	*	*	*	*	*
	- Chandler to Scottsdale	*	*	*	*	*
	- Peoria to Phoenix	*	*	*	*	*
	PM Peak period delay by facility type/total # of lane miles for that facility type					
	- Freeway	52.9	252.34	98.36	110.46	93.29
	- Arterial	13.03	68.39	27.89	28.32	33.65
	- HOV Lane	10.23	240.04	104.05	48.32	56.91
	PM Peak period speed by facility type and geographic location					
	- Freeway	33	14	25	23	24
	- Arterial	23	12	17	17	16
	- HOV Lane	48	14	24	32	29
	Number of major intersections at specific level of service during PM peak period/total number of intersections					
	E	11.67%	18.66%	20.27%	20.13%	18.81%
	F	3.42%	11.59%	7.50%	8.58%	9.92%
	F-	3.09%	23.15%	9.06%	9.63%	10.89%
	Percentage of Lane Miles of freeway with level of service "E" or worse during PM peak period	30.47%	58.76%	44.34%	47.40%	37.43%
	Number of Lane Miles with level of service "F" or worse during PM peak period					
	- Freeway	283	908	1,134	898	885
	- HOV Lane	3	90	49	95	129
2B: Provide residents of the region with access to jobs, shopping, educational, cultural, and recreational opportunities and provide employers with reasonable access to the workforce in the region.	Percentage of persons within 30 and 60 minutes travel time of employment by auto and transit mode					
	Auto					
	- 30 min or less	76%	54%	60%	59%	57%
	- 60 min or less	98%	80%	89%	87%	87%
	Transit					
	- 30 min or less	*	*	*	*	*
	- 60 min or less	*	*	*	*	*
2C: Maintain a reasonable and reliable travel time for moving freight into, through and within the region, as well as provide high-quality access between intercity freight transportation corridors and freight terminal locations, including intermodal facilities for air, rail and truck cargo	Average daily truck delay	*	*	*	*	*
2D: Provide the people of the region with transportation modal options necessary to carry out their essential daily activities and support equitable access to the region's opportunities	Jobs within one-quarter mile distance of transit service	*	1,469,158	1,903,776	1,903,776	2,186,368
	Percentage of major arterial streets that have bike lanes	*	*	*	*	*
	Percentage of regional connectors funded as part of the number of miles of off-street bike/pedestrian system plan	*	*	*	*	*
2E: Address the needs of the elderly and other population groups that may have special transportation needs, such as non-drivers or those with disabilities	Percent of transit dependent population served	*	38%	48%	48%	54%
Goal 3: Sustaining The Environment						
3A: Identify and encourage implementation of mitigation measures that will reduce noise, visual and traffic impacts of transportation projects on existing neighborhoods	Per Capita VMT by facility type and mode					
	Freeway					
	- PM Peak Per Capita VMT	1.77	1.50	2.64	2.11	2.14
	- 24 HR Per Capita VMT	8.99	7.50	13.13	10.71	10.73
	Arterial					
	- PM Peak Per Capita VMT	3.00	4.22	3.46	3.44	3.64
	- 24 HR Per Capita VMT	13.22	18.79	15.16	15.35	16.09
	HOV Lane					
	- PM Peak Per Capita VMT	0.08	0.14	0.12	0.36	0.35
	- 24 HR Per Capita VMT	0.26	0.63	0.49	1.41	1.38
	TOTAL					
	- 24 HR Per Capita VMT	27.23	31.54	33.39	33.10	32.78
	Per Capita Transit PMT	*	0.13	0.36	0.39	0.51
	Total transit ridership	70,111	103,694	228,142	226,430	282,241
	Transit Percent of Total Trips	0.61%	0.46%	1.02%	1.01%	1.26%
3B: Encourage programs and land use planning that advance efficient trip-making patterns in the region	Households within one-quarter mile of transit	*	751,040	1,010,241	1,010,241	1,274,647
	Transit share of travel (by transit sub-mode).					
	- Local Bus	0.97	0.75	0.68	0.68	0.70
	- Express Bus/BRT/LRT	0.03	0.25	0.32	0.32	0.30
3C: Make transportation decisions that are compatible with air quality conformity and water quality standards, the sustainable preservation of key regional ecosystems and desired lifestyles	Households within five miles of park-and-ride lots or major transit centers	*	556,501	556,501	556,501	746,503
	Total pollutant emissions index (NAQS).		1.000	0.998	0.928	0.942

* Data for this measure is not available at this time