RULE on WORK ZONE Safety and Mobility

SAMPLE TRANSPORTATION MANAGEMENT PLANS AND TEMPLATES

A. How to Use the Guide

B. TMP Tips and Tools

C. TMP Template 1 Minor-to-Moderate Impacts

D. TMP Template 2 Moderate-to-Major Impacts

E. Sample TMP 1 Minor-to-Moderate Impacts

F. Sample TMP 2 Moderate-to-Major Impacts

August 2010

U.S. Department of Transportation
Federal Highway Administration

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15. Supplementary Notes

FHWA Project Leader-Tracy Scriba

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16. Abstract

This Guide consisting of samples, templates, and tips is designed to help transportation agencies with the development and implementation of their own Transportation Management Plans (TMPs). Understanding the work zone impacts is critical to developing effective work zone TMPs that provide for adequate safety and mobility for the traveling public and construction workers. The primary intended audience for this guide is transportation agency staff, including technical staff, (planners, designers, traffic engineers, highway/safety engineers, etc); management and executive-level staff responsible for setting policy and program direction; field staff responsible for building projects and managing work zones; and staff responsible for assessing performance in these areas. The TMP samples and templates presented in the guide represent two projects with different levels of impacts.

- **Template 1 and Sample 1— Projects with minor-to-moderate level of impacts.**
- **Template 2 and Sample 2— Projects with moderate-to-major level of impacts.**

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SAMPLE TRANSPORTATION MANAGEMENT PLANS AND TEMPLATES

August 2010

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Office of Operations

List of Acronyms

ADA	— Americans with Disability Act
ADOT	— Arizona Department of Transportation
ADT	— Average Daily Traffic
AFAD	— Automatic Flagger Assistance Devices
CALTRANS	— California Department of Transportation
CCTV	— Closed Circuit Television
CO3	— Construction Congestion Cost Program
CPM	— Capital Preventive Maintenance
CS	— Control Section
DC HSEMA	— District of Columbia Homeland Security and Emergency Management Agency
DDOT	— District Department of Transportation
DOH	— Department of Health
DOT	— Department of Transportation
EB	— Eastbound
FEMS	— Fire and Emergency Medical Services
HAR	— Highway Advisory Radio
HMA	— Hot-Mix Asphalt
ITS	— Intelligent Transportation Systems
IWZ	— Intelligent Work Zones
JN	— Job Number
LCAP	— Lane Closure Analysis Program
LOS	— Level of Service
MTA	— Mass Transit Authority
WMATA	— Washington Metropolitan Area Transit Authority
MDOT	— Michigan Department of Transportation
MdSHA	— Maryland State Highway Administration
Mn/DOT	— Minnesota Department of Transportation
MoDOT	— Missouri Department of Transportation
MOE	— Measure of Effectiveness
MOT	— Maintenance of Traffic
MPD	— Metropolitan Police Department
NE	— Northeast Quadrant
PCMS	— Portable Changeable Message Signs
PD	— Police Department
PHV	— Peak Hourly Volume

List of Acronyms

PI&O	— Public Information and Outreach Plan
PIP	— Public Information Plan
POB	— Point of Beginning
POE	— Point of End
RIDOT	— Rhode Island Department of Transportation
SMPT	— Safety and Mobility Peer Team
TMC	— Transportation Management Center
TMP	— Transportation Management Plan
TO	— Transportation Operations
TOP	— Transportation Operations Plan
TSC	— Transportation Service Center
TMS	— Transportation Management System
TTC	— Temporary Traffic Control
TTCP	— Temporary Traffic Control Plan
V/C	— Volume/Capacity
VPD	— Vehicles Per Day
WB	— Westbound

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B. TMP Tips and Tools

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F. Sample TMP 2 Moderate-to-Major Impacts

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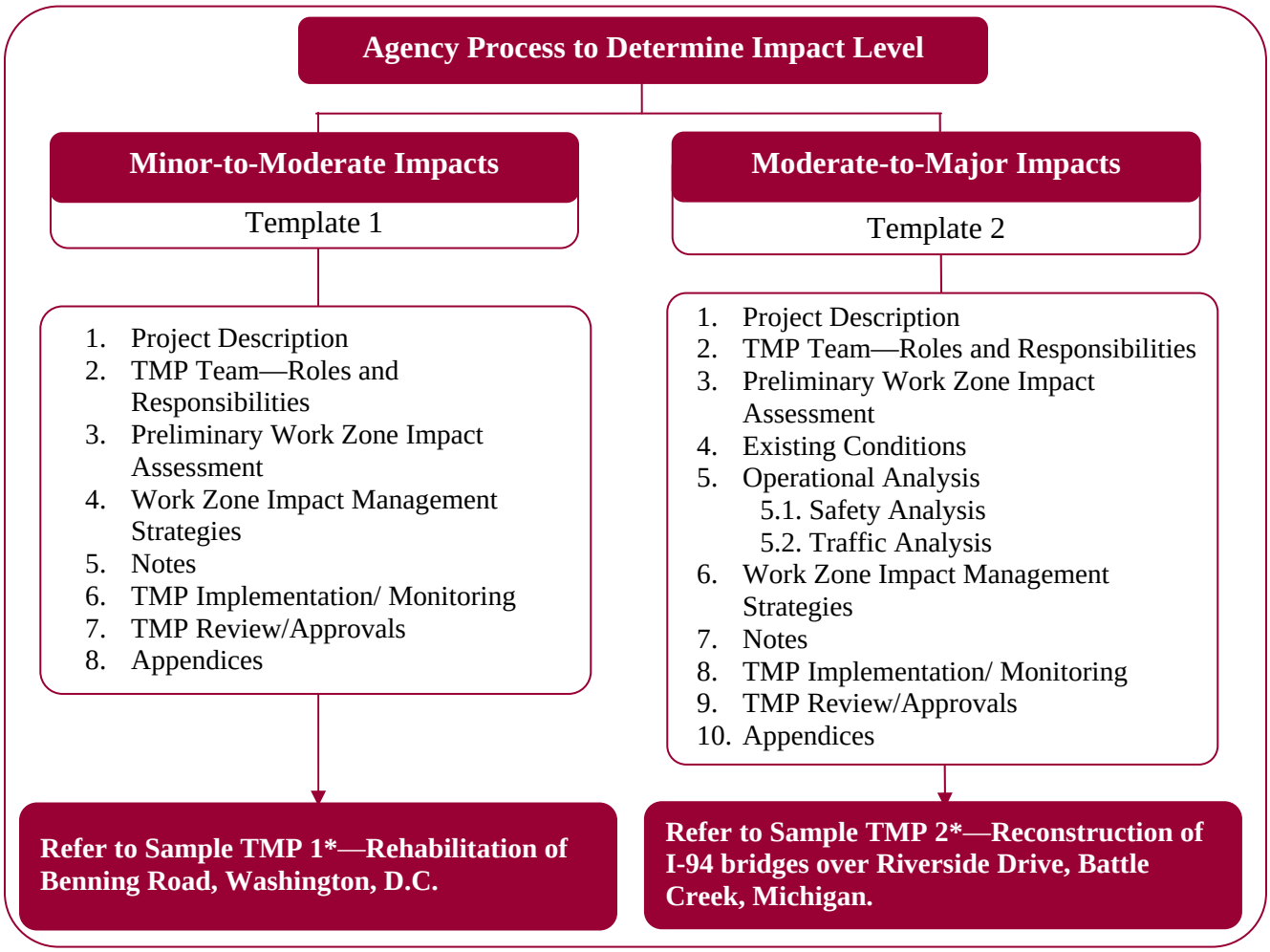
How to Use the Guide

This document is intended to provide assistance to transportation agencies in developing transportation management plans (TMPs) for their road projects. A TMP lays out a set of strategies for managing the work zone impacts of a project and is required by the Work Zone Safety and Mobility Rule. Because work zone objectives, needs, and issues vary from project to project, the scope, content, and detail in a TMP will also vary from project to project. It is ultimately up to the agency to establish and implement TMPs that best serve the mobility and safety needs of the motoring public, construction workers, businesses, and the community. To assist transportation agencies in developing TMPs, this document provides example templates and samples for two different levels of impacts:

- Template 1 and Sample 1— Projects with minor-to-moderate level of impacts.
- Template 2 and Sample 2— Projects with moderate-to-major level of impacts.

Depending on the level of expected impacts of an upcoming project, transportation agencies can use either Template 1 or Template 2 as a guide to develop their own TMPs. For each template, a sample TMP is included that was developed based on information provided by the State/agency where the project is located. These templates and samples are intended only as resources to transportation agencies and are *not* the only possible/acceptable format for a TMP.



**Footnotes in the samples are intended to provide additional information for users. Real TMPs may not include such information.*

RULE on WORK ZONE Safety and Mobility

SAMPLE TRANSPORTATION MANAGEMENT PLANS (TMPs) AND TEMPLATES

B. TMP DEVELOPMENT AND IMPLEMENTATION TIPS AND TOOLS

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TMP Development Tips and Considerations

- **Early TMP Development—**Conducting TMP analyses early in a project's development helps ensure that TMP development and implementation costs are included in the project budget and that agencies consider work zone impacts in evaluation and selection of design alternatives.
- **Early Project Coordination—**Coordinating among multiple projects in the same corridor or region is important to effectively manage overall work zone impacts and maximize use of resources. When coordination across projects is not done early in the process, it can lead to conflicts in roles and responsibilities, TTC plans, and other strategies in the future and can result in additional cost. Some agencies have found to helpful to create a regional TMP or corridor TMP to help coordinate individual project TMPs and address overarching issues in an integrated way when there are several projects in an area at the same time. Such coordination may also bring to light opportunities for sharing resources, such as dynamic message signs or motorist assist patrols, potentially leading to cost efficiencies.
- **Stakeholder Coordination—**Stakeholder coordination is invaluable for successful completion of any project as it helps keep the stakeholders informed, provides an avenue to seek their input on and knowledge of local/regional issues, and improves interagency coordination and response to work zone issues. Good, early coordination with stakeholders can help identify additional solutions to work zone concerns and eliminate later surprises.
- **TMP Costs—**Estimating the work zone management strategy implementation cost of the TMP and including these costs within the overall project budget is crucial, as it may be difficult to obtain additional funding at a later time.
- **Multi-Jurisdictional Communication and Buy-In—**Early communication and coordination with surrounding DOTs and other relevant agencies will help in planning mitigation strategies and provide the basis for better support and solutions. This is particularly important for projects where impacts are expected to extend beyond State lines.
- **Viability of Alternate Routes, Including Pedestrian Detours—**Consider and include proposed alternate/detour routes in the traffic analysis to assess how viable the proposed routes are in addressing the safety and mobility issues that may arise for all road users. Also assess any proposed pedestrian/bicycle detour routes to determine any safety or accessibility issues.
- **Contract Documents—**Specify in contract documents which requirements supersede others to avoid any conflicts between TMP guidelines and any other contract documents. It is also desirable to include any specific TMP requirements (including the potential need for TMP modifications as the project develops) in contract documents for projects when a contractor will develop the TMP (e.g., design-build project).
- **Summary Tables—**When possible, use summary tables in the TMP document to help increase the clarity of information. Some transportation agencies include a summary table in the TMP to provide a quick overview of the operational characteristics for the existing and proposed conditions.

- **TMP Updates—**Revise the TMP and its appendices/attachments periodically as major changes are made to the proposed improvements and schedules. Specify the requirement of TMP updates (if needed frequency of updates can also be included) in contract documents for a contractor-developed TMP.
- **TMP Uniqueness and Flexibility in Development—**Because each project is unique, these TMP Samples and Templates are not intended to be restrictive; agencies should use them as resources to assist in the TMP development process.
- **TMP Training—**It is important to provide TMP Training to all involved in the development and implementation of TMPs. Training will help the staff to understand work zone impacts issues, and the process involved and options available in developing, implementing, and monitoring TMPs and help improve the consistency of TMPs within an agency.

TMP Development and Implementation Tools

FHWA has developed a guide, *Developing and Implementing Transportation Management Plans for Work Zones*, to assist practitioners with TMPs. The guide discusses TMP development processes and considerations, and include a work zone management strategies matrix. This guide, and more information on the below tools, are available on the FHWA Work Zone website at http://ops.fhwa.dot.gov/wz/resources/final_rule/tmp_examples/tmp_dev_resources.htm.

Many States have developed tools to assist their work zone practitioners through the TMP development process. A sampling of these tools include:

- **Red Flag Summary—**The Maryland State Highway Administration (MdSHA) has developed a red flag summary to assist its agency personnel in making a preliminary determination on some of the major issues that could arise during project development. The checklist flags any major construction issues during the early planning stage to avoid costly and complex conflicts or changes in the future.
- **TMP Data Sheets—**The California Department of Transportation (Caltrans) prepares TMP data sheets for all projects during the conceptual planning and design stages of a project to gather and summarize TMP-related information as the project develops. The data sheets include preliminary TMP strategies and costs, a work description, the work areas, and available information about traffic patterns.
- **TMP Templates—** Rhode Island DOT (RIDOT) has developed four templates depending on the impact level of projects, with levels 1 and 2 designated as significant. The templates help to ensure that key steps are completed during TMP development and that TMPs do not overlook key items. The templates also provide consistency, which can aid in TMP review, approval, and evaluation.
  - RIDOT TMP Templates also includes a Post-Construction Work Zone Performance Assessment to be completed by the RIDOT TMP Implementation Manager at the completion of the work. This assessment helps document lessons learned and successes/failures of the TMP itself and its requirements, and provides recommendations on how to improve the TMP process and/or modify guidelines.
- **Work Zone Impact Assessment Decision Tree—** The Minnesota Department of Transportation (Mn/DOT) has developed a work zone impact assessment decision tree and

an impacts consideration worksheet to help identify the potential project work zone mobility impacts and provide guidelines for developing strategies to mitigate the impacts.

- **Intelligent Work Zone (IWZ) Toolbox—** Mn/DOT developed an IWZ Toolbox that contains preliminary illustrations of IWZ Systems that are typically deployed and provides guidelines for selecting an appropriate IWZ System for existing work zone traffic issues and to mitigate anticipated issues on scheduled projects. The IWZ systems illustrated in the toolbox can be combined, modified, enhanced or simplified as necessary to suit the project needs.
- **TMP Workbook—** The Tennessee Department of Transportation developed a TMP Workbook to aid DOT staff in developing TMPs. The Workbook serves as a decision-making platform for the TMP and also helps document TMP development. The first part of the Workbook (Project Significance Determination) is filled in by the planning staff, and then passed to designers to complete the sections on TMP strategies during project design.
- **TMP Strategy Database—** The Missouri Department of Transportation (MoDOT) developed a TMP Strategy Database program that returns possible appropriate work zone management strategies based on user inputs or various project characteristics. The program helps planners and designers select work zone management strategies and develop TMPs in a more systematic way, beginning at work zone planning, with re-evaluation occurring in the design stage. Construction personnel can use the program to find a solution should concerns arise while the work zone is in operation.
- **Work Zone Design Checklist—** MdSHA developed a work zone design checklist, which provides a list of potential work zone impacts, design options, and management strategies. The Checklist helps designers identify work zone impacts that need to be assessed, and helps ensure that appropriate work zone options have been considered and strategies have been chosen before going forward.
- **Transportation Systems Management Meetings (TSMs) -** The Arizona Department of Transportation (ADOT) Communications and Community Partnerships Division is involved throughout the design, construction, and maintenance process of a project to ensure that all stakeholders are involved. During construction, ADOT conducts frequent TSM meetings with all stakeholders, including contractors and political subdivisions.
- **TMP Training—** The Wisconsin Department of Transportation developed and implemented a TMP training course that explains specific components of a TMP within the context of Wisconsin practice, requirements, and project development.

RULE on WORK ZONE Safety and Mobility

TRANSPORTATION MANAGEMENT PLAN (TMP) TEMPLATE 1

C. MINOR-TO-MODERATE IMPACTS PROJECT TEMPLATE

A. How to Use the Guide

C. TMP Template 1 Minor-to-Moderate Impacts

E. Sample TMP 1 Minor-to-Moderate Impacts

B. TMP Tips and Tools

D. TMP Template 2 Moderate-to-Major Impacts

F. Sample TMP 2 Moderate-to-Major Impacts

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1.0 Project Description

This section provides an overview of the project, which generally includes:

- Work zone limits (if possible, include a map showing the limits of the work)
- Project background information
- Overview of roadways directly affected by project work zones
- Specific traffic restrictions expected on major roadways during the work (e.g., shoulder closures, lane closures, lane shifts)
- Regional projects that may impact each other
- Project Schedule.

2.0 TMP Team—Roles and Responsibilities

This section includes contact information and roles and responsibilities of major personnel involved in the project such as:

- TMP Development Managers—Agency/Contractor personnel who have primary responsibility for developing the TMP.
- TMP Implementation/Monitoring Managers—Agency/Contractor personnel who have primary responsibility for implementing and monitoring the TMP.
- TMP Implementation Task Leaders—Responsible for managing, completing, overseeing, or assisting in specific transportation management tasks during the work.
- Emergency Contacts—Public and semi-public agencies, such as hospitals, schools, health clinics, etc., who must be kept informed about the work zone activities, especially in case of a road closure.

The following tables can be used to list the contact information and roles and responsibilities for major personnel involved in the project. Tables can be modified depending on agency needs.

TMP Development Managers	
Department Of Transportation (DOT)	**Consultant**
Name/Title: Unit: Phone: Email:	Name/Title: Unit: Phone: Email:
Roles and Responsibilities:	

TMP Implementation/Monitoring Managers	
DOT	**Consultant**
Name/Title: Unit: Phone: Email:	Name/Title: Unit: Phone: Email:
Roles and Responsibilities:	

TMP Implementation Task Leaders	
DOT	**Consultant**
Name/Title: Unit: Phone: Email:	Name/Title: Unit: Phone: Email:
Roles and Responsibilities:	

Emergency Service Contacts	
Fire and Emergency Medical Services (FEMS)	**Police Department (PD)**
Name/Title: Unit: Phone: Email:	Name/Title: Unit: Phone: Email:
Roles and Responsibilities:	

3.0 Preliminary Work Zone Impact Assessment

As challenges vary greatly from one project to another, a preliminary assessment of work zone impacts developed in the early planning stages of the project will help identify issues or uncover problem areas that should be considered during project development. Agency guidelines apply on determining the impact levels and how extensive the preliminary assessment should be. Some agencies use decision-support tools, while others have developed checklists/flowcharts to assist in the decision-making process.

Some of the potential questions that could help in the preliminary assessment of work zone impacts include:

Does the project includes a long-term closure and/or extended weekend closure?

If Yes, what is/are the applicable type of facility(ies)?

- Freeway
- Principal Arterial
- Minor Arterial
- Collector
- Local

Can traffic be detoured?

- Is the local alternate detour route in good condition?
- Will the detour route have a detrimental impact on emergency vehicles, school buses, or other sensitive traffic?
- Are there load limit restrictions on the detour?
- Are there bridge/culvert height or width restrictions on the detour?

Is the existing shoulder sufficient to support traffic during construction?

Is additional width required on culverts or bridges to maintain traffic?

Is there a pedestrian/bicycle facility that must be maintained?

Would a temporary structure(s) be required?

Would a median crossover be needed?
Would there be a need to maintain railroad traffic?

Could maintenance of traffic have an impact on existing or proposed utilities?

Does it appear that maintenance of traffic will require additional right-of-way?

Can the contractor restrict the roadway during the time periods listed?

- a.m. peak hours, one direction
- p.m. peak hours, one direction
- a.m. peak hours, both directions
- p.m. peak hours, both directions
- Overnight
- Local celebrations
- Holidays or weekends
- Sporting events/other special events

Will project timing (for example, start or end date) be affected by special events:

- School closings or openings?
- Holidays?
- Sporting events?

Are there any projects to be considered along the corridor or in the region?

- Roadwork in the immediate area that may affect traffic or the contractor's operations?
- Roadwork on other roads that may affect the use of alternate routes?

Are there other maintenance of traffic issues? If so, specify.

Some projects (e.g., on low volume rural roads) may need only a simple screening tool such as a checklist, while others (e.g., in congested urban areas) may need quantitative analysis (level of service analysis, signal timing, etc) to determine the impact levels. Quantitative analysis may indicate the need for some additional analysis and/or strategies to assess and manage the impacts, or it may indicate that impacts are relatively low and few strategies are required beyond the temporary traffic control (TTC) plan.

NOTE: If the project is expected to create moderate-to-major impacts, use Template 2. For lower impacts projects, continue with this template.

4.0 Work Zone Impact Management Strategies

This section provides an overview of various strategies employed to improve the safety and mobility of work zones and reduce the work zone impacts on communities and businesses. The strategies are grouped according to the following categories:

1. Temporary Traffic Control (TTC)
2. Transportation Operations (TO)
3. Public Information and Outreach (PI&O).

Additional Considerations

TMP Details—Many agencies have the details of proposed work zone strategies in TTC plans (e.g., PCMS message content) and strategies listed in the TMP document. In such cases, it will be useful to include the detailed plans (e.g., TTC Plan) as attachments to the TMP.

TMP Costs—Agency guidelines apply regarding whether cost should be shown in the TMP document. If the TMP is to be a contract document, it typically does not show cost items. However, estimating the work zone management strategy implementation costs and including these within the overall project budget is crucial, as it may be difficult to obtain additional funding at a later time. This potentially avoids under-allocation of funds. Where feasible, it is helpful to itemize the cost estimates for the various management strategies and document them in the TMP, and specify cost responsibilities, opportunities for sharing or coordinating with other projects, and funding sources. TMP components can be funded as part of the construction contract and/or in separate agreements.

The sample tables below provide a summary of various work zone management strategies. They can be modified by agencies to suit their needs.

Temporary Traffic Control	√	Cost
Control Strategies		
1. Construction phasing/staging		
2. Full roadway closures		
3. Lane shifts or closures		
4. One-lane, two-way controlled operation		
5. Two-way, one-lane traffic/reversible lanes		
6. Ramp closures/relocation		
7. Freeway-to-freeway interchange closures		
8. Night work		
9. Weekend work		
10. Work hour restrictions for peak travel		
11. Pedestrian/bicycle access improvements		
12. Business access improvements		

Temporary Traffic Control	√	Cost
13. Off-site detours/use of alternate routes		
Traffic Control Devices		
14. Temporary signs		
15. Arrow boards		
16. Channelizing devices		
17. Temporary pavement markings		
18. Flaggers and uniformed traffic control officers		
19. Temporary traffic signals		
20. Lighting devices		
Project Coordination Strategies		
21. Other area projects		
22. Utilities		
23. Right-of-Way		
24. Other transportation infrastructure		
Innovative Contracting Strategies		
25. Design-Build		
26. A+B Bidding		
27. Incentive/Disincentive clauses		
28. Lane rental		
29. Performance specifications		
Innovative or Accelerated Construction Techniques		
30. Prefabricated/precast elements		
31. Rapid cure materials		

Transportation Operations	√	Cost
Demand Management Strategies		
1. Transit service improvements		
2. Transit incentives		
3. Shuttle services		
4. Parking supply management		
5. Variable work hours		
6. Telecommuting		
7. Ridesharing/carpooling incentives		
8. Park-and-Ride promotion		

Transportation Operations	√	Cost
Corridor/Network Management Strategies		
9. Signal timing/coordination improvements		
10. Temporary traffic signals		
11. Street/intersection improvements		
12. Bus turnouts		
13. Turn restrictions		
14. Parking restrictions		
15. Truck/heavy vehicle restrictions		
16. Reversible lanes		
17. Dynamic lane closure system		
18. Ramp closures		
19. Railroad crossing controls		
20. Coordination with adjacent construction site(s)		
Work Zone ITS Strategies		
21. Late lane merge		
22. PCMS with speed display		
23. Travel time estimation system		
24. Advanced speed information system		
25. Advanced congestion warning system		
26. Conflict warning system (e.g., construction vehicles entering roadway)		
27. Travel time monitor system		
28. Freeway queue monitor system		
29. CCTV monitoring		
30. Real-time detour		
Work Zone Safety Management Strategies		
31. Speed limit reduction/variable speed limits		
32. Temporary traffic signals		
33. Temporary traffic barrier		
34. Movable traffic barrier systems		
35. Crash cushions		
36. Temporary rumble strips		
37. Intrusion alarms		
38. Warning lights		
39. Automated flagger assistance devices (AFADs)		

Transportation Operations	√	Cost
40. Project task force/committee		
41. Construction safety supervisors/inspectors		
42. Road safety audits		
43. TMP monitor/inspection team		
Incident Management and Enforcement Strategies		
44. ITS for traffic monitoring/management		
45. TMC		
46. Surveillance (e.g., CCTV)		
47. Helicopter for aerial surveillance		
48. Traffic Screens		
49. Call boxes		
50. Mile-post markers		
51. Tow/freeway service patrol		
52. Total station units		
53. Photogrammetry		
54. Media coordination		
55. Local detour routes		
56. Contract support for Incident Management		
57. Incident/Emergency management coordination		
58. Incident/Emergency response plan		
59. Dedicated (paid) police enforcement		
60. Cooperative police enforcement		
61. Automated enforcement		
62. Increased penalties for work zone violations		
63. Emergency pull-offs		

Public Information and Outreach	√	Cost
Public Awareness Strategies		
1. Branding		
2. Press kits		
3. Brochures and mailers		
4. Press releases/media alerts		
5. Mass media (earned and/or paid)		
6. Paid advertisements		
7. Project Information Center		

Public Information and Outreach	√	Cost
8. Telephone hotline		
9. Planned lane closure website		
10. Project website		
11. Public meetings/hearings, workshops		
12. Community task forces		
13. Coordination with media/schools/business/emergency services		
14. Work zone education and safety campaigns		
15. Work zone safety highway signs		
16. Rideshare promotions		
17. Visual information		
Motorist Information Strategies		
18. Radio traffic news		
19. Changeable message signs		
20. Temporary motorist information signs		
21. Dynamic speed message sign		
22. Highway Advisory Radio (HAR)		
23. Extinguishable Signs		
24. Highway information network (web-based)		
25. Traveler information systems(wireless, handheld)		
26. Transportation Management Center (TMC)		
27. Live traffic camera(s) on a website		
28. Project information hotline		
29. Email alerts		

5.0 Notes

Any additional notes on selected strategies, the TMP in general, or any item requiring special attention for the project can be provided in this section.

6.0 TMP Implementation/Monitoring

Agency requirements for TMP implementation and monitoring can be included here. The responsible personnel for TMP implementation and monitoring can be identified in Section 2.0—Roles and Responsibilities.

Monitoring performance of the TMP during the construction phase is important in establishing whether the predicted impacts closely resemble the actual conditions in the field, and whether the TMP strategies are effective in managing the impacts. According to 23 CFR 630 Subpart J - §630.1012(e), the State/Agency and the contractor shall each designate a trained person at the project level who has the primary responsibility and sufficient authority for implementing the TMP and other safety and mobility aspects of the project.

7.0 TMP Review/Approvals

TMPs, and changes to TMPs, must be approved by the DOT before they are implemented. A sample TMP Approval Template is given below which can be modified by agencies according to their practice/needs.

Chief Engineer			Project Engineer		
All approvals must be obtained prior to start of work					
Signature: Name: Date:			Signature: Name: Date:		
Revision#	Initials	Date	Revision#	Initials	Date
1			1		
2			2		

8.0 Appendices

A. Traffic Analysis Reports (if applicable)
B. Temporary Traffic Control Plans
C. Public Information and Outreach Plan (if applicable)
D. Post Project Evaluation Report

RULE on WORK ZONE Safety and Mobility

TRANSPORTATION MANAGEMENT PLAN (TMP) TEMPLATE 2

D. MODERATE-TO-MAJOR IMPACTS PROJECT TEMPLATE

A. How to Use the Guide

C. TMP Template 1 Minor-to-Moderate Impacts

E. Sample TMP 1 Minor-to-Moderate Impacts

B. TMP Tips and Tools

D. TMP Template 2 Moderate-to-Major Impacts

F. Sample TMP 2 Moderate-to-Major Impacts

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- Project background information.
- Specific traffic restrictions expected on major roadways during the work (e.g., shoulder closures, lane closures, lane shifts).
- Specific roadways that will be directly affected by the project work zones.
- Regional projects that may impact each other.
- Project schedule.

2.0 TMP Team—Roles and Responsibilities

Defining roles and responsibilities from the initial stages of a project helps to coordinate all the activities related to TMP development, implementation, and monitoring. This section includes contact information and roles and responsibilities for major personnel involved in the project, such as:

Additional Considerations

- Some TMPs may not have all the information at the early stages of the project. Information can be added as the project progresses.
- When multiple sections of an agency or different agencies, consultants, or contractors are involved, this would be a good place to include their contact information to help with coordination across agencies/projects.

- TMP Development Managers—Agency/Contractor personnel with the primary responsibility for developing the TMP.
- TMP Implementation Managers—Agency/Contractor personnel primarily responsible for implementing the TMP.
- TMP Implementation Task Leaders—Agency personnel/Contractor personnel who manage, complete, oversee, or assist in specific transportation management tasks (examples include TTC inspection/supervision, PI Officer, etc.) during the work.
- Public Information Officer—Agency personnel who provide real-time public awareness of the work zone, including detection, prevention, and response to incidents.
- Emergency Contacts—Public or semi-public agencies (e.g., hospitals, schools) that need to be kept informed about work zone activities, especially in case of a road closures.

The following tables can be used to list contact information and roles and responsibilities of major personnel involved in the project. The tables can be modified to meet agency needs.

TMP Development Managers	
Department of Transportation (DOT)	**Consultant**
Name/Title: Unit: Phone: Email:	Name/Title: Unit: Phone: Email:
Roles and Responsibilities:	

TMP Implementation/Monitoring Managers	
DOT	**Consultant**
Name/Title: Unit: Phone: Email:	Name/Title: Unit: Phone: Email:
Roles and Responsibilities:	

TMP Implementation Task Leaders	
DOT	**Consultant**
Name/Title: Unit: Phone: Email:	Name/Title: Unit: Phone: Email:
Roles and Responsibilities:	

Public Information Officer	
DOT	**Consultant**
Name/Title: Unit: Phone: Email:	Name/Title: Unit: Phone: Email:
Roles and Responsibilities:	

Emergency Service Contacts	
Fire and Emergency Medical Services (FEMS)	**Police Department (PD)**
Name/Title: Unit: Phone: Email:	Name/Title: Unit: Phone: Email:
Roles and Responsibilities:	

3.0 Preliminary Work Zone Impact Assessment

As challenges vary greatly from one project to another, a preliminary assessment of work zone impacts developed in the early planning stages of the project will help identify issues or uncover problem areas that should be considered during project development. Agency guidelines apply on determining the impact levels and how extensive the preliminary assessment should be. Some agencies use decision-support tools, while others have developed checklists/flowcharts to assist in the decision-making process. For projects where major impacts are readily apparent, agencies may choose to conduct a detailed analysis directly (skip to Section 4.0), rather than go through a preliminary assessment.

Some of the potential questions that could help in a preliminary assessment of work zone impacts include:

Does the project includes a long-term closure and/or extended weekend closure?

If Yes, what is/are the applicable type of facility(ies)?

- Freeway
- Principal Arterial
- Minor Arterial
- Collector
- Local

Can traffic be detoured?

- Is the local alternate detour route in good condition?
- Will the detour route have a detrimental impact on emergency vehicles, school buses, or other sensitive traffic?
- Are there load limit restrictions on the detour?
- Are there bridge/culvert height or width restrictions on the detour?

Is the existing shoulder sufficient to support traffic during construction?

Is additional width required on culverts or bridges to maintain traffic?

Is there a pedestrian/bicycle facility that must be maintained?

Would a temporary structure(s) be required?

Would a median crossover be needed?

Would there be a need to maintain railroad traffic?

Could maintenance of traffic have an impact on existing or proposed utilities?

Does it appear that maintenance of traffic will require additional right-of-way?

Can the contractor restrict the roadway during the time periods listed?

- a.m. peak hours, one direction
- p.m. peak hours, one direction
- a.m. peak hours, both directions
- p.m. peak hours, both directions
- Overnight
- Local celebrations

- Holidays or weekends
- Sporting events/other special events

Will project timing (for example, start or end date) be affected by special events:

- School closings or openings?
- Holidays?
- Sporting events?

Are there any projects to be considered along the corridor or in the region?

- Roadwork in the immediate area that may affect traffic or the contractor's operations?
- Roadwork on other roads that may affect the use of alternate routes?

Are there other maintenance of traffic issues? If so, specify.

Some projects (e.g., on low volume rural roads) may need only a simple screening tool such as a checklist, while others (e.g., in congested urban areas) may need quantitative analysis (level of service analysis, signal timing, etc) to determine the impact levels. Quantitative analysis may indicate the need for some additional analysis and/or strategies to assess and manage the impacts, or it may indicate that impacts are relatively low and few strategies are required beyond the temporary traffic control (TTC) plan.

NOTE: If the project is expected to create moderate-to-major impacts, continue with this template. For lower impacts projects, use Template 1.

4.0 Existing Conditions

This section provides an overview of the existing conditions within the study area. The existing conditions generally include:

- Roadway characteristics (history, roadway classification, number of lanes, geometrics, urban/suburban/rural).
- Historical traffic data (volumes, speed, capacity, volume/capacity, percent trucks, queue length, peak traffic hours).
- Traffic operations (signal timing, traffic controls).
- Crash data.
- Pedestrian/bicycle facilities.
- Transit facilities.
- Truck routes.
- Local community and business concerns/issues.
    - Comments/concerns regarding traffic operations, delays, access/egress, etc., that have been received from community, business representatives, and stakeholders during the planning and design stages of the project development.
    - Specific concerns on pedestrian, bicycle, transit facilities, etc. This will help in assessing the impacts and assist in developing appropriate strategies to alleviate the identified issues and concerns.

The sample table below summarizes pertinent project information. Agencies can modify the table to meet their needs.

Roadways Affected By MOT Plans—Summary						
Roadway/Street Name	**Classification**	**ADT**	**Capacity**	**Peak Hour Volume**	**Existing LOS**	**Proposed LOS**

5.0 Operational Analysis

This section is intended to provide information on safety and mobility aspects within the project influence area, including traffic safety, data collection and modeling approach, traffic analysis, and other issues and concerns. This operational analysis will help identify potential work zone impacts and guide selection of TMP strategies.

5.1. Safety Analysis

A safety analysis will help identify the potential locations for monitoring and/or other strategy deployments during construction to help manage work zone safety. Ongoing monitoring of the potential locations for any increase in crashes is important while the TTC, TOP, and PI&O are implemented.

The table, below can be used to summarize crash data (at least for the previous three years) by intersection or control section. The table can be modified depending on agency needs/standards. Crash data may include:

- Number of crashes by location.
- Percentage of crashes by type or contributory factors.
- Crashes per million vehicles, etc.

Summary of Crashes									
Intersection Name/ Control Section					**Type of Crashes**				
	Total	**Injuries**	**Fatalities**	**Work Zone**	**Pedestrian**	**Bicycle**	**Rear-End**	**Right Angle**	**Left-Turn**

5.2. Traffic Analysis

5.2.1. Data Collection and Traffic Modeling

Based on the type and complexity of the analysis to be conducted, data collection/gathering may include:

- Traffic counts (vehicles, bicycles, pedestrians, trucks).
- Speed survey (counts, posted and 85th percentile speeds, etc).
- Intersection control.
- Land use.

Measures of effectiveness (MOEs) are usually determined for the primary/critical roadway segments. The type of analysis greatly depends on agency policies and practices, and complexity of the project.

Additional Considerations

- Model adjacent roadways impacted by the construction in the overall analysis, as traffic can detour from a congested construction route.
- The FHWA Traffic Analysis Tools program provides information on traffic analysis tools. (http://ops.fhwa.dot.gov/trafficanalysistools/index.htm)

MOEs can include:

- Delays
- Queue Lengths
- LOS
- Travel Time
- V/C Ratio
- Congestion/User cost

The use of traffic analysis tools depends on the roadway classification (corridor/freeway/freeway surface street interchange) and level of complexity of the project. Specific tools available for use in modeling include the following:

- SYNCHRO
- HCS
- Quick Zone
- QUEWZ
- CA4PRS
- DYNASMART- P
- Lane Closure Analysis Program (LCAP)/Charts
- VISSIM
- CORSIM
- Quadro

A single tool may be used in modeling, or for some projects a combination of tools may be helpful.

Additional Considerations

Many States have developed/modified various spreadsheet programs and other tools, such as web-based work zone safety analysis, lane closure analysis programs, lane closure requirement charts or maps, etc., to assist in work zone impact analysis.

5.2.2. Alternatives/Impact Assessment

A work zone impact assessment is the process of understanding the safety and mobility impacts of a road construction, rehabilitation, or maintenance projects. The analysis compares and documents various work zone options and associated maintenance of traffic constraints, including staging/phasing options as well as temporary traffic control options, for each project and work zone design alternative. Performing an alternatives analysis during the preliminary stages of the project helps in selecting the best option going forward.

An alternative assessment may involve a high-level qualitative analysis or a detailed quantitative analysis using various models, as described in section 5.2.1. It involves a comparison between existing and future traffic operations for different alternatives. These comparisons should be evaluated in conjunction with agency thresholds to determine whether the impacts are acceptable or not. For unacceptable impacts, agencies should follow their safety and mobility policy guidelines for reducing the impacts.

To assess the impacts, traffic analysis is usually conducted for existing conditions and proposed work zone alternatives, and the results compared. Traffic analysis helps to:

- Provide a baseline to compare with future work zone alternatives.
- Identify the extent of possible traffic backups, which can then be used to determine potential detour routes or where traffic may naturally reroute itself, or locations that may need additional monitoring.

Additional Considerations
If the MOT alternative analysis is prepared during the design process, and is referenced in the TMP, consider including it as an appendix for easy reference and access.

The sample table template below provides an easy comparison of MOEs for different alternatives. Agencies can modify the table to meet their needs.

Summary Of MOEs For Alternatives – Exiting with Construction Conditions

MOEs	Existing	Alternative 1	Alternative 2	Alternative 3
Legend				
	Indicates Selected Alternative			

Additional Considerations
It is recommended to include a short narrative on the reason for the selected alternative.

This section can also include a brief review of the impact assessment of the selected construction alternative in different areas such as:

- Community Accessibility—Impact on access/egress of the community and businesses around the work zones (if any).
- Pedestrians and Bicyclists—Safety and accessibility of pedestrians with respect to sidewalk/crosswalk closures, ADA compliance, feasibility, safety of pedestrian detours, temporary crosswalks, etc.
- Public Transportation—Work zone impact on the existing bus routes and bus stops. If any alternate bus stops are provided, are the routes to, as well as the bus stops ADA compliant?
- Commercial Vehicles—Measures considered to reduce/detour the commercial vehicles (in case of significant impact operating in and around the work zones).
- Utilities—Major utility projects could impact the roadway traffic. It is important to identify the utility projects scheduled to take place during the construction period and consider them while developing the TMP.

6.0 Work Zone Impact Management Strategies

This section provides an overview of various strategies deployed to improve the safety and mobility of work zones and reduce the work zone impacts on the road users, community, and businesses.

The strategies are grouped according to the following three categories.

1. Temporary Traffic Control (TTC)
2. Transportation Operations (TO)
3. Public Information and Outreach (PI&O).

In addition to traditional TTC strategies, TO and PI mitigation measures must be used for significant projects. Some examples of TO and PI strategies include:

- Motorist assist patrols.
- Enhanced sign and pavement markings.
- Increased police enforcement.
- Real-time traffic information and updates on project delays.

Additional Considerations

TMP Details—For traditional design-bid-build project, many agencies have details of the proposed work zone strategies in TTC plans (e.g., PCMS message content) and list of strategies in the TMP document. In such cases it is useful to include the TTC Plan as an attachment to the TMP. In case of design-build projects, work zone strategies based on preliminary TTC concept plans would be included in the TMP document.

TMP Costs—Agency guidelines apply on whether cost should be listed in the TMP document. When the TMP is a contract document, the cost items are typically not listed. However, estimating the work zone management strategy implementation costs and including these within the overall project budget is crucial, as it may be difficult to obtain additional funding at a later time for needed strategies. This potentially avoids under-allocation of funds. Where feasible, it is helpful to itemize the cost estimates for the various management strategies and document them in the TMP, with cost responsibilities, opportunities for sharing or coordinating with other projects, and funding sources specified. TMP components can be funded as part of the construction contract and/or in separate agreements.

Contingency/Incident Management Plans—Consider developing a contingency plan that addresses specific actions that will be taken to restore or minimize impacts on traffic when the congestion or delay exceeds original estimates due to unforeseen events. This includes work-zone crashes, traffic volumes higher than predicted traffic demand, delayed pick-up of lane closures, etc.

It is best to develop the Contingency/Incident Management plan as a collaborative effort with the emergency response and the public safety community. Development of such a plan is crucial in the early phases to properly integrate the concerns of the first responder personnel. It is recommended that agencies consider key components, such as the following six items, in developing the plan:

(1) Incident Detection and Verification; (2) Incident Classification and Response; (3) Site Management; (4) Site Clearance; (5) Motorist Information; (6) Evaluation.

The sample tables below provide a summary of various work zone management strategies. The tables can be modified by agencies to suit their needs.

Temporary Traffic Control	√	Cost
Control Strategies		
1. Construction phasing/staging		
2. Full roadway closures		
3. Lane shifts or closures		
4. One-lane, two-way controlled operation		
5. Two-way, one-lane traffic/reversible lanes		
6. Ramp closures/relocation		
7. Freeway-to-freeway interchange closures		
8. Night work		
9. Weekend work		
10. Work hour restrictions for peak travel		
11. Pedestrian/bicycle access improvements		
12. Business access improvements		
13. Off-site detours/use of alternate routes		
Traffic Control Devices		
14. Temporary signs		
15. Arrow boards		
16. Channelizing devices		
17. Temporary pavement markings		
18. Flaggers and uniformed traffic control officers		
19. Temporary traffic signals		
20. Lighting devices		
Project Coordination Strategies		
21. Other area projects		
22. Utilities		
23. Right-of-Way		
24. Other transportation infrastructure		
Innovative Contracting Strategies		
25. Design-Build		
26. A+B Bidding		
27. Incentive/Disincentive clauses		
28. Lane rental		
29. Performance specifications		
Innovative or Accelerated Construction Techniques		
30. Prefabricated/precast elements		
31. Rapid cure materials		

Transportation Operations	√	Cost
Demand Management Strategies		
1. Transit service improvements		
2. Transit incentives		
3. Shuttle services		
4. Parking supply management		
5. Variable work hours		
6. Telecommuting		
7. Ridesharing/carpooling incentives		
8. Park-and-Ride promotion		
Corridor/Network Management Strategies		
9. Signal timing/coordination improvements		
10. Temporary traffic signals		
11. Street/intersection improvements		
12. Bus turnouts		
13. Turn restrictions		
14. Parking restrictions		
15. Truck/heavy vehicle restrictions		
16. Reversible lanes		
17. Dynamic lane closure system		
18. Ramp closures		
19. Railroad crossing controls		
20. Coordination with adjacent construction site(s)		
Work Zone ITS Strategies		
21. Late lane merge		
22. PCMS with speed display		
23. Travel time estimation system		
24. Advanced speed information system		
25. Advanced congestion warning system		
26. Conflict warning system (e.g., construction vehicles entering roadway)		
27. Travel time monitor system		
28. Freeway queue monitor system		
29. CCTV monitoring		
30. Real-time detour		
Work Zone Safety Management Strategies		
31. Speed limit reduction/variable speed limits		
32. Temporary traffic signals		
33. Temporary traffic barrier		
34. Movable traffic barrier systems		

Transportation Operations	√	Cost
35. Crash cushions		
36. Temporary rumble strips		
37. Intrusion alarms		
38. Warning lights		
39. Automated flagger assistance devices (AFADs)		
40. Project task force/committee		
41. Construction safety supervisors/inspectors		
42. Road safety audits		
43. TMP monitor/inspection team		
Incident Management and Enforcement Strategies		
44. ITS for traffic monitoring/management		
45. TMC		
46. Surveillance (e.g., CCTV)		
47. Helicopter for aerial surveillance		
48. Traffic Screens		
49. Call boxes		
50. Mile-post markers		
51. Tow/freeway service patrol		
52. Total station units		
53. Photogrammetry		
54. Media coordination		
55. Local detour routes		
56. Contract support for incident management		
57. Incident/Emergency management coordination		
58. Incident/Emergency response plan		
59. Dedicated (paid) police enforcement		
60. Cooperative police enforcement		
61. Automated enforcement		
62. Increased penalties for work zone violations		
63. Emergency pull-offs		

Public Information and Outreach	√	Cost
Public Awareness Strategies		
1. Branding		
2. Press kits		
3. Brochures and mailers		
4. Press releases/media alerts		
5. Mass media (earned and/or paid)		
6. Paid advertisements		
7. Project Information Center		
8. Telephone hotline		
9. Planned lane closure website		
10. Project website		
11. Public meetings/hearings, workshops		
12. Community task forces		
13. Coordination with media/schools/business/emergency services		
14. Work zone education and safety campaigns		
15. Work zone safety highway signs		
16. Rideshare promotions		
17. Visual information		
Motorist Information Strategies		
18. Radio traffic news		
19. Changeable message signs		
20. Temporary motorist information signs		
21. Dynamic speed message sign		
22. Highway Advisory Radio (HAR)		
23. Extinguishable Signs		
24. Highway information network (web-based)		
25. Traveler information systems(wireless, handheld)		
26. Transportation Management Center (TMC)		
27. Live traffic camera(s) on a website		
28. Project information hotline		
29. Email alerts		

7.0 Notes

Any additional notes on selected strategies, the TMP in general, or any item requiring special attention for the project can be provided in this section.

8.0 TMP Implementation/Monitoring

The TMP needs to be implemented in the field, as specified, unless any changes have been approved by the agency. To help ensure appropriate implementation, 23 CFR 630 Subpart J §630.1012(e) requires that the State/Agency and the contractor each designate a trained person at the project level who has the primary responsibility and sufficient authority for implementing the TMP and other safety and mobility aspects of the project.

Monitoring the performance of the TMP during the construction phase is important to establish whether the predicted impacts closely resemble the actual conditions in the field, and whether the TMP strategies are effective in managing the impacts. TMP monitoring is needed for both oversight and evaluation purposes, such as:

- Monitoring and documenting TMP changes during construction.
- Preparing an evaluation of the TMP, including lessons learned.
- Refining work zone impact analysis processes and models based on outcomes.

TMP monitoring includes details of any specific observational, logging, and/or recording activities conducted during the project for work zone performance measurement purposes. Examples of possible performance measures for TMP monitoring include:

- Volume
- LOS
- Queue length
- Delay
- Travel time
- Number of crashes/incidents
- Incident response and clearance times
- Type and frequency of legitimate complaints received.

Additional Considerations
Agencies use different methods to monitor and assess performance, such as portable sensors or floating car methods to measure queues and travel times, and video cameras with detection capabilities for real time measurements.

It is helpful for the TMP Implementation/Monitoring Managers to meet with the Project Manager on a regular basis to discuss and assess the safety and mobility impacts of the project work zone to date. This helps to assess how well the TMP is managing the project impacts, and can help identify and address issues before they become problems. It also provides the opportunity to verify that all key stakeholders and project officials have been receiving timely notifications where required.

9.0 TMP Review/Approvals

TMPs, and changes to TMPs, must be approved by the DOT before they are implemented. As part of this process, many agencies conduct a TMP review, either by a designated individual or a team. A TMP review is particularly important for higher impact projects, and will help with future revisions of the TMP and performance monitoring. The TMP approval is then based on the TMP review.

It is ideal to have a specific person, such as the Chief Engineer and/or a designate, approve the final TMP design document before implementation. It is recommended that major updates also be approved by Chief Engineer or designate.

Additional Considerations

Peer Review – Some agencies have found it helpful to use a TMP peer review process for significant projects that involves a team not directly involved with the project (e.g., staff from DOT central office and other regions/districts). The TMP may go through peer review at various stages of the project, at which the TMP is assessed and comments are provided, including how to proceed.

Additional Considerations

Following are some State/agency practices relating to TMP review and approval:

- Michigan—has a statewide Safety and Mobility Peer Review Team for projects exceeding thresholds set in the Michigan *Work Zone Safety and Mobility Manual*.
- Oregon—each region has it own TMP reviews.
- Montana—TMP approval is conducted as part of the PS&E checklist
- California—has a signature line for the TMP Manager on the project "ready to list" form so that the TMP is signed off right before the project is put to bid.
- Maryland—District/relevant central office managers and the Public information Officer sign off on the TMP.
- Rhode Island—requires that the Chief Engineer, State Traffic Engineer, and Traffic Management Chief sign off on the TMP as part of the PS&E review and process.
- Wisconsin—has signoffs on the TMP worksheet checklist in the regions.

A sample TMP Approval Template is given below which can be modified by agencies according to their practice/needs.

Chief Engineer			Project Engineer		
All approvals must be obtained prior to the start of work					
Signature: Name: Date:			Signature: Name: Date:		
Revision#	Initials	Date	Revision#	Initials	Date
1					
2					

10.0 Appendices

Appendices may include:

- Traffic Counts
- Traffic Analysis (Existing compared with future)
- Temporary Traffic Control Plans
- Public Information and Outreach Plan
- TMP Review Notes
- Project Monitoring Form or Post-Project Evaluation Form.

RULE on WORK ZONE Safety and Mobility

SAMPLE TRANSPORTATION MANAGEMENT PLAN (TMP) 1

E. MINOR-TO-MODERATE IMPACTS PROJECT SAMPLE

A. How to Use the Guide

C. TMP Template 1 Minor-to-Moderate Impacts

E. Sample TMP 1 Minor-to-Moderate Impacts

B. TMP Tips and Tools

D. TMP Template 2 Moderate-to-Major Impacts

F. Sample TMP 2 Moderate-to-Major Impacts

August 2010

U.S. Department of Transportation
Federal Highway Administration

Table of Contents

Project Name:

Rehabilitation of Benning Road, NE from Anacostia Avenue to 42nd Street Washington, D.C.

1.0 Project Description

The project mainly consists of reconstruction of Benning Road, NE from Anacostia Avenue to 42nd Street, NE, Washington, D.C. The study area (figure below) considered for analysis is bounded by:

- Benning Road, NE on the north and northeast side
- Independence Avenue/E. Capitol Street, NE on the south side
- 17th Street, NE on the west side.

Benning Road is a principal arterial and, as such, the project is defined as a significant project according to District Department of Transportation (DDOT). Therefore, the TMP must comprise of:

- Temporary Traffic Control (TTC)
- Transportation Operation (TO)
- Public Information and Outreach (PI&O).

Expected Construction Schedule:

Months	1	2	3	4	5	6	7	8
Phase 1								
Phase 2								
Phase 3								
Phase 4								
Phase 5								

2.0 TMP Team—Roles and Responsibilities

TMP Approval Contacts	
District Department of Transportation	Name: John Xxxxx[1] Phone: 202-671-xxxx Email: johnx@dc.gov
Roles and Responsibilities:	Responsible for the review and approval of the TMP.

TMP Management	
Program Manager	Name: Thomas Xxxxx Phone: 202-671-xxxx Email: thomasx@dc.gov
Project Manager and TMP Manager	Name: David Xxxxx Phone: 202-741-xxxx Email: davidx@dc.gov
TMP Manager/Traffic	Name: Brian Xxxxx Phone: 202-671-xxxx Email: brianx@dc.gov
TMP Manger/ Monitoring	Name: Karen Xxxxx Phone: 202-671-xxxx Email: karenx@dc.gov
TMP Manager/ Contractor	Name: Susan Xxxxx Phone: 202-671-xxxx Email: susanx@dc.gov
Roles and Responsibilities:	• Perform quality control and assurance of work zone policies to promote consistency and ensure compliance with contract documents, policies, and guidelines. • Coordinate implementation of the TMP. • Provide input and/or review each project phase regarding timeframe for completion of construction; sequence of construction; innovative, accelerated, or unusual construction methods; and constructability.

TMP Stakeholder Contacts		
Mass Transit Administration (MTA) Temporary Bus Stop Relocation	Name: Isaac Xxxxx Phone: 202-673-xxxx Email: isaacx@dc.gov	
Washington Metropolitan Area Transit Authority (WMATA)	Service/Route Changes	Name: William Xxxxx Phone: 202-741-xxxx Email: williamx@dc.gov
	Temporary Bus Stop	Name: Sunny Xxxxx

[1] Team member information is omitted. The information shown is for demonstration purposes only.

TMP Stakeholder Contacts		
	Relocation	Phone: 202-962-xxxx Email: sunnyx@dc.gov
Maryland State Highway Administration (MdSHA), District 3	District Engineer	Name: David Xxxxx Phone: 301-513-xxxx Email: davidx@md.gov
	Assistant District Engineer–Traffic	Name: Brian Xxxxx Phone: 301-513-xxxx Email:brianx@md.gov
Additional Stakeholders	Name: Levon Xxxxx Phone: 202-741-xxxx Email: levon@xx.xxx	Name: Michael Xxxxx Phone: 202-741-xxxx Email: michaelx@dc.gov
Roles and Responsibilities:	TMP stakeholders must be consulted/coordinated with during the project in order to keep them informed and to: • Seek their input on and knowledge of local/regional issues • Improve interagency coordination and response to work zone issues.	

TMP Implementation Task Leaders	
Public Information & Outreach	
DDOT Press Officer	Name: Paul Xxxxx Phone: 202-298-xxxx Email: paulx@dc.gov
Communication Specialist (IPMA)	Name: William Xxxxx Phone: 202-671-xxxx Email: williamx@dc.gov
Roles and Responsibilities:	Responsible for providing real-time public awareness of this work zone.
Monitoring	
TMP Monitoring	Name: Wendy Xxxxx Phone: 202-741-xxxx Email: wendyx@dc.gov
Roles and Responsibilities:	• Conduct periodic inspections including windshield surveys and site visits during construction to assess effectiveness of staging plans and TMP strategies. • Conduct periodic review and evaluation of both traffic operations and safety conditions during construction, in coordination with TMP management personnel.

Emergency Service Contacts	
Metropolitan Police Department (MPD)	Name: Faye Xxxxx Phone: 202-741-xxxx Email: fayex@dc.gov
Roles and Responsibilities	• Provide active and passive law enforcement, as necessary, to promote safety and mobility in the work zone. • Identify unsafe conditions. • Take appropriate measures to clear work zone incidents efficiently.
Fire and Emergency Medical Services (FEMS)	Name: Smith Xxxxx Phone: 202-741-xxxx Email: smithx@dc.gov
Roles and Responsibilities:	Be informed of ongoing construction activities and detours to improve coordination and response to emergency issues in, around, and through work zones.

3.0 Work Zone Impact Assessment

An analysis using Synchro was conducted to estimate the work zone impacts. This was warranted due to the location of the project in an urban corridor with moderate traffic. The impacts analysis indicates that this is a significant project, with limited impacts as shown below. A summary of operational analysis is provided in the Appendix A.

A. Does the project include long-term closures/extended weekend closures?

■ Yes
☐ No

If Yes,

Check all applicable types of facilities:

☐ Freeway
■ Principal Arterial
☐ Minor Arterial
☐ Collector
☐ Local

B. Significant Rating:

☐ Not significant
■ Significant with few impacts
☐ Significant with moderate impacts
☐ Significant with high impacts

C. Does the project need operational analysis to assess impacts?

■ Yes
☐ No

If Yes, check all applicable MOEs

1. Expected additional travel time:	2. Expected queue:
■ Less than 15 minutes ☐ Between 15–30 minutes ☐ Greater than 30 minutes	■ Less than 1,500 ft ☐ Between 1,500–3,000 ft ☐ Greater than 3,000 ft

D. Are additional analyses/strategies needed to assess impacts?

☐ Yes

■ No

E. TMP Components Included	Location/Contact (at DOT)	Appendix # (if included)
■ Traffic Operational Analysis (TOA)	TMP Report	A (Traffic Analysis Report)
☐ TOA Alternative Assessment		
☐ Other Impact Assessment		
■ Temporary Traffic Control	TMP Report	B (MOT Plans)
■ TO Strategies	TMP Report	
■ PI&O	TMP Report	
☐ Incident Management Plan		

4.0 Work Zone Impact Management Strategies

Work zone impact management strategies are intended to provide mobility and access in and/or around the construction area without compromising public safety. The strategies are grouped according to the following three categories:

1. Temporary Traffic Control (TTC)
2. Transportation Operations (TO)
3. Public Information and Outreach (PI&O).

Table 1 provides a summary of the work zone impact management strategies that will be used. Appendix B contains the TTC plan sheets.

Table 1: Summary of Work Zone Impact Management Strategies[2]

Temporary Traffic Control	√	Cost
Control Strategies		
1. Construction phasing/staging	√	
2. Full roadway closures		
3. Lane shifts or closures	√	
4. One-lane, two-way controlled operation		

[2] The strategies and sample cost shown are for demonstration purposes only. Cost items are typically not shown when the TMP is a contract document.

Temporary Traffic Control	√	Cost
5. Two-way, one-lane traffic/Reversible lanes		
6. Ramp closures/relocation		
7. Freeway-to-freeway interchange closures		
8. Night work		
9. Weekend work		
10. Work hour restrictions for peak travel		
11. Pedestrian/Bicycle access improvements	√	
12. Business access improvements		
13. Off-site detours/use of alternate routes		
Traffic Control Devices		
14. Temporary signs	√	$10,000/each
15. Arrow panels	√	
16. Channelizing devices	√	
17. Temporary pavement markings	√	
18. Flaggers and uniformed traffic control officers	√	
19. Temporary traffic signals	√	
20. Lighting devices		
Project Coordination Strategies		
21. Other area projects		
22. Utilities		
23. Right-of-Way		
24. Other transportation infrastructure		
Innovative Contracting Strategies		
25. Design-Build		
26. A+B Bidding		
27. Incentive/Disincentive clauses		
28. Lane rental		
29. Performance specifications		
Innovative or Accelerated Construction Techniques		
30. Prefabricated/Precast elements		
31. Rapid cure materials		

Transportation Operations	√	Cost
Demand Management Strategies		
1. Transit service improvements		
2. Transit incentives		
3. Shuttle services		
4. Parking supply management		
5. Variable work hours		
6. Telecommuting		
7. Ridesharing/Carpooling incentives		
8. Park-and-Ride promotion		
Corridor/Network Management Strategies		
9. Signal timing/coordination improvements		
10. Temporary traffic signals		
11. Street/Intersection improvements		
12. Bus turnouts		
13. Turn restrictions	√	
14. Parking restrictions	√	
15. Truck/heavy vehicle restrictions		
16. Reversible lanes		
17. Dynamic lane closure system		
18. Ramp closures		
19. Railroad crossing controls		
20. Coordination with adjacent construction site(s)		
Work Zone ITS Strategies		
21. Late lane merge		
22. PCMS with speed display	√	$20,000/each
23. Travel time estimation system		
24. Advanced speed information system		
25. Advanced congestion warning system		
26. Conflict warning system (e.g., construction vehicles entering roadway)		
27. Travel time monitor system		
28. Freeway queue monitor system		
29. CCTV monitoring		
30. Real-time detour		

Transportation Operations	√	Cost
Work Zone Safety Management Strategies		
31. Speed limit reduction/variable speed limits		
32. Temporary traffic signals		
33. Temporary traffic barrier	√	
34. Movable traffic barrier systems		
35. Crash cushions		
36. Temporary rumble strips		
37. Intrusion alarms		
38. Warning lights		
39. Automated flagger assistance devices (AFADs)		
40. Project task force/committee		
41. Construction safety supervisors/inspectors		
42. Road safety audits		
43. TMP monitor/inspection team		
Incident Management and Enforcement Strategies		
44. ITS for traffic monitoring/management		
45. Traffic Cameras linked to TMC	√	$5,000–7,000/each
46. Surveillance (e.g., CCTV)		
47. Helicopter for aerial surveillance		
48. Traffic Screens		
49. Call boxes		
50. Milepost markers		
51. Tow/Freeway service patrol		
52. Total station units		
53. Photogrammetry		
54. Media coordination		
55. Local detour routes		
56. Contract support for Incident Management		
57. Incident/Emergency management coordination		
58. Incident/Emergency response plan		
59. Dedicated (paid) police enforcement	√	25,000/year
60. Cooperative police enforcement		
61. Automated enforcement		
62. Increased penalties for work zone violations	√	
63. Emergency pull-offs		

Public Information and Outreach	√	Cost
Public Awareness Strategies		
1. Branding		
2. Press kits		
3. Brochures and mailers		
4. Press releases/media alerts	√	
5. Mass media (earned and/or paid)		
6. Paid advertisements		
7. Project Information Center		
8. Telephone hotline	√	$20,000–25,000/initial setup
9. Planned lane closure website		
10. Project website		
11. Public meetings/hearings, workshops		
12. Community task forces		
13. Coordination with media/schools/business/emergency services		
14. Work zone education and safety campaigns		
15. Work zone safety highway signs		
16. Rideshare promotions		
17. Visual information	√	
Motorist information strategies		
18. Radio traffic news		
19. Changeable message signs	√	
20. Temporary motorist information signs		
21. Dynamic speed message sign		
22. Highway Advisory Radio (HAR)		
23. Extinguishable Signs		
24. Highway information network (web-based)		
25. Traveler information systems(wireless, handheld)		
26. Transportation management Center (TMC)	√	
27. Live traffic camera(s) on a website		
28. Project information hotline		
29. Email alerts		

5.0 Notes

1. Portable Changeable Message Signs (PCMS) on either end of the construction zone to alert drivers of any lane shifts/closures, reduced speed limits, and expected behaviors. Recommended locations are:

- EB Benning Road, NE west of Anacostia Avenue, NE.
- WB Benning Road, NE east of 42nd Street, NE.

2. Paid Police Enforcement at intersections along Benning Road with Oklahoma Avenue, NE, Anacostia Avenue, NE, 34th Street, NE, Minnesota Avenue, NE, and E. Capitol Street, NE.

3. Contractor should install traffic cameras linked to the TMC at following locations.

- Benning Road, NE at Minnesota Avenue, NE
- Benning Road, NE at 36th Street, NE

The TMC can coordinate and manage traffic as necessary. The existing TMC for the District can be used and may be staffed by either contract staff and/or agency personnel as per DDOT regulations.

4. Benning Road, NE is an evacuation route and in case of any incident resulting in full closure other agencies should be informed, including:

- D.C. Homeland Security and Emergency Management Agency (HSEMA).
- Washington Metropolitan Area Transit Authority (WMATA).
- D.C. Fire and Emergency Medical Services (FEMS).
- Department of Health (DOH).
- Metropolitan Police Department (MPD).

6.0 TMP Implementation/Monitoring

Both DDOT and the Contractor must designate a trained person at the project level to implement the TMP (see Section 2 for Roles and Responsibilities) and other safety and mobility aspects of the project. For the Contractor, this person will be the Traffic Safety Officer (TSO), as specified in the DDOT Standard Specifications for Highways and Structures, 2005 or later, Section 616.02(B1). These persons are responsible for efficiently and appropriately implementing the TMP.

Both DDOT and the Contractor-designated trained person are responsible for reviewing traffic operations throughout the project limits on a regular basis, including the condition of all traffic control devices. DDOT will monitor the TMP for both oversight and evaluation purposes. DDOT will (as practical):

1. Monitor and document TMP changes during construction.
2. Prepare an evaluation report of the TMP, including lessons learned. (Appendix C contains the DDOT Post Project Evaluation Report template).

7.0 TMP Review/Approvals

In accordance with the DDOT Work Zone Safety and Mobility Policy, the designated DDOT Chief Engineer/Deputy Chief Engineer approves the final TMP design document before implementation.

Chief Engineer					
All approvals must be obtained prior to start of work					
Signature: Name: Dawn Xxxxxx[3] Date: xx/xx/xxxx					
Revision#	Initials	Date	Revision#	Initials	Date
1			1		
2			2		

8.0 Appendices

A. Operational Analysis Summary
B. Temporary Traffic Control Plan[4]
C. Post Project Evaluation Report.

[3]Team member information is omitted.
[4] Appendix B contains a sample plan sheet from the full TTC Plan for this TMP. To limit file size to enable downloading, the full TTC Plan has not been included.

Sample Appendices

Minor-to-Moderate Impacts (Sample TMP 1)

A. Operational Analysis Summary

B. Temporary Traffic Control Plans (Sample)

C. Post Project Evaluation Report

A. Operational Analysis Summary

Operational Analysis

Data Collection and Modeling Approach — The study team collected a wide range of geometric, traffic flow, traffic control, and operational data elements. Annual Average Daily Traffic (AADT) values were obtained from DDOT 2007 Traffic Volumes Map. This data was projected by using 1 percent growth factor to obtain the future conditions, 2008 AADT. Turning movement counts were conducted at five locations (shown in Figure: 1) to understand the traffic flow characteristics.

- Benning Road/Minnesota Avenue, NE.
- Benning Road/E. Capitol Street, NE.
- Minnesota Avenue/E. Capitol Street/Ames Street, NE.
- 17th Street SE /Independence Avenue, SE.
- 21st Street NE/C Street, NE.

Existing Traffic Operations — There are 33 signalized intersections (see below) within the study area. The Synchro file for the influence area was obtained from DDOT.

- 17th Street/ Benning Road, NE.
- 17th Street/Gales Street, NE.
- 17th Street/D Street, NE.
- 17th Street/ C Street, NE.
- 17th Street/Constitution Avenue, NE.
- 17th Street/E. Capitol Street, NE/SE.
- 17th Street/ Independence Avenue SE.
- 18th Street/C Street, NE.
- 19th Street/ Benning Road, NE.
- 19th Street/E Street, NE.
- 19th Street/C Street, NE.
- 19th Street/E Capitol Street, NE.
- 19th Street/Independence Avenue, SE.
- E. Capitol Street/22nd Street/ RFK Stadium, NE.
- E. Capitol Street/22nd Street/ RFK Stadium, SE.
- 21st Street/ Benning Road, NE.
- 21st Street/ C Street, NE.
- 24th Street/ Benning Road, NE.
- 26th Street/Benning Road, NE.
- Oklahoma Avenue/ Benning Road, NE.
- Minnesota Avenue/Benning Road, NE.
- Minnesota Avenue/Grant Road, NE.
- Minnesota Avenue/Ames Street/E. Capitol Street, NE.
- Minnesota Avenue/Ridge Road, NE.
- Minnesota Avenue/B Street, SE.
- E. Capitol Street/ Stoddert Place, SE.
- Minnesota Avenue/Dix Street, NE.
- Benning Road/Anacostia Avenue, NE.
- Benning Road/34th Street, NE.
- Benning Road/42nd Street, NE.
- Benning Road/44th Street, NE.
- Benning Road/E. Capitol Street/Central Avenue, NE.
- E Capitol Street/Texas Avenue, SE.

Crash History — Crash history of the influence area indicates a very high percentage of rear-end and sideswipe crashes, followed by right-angle crashes. Table 2, below, provides a summary of crashes for the period 2004 to 2006.

Table 1: Summary of Crashes for the Period 2004 to 2006

CRASH TYPE	CRASH COUNT	PERCENTAGE	CRASH COUNT	PERCENTAGE
	Benning Road NE from Anacostia Avenue NE to E. Capitol Street, NE		*Influence Area, Shown in Figure 1*	
Right Angle	58	11.46	157	9.78
Left Turn, Hit Vehicle	47	9.29	124	7.73
Right Turn, Hit Vehicle	9	1.78	32	1.99
Rear End	174	34.39	449	27.98
Sideswipe	131	25.89	410	25.55
Head On	10	1.98	47	2.93
Parked Vehicle	11	2.17	97	6.04
Fixed Object	14	2.77	74	4.61
Run-Off-Road	0	0.00	8	0.50
Left Turn, Hit Pedestrian	3	0.59	8	0.50
Right Turn, Hit Pedestrian	2	0.40	8	0.50
Backing, Hit Pedestrian	2	0.40	5	0.31
Straight, Hit Pedestrian	15	2.96	64	3.99
Backing, Hit Parked Vehicle	3	0.59	16	1.00
Backing, Hit Moving Vehicle	3	0.59	11	0.69
Backing, Hit Stopped Vehicle	5	0.99	14	0.87
Non-Collision Accident	4	0.79	5	0.31
Other	15	2.96	76	4.74

Based on the crash history, it is recommended that all intersections be monitored throughout construction for an increase in crashes resulting from work zone implementation. In particular, special attention should be paid to Benning Road where it intersects with:

1. Oklahoma Avenue, NE.
2. Anacostia Avenue, NE.
3. 34th Street, NE.
4. Minnesota Avenue, NE.
5. 42nd Street, NE.
6. E. Capitol Street, NE.

Figure 1: Crash Map of the Influence Area

Work Zone Impact Assessment

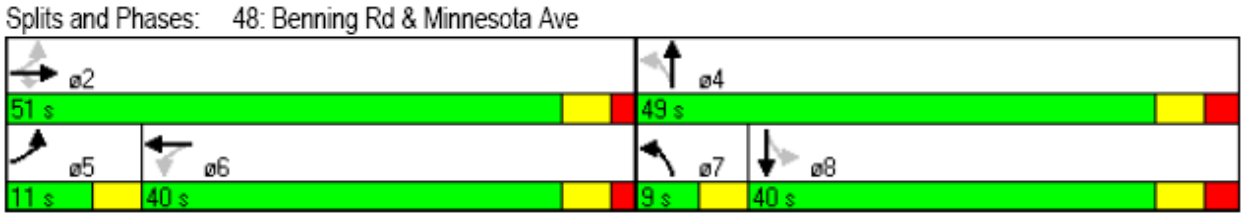
The following assessment includes a brief discussion about how the project is expected to affect the work zone vicinity. This provides an estimate of how traffic demand and traffic patterns are expected to change because of the construction. Also, it gives an idea of areas of potential concerns.

TRAFFIC ANALYSIS

The traffic analysis detailed below helps to assess the impact of the construction phasing on motorists delay and queues.

The Study Team used the DDOT Synchro Model as a basis for developing the traffic model of the project influence area. Traffic analysis was performed for existing and proposed construction conditions. The construction is proposed to take place in five phases, each of which was analyzed independently. The analysis did not consider the sub-phases of any phase. Measures of effectiveness (MOEs) such as level of service (LOS), delays, and queue lengths were reported. Table 2 shows the MOEs for the projected construction traffic for each phase as compared against existing conditions.

Results — While the LOS decrease on some segments, the overall LOS remained acceptable, as Table 2 shows. The analysis also indicates significant delay at Benning Road and Minnesota Avenue for Phase 1, NE (see Table 2 for WB movement information). It is recommended that DDOT review/modify the signal timing as shown below and monitor the intersection throughout the project.



As the projected impacts are below DDOT allowable thresholds[(1)] for arterials, the proposed TMP (MOT, TO, PI&O) may be implemented in line with the recommendation of this analysis. Figure 2 provides an estimate of travel time (Benning Road from 21st Street to E. Capitol Road) by work zone phasing considering unforeseen conditions.

[1]According to DDOT Work Zone Safety and Mobility Policy, for arterials, unacceptable travel delays are those longer than 15 minutes or a traffic queue extending more than 1500 ft on the mainline, beyond what are considered normal for the affected roadway segment.

Table 2: Traffic Analysis Summary (Comparison of Existing with Proposed Phasing 1-V)

Locations	Existing					Phase 1				Phase 2				Phase 3				Phase 4				Phase 5			
	Approach	V/C ratio	Control delay	Queue Length 95th (ft)	LOS	V/C ratio	Control delay (sec)	Queue Length 95th (ft)	LOS	V/C ratio	Control delay	Queue Length 95th (ft)	LOS	V/C ratio	Control delay	Queue Length 95th (ft)	LOS	V/C ratio	Control delay	Queue Length 95th (ft)	LOS	V/C ratio	Control delay	Queue Length 95th (ft)	LOS
Benning Road and 21st Street	EB	0.38	18.5	146	B	0.38	18.5	146	B	0.69	24.9	315	C	0.38	18.5	146	B	0.38	18.5	146	B	0.38	18.5	146	B
	WB	0.45	17.4	200	B	0.45	17.4	200	B	0.73	19.8	394	B	0.45	17.4	200	B	0.45	17.4	200	B	0.45	17.4	200	B
	NB	0.31	17.0	132	B	0.31	17.0	132	B	0.31	17.0	132	B	0.31	17.0	132	B	0.31	17.0	132	B	0.31	17.0	132	B
	SB	0.04	11.3	23	B	0.04	11.3	23	B	0.04	11.3	23	B	0.04	11.3	23	B	0.04	11.3	23	B	0.04	11.3	23	B
	Intersection LOS - B					Intersection LOS - B				Intersection LOS - C				Intersection LOS - B				Intersection LOS -B				Intersection LOS - B			
Benning Road and Oklahoma Avenue	EB	0.31	3.2	19	A	0.31	4.3	31	A	0.58	5.0	30	A	0.31	3.1	17	A	0.31	3.1	17	A	0.31	3.1	17	A
	WB	0.38	12.7	136	B	0.38	12.7	136	B	0.74	19.8	340	B	0.38	12.7	136	B	0.38	12.7	136	B	0.38	12.7	136	B
	NB	0.25	23.0	107	C	0.25	23.0	107	C	0.25	23.0	107	C	0.25	23.0	107	C	0.25	23.0	107	C	0.25	23.0	107	C
	Intersection LOS - A					Intersection LOS - B				Intersection LOS - B				Intersection LOS - A				Intersection LOS - A				Intersection LOS - A			
Benning Road and Anacostia Avenue	EB	0.17	12.0	84	B	0.18	12.3	102	B	0.57	20.0	395	B	0.26	13.9	146	B	0.18	11.6	97	B	0.18	11.6	97	B
	WB	0.19	12.2	94	B	0.25	12.9	126	B	0.66	22.5	426	C	0.50	13.5	186	B	0.25	12.2	117	B	0.20	11.6	89	B
	NB	0.16	26.8	73	C	0.16	26.8	73	C	0.21	24.1	85	C	0.16	26.8	73	C	0.16	26.8	73	C	0.16	26.8	73	C
	SB	0.43	43.2	38	D	0.43	42.7	38	D	0.57	57.8	95	E	0.30	33.0	38	C	0.30	33.0	38	C	0.30	32.9	38	C
	Intersection LOS - A					Intersection LOS - B				Intersection LOS - C				Intersection LOS - B				Intersection LOS - B				Intersection LOS - A			
Benning Road and Minnesota Avenue	EB	0.28 (L- .34)	14.7	68 (L-85)	B	(L-0.41) 0.36 (R- 0.20)	36.2	(L-144) 249 (R-98)	D	0.57 (L- 0.36)	23.4	172 (L-98)	C	0.40 (L-0.40)	25.7	170 (L-117)	C	0.57 (L- 0.40)	25.0	267 (L-95)	C	0.57 (L -0.40)	46.4	346 (L-151)	D
	WB	0.56	24.2	166	C	1.04	93.7	454*	F	0.23	38.2	146	D	0.23 (R-21)	45.5	316* (R-34)	D	(L -0.10) 0.70 (R-0.25)	31.2	(L- 28) 185 (R-22)	C	(L-0.10) 0.70 (R-0.25)	31.2	(L- 28) 185 (R-22)	C
	NB	0.17 (L-0.26)	11.6	70 (L-68)	B	0.17 (L-0.26)	11.6	70 (L-68)	B	0.54 L-0.54	11.6	70 (L-68)	B	0.17 (L-0.26)	11.6	70 (L-68)	B	(L -0.30) 0.28 (R-0.04)	12.7	(L-68) 142 (R- 15)	B	(L -0.26) 017	11.6	(L-68), 70	B
	SB	0.40 (R-0.08)	21.3	161 (R-19)	C	0.38 (L-0.10)	22.5	161 (L-40)	C	0.38 (L-0.38)	22.5	161 (L-40)	C	0.38 (L-0.10)	22.5	161 (L-40)	C	0.48 (L-0.10)	21.6	191 (L-40)	C	0.38 (L-0.10)	22.5	161 (L-40)	C
	Intersection LOS - B					Intersection LOS - D				Intersection LOS - C				Intersection LOS - C				Intersection LOS - C				Intersection LOS - C			
Benning Road and 42nd Street	EB	0.19	5.5	46	A	0.36	4.8	84	A	0.36	10.8	163	B	0.36	10.7	163	B	0.20	5.3	49	A	0.20	4.0	45	A
	WB	0.27	1.9	18	A	0.50	7.3	275	A	0.50	7.5	256	A	0.50	7.3	271	A	0.28	2.3	21	A	0.28	2.3	21	A
	NB	0.12	22.1	50	C	0.12	22.1	50	C	0.12	22.1	50	C	0.12	22.1	50	C	0.12	22.1	50	C	0.12	22.1	50	C
	SB	0.12	14.9	43	B	0.12	14.9	43	B	0.12	14.9	43	B	0.12	14.9	43	B	0.12	14.9	43	B	0.12	14.9	43	B
	Intersection LOS - A					Intersection LOS - A				Intersection LOS - B				Intersection LOS - A				Intersection LOS - A				Intersection LOS - A			
Benning Road and 44th Street	EB	0.21	9.5	62	A	0.21	18.0	113	B	0.21	11.7	82	B	0.21	11.4	81	B	0.21	15.8	106	B	0.21	16.8	108	B
	WB	0.23	4.9	51	A	0.22	5.0	51	A	0.23	5.0	51	A	0.23	4.9	51	A	0.23	5.0	51	A	0.23	5.0	51	A
	SB	0.12	15.1	40	B	0.12	15.1	40	B	0.12	15.1	40	B	0.12	15.1	40	B	0.12	15.1	40	B	0.12	15.1	40	B
	Intersection LOS - A					Intersection LOS - B				Intersection LOS - A				Intersection LOS - A				Intersection LOS - B				Intersection LOS - B			
Benning Road and E. Capitol Street (WB)	WB	0.57	35.1	173	D	0.57	35.1	173	D	0.57	35.1	173	D	0.57	35.1	173	D	0.57	35.1	173	D	0.57	35.1	173	D
	NB	0.14 (L-0.49)	11.9	0 (L-74)	B	0.14 (L-.45)	10.6	0 L-75	B	0.14 (L-0.49)	10.2	0 (L-97)	B	0.14 (L-0.49)	11.9	0 (L-79)	B	0.14 (L-0.49)	10.2	0 (L-97)	B	0.14 (L-0.48)	9.5	0 (L-95)	A
	SB	0.32	23.9	58	C	0.28	24.7	52	C	0.32	31.8	72	C	0.32	32.2	73	C	0.32	22.2	53	C	0.32	20.3	52	C
	Intersection LOS - C					Intersection LOS - C				Intersection LOS - C				Intersection LOS - C				Intersection LOS - C				Intersection LOS - C			
Benning Road and E. Capitol Street (EB)	EB	0.34 (L-0.23)	1.2	0 (L-2)	A	0.34 (L-0.23)	1.2	0 (L-2)	A	0.34 (L-0.23)	1.2	0 (L-2)	A	0.34 (L-0.23)	1.2	0 (L-2)	A	0.34 (L-0.23)	1.6	1 (L-4)	A	0.34 (L-0.23)	1.2	0 (L-2)	A
	NB	0.67	42.5	195	D	0.64	41.5	194	D	0.55	39.2	165	D	0.64	41.6	194	D	0.55	39.2	165	D	0.55	39.2	165	D

Locations	Existing					Phase 1				Phase 2				Phase 3				Phase 4				Phase 5			
	Approach	V/C ratio	Control delay	Queue Length 95th (ft)	LOS	V/C ratio	Control delay (sec)	Queue Length 95th (ft)	LOS	V/C ratio	Control delay	Queue Length 95th (ft)	LOS	V/C ratio	Control delay	Queue Length 95th (ft)	LOS	V/C ratio	Control delay	Queue Length 95th (ft)	LOS	V/C ratio	Control delay	Queue Length 95th (ft)	LOS
	SB	.09 (L-.14)	2.6	2 (L-4)	A	0.09 (L-0.14)	2.5	0 (L-1)	A	0.09 (L-0.14)	2.6	2 (L-4)	A	0.09 (L-0.14)	2.6	2 (L-4)	A	0.09 (L-0.14)	2.6	2 (L-4)	A	0.09 (L-0.14)	142.3	2 (L-4)	A
	Intersection LOS - B					Intersection LOS - B				Intersection LOS - B				Intersection LOS - B				Intersection LOS - B				Intersection LOS - B			
21st Street and C Street	EB	(L-0.22), (R-0.14)	(L-20.9), (R-16.5)	(L-39), (R-57)	(L-C), (R-B)	(L-0..22, R-0.14)	(L-12.2, R-8.3)	(L-20), (R-20)	(L-B), (R-A)	(L-0.22), (R-0.14)	(L-12.2, R-8.3)	(L-20), (R-20)	(L-B), (R-A)	(L-0.22), (R-0.14)	(L-12.2), (R-8.3)	(L-20), (R-20)	(L-B), (R-A)	(L-0.22), (R-0.14)	(L-12.2), (R-8.3)	(L-20), (R-20)	(L-B), (R-A)	(L-0.22), (R-0.14)	(L-12.2), (R-8.3)	(L-20), (R-20)	(L-B), (R-A)
	WB	0.45	18.1	182	B	0.45	18.1	182	B	0.45	18.1	182	B	0.45	18.1	182	A	0.45	18.1	182	B	0.45	18.1	182	B
	NB	0.01	13.2	9	B	0.01	13.2	9	B	0.01	13.2	9	B	0.01	13.2	9	B	0.01	13.2	9	B	0.01	13.2	9	B
	SB	0.24	11.3	84	B	0.24	11.3	84	B	0.24	11.3	84	B	0.24	11.3	84	B	0.24	11.3	84	B	0.24	11.3	84	B
	Intersection LOS - C					Intersection LOS -B				Intersection LOS - B				Intersection LOS - C				Intersection LOS - B				Intersection LOS - B			
		Existing -Travel time (LOS)				Phase 1				Phase 2				Phase 3				Phase 4				Phase 5			
Benning Road from 21st Street to E. Capitol Street	EB	430.7 seconds (B)				497.0 seconds (C)				467.6 seconds (C)				467.7 seconds (C)				475.7 seconds (C)				496.0 seconds (C)			
	WB	446.6 seconds (C)				563.1 seconds (D)				485.6 seconds (C)				505.7 seconds (C)				498.6 seconds (C)				479.0 seconds (C)			
		Existing -Travel time (LOS)				Phase 1				Phase 2				Phase 3				Phase 4				Phase 5			

Notes: * 95th percentile volume exceeds capacity and queues may be longer, R-Dedicated right-turn, L-Dedicated left-turn

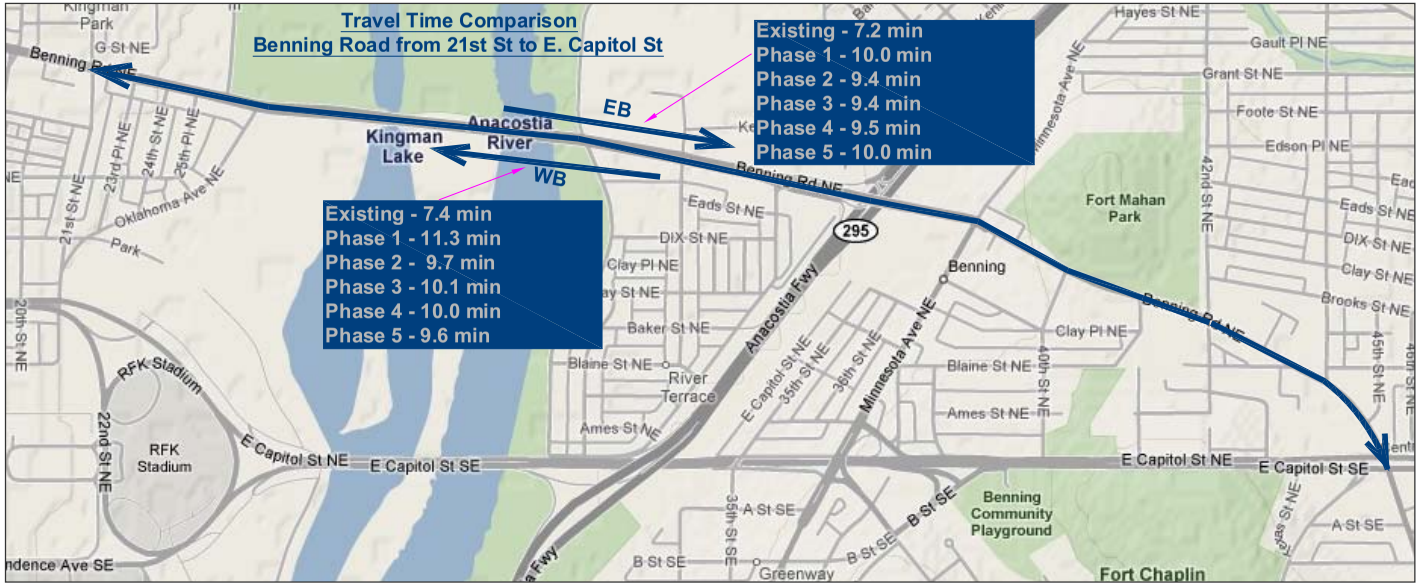


Figure 2: Travel Time Comparison - Benning Road from 21st Street to E. Capitol Street

ANTICIPATED WORK ZONE IMPACTS

Public Transportation – The MOT Plans show bus stop locations affected by lane closures. These and other similarly affected locations must be monitored to minimize public inconvenience and ensure full accessibility. While all bus routes are maintained, they also must be monitored to ensure scheduled viability.

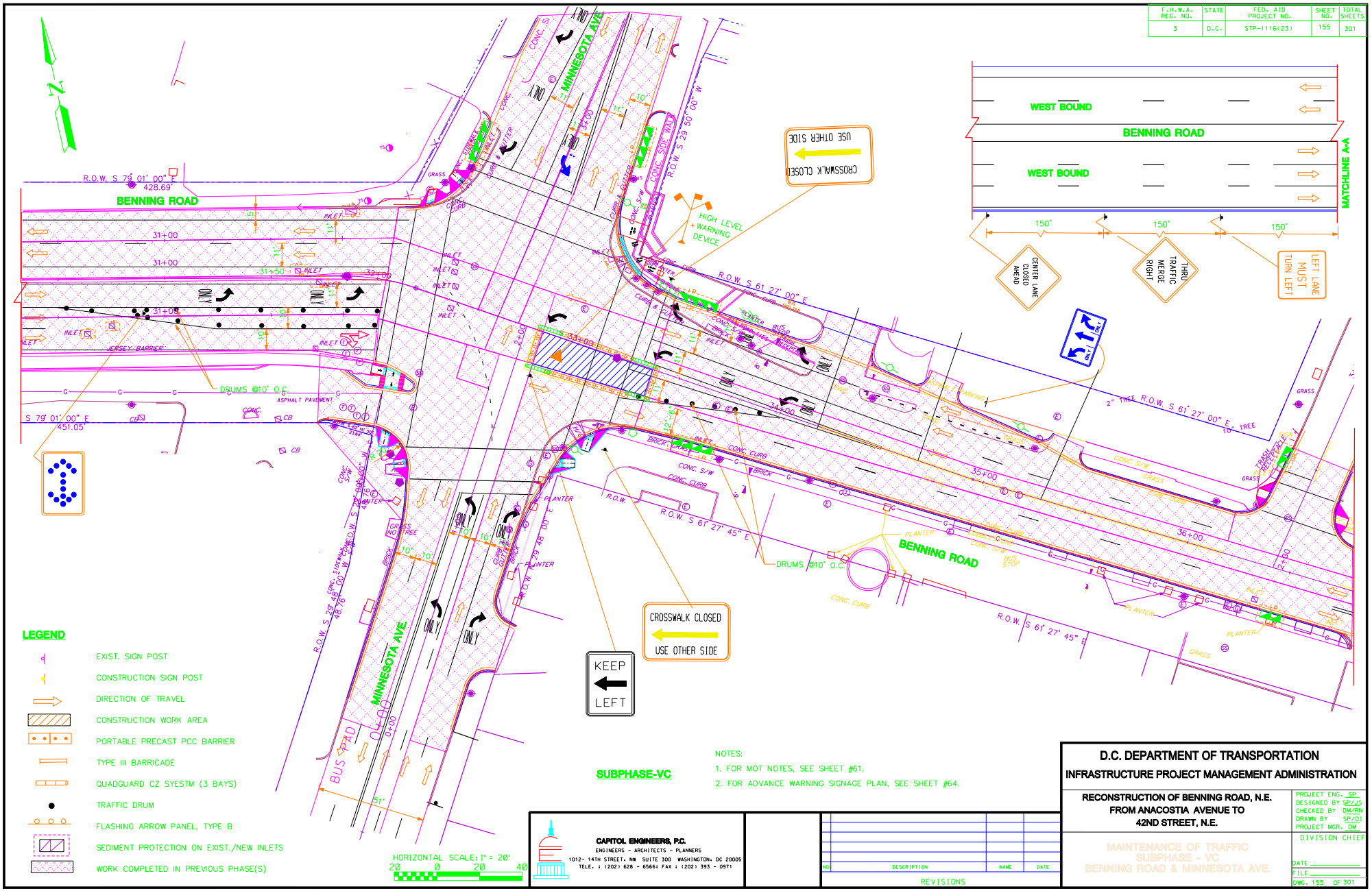
Community Accessibility — The Contractor shall advise residents affected by alley access resulting from temporary closures in writing to take alternative alley egress and ingress. Residents affected by driveway access resulting from temporary closure shall be advised in writing by the contractor to park their vehicles in nearby parking zones. Community meetings are suggested during various stages of the project

Non-motorized Assessment – Temporary crosswalks and all other affected crosswalks and sidewalks, as shown in the MOT plans, must be monitored throughout the construction for safety and full accessibility. All pedestrian temporary provisions must comply with ADA and other District requirements.

Utility — Utility impacts were not included in this analysis.

B. Temporary Traffic Control Plans

Only sample TTC plan is included here for reference, to manage the file download size. Generally all the TTC plans are included in TMP.



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C. Post-Project Evaluation Report

POST PROJECT EVALUATION
Describe Areas of the TMP that were Most Successfully Implemented & Why
Describe Areas of the TMP that were Least Successfully Implemented & Why
Summarize/Describe all Changes Necessary to Correct Oversight of the Original TMP
Summarize the Effectiveness of Each Change Made to the TMP
Summarize the Type and Frequency of Legitimate Complaints Received
Describe/Summarize Road User Mobility Impacts Observed During Work

Describe/Summarize Crashes and Incidents that Occurred During the Work
Describe/Summarize Road Safety Impacts Observed During Work
Suggested TMP Improvements or Changes for Future Similar Projects

This completed assessment shall be forwarded to the Project manager and Team Leader following approval below.

DDOT PROJECT MANGER	DDOT TEAM LEADER
Signature: Name: Date:	Signature: Name: Date:

RULE on WORK ZONE Safety and Mobility

SAMPLE TRANSPORTATION MANAGEMENT PLAN (TMP) 2

F. MODERATE-TO-MAJOR IMPACTS PROJECT SAMPLE

A. How to Use the Guide

C. TMP Template 1 Minor-to-Moderate Impacts

E. Sample TMP 1 Minor-to-Moderate Impacts

B. TMP Tips and Tools

D. TMP Template 2 Moderate-to-Major Impacts

F. Sample TMP 2 Moderate-to-Major Impacts

August 2010

U.S. Department of Transportation
Federal Highway Administration

Table of Contents

Project Name:

Replacement of 1-94 Bridges over Riverside Drive Battle Creek, Michigan

Executive Summary

This sample was developed based on the Transportation Management Plan (TMP) created for the replacement of I-94 bridges over Riverside Drive in Battle Creek, Michigan. Replacement of the I-94 bridges is expected to create significant impacts in the vicinity of the project. This TMP shows the analysis of alternate traffic control schemes, the anticipated impacts of the construction, and the strategies that will be deployed to mitigate the impacts. [1]

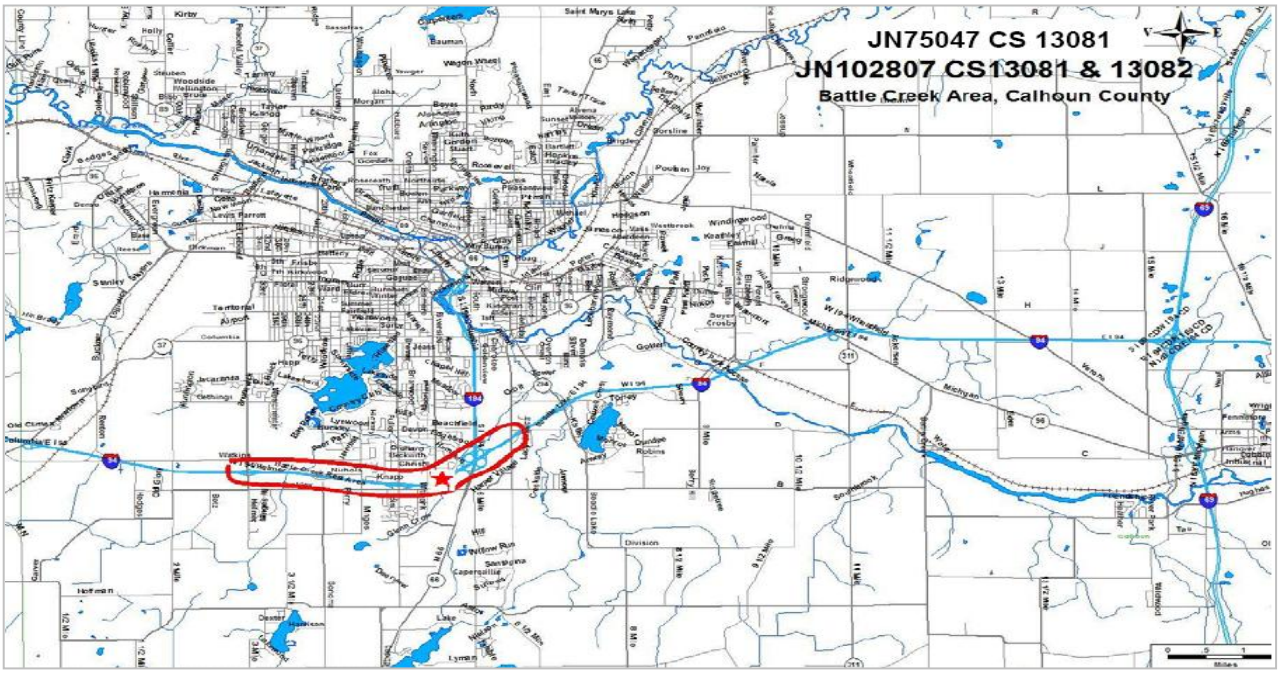
[1] The scope, content, and level of detail of a TMP should vary based on the size, location, complexity, and expected level and range of impacts of a project. Depending on these project characteristics, a TMP for a moderate-to-major impact project may have more or less analysis and detail than this sample.

1.0 Project Description

The proposed project consists of two projects combined because of location. The first is the replacement of the two I-94 bridges over Riverside Drive. The second project is a capital preventive maintenance (CPM) cold mill and single course hot-mix asphalt (HMA) overlay of I-94 EB and WB from Helmer Road to 6 ½ Mile Road, including ramps and rest area repairs.

This is a significant project based on the criteria specified in the Michigan *Work Zone Safety and Mobility Manual*[2]. Thus, the TMP is comprised of all three components:

1. Temporary Traffic Control Plan (TTCP)
2. Transportation Operations Plan (TOP)
3. Public Information Plan (PIP).



Vicinity Map

[2] A non-traffic regulating operation project in Michigan is to be considered potentially significant if any of the following apply:

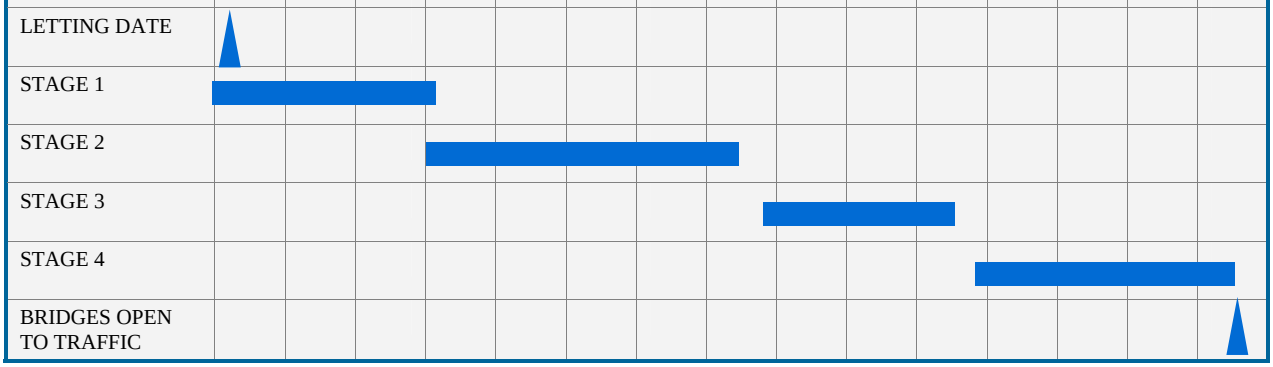
- Any project that occupies a specific location for more than three days, with either intermittent or continuous lane closures;
- Any project that, alone or in combination with other nearby or concurrent projects, is anticipated to cause sustained work zone impacts that are greater than what is considered tolerable. This will be based on an assessment of work zone safety and mobility impacts (volume/capacity, travel time, and level of service);
- Any project defined as "potentially significant" or" critical" by region staff.

All potentially significant projects in Michigan are to be further evaluated for possible mobility impacts to the transportation system by comparison with the thresholds for the following critical evaluation criteria:

- Volume to Capacity: Threshold—greater than 0.80.
- Travel Time: Threshold—greater than 10 minutes.
- Level of Service: Threshold—level of service drops 2 or more levels. For example, level of service A to C or C to E.

Project Schedule: The proposed construction phasing consists of four stages, as illustrated by the schedule below:

Proposed Schedule—I-94 Bridge Replacement



2.0 TMP Team–Roles and Responsibilities

Michigan Department of Transportation (MDOT) Project Engineer
Name: Daniel Xxxxx[3] Unit: MDOT Phone: 517-242-XXXX Email: danielx@michigan.gov
Roles and Responsibilities: Ensure TMP Compliance with the Work Zone Safety and Mobility Policy. Coordinate the PIP completion with the communication representative.

Transportation Service Center (TSC) Staff
Name (TSC Staff Lead): Leslie Xxxxx Unit: TSC Phone: 517-242-XXXX Email: lesliex@michigan.gov
Roles and Responsibilities: Identify and propose mitigation activities to be included in the TMP in subsequent project development phases. Develop the project-level TMP, Temporary Traffic Control Plan (TTCP), Transportation Operations Plan (TOP), and Public Information Plan (PIP) for significant projects. Conduct capacity analysis using the CO3 (Construction, congestion, Cost) program or comparable project-level models.

[3] Team member information is omitted. The information shown is for demonstration purposes only.

TSC Delivery Engineer
Name: George Xxxxx Unit: TSC Phone: 517-242-XXXX Email: georgex@michigan.gov
Roles and Responsibilities: Ensure all aspects of TMP comply with the Work Zone Safety and Mobility Policy during the construction, which includes monitoring, analyzing, and documenting mobility criteria in the TMP and crash numbers once implemented.

Region/TSC Maintenance Supervisor/Coordinator
Name: Marshall Xxxxx Unit: TSC Phone: 517-242-XXXX Email: marshallx@michigan.gov
Roles and Responsibilities: Ensure all State and contract maintenance activity is conducted in accordance with the Work Zone Safety and Mobility Policy.

Public Information Officer	
MDOT	**Consultant**
Name: William Xxxxx Unit: MDOT Phone: 517-242-XXXX Email: williamx@michigan.gov	Name: Mesfin Xxxxx Phone: 517-242-XXXX Email: mesfinx@eng.com
Roles and Responsibilities: Provide real-time public awareness of the work zone.	

Emergency Service Contacts
Name: Greer xxxxx Unit: TSC (Delivery Engineer) Phone: 517-242-XXXX Email: greerx@ michigan.gov
Roles and Responsibilities: Respond in case of an emergency or unexpected event such as accidents, major traffic delays, etc.

3.0 Existing Conditions

I-94 is a multilane freeway with two lanes in each direction. Table 1 provides a summary of the roadway characteristics. Appendix A provides hourly count reports.

Table 1: Summary of Roadways Affected by Construction

Control Section, Roadway	13081, I-94 Bridges over Riverside Drive (Bridge Replacement)	13081, I-94 by Riverside bridges (CPM Mill and Fill)	13082, I-94 East of I-194/M66 (CPM Mill and Fill)
Road Type	4 Lane Freeway	4 Lane Freeway	4 Lane freeway
Existing Lane Configuration	2 Lanes Eastbound & 2 Lanes Westbound	2 Lanes Eastbound & 2 Lanes Westbound	2 Lanes Eastbound & 2 Lanes Westbound
Proposed Lane Configuration	2	1 (for nonrestricted hours only)	1 (for nonrestricted hours only)
ADT	55,800	55,800	50,400
% Commercial	25%	25%	24%
Expected % Diversion	5%	0%	0%
Existing PHV (V/C)	0.90	0.90	0.75
Existing PHV LOS	D	E	C

4.0 Operational Analysis—Existing

This section analyzes the existing safety and traffic conditions within the project influence area.

4.1. Safety Analysis

A Crash Analysis & Safety Review was conducted for I-94 EB & WB (from Helmer Road to 6½ Mile Road), for the 3-year period (January 1, 2005—December 31, 2007), using the MDOT Transportation Management System (TMS) database. The segment analyzed was approximately 0.25 miles before and after the point of beginning (POB) and point of end (POE). Table 2 below provides a summary of crashes. Fixed object, animal crashes, and rear-end crashes are the predominant crash types. Additional details on the analysis are provided in Appendix B.

Table 2: Summary of Crashes (January 1, 2005—December 31, 2007, I-94 EB & WB)

Crash Type	Crash Count	Percentage
Fixed Object	97	28.28
Animal	56	16.33
Rear-End Straight	52	15.16
Sideswipe Same	38	11.08
Miscellaneous One Vehicle	28	8.16
Overturn	28	8.16
Other Object	21	6.12

Crash Type	Crash Count	Percentage
Angle Straight	9	2.62
Rear-End Right Turn	4	1.17
Head-On	3	0.87
Sideswipe Opposite	3	0.87
Rear-End Left Turn	1	0.29
Angle Turn	1	0.29

4.2. Traffic Analysis

4.2.1. Data Collection and Traffic Modeling Approach

The CO3 model[4] was used to model traffic delay, user cost, and construction cost for construction and maintenance operations. In addition, LOS charts were generated based on *Highway Capacity Manual*.

The traffic data for analyses was obtained from hourly count reports provided by the MDOT Bureau of Transportation Planning. Appendix B provides the traffic counts and Appendix C shows the detailed reports.

Output data from the CO3 software and LOS Charts were used to describe the operation of the control sections 13081 (I-94 bridges over Riverside Drive) and 13082 (I-94 East of I-194/M66). Measures of Effectiveness considered are:

1. Vehicle delay (in minutes)
2. V/C ratio
3. Level of Service
4. Maximum backup length (in miles).

4.2.2. Alternatives/Impact Assessment

The project team considered different alternatives on how to balance cost and mobility. CO3 models were run based on these alternatives. The selection of alternatives was based on a combination of qualitative and quantitative analysis.

[4] The CO3 Model is a tool that engineers can use to estimate the magnitude and impacts of traffic congestion, including its cost impact on road users, that can be expected during a construction project. CO3 enables engineers to include construction congestion and its costs to users as an important variable in all project decisions, and helps in selecting among alternative methods of maintaining traffic during construction.

Alternatives Considered

To possibly minimize the impact on user mobility, the following alternative traffic control schemes were evaluated for replacing the I-94 bridges over Riverside Drive project:

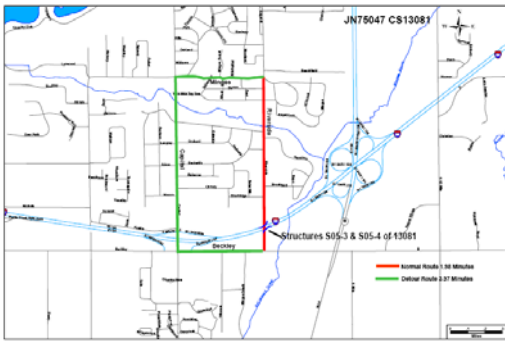
1. Detour existing I-94 traffic to other routes: I-94 has an average daily traffic (ADT) of 55,800 vehicles per day (VPD). This alternative was not feasible because detouring high volumes to existing routes would result in unacceptable delays and congestion on the surrounding road network.
2. Construct a temporary bridge: This alternative was cost-prohibitive because of the steep grades and existing interchanges close to the bridge.
3. One lane with alternating traffic on Riverside Drive during construction: This alternative would potentially increase project construction duration to two construction seasons.
4. Part-width Construction: Construction would be performed as part-width to maintain two 11-ft lanes with 1-ft shy distance in each direction (EB & WB) at all times for I-94. Riverside Drive would be closed and detoured.

Selected Traffic Control Scheme for I-94 Bridge Replacement over Riverside Drive

The selected alternative provides a project solution that not only meets and exceeds the final goals of the project, but one that could also be constructed with minimal impact to the surrounding roadway network and the roadways within the project limits. Part-width construction as detailed in alternative 4 above was selected. Traffic staging for this alternative includes:

1. Stage 1: Shift two lanes of traffic in each direction (EB &WB) to the outside lane of the existing bridges. Remove inside portion of each bridge.
2. Stage 2: Traffic remains shifted to the outside lanes of the existing bridges. Construct the new inside portion of bridge wide enough for two lanes of traffic in Stage 3.
3. Stage 3: Shift two lanes of traffic to the inside lanes of the newly constructed bridges. Remove the outside portion of each existing bridge.
4. Stage 4: Traffic remains shifted to inside of newly constructed bridge. Construct new outside portion of the bridge.

Riverside Drive Detour



The proposed detour route is Minges Road to Capital Avenue to Beckley Road. The travel time along the existing route is 1.98 minutes and the travel time of the detour route is 3.97 minutes, a difference of only 1.99 minutes. The detour route will be reviewed to determine the need for new/additional signing and pavement markings, including detour guide signs, detour ramp gore signs, and two portable changeable message signs providing warning messages one week prior to and during the detour. The City of Battle Creek approved the detour route. During construction, access to all business and residential drives will be maintained.

Selected Traffic Control Scheme for I-94 CPM Project from Helmer Road to M-66

The CPM paving operations will be performed at night (Sunday through Thursday). During certain periods while paving operations are under way, roadway performance will decrease to LOS D and E due to time needed for constructability/production each night. The time restrictions for this project only permit an 11 hour work period for temporary traffic control setup, paving, stripping of temporary pavement markings, and removal of temporary traffic control. The contractor will pave one lane and a shoulder with a tapered overlapping centerline longitudinal joint. The following night the contractor will pave the adjacent lane. Table 3 provides a summary of Measures of Effectiveness (MOEs) for existing and proposed construction conditions for the affected roadways.

Table 3: Summary of MOEs for Existing Conditions and Proposed Construction Conditions

	Hourly Capacity		Peak Hourly Volume (PHV)			PHV V/C			PHV LOS	
Control Section, Roadway	Existing	Proposed	Existing	Proposed		Existing	Proposed		Existing	Proposed
				WD	WE		WD	WE		
13081, I-94 by Riverside Bridge (Bridge Replacement)	3,424	2,732	3,090	3,090	2,485	0.90	1.13	0.91	D	E
13081, I-94 by Riverside Bridge (CPM Mill and Fill)	3,424	1,387	3,090	2,176	1,855	0.90	1.57	1.34	D	E
13082, I-94 East of I-194/M66 (CPM Mill and Fill)	3,424	1,387	2,581	1,950	-	0.75	1.41	-	C	E

	Average Delay		Peak Hour Delay		Maximum Back Up Length	
Control Section, Roadway	Proposed (minutes)		Proposed (minutes)		Proposed (miles)	
	WD	WE	WD	WE	WD	WE
13081, I-94 by Riverside Bridge (Bridge Replacement)	0.9	1.0	1.4	1.4	0.0	0.0
13081, I-94 by Riverside Bridge (CPM Mill and Fill)	1.4	3.9	18.4	40.5	2.2	5.1
13082, I-94 East of I-194/M66 (CPM Mill and Fill)	1.4	-	18.4	-	2.2	-

- **I-94 Bridge Replacement**
  - Maintain two lanes in each direction with part-width construction.
  - WD—Weekday; WE—Weekend
- **I-94 CPM Mill and Fill**
  - Maintain one lane in each direction during non-restricted hours (paving only Sun–Thu Nights)
  - WD—Weekday; WE—Weekend

Appendix C presents detailed analysis reports.

5.0 Work Zone Impact Management Strategies

Work zone impact management strategies are intended to provide mobility and access in and around the construction area without compromising public safety. The strategies are grouped according to the following three categories:

1. Maintenance of Traffic (MOT)/Temporary Traffic Control Plan (TTCP)
2. Transportation Operations Plan (TOP)
3. Public Information Plan (PIP).

5.1. Temporary Traffic Control Plan

The MOT concept described recommends the use of the following measures to maximize work zone safety and minimize impacts on user mobility:

- Conduct an initial Plan Review meeting for the I-94 Bridges over Riverside Road project.
- Provide adequate lateral and longitudinal buffers during active work periods to maximize user mobility and worker safety.
- Provide positive separation between traffic and the work area using temporary concrete barrier, with attenuator.

Notes:

- Appendix D provides information on contracting clauses.
- Appendix E provides the MOT plans and detour plan sheet.
- Appendix F provides design plans/typical.
- See section 4.2.2 for selected traffic control schemes for Riverside Bridge Project and the CPM Project.

5.2. Transportation Operations Plan

The general strategies for operations and management of the work zones include:

- Air traffic will not be affected.
- Work will be suspended during holiday periods, as defined by the project engineer. All work shall be coordinated around local festivals.
- Custom signs, (RUMBLE STRIPS) and (ATTENTION MOTORCYCLISTS) signs included in the quantities should be placed as the lead signs in the sign sequence when traffic is shifted. These signs will be placed on both sides of the roadway.
- W20-15b (WATCH FOR TRAFFIC BACKUPS/BE PREPARED TO STOP) signs should be placed at the Point of Beginning (POB) for WB and POB for EB and 5 miles in advance of each POB on the right and left of the roadway.
- A minimum of two R11-4MOD (OVERWIDTH VEHICLES PROHIBITED/10-FOOT MAXIMUM WIDTH) signs should be placed (1) at ½ mile before the interchange of I-94BL/M-37/Columbia Ave/Skyline/Martin Luther King Blvd/Exit 92 (eastbound) and (2) in advance of the interchange of M-294/Beadle Lake Road/Exit 100 (westbound).
- Portable Changeable Message Signs (PCMS) will be used to warn traffic of upcoming work and changing traffic control during the life of the project. The PCMS will be installed and

operational a minimum of 7 calendar days prior to the start of work. The proposed PCMS message sequence to be used is given below:

Riverside Bridge Project

Advance Notice for Road Work		Notice for Road Work	
BRIDGE WORK XX/XX/XX	2 LANES WILL BE OPEN	BRIDGE WORK	2 LANE TRAFFIC SHIFT
Sequence 1	Sequence 2	Sequence 1	Sequence 2

I-94 CPM Project

Advance Notice for Road Work		Notice for Road Work
ROAD WORK BEGINS XX/XX/XX	NIGHT WORK UTILIZED	NIGHT LANE CLOSURES
Sequence 1	Sequence 2	Sequence 1

- Notify the Battle Creek Area Transit Authority in advance of any roadway maintaining traffic changes to decrease any impacts to normal transit routes.
- Law enforcement will be asked to provide patrol of the work zone.
- Restrict access for construction vehicles between traveled lanes and work areas to specific locations. The number of access points and their locations require prior approval from the Engineer.

The strategies for operations and management of the I-94 CPM Project are as follows:

- Maintain two lanes of traffic on I-94 during the following hours:
  - Monday through Thursday, 6:00 a.m. to 7:00 p.m.
  - Friday, 6:00 a.m. to 9:00 p.m.
  - Saturday, 8:00 a.m. to 7:00 p.m.
  - Sunday, noon to 9:00 p.m.
- Remove all signs and traffic control devices during the hours of the above lane restrictions, according to the special provision for temporary removal of portable signs. If the signs are displayed during the restricted hours, then the contractor is charged liquidated damages of $333 for every 15 minutes the signs are displayed.

- Provide transverse and longitudinal HMA tapers at all grade changes caused by cold milling and overlays. Pave all cold-milled areas the same day as the cold milling operation is performed. Allow no traffic on the cold-milled surface, unless otherwise approved by the Engineer.
- Place lighted plastic drums for the WHOLE length of the project on BOTH sides of the EB and WB I-94.
- When not in use, store the lighted plastic drums along the edge of the shoulders. Do not drag drums across open lanes of traffic on a routine basis.
- During the paving operation, when the lap joint will be exposed to traffic, place a solid white lane line on the tapered portion of the joint, in addition to the solid white edgeline. Within the following work period, after the contractor has paved the adjacent lane to previous paving length, place a dashed white lane and 4-ft strips on 50-ft centers to delineate the center line, in addition to the solid yellow edgeline.
- Place temporary pavement markings, Type NR paint, 4-inch white at 4-ft skips on 50-ft centers to delineate the centerline, prior to opening to traffic, at the end of each work night.
- Place Temporary Paint (Type NR paint, 4-inch white and 4-inch yellow) to delineate the edge of the roadway lanes after each HMA course at the end of EACH working night, prior to opening to traffic.

Incident Management Plan

- Install permanent emergency routes signs along the I-94 corridor in the project limits to provide motorist guidance in the event of a traffic incident.
- Maintain access for emergency vehicles at all times through coordination with the MDOT construction staff.

5.3. Public Information Plan

The following strategies will be used to inform the public and stakeholders about the project:

- Circulate a project brochure detailing the type of project, the traffic control required to construct the job, and the time the project is expected to last.
- Issue a press release before the project begins detailing the type of project, the traffic control required to construct the job, and the time the project is expected to last.
- Keep the MDOT lane closure website up to date.
- Attend Neighborhood Planning Counsel Meeting(s) to describe the upcoming project, provide status, and receive feedback.
- Use portable changeable message signs (PCMS) to notify road users of upcoming work and changing traffic control throughout the life of the project. Install the PCMS and keep operational a minimum of 7 calendar days prior to the start of work.

Table 4 provides a summary of work zone impact management strategies.

Table 4: Summary of Work Zone Impact Management Strategies[5]

Temporary Traffic Control	√	Cost ($)
Control Strategies		
1. Construction phasing/staging	√	
2. Full roadway closures		
3. Lane shifts or closures	√	
4. One-lane, two-way controlled operation		
5. Two-way traffic on one side of facility. Reversible lanes		
6. Ramp closures/relocation		
7. Freeway-to-freeway interchange closures		
8. Night work	√	
9. Weekend work		
10. Work hour restrictions for peak travel	√	
11. Pedestrian/Bicycle access improvements		
12. Business access improvements		
13. Off-site detours/use of alternate routes	√	
Traffic Control Devices		
14. Temporary signs	√	300-500
15. Arrow panels	√	5,000-10,000
16. Channelizing devices	√	
17. Temporary pavement markings	√	
18. Flaggers and uniformed traffic control officers	√	
19. Temporary traffic signals	√	100,000-250,000
20. Lighting devices	√	
Project Coordination Strategies		
21. Other area projects	√	
22. Utilities	√	
23. Right-of-Way		
24. Other transportation infrastructure		
Innovative Contracting Strategies		
25. Design-Build		
26. A+B Bidding		

[5] The strategies and sample cost shown are for demonstration purposes only. When the TMP is incorporated in the contract documents, the cost items typically are not shown.

Temporary Traffic Control	√	Cost ($)
27. Incentive/Disincentive clauses		
28. Lane rental		
29. Performance specifications		
Innovative or Accelerated Construction Techniques		
30. Prefabricated/Precast elements		
31. Rapid cure materials		

Transportation Operations	√	Cost ($)
Demand Management Strategies		
1. Transit service improvements		
2. Transit incentives		
3. Shuttle services		
4. Parking supply management		
5. Variable work hours		
6. Telecommuting		
7. Ridesharing/carpooling incentives		
8. Park-and-Ride promotion		
Corridor/Network Management Strategies		
9. Signal timing/coordination improvements		
10. Temporary traffic signals		
11. Street/Intersection improvements		
12. Bus turnouts		
13. Turn restrictions		
14. Parking restrictions		
15. Truck/Heavy vehicle restrictions		
16. Reversible lanes		
17. Dynamic lane closure system		
18. Ramp closures		
19. Railroad crossing controls		
20. Coordination with adjacent construction site(s)		
Work Zone ITS Strategies		
21. Late lane merge		
22. PCMS with speed display	√	20,000/each
23. Travel time estimation system		

Transportation Operations	√	Cost ($)
24. Advanced speed information system		
25. Advanced congestion warning system		
26. Conflict warning system (e.g., construction vehicles entering roadway)		
27. Travel time monitor system		
28. Freeway queue monitor system		
29. CCTV monitoring		
30. Real-time detour		
Work Zone Safety Management Strategies		
31. Speed limit reduction/variable speed limits		
32. Temporary traffic signals		
33. Temporary traffic barrier	√	
34. Movable traffic barrier systems	√	
35. Crash cushions	√	
36. Temporary rumble strips		
37. Intrusion alarms		
38. Warning lights		
39. Automated flagger assistance devices (AFADs)		
40. Project task force/committee	√	
41. Construction safety supervisors/inspectors		
42. Road safety audits		
43. TMP monitor/inspection team		
Incident Management and Enforcement Strategies		
44. ITS for traffic monitoring/management	√	
45. TMC	√	
46. Surveillance (e.g., CCTV)	√	5,000-7,000 /each
47. Helicopter for aerial surveillance		
48. Traffic Screens		
49. Call boxes		
50. Milepost markers		
51. Tow/Freeway service patrol	√	
52. Total station units		
53. Photogrammetry		
54. Media coordination	√	250,000-500,000/year
55. Local detour routes	√	

Transportation Operations	√	Cost ($)
56. Contract support for incident management		
57. Incident/Emergency management coordination		
58. Incident/Emergency response plan		
59. Dedicated (paid) police enforcement		
60. Cooperative police enforcement		
61. Automated enforcement		
62. Increased penalties for work zone violations	√	
63. Emergency pull-offs		

Public Information	√	Cost ($)
Public Awareness Strategies		
1. Branding		
2. Press kits		
3. Brochures and mailers	√	2,000–5,000/each
4. Press releases/media alerts	√	
5. Mass media (earned and/or paid)		
6. Paid advertisements	√	3,000–5,000/15 seconds
7. Project Information Center/Kiosk	√	
8. Telephone hotline		
9. Planned lane closure website		
10. Project website	√	20,000-25,000/ initial setup
11. Public meetings/hearings, workshops	√	
12. Community task forces		
13. Coordination with media/schools/business/emergency services		
14. Work zone education and safety campaigns		
15. Work zone safety highway signs	√	
16. Rideshare promotions		
17. Visual information		
Motorist Information Strategies		
18. Radio traffic news	√	
19. Changeable message signs	√	18,000-20,000/each
20. Temporary motorist information signs		
21. Dynamic speed message sign	√	6,000-8,000/each
22. Highway Advisory Radio (HAR)	√	

Public Information	√	Cost ($)
23. Extinguishable Signs		
24. Highway information network (web-based)		
25. Traveler information systems(wireless, handheld)		
26. Transportation Management Center (TMC)	√	
27. Live traffic camera(s) on a website		
28. Project information hotline		
29. Email alerts		

6.0 TMP Implementation/Monitoring

In accordance with the MDOT *Work Zone Safety and Mobility Manual*, work zone monitoring will be completed by the region/TSC traffic and safety engineer. After initial implementation of the TMP, traffic delay monitoring, analysis and documentation are required during the life of the project. In addition, work zone crashes are to be documented and an analysis should be conducted to ensure that crash numbers have not increased. If monitoring of the work zone indicates that the actual delay times have exceeded the threshold limits anticipated or crash numbers have increased, then the need for adjustments in the TOP is to be considered.

7.0 TMP Review/Approvals

Note: In Michigan, the region engineer and region system manager are notified if after all mitigation measures have been applied, the project is still expected to exceed the mobility threshold limits (see footnote 2, page 1), or the TMP costs exceed 25% of the projects costs. The region is then responsible for contacting the Safety and Mobility Peer Team (SMPT) for a project review. The purpose of the SMPT is to conduct independent reviews and/or inspections of projects and provide recommendations to the Chief Operations Officer for approval before any implementations are made. See Appendix G for a sample Safety and Mobility Peer Team Review for this project.

8.0 Appendices

A. Hourly Count Reports
B. Crash Analysis & Safety Review
C. Traffic Analysis Reports
D. Clauses
E. Maintenance of Traffic Concept/Typical
F. Design Plans/Typical
G. Safety and Mobility Peer Team Review

Sample Appendices

Moderate-to-Major Impacts (Sample TMP 2)

A. Hourly Count Reports

B. Crash Analysis & Safety Review

C. Traffic Analysis Reports

D. Clauses

E. Maintenance of Traffic Concept/Typical

F. Design Plans/Typical

G. Safety and Mobility Peer Team Review

A. Hourly Count Reports

MDOT - Bureau of Transportation Planning

Hourly Count Report

County	Calhoun	**Station**	91	**CS #**	13081	**CS MP**	5.45
Route Desc	I-94			**PR #**	1296506	**PR MP**	5.45
Station Desc	0.3 MI E OF CAPITAL AV (0.8 MI W OF M-66)			**City**	None		
Direction	East			**Year**	2000		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
10/03/2000 Tuesday																									
0	0	0	0	0	0	0	0	0	0	0	0	0	1876	1894	2133	2149	2256	1695	1387	1299	1257	1114	911	**34660**	17971
AM High		**0**		**AM High Hour**		**01:00**				**PM High**		**2256**		**PM High Hour**			**18:00**								
10/04/2000 Wednesday																									
655	594	460	506	521	792	1418	2292	2146	1828	1906	1745	1826	1853	1911	2126	2156	2301	1851	1487	1487	1377	1044	1006	**35873**	35288
AM High		**2292**		**AM High Hour**		**08:00**				**PM High**		**2301**		**PM High Hour**			**18:00**								
10/05/2000 Thursday																									
875	657	552	625	614	968	1463	2210	2075	1868	1691	1904	1772	2033	2028	2275	2351	2269	1787	1518	1422	1448	1138	901	**35466**	36444
AM High		**2210**		**AM High Hour**		**08:00**				**PM High**		**2351**		**PM High Hour**			**17:00**								
10/06/2000 Friday																									
725	573	601	545	622	868	1381	2135	1999	1952	1929	1994	972	951	1344	3390	2829	0	0	0	0	0	0	0	**8514**	24810
AM High		**2135**		**AM High Hour**		**08:00**				**PM High**		**3390**		**PM High Hour**			**16:00**								

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County	Calhoun	**Station**	91	**CS #**	13081	**CS MP**	5.45
Route Desc	I-94			**PR #**	1297009	**PR MP**	5.45
Station Desc	0.3 MI E OF CAPITAL AV (0.8 MI W OF M-66)			**City**	None		
Direction	West			**Year**	2000		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
10/03/2000 Tuesday																									
0	0	0	0	0	0	0	0	0	0	0	0	0	1887	2056	2420	2539	2486	1938	1629	1460	1234	940	755	**34498**	19344
AM High		**0**		**AM High Hour**		**01:00**				**PM High**		**2539**		**PM High Hour**			**17:00**								
10/04/2000 Wednesday																									
580	503	474	468	498	612	1228	1720	1629	1696	1916	1824	2006	1981	2041	2371	2610	2630	1977	1550	1497	1336	1127	869	**35724**	35143
AM High		**1916**		**AM High Hour**		**11:00**				**PM High**		**2630**		**PM High Hour**			**18:00**								
10/05/2000 Thursday																									
583	545	471	467	576	710	1343	1795	1833	1720	1733	1973	1986	2008	2018	2333	2404	2435	1983	1631	1534	1254	965	796	**34917**	35096
AM High		**1973**		**AM High Hour**		**12:00**				**PM High**		**2435**		**PM High Hour**			**18:00**								
10/06/2000 Friday																									
617	509	518	470	488	661	1221	1725	1732	1788	1829	1919	2079	2259	2272	2822	3277	0	0	0	0	0	0	0	**10630**	26186
AM High		**1919**		**AM High Hour**		**12:00**				**PM High**		**3277**		**PM High Hour**			**17:00**								

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Hourly Count Report

County	Calhoun	**Station**	91	**CS #**	13081	**CS MP**	5.45
Route Desc	I-94			**PR #**	1296506	**PR MP**	5.45
Station Desc	0.3 MI E OF CAPITAL AV (0.8 MI W OF M-66)			**City**	None		
Direction	East			**Year**	2002		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
07/23/2002 Tuesday																									
0	0	0	0	0	0	0	0	0	0	0	1924	2077	2153	2162	2425	2556	2458	1991	1553	1467	1370	1170	861	**36776**	24167
AM High		**1924**		**AM High Hour**		**12:00**				**PM High**		**2556**		**PM High Hour**			**17:00**								
07/24/2002 Wednesday																									
748	541	470	487	528	720	1280	1854	1944	1954	2083	2087	2032	2137	2318	2509	2612	2528	2150	1675	1508	1354	1199	1091	**38588**	37809
AM High		**2087**		**AM High Hour**		**12:00**				**PM High**		**2612**		**PM High Hour**			**17:00**								
07/25/2002 Thursday																									
749	603	598	524	596	825	1361	2032	2071	1890	2139	2117	2197	0	0	0	0	0	0	0	0	0	0	0	**4314**	17702
AM High		**2139**		**AM High Hour**		**11:00**				**PM High**		**2197**		**PM High Hour**			**13:00**								

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County	Calhoun	**Station**	91	**CS #**	13081	**CS MP**	5.45
Route Desc	I-94			**PR #**	1297009	**PR MP**	5.45
Station Desc	0.3 MI E OF CAPITAL AV (0.8 MI W OF M-66)			**City**	None		
Direction	West			**Year**	2002		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
07/23/2002 Tuesday																									
0	0	0	0	0	0	0	0	0	0	0	2115	2274	2114	2329	2612	2582	2671	2013	1661	1415	1489	1192	1017	**38552**	25484
AM High		**2115**		**AM High Hour**		**12:00**				**PM High**		**2671**		**PM High Hour**			**18:00**								
07/24/2002 Wednesday																									
762	546	453	506	587	774	1477	2055	1949	1952	2007	2279	2207	2257	2410	2591	2592	2651	2001	1635	1391	1422	1205	1010	**38999**	38719
AM High		**2279**		**AM High Hour**		**12:00**				**PM High**		**2651**		**PM High Hour**			**18:00**								
07/25/2002 Thursday																									
748	566	492	518	605	767	1510	2101	2009	1975	2057	2135	2291	0	0	0	0	0	0	0	0	0	0	0	**4426**	17774
AM High		**2135**		**AM High Hour**		**12:00**				**PM High**		**2291**		**PM High Hour**			**13:00**								

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Hourly Count Report

County	Calhoun	**Station**	91	**CS #**	13081	**CS MP**	5.45
Route Desc	I-94			**PR #**	1296506	**PR MP**	5.45
Station Desc	0.3 MI E OF CAPITAL AV (0.8 MI W OF M-66)			**City**	None		
Direction	East			**Year**	2004		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
06/22/2004 Tuesday																									
0	0	0	0	0	0	0	0	0	0	0	0	0	2045	2217	2314	2618	2553	1969	1598	1412	1321	1101	929	**37554**	20077
AM High		**0**		**AM High Hour**		**01:00**				**PM High**		**2618**		**PM High Hour**			**17:00**								
06/23/2004 Wednesday																									
770	521	430	418	517	725	1402	2228	2221	2109	2002	2075	2059	2154	2318	2377	2596	2659	2067	1663	1577	1273	1170	1211	**39244**	38542
AM High		**2228**		**AM High Hour**		**08:00**				**PM High**		**2659**		**PM High Hour**			**18:00**								
06/24/2004 Thursday																									
864	765	482	459	633	787	1420	2247	2197	2192	2072	1992	2069	2101	2397	2650	2546	2635	2071	1740	1580	1375	1200	1060	**39477**	39534
AM High		**2247**		**AM High Hour**		**08:00**				**PM High**		**2650**		**PM High Hour**			**16:00**								
06/25/2004 Friday																									
764	614	478	490	556	805	1327	2002	2223	2110	2252	2222	2279	2630	2727	2895	2981	2775	2371	2075	1882	1572	1293	1034	**37850**	42357
AM High		**2252**		**AM High Hour**		**11:00**				**PM High**		**2981**		**PM High Hour**			**17:00**								
06/26/2004 Saturday																									
729	465	412	333	376	417	618	1049	1428	1628	1962	2047	2151	2048	1979	1837	1842	1778	1696	1441	1200	1102	944	720	**26267**	30202
AM High		**2047**		**AM High Hour**		**12:00**				**PM High**		**2151**		**PM High Hour**			**13:00**								
06/27/2004 Sunday																									
487	321	254	203	195	198	373	439	769	1156	1453	1754	2078	2261	2282	2147	2485	2380	2274	1952	2293	1771	1357	1105	**38097**	31987
AM High		**1754**		**AM High Hour**		**12:00**				**PM High**		**2485**		**PM High Hour**			**17:00**								
06/28/2004 Monday																									
703	526	422	449	511	790	1287	1846	1860	1792	1803	1833	1968	2051	2270	2354	2379	0	0	0	0	0	0	0	**9054**	24844
AM High		**1860**		**AM High Hour**		**09:00**				**PM High**		**2379**		**PM High Hour**			**17:00**								

County	Calhoun	**Station**	91	**CS #**	13081	**CS MP**	5.45
Route Desc	I-94			**PR #**	1296506	**PR MP**	5.45
Station Desc	0.3 MI E OF CAPITAL AV (0.8 MI W OF M-66)			**City**	None		
Direction	East			**Year**	2004		

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County	Calhoun	**Station**	91	**CS #**	13081	**CS MP**	5.45
Route Desc	I-94			**PR #**	1297009	**PR MP**	5.45
Station Desc	0.3 MI E OF CAPITAL AV (0.8 MI W OF M-66)			**City**	None		
Direction	West			**Year**	2004		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
06/22/2004 Tuesday																									
0	0	0	0	0	0	0	0	0	0	0	0	0	2326	2196	2449	2542	2701	1939	1765	1536	1271	1184	969	**38324**	20878
AM High		**0**		**AM High Hour**		**01:00**				**PM High**		**2701**		**PM High Hour**			**18:00**								
06/23/2004 Wednesday																									
671	517	462	435	535	822	1506	2114	1997	2069	1985	2189	2144	2248	2343	2497	2496	2520	2165	1677	1667	1436	1153	934	**39226**	38582
AM High		**2189**		**AM High Hour**		**12:00**				**PM High**		**2520**		**PM High Hour**			**18:00**								
06/24/2004 Thursday																									
651	495	539	482	548	875	1567	2097	2048	2097	2255	2228	2208	2361	2331	2553	2976	2943	2176	1910	1692	1493	1186	948	**40838**	40659
AM High		**2255**		**AM High Hour**		**11:00**				**PM High**		**2976**		**PM High Hour**			**17:00**								
06/25/2004 Friday																									
667	505	431	434	560	755	1461	1942	2044	2109	2336	2417	2608	2703	3086	3090	3020	2879	2585	2272	1985	1662	1248	947	**39316**	43746
AM High		**2417**		**AM High Hour**		**12:00**				**PM High**		**3090**		**PM High Hour**			**16:00**								
06/26/2004 Saturday																									
590	446	361	259	255	440	742	1148	1458	1874	2113	2162	1991	2048	1962	1990	1811	1748	1642	1372	1201	1103	925	689	**26342**	30330
AM High		**2162**		**AM High Hour**		**12:00**				**PM High**		**2048**		**PM High Hour**			**14:00**								
06/27/2004 Sunday																									
495	315	237	128	139	188	337	461	817	1180	1541	1897	2116	2116	2182	2204	2184	2230	2133	2090	1855	1600	1235	920	**37431**	30600
AM High		**1897**		**AM High Hour**		**12:00**				**PM High**		**2230**		**PM High Hour**			**18:00**								
06/28/2004 Monday																									
601	470	390	376	484	732	1443	1929	1784	1861	2087	2236	2289	2298	2256	2322	2418	0	0	0	0	0	0	0	**9294**	25976
AM High		**2236**		**AM High Hour**		**12:00**				**PM High**		**2418**		**PM High Hour**			**17:00**								

County	Calhoun	**Station**	91	**CS #**	13081	**CS MP**	5.45
Route Desc	I-94			**PR #**	1297009	**PR MP**	5.45
Station Desc	0.3 MI E OF CAPITAL AV (0.8 MI W OF M-66)			**City**	None		
Direction	West			**Year**	2004		

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County	Calhoun	**Station**	90	**CS #**	13082	**CS MP**	1.15
Route Desc	I-94			**PR #**	1296506	**PR MP**	7.46
Station Desc	1 MILE N.E. OF M-66			**City**	None		
Direction	North-East			**Year**	2000		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
10/03/2000 Tuesday																									
0	0	0	0	0	0	0	0	0	0	0	0	0	1735	1798	2023	2099	2079	1623	1302	1240	1120	967	809	**31164**	16795
AM High		**0**		**AM High Hour**		**01:00**				**PM High**		**2099**		**PM High Hour**			**17:00**								
10/04/2000 Wednesday																									
610	629	480	497	534	767	1198	1696	1652	1504	1653	1572	1577	1684	1767	1943	2019	2133	1646	1336	1353	1175	866	886	**31155**	31177
AM High		**1696**		**AM High Hour**		**08:00**				**PM High**		**2133**		**PM High Hour**			**18:00**								
10/05/2000 Thursday																									
759	556	478	540	538	873	1227	1546	1562	1597	1433	1659	1579	1910	1935	2104	2204	2099	1654	0	0	0	0	0	**11906**	26253
AM High		**1659**		**AM High Hour**		**12:00**				**PM High**		**2204**		**PM High Hour**			**17:00**								

County	Calhoun	**Station**	90	**CS #**	13082	**CS MP**	1.15
Route Desc	I-94			**PR #**	1297009	**PR MP**	7.46
Station Desc	1 MILE N.E. OF M-66			**City**	None		
Direction	South-West			**Year**	2000		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
10/03/2000 Tuesday																									
0	0	0	0	0	0	0	0	0	0	0	0	0	1786	1946	2168	2235	2165	1806	1467	1241	1075	814	667	**31802**	17370
AM High		**0**		**AM High Hour**		**01:00**				**PM High**		**2235**		**PM High Hour**			**17:00**								
10/04/2000 Wednesday																									
574	463	457	467	472	594	1108	1660	1608	1651	1786	1698	1894	1892	1956	2251	2337	2187	1785	1380	1344	1191	993	761	**32661**	32509
AM High		**1786**		**AM High Hour**		**11:00**				**PM High**		**2337**		**PM High Hour**			**17:00**								
10/05/2000 Thursday																									
538	473	471	439	523	651	1186	1797	1672	1646	1605	1819	1764	1823	1873	2020	2071	2127	1765	0	0	0	0	0	**11679**	26263
AM High		**1819**		**AM High Hour**		**12:00**				**PM High**		**2127**		**PM High Hour**			**18:00**								

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County	Calhoun	**Station**	90	**CS #**	13082	**CS MP**	1.15
Route Desc	I-94			**PR #**	1296506	**PR MP**	7.46
Station Desc	1 MILE N.E. OF M-66			**City**	None		
Direction	North-East			**Year**	2002		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
07/23/2002 Tuesday																									
0	0	0	0	0	0	0	0	0	0	1733	1855	1889	1989	2121	2352	2453	2241	1882	1509	1441	1360	1134	916	**35178**	24875
AM High		**1855**		**AM High Hour**		**12:00**				**PM High**		**2453**		**PM High Hour**			**17:00**								
07/24/2002 Wednesday																									
717	577	484	553	604	797	1333	1679	1750	1809	1927	1971	1956	2116	2202	2444	2581	2433	2039	1655	1491	1334	1160	1085	**37276**	36697
AM High		**1971**		**AM High Hour**		**12:00**				**PM High**		**2581**		**PM High Hour**			**17:00**								
07/25/2002 Thursday																									
741	607	603	541	701	876	1330	1816	1857	1810	2091	2014	0	0	0	0	0	0	0	0	0	0	0	0	**4105**	14987
AM High		**2091**		**AM High Hour**		**11:00**				**PM High**		**0**		**PM High Hour**											

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County	Calhoun	**Station**	90	**CS #**	13082	**CS MP**	1.15
Route Desc	I-94			**PR #**	1297009	**PR MP**	7.46
Station Desc	1 MILE N.E. OF M-66			**City**	None		
Direction	South-West			**Year**	2002		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
07/23/2002 Tuesday																									
0	0	0	0	0	0	0	0	0	0	2067	2088	2060	2055	2212	2405	2350	2389	1810	1492	1280	1350	1043	887	**35778**	25488
AM High		**2088**		**AM High Hour**		**12:00**				**PM High**		**2405**		**PM High Hour**			**16:00**								
07/24/2002 Wednesday																									
678	476	422	475	483	690	1287	1914	1886	1979	2006	2185	2136	2198	2287	2339	2567	2538	1950	1673	1466	1358	1161	900	**37235**	37054
AM High		**2185**		**AM High Hour**		**12:00**				**PM High**		**2567**		**PM High Hour**			**17:00**								
07/25/2002 Thursday																									
690	481	444	508	540	751	1344	1751	1913	2049	2133	2325	0	0	0	0	0	0	0	0	0	0	0	0	**4458**	14929
AM High		**2325**		**AM High Hour**		**12:00**				**PM High**		**0**		**PM High Hour**											

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County	Calhoun	**Station**	90	**CS #**	13082	**CS MP**	1.15
Route Desc	I-94			**PR #**	1296506	**PR MP**	7.46
Station Desc	1 MILE N.E. OF M-66			**City**	None		
Direction	North-East			**Year**	2004		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
06/17/2004 Thursday																									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2267	2502	2313	1882	1515	1492	1264	1046	835	**35148**	15116
AM High		**0**		**AM High Hour**		**01:00**				**PM High**		**2502**		**PM High Hour**			**17:00**								
06/18/2004 Friday																									
830	560	494	547	662	885	1317	1729	1802	1806	1876	1865	1738	1892	2029	2359	2384	2360	1887	1530	1485	1398	1249	930	**36175**	35614
AM High		**1876**		**AM High Hour**		**11:00**				**PM High**		**2384**		**PM High Hour**			**17:00**								
06/19/2004 Saturday																									
833	661	540	507	676	855	1323	1841	1781	1881	1856	1777	1888	2116	2058	2323	1855	1523	0	0	0	0	0	0	**5701**	26294
AM High		**1881**		**AM High Hour**		**10:00**				**PM High**		**2323**		**PM High Hour**			**16:00**								

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County	Calhoun	**Station**	90	**CS #**	13082	**CS MP**	1.15
Route Desc	I-94			**PR #**	1297009	**PR MP**	7.46
Station Desc	1 MILE N.E. OF M-66			**City**	None		
Direction	South-West			**Year**	2004		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
06/17/2004 Thursday																									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2010	2180	2203	1749	1553	1355	1216	991	794	**37479**	14051
AM High		**0**		**AM High Hour**		**01:00**				**PM High**		**2203**			**PM High Hour**		**18:00**								
06/18/2004 Friday																									
639	476	512	489	530	672	1459	2260	2489	2415	2399	2290	2495	2158	2145	2300	2248	2385	2355	1935	1523	1305	1120	902	**39293**	39501
AM High		**2489**		**AM High Hour**		**09:00**				**PM High**		**2495**			**PM High Hour**		**13:00**								
06/19/2004 Saturday																									
725	510	501	492	510	655	1485	2106	2402	2345	2271	2410	2505	2158	2145	2300	2248	2385	0	0	0	0	0	0	**6933**	30153
AM High		**2410**		**AM High Hour**		**12:00**				**PM High**		**2505**			**PM High Hour**		**13:00**								

MDOT - Bureau of Transportation Planning

Hourly Count Report

County	Calhoun	**Station**	90	**CS #**	13082	**CS MP**	1.15
Route Desc	I-94			**PR #**	1296506	**PR MP**	7.46
Station Desc	1 MILE N.E. OF M-66			**City**	None		
Direction	North-East			**Year**	2002		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
07/23/2002 Tuesday																									
0	0	0	0	0	0	0	0	0	0	1733	1855	1889	1989	2121	2352	2453	2241	1882	1509	1441	1360	1134	916	**35178**	24875
AM High		**1855**		**AM High Hour**		**12:00**				**PM High**		**2453**		**PM High Hour**			**17:00**								
07/24/2002 Wednesday																									
717	577	484	553	604	797	1333	1679	1750	1809	1927	1971	1956	2116	2202	2444	2581	2433	2039	1655	1491	1334	1160	1085	**37276**	36697
AM High		**1971**		**AM High Hour**		**12:00**				**PM High**		**2581**		**PM High Hour**			**17:00**								
07/25/2002 Thursday																									
741	607	603	541	701	876	1330	1816	1857	1810	2091	2014	0	0	0	0	0	0	0	0	0	0	0	0	**4105**	14987
AM High		**2091**		**AM High Hour**		**11:00**				**PM High**		**0**		**PM High Hour**											

County	Calhoun	**Station**	90	**CS #**	13082	**CS MP**	1.15
Route Desc	I-94			**PR #**	1297009	**PR MP**	7.46
Station Desc	1 MILE N.E. OF M-66			**City**	None		
Direction	South-West			**Year**	2002		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
07/23/2002 Tuesday																									
0	0	0	0	0	0	0	0	0	0	2067	2088	2060	2055	2212	2405	2350	2389	1810	1492	1280	1350	1043	887	**35778**	25488
AM High		**2088**		**AM High Hour**		**12:00**				**PM High**		**2405**		**PM High Hour**			**16:00**								
07/24/2002 Wednesday																									
678	476	422	475	483	690	1287	1914	1886	1979	2006	2185	2136	2198	2287	2339	2567	2538	1950	1673	1466	1358	1161	900	**37235**	37054
AM High		**2185**		**AM High Hour**		**12:00**				**PM High**		**2567**		**PM High Hour**			**17:00**								
07/25/2002 Thursday																									
690	481	444	508	540	751	1344	1751	1913	2049	2133	2325	0	0	0	0	0	0	0	0	0	0	0	0	**4458**	14929
AM High		**2325**		**AM High Hour**		**12:00**				**PM High**		**0**		**PM High Hour**											

MDOT - Bureau of Transportation Planning
Hourly Count Report

County	Calhoun	**Station**	90	**CS #**	13082	**CS MP**	1.15
Route Desc	I-94			**PR #**	1296506	**PR MP**	7.46
Station Desc	1 MILE N.E. OF M-66			**City**	None		
Direction	North-East			**Year**	2004		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
06/17/2004 Thursday																									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2267	2502	2313	1882	1515	1492	1264	1046	835	**35148**	15116
AM High		**0**		**AM High Hour**		**01:00**				**PM High**		**2502**		**PM High Hour**			**17:00**								
06/18/2004 Friday																									
830	560	494	547	662	885	1317	1729	1802	1806	1876	1865	1738	1892	2029	2359	2384	2360	1887	1530	1485	1398	1249	930	**36175**	35614
AM High		**1876**		**AM High Hour**		**11:00**				**PM High**		**2384**		**PM High Hour**			**17:00**								
06/19/2004 Saturday																									
833	661	540	507	676	855	1323	1841	1781	1881	1856	1777	1888	2116	2058	2323	1855	1523	0	0	0	0	0	0	**5701**	26294
AM High		**1881**		**AM High Hour**		**10:00**				**PM High**		**2323**		**PM High Hour**			**16:00**								

MDOT - Bureau of Transportation Planning
Hourly Count Report

County	Calhoun	**Station**	90	**CS #**	13082	**CS MP**	1.15
Route Desc	I-94			**PR #**	1297009	**PR MP**	7.46
Station Desc	1 MILE N.E. OF M-66			**City**	None		
Direction	South-West			**Year**	2004		

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24 Hour Total	Day
06/17/2004 Thursday																									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2010	2180	2203	1749	1553	1355	1216	991	794	**37479**	14051
AM High		**0**		**AM High Hour**		**01:00**				**PM High**		**2203**			**PM High Hour**		**18:00**								
06/18/2004 Friday																									
639	476	512	489	530	672	1459	2260	2489	2415	2399	2290	2495	2158	2145	2300	2248	2385	2355	1935	1523	1305	1120	902	**39293**	39501
AM High		**2489**		**AM High Hour**		**09:00**				**PM High**		**2495**			**PM High Hour**		**13:00**								
06/19/2004 Saturday																									
725	510	501	492	510	655	1485	2106	2402	2345	2271	2410	2505	2158	2145	2300	2248	2385	0	0	0	0	0	0	**6933**	30153
AM High		**2410**		**AM High Hour**		**12:00**				**PM High**		**2505**			**PM High Hour**		**13:00**								

03/21/2007 **HOURLY COUNT REPORT**

County	Calhoun	**Station**	91	**CS #**	13081	**CS MP**	5.45
Route Desc	I-94			**PR #**	1296506	**PR MP**	5.45
Station Desc	0.3 MI E OF CAPITAL AV (0.8 MI W OF M-66)			**City**	None		
Direction	East			**Year**	2004		

	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24HourTotal	DAY
Tuesday	**06/22/2004**																									**20077**
	0	0	0	0	0	0	0	0	0	0	0	0	0	2045	2217	2314	2618	2553	1969	1598	1412	1321	1101	929		
AM High:	**0**		**AM High Hour:**	**01:00**							**PM High:**	**2618**		**PM High Hour:**	**17:00**										**37554**	
Wednesday	**06/23/2004**																									**38542**
	770	521	430	418	517	725	1402	2228	2221	2109	2002	2075	2059	2154	2318	2377	2596	2659	2067	1663	1577	1273	1170	1211		
AM High:	**2228**		**AM High Hour:**	**08:00**							**PM High:**	**2659**		**PM High Hour:**	**18:00**										**39244**	
Thursday	**06/24/2004**																									**39534**
	864	765	482	459	633	787	1420	2247	2197	2192	2072	1992	2069	2101	2397	2650	2546	2635	2071	1740	1580	1375	1200	1060		
AM High:	**2247**		**AM High Hour:**	**08:00**							**PM High:**	**2650**		**PM High Hour:**	**16:00**										**39477**	
Friday	**06/25/2004**																									**42357**
	764	614	478	490	556	805	1327	2002	2223	2110	2252	2222	2279	2630	2727	2895	2981	2775	2371	2075	1882	1572	1293	1034		
AM High:	**2252**		**AM High Hour:**	**11:00**							**PM High:**	**2981**		**PM High Hour:**	**17:00**										**37850**	
Saturday	**06/26/2004**																									**30202**
	729	465	412	333	376	417	618	1049	1428	1628	1962	2047	2151	2048	1979	1837	1842	1778	1696	1441	1200	1102	944	720		
AM High:	**2047**		**AM High Hour:**	**12:00**							**PM High:**	**2151**		**PM High Hour:**	**13:00**										**26267**	
Sunday	**06/27/2004**																									**31987**
	487	321	254	203	195	198	373	439	769	1156	1453	1754	2078	2261	2282	2147	2485	2380	2274	1952	2293	1771	1357	1105		
AM High:	**1754**		**AM High Hour:**	**12:00**							**PM High:**	**2485**		**PM High Hour:**	**17:00**										**38097**	
Monday	**06/28/2004**																									**24844**
	703	526	422	449	511	790	1287	1846	1860	1792	1803	1833	1968	2051	2270	2354	2379	0	0	0	0	0	0	0		
AM High:	**1860**		**AM High Hour:**	**09:00**							**PM High:**	**2379**		**PM High Hour:**	**17:00**										**9054**	

03/21/2007

HOURLY COUNT REPORT

County Calhoun **Station** 91 **CS #** 13081 **CS MP** 5.45
Route Desc I-94 **PR #** 1297009 **PR MP** 5.45
Station Desc 0.3 MI E OF CAPITAL AV (0.8 MI W OF M-66) **City** None

Direction West **Year** 2004

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	24HourTotal	DAY
Tuesday			**06/22/2004**																						**20878**
0	0	0	0	0	0	0	0	0	0	0	0	0	2326	2196	2449	2542	2701	1939	1765	1536	1271	1184	969		
AM High:	**0**			**AM High Hour:**	**01:00**							**PM High:**	**2701**			**PM High Hour:**	**18:00**							**38324**	
Wednesday			**06/23/2004**																						**38582**
671	517	462	435	535	822	1506	2114	1997	2069	1985	2189	2144	2248	2343	2497	2496	2520	2165	1677	1667	1436	1153	934		
AM High:	**2189**			**AM High Hour:**	**12:00**							**PM High:**	**2520**			**PM High Hour:**	**18:00**							**39226**	
Thursday			**06/24/2004**																						**40659**
651	495	539	482	548	875	1567	2097	2048	2097	2255	2228	2208	2361	2331	2553	2976	2943	2176	1910	1692	1493	1186	948		
AM High:	**2255**			**AM High Hour:**	**11:00**							**PM High:**	**2976**			**PM High Hour:**	**17:00**							**40838**	
Friday			**06/25/2004**																						**43746**
667	505	431	434	560	755	1461	1942	2044	2109	2336	2417	2608	2703	3086	3090	3020	2879	2585	2272	1985	1662	1248	947		
AM High:	**2417**			**AM High Hour:**	**12:00**							**PM High:**	**3090**			**PM High Hour:**	**16:00**							**39316**	
Saturday			**06/26/2004**																						**30330**
590	446	361	259	255	440	742	1148	1458	1874	2113	2162	1991	2048	1962	1990	1811	1748	1642	1372	1201	1103	925	689		
AM High:	**2162**			**AM High Hour:**	**12:00**							**PM High:**	**2048**			**PM High Hour:**	**14:00**							**26342**	
Sunday			**06/27/2004**																						**30600**
495	315	237	128	139	188	337	461	817	1180	1541	1897	2116	2116	2182	2204	2184	2230	2133	2090	1855	1600	1235	920		
AM High:	**1897**			**AM High Hour:**	**12:00**							**PM High:**	**2230**			**PM High Hour:**	**18:00**							**37431**	
Monday			**06/28/2004**																						**25976**
601	470	390	376	484	732	1443	1929	1784	1861	2087	2236	2289	2298	2256	2322	2418	0	0	0	0	0	0	0		
AM High:	**2236**			**AM High Hour:**	**12:00**							**PM High:**	**2418**			**PM High Hour:**	**17:00**							**9294**	

B. Crash Analysis & Safety Review

MDOT Michigan Department of Transportation

OFFICE MEMORANDUM

DATE: March 4, 2008

TO: Raja Jildeh, Supervising Engineer, Lansing Bridge Design Unit

FROM: Angie Kremer, Traffic & Safety Engineer, Marshall TSC

SUBJECT: Crash Analysis & Safety Review
CS 13081 JN 75047
I-94 Structures S05-3 & S05-4 of 13081, Riverside Drive Bridges

I have conducted a crash analysis and safety review for a three year period (January 1, 2005 – December 31, 2007) of the following locations.

I-94 Structures S05-3 & S05-04 of 13081, Riverside Drive Bridges

The proposed project consists of a total structure replacement for both structures. The structures are in a horizontal curve and the super elevation will be built to current standards. The following table describes the roadway, ADT and level-of-service:

Control Section	Bound	BMP to EMP	Type of Road way	ADT	LOS
13081	East	0.642	4L-2W	27,900	C
13081	West	0.640	4L-2W	27,900	C

Crash Analysis & Safety Review I-94 Eastbound
Three year period (January 1, 2005 – December 31, 2007) were reviewed for this location using the TMS database. The segment analyzed was 0.2 miles east and west of S05-3 of 13081. Eight (8) crashes occurred at this location in the three year study period. The crashes are as summarized in the table below.

Crash Type	Crash Count	Percentage
Fixed Object	3	37.5
Sideswipe Same	2	25.0
Miscellaneous Vehicle	1	12.5
Overturn	1	12.5
Other Object	1	12.5

No fatalities or disabling injuries occurred from any of the crashes. One crash was alcohol related, a fixed object crash. Driver hit guardrail and was cited for OWI.

Four crashes were due to weather conditions either being icy, snowy or wet. The wet crash the officer noted on the crash report that driver needed to replace tires.

Two crashes were either due to passing or quick lane changes that caused swerving.

The remaining crash was road debris that fell off a trailer the driver was behind.

No correctable crash patterns exist at this location on I-94 eastbound for which safety countermeasures will be necessary beyond the current scope of work.

Crash Analysis & Safety Review I-94 Westbound
Three year period (January 1, 2005 – December 31, 2007) were reviewed for this location using the TMS database. The segment analyzed was 0.2 miles east and west of S05-4 of 13081. Eight (8) crashes occurred at this location in the three year study period. The crashes are as summarized in the table below.

Crash Type	Crash Count	Percentage
Animal	2	25.0
Sideswipe Same	2	25.0
Rear-end Straight	1	12.5
Angle Straight	1	12.5
Miscellaneous Vehicle	1	12.5
Fixed Object	1	12.5

No fatalities or disabling injuries occurred from any of the crashes. Also no crashes were alcohol related.

The animal and sideswipe crashes were the predominate crash pattern for this area. The animal crashes were not deer crashes. One crash involved a turkey and the other a dog.

Two crashes (sideswipe same and angle straight crash) were due to the ramp merge area. One of the crashes the driver lost control of a trailer and the other crash the roadway was marked as "icy".

One crash was construction related. The vehicle was stopped due to construction and one of the vehicles then started to roll back and stuck the vehicle behind.

The remaining three crashes were either due to weather conditions or quick lane changes that caused swerving.

No correctable crash patterns exist at this location on I-94 westbound for which safety countermeasures will be necessary beyond the current scope of work.

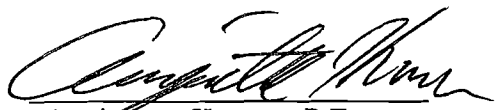
Crash Analysis & Safety Review Riverside Drive
Three year period (January 1, 2005 – December 31, 2007) were reviewed for this location using the TMS database. The segment analyzed was 0.076 miles north and south of I-94 on Riverside

Drive below. One (1) crashes occurred during this span, and the crash was an animal crashes.

Searching the High Load Hit Statewide Bridge list from 2001 to 2006 no events were recorded for the Riverside Drive structures. Two events were logged in for the High Load Hit Southwest Bridge list from 1977 to 2000. The events were not crash related but were listed as "Raise and Shim Bridge." The new structures will meet the minimum bridge under clearance for a local road, (14' 6"). None of the crashes are attributable to insufficient structure underclearance.

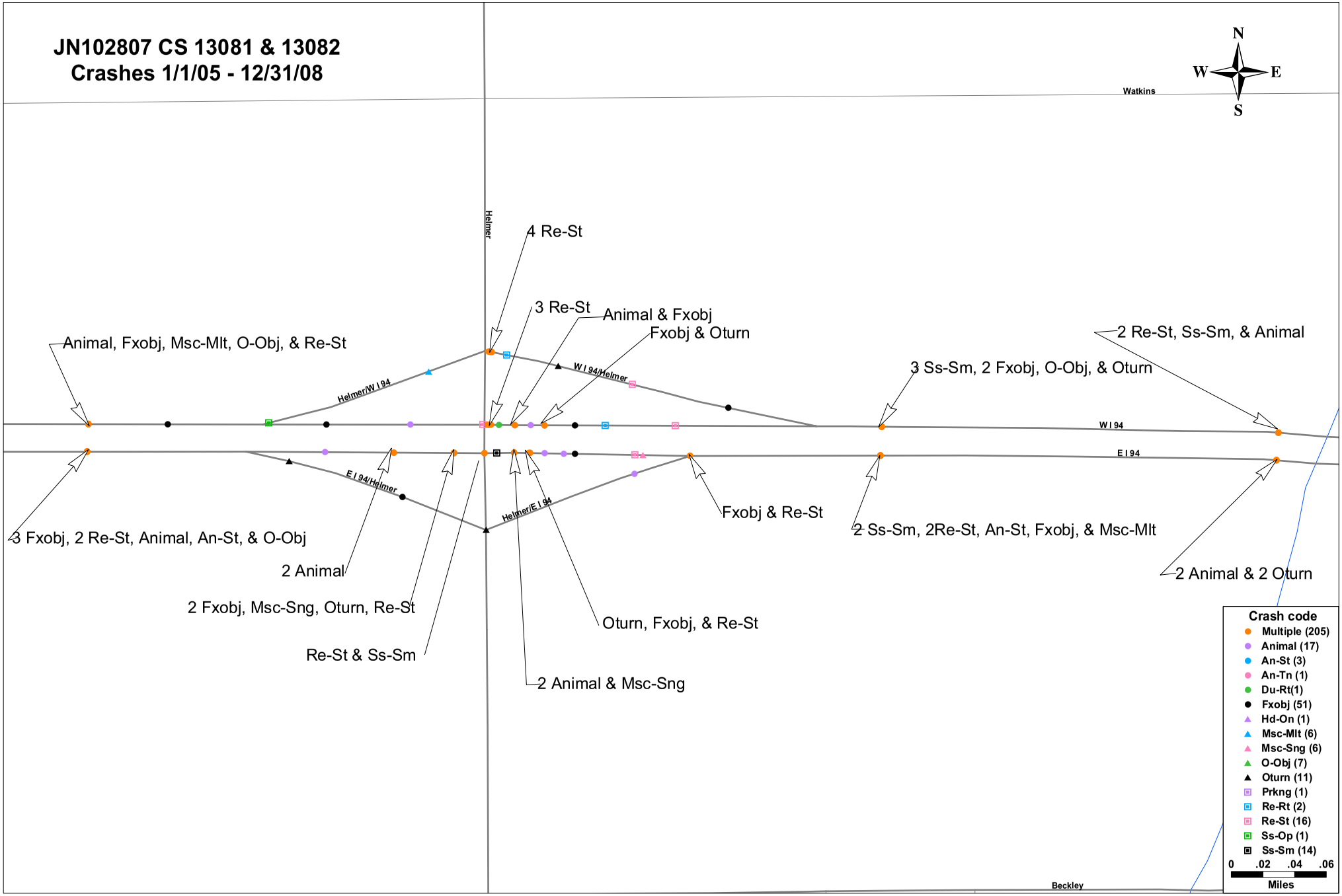
No correctable crash patterns exist at this location on Riverside Drive for which safety countermeasures will be necessary beyond the current scope of work.

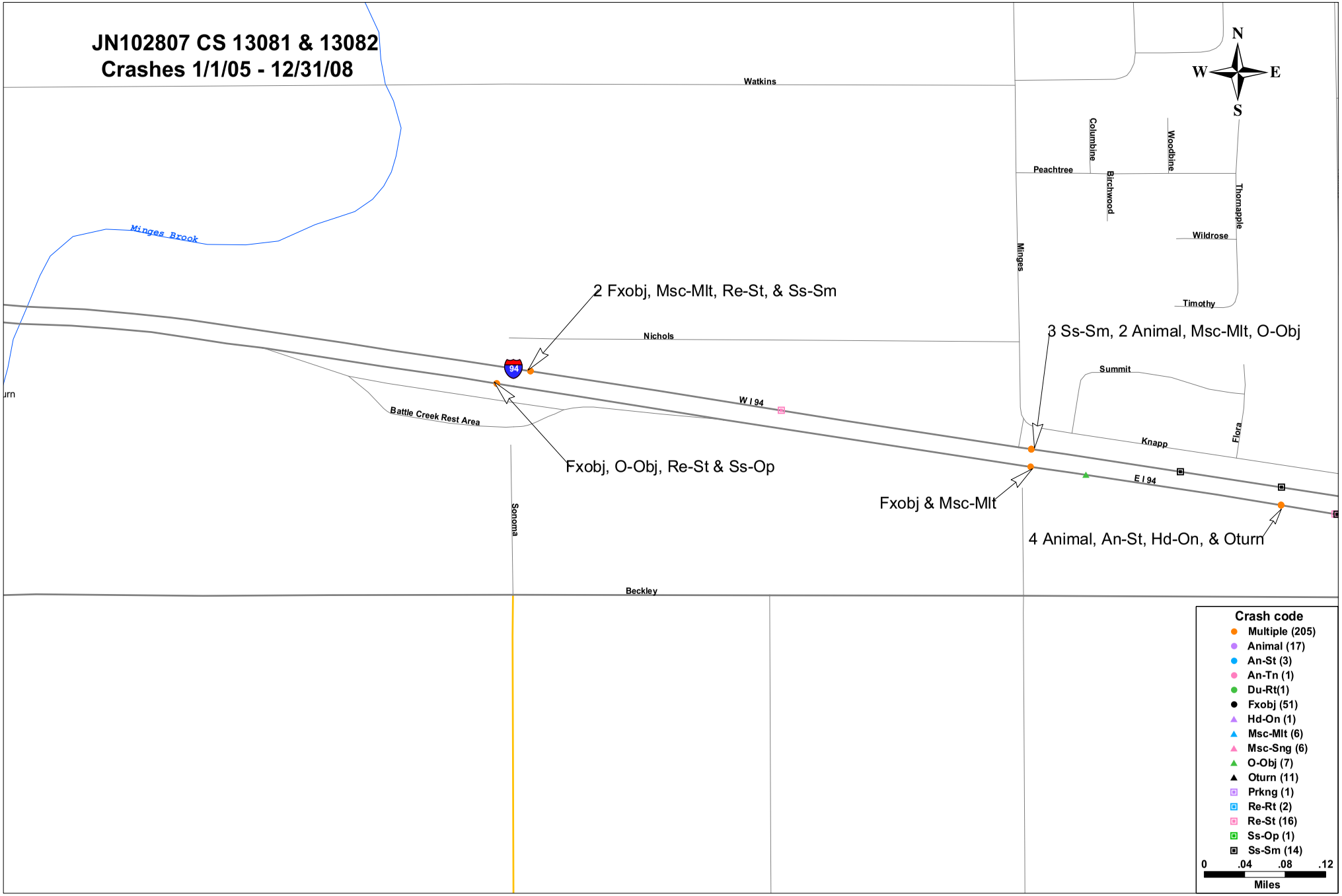
If you have any questions regarding this document please call me at 269-789-0560 extension 239.

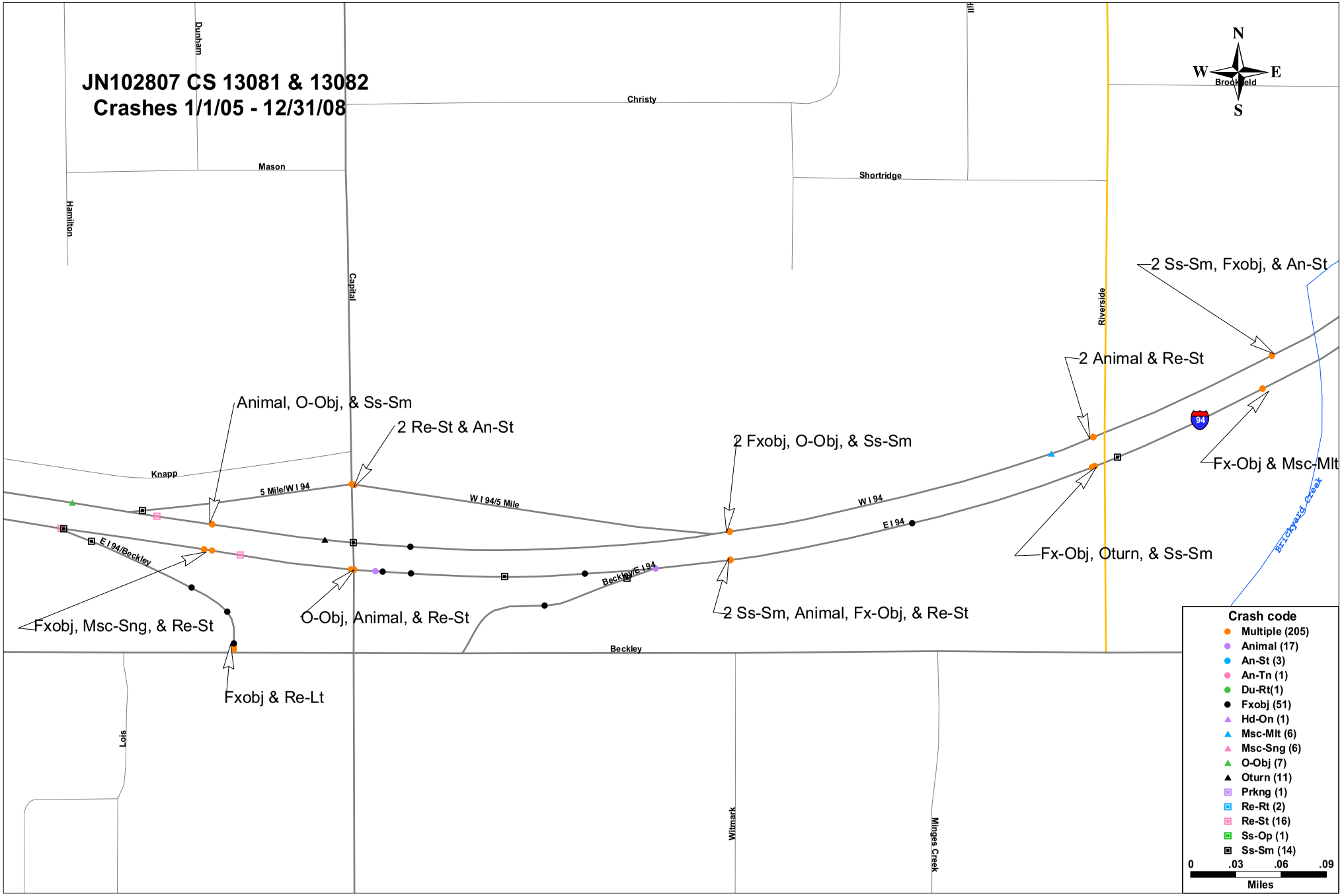


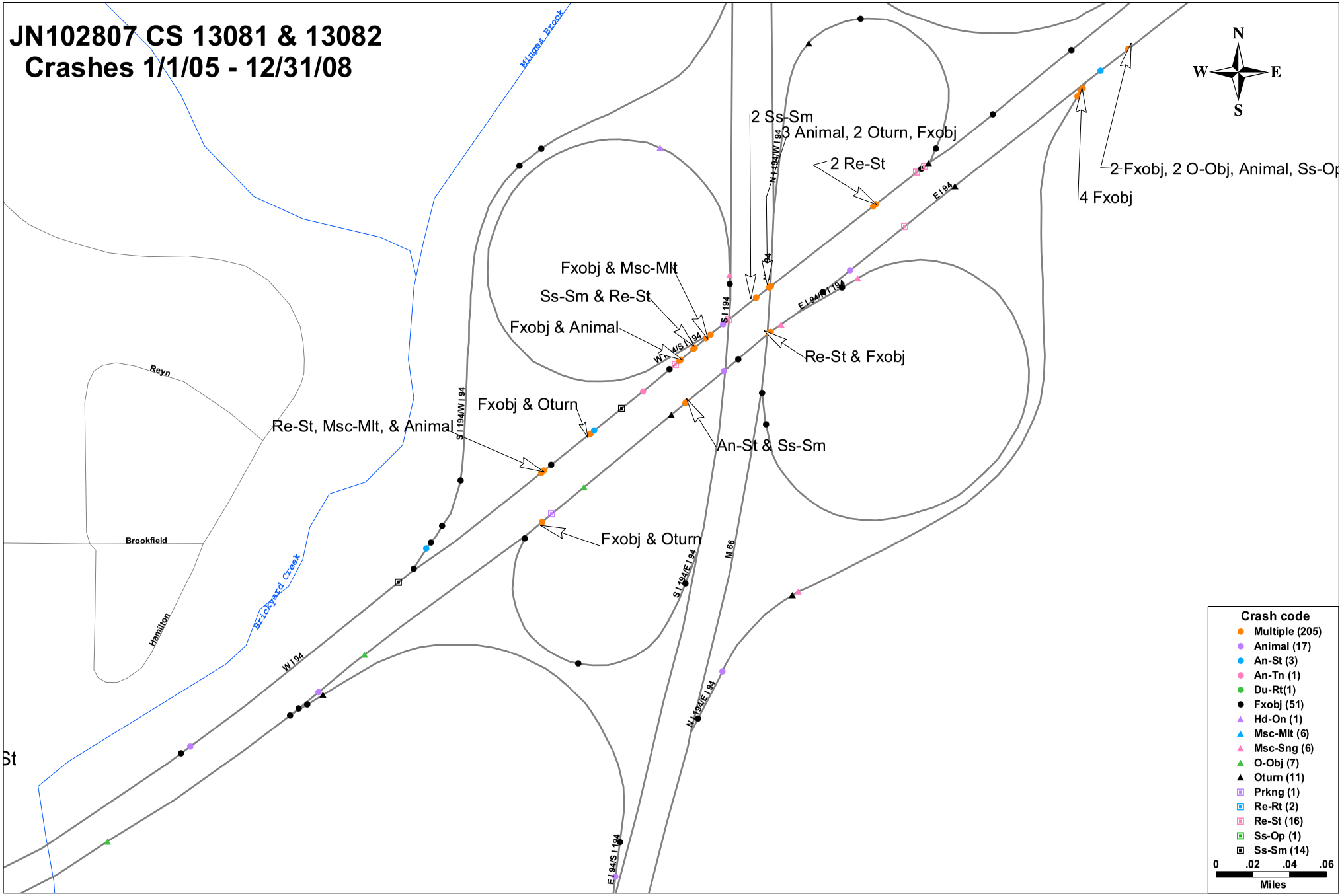
Annjanette Kremer, P.E.
Traffic & Safety Engineer
MDOT – Marshall TSC

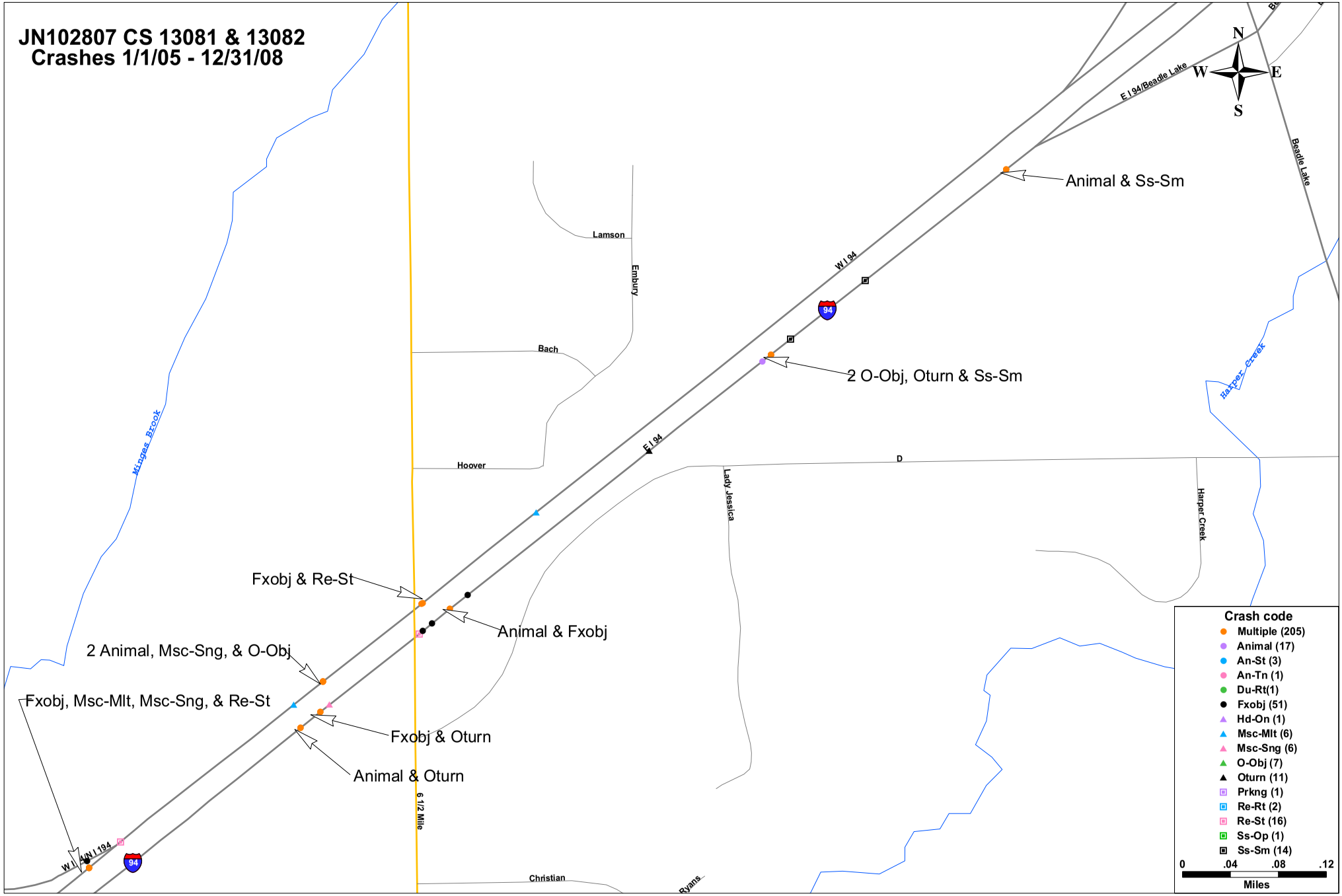
Cc: Alissa Hubbell
Carrie Hamel
Sarah Fedders


JN102807 CS 13081 & 13082
Crashes 1/1/05 - 12/31/08
N
W
E
S
Watkins
Helmer
4 Re-St
3 Re-St
Animal & Fxobj
Fxobj & Oturn
Animal, Fxobj, Msc-Mlt, O-Obj, & Re-St
2 Re-St, Ss-Sm, & Animal
3 Ss-Sm, 2 Fxobj, O-Obj, & Oturn
Helmer/W I 94
W I 94/Helmer
W I 94
E I 94
E I 94/Helmer
Helmer/E I 94
Fxobj & Re-St
3 Fxobj, 2 Re-St, Animal, An-St, & O-Obj
2 Ss-Sm, 2Re-St, An-St, Fxobj, & Msc-Mlt
2 Animal & 2 Oturn
2 Animal
2 Fxobj, Msc-Sng, Oturn, Re-St
Oturn, Fxobj, & Re-St
Re-St & Ss-Sm
2 Animal & Msc-Sng
Crash code
Multiple (205)
Animal (17)
An-St (3)
An-Tn (1)
Du-Rt(1)
Fxobj (51)
Hd-On (1)
Msc-Mlt (6)
Msc-Sng (6)
O-Obj (7)
Oturn (11)
Prkng (1)
Re-Rt (2)
Re-St (16)
Ss-Op (1)
Ss-Sm (14)
0 .02 .04 .06
Miles
Beckley


JN102807 CS 13081 & 13082
Crashes 1/1/05 - 12/31/08
N
W
E
S
Watkins
Minges Brook
Columbine
Woodbine
Peachtree
Birchwood
Thornapple
Wildrose
Minges
Timothy
2 Fxobj, Msc-Mlt, Re-St, & Ss-Sm
3 Ss-Sm, 2 Animal, Msc-Mlt, O-Obj
Nichols
94
Summit
W I 94
Battle Creek Rest Area
Knapp
Flora
Fxobj, O-Obj, Re-St & Ss-Op
E I 94
Fxobj & Msc-Mlt
Sonoma
4 Animal, An-St, Hd-On, & Oturn
Beckley
Crash code
Multiple (205)
Animal (17)
An-St (3)
An-Tn (1)
Du-Rt(1)
Fxobj (51)
Hd-On (1)
Msc-Mlt (6)
Msc-Sng (6)
O-Obj (7)
Oturn (11)
Prkng (1)
Re-Rt (2)
Re-St (16)
Ss-Op (1)
Ss-Sm (14)
0 .04 .08 .12
Miles


JN102807 CS 13081 & 13082
Crashes 1/1/05 - 12/31/08
N
W
E
S
Brookfield
Dunham
Christy
Mason
Shortridge
Hamilton
Capital
Riverside
Knapp
5 Mile/W I 94
W I 94/5 Mile
W I 94
E I 94
E I 94/Beckley
Beckley/E I 94
Beckley
Lois
Witmark
Minges Creek
Brickyard Creek
94
Animal, O-Obj, & Ss-Sm
2 Re-St & An-St
2 Fxobj, O-Obj, & Ss-Sm
2 Ss-Sm, Fxobj, & An-St
2 Animal & Re-St
Fx-Obj & Msc-Mlt
Fx-Obj, Oturn, & Ss-Sm
Fxobj, Msc-Sng, & Re-St
O-Obj, Animal, & Re-St
2 Ss-Sm, Animal, Fx-Obj, & Re-St
Fxobj & Re-Lt
Crash code
Multiple (205)
Animal (17)
An-St (3)
An-Tn (1)
Du-Rt(1)
Fxobj (51)
Hd-On (1)
Msc-Mlt (6)
Msc-Sng (6)
O-Obj (7)
Oturn (11)
Prkng (1)
Re-Rt (2)
Re-St (16)
Ss-Op (1)
Ss-Sm (14)
0 .03 .06 .09
Miles


JN102807 CS 13081 & 13082
Crashes 1/1/05 - 12/31/08
Minges Brook
Reyn
Brookfield
Hamilton
Brickyard Creek
2 Ss-Sm
3 Animal, 2 Oturn, Fxobj
2 Re-St
2 Fxobj, 2 O-Obj, Animal, Ss-Op
4 Fxobj
Fxobj & Msc-Mlt
Ss-Sm & Re-St
Fxobj & Animal
Re-St & Fxobj
Re-St, Msc-Mlt, & Animal
Fxobj & Oturn
An-St & Ss-Sm
Fxobj & Oturn
N
W
E
S
Crash code
Multiple (205)
Animal (17)
An-St (3)
An-Tn (1)
Du-Rt(1)
Fxobj (51)
Hd-On (1)
Msc-Mlt (6)
Msc-Sng (6)
O-Obj (7)
Oturn (11)
Prkng (1)
Re-Rt (2)
Re-St (16)
Ss-Op (1)
Ss-Sm (14)
0 .02 .04 .06
Miles


JN102807 CS 13081 & 13082
Crashes 1/1/05 - 12/31/08
N
W
E
S
E I 94/Beadle Lake
Beadle Lake
Animal & Ss-Sm
W I 94
94
2 O-Obj, Oturn & Ss-Sm
Lamson
Embury
Bach
Hoover
Kriggs Brook
E I 94
D
Lady Jessica
Harper Creek
Harper Creek
Fxobj & Re-St
Animal & Fxobj
2 Animal, Msc-Sng, & O-Obj
Fxobj, Msc-Mlt, Msc-Sng, & Re-St
Fxobj & Oturn
Animal & Oturn
6 1/2 Mile
W I 94
94
Christian
Ryans
Crash code
Multiple (205)
Animal (17)
An-St (3)
An-Tn (1)
Du-Rt(1)
Fxobj (51)
Hd-On (1)
Msc-Mlt (6)
Msc-Sng (6)
O-Obj (7)
Oturn (11)
Prkng (1)
Re-Rt (2)
Re-St (16)
Ss-Op (1)
Ss-Sm (14)
0
.04
.08
.12
Miles

C. Traffic Analysis Reports

I-94 WB by Riverside Bridge: Existing

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time	6/22/04	V/C	LOS	6/23/04	V/C	LOS	6/24/04	V/C	LOS	6/25/04	V/C	LOS	6/26/04	V/C	LOS	6/27/04	V/C	LOS	6/28/04	V/C	LOS
1:00 AM				671	0.20	A	651	0.19	A	667	0.19	A	590	0.17	A	495	0.14	A	601	0.18	A
2:00 AM				517	0.15	A	495	0.14	A	505	0.15	A	446	0.13	A	315	0.09	A	470	0.14	A
3:00 AM				462	0.13	A	539	0.16	A	431	0.13	A	361	0.11	A	237	0.07	A	390	0.11	A
4:00 AM				435	0.13	A	482	0.14	A	434	0.13	A	259	0.08	A	128	0.04	A	376	0.11	A
5:00 AM				535	0.16	A	548	0.16	A	560	0.16	A	255	0.07	A	139	0.04	A	484	0.14	A
6:00 AM				822	0.24	A	875	0.26	A	755	0.22	A	440	0.13	A	188	0.05	A	732	0.21	A
7:00 AM				1,506	0.44	A	1,567	0.46	A	1,461	0.43	A	742	0.22	A	337	0.10	A	1,443	0.42	A
8:00 AM				2,114	0.62	A	2,097	0.61	A	1,942	0.57	A	1,148	0.34	A	461	0.13	A	1,929	0.56	A
9:00 AM				1,997	0.58	A	2,048	0.60	A	2,044	0.60	A	1,458	0.43	A	817	0.24	A	1,784	0.52	A
10:00 AM				2,069	0.60	A	2,097	0.61	A	2,109	0.62	A	1,874	0.55	A	1,180	0.34	A	1,861	0.54	A
11:00 AM				1,985	0.58	A	2,255	0.66	B	2,336	0.68	B	2,113	0.62	A	1,541	0.45	A	2,087	0.61	A
12:00 PM				2,189	0.64	B	2,228	0.65	B	2,417	0.71	B	2,162	0.63	B	1,897	0.55	A	2,236	0.65	B
1:00 PM				2,144	0.63	A	2,208	0.64	B	2,608	0.76	C	1,991	0.58	A	2,116	0.62	A	2,289	0.67	B
2:00 PM	2,326	0.68	B	2,248	0.66	B	2,361	0.69	B	2,703	0.79	C	2,048	0.60	A	2,116	0.62	A	2,298	0.67	B
3:00 PM	2,196	0.64	B	2,343	0.68	B	2,331	0.68	B	3,086	0.90	D	1,962	0.57	A	2,182	0.64	B	2,256	0.66	B
4:00 PM	2,449	0.72	B	2,497	0.73	B	2,553	0.75	B	3,090	0.90	D	1,990	0.58	A	2,204	0.64	B	2,322	0.68	B
5:00 PM	2,542	0.74	B	2,496	0.73	B	2,976	0.87	D	3,020	0.88	D	1,811	0.53	A	2,184	0.64	B	2,418	0.71	B
6:00 PM	2,701	0.79	C	2,520	0.74	B	2,943	0.86	D	2,879	0.84	D	1,748	0.51	A	2,230	0.65	B			
7:00 PM	1,939	0.57	A	2,165	0.63	B	2,176	0.64	B	2,585	0.76	B	1,642	0.48	A	2,133	0.62	A			
8:00 PM	1,765	0.52	A	1,677	0.49	A	1,910	0.56	A	2,272	0.66	B	1,372	0.40	A	2,090	0.61	A			
9:00 PM	1,536	0.45	A	1,667	0.49	A	1,692	0.49	A	1,985	0.58	A	1,201	0.35	A	1,855	0.54	A			
10:00 PM	1,271	0.37	A	1,436	0.42	A	1,493	0.44	A	1,662	0.49	A	1,103	0.32	A	1,600	0.47	A			
11:00 PM	1,184	0.35	A	1,153	0.34	A	1,186	0.35	A	1,248	0.36	A	925	0.27	A	1,235	0.36	A			
12:00 AM	969	0.28	A	934	0.27	A	948	0.28	A	947	0.28	A	689	0.20	A	920	0.27	A			
Total	**20,878**			**38,582**			**40,659**			**43,746**			**30,330**			**30,600**			**25,976**		

Capacity LOS E

3,424 Veh/hr for 2 lanes

Reduction Factors

100% Lane Widths to 12 Feet

100% Side Clearance on Both Sides

90.1% Truck Factor for 22% Truck and 2% grade

I-94 EB by Riverside Bridge:Existing

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time	6/22/04	V/C	LOS	6/23/04	V/C	LOS	6/24/04	V/C	LOS	6/25/04	V/C	LOS	6/26/04	V/C	LOS	6/27/04	V/C	LOS	6/28/04	V/C	LOS
1:00 AM				770	0.22	A	864	0.25	A	764	0.22	A	729	0.21	A	487	0.14	A	703	0.21	A
2:00 AM				521	0.15	A	765	0.22	A	614	0.18	A	465	0.14	A	321	0.09	A	526	0.15	A
3:00 AM				430	0.13	A	482	0.14	A	478	0.14	A	412	0.12	A	254	0.07	A	422	0.12	A
4:00 AM				418	0.12	A	459	0.13	A	490	0.14	A	333	0.10	A	203	0.06	A	449	0.13	A
5:00 AM				517	0.15	A	633	0.18	A	556	0.16	A	376	0.11	A	195	0.06	A	511	0.15	A
6:00 AM				725	0.21	A	787	0.23	A	805	0.24	A	417	0.12	A	198	0.06	A	790	0.23	A
7:00 AM				1,402	0.41	A	1,420	0.41	A	1,327	0.39	A	618	0.18	A	373	0.11	A	1,287	0.38	A
8:00 AM				2,228	0.65	B	2,247	0.66	B	2,002	0.58	A	1,049	0.31	A	439	0.13	A	1,846	0.54	A
9:00 AM				2,221	0.65	B	2,197	0.64	B	2,223	0.65	B	1,428	0.42	A	769	0.22	A	1,860	0.54	A
10:00 AM				2,109	0.62	A	2,192	0.64	B	2,110	0.62	A	1,628	0.48	A	1,156	0.34	A	1,792	0.52	A
11:00 AM				2,002	0.58	A	2,072	0.61	A	2,252	0.66	B	1,962	0.57	A	1,453	0.42	A	1,803	0.53	A
12:00 PM				2,075	0.61	A	1,992	0.58	A	2,222	0.65	B	2,047	0.60	A	1,754	0.51	A	1,833	0.54	A
1:00 PM				2,059	0.60	A	2,069	0.60	A	2,279	0.67	B	2,151	0.63	A	2,078	0.61	A	1,968	0.57	A
2:00 PM	2,045	0.60	A	2,154	0.63	A	2,101	0.61	A	2,630	0.77	C	2,048	0.60	A	2,261	0.66	B	2,051	0.60	A
3:00 PM	2,217	0.65	B	2,318	0.68	B	2,397	0.70	B	2,727	0.80	C	1,979	0.58	A	2,282	0.67	B	2,270	0.66	B
4:00 PM	2,314	0.68	B	2,377	0.69	B	2,650	0.77	C	2,895	0.85	D	1,837	0.54	A	2,147	0.63	A	2,354	0.69	B
5:00 PM	2,618	0.76	C	2,596	0.76	B	2,546	0.74	B	2,981	0.87	D	1,842	0.54	A	2,485	0.73	B	2,379	0.69	B
6:00 PM	2,553	0.75	B	2,659	0.78	C	2,635	0.77	C	2,775	0.81	C	1,778	0.52	A	2,380	0.70	B			
7:00 PM	1,969	0.58	A	2,067	0.60	A	2,071	0.60	A	2,371	0.69	B	1,696	0.50	A	2,274	0.66	B			
8:00 PM	1,598	0.47	A	1,663	0.49	A	1,740	0.51	A	2,075	0.61	A	1,441	0.42	A	1,952	0.57	A			
9:00 PM	1,412	0.41	A	1,577	0.46	A	1,580	0.46	A	1,882	0.55	A	1,200	0.35	A	2,293	0.67	B			
10:00 PM	1,321	0.39	A	1,273	0.37	A	1,375	0.40	A	1,572	0.46	A	1,102	0.32	A	1,771	0.52	A			
11:00 PM	1,101	0.32	A	1,170	0.34	A	1,200	0.35	A	1,293	0.38	A	944	0.28	A	1,357	0.40	A			
12:00 AM	929	0.27	A	1,211	0.35	A	1,060	0.31	A	1,034	0.30	A	720	0.21	A	1,105	0.32	A			
Total	**20,077**			**38,542**			**39,534**			**42,357**			**30,202**			**31,987**			**24,844**		

Capacity LOS E

3,424 Veh/hr for 2 lanes

Reduction Factors

100% Lane Widths to 12 Feet

100% Side Clearance on Both Sides

90.1% Truck Factor for 22% Truck and 2% grade

I-94 EB East of I-194/M-66:Exisiting

	Thursday			Friday			Saturday			Sunday		
Time	6/17/04	V/C	LOS	6/18/04	V/C	LOS	6/19/04	V/C	LOS		V/C	LOS
1:00 AM				830	0.24	A	833	0.24	A			
2:00 AM				560	0.16	A	661	0.19	A			
3:00 AM				494	0.14	A	540	0.16	A			
4:00 AM				547	0.16	A	507	0.15	A			
5:00 AM				662	0.19	A	676	0.20	A			
6:00 AM				885	0.26	A	855	0.25	A			
7:00 AM				1317	0.38	A	1323	0.39	A			
8:00 AM				1729	0.50	B	1841	0.54	B			
9:00 AM				1802	0.53	B	1781	0.52	B			
10:00 AM				1806	0.53	B	1881	0.55	B			
11:00 AM				1876	0.55	B	1856	0.54	B			
12:00 PM				1865	0.54	B	1777	0.52	B			
1:00 PM				1738	0.51	B	1888	0.55	B			
2:00 PM				1892	0.55	B	2116	0.62	B			
3:00 PM				2029	0.59	B	2058	0.60	B			
4:00 PM	2267	0.66	C	2359	0.69	C	2323	0.68	C			
5:00 PM	2502	0.73	C	2384	0.70	C	1855	0.54	B			
6:00 PM	2313	0.68	C	2360	0.69	C	1523	0.44	B			
7:00 PM	1882	0.55	B	1887	0.55	B						
8:00 PM	1515	0.44	B	1530	0.45	B						
9:00 PM	1492	0.44	B	1485	0.43	B						
10:00 PM	1264	0.37	A	1398	0.41	A						
11:00 PM	1046	0.31	A	1249	0.36	A						
12:00 AM	835	0.24	A	930	0.27	A						
Total	**15,116**			**35,614**			**26,294**			**0**		

Capacity LOS E
3,424

Reduction Factors
100% Lane Widths to 12 Feet
100% Side Clearance on Both Sides
90.1% Truck Factor for 22% Truck and 2% grade

I-94 WB East of I-194/M-66: Existing

	Thursday			Friday			Saturday			Sunday		
Time	6/17/04	V/C	LOS	6/18/04	V/C	LOS	6/18/04	V/C	LOS		V/C	LOS
1:00 AM				639	0.19	A	725	0.21	A			
2:00 AM				476	0.14	A	510	0.15	A			
3:00 AM				512	0.15	A	501	0.15	A			
4:00 AM				489	0.14	A	492	0.14	A			
5:00 AM				530	0.15	A	510	0.15	A			
6:00 AM				672	0.20	A	655	0.19	A			
7:00 AM				1459	0.43	A	1485	0.43	B			
8:00 AM				2260	0.66	C	2106	0.62	B			
9:00 AM				2489	0.73	C	2402	0.70	C			
10:00 AM				2415	0.71	C	2345	0.68	C			
11:00 AM				2399	0.70	C	2271	0.66	C			
12:00 PM				2290	0.67	C	2410	0.70	C			
1:00 PM				2495	0.73	C	2505	0.73	C			
2:00 PM				2158	0.63	C	2158	0.63	C			
3:00 PM				2145	0.63	B	2145	0.63	B			
4:00 PM	2010	0.59	B	2300	0.67	C	2300	0.67	C			
5:00 PM	2180	0.64	C	2248	0.66	C	2248	0.66	C			
6:00 PM	2203	0.64	C	2385	0.70	C	2385	0.70	C			
7:00 PM	1749	0.51	B	2355	0.69	C						
8:00 PM	1553	0.45	B	1935	0.57	B						
9:00 PM	1355	0.40	A	1523	0.44	B						
10:00 PM	1216	0.36	A	1305	0.38	A						
11:00 PM	991	0.29	A	1120	0.33	A						
12:00 AM	794	0.23	A	902	0.26	A						
Total	**14,051**			**39,501**			**30,153**			**0**		

Capacity LOS E
3,424

Reduction Factors
100% Lane Widths to 12 Feet
100% Side Clearance on Both Sides
90.1% Truck Factor for 22% Truck and 2% grade

I-94 EB by Riverside Bridge
MOT: Maintain 2 Lanes Each Direction with Part-Width Construction

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time	6/22/04	V/C	LOS	6/23/04	V/C	LOS	6/24/04	V/C	LOS	6/25/04	V/C	LOS	6/26/04	V/C	LOS	6/27/04	V/C	LOS	6/28/04	V/C	LOS
1:00 AM				770	0.28	A	864	0.32	A	764	0.28	A	729	0.27	A	487	0.18	A	703	0.26	A
2:00 AM				521	0.19	A	765	0.28	A	614	0.22	A	465	0.17	A	321	0.12	A	526	0.19	A
3:00 AM				430	0.16	A	482	0.18	A	478	0.17	A	412	0.15	A	254	0.09	A	422	0.15	A
4:00 AM				418	0.15	A	459	0.17	A	490	0.18	A	333	0.12	A	203	0.07	A	449	0.16	A
5:00 AM				517	0.19	A	633	0.23	A	556	0.20	A	376	0.14	A	195	0.07	A	511	0.19	A
6:00 AM				725	0.27	A	787	0.29	A	805	0.29	A	417	0.15	A	198	0.07	A	790	0.29	A
7:00 AM				1,402	0.51	B	1,420	0.52	B	1,327	0.49	B	618	0.23	A	373	0.14	A	1,287	0.47	B
8:00 AM				2,228	0.82	D	2,247	0.82	E	2,002	0.73	C	1,049	0.38	A	439	0.16	A	1,846	0.68	C
9:00 AM				2,221	0.81	D	2,197	0.80	D	2,223	0.81	D	1,428	0.52	B	769	0.28	A	1,860	0.68	C
10:00 AM				2,109	0.77	D	2,192	0.80	D	2,110	0.77	D	1,628	0.60	B	1,156	0.42	A	1,792	0.66	C
11:00 AM				2,002	0.73	C	2,072	0.76	C	2,252	0.82	E	1,962	0.72	C	1,453	0.53	B	1,803	0.66	C
12:00 PM				2,075	0.76	C	1,992	0.73	C	2,222	0.81	D	2,047	0.75	C	1,754	0.64	C	1,833	0.67	C
1:00 PM				2,059	0.75	C	2,069	0.76	C	2,279	0.83	E	2,151	0.79	D	2,078	0.76	D	1,968	0.72	C
2:00 PM	2,045	0.75	C	2,154	0.79	D	2,101	0.77	D	2,630	0.96	E	2,048	0.75	C	2,261	0.83	E	2,051	0.75	C
3:00 PM	2,217	0.81	D	2,318	0.85	E	2,397	0.88	E	2,727	1.00	E	1,979	0.72	C	2,282	0.84	E	2,270	0.83	E
4:00 PM	2,314	0.85	E	2,377	0.87	E	2,650	0.97	E	2,895	1.06	E	1,837	0.67	C	2,147	0.79	D	2,354	0.86	E
5:00 PM	2,618	0.96	E	2,596	0.95	E	2,546	0.93	E	2,981	1.09	E	1,842	0.67	C	2,485	0.91	E	2,379	0.87	E
6:00 PM	2,553	0.93	E	2,659	0.97	E	2,635	0.96	E	2,775	1.02	E	1,778	0.65	C	2,380	0.87	E			
7:00 PM	1,969	0.72	C	2,067	0.76	C	2,071	0.76	C	2,371	0.87	E	1,696	0.62	B	2,274	0.83	E			
8:00 PM	1,598	0.58	B	1,663	0.61	B	1,740	0.64	C	2,075	0.76	C	1,441	0.53	B	1,952	0.71	C			
9:00 PM	1,412	0.52	B	1,577	0.58	B	1,580	0.58	B	1,882	0.69	C	1,200	0.44	B	2,293	0.84	E			
10:00 PM	1,321	0.48	B	1,273	0.47	B	1,375	0.50	B	1,572	0.58	B	1,102	0.40	A	1,771	0.65	C			
11:00 PM	1,101	0.40	A	1,170	0.43	A	1,200	0.44	B	1,293	0.47	B	944	0.35	A	1,357	0.50	B			
12:00 AM	929	0.34	A	1,211	0.44	B	1,060	0.39	A	1,034	0.38	A	720	0.26	A	1,105	0.40	A			
Total	**20,077**			**38,542**			**39,534**			**42,357**			**30,202**			**31,987**			**24,844**		

Capacity LOS E

2,732 Veh/hr for 2 lanes

Reduction Factors

95% Lane Widths to 11 Feet

84% Side Clearance on Both Sides

90.1% Truck Factor for 22% Truck and 2% grade

I-94 WB by Riverside Bridge
MOT: Maintain 2 Lanes Each Direction with Part-Width Construction

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time	6/22/04	V/C	LOS	6/23/04	V/C	LOS	6/24/04	V/C	LOS	6/25/04	V/C	LOS	6/26/04	V/C	LOS	6/27/04	V/C	LOS	6/28/04	V/C	LOS
1:00 AM				671	0.25	A	651	0.24	A	667	0.24	A	590	0.22	A	495	0.18	A	601	0.22	A
2:00 AM				517	0.19	A	495	0.18	A	505	0.18	A	446	0.16	A	315	0.12	A	470	0.17	A
3:00 AM				462	0.17	A	539	0.20	A	431	0.16	A	361	0.13	A	237	0.09	A	390	0.14	A
4:00 AM				435	0.16	A	482	0.18	A	434	0.16	A	259	0.09	A	128	0.05	A	376	0.14	A
5:00 AM				535	0.20	A	548	0.20	A	560	0.20	A	255	0.09	A	139	0.05	A	484	0.18	A
6:00 AM				822	0.30	A	875	0.32	A	755	0.28	A	440	0.16	A	188	0.07	A	732	0.27	A
7:00 AM				1,506	0.55	B	1,567	0.57	B	1,461	0.53	B	742	0.27	A	337	0.12	A	1,443	0.53	B
8:00 AM				2,114	0.77	D	2,097	0.77	D	1,942	0.71	C	1,148	0.42	A	461	0.17	A	1,929	0.71	C
9:00 AM				1,997	0.73	C	2,048	0.75	C	2,044	0.75	C	1,458	0.53	B	817	0.30	A	1,784	0.65	C
10:00 AM				2,069	0.76	C	2,097	0.77	D	2,109	0.77	D	1,874	0.69	C	1,180	0.43	B	1,861	0.68	C
11:00 AM				1,985	0.73	C	2,255	0.83	E	2,336	0.85	E	2,113	0.77	D	1,541	0.56	B	2,087	0.76	D
12:00 PM				2,189	0.80	D	2,228	0.82	D	2,417	0.88	E	2,162	0.79	D	1,897	0.69	C	2,236	0.82	D
1:00 PM				2,144	0.78	D	2,208	0.81	D	2,608	0.95	E	1,991	0.73	C	2,116	0.77	D	2,289	0.84	E
2:00 PM	2,326	0.85	E	2,248	0.82	E	2,361	0.86	E	2,703	0.99	E	2,048	0.75	C	2,116	0.77	D	2,298	0.84	E
3:00 PM	2,196	0.80	D	2,343	0.86	E	2,331	0.85	E	3,086	1.13	E	1,962	0.72	C	2,182	0.80	D	2,256	0.83	E
4:00 PM	2,449	0.90	E	2,497	0.91	E	2,553	0.93	E	3,090	1.13	E	1,990	0.73	C	2,204	0.81	D	2,322	0.85	E
5:00 PM	2,542	0.93	E	2,496	0.91	E	2,976	1.09	E	3,020	1.11	E	1,811	0.66	C	2,184	0.80	D	2,418	0.89	E
6:00 PM	2,701	0.99	E	2,520	0.92	E	2,943	1.08	E	2,879	1.05	E	1,748	0.64	C	2,230	0.82	D			
7:00 PM	1,939	0.71	C	2,165	0.79	D	2,176	0.80	D	2,585	0.95	E	1,642	0.60	B	2,133	0.78	D			
8:00 PM	1,765	0.65	C	1,677	0.61	B	1,910	0.70	C	2,272	0.83	E	1,372	0.50	B	2,090	0.76	D			
9:00 PM	1,536	0.56	B	1,667	0.61	B	1,692	0.62	B	1,985	0.73	C	1,201	0.44	B	1,855	0.68	C			
10:00 PM	1,271	0.47	B	1,436	0.53	B	1,493	0.55	B	1,662	0.61	B	1,103	0.40	A	1,600	0.59	B			
11:00 PM	1,184	0.43	B	1,153	0.42	A	1,186	0.43	B	1,248	0.46	B	925	0.34	A	1,235	0.45	B			
12:00 AM	969	0.35	A	934	0.34	A	948	0.35	A	947	0.35	A	689	0.25	A	920	0.34	A			
Total	**20,878**			**38,582**			**40,659**			**43,746**			**30,330**			**30,600**			**25,976**		

Capacity LOS E
2,732 Veh/hr for 2 lanes

Reduction Factors
95% Lane Widths to 11 Feet
84% Side Clearance on Both Sides
90.1% Truck Factor for 22% Truck and 2% grade

I-94 WB East of I-194/M-66
MOT: Maintain 2 Lanes Each Direction with Part-Width Construction

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time		V/C	LOS		V/C	LOS	6/17/04	V/C	LOS	6/18/04	V/C	LOS	6/18/04	V/C	LOS		V/C	LOS		V/C	LOS
1:00 AM										639	0.23	A	725	0.27	A						
2:00 AM										476	0.17	A	510	0.19	A						
3:00 AM										512	0.19	A	501	0.18	A						
4:00 AM										489	0.18	A	492	0.18	A						
5:00 AM										530	0.19	A	510	0.19	A						
6:00 AM										672	0.25	A	655	0.24	A						
7:00 AM										1459	0.53	B	1485	0.54	B						
8:00 AM										2260	0.83	E	2106	0.77	D						
9:00 AM										2489	0.91	E	2402	0.88	E						
10:00 AM										2415	0.88	E	2345	0.86	E						
11:00 AM										2399	0.88	E	2271	0.83	E						
12:00 PM										2290	0.84	E	2410	0.88	E						
1:00 PM										2495	0.91	E	2505	0.92	E						
2:00 PM										2158	0.79	D	2158	0.79	D						
3:00 PM										2145	0.79	D	2145	0.79	D						
4:00 PM							2010	0.74	C	2300	0.84	E	2300	0.84	E						
5:00 PM							2180	0.80	D	2248	0.82	E	2248	0.82	E						
6:00 PM							2203	0.81	D	2385	0.87	E	2385	0.87	E						
7:00 PM							1749	0.64	C	2355	0.86	E									
8:00 PM							1553	0.57	B	1935	0.71	C									
9:00 PM							1355	0.50	B	1523	0.56	B									
10:00 PM							1216	0.45	B	1305	0.48	B									
11:00 PM							991	0.36	A	1120	0.41	A									
12:00 AM							794	0.29	A	902	0.33	A									
Total	**0**			**0**			**14,051**			**39,501**			**30,153**			**0**			**0**		

Capacity LOS E

2,732 Veh/hr for 2 lanes

Reduction Factors

95% Lane Widths to 11 Feet

84% Side Clearance on Both Sides

90.1% Truck Factor for 22% Truck and 2% grade

I-94 EB East of I-194/M-66
MOT: Maintain 2 Lanes Each Direction with Part-Width Construction

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time		V/C	LOS		V/C	LOS	6/17/04	V/C	LOS	6/18/04	V/C	LOS	6/19/04	V/C	LOS		V/C	LOS		V/C	LOS
1:00 AM										830	0.30	A	833	0.30	A						
2:00 AM										560	0.20	A	661	0.24	A						
3:00 AM										494	0.18	A	540	0.20	A						
4:00 AM										547	0.20	A	507	0.19	A						
5:00 AM										662	0.24	A	676	0.25	A						
6:00 AM										885	0.32	A	855	0.31	A						
7:00 AM										1317	0.48	B	1323	0.48	B						
8:00 AM										1729	0.63	C	1841	0.67	C						
9:00 AM										1802	0.66	C	1781	0.65	C						
10:00 AM										1806	0.66	C	1881	0.69	C						
11:00 AM										1876	0.69	C	1856	0.68	C						
12:00 PM										1865	0.68	C	1777	0.65	C						
1:00 PM										1738	0.64	C	1888	0.69	C						
2:00 PM										1892	0.69	C	2116	0.77	D						
3:00 PM										2029	0.74	C	2058	0.75	C						
4:00 PM							2267	0.83	E	2359	0.86	E	2323	0.85	E						
5:00 PM							2502	0.92	E	2384	0.87	E	1855	0.68	C						
6:00 PM							2313	0.85	E	2360	0.86	E	1523	0.56	B						
7:00 PM							1882	0.69	C	1887	0.69	C									
8:00 PM							1515	0.55	B	1530	0.56	B									
9:00 PM							1492	0.55	B	1485	0.54	B									
10:00 PM							1264	0.46	B	1398	0.51	B									
11:00 PM							1046	0.38	A	1249	0.46	B									
12:00 AM							835	0.31	A	930	0.34	A									
Total	**0**			**0**			**15,116**			**35,614**			**26,294**			**0**			**0**		

Capacity LOS E
2,732 Veh/hr for 2 lanes

Reduction Factors
95% Lane Widths to 11 Feet
84% Side Clearance on Both Sides
90.1% Truck Factor for 22% Truck and 2% grade

Average I-94 EB LOS

Time	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C
1:00 AM		0.28	0.32	0.28	0.27	0.18	0.26		0.30	0.30
2:00 AM		0.19	0.28	0.22	0.17	0.12	0.19		0.20	0.24
3:00 AM		0.16	0.18	0.17	0.15	0.09	0.15		0.18	0.20
4:00 AM		0.15	0.17	0.18	0.12	0.07	0.16		0.20	0.19
5:00 AM		0.19	0.23	0.20	0.14	0.07	0.19		0.24	0.25
6:00 AM		0.27	0.29	0.29	0.15	0.07	0.29		0.32	0.31
7:00 AM		0.51	0.52	0.49	0.23	0.14	0.47		0.48	0.48
8:00 AM		0.82	0.82	0.73	0.38	0.16	0.68		0.63	0.67
9:00 AM		0.81	0.80	0.81	0.52	0.28	0.68		0.66	0.65
10:00 AM		0.77	0.80	0.77	0.60	0.42	0.66		0.66	0.69
11:00 AM		0.73	0.76	0.82	0.72	0.53	0.66		0.69	0.68
12:00 PM		0.76	0.73	0.81	0.75	0.64	0.67		0.68	0.65
1:00 PM		0.75	0.76	0.83	0.79	0.76	0.72		0.64	0.69
2:00 PM	0.75	0.79	0.77	0.96	0.75	0.83	0.75		0.69	0.77
3:00 PM	0.81	0.85	0.88	1.00	0.72	0.84	0.83		0.74	0.75
4:00 PM	0.85	0.87	0.97	1.06	0.67	0.79	0.86	0.83	0.86	0.85
5:00 PM	0.96	0.95	0.93	1.09	0.67	0.91	0.87	0.92	0.87	0.68
6:00 PM	0.93	0.97	0.96	1.02	0.65	0.87		0.85	0.86	0.56
7:00 PM	0.72	0.76	0.76	0.87	0.62	0.83		0.69	0.69	
8:00 PM	0.58	0.61	0.64	0.76	0.53	0.71		0.55	0.56	
9:00 PM	0.52	0.58	0.58	0.69	0.44	0.84		0.55	0.54	
10:00 PM	0.48	0.47	0.50	0.58	0.40	0.65		0.46	0.51	
11:00 PM	0.40	0.43	0.44	0.47	0.35	0.50		0.38	0.46	
12:00 AM	0.34	0.44	0.39	0.38	0.26	0.40		0.31	0.34	
Total	**7.35**	**14.11**	**14.47**	**15.50**	**11.05**	**11.71**	**9.09**	**5.53**	**13.03**	**9.62**
Avg	**0.67**	**0.59**	**0.60**	**0.65**	**0.46**	**0.49**	**0.53**	**0.61**	**0.54**	**0.53**

Overall Avg V/C 0.56 =B

Average I-94 WB LOS

Time	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C
1:00 AM		0.25	0.24	0.24	0.22	0.18	0.22		0.23	0.27
2:00 AM		0.19	0.18	0.18	0.16	0.12	0.17		0.17	0.19
3:00 AM		0.17	0.20	0.16	0.13	0.09	0.14		0.19	0.18
4:00 AM		0.16	0.18	0.16	0.09	0.05	0.14		0.18	0.18
5:00 AM		0.20	0.20	0.20	0.09	0.05	0.18		0.19	0.19
6:00 AM		0.30	0.32	0.28	0.16	0.07	0.27		0.25	0.24
7:00 AM		0.55	0.57	0.53	0.27	0.12	0.53		0.53	0.54
8:00 AM		0.77	0.77	0.71	0.42	0.17	0.71		0.83	0.77
9:00 AM		0.73	0.75	0.75	0.53	0.30	0.65		0.91	0.88
10:00 AM		0.76	0.77	0.77	0.69	0.43	0.68		0.88	0.86
11:00 AM		0.73	0.83	0.85	0.77	0.56	0.76		0.88	0.83
12:00 PM		0.80	0.82	0.88	0.79	0.69	0.82		0.84	0.88
1:00 PM		0.78	0.81	0.95	0.73	0.77	0.84		0.91	0.92
2:00 PM	0.85	0.82	0.86	0.99	0.75	0.77	0.84		0.79	0.79
3:00 PM	0.80	0.86	0.85	1.13	0.72	0.80	0.83		0.79	0.79
4:00 PM	0.90	0.91	0.93	1.13	0.73	0.81	0.85	0.74	0.84	0.84
5:00 PM	0.93	0.91	1.09	1.11	0.66	0.80	0.89	0.80	0.82	0.82
6:00 PM	0.99	0.92	1.08	1.05	0.64	0.82		0.81	0.87	0.87
7:00 PM	0.71	0.79	0.80	0.95	0.60	0.78		0.64	0.86	
8:00 PM	0.65	0.61	0.70	0.83	0.50	0.76		0.57	0.71	
9:00 PM	0.56	0.61	0.62	0.73	0.44	0.68		0.50	0.56	
10:00 PM	0.47	0.53	0.55	0.61	0.40	0.59		0.45	0.48	
11:00 PM	0.43	0.42	0.43	0.46	0.34	0.45		0.36	0.41	
12:00 AM	0.35	0.34	0.35	0.35	0.25	0.34		0.29	0.33	
Total	**7.64**	**14.12**	**14.88**	**16.01**	**11.10**	**11.20**	**9.51**	**5.14**	**14.46**	**11.04**
Avg	**0.69**	**0.59**	**0.62**	**0.67**	**0.46**	**0.47**	**0.56**	**0.57**	**0.60**	**0.61**

Overall Avg V/C 0.578 =B

I-94 WB by Riverside Bridge:Existing

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time	6/22/04	V/C	LOS	6/23/04	V/C	LOS	6/24/04	V/C	LOS	6/25/04	V/C	LOS	6/26/04	V/C	LOS	6/27/04	V/C	LOS	6/28/04	V/C	LOS
1:00 AM				671	0.20	A	651	0.19	A	667	0.19	A	590	0.17	A	495	0.14	A	601	0.18	A
2:00 AM				517	0.15	A	495	0.14	A	505	0.15	A	446	0.13	A	315	0.09	A	470	0.14	A
3:00 AM				462	0.13	A	539	0.16	A	431	0.13	A	361	0.11	A	237	0.07	A	390	0.11	A
4:00 AM				435	0.13	A	482	0.14	A	434	0.13	A	259	0.08	A	128	0.04	A	376	0.11	A
5:00 AM				535	0.16	A	548	0.16	A	560	0.16	A	255	0.07	A	139	0.04	A	484	0.14	A
6:00 AM				822	0.24	A	875	0.26	A	755	0.22	A	440	0.13	A	188	0.05	A	732	0.21	A
7:00 AM				1,506	0.44	B	1,567	0.46	B	1,461	0.43	A	742	0.22	A	337	0.10	A	1,443	0.42	A
8:00 AM				2,114	0.62	B	2,097	0.61	B	1,942	0.57	B	1,148	0.34	A	461	0.13	A	1,929	0.56	B
9:00 AM				1,997	0.58	B	2,048	0.60	B	2,044	0.60	B	1,458	0.43	A	817	0.24	A	1,784	0.52	B
10:00 AM				2,069	0.60	B	2,097	0.61	B	2,109	0.62	B	1,874	0.55	B	1,180	0.34	A	1,861	0.54	B
11:00 AM				1,985	0.58	B	2,255	0.66	C	2,336	0.68	C	2,113	0.62	B	1,541	0.45	B	2,087	0.61	B
12:00 PM				2,189	0.64	C	2,228	0.65	C	2,417	0.71	C	2,162	0.63	C	1,897	0.55	B	2,236	0.65	C
1:00 PM				2,144	0.63	B	2,208	0.64	C	2,608	0.76	D	1,991	0.58	B	2,116	0.62	B	2,289	0.67	C
2:00 PM	2,326	0.68	C	2,248	0.66	C	2,361	0.69	C	2,703	0.79	D	2,048	0.60	B	2,116	0.62	B	2,298	0.67	C
3:00 PM	2,196	0.64	C	2,343	0.68	C	2,331	0.68	C	3,086	0.90	E	1,962	0.57	B	2,182	0.64	C	2,256	0.66	C
4:00 PM	2,449	0.72	C	2,497	0.73	C	2,553	0.75	C	3,090	0.90	E	1,990	0.58	B	2,204	0.64	C	2,322	0.68	C
5:00 PM	2,542	0.74	C	2,496	0.73	C	2,976	0.87	E	3,020	0.88	E	1,811	0.53	B	2,184	0.64	C	2,418	0.71	C
6:00 PM	2,701	0.79	D	2,520	0.74	C	2,943	0.86	E	2,879	0.84	E	1,748	0.51	B	2,230	0.65	C			
7:00 PM	1,939	0.57	B	2,165	0.63	C	2,176	0.64	C	2,585	0.76	C	1,642	0.48	B	2,133	0.62	B			
8:00 PM	1,765	0.52	B	1,677	0.49	B	1,910	0.56	B	2,272	0.66	C	1,372	0.40	A	2,090	0.61	B			
9:00 PM	1,536	0.45	B	1,667	0.49	B	1,692	0.49	B	1,985	0.58	B	1,201	0.35	A	1,855	0.54	B			
10:00 PM	1,271	0.37	A	1,436	0.42	A	1,493	0.44	B	1,662	0.49	B	1,103	0.32	A	1,600	0.47	B			
11:00 PM	1,184	0.35	A	1,153	0.34	A	1,186	0.35	A	1,248	0.36	A	925	0.27	A	1,235	0.36	A			
12:00 AM	969	0.28	A	934	0.27	A	948	0.28	A	947	0.28	A	689	0.20	A	920	0.27	A			
Total	**20,878**			**38,582**			**40,659**			**43,746**			**30,330**			**30,600**			**25,976**		

Capacity LOS E

3,424 Veh/hr for 2 lanes

Reduction Factors

100% Lane Widths to 12 Feet

100% Side Clearance No Side Restrictions

90.1% Truck Factor for 22% Truck and 2% grade

= Restricted Hours

= Non Paving Hours

I-94 EB by Riverside Bridge: Existing

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time	6/22/04	V/C	LOS	6/23/04	V/C	LOS	6/24/04	V/C	LOS	6/25/04	V/C	LOS	6/26/04	V/C	LOS	6/27/04	V/C	LOS	6/28/04	V/C	LOS
1:00 AM				770	0.22	A	864	0.25	A	764	0.22	A	729	0.21	A	487	0.14	A	703	0.21	A
2:00 AM				521	0.15	A	765	0.22	A	614	0.18	A	465	0.14	A	321	0.09	A	526	0.15	A
3:00 AM				430	0.13	A	482	0.14	A	478	0.14	A	412	0.12	A	254	0.07	A	422	0.12	A
4:00 AM				418	0.12	A	459	0.13	A	490	0.14	A	333	0.10	A	203	0.06	A	449	0.13	A
5:00 AM				517	0.15	A	633	0.18	A	556	0.16	A	376	0.11	A	195	0.06	A	511	0.15	A
6:00 AM				725	0.21	A	787	0.23	A	805	0.24	A	417	0.12	A	198	0.06	A	790	0.23	A
7:00 AM				1,402	0.41	A	1,420	0.41	A	1,327	0.39	A	618	0.18	A	373	0.11	A	1,287	0.38	A
8:00 AM				2,228	0.65	C	2,247	0.66	C	2,002	0.58	B	1,049	0.31	A	439	0.13	A	1,846	0.54	B
9:00 AM				2,221	0.65	C	2,197	0.64	C	2,223	0.65	C	1,428	0.42	A	769	0.22	A	1,860	0.54	B
10:00 AM				2,109	0.62	B	2,192	0.64	C	2,110	0.62	B	1,628	0.48	B	1,156	0.34	A	1,792	0.52	B
11:00 AM				2,002	0.58	B	2,072	0.61	B	2,252	0.66	C	1,962	0.57	B	1,453	0.42	A	1,803	0.53	B
12:00 PM				2,075	0.61	B	1,992	0.58	B	2,222	0.65	C	2,047	0.60	B	1,754	0.51	B	1,833	0.54	B
1:00 PM				2,059	0.60	B	2,069	0.60	B	2,279	0.67	C	2,151	0.63	B	2,078	0.61	B	1,968	0.57	B
2:00 PM	2,045	0.60	B	2,154	0.63	B	2,101	0.61	B	2,630	0.77	D	2,048	0.60	B	2,261	0.66	C	2,051	0.60	B
3:00 PM	2,217	0.65	C	2,318	0.68	C	2,397	0.70	C	2,727	0.80	D	1,979	0.58	B	2,282	0.67	C	2,270	0.66	C
4:00 PM	2,314	0.68	C	2,377	0.69	C	2,650	0.77	D	2,895	0.85	E	1,837	0.54	B	2,147	0.63	B	2,354	0.69	C
5:00 PM	2,618	0.76	D	2,596	0.76	C	2,546	0.74	C	2,981	0.87	E	1,842	0.54	B	2,485	0.73	C	2,379	0.69	C
6:00 PM	2,553	0.75	C	2,659	0.78	D	2,635	0.77	D	2,775	0.81	D	1,778	0.52	B	2,380	0.70	C			
7:00 PM	1,969	0.58	B	2,067	0.60	B	2,071	0.60	B	2,371	0.69	C	1,696	0.50	B	2,274	0.66	C			
8:00 PM	1,598	0.47	B	1,663	0.49	B	1,740	0.51	B	2,075	0.61	B	1,441	0.42	A	1,952	0.57	B			
9:00 PM	1,412	0.41	A	1,577	0.46	B	1,580	0.46	B	1,882	0.55	B	1,200	0.35	A	2,293	0.67	C			
10:00 PM	1,321	0.39	A	1,273	0.37	A	1,375	0.40	A	1,572	0.46	B	1,102	0.32	A	1,771	0.52	B			
11:00 PM	1,101	0.32	A	1,170	0.34	A	1,200	0.35	A	1,293	0.38	A	944	0.28	A	1,357	0.40	A			
12:00 AM	929	0.27	A	1,211	0.35	A	1,060	0.31	A	1,034	0.30	A	720	0.21	A	1,105	0.32	A			
Total	20,077			38,542			39,534			42,357			30,202			31,987			24,844		

Capacity LOS E
3,424 Veh/hr for 2 lanes

Reduction Factors
100% Lane Widths to 12 Feet
100% Side Clearance No Side Restrictions
90.1% Truck Factor for 22% Truck and 2% grade

= Restricted Hours
= Non Paving Hours

I-94 WB East of I-194/M-66:Existing

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time	7/23/02	V/C	LOS	7/24/02	V/C	LOS	7/25/02	V/C	LOS		V/C	LOS		V/C	LOS		V/C	LOS		V/C	LOS
1:00 AM				678	0.20	A	690	0.20	A												
2:00 AM				476	0.14	A	481	0.14	A												
3:00 AM				422	0.12	A	444	0.13	A												
4:00 AM				475	0.14	A	508	0.15	A												
5:00 AM				483	0.14	A	540	0.16	A												
6:00 AM				690	0.20	A	751	0.22	A												
7:00 AM				1287	0.38	A	1344	0.39	A												
8:00 AM				1914	0.56	B	1751	0.51	B												
9:00 AM				1886	0.55	B	1913	0.56	B												
10:00 AM				1979	0.58	B	2049	0.60	B												
11:00 AM	2067	0.60	B	2006	0.59	B	2133	0.62	B												
12:00 PM	2088	0.61	B	2185	0.64	C	2325	0.68	C												
1:00 PM	2060	0.60	B	2136	0.62	B															
2:00 PM	2055	0.60	B	2198	0.64	C															
3:00 PM	2212	0.65	C	2287	0.67	C															
4:00 PM	2405	0.70	C	2339	0.68	C															
5:00 PM	2350	0.69	C	2567	0.75	C															
6:00 PM	2389	0.70	C	2538	0.74	C															
7:00 PM	1810	0.53	B	1950	0.57	B															
8:00 PM	1492	0.44	B	1673	0.49	B															
9:00 PM	1280	0.37	A	1466	0.43	A															
10:00 PM	1350	0.39	A	1358	0.40	A															
11:00 PM	1043	0.30	A	1161	0.34	A															
12:00 AM	887	0.26	A	900	0.26	A															
Total	**19,273**			**37,054**			**14,929**			**0**			**0**			**0**			**0**		

Capacity LOS E

3,424 Veh/hr for 2 lanes

Reduction Factors

100% Lane Widths to 12 Feet

100% Side Clearance No Side Restrictions

90.1% Truck Factor for 22% Truck and 2% grade

= Restricted Hours

= Non Paving Hours

I-94 EB East of I-194/M-66: Existing

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time	7/23/02	V/C	LOS	7/24/02	V/C	LOS	7/25/02	V/C	LOS		V/C	LOS		V/C	LOS		V/C	LOS		V/C	LOS
1:00 AM				717	0.21	A	741	0.22	A												
2:00 AM				577	0.17	A	607	0.18	A												
3:00 AM				484	0.14	A	603	0.18	A												
4:00 AM				553	0.16	A	541	0.16	A												
5:00 AM				604	0.18	A	701	0.20	A												
6:00 AM				797	0.23	A	876	0.26	A												
7:00 AM				1333	0.39	A	1330	0.39	A												
8:00 AM				1679	0.49	B	1816	0.53	B												
9:00 AM				1750	0.51	B	1857	0.54	B												
10:00 AM				1809	0.53	B	1810	0.53	B												
11:00 AM	1733	0.51	B	1927	0.56	B	2091	0.61	B												
12:00 PM	1855	0.54	B	1971	0.58	B	2014	0.59	B												
1:00 PM	1889	0.55	B	1956	0.57	B															
2:00 PM	1989	0.58	B	2116	0.62	B															
3:00 PM	2121	0.62	B	2202	0.64	C															
4:00 PM	2352	0.69	C	2444	0.71	C															
5:00 PM	2453	0.72	C	2581	0.75	C															
6:00 PM	2241	0.65	C	2433	0.71	C															
7:00 PM	1882	0.55	B	2039	0.60	B															
8:00 PM	1509	0.44	B	1655	0.48	B															
9:00 PM	1441	0.42	A	1491	0.44	B															
10:00 PM	1360	0.40	A	1334	0.39	A															
11:00 PM	1134	0.33	A	1160	0.34	A															
12:00 AM	916	0.27	A	1085	0.32	A															
Total	**17,409**			**36,697**			**14,987**			**0**			**0**			**0**			**0**		

Capacity LOS E
3,424 Veh/hr for 2 lanes

Reduction Factors
100% Lane Widths to 12 Feet
100% Side Clearance No Side Restrictions
90.1% Truck Factor for 22% Truck and 2% grade

= Restricted Hours
= Non Paving Hours

I-94 EB East of I-194/M-66: Existing

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time		V/C	LOS		V/C	LOS	6/17/04	V/C	LOS	6/18/04	V/C	LOS	6/19/04	V/C	LOS		V/C	LOS		V/C	LOS
1:00 AM										830	0.24	A	833	0.24	A						
2:00 AM										560	0.16	A	661	0.19	A						
3:00 AM										494	0.14	A	540	0.16	A						
4:00 AM										547	0.16	A	507	0.15	A						
5:00 AM										662	0.19	A	676	0.20	A						
6:00 AM										885	0.26	A	855	0.25	A						
7:00 AM										1317	0.38	A	1323	0.39	A						
8:00 AM										1729	0.50	B	1841	0.54	B						
9:00 AM										1802	0.53	B	1781	0.52	B						
10:00 AM										1806	0.53	B	1881	0.55	B						
11:00 AM										1876	0.55	B	1856	0.54	B						
12:00 PM										1865	0.54	B	1777	0.52	B						
1:00 PM										1738	0.51	B	1888	0.55	B						
2:00 PM										1892	0.55	B	2116	0.62	B						
3:00 PM										2029	0.59	B	2058	0.60	B						
4:00 PM							2267	0.66	C	2359	0.69	C	2323	0.68	C						
5:00 PM							2502	0.73	C	2384	0.70	C	1855	0.54	B						
6:00 PM							2313	0.68	C	2360	0.69	C	1523	0.44	B						
7:00 PM							1882	0.55	B	1887	0.55	B									
8:00 PM							1515	0.44	B	1530	0.45	B									
9:00 PM							1492	0.44	B	1485	0.43	B									
10:00 PM							1264	0.37	A	1398	0.41	A									
11:00 PM							1046	0.31	A	1249	0.36	A									
12:00 AM							835	0.24	A	930	0.27	A									
Total	0			0			15,116			35,614			26,294			0			0		

Capacity LOS E
3,424 Veh/hr for 2 lanes

Reduction Factors
100% Lane Widths to 12 Feet
100% Side Clearance No Side Restrictions
90.1% Truck Factor for 22% Truck and 2% grade

= Restricted Hours
= Non Paving Hours

I-94 WB East of I-194/M-66: Existing

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time		V/C	LOS		V/C	LOS	6/17/04	V/C	LOS	6/18/04	V/C	LOS	6/18/04	V/C	LOS		V/C	LOS		V/C	LOS
1:00 AM										639	0.19	A	725	0.21	A						
2:00 AM										476	0.14	A	510	0.15	A						
3:00 AM										512	0.15	A	501	0.15	A						
4:00 AM										489	0.14	A	492	0.14	A						
5:00 AM										530	0.15	A	510	0.15	A						
6:00 AM								0.00	A	672	0.20	A	655	0.19	A						
7:00 AM								0.00	A	1459	0.43	A	1485	0.43	B						
8:00 AM								0.00	A	2260	0.66	C	2106	0.62	B						
9:00 AM								0.00	A	2489	0.73	C	2402	0.70	C						
10:00 AM								0.00	A	2415	0.71	C	2345	0.68	C						
11:00 AM								0.00	A	2399	0.70	C	2271	0.66	C						
12:00 PM								0.00	A	2290	0.67	C	2410	0.70	C						
1:00 PM								0.00	A	2495	0.73	C	2505	0.73	C						
2:00 PM								0.00	A	2158	0.63	C	2158	0.63	C						
3:00 PM								0.00	A	2145	0.63	B	2145	0.63	B						
4:00 PM							2010	0.59	B	2300	0.67	C	2300	0.67	C						
5:00 PM							2180	0.64	C	2248	0.66	C	2248	0.66	C						
6:00 PM							2203	0.64	C	2385	0.70	C	2385	0.70	C						
7:00 PM							1749	0.51	B	2355	0.69	C									
8:00 PM							1553	0.45	B	1935	0.57	B									
9:00 PM							1355	0.40	A	1523	0.44	B									
10:00 PM							1216	0.36	A	1305	0.38	A									
11:00 PM							991	0.29	A	1120	0.33	A									
12:00 AM							794	0.23	A	902	0.26	A									
Total	**0**			**0**			**14,051**			**39,501**			**30,153**			**0**			**0**		

Capacity LOS E

3,424 Veh/hr for 2 lanes

Reduction Factors

100% Lane Widths to 12 Feet

100% Side Clearance No Side Restrictions

90.1% Truck Factor for 22% Truck and 2% grade

= Restricted Hours

= Non Paving Hours

I-94 EB by Riverside Bridge
MOT: Maintain 1 Lanes Each Direction During Non-Restricted Hours (Paving Only Sun -Thur Nights)

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time	6/22/04	V/C	LOS	6/23/04	V/C	LOS	6/24/04	V/C	LOS	6/25/04	V/C	LOS	6/26/04	V/C	LOS	6/27/04	V/C	LOS	6/28/04	V/C	LOS
1:00 AM				770	0.56	B	864	0.62	B	764	0.55	B	729	0.53	B	487	0.35	A	703	0.51	B
2:00 AM				521	0.38	A	765	0.55	B	614	0.44	B	465	0.34	A	321	0.23	A	526	0.38	A
3:00 AM				430	0.31	A	482	0.35	A	478	0.34	A	412	0.30	A	254	0.18	A	422	0.30	A
4:00 AM				418	0.30	A	459	0.33	A	490	0.35	A	333	0.24	A	203	0.15	A	449	0.32	A
5:00 AM				517	0.37	A	633	0.46	B	556	0.40	A	376	0.27	A	195	0.14	A	511	0.37	A
6:00 AM				725	0.52	B	787	0.57	B	805	0.58	B	417	0.30	A	198	0.14	A	790	0.57	B
7:00 AM				1,402	1.01	E	1,420	1.02	E	1,327	0.96	E	618	0.45	B	373	0.27	A	1,287	0.93	E
8:00 AM				2,228	1.61	E	2,247	1.62	E	2,002	1.44	E	1,049	0.76	C	439	0.32	A	1,846	1.33	E
9:00 AM				2,221	1.60	E	2,197	1.58	E	2,223	1.60	E	1,428	1.03	E	769	0.55	B	1,860	1.34	E
10:00 AM				2,109	1.52	E	2,192	1.58	E	2,110	1.52	E	1,628	1.17	E	1,156	0.83	E	1,792	1.29	E
11:00 AM				2,002	1.44	E	2,072	1.49	E	2,252	1.62	E	1,962	1.41	E	1,453	1.05	E	1,803	1.30	E
12:00 PM				2,075	1.50	E	1,992	1.44	E	2,222	1.60	E	2,047	1.48	E	1,754	1.26	E	1,833	1.32	E
1:00 PM				2,059	1.48	E	2,069	1.49	E	2,279	1.64	E	2,151	1.55	E	2,078	1.50	E	1,968	1.42	E
2:00 PM	2,045	1.47	E	2,154	1.55	E	2,101	1.52	E	2,630	1.90	E	2,048	1.48	E	2,261	1.63	E	2,051	1.48	E
3:00 PM	2,217	1.60	E	2,318	1.67	E	2,397	1.73	E	2,727	1.97	E	1,979	1.43	E	2,282	1.65	E	2,270	1.64	E
4:00 PM	2,314	1.67	E	2,377	1.71	E	2,650	1.91	E	2,895	2.09	E	1,837	1.32	E	2,147	1.55	E	2,354	1.70	E
5:00 PM	2,618	1.89	E	2,596	1.87	E	2,546	1.84	E	2,981	2.15	E	1,842	1.33	E	2,485	1.79	E	2,379	1.72	E
6:00 PM	2,553	1.84	E	2,659	1.92	E	2,635	1.90	E	2,775	2.00	E	1,778	1.28	E	2,380	1.72	E			
7:00 PM	1,969	1.42	E	2,067	1.49	E	2,071	1.49	E	2,371	1.71	E	1,696	1.22	E	2,274	1.64	E			
8:00 PM	1,598	1.15	E	1,663	1.20	E	1,740	1.25	E	2,075	1.50	E	1,441	1.04	E	1,952	1.41	E			
9:00 PM	1,412	1.02	E	1,577	1.14	E	1,580	1.14	E	1,882	1.36	E	1,200	0.87	E	2,293	1.65	E			
10:00 PM	1,321	0.95	E	1,273	0.92	E	1,375	0.99	E	1,572	1.13	E	1,102	0.79	D	1,771	1.28	E			
11:00 PM	1,101	0.79	D	1,170	0.84	E	1,200	0.87	E	1,293	0.93	E	944	0.68	C	1,357	0.98	E			
12:00 AM	929	0.67	C	1,211	0.87	E	1,060	0.76	D	1,034	0.75	C	720	0.52	B	1,105	0.80	D			
Total	**20,077**			**38,542**			**39,534**			**42,357**			**30,202**			**31,987**			**24,844**		

Capacity LOS E

1,387 Veh/hr for 1 lanes

Reduction Factors

90% Lane Widths to 10 Feet

90% Side Clearance on One Side

90.1% Truck Factor for 22% Truck and 2% grade

= Restricted Hours

= Non Paving Hours

I-94 WB by Riverside Bridge
MOT: Maintain 1 Lanes Each Direction During Non-Restricted Hours (Paving Only Sun -Thur Nights)

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time	6/22/04	V/C	LOS	6/23/04	V/C	LOS	6/24/04	V/C	LOS	6/25/04	V/C	LOS	6/26/04	V/C	LOS	6/27/04	V/C	LOS	6/28/04	V/C	LOS
1:00 AM				671	0.48	B	651	0.47	B	667	0.48	B	590	0.43	A	495	0.36	A	601	0.43	B
2:00 AM				517	0.37	A	495	0.36	A	505	0.36	A	446	0.32	A	315	0.23	A	470	0.34	A
3:00 AM				462	0.33	A	539	0.39	A	431	0.31	A	361	0.26	A	237	0.17	A	390	0.28	A
4:00 AM				435	0.31	A	482	0.35	A	434	0.31	A	259	0.19	A	128	0.09	A	376	0.27	A
5:00 AM				535	0.39	A	548	0.40	A	560	0.40	A	255	0.18	A	139	0.10	A	484	0.35	A
6:00 AM				822	0.59	B	875	0.63	C	755	0.54	B	440	0.32	A	188	0.14	A	732	0.53	B
7:00 AM				1,506	1.09	E	1,567	1.13	E	1,461	1.05	E	742	0.54	B	337	0.24	A	1,443	1.04	E
8:00 AM				2,114	1.52	E	2,097	1.51	E	1,942	1.40	E	1,148	0.83	E	461	0.33	A	1,929	1.39	E
9:00 AM				1,997	1.44	E	2,048	1.48	E	2,044	1.47	E	1,458	1.05	E	817	0.59	B	1,784	1.29	E
10:00 AM				2,069	1.49	E	2,097	1.51	E	2,109	1.52	E	1,874	1.35	E	1,180	0.85	E	1,861	1.34	E
11:00 AM				1,985	1.43	E	2,255	1.63	E	2,336	1.68	E	2,113	1.52	E	1,541	1.11	E	2,087	1.51	E
12:00 PM				2,189	1.58	E	2,228	1.61	E	2,417	1.74	E	2,162	1.56	E	1,897	1.37	E	2,236	1.61	E
1:00 PM				2,144	1.55	E	2,208	1.59	E	2,608	1.88	E	1,991	1.44	E	2,116	1.53	E	2,289	1.65	E
2:00 PM	2,326	1.68	E	2,248	1.62	E	2,361	1.70	E	2,703	1.95	E	2,048	1.48	E	2,116	1.53	E	2,298	1.66	E
3:00 PM	2,196	1.58	E	2,343	1.69	E	2,331	1.68	E	3,086	2.23	E	1,962	1.41	E	2,182	1.57	E	2,256	1.63	E
4:00 PM	2,449	1.77	E	2,497	1.80	E	2,553	1.84	E	3,090	2.23	E	1,990	1.44	E	2,204	1.59	E	2,322	1.67	E
5:00 PM	2,542	1.83	E	2,496	1.80	E	2,976	2.15	E	3,020	2.18	E	1,811	1.31	E	2,184	1.58	E	2,418	1.74	E
6:00 PM	2,701	1.95	E	2,520	1.82	E	2,943	2.12	E	2,879	2.08	E	1,748	1.26	E	2,230	1.61	E			
7:00 PM	1,939	1.40	E	2,165	1.56	E	2,176	1.57	E	2,585	1.86	E	1,642	1.18	E	2,133	1.54	E			
8:00 PM	1,765	1.27	E	1,677	1.21	E	1,910	1.38	E	2,272	1.64	E	1,372	0.99	E	2,090	1.51	E			
9:00 PM	1,536	1.11	E	1,667	1.20	E	1,692	1.22	E	1,985	1.43	E	1,201	0.87	E	1,855	1.34	E			
10:00 PM	1,271	0.92	E	1,436	1.04	E	1,493	1.08	E	1,662	1.20	E	1,103	0.80	D	1,600	1.15	E			
11:00 PM	1,184	0.85	E	1,153	0.83	E	1,186	0.86	E	1,248	0.90	E	925	0.67	C	1,235	0.89	E			
12:00 AM	969	0.70	C	934	0.67	C	948	0.68	C	947	0.68	C	689	0.50	B	920	0.66	C			
Total	**20,878**			**38,582**			**40,659**			**43,746**			**30,330**			**30,600**			**25,976**		

Capacity LOS E

1,387 Veh/hr for 1 lanes

Reduction Factors

90% Lane Widths to 10 Feet

90% Side Clearance on One Side

90.1% Truck Factor for 22% Truck and 2% grade

= Restricted Hours

= Non Paving Hours

I-94 WB East of I-194/M-66
MOT: Maintain 1 Lanes Each Direction During Non-Restricted Hours (Paving Only Sun -Thur Nights)

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time		V/C	LOS		V/C	LOS	6/17/04	V/C	LOS	6/18/04	V/C	LOS	6/18/04	V/C	LOS		V/C	LOS		V/C	LOS
1:00 AM										639	0.46	B	725	0.52	B						
2:00 AM										476	0.34	A	510	0.37	A						
3:00 AM										512	0.37	A	501	0.36	A						
4:00 AM										489	0.35	A	492	0.35	A						
5:00 AM										530	0.38	A	510	0.37	A						
6:00 AM								0.00	A	672	0.48	B	655	0.47	B						
7:00 AM								0.00	A	1459	1.05	E	1485	1.07	E						
8:00 AM								0.00	A	2260	1.63	E	2106	1.52	E						
9:00 AM								0.00	A	2489	1.79	E	2402	1.73	E						
10:00 AM								0.00	A	2415	1.74	E	2345	1.69	E						
11:00 AM								0.00	A	2399	1.73	E	2271	1.64	E						
12:00 PM								0.00	A	2290	1.65	E	2410	1.74	E						
1:00 PM								0.00	A	2495	1.80	E	2505	1.81	E						
2:00 PM								0.00	A	2158	1.56	E	2158	1.56	E						
3:00 PM								0.00	A	2145	1.55	E	2145	1.55	E						
4:00 PM							2010	1.45	E	2300	1.66	E	2300	1.66	E						
5:00 PM							2180	1.57	E	2248	1.62	E	2248	1.62	E						
6:00 PM							2203	1.59	E	2385	1.72	E	2385	1.72	E						
7:00 PM							1749	1.26	E	2355	1.70	E									
8:00 PM							1553	1.12	E	1935	1.40	E									
9:00 PM							1355	0.98	E	1523	1.10	E									
10:00 PM							1216	0.88	E	1305	0.94	E									
11:00 PM							991	0.71	C	1120	0.81	D									
12:00 AM							794	0.57	B	902	0.65	C									
Total	**0**			**0**			**14,051**			**39,501**			**30,153**			**0**			**0**		

Capacity LOS E

1,387 Veh/hr for 1 lanes

Reduction Factors

90% Lane Widths to 10 Feet

90% Side Clearance on One Side

90.1% Truck Factor for 22% Truck and 2% grade

= Restricted Hours

= Non Paving Hours

I-94 EB East of I-194/M-66
MOT: Maintain 1 Lanes Each Direction During Non-Restricted Hours (Paving Only Sun -Thur Nights)

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time		V/C	LOS		V/C	LOS	6/17/04	V/C	LOS	6/18/04	V/C	LOS	6/19/04	V/C	LOS		V/C	LOS		V/C	LOS
1:00 AM										830	0.60	B	833	0.60	B						
2:00 AM										560	0.40	A	661	0.48	B						
3:00 AM										494	0.36	A	540	0.39	A						
4:00 AM										547	0.39	A	507	0.37	A						
5:00 AM										662	0.48	B	676	0.49	B						
6:00 AM										885	0.64	C	855	0.62	B						
7:00 AM										1317	0.95	E	1323	0.95	E						
8:00 AM										1729	1.25	E	1841	1.33	E						
9:00 AM										1802	1.30	E	1781	1.28	E						
10:00 AM										1806	1.30	E	1881	1.36	E						
11:00 AM										1876	1.35	E	1856	1.34	E						
12:00 PM										1865	1.34	E	1777	1.28	E						
1:00 PM										1738	1.25	E	1888	1.36	E						
2:00 PM										1892	1.36	E	2116	1.53	E						
3:00 PM										2029	1.46	E	2058	1.48	E						
4:00 PM							2267	1.63	E	2359	1.70	E	2323	1.68	E						
5:00 PM							2502	1.80	E	2384	1.72	E	1855	1.34	E						
6:00 PM							2313	1.67	E	2360	1.70	E	1523	1.10	E						
7:00 PM							1882	1.36	E	1887	1.36	E									
8:00 PM							1515	1.09	E	1530	1.10	E									
9:00 PM							1492	1.08	E	1485	1.07	E									
10:00 PM							1264	0.91	E	1398	1.01	E									
11:00 PM							1046	0.75	C	1249	0.90	E									
12:00 AM							835	0.60	B	930	0.67	C									
Total	0			0			15,116			35,614			26,294			0			0		

Capacity LOS E
1,387 Veh/hr for 1 lanes

Reduction Factors
90% Lane Widths to 10 Feet
90% Side Clearance on One Side
90.1% Truck Factor for 22% Truck and 2% grade

= Restricted Hours
= Non Paving Hours

I-94 WB East of I-194/M-66
MOT: Maintain 1 Lanes Each Direction During Non-Restricted Hours (Paving Only Sun -Thur Nights)

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time	7/23/02	V/C	LOS	7/24/02	V/C	LOS	7/25/02	V/C	LOS		V/C	LOS		V/C	LOS		V/C	LOS		V/C	LOS
1:00 AM				678	0.49	B	690	0.50	B												
2:00 AM				476	0.34	A	481	0.35	A												
3:00 AM				422	0.30	A	444	0.32	A												
4:00 AM				475	0.34	A	508	0.37	A												
5:00 AM				483	0.35	A	540	0.39	A												
6:00 AM				690	0.50	B	751	0.54	B												
7:00 AM				1287	0.93	E	1344	0.97	E												
8:00 AM				1914	1.38	E	1751	1.26	E												
9:00 AM				1886	1.36	E	1913	1.38	E												
10:00 AM				1979	1.43	E	2049	1.48	E												
11:00 AM	2067	1.49	E	2006	1.45	E	2133	1.54	E												
12:00 PM	2088	1.51	E	2185	1.58	E	2325	1.68	E												
1:00 PM	2060	1.49	E	2136	1.54	E															
2:00 PM	2055	1.48	E	2198	1.59	E															
3:00 PM	2212	1.60	E	2287	1.65	E															
4:00 PM	2405	1.73	E	2339	1.69	E															
5:00 PM	2350	1.69	E	2567	1.85	E															
6:00 PM	2389	1.72	E	2538	1.83	E															
7:00 PM	1810	1.31	E	1950	1.41	E															
8:00 PM	1492	1.08	E	1673	1.21	E															
9:00 PM	1280	0.92	E	1466	1.06	E															
10:00 PM	1350	0.97	E	1358	0.98	E															
11:00 PM	1043	0.75	C	1161	0.84	E															
12:00 AM	887	0.64	C	900	0.65	C															
Total	**19,273**			**37,054**			**14,929**			**0**			**0**			**0**			**0**		

Capacity LOS E

1,387 Veh/hr for 1 lanes

Reduction Factors

90% Lane Widths to 10 Feet

90% Side Clearance on One Side

90.1% Truck Factor for 22% Truck and 2% grade

= Restricted Hours

= Non Paving Hours

I-94 EB East of I-194/M-66
MOT: Maintain 1 Lanes Each Direction During Non-Restricted Hours (Paving Only Sun -Thur Nights)

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday		
Time	7/23/02	V/C	LOS	7/24/02	V/C	LOS	7/25/02	V/C	LOS		V/C	LOS		V/C	LOS		V/C	LOS		V/C	LOS
1:00 AM				717	0.52	B	741	0.53	B												
2:00 AM				577	0.42	A	607	0.44	B												
3:00 AM				484	0.35	A	603	0.43	B												
4:00 AM				553	0.40	A	541	0.39	A												
5:00 AM				604	0.44	B	701	0.51	B												
6:00 AM				797	0.57	B	876	0.63	C												
7:00 AM				1333	0.96	E	1330	0.96	E												
8:00 AM				1679	1.21	E	1816	1.31	E												
9:00 AM				1750	1.26	E	1857	1.34	E												
10:00 AM				1809	1.30	E	1810	1.31	E												
11:00 AM	1733	1.25	E	1927	1.39	E	2091	1.51	E												
12:00 PM	1855	1.34	E	1971	1.42	E	2014	1.45	E												
1:00 PM	1889	1.36	E	1956	1.41	E															
2:00 PM	1989	1.43	E	2116	1.53	E															
3:00 PM	2121	1.53	E	2202	1.59	E															
4:00 PM	2352	1.70	E	2444	1.76	E															
5:00 PM	2453	1.77	E	2581	1.86	E															
6:00 PM	2241	1.62	E	2433	1.75	E															
7:00 PM	1882	1.36	E	2039	1.47	E															
8:00 PM	1509	1.09	E	1655	1.19	E															
9:00 PM	1441	1.04	E	1491	1.08	E															
10:00 PM	1360	0.98	E	1334	0.96	E															
11:00 PM	1134	0.82	D	1160	0.84	E															
12:00 AM	916	0.66	C	1085	0.78	D															
Total	17,409			36,697			14,987			0			0			0			0		

Capacity LOS E

1,387 Veh/hr for 1 lanes

Reduction Factors

90% Lane Widths to 10 Feet

90% Side Clearance on One Side

90.1% Truck Factor for 22% Truck and 2% grade

= Restricted Hours

= Non Paving Hours

Avg WB I-94 LOS

Time	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C
1:00 AM		0.48	0.47	0.48	0.17	0.14	0.43		0.49	0.50		0.19	0.21
2:00 AM		0.37	0.36	0.36	0.13	0.09	0.34		0.34	0.35		0.14	0.15
3:00 AM		0.33	0.39	0.31	0.11	0.07	0.28		0.30	0.32		0.15	0.15
4:00 AM		0.31	0.35	0.31	0.08	0.04	0.27		0.34	0.37		0.14	0.14
5:00 AM		0.39	0.40	0.40	0.07	0.04	0.35		0.35	0.39		0.15	0.15
6:00 AM		0.24	0.26	0.22	0.13	0.05	0.21		0.20	0.22		0.20	0.19
7:00 AM		0.44	0.46	0.43	0.22	0.10	0.42		0.38	0.39		0.43	0.43
8:00 AM		0.62	0.61	0.57	0.34	0.13	0.56		0.56	0.51		0.66	0.62
9:00 AM		0.58	0.60	0.60	0.43	0.24	0.52		0.55	0.56		0.73	0.70
10:00 AM		0.60	0.61	0.62	0.55	0.34	0.54		0.58	0.60		0.71	0.68
11:00 AM		0.58	0.66	0.68	0.62	0.45	0.61	0.60	0.59	0.62		0.70	0.66
12:00 PM		0.64	0.65	0.71	0.63	0.55	0.65	0.61	0.64	0.68		0.67	0.70
1:00 PM		0.63	0.64	0.76	0.58	0.62	0.67	0.60	0.62			0.73	0.73
2:00 PM	0.68	0.66	0.69	0.79	0.60	0.62	0.67	0.60	0.64			0.63	0.63
3:00 PM	0.64	0.68	0.68	0.90	0.57	0.64	0.66	0.65	0.67			0.63	0.63
4:00 PM	0.72	0.73	0.75	0.90	0.58	0.64	0.68	0.70	0.68		0.59	0.67	0.67
5:00 PM	0.74	0.73	0.87	0.88	0.53	0.64	0.71	0.69	0.75		0.64	0.66	0.66
6:00 PM	0.79	0.74	0.86	0.84	0.51	0.65		0.70	0.74		0.64	0.70	0.70
7:00 PM	1.40	1.56	1.57	0.76	0.48	0.62		1.31	1.41		1.26	0.69	
8:00 PM	1.27	1.21	1.38	0.66	0.40	0.61		1.08	1.21		1.12	0.57	
9:00 PM	1.11	1.20	1.22	0.58	0.35	1.34		0.92	1.06		0.98	0.44	
10:00 PM	0.92	1.04	1.08	0.49	0.32	1.15		0.97	0.98		0.88	0.38	
11:00 PM	0.85	0.83	0.86	0.36	0.27	0.89		0.75	0.84		0.71	0.33	
12:00 AM	0.70	0.67	0.68	0.28	0.20	0.66		0.64	0.65		0.57	0.26	
Total	**9.82**	**16.27**	**17.08**	**13.89**	**8.86**	**11.34**	**8.58**	**10.82**	**15.56**	**5.50**	**7.39**	**11.54**	**8.81**
Avg	**0.89**	**0.68**	**0.71**	**0.58**	**0.37**	**0.47**	**0.50**	**0.77**	**0.65**	**0.46**	**0.82**	**0.48**	**0.49**

Overall Avg V/C 0.584 =B

Avg EB I-94 LOS

Time	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C
1:00 AM		0.56	0.62	0.55	0.21	0.14	0.51		0.52	0.53		0.60	0.24
2:00 AM		0.38	0.55	0.44	0.14	0.09	0.38		0.42	0.44		0.40	0.19
3:00 AM		0.31	0.35	0.34	0.12	0.07	0.30		0.35	0.43		0.36	0.16
4:00 AM		0.30	0.33	0.35	0.10	0.06	0.32		0.40	0.39		0.39	0.15
5:00 AM		0.37	0.46	0.40	0.11	0.06	0.37		0.44	0.51		0.48	0.20
6:00 AM		0.21	0.23	0.24	0.12	0.06	0.23		0.23	0.26		0.26	0.25
7:00 AM		0.41	0.41	0.39	0.18	0.11	0.38		0.39	0.39		0.38	0.39
8:00 AM		0.65	0.66	0.58	0.31	0.13	0.54		0.49	0.53		0.50	0.54
9:00 AM		0.65	0.64	0.65	0.42	0.22	0.54		0.51	0.54		0.53	0.52
10:00 AM		0.62	0.64	0.62	0.48	0.34	0.52		0.53	0.53		0.53	0.55
11:00 AM		0.58	0.61	0.66	0.57	0.42	0.53	0.51	0.56	0.61		0.55	0.54
12:00 PM		0.61	0.58	0.65	0.60	0.51	0.54	0.54	0.58	0.59		0.54	0.52
1:00 PM		0.60	0.60	0.67	0.63	0.61	0.57	0.55	0.57			0.51	0.55
2:00 PM	0.60	0.63	0.61	0.77	0.60	0.66	0.60	0.58	0.62			0.55	0.62
3:00 PM	0.65	0.68	0.70	0.80	0.58	0.67	0.66	0.62	0.64			0.59	0.60
4:00 PM	0.68	0.69	0.77	0.85	0.54	0.63	0.69	0.69	0.71		0.66	0.69	0.68
5:00 PM	0.76	0.76	0.74	0.87	0.54	0.73	0.69	0.72	0.75		0.73	0.70	0.54
6:00 PM	0.75	0.78	0.77	0.81	0.52	0.70		0.65	0.71		0.68	0.69	0.44
7:00 PM	1.42	1.49	1.49	0.69	0.50	0.66		1.36	1.47		1.36	0.55	
8:00 PM	1.15	1.20	1.25	0.61	0.42	0.57		1.09	1.19		1.09	0.45	
9:00 PM	1.02	1.14	1.14	0.55	0.35	0.67		1.04	1.08		1.08	0.43	
10:00 PM	0.95	0.92	0.99	0.46	0.32	1.28		0.98	0.96		0.91	0.41	
11:00 PM	0.79	0.84	0.87	0.38	0.28	0.98		0.82	0.84		0.75	0.36	
12:00 AM	0.67	0.87	0.76	0.30	0.21	0.80		0.66	0.78		0.60	0.27	
Total	**9.44**	**16.24**	**16.79**	**13.62**	**8.82**	**11.16**	**8.38**	**10.80**	**15.74**	**5.75**	**7.86**	**11.73**	**7.68**
Avg	**0.86**	**0.68**	**0.70**	**0.57**	**0.37**	**0.46**	**0.49**	**0.77**	**0.66**	**0.48**	**0.87**	**0.49**	**0.43**

Overall Avg V/C 0.578 =B

SummaryView

period length (min)	60
annual traffic growth (%)	1.25%
years of growth	5

VEHICLE INPUT	cars	trucks
design demand (%)	75.0%	25.0%
user cost per hour ($/V hr)	$15.31	$27.02
user cost per mile, ($/V mi)	$0.45	$1.59
user cost per cancellation, ($/V)		

PROJECT INFORMATION			
PROJECT TITLE	I-94 WB by Riverside Bridge Bridge Replacement	C.S.	13081
		JOB #	75047
		START DATE	Summer 09

REPORT INFORMATION			
REPORT TITLE	DETAILED USER COST REPORT SUMMARY SHEET	DIVISION	Marshall
		REPORT BY	AMK
		REPORT DATE	4/10/2008

NOTES: Night Paving Sunday Night through Thur Night
Night work

METHOD INPUT		METHOD 1		METHOD 2		METHOD 3		METHOD 4	
	method title								
DISTANCE AND SPEED	(mi) (mph)	distance	speed	distance	speed	distance	speed	distance	speed
work zone	method travel	2.0	see delay		see delay		see delay		see delay
	normal travel	2.0	70.0						
diversion	method travel								
	normal travel								
SPEED DELAY		threshold	range	threshold	range	threshold	range	threshold	range
capacity for speed delay (V/period)		2732							
speed (when D~0) (mph)		60							
speed (when D=C) (mph)		38							
DECREASE TO DEMAND		threshold	range	threshold	range	threshold	range	threshold	range
capacity for decreases to design demand (V/period)		2732							
canceled cars (with no delay) (%)									
canceled trucks (with no delay) (%)									
canceled cars (with delay) (%/min)									
canceled trucks (with delay) (%/min)									
diverted cars (with no delay) (%)									
diverted trucks (with no delay) (%)									
diverted cars (with delay) (%/min)		5.0%							
diverted trucks (with delay) (%/min)									

OTHER USER COST INPUT	cars	trucks	cars	trucks	cars	trucks	cars	trucks
other user cost per actual demand ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
user cost per diversion ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

PERIOD INPUT			backup at start (V)		0	0	0	0	0	0	0	0
direction:	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Saturday	Weekday	Sunday	Weekday	Sunday
period	historical demand		design demand		capacity		capacity		capacity		capacity	
(hr)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A	934		994	0	2732							
1 A	671		714	0	2732							
2 A	517		550	0	2732							
3 A	462		492	0	2732							
4 A	435		463	0	2732							
5 A	535		569	0	2732							
6 A	822		875	0	2732							
7 A	1,506		1603	0	2732							
8 A	2,114		2249	0	2732							
9 A	1,997		2125	0	2732							
10 A	2,069		2202	0	2732							
11 A	1,985		2112	0	2732							
12 P	2,189		2329	0	2732							
1 P	2,144		2281	0	2732							
2 P	2,248		2392	0	2732							
3 P	2,343		2493	0	2732							
4 P	2,497		2657	0	2732							
5 P	2,496		2656	0	2732							
6 P	2,520		2681	0	2732							
7 P	2,165		2304	0	2732							
8 P	1,677		1784	0	2732							
9 P	1,667		1774	0	2732							
10 P	1,436		1528	0	2732							
11 P	1,153		1227	0	2732							
Total	38582	0	41054	0	65568	0	0	0	0	0	0	0

SUMMARY OUTPUT	traffic method	Weekday & Sun							
	direction	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
total user cost		$11,321	$0	$0	$1,694	$0	$0	$0	$0
user cost of delays		$11,321	$0	$0	$1,694	$0	$0	$0	$0
user cost of decreases		$0	$0	$0	$0	$0	$0	$0	$0
maximum backup (V)		0	0	0	82	0	0	0	0
maximum backup length (lane mi)		0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
maximum delay (min.)		1.3	0.0	0.0	3.9	0.0	0.0	0.0	0.0
average delay, except diversions (min)		0.9	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, except diversions (V hr)		617	0	0	94	0	0	0	0
total vehicles canceled(V)		0	0	0	0	0	0	0	0
total vehicles diverted (V)		1443	0	0	0	0	0	0	0
total decrease in demand (V)		1443	0	0	0	0	0	0	0
% decrease in demand		3.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
delay per diverted vehicle (min)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total diversion delay (V hr)		0	0	0	0	0	0	0	0
average delay, including diversions (min)		0.9	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, including diversions (V hr)		617	0	0	94	0	0	0	0
user cost / design demand		$0.28	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
delay cost / actual demand		$0.29	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
Aut ON Prin ON No OK	validity of output	VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID

SummaryView

period length (min)	60
annual traffic growth (%)	1.25%
years of growth	7

VEHICLE INPUT	cars	trucks
design demand (%)	75.0%	25.0%
user cost per hour ($/V hr)	$15.31	$27.02
user cost per mile, ($/V mi)	$0.45	$1.59
user cost per cancellation, ($/V)		

PROJECT INFORMATION			
PROJECT TITLE	I-94 EB East of I-194/M-66 Bridge Replacement	C.S.	13081
		JOB #	75047
		START DATE	Summer 09

REPORT INFORMATION			
REPORT TITLE	DETAILED USER COST REPORT SUMMARY SHEET	DIVISION	Marshall
		REPORT BY	AMK
		REPORT DATE	4/10/2008

NOTES: Night Paving Sunday Night through Thur Night
Night work

METHOD INPUT		METHOD 1		METHOD 2		METHOD 3		METHOD 4	
	method title								
DISTANCE AND SPEED	(mi) (mph)	distance	speed	distance	speed	distance	speed	distance	speed
work zone	method travel	2.0	see delay		see delay		see delay		see delay
	normal travel	2.0	70.0						
diversion	method travel								
	normal travel								
SPEED DELAY		threshold	range	threshold	range	threshold	range	threshold	range
capacity for speed delay (V/period)		2732							
speed (when D~0) (mph)		60							
speed (when D=C) (mph)		38							
DECREASE TO DEMAND		threshold	range	threshold	range	threshold	range	threshold	range
capacity for decreases to design demand (V/period)		2732							
canceled cars (with no delay) (%)									
canceled trucks (with no delay) (%)									
canceled cars (with delay) (%/min)									
canceled trucks (with delay) (%/min)									
diverted cars (with no delay) (%)									
diverted trucks (with no delay) (%)									
diverted cars (with delay) (%/min)		5.0%							
diverted trucks (with delay) (%/min)									

OTHER USER COST INPUT	cars	trucks	cars	trucks	cars	trucks	cars	trucks
other user cost per actual demand ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
user cost per diversion ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

PERIOD INPUT			backup at start (V)		0	0	0	0	0	0	0	0
direction:	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Saturday	Weekday	Sunday	Weekday	Sunday
period	historical demand		design demand		capacity		capacity		capacity		capacity	
(hr)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A	1085		1184	0	2732							
1 A	717		782	0	2732							
2 A	577		629	0	2732							
3 A	484		528	0	2732							
4 A	553		603	0	2732							
5 A	604		659	0	2732							
6 A	797		869	0	2732							
7 A	1333		1454	0	2732							
8 A	1679		1832	0	2732							
9 A	1750		1909	0	2732							
10 A	1809		1973	0	2732							
11 A	1927		2102	0	2732							
12 P	1971		2150	0	2732							
1 P	1956		2134	0	2732							
2 P	2116		2308	0	2732							
3 P	2202		2402	0	2732							
4 P	2444		2666	0	2732							
5 P	2581		2815	0	2732							
6 P	2433		2654	0	2732							
7 P	2039		2224	0	2732							
8 P	1655		1805	0	2732							
9 P	1491		1626	0	2732							
10 P	1334		1455	0	2732							
11 P	1160		1265	0	2732							
Total	36697	0	40031	0	65568	0	0	0	0	0	0	0

SUMMARY OUTPUT	traffic method		Weekday & Sun							
	direction	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
total user cost		$10,493	$0	$0	$1,694	$0	$0	$0	$0
user cost of delays		$10,493	$0	$0	$1,694	$0	$0	$0	$0
user cost of decreases		$0	$0	$0	$0	$0	$0	$0	$0
maximum backup (V)		0	0	0	82	0	0	0	0
maximum backup length (lane mi)		0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
maximum delay (min.)		1.4	0.0	0.0	3.9	0.0	0.0	0.0	0.0
average delay, except diversions (min)		0.9	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, except diversions (V hr)		572	0	0	94	0	0	0	0
total vehicles canceled(V)		0	0	0	0	0	0	0	0
total vehicles diverted (V)		1336	0	0	0	0	0	0	0
total decrease in demand (V)		1336	0	0	0	0	0	0	0
% decrease in demand		3.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
delay per diverted vehicle (min)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total diversion delay (V hr)		0	0	0	0	0	0	0	0
average delay, including diversions (min)		0.9	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, including diversions (V hr)		572	0	0	94	0	0	0	0
user cost / design demand		$0.26	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
delay cost / actual demand		$0.27	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
Aut ON Prin ON No OK	validity of output	VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID

SummaryView

period length (min)	60
annual traffic growth (%)	1.25%
years of growth	5

VEHICLE INPUT	cars	trucks
design demand (%)	75.0%	25.0%
user cost per hour ($/V hr)	$15.31	$27.02
user cost per mile, ($/V mi)	$0.45	$1.59
user cost per cancellation, ($/V)		

PROJECT INFORMATION			
PROJECT TITLE	I-94 EB by Riverside Bridge Bridge Replacement	C.S.	13081
		JOB #	75047
		START DATE	Summer 09

REPORT INFORMATION			
REPORT TITLE	DETAILED USER COST REPORT SUMMARY SHEET	DIVISION	Marshall
		REPORT BY	AMK
		REPORT DATE	4/10/2008

NOTES: Night Paving Sunday Night through Thur Night
Night work

METHOD INPUT		METHOD 1		METHOD 2		METHOD 3		METHOD 4	
	method title								
DISTANCE AND SPEED	(mi) (mph)	distance	speed	distance	speed	distance	speed	distance	speed
work zone	method travel	2.0	see delay		see delay		see delay		see delay
	normal travel	2.0	70.0						
diversion	method travel								
	normal travel								
SPEED DELAY		threshold	range	threshold	range	threshold	range	threshold	range
capacity for speed delay (V/period)		2732							
speed (when D~0) (mph)		60							
speed (when D=C) (mph)		38							
DECREASE TO DEMAND		threshold	range	threshold	range	threshold	range	threshold	range
capacity for decreases to design demand (V/period)		2732							
canceled cars (with no delay) (%)									
canceled trucks (with no delay) (%)									
canceled cars (with delay) (%/min)									
canceled trucks (with delay) (%/min)									
diverted cars (with no delay) (%)									
diverted trucks (with no delay) (%)									
diverted cars (with delay) (%/min)		5.0%							
diverted trucks (with delay) (%/min)									

OTHER USER COST INPUT	cars	trucks	cars	trucks	cars	trucks	cars	trucks
other user cost per actual demand ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
user cost per diversion ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

PERIOD INPUT	backup at start (V)	0	0	0	0	0	0	0	0
direction:	Weekday / Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Saturday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
period	historical demand	design demand		capacity		capacity		capacity		capacity	
(hr)	(V/period) / (V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A	1211	1289	0	2732							
1 A	770	819	0	2732							
2 A	521	554	0	2732							
3 A	430	458	0	2732							
4 A	418	445	0	2732							
5 A	517	550	0	2732							
6 A	725	771	0	2732							
7 A	1,402	1492	0	2732							
8 A	2,228	2371	0	2732							
9 A	2,221	2363	0	2732							
10 A	2,109	2244	0	2732							
11 A	2,002	2130	0	2732							
12 P	2,075	2208	0	2732							
1 P	2,059	2191	0	2732							
2 P	2,154	2292	0	2732							
3 P	2,318	2467	0	2732							
4 P	2,377	2529	0	2732							
5 P	2,596	2762	0	2732							
6 P	2,659	2829	0	2732							
7 P	2,067	2199	0	2732							
8 P	1,663	1770	0	2732							
9 P	1,577	1678	0	2732							
10 P	1,273	1355	0	2732							
11 P	1,170	1245	0	2732							
Total	38542 / 0	41012	0	65568	0	0	0	0	0	0	0

SUMMARY OUTPUT	traffic method	Weekday & Sun							
	direction	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
total user cost		$11,342	$0	$0	$1,694	$0	$0	$0	$0
user cost of delays		$11,342	$0	$0	$1,694	$0	$0	$0	$0
user cost of decreases		$0	$0	$0	$0	$0	$0	$0	$0
maximum backup (V)		0	0	0	82	0	0	0	0
maximum backup length (lane mi)		0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
maximum delay (min.)		1.4	0.0	0.0	3.9	0.0	0.0	0.0	0.0
average delay, except diversions (min)		0.9	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, except diversions (V hr)		618	0	0	94	0	0	0	0
total vehicles canceled(V)		0	0	0	0	0	0	0	0
total vehicles diverted (V)		1447	0	0	0	0	0	0	0
total decrease in demand (V)		1447	0	0	0	0	0	0	0
% decrease in demand		3.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
delay per diverted vehicle (min)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total diversion delay (V hr)		0	0	0	0	0	0	0	0
average delay, including diversions (min)		0.9	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, including diversions (V hr)		618	0	0	94	0	0	0	0
user cost / design demand		$0.28	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
delay cost / actual demand		$0.29	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
Aut ON Prin ON No OK	validity of output	VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID

SummaryView

period length (min)	60
annual traffic growth (%)	1.25%
years of growth	7

VEHICLE INPUT	cars	trucks
design demand (%)	75.0%	25.0%
user cost per hour ($/V hr)	$15.31	$27.02
user cost per mile, ($/V mi)	$0.45	$1.59
user cost per cancellation, ($/V)		

PROJECT INFORMATION			
PROJECT TITLE	I-94 WB East of I-194/M-66 Bridge Replacement	C.S.	13081
		JOB #	75047
		START DATE	Summer 09

REPORT INFORMATION			
REPORT TITLE	DETAILED USER COST REPORT SUMMARY SHEET	DIVISION	Marshall
		REPORT BY	AMK
		REPORT DATE	4/10/2008

NOTES: Night Paving Sunday Night through Thur Night
Night work

METHOD INPUT			METHOD 1		METHOD 2		METHOD 3		METHOD 4	
		method title								
DISTANCE AND SPEED		(mi) (mph)	distance	speed	distance	speed	distance	speed	distance	speed
work zone	method travel		2.0	see delay		see delay		see delay		see delay
	normal travel		2.0	70.0						
diversion	method travel									
	normal travel									
SPEED DELAY			threshold	range	threshold	range	threshold	range	threshold	range
capacity for speed delay (V/period)			3732							
speed (when D~0) (mph)			60							
speed (when D=C) (mph)			38							
DECREASE TO DEMAND			threshold	range	threshold	range	threshold	range	threshold	range
capacity for decreases to design demand (V/period)			2732							
canceled cars (with no delay) (%)										
canceled trucks (with no delay) (%)										
canceled cars (with delay) (%/min)										
canceled trucks (with delay) (%/min)										
diverted cars (with no delay) (%)										
diverted trucks (with no delay) (%)										
diverted cars (with delay) (%/min)			5.0%							
diverted trucks (with delay) (%/min)										

OTHER USER COST INPUT			cars	trucks	cars	trucks	cars	trucks	cars	trucks
other user cost per actual demand ($/V)			$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
user cost per diversion ($/V)			$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
PERIOD INPUT		backup at start (V)	0	0	0	0	0	0	0	0
direction:	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Saturday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
period	historical demand		design demand		capacity		capacity		capacity		capacity	
(hr)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A	900		982	0	2732							
1 A	678		740	0	2732							
2 A	476		519	0	2732							
3 A	422		460	0	2732							
4 A	475		518	0	2732							
5 A	483		527	0	2732							
6 A	690		753	0	2732							
7 A	1287		1404	0	2732							
8 A	1914		2088	0	2732							
9 A	1886		2057	0	2732							
10 A	1979		2159	0	2732							
11 A	2006		2188	0	2732							
12 P	2185		2384	0	2732							
1 P	2136		2330	0	2732							
2 P	2198		2398	0	2732							
3 P	2287		2495	0	2732							
4 P	2339		2551	0	2732							
5 P	2567		2800	0	2732							
6 P	2538		2769	0	2732							
7 P	1950		2127	0	2732							
8 P	1673		1825	0	2732							
9 P	1466		1599	0	2732							
10 P	1358		1481	0	2732							
11 P	1161		1266	0	2732							
Total	37054	0	40420	0	65568	0	0	0	0	0	0	0

SUMMARY OUTPUT	traffic method	Weekday & Sun							
	direction	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
total user cost		$11,115	$0	$0	$1,694	$0	$0	$0	$0
user cost of delays		$11,115	$0	$0	$1,694	$0	$0	$0	$0
user cost of decreases		$0	$0	$0	$0	$0	$0	$0	$0
maximum backup (V)		0	0	0	82	0	0	0	0
maximum backup length (lane mi)		0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
maximum delay (min.)		1.4	0.0	0.0	3.9	0.0	0.0	0.0	0.0
average delay, except diversions (min)		0.9	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, except diversions (V hr)		606	0	0	94	0	0	0	0
total vehicles canceled(V)		0	0	0	0	0	0	0	0
total vehicles diverted (V)		1417	0	0	0	0	0	0	0
total decrease in demand (V)		1417	0	0	0	0	0	0	0
% decrease in demand		3.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
delay per diverted vehicle (min)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total diversion delay (V hr)		0	0	0	0	0	0	0	0
average delay, including diversions (min)		0.9	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, including diversions (V hr)		606	0	0	94	0	0	0	0
user cost / design demand		$0.27	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
delay cost / actual demand		$0.28	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
Aut ON Prin ON No OK	validity of output	VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID

SummaryView

period length (min)	60
annual traffic growth (%)	1.25%
years of growth	5

VEHICLE INPUT	cars	trucks
design demand (%)	88.6%	11.4%
user cost per hour ($/V hr)	$15.31	$27.02
user cost per mile, ($/V mi)	$0.45	$1.59
user cost per cancellation, ($/V)		

PROJECT INFORMATION			
PROJECT TITLE	I-94 WB by Riverside Bridge Bridge Replacement	C.S.	13081
		JOB #	75047
		START DATE	Summer 09

REPORT INFORMATION			
REPORT TITLE	DETAILED USER COST REPORT SUMMARY SHEET	DIVISION	Marshall
		REPORT BY	AMK
		REPORT DATE	4/10/2008

NOTES: Night Paving Sunday Night through Thur Night
Night work

METHOD INPUT		METHOD 1		METHOD 2		METHOD 3		METHOD 4	
	method title								
DISTANCE AND SPEED	(mi) (mph)	distance	speed	distance	speed	distance	speed	distance	speed
work zone	method travel	2.0	see delay		see delay		see delay		see delay
	normal travel	2.0	70.0						
diversion	method travel								
	normal travel								
SPEED DELAY		threshold	range	threshold	range	threshold	range	threshold	range
capacity for speed delay (V/period)		2732							
speed (when D~0) (mph)		60							
speed (when D=C) (mph)		38							
DECREASE TO DEMAND		threshold	range	threshold	range	threshold	range	threshold	range
capacity for decreases to design demand (V/period)		2732							
canceled cars (with no delay) (%)									
canceled trucks (with no delay) (%)									
canceled cars (with delay) (%/min)									
canceled trucks (with delay) (%/min)									
diverted cars (with no delay) (%)									
diverted trucks (with no delay) (%)									
diverted cars (with delay) (%/min)									
diverted trucks (with delay) (%/min)									

OTHER USER COST INPUT	cars	trucks	cars	trucks	cars	trucks	cars	trucks
other user cost per actual demand ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
user cost per diversion ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

PERIOD INPUT			backup at start (V)		0	0	0	0	0	0	0	0
direction:	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Saturday	Weekday	Sunday	Weekday	Sunday
period	historical demand		design demand		capacity		capacity		capacity		capacity	
(hr)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A		920	0	979		2732						
1 A		495	0	527		2732						
2 A		315	0	335		2732						
3 A		237	0	252		2732						
4 A		128	0	136		2732						
5 A		139	0	148		2732						
6 A		188	0	200		2732						
7 A		337	0	359		2732						
8 A		461	0	491		2732						
9 A		817	0	869		2732						
10 A		1,180	0	1256		2732						
11 A		1,541	0	1640		2732						
12 P		1,897	0	2019		2732						
1 P		2,116	0	2252		2732						
2 P		2,116	0	2252		2732						
3 P		2,182	0	2322		2732						
4 P		2,204	0	2345		2732						
5 P		2,184	0	2324		2732						
6 P		2,230	0	2373		2732						
7 P		2,133	0	2270		2732						
8 P		2,090	0	2224		2732						
9 P		1,855	0	1974		2732						
10 P		1,600	0	1703		2732						
11 P		1,235	0	1314		2732						
Total	0	30600	0	32561	0	65568	0	0	0	0	0	0

SUMMARY OUTPUT	traffic method		Weekday & Sun							
	direction	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
total user cost		$0	$8,101	$0	$1,694	$0	$0	$0	$0
user cost of delays		$0	$8,101	$0	$1,694	$0	$0	$0	$0
user cost of decreases		$0	$0	$0	$0	$0	$0	$0	$0
maximum backup (V)		0	0	0	82	0	0	0	0
maximum backup length (lane mi)		0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
maximum delay (min.)		0.0	1.2	0.0	3.9	0.0	0.0	0.0	0.0
average delay, except diversions (min)		0.0	0.9	0.0	0.2	0.0	0.0	0.0	0.0
total delay, except diversions (V hr)		0	487	0	94	0	0	0	0
total vehicles canceled(V)		0	0	0	0	0	0	0	0
total vehicles diverted (V)		0	0	0	0	0	0	0	0
total decrease in demand (V)		0	0	0	0	0	0	0	0
% decrease in demand		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
delay per diverted vehicle (min)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total diversion delay (V hr)		0	0	0	0	0	0	0	0
average delay, including diversions (min)		0.0	0.9	0.0	0.2	0.0	0.0	0.0	0.0
total delay, including diversions (V hr)		0	487	0	94	0	0	0	0
user cost / design demand		$0.00	$0.25	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
delay cost / actual demand		$0.00	$0.25	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
Aut ON Prin ON No OK	validity of output	NOT VALID	VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID

SummaryView

period length (min)	60
annual traffic growth (%)	1.25%
years of growth	5

VEHICLE INPUT	cars	trucks
design demand (%)	88.6%	11.4%
user cost per hour ($/V hr)	$15.31	$27.02
user cost per mile, ($/V mi)	$0.45	$1.59
user cost per cancellation, ($/V)		

PROJECT INFORMATION			
PROJECT TITLE	I-94 EB by Riverside Bridge Bridge Replacement	C.S.	13081
		JOB #	74956
		START DATE	Summer 09

REPORT INFORMATION			
REPORT TITLE	DETAILED USER COST REPORT SUMMARY SHEET	DIVISION	Marshall
		REPORT BY	AMK
		REPORT DATE	4/10/2008

NOTES: Night Paving Sunday Night through Thur Night
Night work

METHOD INPUT		METHOD 1		METHOD 2		METHOD 3		METHOD 4	
	method title								
DISTANCE AND SPEED	(mi) (mph)	distance	speed	distance	speed	distance	speed	distance	speed
work zone	method travel	2.0	see delay		see delay		see delay		see delay
	normal travel	2.0	70.0						
diversion	method travel								
	normal travel								
SPEED DELAY		threshold	range	threshold	range	threshold	range	threshold	range
capacity for speed delay (V/period)		2732							
speed (when D~0) (mph)		60							
speed (when D=C) (mph)		38							
DECREASE TO DEMAND		threshold	range	threshold	range	threshold	range	threshold	range
capacity for decreases to design demand (V/period)		2732							
canceled cars (with no delay) (%)									
canceled trucks (with no delay) (%)									
canceled cars (with delay) (%/min)									
canceled trucks (with delay) (%/min)									
diverted cars (with no delay) (%)									
diverted trucks (with no delay) (%)									
diverted cars (with delay) (%/min)									
diverted trucks (with delay) (%/min)									

OTHER USER COST INPUT	cars	trucks	cars	trucks	cars	trucks	cars	trucks
other user cost per actual demand ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
user cost per diversion ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

PERIOD INPUT			backup at start (V)		0	0	0	0	0	0	0	0
direction:	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Saturday	Weekday	Sunday	Weekday	Sunday
period	historical demand		design demand		capacity		capacity		capacity		capacity	
(hr)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A		487	0	518		2732						
1 A		321	0	342		2732						
2 A		254	0	270		2732						
3 A		203	0	216		2732						
4 A		195	0	207		2732						
5 A		198	0	211		2732						
6 A		373	0	397		2732						
7 A		439	0	467		2732						
8 A		769	0	818		2732						
9 A		1,156	0	1230		2732						
10 A		1,453	0	1546		2732						
11 A		1,754	0	1866		2732						
12 P		2,078	0	2211		2732						
1 P		2,261	0	2406		2732						
2 P		2,282	0	2428		2732						
3 P		2,147	0	2285		2732						
4 P		2,485	0	2644		2732						
5 P		2,380	0	2533		2732						
6 P		2,274	0	2420		2732						
7 P		1,952	0	2077		2732						
8 P		2,293	0	2440		2732						
9 P		1,771	0	1884		2732						
10 P		1,357	0	1444		2732						
11 P		1,105	0	1176		2732						
Total	0	31987	0	34037	0	65568	0	0	0	0	0	0

SUMMARY OUTPUT	traffic method		Weekday & Sun							
	direction	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
total user cost		$0	$9,051	$0	$1,694	$0	$0	$0	$0
user cost of delays		$0	$9,051	$0	$1,694	$0	$0	$0	$0
user cost of decreases		$0	$0	$0	$0	$0	$0	$0	$0
maximum backup (V)		0	0	0	82	0	0	0	0
maximum backup length (lane mi)		0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
maximum delay (min.)		0.0	1.4	0.0	3.9	0.0	0.0	0.0	0.0
average delay, except diversions (min)		0.0	1.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, except diversions (V hr)		0	544	0	94	0	0	0	0
total vehicles canceled(V)		0	0	0	0	0	0	0	0
total vehicles diverted (V)		0	0	0	0	0	0	0	0
total decrease in demand (V)		0	0	0	0	0	0	0	0
% decrease in demand		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
delay per diverted vehicle (min)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total diversion delay (V hr)		0	0	0	0	0	0	0	0
average delay, including diversions (min)		0.0	1.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, including diversions (V hr)		0	544	0	94	0	0	0	0
user cost / design demand		$0.00	$0.27	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
delay cost / actual demand		$0.00	$0.27	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
Aut ON Prin ON No OK	validity of output	NOT VALID	VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID

SummaryView

period length (min)	60
annual traffic growth (%)	1.25%
years of growth	5

VEHICLE INPUT	cars	trucks
design demand (%)	88.6%	11.4%
user cost per hour ($/V hr)	$15.31	$27.02
user cost per mile, ($/V mi)	$0.45	$1.59
user cost per cancellation, ($/V)		

PROJECT INFORMATION			
PROJECT TITLE	I-94 EB by Riverside Bridge Bridge Replacement	C.S.	13081
		JOB #	74956
		START DATE	Summer 09
NOTES:	Night Paving Sunday Night through Thur Night Night work		

REPORT INFORMATION			
REPORT TITLE	DETAILED USER COST REPORT SUMMARY SHEET	DIVISION	Marshall
		REPORT BY	AMK
		REPORT DATE	4/10/2008

METHOD INPUT		METHOD 1		METHOD 2		METHOD 3		METHOD 4	
	method title								
DISTANCE AND SPEED	(mi) (mph)	distance	speed	distance	speed	distance	speed	distance	speed
work zone	method travel	2.0	see delay		see delay		see delay		see delay
	normal travel	2.0	70.0						
diversion	method travel								
	normal travel								
SPEED DELAY		threshold	range	threshold	range	threshold	range	threshold	range
capacity for speed delay (V/period)		2732							
speed (when D~0) (mph)		60							
speed (when D=C) (mph)		38							
DECREASE TO DEMAND		threshold	range	threshold	range	threshold	range	threshold	range
capacity for decreases to design demand (V/period)		2732							
canceled cars (with no delay) (%)									
canceled trucks (with no delay) (%)									
canceled cars (with delay) (%/min)									
canceled trucks (with delay) (%/min)									
diverted cars (with no delay) (%)									
diverted trucks (with no delay) (%)									
diverted cars (with delay) (%/min)									
diverted trucks (with delay) (%/min)									

OTHER USER COST INPUT	cars	trucks	cars	trucks	cars	trucks	cars	trucks
other user cost per actual demand ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
user cost per diversion ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

PERIOD INPUT			backup at start (V)		0	0	0	0	0	0	0	0
direction:	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday
period	historical demand		design demand		capacity		capacity		capacity		capacity	
(hr)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A		729	0	776		2732						
1 A		465	0	495		2732						
2 A		412	0	438		2732						
3 A		333	0	354		2732						
4 A		376	0	400		2732						
5 A		417	0	444		2732						
6 A		618	0	658		2732						
7 A		1,049	0	1116		2732						
8 A		1,428	0	1520		2732						
9 A		1,628	0	1732		2732						
10 A		1,962	0	2088		2732						
11 A		2,047	0	2178		2732						
12 P		2,151	0	2289		2732						
1 P		2,048	0	2179		2732						
2 P		1,979	0	2106		2732						
3 P		1,837	0	1955		2732						
4 P		1,842	0	1960		2732						
5 P		1,778	0	1892		2732						
6 P		1,696	0	1805		2732						
7 P		1,441	0	1533		2732						
8 P		1,200	0	1277		2732						
9 P		1,102	0	1173		2732						
10 P		944	0	1004		2732						
11 P		720	0	766		2732						
Total	0	30202	0	32137	0	65568	0	0	0	0	0	0

SUMMARY OUTPUT	traffic method	Weekday & Sun							
	direction	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday
total user cost		$0	$6,796	$0	$1,694	$0	$0	$0	$0
user cost of delays		$0	$6,796	$0	$1,694	$0	$0	$0	$0
user cost of decreases		$0	$0	$0	$0	$0	$0	$0	$0
maximum backup (V)		0	0	0	82	0	0	0	0
maximum backup length (lane mi)		0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
maximum delay (min.)		0.0	1.1	0.0	3.9	0.0	0.0	0.0	0.0
average delay, except diversions (min)		0.0	0.8	0.0	0.2	0.0	0.0	0.0	0.0
total delay, except diversions (V hr)		0	408	0	94	0	0	0	0
total vehicles canceled(V)		0	0	0	0	0	0	0	0
total vehicles diverted (V)		0	0	0	0	0	0	0	0
total decrease in demand (V)		0	0	0	0	0	0	0	0
% decrease in demand		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
delay per diverted vehicle (min)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total diversion delay (V hr)		0	0	0	0	0	0	0	0
average delay, including diversions (min)		0.0	0.8	0.0	0.2	0.0	0.0	0.0	0.0
total delay, including diversions (V hr)		0	408	0	94	0	0	0	0
user cost / design demand		$0.00	$0.21	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
delay cost / actual demand		$0.00	$0.21	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
Aut ON Prin ON No OK	validity of output	NOT VALID	VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID

SummaryView

period length (min)	60
annual traffic growth (%)	1.25%
years of growth	5

VEHICLE INPUT	cars	trucks
design demand (%)	88.6%	11.4%
user cost per hour ($/V hr)	$15.31	$27.02
user cost per mile, ($/V mi)	$0.45	$1.59
user cost per cancellation, ($/V)		

PROJECT INFORMATION			
PROJECT TITLE	I-94 WB by Riverside Bridge Bridge Replacement	C.S.	13081
		JOB #	75047
		START DATE	Summer 09
NOTES:	Night Paving Sunday Night through Thur Night Night work		

REPORT INFORMATION			
REPORT TITLE	DETAILED USER COST REPORT SUMMARY SHEET	DIVISION	Marshall
		REPORT BY	AMK
		REPORT DATE	4/10/2008

METHOD INPUT		METHOD 1		METHOD 2		METHOD 3		METHOD 4	
	method title								
DISTANCE AND SPEED	(mi) (mph)	distance	speed	distance	speed	distance	speed	distance	speed
work zone	method travel	2.0	see delay		see delay		see delay		see delay
	normal travel	2.0	70.0						
diversion	method travel								
	normal travel								
SPEED DELAY		threshold	range	threshold	range	threshold	range	threshold	range
capacity for speed delay (V/period)		2732							
speed (when D~0) (mph)		60							
speed (when D=C) (mph)		38							
DECREASE TO DEMAND		threshold	range	threshold	range	threshold	range	threshold	range
capacity for decreases to design demand (V/period)		2732							
canceled cars (with no delay) (%)									
canceled trucks (with no delay) (%)									
canceled cars (with delay) (%/min)									
canceled trucks (with delay) (%/min)									
diverted cars (with no delay) (%)									
diverted trucks (with no delay) (%)									
diverted cars (with delay) (%/min)									
diverted trucks (with delay) (%/min)									

OTHER USER COST INPUT	cars	trucks	cars	trucks	cars	trucks	cars	trucks
other user cost per actual demand ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
user cost per diversion ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

PERIOD INPUT			backup at start (V)		0	0	0	0	0	0	0	0
direction:	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday
period	historical demand		design demand		capacity		capacity		capacity		capacity	
(hr)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A		590	0	628		2732						
1 A		446	0	475		2732						
2 A		361	0	384		2732						
3 A		259	0	276		2732						
4 A		255	0	271		2732						
5 A		440	0	468		2732						
6 A		742	0	790		2732						
7 A		1,148	0	1222		2732						
8 A		1,458	0	1551		2732						
9 A		1,874	0	1994		2732						
10 A		2,113	0	2248		2732						
11 A		2,162	0	2301		2732						
12 P		1,991	0	2119		2732						
1 P		2,048	0	2179		2732						
2 P		1,962	0	2088		2732						
3 P		1,990	0	2118		2732						
4 P		1,811	0	1927		2732						
5 P		1,748	0	1860		2732						
6 P		1,642	0	1747		2732						
7 P		1,372	0	1460		2732						
8 P		1,201	0	1278		2732						
9 P		1,103	0	1174		2732						
10 P		925	0	984		2732						
11 P		689	0	733		2732						
Total	0	30330	0	32274	0	65568	0	0	0	0	0	0

SUMMARY OUTPUT	traffic method	Weekday & Sun							
	direction	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday
total user cost		$0	$8,101	$0	$1,694	$0	$0	$0	$0
user cost of delays		$0	$8,101	$0	$1,694	$0	$0	$0	$0
user cost of decreases		$0	$0	$0	$0	$0	$0	$0	$0
maximum backup (V)		0	0	0	82	0	0	0	0
maximum backup length (lane mi)		0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
maximum delay (min.)		0.0	1.2	0.0	3.9	0.0	0.0	0.0	0.0
average delay, except diversions (min)		0.0	0.9	0.0	0.2	0.0	0.0	0.0	0.0
total delay, except diversions (V hr)		0	487	0	94	0	0	0	0
total vehicles canceled(V)		0	0	0	0	0	0	0	0
total vehicles diverted (V)		0	0	0	0	0	0	0	0
total decrease in demand (V)		0	0	0	0	0	0	0	0
% decrease in demand		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
delay per diverted vehicle (min)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total diversion delay (V hr)		0	0	0	0	0	0	0	0
average delay, including diversions (min)		0.0	0.9	0.0	0.2	0.0	0.0	0.0	0.0
total delay, including diversions (V hr)		0	487	0	94	0	0	0	0
user cost / design demand		$0.00	$0.25	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
delay cost / actual demand		$0.00	$0.25	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
Aut ON Prin ON No OK	validity of output	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID

SummaryView

period length (min)	60
annual traffic growth (%)	1.25%
years of growth	5

VEHICLE INPUT	cars	trucks
design demand (%)	75.0%	25.0%
user cost per hour ($/V hr)	$15.31	$27.02
user cost per mile, ($/V mi)	$0.45	$1.59
user cost per cancellation, ($/V)		

PROJECT INFORMATION			
PROJECT TITLE	I-94 WB by Riverside Bridge	C.S.	13081 & 13082
	CPM Mill & Fill	JOB #	102807
		START DATE	Summer 09

REPORT INFORMATION			
REPORT TITLE	DETAILED USER COST REPORT	DIVISION	Marshall
	SUMMARY SHEET	REPORT BY	AMK
		REPORT DATE	4/10/2008

NOTES: Night Paving Sunday Night through Thur Night
Night work

METHOD INPUT		METHOD 1		METHOD 2		METHOD 3		METHOD 4	
method title									
DISTANCE AND SPEED	(mi) (mph)	distance	speed	distance	speed	distance	speed	distance	speed
work zone	method travel	2.0	see delay		see delay		see delay		see delay
	normal travel	2.0	70.0						
diversion	method travel								
	normal travel								
SPEED DELAY		threshold	range	threshold	range	threshold	range	threshold	range
capacity for speed delay (V/period)		1387							
speed (when D~0) (mph)		60							
speed (when D=C) (mph)		38							
DECREASE TO DEMAND		threshold	range	threshold	range	threshold	range	threshold	range
capacity for decreases to design demand (V/period)		1387							
canceled cars (with no delay) (%)									
canceled trucks (with no delay) (%)									
canceled cars (with delay) (%/min)									
canceled trucks (with delay) (%/min)									
diverted cars (with no delay) (%)									
diverted trucks (with no delay) (%)									
diverted cars (with delay) (%/min)		5.0%							
diverted trucks (with delay) (%/min)									

OTHER USER COST INPUT	cars	trucks	cars	trucks	cars	trucks	cars	trucks
other user cost per actual demand ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
user cost per diversion ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

PERIOD INPUT			backup at start (V)		0	0	0	0	0	0	0	0
direction:	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Saturday	Weekday	Sunday	Weekday	Sunday
period	historical demand		design demand		capacity		capacity		capacity		capacity	
(hr)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A	934		994	0	1387							
1 A	671		714	0	1387							
2 A	517		550	0	1387							
3 A	462		492	0	1387							
4 A	435		463	0	1387							
5 A	535		569	0	1387							
6 A	822		875	0	3000							
7 A	1,506		1603	0	3000							
8 A	2,114		2249	0	3000							
9 A	1,997		2125	0	3000							
10 A	2,069		2202	0	3000							
11 A	1,985		2112	0	3000							
12 P	2,189		2329	0	3000							
1 P	2,144		2281	0	3000							
2 P	2,248		2392	0	3000							
3 P	2,343		2493	0	3000							
4 P	2,497		2657	0	3000							
5 P	2,496		2656	0	3000							
6 P	2,520		2681	0	3000							
7 P	2,165		2304	0	1387							
8 P	1,677		1784	0	1387							
9 P	1,667		1774	0	1387							
10 P	1,436		1528	0	1387							
11 P	1,153		1227	0	1387							
Total	38582	0	41054	0	54257	0	0	0	0	0	0	0

SUMMARY OUTPUT	traffic method	Weekday & Sun							
	direction	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
total user cost		$12,563	$0	$0	$1,694	$0	$0	$0	$0
user cost of delays		$12,563	$0	$0	$1,694	$0	$0	$0	$0
user cost of decreases		$0	$0	$0	$0	$0	$0	$0	$0
maximum backup (V)		276	0	0	82	0	0	0	0
maximum backup length (lane mi)		1.6	0.0	0.0	0.5	0.0	0.0	0.0	0.0
maximum delay (min.)		13.4	0.0	0.0	3.9	0.0	0.0	0.0	0.0
average delay, except diversions (min)		1.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, except diversions (V hr)		654	0	0	94	0	0	0	0
total vehicles canceled(V)		0	0	0	0	0	0	0	0
total vehicles diverted (V)		1962	0	0	0	0	0	0	0
total decrease in demand (V)		1962	0	0	0	0	0	0	0
% decrease in demand		4.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
delay per diverted vehicle (min)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total diversion delay (V hr)		0	0	0	0	0	0	0	0
average delay, including diversions (min)		1.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, including diversions (V hr)		654	0	0	94	0	0	0	0
user cost / design demand		$0.31	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
delay cost / actual demand		$0.32	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
Auto ON Prin ON No OK	validity of output	VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID

SummaryView

period length (min)	60
annual traffic growth (%)	1.25%
years of growth	5

VEHICLE INPUT	cars	trucks
design demand (%)	88.6%	11.4%
user cost per hour ($/V hr)	$15.31	$27.02
user cost per mile, ($/V mi)	$0.45	$1.59
user cost per cancellation, ($/V)		

PROJECT INFORMATION			
PROJECT TITLE	I-94 WB by Riverside Bridge	C.S.	13081 & 13082
	CPM Mill & Fill	JOB #	102807
		START DATE	Summer 09

REPORT INFORMATION			
REPORT TITLE	DETAILED USER COST REPORT	DIVISION	Marshall
	SUMMARY SHEET	REPORT BY	AMK
		REPORT DATE	4/10/2008

NOTES: Night Paving Sunday Night through Thur Night
Night work

METHOD INPUT		METHOD 1		METHOD 2		METHOD 3		METHOD 4	
method title									
DISTANCE AND SPEED	(mi) (mph)	distance	speed	distance	speed	distance	speed	distance	speed
work zone	method travel	2.0	see delay		see delay		see delay		see delay
	normal travel	2.0	70.0						
diversion	method travel								
	normal travel								
SPEED DELAY		threshold	range	threshold	range	threshold	range	threshold	range
capacity for speed delay (V/period)		1387							
speed (when D~0) (mph)		60							
speed (when D=C) (mph)		38							
DECREASE TO DEMAND		threshold	range	threshold	range	threshold	range	threshold	range
capacity for decreases to design demand (V/period)		1387							
canceled cars (with no delay) (%)									
canceled trucks (with no delay) (%)									
canceled cars (with delay) (%/min)									
canceled trucks (with delay) (%/min)									
diverted cars (with no delay) (%)									
diverted trucks (with no delay) (%)									
diverted cars (with delay) (%/min)									
diverted trucks (with delay) (%/min)									

OTHER USER COST INPUT	cars	trucks	cars	trucks	cars	trucks	cars	trucks
other user cost per actual demand ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
user cost per diversion ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

PERIOD INPUT			backup at start (V)		0	0	0	0	0	0	0	0
direction:	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Saturday	Weekday	Sunday	Weekday	Sunday
period	historical demand		design demand		capacity		capacity		capacity		capacity	
(hr)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A		920	0	979		3000						
1 A		495	0	527		3000						
2 A		315	0	335		3000						
3 A		237	0	252		3000						
4 A		128	0	136		3000						
5 A		139	0	148		3000						
6 A		188	0	200		3000						
7 A		337	0	359		3000						
8 A		461	0	491		3000						
9 A		817	0	869		3000						
10 A		1,180	0	1256		3000						
11 A		1,541	0	1640		3000						
12 P		1,897	0	2019		3000						
1 P		2,116	0	2252		3000						
2 P		2,116	0	2252		3000						
3 P		2,182	0	2322		3000						
4 P		2,204	0	2345		3000						
5 P		2,184	0	2324		3000						
6 P		2,230	0	2373		3000						
7 P		2,133	0	2270		3000						
8 P		2,090	0	2224		3000						
9 P		1,855	0	1974		1387						
10 P		1,600	0	1703		1387						
11 P		1,235	0	1314		1387						
Total	0	30600	0	32561	0	67161	0	0	0	0	0	0

SUMMARY OUTPUT	traffic method	Weekday & Sun							
	direction	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
total user cost		$0	$35,258	$0	$1,694	$0	$0	$0	$0
user cost of delays		$0	$35,258	$0	$1,694	$0	$0	$0	$0
user cost of decreases		$0	$0	$0	$0	$0	$0	$0	$0
maximum backup (V)		0	902	0	82	0	0	0	0
maximum backup length (lane mi)		0.0	5.1	0.0	0.5	0.0	0.0	0.0	0.0
maximum delay (min.)		0.0	40.5	0.0	3.9	0.0	0.0	0.0	0.0
average delay, except diversions (min)		0.0	3.9	0.0	0.2	0.0	0.0	0.0	0.0
total delay, except diversions (V hr)		0	2119	0	94	0	0	0	0
total vehicles canceled(V)		0	0	0	0	0	0	0	0
total vehicles diverted (V)		0	0	0	0	0	0	0	0
total decrease in demand (V)		0	0	0	0	0	0	0	0
% decrease in demand		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
delay per diverted vehicle (min)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total diversion delay (V hr)		0	0	0	0	0	0	0	0
average delay, including diversions (min)		0.0	3.9	0.0	0.2	0.0	0.0	0.0	0.0
total delay, including diversions (V hr)		0	2119	0	94	0	0	0	0
user cost / design demand		$0.00	$1.08	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
delay cost / actual demand		$0.00	$1.08	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
Aut ON Prin ON No OK	validity of output	NOT VALID	VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID

SummaryView

period length (min)	60
annual traffic growth (%)	1.25%
years of growth	5

VEHICLE INPUT	cars	trucks
design demand (%)	88.6%	11.4%
user cost per hour ($/V hr)	$15.31	$27.02
user cost per mile, ($/V mi)	$0.45	$1.59
user cost per cancellation, ($/V)		

PROJECT INFORMATION			
PROJECT TITLE	I-94 EB by Riverside Bridge	C.S.	13081 & 13082
	CPM Mill & Fill	JOB #	102807
		START DATE	Summer 09
NOTES:	Night Paving Sunday Night through Thur Night		
	Night work		

REPORT INFORMATION			
REPORT TITLE	DETAILED USER COST REPORT	DIVISION	Marshall
	SUMMARY SHEET	REPORT BY	AMK
		REPORT DATE	4/10/2008

METHOD INPUT		METHOD 1		METHOD 2		METHOD 3		METHOD 4	
	method title								
DISTANCE AND SPEED	(mi) (mph)	distance	speed	distance	speed	distance	speed	distance	speed
work zone	method travel	2.0	see delay		see delay		see delay		see delay
	normal travel	2.0	70.0						
diversion	method travel								
	normal travel								
SPEED DELAY		threshold	range	threshold	range	threshold	range	threshold	range
capacity for speed delay (V/period)		1387							
speed (when D~0) (mph)		60							
speed (when D=C) (mph)		38							
DECREASE TO DEMAND		threshold	range	threshold	range	threshold	range	threshold	range
capacity for decreases to design demand (V/period)		1387							
canceled cars (with no delay) (%)									
canceled trucks (with no delay) (%)									
canceled cars (with delay) (%/min)									
canceled trucks (with delay) (%/min)									
diverted cars (with no delay) (%)									
diverted trucks (with no delay) (%)									
diverted cars (with delay) (%/min)									
diverted trucks (with delay) (%/min)									

OTHER USER COST INPUT	cars	trucks	cars	trucks	cars	trucks	cars	trucks
other user cost per actual demand ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
user cost per diversion ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

PERIOD INPUT			backup at start (V)		0	0	0	0	0	0	0	0
direction:	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Saturday	Weekday	Sunday	Weekday	Sunday
period	historical demand		design demand		capacity		capacity		capacity		capacity	
(hr)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A		487	0	518		3000						
1 A		321	0	342		3000						
2 A		254	0	270		3000						
3 A		203	0	216		3000						
4 A		195	0	207		3000						
5 A		198	0	211		3000						
6 A		373	0	397		3000						
7 A		439	0	467		3000						
8 A		769	0	818		3000						
9 A		1,156	0	1230		3000						
10 A		1,453	0	1546		3000						
11 A		1,754	0	1866		3000						
12 P		2,078	0	2211		3000						
1 P		2,261	0	2406		3000						
2 P		2,282	0	2428		3000						
3 P		2,147	0	2285		3000						
4 P		2,485	0	2644		3000						
5 P		2,380	0	2533		3000						
6 P		2,274	0	2420		3000						
7 P		1,952	0	2077		3000						
8 P		2,293	0	2440		3000						
9 P		1,771	0	1884		1387						
10 P		1,357	0	1444		1387						
11 P		1,105	0	1176		1387						
Total	0	31987	0	34037	0	67161	0	0	0	0	0	0

SUMMARY OUTPUT	traffic method	Weekday & Sun							
	direction	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
total user cost		$0	$16,048	$0	$1,694	$0	$0	$0	$0
user cost of delays		$0	$16,048	$0	$1,694	$0	$0	$0	$0
user cost of decreases		$0	$0	$0	$0	$0	$0	$0	$0
maximum backup (V)		0	406	0	82	0	0	0	0
maximum backup length (lane mi)		0.0	2.3	0.0	0.5	0.0	0.0	0.0	0.0
maximum delay (min.)		0.0	19.0	0.0	3.9	0.0	0.0	0.0	0.0
average delay, except diversions (min)		0.0	1.8	0.0	0.2	0.0	0.0	0.0	0.0
total delay, except diversions (V hr)		0	964	0	94	0	0	0	0
total vehicles canceled(V)		0	0	0	0	0	0	0	0
total vehicles diverted (V)		0	0	0	0	0	0	0	0
total decrease in demand (V)		0	0	0	0	0	0	0	0
% decrease in demand		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
delay per diverted vehicle (min)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total diversion delay (V hr)		0	0	0	0	0	0	0	0
average delay, including diversions (min)		0.0	1.8	0.0	0.2	0.0	0.0	0.0	0.0
total delay, including diversions (V hr)		0	964	0	94	0	0	0	0
user cost / design demand		$0.00	$0.50	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
delay cost / actual demand		$0.00	$0.50	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
Aut ON Prin ON No OK	validity of output	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID

SummaryView

period length (min)	60
annual traffic growth (%)	1.25%
years of growth	7

VEHICLE INPUT	cars	trucks
design demand (%)	75.0%	25.0%
user cost per hour ($/V hr)	$15.31	$27.02
user cost per mile, ($/V mi)	$0.45	$1.59
user cost per cancellation, ($/V)		

PROJECT INFORMATION			
PROJECT TITLE	I-94 EB East of I-194/M-66	C.S.	13081 & 13082
	CPM Mill & Fill	JOB #	102807
		START DATE	Summer 09

REPORT INFORMATION			
REPORT TITLE	DETAILED USER COST REPORT	DIVISION	Marshall
	SUMMARY SHEET	REPORT BY	AMK
		REPORT DATE	4/10/2008

NOTES: Night Paving Sunday Night through Thur Night
Night work

METHOD INPUT		METHOD 1		METHOD 2		METHOD 3		METHOD 4	
method title									
DISTANCE AND SPEED	(mi) (mph)	distance	speed	distance	speed	distance	speed	distance	speed
work zone	method travel	2.0	see delay		see delay		see delay		see delay
	normal travel	2.0	70.0						
diversion	method travel								
	normal travel								
SPEED DELAY		threshold	range	threshold	range	threshold	range	threshold	range
capacity for speed delay (V/period)		1387							
speed (when D~0) (mph)		60							
speed (when D=C) (mph)		38							
DECREASE TO DEMAND		threshold	range	threshold	range	threshold	range	threshold	range
capacity for decreases to design demand (V/period)		1387							
canceled cars (with no delay) (%)									
canceled trucks (with no delay) (%)									
canceled cars (with delay) (%/min)									
canceled trucks (with delay) (%/min)									
diverted cars (with no delay) (%)									
diverted trucks (with no delay) (%)									
diverted cars (with delay) (%/min)		5.0%							
diverted trucks (with delay) (%/min)									

OTHER USER COST INPUT	cars	trucks	cars	trucks	cars	trucks	cars	trucks
other user cost per actual demand ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
user cost per diversion ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

PERIOD INPUT			backup at start (V)		0	0	0	0	0	0	0	0
direction:	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Saturday	Weekday	Sunday	Weekday	Sunday
period	historical demand		design demand		capacity		capacity		capacity		capacity	
(hr)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A	1085		1184	0	1387							
1 A	717		782	0	1387							
2 A	577		629	0	1387							
3 A	484		528	0	1387							
4 A	553		603	0	1387							
5 A	604		659	0	1387							
6 A	797		869	0	3000							
7 A	1333		1454	0	3000							
8 A	1679		1832	0	3000							
9 A	1750		1909	0	3000							
10 A	1809		1973	0	3000							
11 A	1927		2102	0	3000							
12 P	1971		2150	0	3000							
1 P	1956		2134	0	3000							
2 P	2116		2308	0	3000							
3 P	2202		2402	0	3000							
4 P	2444		2666	0	3000							
5 P	2581		2815	0	3000							
6 P	2433		2654	0	3000							
7 P	2039		2224	0	1387							
8 P	1655		1805	0	1387							
9 P	1491		1626	0	1387							
10 P	1334		1455	0	1387							
11 P	1160		1265	0	1387							
Total	36697	0	40031	0	54257	0	0	0	0	0	0	0

SUMMARY OUTPUT	traffic method	Weekday & Sun							
	direction	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
total user cost		$18,006	$0	$0	$1,694	$0	$0	$0	$0
user cost of delays		$18,006	$0	$0	$1,694	$0	$0	$0	$0
user cost of decreases		$0	$0	$0	$0	$0	$0	$0	$0
maximum backup (V)		388	0	0	82	0	0	0	0
maximum backup length (lane mi)		2.2	0.0	0.0	0.5	0.0	0.0	0.0	0.0
maximum delay (min.)		18.4	0.0	0.0	3.9	0.0	0.0	0.0	0.0
average delay, except diversions (min)		1.4	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, except diversions (V hr)		910	0	0	94	0	0	0	0
total vehicles canceled(V)		0	0	0	0	0	0	0	0
total vehicles diverted (V)		3129	0	0	0	0	0	0	0
total decrease in demand (V)		3129	0	0	0	0	0	0	0
% decrease in demand		7.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
delay per diverted vehicle (min)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total diversion delay (V hr)		0	0	0	0	0	0	0	0
average delay, including diversions (min)		1.3	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, including diversions (V hr)		910	0	0	94	0	0	0	0
user cost / design demand		$0.44	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
delay cost / actual demand		$0.48	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
Auto ON Prin ON No OK	validity of output	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID

SummaryView

period length (min)	60
annual traffic growth (%)	1.25%
years of growth	5

VEHICLE INPUT	cars	trucks
design demand (%)	75.0%	25.0%
user cost per hour ($/V hr)	$15.31	$27.02
user cost per mile, ($/V mi)	$0.45	$1.59
user cost per cancellation, ($/V)		

PROJECT INFORMATION			
PROJECT TITLE	I-94 EB by Riverside Bridge	C.S.	13081 & 13082
	CPM Mill & Fill	JOB #	102807
		START DATE	Summer 09
NOTES:	Night Paving Sunday Night through Thur Night		
	Night work		

REPORT INFORMATION			
REPORT TITLE	DETAILED USER COST REPORT	DIVISION	Marshall
	SUMMARY SHEET	REPORT BY	AMK
		REPORT DATE	4/10/2008

METHOD INPUT		METHOD 1		METHOD 2		METHOD 3		METHOD 4	
	method title								
DISTANCE AND SPEED	(mi) (mph)	distance	speed	distance	speed	distance	speed	distance	speed
work zone	method travel	2.0	see delay		see delay		see delay		see delay
	normal travel	2.0	70.0						
diversion	method travel								
	normal travel								
SPEED DELAY		threshold	range	threshold	range	threshold	range	threshold	range
capacity for speed delay (V/period)		1387							
speed (when D~0) (mph)		60							
speed (when D=C) (mph)		38							
DECREASE TO DEMAND		threshold	range	threshold	range	threshold	range	threshold	range
capacity for decreases to design demand (V/period)		1387							
canceled cars (with no delay) (%)									
canceled trucks (with no delay) (%)									
canceled cars (with delay) (%/min)									
canceled trucks (with delay) (%/min)									
diverted cars (with no delay) (%)									
diverted trucks (with no delay) (%)									
diverted cars (with delay) (%/min)		5.0%							
diverted trucks (with delay) (%/min)									

OTHER USER COST INPUT	cars	trucks	cars	trucks	cars	trucks	cars	trucks
other user cost per actual demand ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
user cost per diversion ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

PERIOD INPUT			backup at start (V)		0	0	0	0	0	0	0	0
direction:	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Saturday	Weekday	Sunday	Weekday	Sunday
period	historical demand		design demand		capacity		capacity		capacity		capacity	
(hr)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A	1211		1289	0	1387							
1 A	770		819	0	1387							
2 A	521		554	0	1387							
3 A	430		458	0	1387							
4 A	418		445	0	1387							
5 A	517		550	0	1387							
6 A	725		771	0	3000							
7 A	1,402		1492	0	3000							
8 A	2,228		2371	0	3000							
9 A	2,221		2363	0	3000							
10 A	2,109		2244	0	3000							
11 A	2,002		2130	0	3000							
12 P	2,075		2208	0	3000							
1 P	2,059		2191	0	3000							
2 P	2,154		2292	0	3000							
3 P	2,318		2467	0	3000							
4 P	2,377		2529	0	3000							
5 P	2,596		2762	0	3000							
6 P	2,659		2829	0	1387							
7 P	2,067		2199	0	1387							
8 P	1,663		1770	0	1387							
9 P	1,577		1678	0	1387							
10 P	1,273		1355	0	1387							
11 P	1,170		1245	0	1387							
Total	38542	0	41012	0	52644	0	0	0	0	0	0	0

SUMMARY OUTPUT	traffic method	Weekday & Sun							
	direction	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
total user cost		$18,006	$0	$0	$1,694	$0	$0	$0	$0
user cost of delays		$18,006	$0	$0	$1,694	$0	$0	$0	$0
user cost of decreases		$0	$0	$0	$0	$0	$0	$0	$0
maximum backup (V)		388	0	0	82	0	0	0	0
maximum backup length (lane mi)		2.2	0.0	0.0	0.5	0.0	0.0	0.0	0.0
maximum delay (min.)		18.4	0.0	0.0	3.9	0.0	0.0	0.0	0.0
average delay, except diversions (min)		1.4	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, except diversions (V hr)		910	0	0	94	0	0	0	0
total vehicles canceled(V)		0	0	0	0	0	0	0	0
total vehicles diverted (V)		3129	0	0	0	0	0	0	0
total decrease in demand (V)		3129	0	0	0	0	0	0	0
% decrease in demand		7.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
delay per diverted vehicle (min)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total diversion delay (V hr)		0	0	0	0	0	0	0	0
average delay, including diversions (min)		1.3	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, including diversions (V hr)		910	0	0	94	0	0	0	0
user cost / design demand		$0.44	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
delay cost / actual demand		$0.48	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
Auto ON Prin ON No OK	validity of output	VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID

SummaryView

period length (min)	60
annual traffic growth (%)	1.25%
years of growth	7

VEHICLE INPUT	cars	trucks
design demand (%)	75.0%	25.0%
user cost per hour ($/V hr)	$15.31	$27.02
user cost per mile, ($/V mi)	$0.45	$1.59
user cost per cancellation, ($/V)		

PROJECT INFORMATION			
PROJECT TITLE	I-94 WB East of I-194/M-66	C.S.	13081 & 13082
	CPM Mill & Fill	JOB #	102807
		START DATE	Summer 09
NOTES:	Night Paving Sunday Night through Thur Night		
	Night work		

REPORT INFORMATION			
REPORT TITLE	DETAILED USER COST REPORT	DIVISION	Marshall
	SUMMARY SHEET	REPORT BY	AMK
		REPORT DATE	4/10/2008

METHOD INPUT		METHOD 1		METHOD 2		METHOD 3		METHOD 4	
	method title								
DISTANCE AND SPEED	(mi) (mph)	distance	speed	distance	speed	distance	speed	distance	speed
work zone	method travel	2.0	see delay		see delay		see delay		see delay
	normal travel	2.0	70.0						
diversion	method travel								
	normal travel								
SPEED DELAY		threshold	range	threshold	range	threshold	range	threshold	range
capacity for speed delay (V/period)		1387							
speed (when D~0) (mph)		60							
speed (when D=C) (mph)		38							
DECREASE TO DEMAND		threshold	range	threshold	range	threshold	range	threshold	range
capacity for decreases to design demand (V/period)		1387							
canceled cars (with no delay) (%)									
canceled trucks (with no delay) (%)									
canceled cars (with delay) (%/min)									
canceled trucks (with delay) (%/min)									
diverted cars (with no delay) (%)									
diverted trucks (with no delay) (%)									
diverted cars (with delay) (%/min)		5.0%							
diverted trucks (with delay) (%/min)									

OTHER USER COST INPUT	cars	trucks	cars	trucks	cars	trucks	cars	trucks
other user cost per actual demand ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
user cost per diversion ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

PERIOD INPUT			backup at start (V)		0	0	0	0	0	0	0	0
direction:	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Saturday	Weekday	Sunday	Weekday	Sunday
period	historical demand		design demand		capacity		capacity		capacity		capacity	
(hr)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A	900		982	0	1387							
1 A	678		740	0	1387							
2 A	476		519	0	1387							
3 A	422		460	0	1387							
4 A	475		518	0	1387							
5 A	483		527	0	1387							
6 A	690		753	0	3000							
7 A	1287		1404	0	3000							
8 A	1914		2088	0	3000							
9 A	1886		2057	0	3000							
10 A	1979		2159	0	3000							
11 A	2006		2188	0	3000							
12 P	2185		2384	0	3000							
1 P	2136		2330	0	3000							
2 P	2198		2398	0	3000							
3 P	2287		2495	0	3000							
4 P	2339		2551	0	3000							
5 P	2567		2800	0	3000							
6 P	2538		2769	0	3000							
7 P	1950		2127	0	1387							
8 P	1673		1825	0	1387							
9 P	1466		1599	0	1387							
10 P	1358		1481	0	1387							
11 P	1161		1266	0	1387							
Total	37054	0	40420	0	54257	0	0	0	0	0	0	0

SUMMARY OUTPUT	traffic method	Weekday & Sun							
	direction	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
total user cost		$10,644	$0	$0	$1,694	$0	$0	$0	$0
user cost of delays		$10,644	$0	$0	$1,694	$0	$0	$0	$0
user cost of decreases		$0	$0	$0	$0	$0	$0	$0	$0
maximum backup (V)		229	0	0	82	0	0	0	0
maximum backup length (lane mi)		1.3	0.0	0.0	0.5	0.0	0.0	0.0	0.0
maximum delay (min.)		11.4	0.0	0.0	3.9	0.0	0.0	0.0	0.0
average delay, except diversions (min)		0.9	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, except diversions (V hr)		558	0	0	94	0	0	0	0
total vehicles canceled(V)		0	0	0	0	0	0	0	0
total vehicles diverted (V)		1618	0	0	0	0	0	0	0
total decrease in demand (V)		1618	0	0	0	0	0	0	0
% decrease in demand		4.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
delay per diverted vehicle (min)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total diversion delay (V hr)		0	0	0	0	0	0	0	0
average delay, including diversions (min)		0.8	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, including diversions (V hr)		558	0	0	94	0	0	0	0
user cost / design demand		$0.26	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
delay cost / actual demand		$0.27	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
Aut ON Prin ON No OK	validity of output	VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID

SummaryView

period length (min)	60
annual traffic growth (%)	1.25%
years of growth	5

VEHICLE INPUT	cars	trucks
design demand (%)	75.0%	25.0%
user cost per hour ($/V hr)	$15.31	$27.02
user cost per mile, ($/V mi)	$0.45	$1.59
user cost per cancellation, ($/V)		

PROJECT INFORMATION			
PROJECT TITLE	I-94 EB East of I-194/M-66 CPM Mill & Fill	C.S.	13081 & 13082
		JOB #	102807
		START DATE	Summer 09

REPORT INFORMATION			
REPORT TITLE	DETAILED USER COST REPORT SUMMARY SHEET	DIVISION	Marshall
		REPORT BY	AMK
		REPORT DATE	4/22/2008

NOTES: Night Paving Sunday Night through Thur Night Morning Fine Amount

METHOD INPUT		METHOD 1		METHOD 2		METHOD 3		METHOD 4	
method title									
DISTANCE AND SPEED	(mi) (mph)	distance	speed	distance	speed	distance	speed	distance	speed
work zone	method travel	2.0	see delay		see delay		see delay		see delay
	normal travel	2.0	70.0						
diversion	method travel								
	normal travel								
SPEED DELAY		threshold	range	threshold	range	threshold	range	threshold	range
capacity for speed delay (V/period)		1387							
speed (when D~0) (mph)		60							
speed (when D=C) (mph)		38							
DECREASE TO DEMAND		threshold	range	threshold	range	threshold	range	threshold	range
capacity for decreases to design demand (V/period)		1387							
canceled cars (with no delay) (%)									
canceled trucks (with no delay) (%)									
canceled cars (with delay) (%/min)									
canceled trucks (with delay) (%/min)									
diverted cars (with no delay) (%)									
diverted trucks (with no delay) (%)									
diverted cars (with delay) (%/min)		5.0%							
diverted trucks (with delay) (%/min)									

OTHER USER COST INPUT	cars	trucks	cars	trucks	cars	trucks	cars	trucks
other user cost per actual demand ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
user cost per diversion ($/V)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

PERIOD INPUT			backup at start (V)		0	0	0	0	0	0	0	0
direction:	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Saturday	Weekday	Sunday	Weekday	Sunday
period	historical demand		design demand		capacity		capacity		capacity		capacity	
(hr)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)	(V/period)
12 A	830		883	0	1387							
1 A	560		596	0	1387							
2 A	494		526	0	1387							
3 A	574		611	0	1387							
4 A	662		704	0	1387							
5 A	885		942	0	1387							
6 A	1317		1401	0	1387							
7 A	1729		1840	0	3000							
8 A	1802		1917	0	3000							
9 A	1806		1922	0	3000							
10 A	1876		1996	0	3000							
11 A	1865		1985	0	3000							
12 P	1738		1849	0	3000							
1 P	1892		2013	0	3000							
2 P	2029		2159	0	3000							
3 P	2359		2510	0	3000							
4 P	2384		2537	0	3000							
5 P	2360		2511	0	3000							
6 P	1887		2008	0	3000							
7 P	1530		1628	0	3000							
8 P	1485		1580	0	3000							
9 P	1398		1488	0	3000							
10 P	1249		1329	0	3000							
11 P	930		990	0	3000							
Total	35641	0	37925	0	60709	0	0	0	0	0	0	0

SUMMARY OUTPUT	traffic method	Weekday & Sun							
	direction	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday	Weekday	Sunday
total user cost		$1,333	$0	$0	$1,694	$0	$0	$0	$0
user cost of delays		$1,333	$0	$0	$1,694	$0	$0	$0	$0
user cost of decreases		$0	$0	$0	$0	$0	$0	$0	$0
maximum backup (V)		0	0	0	82	0	0	0	0
maximum backup length (lane mi)		0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
maximum delay (min.)		1.4	0.0	0.0	3.9	0.0	0.0	0.0	0.0
average delay, except diversions (min)		0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, except diversions (V hr)		73	0	0	94	0	0	0	0
total vehicles canceled(V)		0	0	0	0	0	0	0	0
total vehicles diverted (V)		169	0	0	0	0	0	0	0
total decrease in demand (V)		169	0	0	0	0	0	0	0
% decrease in demand		0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
delay per diverted vehicle (min)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
total diversion delay (V hr)		0	0	0	0	0	0	0	0
average delay, including diversions (min)		0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0
total delay, including diversions (V hr)		73	0	0	94	0	0	0	0
user cost / design demand		$0.04	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
delay cost / actual demand		$0.04	$0.00	$0.00	$0.06	$0.00	$0.00	$0.00	$0.00
Aut(ON) Prin(ON) No(OK)	validity of output	VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID

D. Clauses

PROGRESS CLAUSE: After receiving Notice of Award, start work on 4-13-09.
No work shall be commenced prior to receipt of formal notice of award by the Department.

The contract shall be open to traffic on or before 11-13-09.

All work shall be completed on or before 11-13-09 except maintenance of soil erosion and sedimentation control items.

This contract shall be completed on or before 5-30-10.

The low bidder(s) for the work covered by this proposal will be required to meet with Department representatives to work out a detailed Progress Schedule.

The named subcontractor(s) for Designated and/or Specialty Items, as shown in the proposal is recommended to be at the scheduled meeting if such items materially affect the work schedule.

The Delivery Engineer will arrange the time and place for the meeting.

The Progress Schedule shall include, as a minimum, the controlling work items for the completion of the project and the planned dates (or work day for a work day project) that these work items will be controlling operations. When specified in the Bidding proposal, the date the project is to be opened to traffic as well as the final project completion date shall also be included in the Progress Schedule.

If the Bidding Proposal specified other controlling dates, these shall also be included in the Progress Schedule.

Failure on the part of the Contractor to carry out the provisions of the Progress Schedule, as established, may be considered sufficient cause to prevent bidding future projects until a satisfactory rate of progress is again established.

The low bidder(s) for the work covered by this proposal may be required to meet with department representatives for a post-construction review meeting, as directed by the Engineer. The MDOT Delivery Engineer will schedule the meetings.

COORDINATION CLAUSE FOR
OTHER CONTRACTS IN VICINITY

CS 13081 - JN 75047A

The contractor shall coordinate their construction and traffic maintenance with the following project:

CS 13082 (13083) – JN 74956A: This project is a HMA overlay, concrete pavement repairs under the structures, ramp improvements, and guardrail upgrades on I-94 in Calhoun County. The construction completion is anticipated for xx/xx/2009

CS 13081 (13082) – JN 102807A: This project is a capital preventative maintenance HMA overlay on I-94 in Calhoun County. The construction completion is anticipated for xx/xx/2009.

The contractor's attention is called to the requirements of cooperation with others as covered in Article 104.07 of the 2003 Standard Specifications Construction.

No claim for extra compensation or adjustments in contract unit prices will be allowed due to delay caused by other projects.

E. Maintenance of Traffic

MOT Concept at Plan Review Stage

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
MAINTAINING TRAFFIC,
PERMANENT SIGNING, AND PAVEMENT MARKING

a. Description. This work consists of all labor, materials and equipment required to maintain traffic in accordance with this special provision for the work on I-94 and Riverside Drive, in the city of Battle Creek, Calhoun County.

b. General. Maintain traffic according to subsections 103.05, 103.06, 812 and sections 922 of the Standard Specifications for Construction, including any Supplemental Specifications, and as specified herein.

1. Notify the Project Engineer a minimum of 24 hours prior to the implementation of any detours, road closures, bridge closures, ramp closures or lane closures and major traffic shifts.

2. Coordinate operations with Contractors performing work on other projects within or adjacent to the Construction Influence Area (CIA).

3. MDOT maintenance crews and/or contract maintenance agencies may perform maintenance work within or adjacent to the Construction Influence Area (CIA). The Maintenance Division of MDOT and/or contract maintenance agency will coordinate their operations with the Delivery Engineer to minimize the interference. All additional costs for joint use of traffic control items will be borne by the Contractor

c. Construction Influence Area (CIA). The CIA includes the right-of-way of the following roadways, within the approximate limits described below:

1. On I-94, from approximately * feet east of the east reference line to * feet west of the west reference line.
   On Riverside Drive, from approximately Beckly Road to Shrotridge Road.

   Include in the CIA the rights-of-way of any intersecting roads and ramps adjacent to the work zone for a distance of approximately 550 feet in advance of the state trunkline and 700 feet in advance of ramps.

d. Traffic Restrictions.

1. Cease work prior to the Memorial Day, July 4th, or Labor Day holiday periods, as defined by the Engineer.

2. Perform work during daytime hours only. Allow night work only at the discretion of the Engineer. Any additional cost for maintaining traffic will be borne by the Contractor.

3. Maintain a minimum of 2 lane(s) of traffic in each direction at all times on I-94.

Minimum lane widths 11 feet

4. Do not occupy any part of the active traffic lane when utilizing a shoulder closure with personnel or equipment.

5. Notify the Engineer at least 24 hours in advance of erection or removal of overlays on existing signs.

6. Cover existing regulatory, warning and construction signs that are not applicable during construction.

7. Continue work that is initiated that includes any lane restrictions until completed. A lack of work activity for more than one week requires the removal and replacement of lane restrictions with all the costs borne by the Contractor.

8. Provide access for pedestrians as shown on attached typical *. Construct no more than one sidewalk on either side of the road at one time.

May not be possible with construction staging.

9. Maintain the non-motorized path crossing * on a paved surface, at all times, during the construction.

10. Restrict access for construction vehicles between traveled lanes and work areas to specific locations. The number of access points and their locations requires the approval of the Engineer.

11. Restore undercuts or excavations in the widening area immediately adjacent to active traffic lanes to no less than a one-on-four slope at the end of each working period unless otherwise approved by the Engineer. Require and provide fencing to protect open trenches during non-working hours as part of the trenching item utilized.

12. Restrict undercuts or excavations in the HMA shoulder work areas immediately adjacent to active traffic lanes to a 1 on 4 slope from the edge of the roadway at the end of each working period unless otherwise approved by the Engineer

13. Complete, inspect and approve all proposed work on the detour route prior to its use. Place pavement markings on the detour route in accordance with the attached convoy details PM* and PM*.

14. Remove and replace guardrail so that exposure to the area protected by it is reduced to a minimum. Use a shoulder closure during non-working periods when there is a guardrail work site with incomplete work. Refer to the Standard Specifications for Construction Section 807.03.

15. Complete the embankment operation up to the bottom of the proposed sand subbase prior to the removal of any portion of the shoulder. ~~(This is a good note for passing flare projects.)~~

e. Work Zone Speeds.

1. Set work zone speeds according to the 2006 Guidelines to Establish Speed Limits in Work Zones.

2. Post additional "WHEN WORKERS PRESENT 45" mph speed limit signs at one mile intervals throughout the work zone.

f. Stage Construction. Base the traffic control required by this Special Provision for work on * and adjacent roadways on the ~~suggested~~ sequence of operations contained in the staging plans. ~~Use an alternate traffic control plan, subject to review and approval by the Engineer~~. Require the following brief description of traffic control detailed on the plans during each construction stage.

I-94 and Riverside Drive

Riverside Drive will be detoured for the duration of the project. Utilizing Minges Road to Capital Avenue, to Beckley Road (B Drive North).
Part Width Construction on each Bridge for Eastbound and Westbound I-94.
Stage 1: Shift 2 lanes of traffic for each bound to the outside of existing bridge. Remove inside portion of each bridge.
Stage 2: Traffic remain shifted to outside of existing bridge. Construct new inside portion of bridge wide enough for 2 lanes of traffic in Stage 3.
Stage 3: Shift 2 lanes of traffic to inside of newly constructed bridge. Remove outside portion of each bridge.
Stage 4: Traffic remain shifted to inside of newly constructed bridge. Construct new outside portion of bridge.

g. Traffic Control Devices.

1. General.

A. Conform all traffic control devices and their usage to Part 6 of the Michigan Manual of Uniform Traffic Control Devices (MMUTCD). This document can be found at the following website:

http://mdotwas1.mdot.state.mi.us/public/tands/plans.cfm

B. Place advance signs (W20-1 - "Road Work Ahead") and lighted plastic drums at any work site with uncompleted work during non-working periods as the Engineer directs. All costs associated with this work will be borne by the Contractor.

C. Perform barrier operations such as slip forming or placing temporary concrete barriers with the flow of the traffic.

D. During construction, maintain access to all business and residential drives.

E. Erect all signs on the * detour route and properly orient prior to closure. Erect all advance signs on the * detour route and cover prior to the closure of the * bridge.

Riverside Drive

Road

2. Temporary Signs.

A. Place temporary sign spacing and taper lengths as shown on attached Typical ~~M000e~~. M0020a

B. Place ground driven sign supports as shown on attached Traffic and Safety Standard Plan Special Detail WZD-100-A. Refer to Traffic and Safety Standard Plan WZD-125-D for portable supports.

C. Place signing for the beginning and ending of the work zone as shown on attached Typical ~~M0080a.~~

M0070a

D. Place signing for a traffic shift as shown on attached Typical *. Use typical M081b - MOD2

Riverside Drive

E. Place signing for the * detour route as shown in the Maintaining Traffic Special Provision and on the plans.

F. Place signing for * on attached Typical *.

G. Include (#) W20-1 ("ROAD WORK AHEAD") signs in the quantities, to place on ramps or intersecting roads in advance of construction areas as the Engineer directs. ~~(The required amount of side street ("ROAD WORK AHEAD") signs can be found using the Traffic Regulator Matrix spreadsheet found at the following location:~~

Enough for each ramp on Capital and I-194/ M-66 Interchanges

~~pwname://MDOTProjectWise/Documents/~ Southwest - Region/Regionwide - Traffic and Safety/Maintaining Traffic/Work Zone Mobility/Flagger Matrix.xls)~~

H. Place (#) W20-15b (WATCH FOR TRAFFIC BACKUPS/BE PREPARED TO STOP) signs at locations designated by the Engineer.

Rumble Strip Filler needed for stage 1 & 2 or Rumble Strip Warning signs

I. ~~Place (#) "ROAD WORK STARTS **/**/** signs, a minimum of seven days prior to the start of work and remove it within seven days of the start of construction.~~

Use PCMB's instead

J. Mount all temporary signs at a five-foot minimum bottom height in uncurbed areas and seven-foot minimum bottom height in curbed or pedestrian areas.

K. Consider distances shown between construction warning, regulatory and guide signs shown on the typicals as approximate. Signs may require field adjustment, as the Engineer directs.

L. Fabricate all temporary signs with legends and symbols flush to the signs face and do not extend beyond the sign borders or edges.

M. Mount all temporary signs that will be in place for more than 14 days on driven posts.

N. Refer to Traffic and Safety Standard Plan WZD-125-D when installing temporary diamond signs with portable supports. Note that the Type A Warning Light is required.

O. When a portable construction sign is no longer applicable, remove it or lay it down on its non-reflective side with its feet off.

P. Use Portable Changeable Message Signs (PCMS) to warn traffic of upcoming work and changing traffic control during the life of the project. Deploy the PCMS's a minimum of seven calendar days prior to the start of work. Secure the PCMS's by elevating the tires above the ground or through the use of wheel chocks or sandbags. Obtain approval from the Engineer for all sign locations and all messages placed on the sign prior to displaying the message.

Q. Use Type C Lighted Arrows (min 48 inch x 98 inch) to merge traffic and secure by

elevating the tires above the ground, or use wheel chocks or sandbags.

R. The Federal Highway Administration (FHWA) requires all signs to be NCHRP 350 crashworthy. For design and configuration refer to their website:

http://safety.fhwa.dot.gov/roadway_dept/road_hardware/workzone_pdmenu.cfm

3. Permanent Signs.

A. Fabricate and place all permanent signing according to the Michigan Manual of Uniform Traffic Control Devices (MMUTCD), Standard Highway Signs Manual and Sign Support Typicals, published by the Michigan Department of Transportation.

B. Mount all permanent signs at a seven-foot bottom height.

C. Fabricate all new permanent signs provided for this job with High-Intensity Reflective sheeting.

D. Use the sign fabrication details included for permanent signs. Prior to fabricating non-standard permanent signs, provide shop drawings similar to the Standard Highway Signs Standards and deliver the drawings to the Project Engineer for review and approval. Do not construe Materials and Technology Division certification of signs as an MDOT approval of sign legend and layout.

4. Channelizing Devices.

A. Use 42” channelizing devices on Riverside Drive. Using Barrels if room

B. Use lighted plastic drums with high intensity sheeting for required channelizing devices on I-94.

C. ~~Use only tubular markers for required channelizing devices.~~

D. Use only 42” cones meeting Special Provision requirements for channelizing devices.

E. Use channelizing devices to delineate the edgelines of right shoulders exceeding six inches in width until the edgelines are painted. Use channelizing devices to delineate all left shoulder edgelines regardless of width until the edgelines are painted.

F. Use eight-foot Barricade, Type III, High Intensity, Lighted to block off Riverside Drive.

G. Place temporary concrete barrier on I-94 as shown in the construction plans. Note: Place yellow & crystal reflectors back-to-back at ten-foot spacing on the temporary concrete barriers or as directed by the Engineer and include in the payment for "Concrete Barrier, Temporary, Furnished".

5. Temporary Pavement Markings. Adding Note for Attenuator ending for concrete barrier wall

A. Temporary pavement markings shall consist of:
Pavt Mrkg, Type R, Tape, 6 inch, Grey, Temp
Pavt Mrkg, Type R, 4 inch, White, Temp
Pavt Mrkg, Type R, 4 inch, Yellow, Temp

B. Place temporary pavement markings, Type R, on existing pavement areas that will remain after construction and on new pavement for interim traffic control at locations the Engineer specifies. Offset material four inches from the permanent marking location on new surfaces where Type R is used for temporary lane lines.

C. During paving operations, base quantities for temporary tape placed on four-inch strips, four-feet long, spaced at 50 feet center to center for lane lines and centerline. Double that for centerline marked for no passing, and mark solid for edgeline. For severe curvature, use four-inch strips, four-feet long at 25 feet center to center.

D. Ensure that all temporary pavement markings adhere to the pavement surface until permanent markings are installed when using Type R or NR tape. Include all cost for any additional adhesives or other materials are included with these Pay Items.

E. Replace all existing pavement markings that are removed for traffic control or obliterated during construction operations with waterborne paint.

6. Permanent Pavement Markings.

A. Permanent pavement markings consist of the following:

Waterborne quantity too small

4 inch white ~~recessed wet retroflective preformed tape~~ for lane lines on I-94
4 inch yellow waterborne for lane lines on Riverside Drive
6 inch white and 6 inch yellow waterborne for edgelines on I-94 and Riverside Drive

B. Use white coldplastic pavement markings for all symbols and legends.

C. Apply the second application of waterborne pavement markings only if the first application was properly applied and deteriorated prematurely.

D. Plan quantities include one application of permanent pavement markings for the detour route.

PAVE-900

E. Fabricate all pavement markings per MDOT Pavement Marking Typicals ~~VIII-900E~~ through ~~VIII-990E.~~

PAVE-990

h. Measurement and Payment. The estimate of quantities for maintaining traffic is based on signing and related traffic control devices.

1. Measure and pay for all traffic control items in accordance with Section 812.04 of the Standard Specifications of Construction.

2. Payment for temporary signs will be made based on the maximum square foot of dissimilar sign legends in use at any one time during the project.

3. ~~Payment for temporary and permanent pavement markings will be made by the foot.~~

4. All cost of additional signing or maintaining traffic devices required to expedite the construction will be borne by the Contractor.

Will list each sign used in MOT

MINIMUM MERGING TAPER LENGTH "L" (FEET)

OFFSET	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)										
FEET	25	30	35	40	45	50	55	60	65	70	
1	10	15	20	27	45	50	55	60	65	70	TAPER LENGTH "L" IN FEET
2	21	30	41	53	90	100	110	120	130	140	
3	31	45	61	80	135	150	165	180	195	210	
4	42	60	82	107	180	200	220	240	260	280	
5	52	75	102	133	225	250	275	300	325	350	
6	63	90	123	160	270	300	330	360	390	420	
7	73	105	143	187	315	350	385	420	455	490	
8	83	120	163	213	360	400	440	480	520	560	
9	94	135	184	240	405	450	495	540	585	630	
10	104	150	204	267	450	500	550	600	650	700	
11	115	165	225	293	495	550	605	660	715	770	
12	125	180	245	320	540	600	660	720	780	840	
13	135	195	266	347	585	650	715	780	845	910	
14	146	210	286	374	630	700	770	840	910	980	
15	157	225	307	400	675	750	825	900	975	1050	

THE FORMULAS FOR THE MINIMUM LENGTH OF A MERGING TAPER IN DERIVING THE "L" VALUES SHOWN IN THE ABOVE TABLES ARE AS FOLLOWS:

$$"L" = \frac{W \times S^2}{60}$$ WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 40 MPH OR LESS

"L" = S x W WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 45 MPH OR GREATER

L = MINIMUM LENGTH OF MERGING TAPER
S = POSTED SPEED LIMIT IN MPH PRIOR TO WORK AREA
W = WIDTH OF OFFSET

TYPES OF TAPERS	TAPER LENGTH
UPSTREAM TAPERS	
MERGING TAPER	L - MINIMUM
SHIFTING TAPER	1/2 L - MINIMUM
SHOULDER TAPER	1/3 L - MINIMUM
TWO-WAY TRAFFIC TAPER	100 ' - MAXIMUM
DOWNSTREAM TAPERS (USE IS OPTIONAL)	100 ' - MINIMUM (PER LANE)

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TABLES FOR "L", "D" AND "B" VALUES

DRAWN BY: CON:AE:djf	JUNE 2006 PLAN DATE:	M0020a	SHEET 1 OF 2
CHECKED BY: BMM			
FILE: K:/DGN/TSR/STDS/ENGLISH/MNTTRF/M0020a.dgn	REV. 08/21/2006		

DISTANCE BETWEEN TRAFFIC CONTROL DEVICES "D" AND LENGTH OF LONGITUDINAL BUFFER SPACE ON "WHERE WORKERS PRESENT" SEQUENCES

"D" DISTANCES	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)									
	25	30	35	40	45	50	55	60	65	70
D (FEET)	250	300	350	400	450	500	550	600	650	700

GUIDELINES FOR LENGTH OF LONGITUDINAL BUFFER SPACE "B"

SPEED* MPH	LENGTH FEET
20	33
25	50
30	83
35	132
40	181
45	230
50	279
55	329
60	411
65	476
70	542

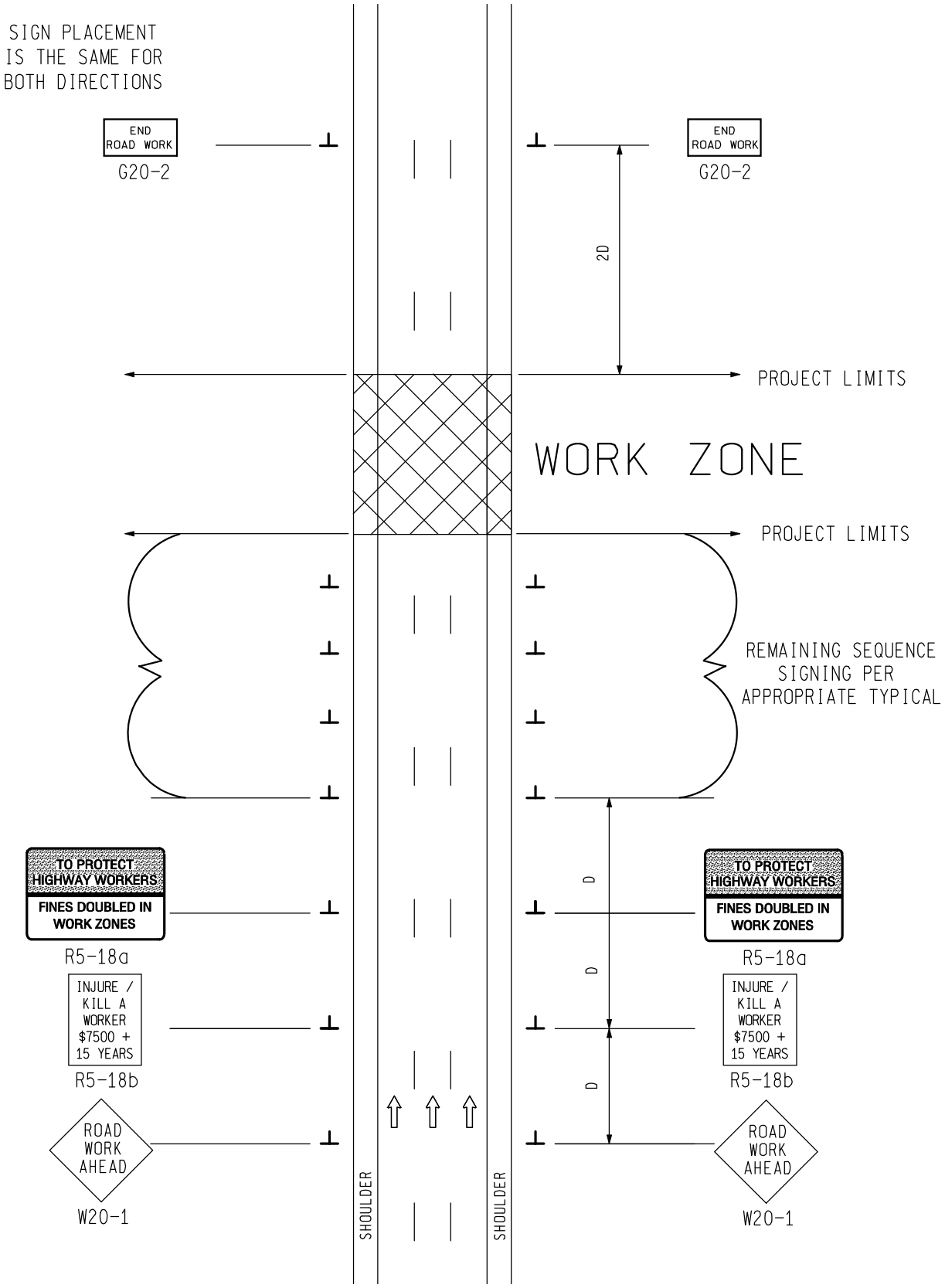
* POSTED SPEED, OFF PEAK 85TH PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED

1 BASED UPON AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) BRAKING DISTANCE PORTION OF STOPPING SIGHT DISTANCE FOR WET AND LEVEL PAVEMENTS (A POLICY ON GEOMETRIC DESIGN OF HIGHWAY AND STREETS), AASHTO. THIS AASHTO DOCUMENT ALSO RECOMMENDS ADJUSTMENTS FOR THE EFFECT OF GRADE ON STOPPING AND VARIATION FOR TRUCKS.

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TABLES FOR "L", "D" AND "B" VALUES

DRAWN BY: CON:AE:djf	JUNE 2006	M0020a	SHEET 2 OF 2
CHECKED BY: BMM	PLAN DATE:		
FILE: K:/DGN/TSR/STDS/ENGLISH/MNTTRF/M0020a.dgn	REV. 08/21/2006		



SIGN = 136 ft2 - TYPE B
FOR ONE DIRECTION OF TRAFFIC
W20-1 QUANTITY INCLUDED WITH
APPROPRIATE TYPICAL FOR
SEQUENCE SIGNING

NOT TO SCALE

MDOT
Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC
TYPICAL

TYPICAL ADVANCE SIGNING TREATMENT FOR
LONG, INTERMEDIATE AND SHORT TERM
STATIONARY WORK ZONE OPERATIONS
OF LESS THAN TWO MILES IN LENGTH WHERE
TRAFFIC CONTROL DEVICES MAY REMAIN AT
END OF WORK DAY ON A DIVIDED ROADWAY.

DRAWN BY: CON:AE:djf	JUNE 2006	M0070a	SHEET 1 OF 2
CHECKED BY: BMM	PLAN DATE:		

FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0070a.dgn REV. 08/15/2007

NOTES

30. THE APPROPRIATE ADVANCE SIGNING SEQUENCE(S), (M0030a THROUGH M0080a) SHALL BE USED ON ALL PROJECTS.

32. THESE SIGNS SHALL BE LEFT IN PLACE AT THEIR PRESCRIBED LOCATIONS FOR THE DURATION OF THE PROJECT AND UNTIL ALL TEMPORARY TRAFFIC CONTROL HAS BEEN REMOVED.

35. THESE SIGNS ARE INTENDED TO BE USED WITHIN THE LIMITS OF THE TEMPORARY SEQUENCE SIGNING AS IS SHOWN ON 1 OF 2. THESE SIGNS ARE NOT TO BE INTERMINGLED WITH ANY OTHER TEMPORARY SEQUENCE SIGNING EXCEPT AS SHOWN.

SIGN SIZES

G20-2	-	48″ x 24″
R5-18a	-	96″ x 60″
R5-18b	-	48″ x 60″
W20-1	-	48″ x 48″

NOT TO SCALE

MDOT Michigan Department of Transportation

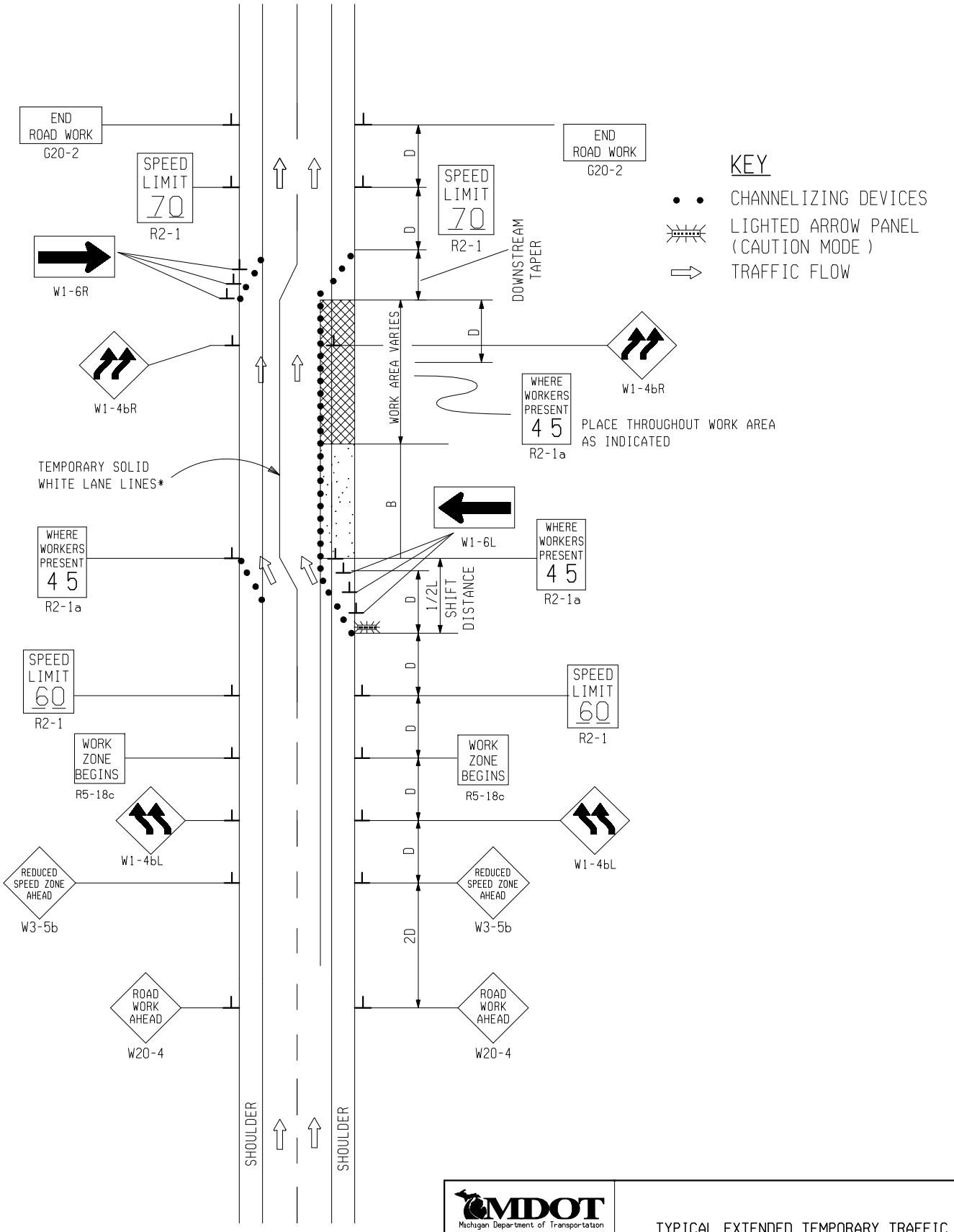
TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

TYPICAL ADVANCE SIGNING TREATMENT FOR LONG, INTERMEDIATE AND SHORT TERM STATIONARY WORK ZONE OPERATIONS OF LESS THAN TWO MILES IN LENGTH WHERE TRAFFIC CONTROL DEVICES MAY REMAIN AT END OF WORK DAY ON A DIVIDED ROADWAY.

DRAWN BY: CON:AE:djf	JUNE 2006	M0070a	SHEET 2 OF 2
CHECKED BY: BMM	PLAN DATE:		

FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0070a.dgn REV. 08/15/2007



*TEMPORARY SOLID WHITE LANE LINES SHALL BE EXTENDED THROUGH THE FIRST SKIP LINE PROIR TO AND AFTER WORK AREA.

NOT TO SCALE

MDOT Michigan Department of Transportation

TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

TYPICAL EXTENDED TEMPORARY TRAFFIC CONTROL FOR TWO LANE SHIFT USING A REDUCED SPEED LIMIT

DRAWN BY: DLL	APRIL 2008	M081b-MOD 2	SHEET 1 OF 2
CHECKED BY: AMK	PLAN DATE:		
FILE: M081b-MOD 2.DGN		REV. 04/07/2008	

NOTES

1G. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
L = MINIMUM LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER
SEE M0020e FOR "D," "L," AND "B" VALUES

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

4D. THE SPACING OF CHANNELIZING DEVICES SHOULD NOT EXCEDD 45 FEET WHEN USED FOR TAPER CHANNELIZATION, AND SHOULD NOT EXCEED 90 FEET WHEN USED FOR TANGENT CHANNELIZATION.

5. FOR OVERNIGHT CLOSURES, CHANNELIZING DEVICES SHALL BE LIGHTED PLASTIC DRUMS.

6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.

8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.

16C. ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED SHALL BE PLACED AFTER EACH ENTRANCE RAMP THAT COMES ONTO THE FREEWAY WHERE THE REDUCED SPEED IS IN EFFECT.

21. ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS, SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.

SIGN SIZES

RECTANGULAR REGULATORY - 48 " x 60 "
DIAMOND WARNING - 48" x 48"
W1-6 DIRECTIONAL ARROW - 48" x 24"

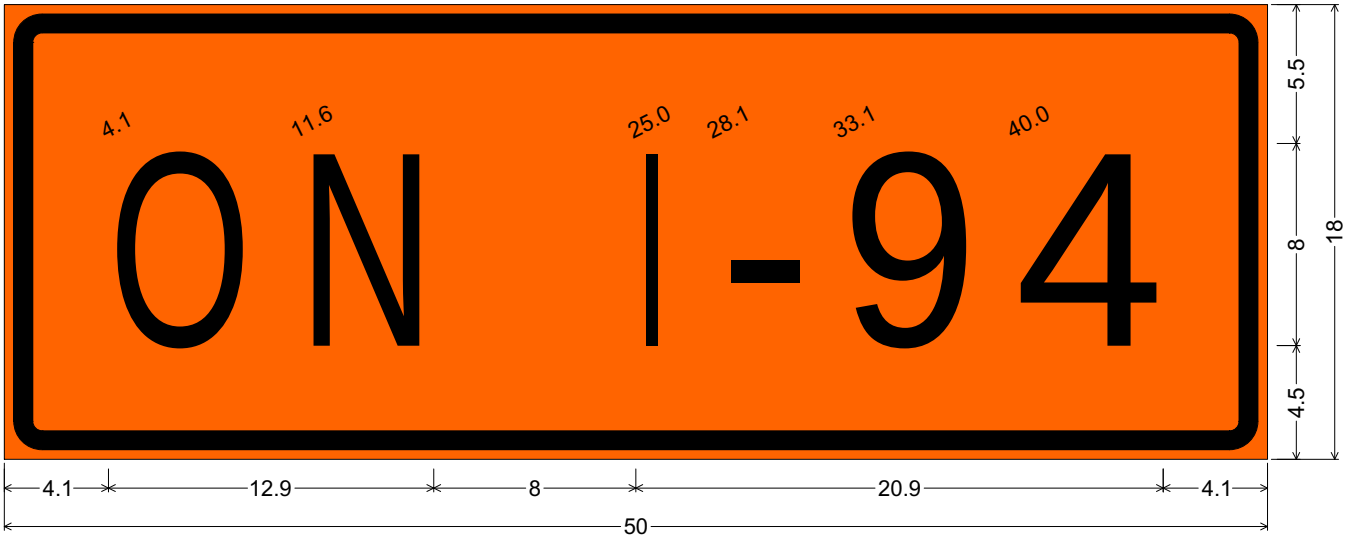
NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

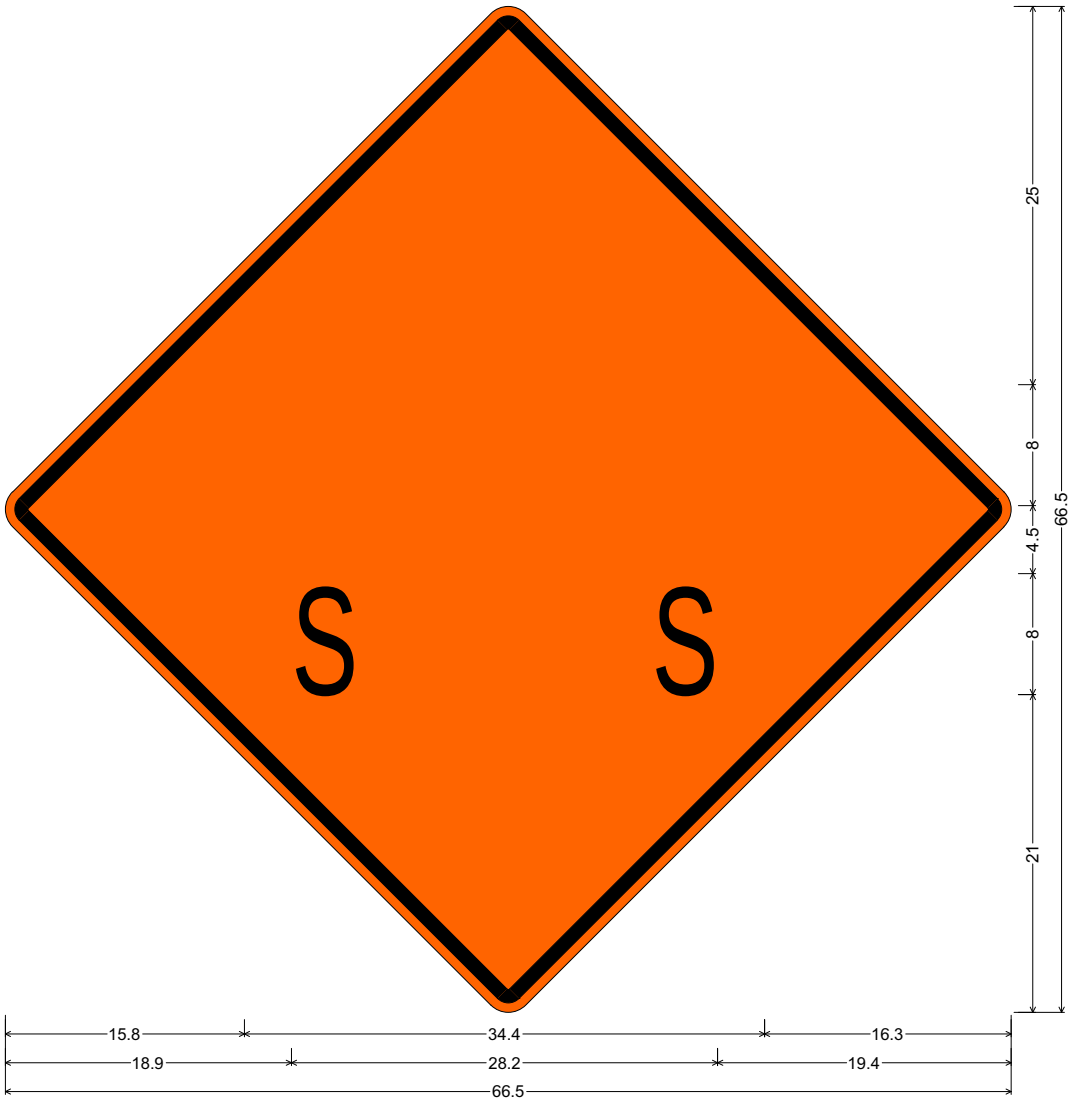
TYPICAL EXTENDED TEMPORARY TRAFFIC CONTROL FOR TWO LANE SHIFT USING A REDUCED SPEED LIMIT

DRAWN BY: DLL	APRIL 2008	M081b-MOD 2	SHEET 2 OF 2
CHECKED BY: AMK	PLAN DATE:		
FILE: M081b-MOD 2.DGN		REV. 04/07/2008	

SF-1



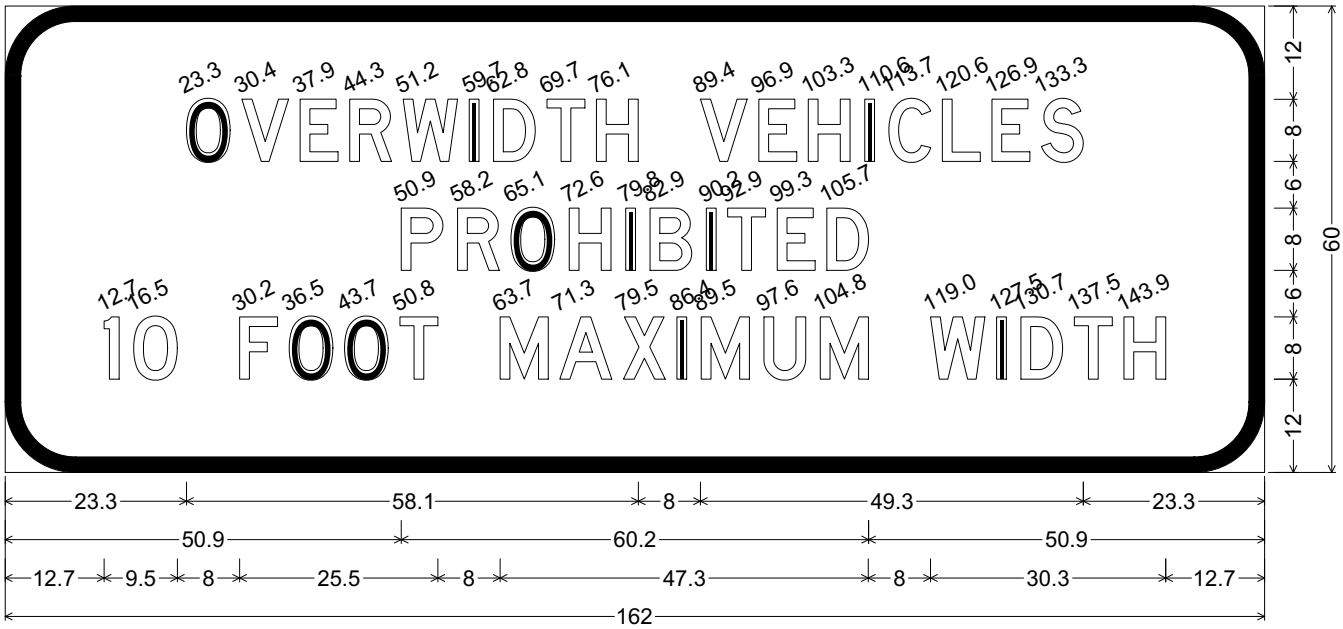
1.5" Radius, 0.8" Border, 0.4" Indent, Black on Orange;
“ON I-94” D;



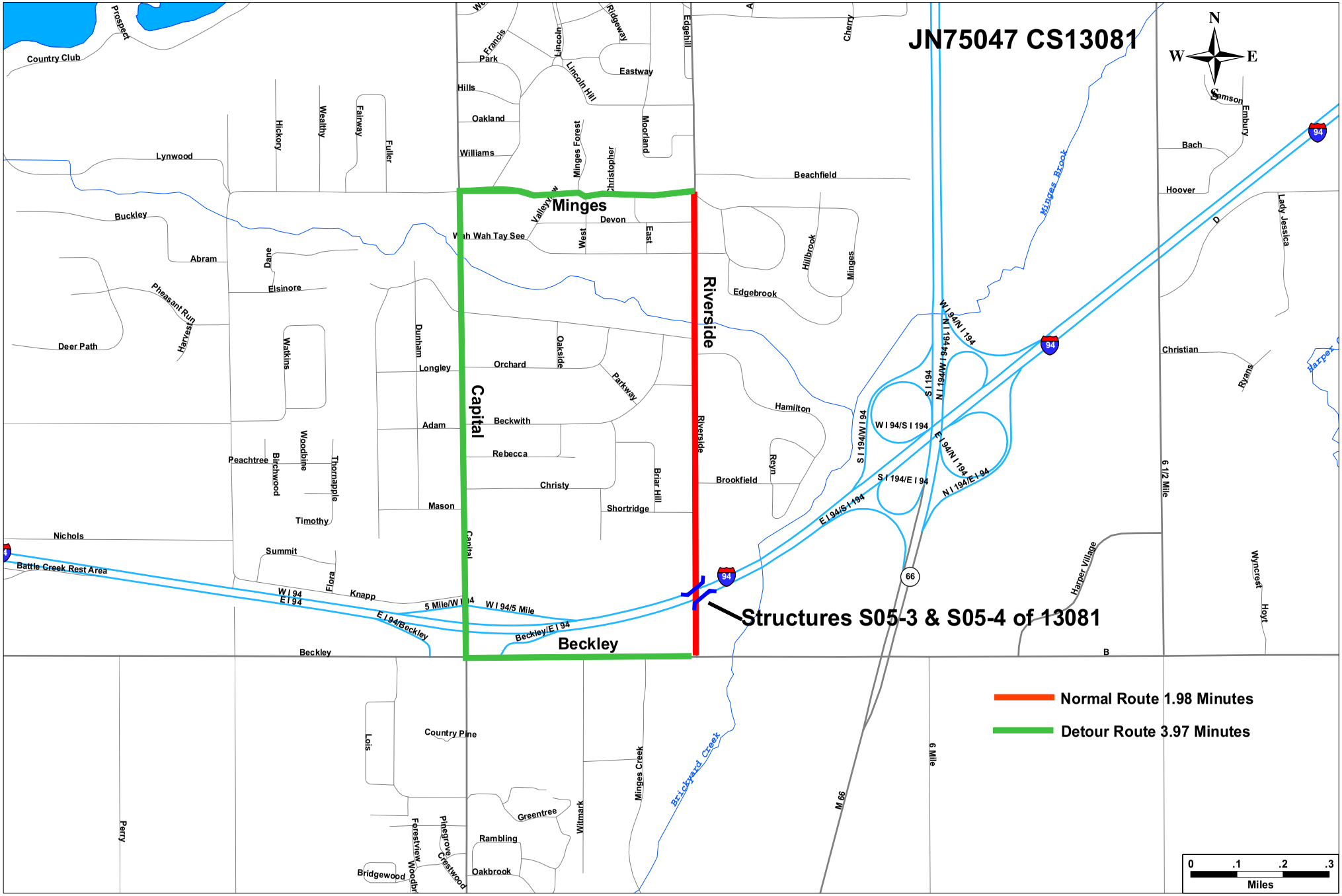
48.0" across sides 1.6" Radius, 0.9" Border, 0.6" Indent, Black on Orange;
“RUMBLE” C; “STRIPS” C 75% spacing;

1.6" Radius, 0.9" Border, 0.6" Indent, Black on Orange;
“ATTENTION” C; “MOTORCYCLISTS” C;

R11-4 MOD



9.0" Radius, 2.0" Border, Black on White;
“OVERWIDTH VEHICLES” D; “PROHIBITED” D; “10 FOOT MAXIMUM WIDTH” D;


JN75047 CS13081
N
W
E
S
Structures S05-3 & S05-4 of 13081
Normal Route 1.98 Minutes
Detour Route 3.97 Minutes
0 .1 .2 .3
Miles
Minges
Beckley
Riverside
Capital
Country Club
Prospect
Lynwood
Buckley
Abram
Pheasant Run
Deer Path
Elsinore
Dane
Hickory
Wealthy
Fairway
Fuller
Watkins
Harvest
Dunham
Longley
Orchard
Oakside
Parkway
Adam
Beckwith
Rebecca
Christy
Mason
Shortridge
Briar Hill
Brookfield
Reyn
Hamilton
Edgebrook
Hillbrook
Minges
Beachfield
Devon
West
East
Wah Wah Tay See
Valley View
Minges Forest
Christopher
Moorland
Edgehill
Eastway
Lincoln Hill
Lincoln
Ridgeway
Francis
Park
Hills
Oakland
Williams
Cherry
Peachtree
Birchwood
Woodbine
Thornapple
Timothy
Nichols
Summit
Flora
Knapp
Battle Creek Rest Area
W I 94
E I 94
E I 94/Beckley
5 Mile/W I 94
W I 94/5 Mile
Beckley/E I 94
E I 94/S I 194
W I 94/S I 194
S I 194/W I 94
S I 194/E I 94
N I 194/E I 94
W I 94/N I 194
S I 194
N I 194
Country Pine
Lois
Perry
Bridgewood
Forestview
Woodbr
Pinegrove
Crestwood
Greentree
Rambling
Oakbrook
Witmark
Minges Creek
Brickyard Creek
M 66
6 Mile
Harper Village
6 1/2 Mile
Wyncrest
Hoyt
Christian
Ryans
Lady Jessica
Hoover
Bach
Embury
Samson
Minges Brook
66
94

2009 CPM Project Just Approved: MOT Concept will be very similar to this project. Items crossed out that do not apply.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
MAINTAINING TRAFFIC
AND PAVEMENT MARKING

a. Description. This work consists of all labor, materials and equipment required to maintain traffic in accordance with this special provision for the Cold milling and Hot Mix Asphalt (HMA) overlay of mainline and ramps at the following Locations:

1. ~~Location A:~~ I-94 (WB & EB) from west of ~~M-311 (11 Mile Road)~~ Helmer Road to approximately ~~one mile east of M-311 (11 Mile Road),~~ 6 1/2 Mile Road in Emmett Township, in Calhoun County.
2. ~~Location B: M-89 from Naomi Street to Hicks Street in the City of Plainwell, in Allegan County.~~
3. ~~Location C: M-60 from North Locust Street to Congress Street in the Village of Mendon, in St. Joseph County.~~
4. ~~Location D: I-196BI from Blue Star Highway to Aylworth Avenue in South Haven Township, in Van Buren County.~~
5. ~~Location E: US-31 (SB) at four locations, starting at the Indiana/Michigan State Line in Bertrand Township, in Berrien County. This location includes the milling of concrete pavement.~~

b. General. Maintain traffic according to subsections 103.05 & 103.06 and sections 812 & 922 of the Standard Specifications for Construction, including any Supplemental Specifications, and as specified herein.

1. Notify the Project Engineer a minimum of 24 hours prior to the implementation of any detours, lane closures on bridges, ramp narrowing, ramp closures, shoulder closures, lane closures or major traffic shifts on mainline.

2. Coordinate operations with Contractors performing work on other projects within or adjacent to the Construction Influence Area (CIA). See **Coordination Clause** for projects ~~on Location A: I-94 and Location C: M-60.~~

3. MDOT maintenance crews and/or contract maintenance agencies may perform maintenance work within or adjacent to the Construction Influence Area (CIA). The Maintenance Division of MDOT and/or contract maintenance agency will coordinate their operations with the Delivery Engineer to minimize the interference. All additional costs for joint use of traffic control items will be borne by the Contractor.

4. Changes and/or adjustments to the Maintaining traffic plans and standards may be applied as approved by the Engineer.

c. Construction Influence Area (CIA). The CIA includes the right-of-way of the following roadways, within the approximate limits described below:

Location A: I-94

- On I-94 WB, the CIA shall be from approximately 2.41 miles (12,700 feet) east of POB to 0.40 miles (2,100 feet) west of POE.
- On I-94 EB, the CIA shall be from approximately 2.41 miles (12,700 feet) west of POB to 0.40 miles (2,100 feet) east of POE.
- On Ramps, the CIA shall be from approximately 0.21 miles (1,100 feet) prior to and after ramp on cross road.

~~**Location B: M-89**~~

- ~~On M-89, the CIA shall be from approximately 0.55 miles (2,900 feet) in advance of the POB to 0.55 miles (2,900 feet) beyond the POE.~~
- ~~The CIA shall also include 150 feet in each direction on all intersecting roads within the work area:~~

~~Naomi Street (Rt)~~
~~Fairlane Street (Lt)~~
~~Prince Street (Rt)~~
~~Michigan Avenue (Lt)~~
~~Dwight Street (Rt)~~
~~Prospect Avenue (Lt)~~
~~Warrant Street (Rt)~~
~~Cedar Street (Lt)~~
~~Scott Street (Lt)~~
~~Church Street (Rt)~~
~~Bridge Street (Rt)~~
~~Main Street (Rt & Lt)~~
~~Anderson Street (Rt & Lt)~~
~~Woodhams Street (~~Rt & Lt)
Hicks Street (Rt).

~~**Location C: M-60**~~

- ~~On M-60, the CIA shall be from approximately 0.53 miles (2,800 feet) in advance of the POB and 0.53 miles (2,800 feet) beyond the POE.~~
- ~~The CIA shall also include 150 feet in each direction on all intersecting roads within the work area:~~

~~Plainfield Dr (Rt)~~
~~Locust Street (Rt & Lt)~~
~~Greenwood Street (Rt)~~
~~Railroad Street (Rt & Lt)~~
~~Mill Street (Rt)~~
~~Lake Street (Lt)~~
~~Burr Oak Street (Lt)~~
~~Portage Street (Lt)~~
~~Nottawa Rd (Rt & Lt)~~
~~East Street (Lt)~~
~~Pleasant Street (Rt & Lt)~~
~~Congress Street (Lt).~~

~~**Location D: I-196BL**~~

- ~~On I-196BL, the CIA shall be from approximately 0.53 miles (2,800 feet) in advance of the POB and 0.53 miles (2,800 feet) beyond the POE.~~

~~**Location E: US-31 SB**~~

- ~~On US-31 SB, from approximately 1.73 miles (9,120 feet) north of POB to 0.27 miles (1,400 feet) south of POE.~~

~~Include in the CIA the rights-of-way of any intersecting roads and ramps adjacent to the work zone for a distance of approximately 700 feet in advance of ramps.~~

d. Traffic Restrictions.

1. Work or lane closures will not be allowed during the Memorial Day, July 4th, or Labor Day holiday periods, or as defined by the Engineer. All work shall be coordinated around local festivals.

2. **MAINLINE CLOSURES ON Location A: I-94**

   A. Maintain two lanes of traffic on I-94 during the following hours:
   6:00am ~~7:00 am~~ to 7:00 pm Monday through Thursday
   6:00am to 9:00pm ~~7:00 am to 8:00~~ pm Friday
   8:00am ~~9:00~~ am to 7:00 pm Saturday
   noon ~~11:00~~ am to 9:00 pm Sunday

   B. A pay item for Ltg for Night Work has be included.

   C. Cold milling and paving operations shall be conducted on I-94 mainline Sunday through Thursday at night. The Contractor shall cold mill and pave one lane and a shoulder with a tapered overlapping centerline longitudinal joint on one night. Then the following night, the Contractor shall cold mill and pave the adjacent lane. When traffic is driving in a section of pavement with the tapered overlapping longitudinal centerline joint, the centerline taper shall have a solid 4 inch white painted line, and UNEVEN LANES signs (W8-11), DO NOT PASS signs (R4-1), and STAY IN LANE signs (R4-9). The signs shall be placed left and right at the beginning and at 0.5 mile intervals before both lanes open to traffic each day.

   D. HMA paving for I-94 mainline, acceleration lanes and deceleration lanes shall only be constructed at night, Sunday through Thursday.

   E. All signs and traffic control devices shall be taken down during the hours of the above lane restrictions pertaining to any lane closure or traffic shift according to the Special Provision for the “TEMPORARY REMOVAL OF PORTABLE SIGNS” (03SP812K). If the signs are up during the restricted hours the Contractor will pay liquidated damages of $ ~~350~~ for every 15 minutes the signs are still up. $333

3. ~~Location B: M-89 in Plainwell~~

~~A. Work at Location B shall start after July 20th, due to Plainwell's Island Festival July 18th and July 19th.~~

~~B. Perform work during night hours only:~~
~~7:00 PM and 6:00 AM Monday through Thursday~~
~~8:00 PM Friday through 11:00 AM Saturday~~
~~6:00 PM Saturday through 6:00 AM Monday.~~

~~C. A pay item for Ltg for Night Work has been included.~~

~~D. Any Lane open to traffic shall have a minimum lane width of 11 feet.~~

~~E. The maximum length for a traffic regulator operation shall be 0.87 miles (4,600 feet) or as approved by the Engineer. Signing for traffic regulator operation is shown in this proposal.~~

~~F. During construction of the entire project, adjacent roads shall remain open to traffic at all times except as approved by the Engineer. Access to residences and commercial businesses shall be maintained at all times unless approved by the Engineer.~~

~~G. A traffic regulator operation shall be utilized with a minimum of two traffic regulators. If necessary, intermediate traffic regulators shall be provided by the Contractor at intersecting roads to prevent conflicting traffic from entering the operation as approved by the Engineer. The cost of all traffic regulators shall be included in the pay item Flag Control.~~

~~H. The work of a traffic regulator operation includes furnishing and operating the personnel and equipment for regulating moving traffic with traffic regulators and radio communication systems. Traffic regulators shall be equipped with two-way radios, stop/slow paddles, warning garments that are both fluorescent orange and reflectorized. Refer to the Michigan Manual on Uniform Traffic Control Devices, Part 6, for other requirements for the traffic regulator operation.~~

~~I. Traffic regulators shall be trained as required and shall be conducted in a manner consistent with the methods in the "Traffic Regulators Instruction Manual".~~

4. **Location C: M-60 in Mendon**

A. Work at Location C, shall be completed prior to Mendon's River Festival, on August 15th.

B. All work shall be restricted to daylight hours only. No work shall be done on Sundays unless approved by the Engineer.

C. Any Lane open to traffic shall have a minimum lane width of 11 feet.

D. The maximum length for a traffic regulator operation shall be 0.95 miles (5,000 feet) or as approved by the Engineer. Signing for traffic regulator operation is shown in this proposal.

E. During construction of the entire project, adjacent roads shall remain open to traffic at all times except as approved by the Engineer. Access to residences and commercial businesses shall be maintained at all times unless approved by the Engineer.

F. A traffic regulator operation shall be utilized with a minimum of two traffic regulators. If necessary, intermediate traffic regulators shall be provided by the Contractor at intersecting roads to prevent conflicting traffic from entering the operation as approved by the Engineer. The cost of all traffic regulators shall be included in the pay item Flag Control.

G. The work of a traffic regulator operation includes furnishing and operating the personnel and equipment for regulating moving traffic with traffic regulators and radio communication systems. Traffic regulators shall be equipped with two-way radios, stop/slow paddles, warning garments that are both fluorescent orange and reflectorized. Refer to the Michigan Manual on Uniform Traffic Control Devices, Part 6, for other requirements for the traffic regulator operation.

H. Traffic regulators shall be trained as required and shall be conducted in a manner consistent with the methods in the "Traffic Regulators Instruction Manual".

5. Location D: I-196BL

A. Work at Location D, shall be completed prior to/after the National Blueberry Festival, on August 7th-10th.

B. All work shall be restricted to daylight hours only. No work shall be done on Sundays unless approved by the Engineer.

C. Any Lane open to traffic shall have a minimum lane width of 11 feet.

D. The maximum length for a traffic regulator operation shall be 0.95 miles (5,000 feet) or as approved by the Engineer. Signing for traffic regulator operation is shown in this proposal.

E. During construction of the entire project, adjacent roads shall remain open to traffic at all times except as approved by the Engineer. Access to residences and commercial businesses shall be maintained at all times unless approved by the Engineer.

F. A traffic regulator operation shall be utilized with a minimum of two traffic regulators. If necessary, intermediate traffic regulators shall be provided by the Contractor at intersecting roads to prevent conflicting traffic from entering the operation as approved by the Engineer. The cost of all traffic regulators shall be included in the pay item Flag Control.

G. The work of a traffic regulator operation includes furnishing and operating the personnel and equipment for regulating moving traffic with traffic regulators and radio communication systems. Traffic regulators shall be equipped with two-way radios, stop/slow paddles, warning garments that are both fluorescent orange and reflectorized. Refer to the Michigan Manual on Uniform Traffic Control Devices, Part 6, for other requirements for the traffic regulator operation.

H. Traffic regulators shall be trained as required and shall be conducted in a manner consistent with the methods in the "Traffic Regulators Instruction Manual".

6. Location E: US-31 Lane and Ramp Closures

A. The ramp detour will utilize the median turn around along US-12; traffic will be turned in the opposite bound and then use the alternate ramp to access US-31 SB as shown in Log of Project Part 2. Traffic will be detour onto state trunkline routes.

B. Detour routes will have detour guide signs, two portable changeable message board warning of the detour one week prior and messages during the detour.

7. During the work (non-restricted hours) no more than 1 single lane closure and/or shoulder closures each of approximately 2.0 miles in length shall be permitted in each direction of travel. No more than 1 ramp/shoulder closure, each of approximately 2.0 miles in length shall be permitted for the daytime work.

8. No lane closure sequences will be allowed where the Contractor can accomplish

the work utilizing a shoulder closure.

9. When utilizing a shoulder closure, the Contractor's personnel and equipment shall not occupy any part of the active traffic lane. If this situation cannot be avoided, then a lane closure sequence shall be used. A 24 hour shoulder closure is allowed it the Contractor does not encroach on the active lanes. During a lane closure the Contractor may not have a shoulder closure opposite the lane closure.

10. Sign Covers shall be placed over existing regulatory, warning and construction signs that are not applicable during construction.

11. Once work is initiated that includes any lane restrictions, that work shall be continuous until completed. A lack of work activity for more than (1) one week requires the removal and replacement of lane restrictions with all the costs borne by the Contractor.

12. Restrict access for construction vehicles between traveled lanes and work areas to specific locations. The number of access points and their locations requires the approval of the Engineer.

13. Transverse and longitudinal HMA tapers shall be provided at all grade changes caused by cold milling and overlays. All cold milled areas shall be paved the same day as the cold milling operation. No traffic shall be allowed on the cold milled surface, unless otherwise approved by the Engineer.

d. Work Zone Speeds.

1. Set work zone speeds according to the *2006 Guidelines to Establish Speed Limits in Work Zones.*

2. Post additional "WHERE WORKERS PRESENT 45" mph speed limit signs at one mile intervals throughout the work zone.

e. Traffic Control Devices.

1. General.

A. All traffic control devices and their usage shall conform to Part 6 of the *Michigan Manual of Uniform Traffic Control Devices* (MMUTCD). This document can be found at the following website: http://mdotwas1.mdot.state.mi.us/public/tands/plans.cfm

B. During non-working periods, place advance signs (W20-1 - "ROAD WORK AHEAD") and lighted plastic drums at any work site with uncompleted work as the Engineer directs. All costs associated with this work will be borne by the Contractor.

2. Temporary Signs.

   A. At all locations use temporary sign spacing and taper lengths as shall be as shown on attached Typical M0020a.

   B. Refer to Traffic and Safety Standard Plan WZD-125-D for portable supports.

   C. Signing for the beginning and ending of the work zone shall be as shown on attached Typicals:
      Location A ~~& E:~~ M0080a
      ~~Locations B, C, & D: M0050a~~

   ~~D. Signing for traffic regulator operation shall be as shown on attached Typicals:~~
      ~~Location B & C: M0140a MOD~~
      ~~Location D: M0140a~~

   E. Signing for a one-lane shift within a lane closure on a freeway using a reduced speed shall be as shown on attached Typicals:
      Location A: M081b-MOD 1
      ~~Location E: M081a MOD~~

   F. Signing for a one-lane closure on a freeway using a reduced speed limit where workers present shall be as shown on attached Typical:
      Locations A ~~& E:~~ M0990a

   G. Show signing for one-lane closure on roadway in advance of a gore area at a minor divergence using a reduced speed limit where workers present shall be as shown on attached Typical:
      Location A: M099e MOD

   H. Signing for a shoulder closure on an exit ramp using an advisory speed shall be as shown in attached Typicals:
      Location A: M0940a or M0950a

   I. Signing for an entrance ramp to a mainline right lane closure shall be as shown on attached Typicals:
      Location A: M081e-MOD 1 or M081e-MOD 2
      ~~Location E: M44BMOD~~

   J. Signing for a one-lane closure on a freeway with an exit ramp reducing speed limit where workers present shall be as shown on attached Typical:
      Location A: M0950a-MOD.

   K. Signing for a one-lane closure on a freeway with an entrance ramp reducing speed limit where workers present shall be as shown on attached Typicals:
      Location A: M0960a-MOD 1 or M0960a-MOD 2

L. Signing for a typical entrance ramp treatment for a shoulder closure on an entrance ramp with no speed reduction shall be as shown on attached Typical:
Location A: M0960a

M. Supplemental speed limit treatment on limited access roadways where workers are present shall be as shown on attached Typical:
Location A: M0100a

N. W20-1 (ROAD WORK AHEAD) signs in the quantities:

- Locations A, ~~C, D &~~ E: Place on ramps or intersecting roads in advance of construction areas as the Engineer directs.

- ~~Location B: (ON M-89) (G20-Type) sign 150 feet in advance of the intersection with M-89 as directed by the Engineer and on the following:~~
  ~~Naomi Street (Rt)~~
  ~~Fairlane Street (Lt)~~
  ~~Prince Street (Rt)~~
  ~~Michigan Avenue (Lt)~~
  ~~Dwight Street (Rt)~~
  ~~Prospect Avenue (Lt)~~
  ~~Warrant Street (Rt)~~
  ~~Cedar Street (Lt)~~
  ~~Scott Street (Lt)~~
  ~~Church Street (Rt)~~
  ~~Bridge Street (Rt)~~
  ~~Main Street (Rt & Lt)~~
  ~~Anderson Street (Rt & Lt)~~
  ~~Woodhams Street (Rt & Lt)~~
  ~~Hicks Street (Rt)~~

- ~~Location C: (ON M-60) (G20-Type) sign 150 feet in advance of the intersection with M-60 as directed by the Engineer and on the following:~~
  ~~Plainfield Drive (Rt)~~
  ~~Locust Street (Rt & Lt)~~
  ~~Greenwood Street (Rt)~~
  ~~Railroad Street (Rt & Lt)~~
  ~~Mill Street (Rt)~~
  ~~Lake Street (Lt)~~
  ~~Burr Oak Street (Lt)~~
  ~~Portage Street (Lt)~~
  ~~Nottawa Rd (Rt & Lt)~~
  ~~East Street (Lt)~~
  ~~Pleasant Street (Rt & Lt)~~
  ~~Congress Street (Lt)~~

O. Place at locations that the Engineer designates W20-15b (WATCH FOR TRAFFIC BACKUPS/BE PREPARED TO STOP) signs included in the quantities.

- Location A: I-94 at the POB for westbound and the POB for eastbound, 5 miles in advance of each CIA.

P. Place SF-1:
- Location A: (ON I-94) signs, included in the quantities, shall be placed with the W20-15b (WATCH FOR TRAFFIC BACKUPS/BE PREPARED TO STOP) signs.
- ~~Location D: (ON I-196BL) signs, included in the quantities~~
- ~~Location E: (ON US-31) and (ON SB US-31) signs, included in the quantities~~

Q. Place W8-11 (UNEVEN LANES) signs, included in the quantities, every one-half mile during paving operations described on Page 3, 2.B.MAINLINE CLOSURES ON I-94 or as directed by the Engineer.

R. Place R4-1 (DO NOT PASS) signs, included in the quantities, every one-half mile during paving operations described on Page 3, 2.B.MAINLINE CLOSURES ON I-94 or as directed by the Engineer.

S. Place R4-9 (STAY IN LANE) signs, included in the quantities, every one-half mile during paving operations described on Page 3, 2.B.MAINLINE CLOSURES ON I-94 or as directed by the Engineer.

T. Custom signs, (RUMBLE STRIPS) and (ATTENTION MOTORCYCLISTS) signs, included in the quantities to be placed, during the lead in sign sequence when traffic is shifted. These signs will be placed on both sides of the roadway.

U. ~~Place a R8-3A (NO PARKING) sign and cover existing PARKING signs when working in the existing parking areas on Location C.~~

V. Consider distances shown between construction warning, regulatory and guide signs shown on the typicals as approximate. Signs may require field adjustment, as the Engineer directs.

W. Construct all temporary signs with legends and symbols flush to the signs face and do not extend beyond the sign borders or edges.

X. Refer to Traffic and Safety Standard Plan WZD-125-D when installing temporary diamond signs with portable supports. Note that the Type A Warning Light is required.

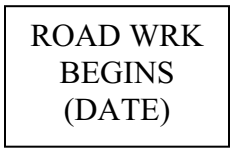
Y. When a portable construction sign is no longer applicable, remove it or lay it down on its non-reflective side with its feet off. Refer to Special Provision for “TEMPORARY REMOVAL OF PORTABLE SIGNS.” (03SP812K)

Z. Two (2) Portable Changeable Message Signs (PCMS) to warn traffic of upcoming work and changing traffic control shall be used during the life of the project. Install and make operational a minimum of seven (7) calendar days

prior to the start of work and secure by elevating the tires above the ground or through the use of wheel chocks or sandbags. Obtain approval from the Engineer for all sign locations and all messages placed on the sign prior to displaying the message. Use on Locations A ~~& E~~.

Location A:

Advance Notice for Road Work



Seq 1

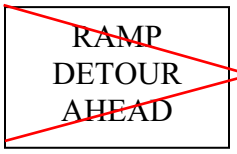
Seq 2

Notice for Road Work

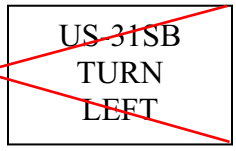
Seq 1

~~Location E:~~

~~Notice for Road Work~~



~~Seq 1~~



~~Seq 2~~

AA. Use Type C Lighted Arrows (min 48 inch x 98 inch) to merge traffic and secure by elevating the tires no more than three (3) inches above the ground, or through the of wheel chocks or sandbags that are no higher than twelve (12) inches above the ground.

BB. The Federal Highway Administration (FHWA) requires all signs to be NCHRP 350 crashworthy. For design and configuration refer to their website:

http://safety.fhwa.dot.gov/roadway_dept/road_hardware/workzone_pdmenu.cfm

~~CC. All temporary signs that will be in place for more than 14 days shall be mounted on driven posts. Ground driven sign supports shall be as shown on attached Figure WZD 100 A. Refer to Standard Plan WZD 125 D for portable supports.~~

3. Permanent Signs

   A. Any signs that are damaged during construction by the Contractor shall be replaced at the Contractor's expense.

4. Channelizing Devices.

   A. Use lighted plastic drums with high intensity sheeting for required channelizing devices on Location A, ~~D, & E~~ as approved by the Engineer.

   B. ~~42 Inch Channelizing Devices shall be used as specified in the Special~~

~~Provision, and as approved by the Engineer on Locations B & C.~~

C. Use high intensity plastic drums to delineate the edgelines of right shoulders exceeding six (6) foot in width until the edgelines are painted. Use high intensity plastic drums to delineate all left shoulder edgelines regardless of width until the edgelines are painted.

D. Lighted plastic drums shall be placed for the WHOLE length of the project on BOTH sides of the roadway on Location A: I-94 WB and EB. Lighted plastic drums shall be dragged, all the way out to the edge of the shoulders on areas where no work is utilized. Drums shall not be dragged across live lanes of traffic on a routine basis.

F. ~~Channelizing devices shall be placed as described in the Special Provision for 42 inch Channelizing Devices. Payment shall be included in the pay items "Channelizing Device, 42 inch, Oper" and "Channelizing Device, 42 inch, Furn" (Ea) on Locations B & C.~~

G ~~Use two (2) eight foot Barricade, Type III, High Intensity, Lighted to block off ends of work zone during Ramp closure on Location E: US-31 (SB).~~

5. Temporary Pavement Markings.

A. Temporary pavement markings shall consist of:
Pavt Mrkg, Type NR, Paint, 4 inch, White, Temp
Pavt Mrkg, Type NR, Paint, 4 inch, Yellow, Temp
Pavt Mrkg, Type R, 4 inch, White, Temp
Pavt Mrkg, Type R, 4 inch, Yellow, Temp
Pavt Mrkg, Type R, 6 inch, Black, Temp
Pavt Mrkg, Type R, 6 inch, Gray, Temp

B. The Contractor shall place temporary pavement markings, Type R, 6 inch, Black/Gray, Temp to cover the skip lines in the night time lane closure tapers. This tape shall be removed prior to opening the lane to traffic. The Contractor shall be responsible to ensure that all temporary pavement markings adhere to the pavement surface until permanent markings are installed. All cost for any additional adhesives or other materials is included with these Pay Items.

C. Place temporary pavement markings, Type NR, at locations on pavement areas that are removed or covered during construction for interim traffic control as the Engineer specifies.

D. During paving operations, base quantities for temporary paint placed on four (4)-inch strips, four (4)-feet long, spaced at 50 feet center to center for lane lines and centerline.

E. The Contractor shall place temporary pavement marking, type NR paint, 4 inch white and 4 inch yellow, as stated in the proposal and as directed by the

Engineer.

F. On Location A: I-94, during the paving operation, when the lap joint will be exposed to traffic, the Contractor SHALL place a solid white lane line on the tapered portion of the joint in addition to the solid white edge line. Within the following work period, after the Contractor has paved the adjacent lane even to previous paving length, place dashed white lane and four (4) foot strips on fifty (50) foot centers, to delineate the center line, in addition to the solid yellow edge line.

G. On Location A: I-94, the Contractor shall place temporary pavement markings, Type NR paint, 4 inch white at four (4) foot skips on fifty (50) foot centers, to delineate the center line, prior to opening to traffic, at the end of EACH work night.

H. On Location A: I-94, the Contractor shall place Temporary Paint (Type NR paint, 4 inch, White and 4 inch, Yellow) to delineate the edge of the roadway lanes after each HMA course at the end of EACH working night, prior to opening to traffic.

I. Any additional adhesives or other materials used shall be includes with these pay items.

J. All required temporary pavement markings shall be placed at the end of each work shift.

K. Pavt Mrkg, Type NR, Paint, 4 inch, Yellow, Temp shall be placed on centerline at 4 ft skips at 50 ft intervals and Pavt Mrkg, Type NR, Paint, 4 inch, White, Temp shall be placed on lane lines at 4 ft skips at 50 ft intervals on the milled and paved surface, allowing for a tolerance of 4 inch +/- (center to center) between temporary and permanent markings.

L. Temporary markings which are installed outside the specified lateral tolerance shall be removed, as directed by the Engineer, at the Contractor's expense.

6. Permanent Pavement Markings.

A. Permanent pavement markings consist of the following:
~~On Locations A, B, C, D, & E:~~
4 inch white waterborne for lane lines
6 inch white and 6 inch yellow waterborne for edge lines
6 inch white and 6 inch yellow waterborne on ramps
12 inch white (gore) waterborne on ramps

B. All permanent pavement markings shall conform to MDOT Pavement Marking Typicals PAVE-900 through PAVE-990.

C. The Contractor is responsible for verifying the existing pavement marking

locations and patterns. Replace the pavement markings as they existed prior to construction, unless otherwise directed by the Engineer.

f. Measurement and Payment. The estimate of quantities for maintaining traffic is based on signing and related traffic control devices for 1 shoulder closure, 1 single lane closure, ~~1 ramp closure & detour,~~ 2 Portable Changeable Message Signs, and 10 "ROAD WORK AHEAD" (W20-1) signs. 2 "WATCH FOR TRAFFIC BACKUPS/BE PREPARED TO STOP" signs, 2 “UNEVEN LANES” signs, 2 “STAY IN LANE” signs, and ~~1 Traffic Regulator Operation.~~ This estimate also includes a maximum of 2 Type C lighted arrows (min 48in by 96in) to be in use at any one time.

1. Measure and pay for all traffic control items in accordance with Section 812.04 of the *Standard Specifications of Construction.*

2. Payment for temporary signs will be made based on the maximum square foot of dissimilar sign legends ~~in use at any Location A thru E, the Contractor is responsible to move all signs at no extra cost to Maintaining of traffic.~~

3. All cost of additional signing or maintaining traffic devices required to expedite the construction shall be borne by the Contractor.

ESTIMATE OF TEMPORARY SIGN QUANTITIES
(For Information Only)

SIGN, TYPE A,TEMPORARY, PRISMATIC:						
SIGN	**MESSAGE**	**QTY.**	**IN. x IN.**			**FT^2**
R1-2	YIELD	4	48	x	48	32
Subtotal, Sign, Type A, Temporary, Prismatic, Furn: Ft^2						32

ESTIMATE OF TEMPORARY SIGN QUANTITIES CONTINUED:
(For Information Only)

SIGN, TYPE B, TEMPORARY, PRISMATIC:						
SIGN	**MESSAGE**	**QTY.**	**IN. x IN.**			**FT²**
SF-1	ON I-94	4	50	x	18	25
~~G20-TYPE~~	~~ON M-89~~	~~18~~	~~48~~	~~x~~	~~12~~	~~72~~
~~G20-TYPE~~	~~ON M-60~~	~~16~~	~~48~~	~~x~~	~~12~~	~~64~~
~~SF-1~~	~~ON I-196BL~~	~~4~~	~~50~~	~~x~~	~~18~~	~~25~~
~~SF-1~~	~~ON US-31~~	~~2~~	~~50~~	~~x~~	~~18~~	~~13~~
~~SF-1~~	~~ON SB US-31~~	~~1~~	~~50~~	~~x~~	~~18~~	~~6~~
W20-15b	WATCH FOR TRAFFIC BACKUPS/BE PREPARED TO STOP	2	96	x	72	96
R5-18b	INJURE/KILL A WORKER $7500 + 15 YEARS	4	48	x	60	80
R5-18	TRAFFIC FINES DOUBLED IN WORK ZONES	2	48	x	60	40
W20-1	ROAD WORK AHEAD	18	48	x	48	288
W20-1 (MOD)	RAMP WORK AHEAD	4	48	x	48	64
~~W20-4~~	~~ONE LANE ROAD AHEAD~~	~~2~~	~~48~~	~~x~~	~~48~~	~~32~~
~~W20-7a~~	~~Traffic Regulator Symbol~~	~~2~~	~~48~~	~~x~~	~~48~~	~~32~~
~~W20-15~~	~~BE PREPARED TO STOP~~	~~2~~	~~48~~	~~x~~	~~48~~	~~32~~
W4-2L	Lane Merge Left Symbol	2	48	x	48	32
W4-2R	Lane Merge Right Symbol	2	48	x	48	32
R5-18c	WORK ZONE BEGINS	4	48	x	48	64
W1-4L	Reverse Curve Symbol	2	48	x	48	32
W1-4R	Reverse Curve Symbol	2	48	x	48	32
W1-4bR	Reverse Curve Symbol, 2 or more Lanes	2	48	x	48	32
W1-4bL	Reverse Curve Symbol, 2 or more Lanes	2	48	x	48	32
W1-6L	One Directional Arrow Symbol	3	48	x	24	24
W1-6R	One Directional Arrow Symbol	3	48	x	24	24

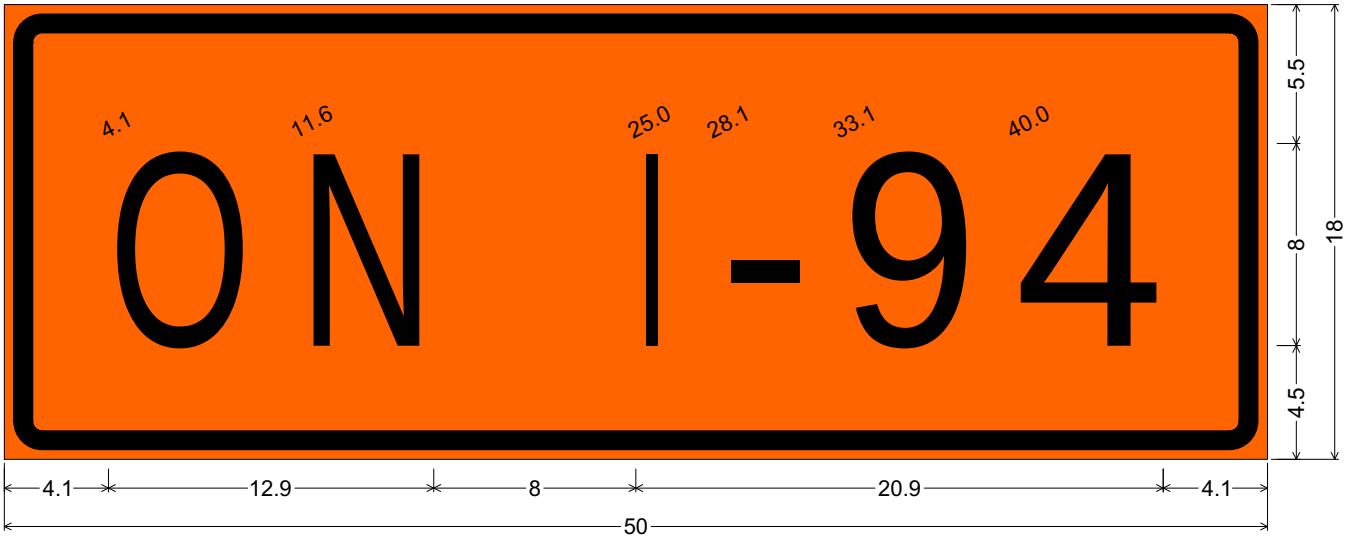
ESTIMATE OF TEMPORARY SIGN QUANTITIES CONTINUED:
(For Information Only)

SIGN, TYPE B, TEMPORARY, PRISMATIC:						
SIGN	**MESSAGE**	**QTY.**	**IN. x IN.**			**FT^2**
W3-2a	Yield Ahead Symbol	4	48	x	48	64
W4-1	Merge Symbol	2	48	x	48	32
W4-3	Through Lane and Ramp Merge Symbol	2	48	x	48	32
~~W20-2~~	~~DETOUR AHEAD~~	~~1~~	~~48~~	~~x~~	~~48~~	~~16~~
W20-5R (MOD)	RIGHT LANE CLOSED AHEAD	2	48	x	48	32
W20-5L (MOD)	LEFT LANE CLOSED AHEAD	2	48	x	48	32
~~W21-4~~	~~RAMP CLOSED AHEAD~~	~~2~~	~~48~~	~~x~~	~~48~~	~~32~~
~~R11-2~~	~~RAMP CLOSED~~	~~2~~	~~48~~	~~x~~	~~30~~	~~20~~
W21-5bL	LEFT SHOULDER CLOSED AHEAD	2	48	x	48	32
W21-5bR	RIGHT SHOULDER CLOSED AHEAD	2	48	x	48	32
W21-5aR	RIGHT SHOULDER CLOSED	2	48	x	48	32
W21-5aL	LEFT SHOULDER CLOSED	2	48	x	48	32
~~W20-1a~~	~~NEXT __ MILES~~	~~2~~	~~48~~	~~x~~	~~36~~	~~24~~
W3-5b	REDUCED SPEED ZONE AHEAD	2	48	x	48	32
E5-1	EXIT Arrow	2	48	x	48	32
E5-2	Exit Number Symbol	2	24	x	24	8
~~R2-1~~	~~SPEED LIMIT 30~~	~~2~~	~~48~~	~~x~~	~~60~~	~~40~~
~~R2-1~~	~~SPEED LIMIT 35~~	~~2~~	~~48~~	~~x~~	~~60~~	~~40~~
~~R2-1~~	~~SPEED LIMIT 40~~	~~4~~	~~48~~	~~x~~	~~60~~	~~80~~
R2-1	SPEED LIMIT 60	12	48	x	60	240
~~W11-16~~	~~WATCH FOR RAMP TRAFFIC~~	~~2~~	~~48~~	~~x~~	~~48~~	~~32~~
R2-1a	WHERE WORKERS PRESENT 45	10	48	x	60	200
W8-11	UNEVEN LANES	2	48	x	48	32
CUSTOM	RUMBLE STRIPS	2	48	x	48	32
CUSTOM	ATTENTION MOTORISTS	2	66	x	24	22

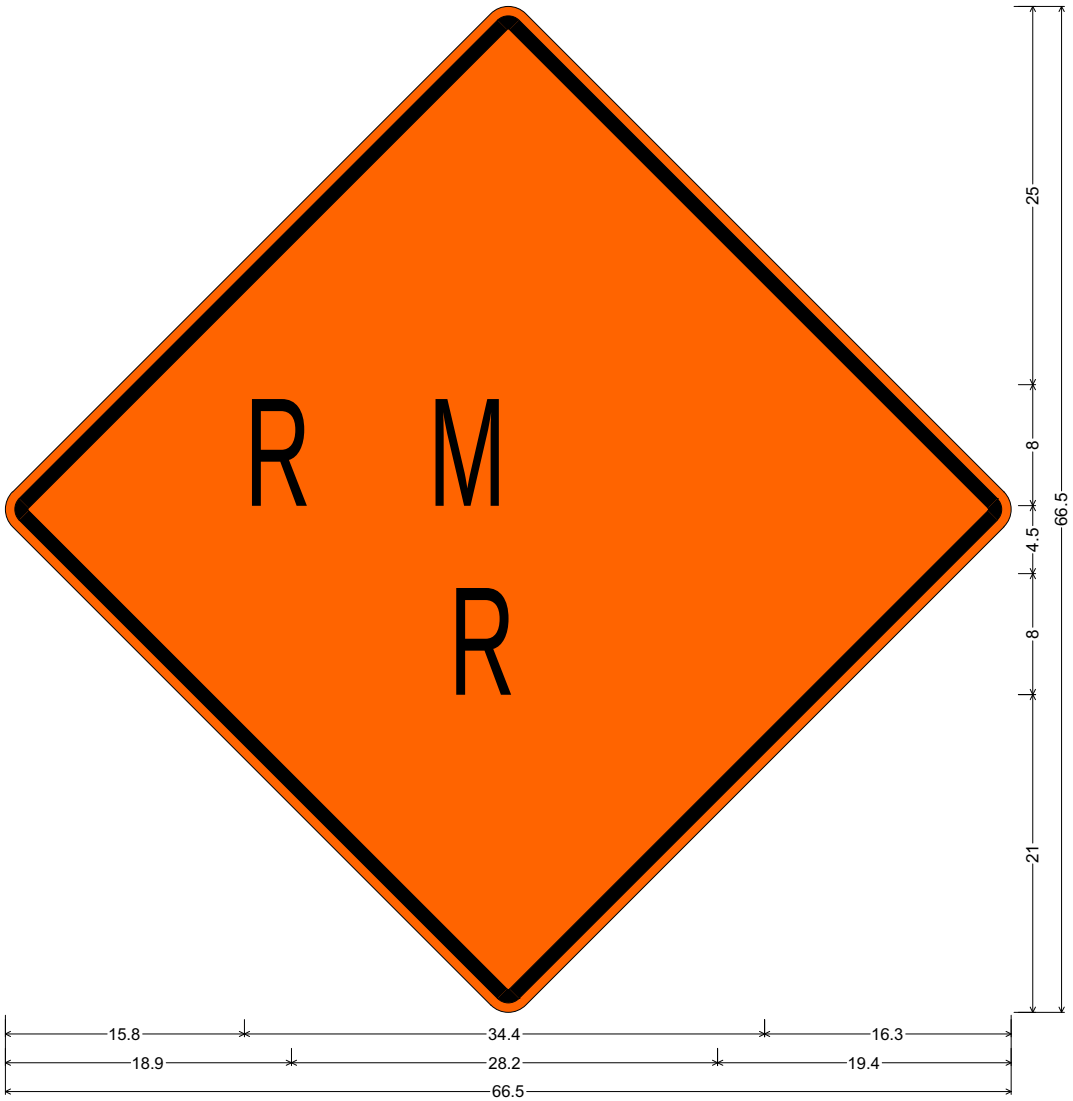
ESTIMATE OF TEMPORARY SIGN QUANTITIES CONTINUED:
(For Information Only)

SIGN, TYPE B, TEMPORARY, PRISMATIC:						
SIGN	**MESSAGE**	**QTY.**	**IN. x IN.**			**FT^2**
R4-1	DO NOT PASS	2	48	x	60	40
R4-9	STAY IN LANE	2	48	x	60	40
R2-1	SPEED LIMIT 70	2	48	x	60	40
~~R8-3a~~	~~NO PARKING~~	~~9~~	~~24~~	~~x~~	~~24~~	~~36~~
~~M1-4~~	~~Interstate Route Marker (31)~~	~~7~~	~~24~~	~~x~~	~~24~~	~~28~~
~~M3-3~~	~~SOUTH~~	~~7~~	~~24~~	~~x~~	~~12~~	~~14~~
~~M4-8~~	~~DETOUR~~	~~6~~	~~24~~	~~x~~	~~12~~	~~12~~
~~M 4-8a~~	~~DETOUR ENDS~~	~~1~~	~~24~~	~~x~~	~~18~~	~~3~~
~~M5-1aL~~	~~Up and Left Arrow~~	~~1~~	~~21~~	~~x~~	~~15~~	~~2~~
~~M6-1aL~~	~~Left Arrow~~	~~2~~	~~21~~	~~x~~	~~15~~	~~4~~
~~M6-3a~~	~~Up Arrow~~	~~2~~	~~21~~	~~x~~	~~15~~	~~4~~
~~M6-2aR~~	~~Diagonal Right Arrow~~	~~1~~	~~21~~	~~x~~	~~15~~	~~2~~
G20-2	END ROAD WORK	2	48	x	24	16
Subtotal, Sign, Type B, Temporary, Prismatic, Furn: Ft^2						1020

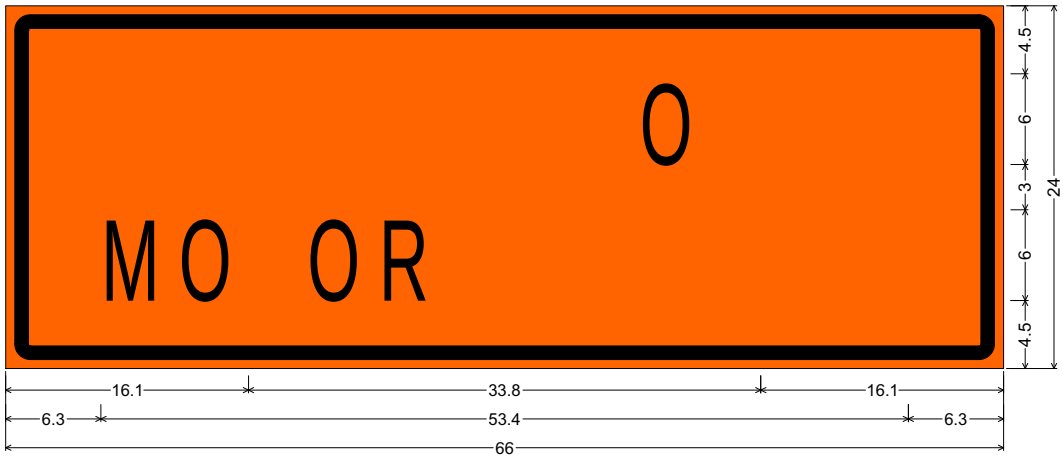
-1



1.5" Radius, 0.8" Border, 0.4" Indent, Black on Orange;
“ON I-94” D;

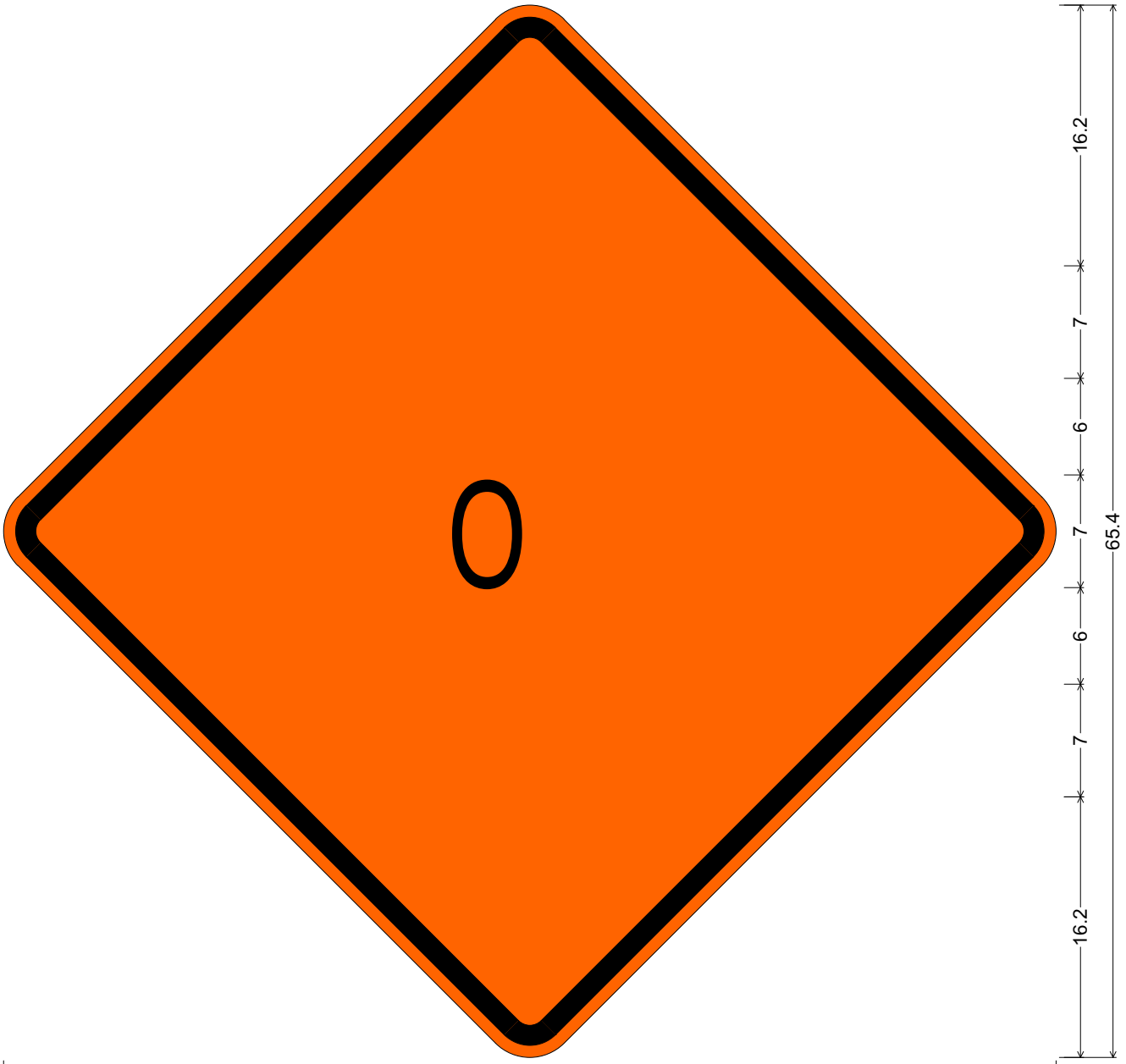


48.0" across sides 1.6" Radius, 0.9" Border, 0.6" Indent, Black on Orange;
“RUMBLE” C; “STRIPS” C 75% spacing;



1.6" Radius, 0.9" Border, 0.6" Indent, Black on Orange;
“ATTENTION” C; “MOTORCYCLISTS” C;

- 0



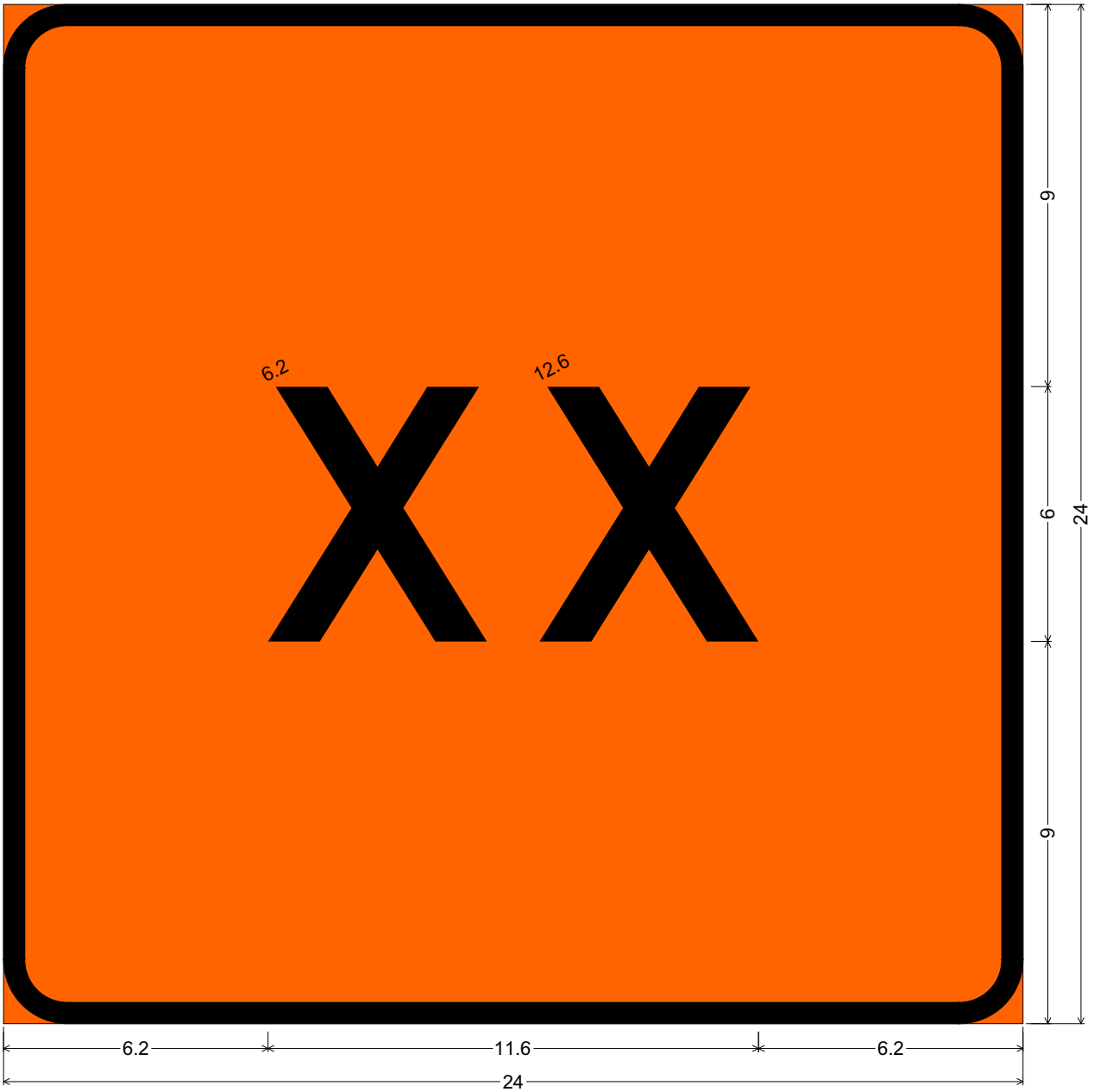
48.0" across sides 3.0" Radius, 1.3" Border, 0.8" Indent, Black on Orange;
“RAMP” D; “WORK” D; “AHEAD” D;
Table of letter and object lefts.

20.2	26.2	33.4	40.5

20.1	0 27.6	34.1	40.5

17.4	24.6	30.9	36.1	43.3

E 5 - 2



1.5" Radius, 0.5" Border, Black on Orange;
“XX” E;

E5-1

3.0" Radius, 0.8" Border, 0.8" Indent, Black on Orange;
“EXIT” ClearviewHwy-6-W; Arrow B-13 - 21.5" 30°;

MINIMUM MERGING TAPER LENGTH "L" (FEET)

OFFSET	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)										
FEET	25	30	35	40	45	50	55	60	65	70	
1	10	15	20	27	45	50	55	60	65	70	TAPER LENGTH "L" IN FEET
2	21	30	41	53	90	100	110	120	130	140	
3	31	45	61	80	135	150	165	180	195	210	
4	42	60	82	107	180	200	220	240	260	280	
5	52	75	102	133	225	250	275	300	325	350	
6	63	90	123	160	270	300	330	360	390	420	
7	73	105	143	187	315	350	385	420	455	490	
8	83	120	163	213	360	400	440	480	520	560	
9	94	135	184	240	405	450	495	540	585	630	
10	104	150	204	267	450	500	550	600	650	700	
11	115	165	225	293	495	550	605	660	715	770	
12	125	180	245	320	540	600	660	720	780	840	
13	135	195	266	347	585	650	715	780	845	910	
14	146	210	286	374	630	700	770	840	910	980	
15	157	225	307	400	675	750	825	900	975	1050	

THE FORMULAS FOR THE MINIMUM LENGTH OF A MERGING TAPER IN DERIVING THE "L" VALUES SHOWN IN THE ABOVE TABLES ARE AS FOLLOWS:

$$"L" = \frac{W \times S^2}{60}$$ WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 40 MPH OR LESS

"L" = S x W WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 45 MPH OR GREATER

L = MINIMUM LENGTH OF MERGING TAPER
S = POSTED SPEED LIMIT IN MPH PRIOR TO WORK AREA
W = WIDTH OF OFFSET

TYPES OF TAPERS	TAPER LENGTH
UPSTREAM TAPERS	
MERGING TAPER	L - MINIMUM
SHIFTING TAPER	1/2 L - MINIMUM
SHOULDER TAPER	1/3 L - MINIMUM
TWO-WAY TRAFFIC TAPER	100 ' - MAXIMUM
DOWNSTREAM TAPERS (USE IS OPTIONAL)	100 ' - MINIMUM (PER LANE)

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TABLES FOR "L", "D" AND "B" VALUES

DRAWN BY: CON:AE:djf	JUNE 2006 PLAN DATE:	M0020a	SHEET 1 OF 2
CHECKED BY: BMM			
FILE: K:/DGN/TSR/STDS/ENGLISH/MNTTRF/M0020a.dgn	REV. 08/21/2006		

DISTANCE BETWEEN TRAFFIC CONTROL DEVICES "D" AND LENGTH OF LONGITUDINAL BUFFER SPACE ON "WHERE WORKERS PRESENT" SEQUENCES

"D" DISTANCES	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)									
	25	30	35	40	45	50	55	60	65	70
D (FEET)	250	300	350	400	450	500	550	600	650	700

GUIDELINES FOR LENGTH OF LONGITUDINAL BUFFER SPACE "B"

SPEED* MPH	LENGTH FEET
20	33
25	50
30	83
35	132
40	181
45	230
50	279
55	329
60	411
65	476
70	542

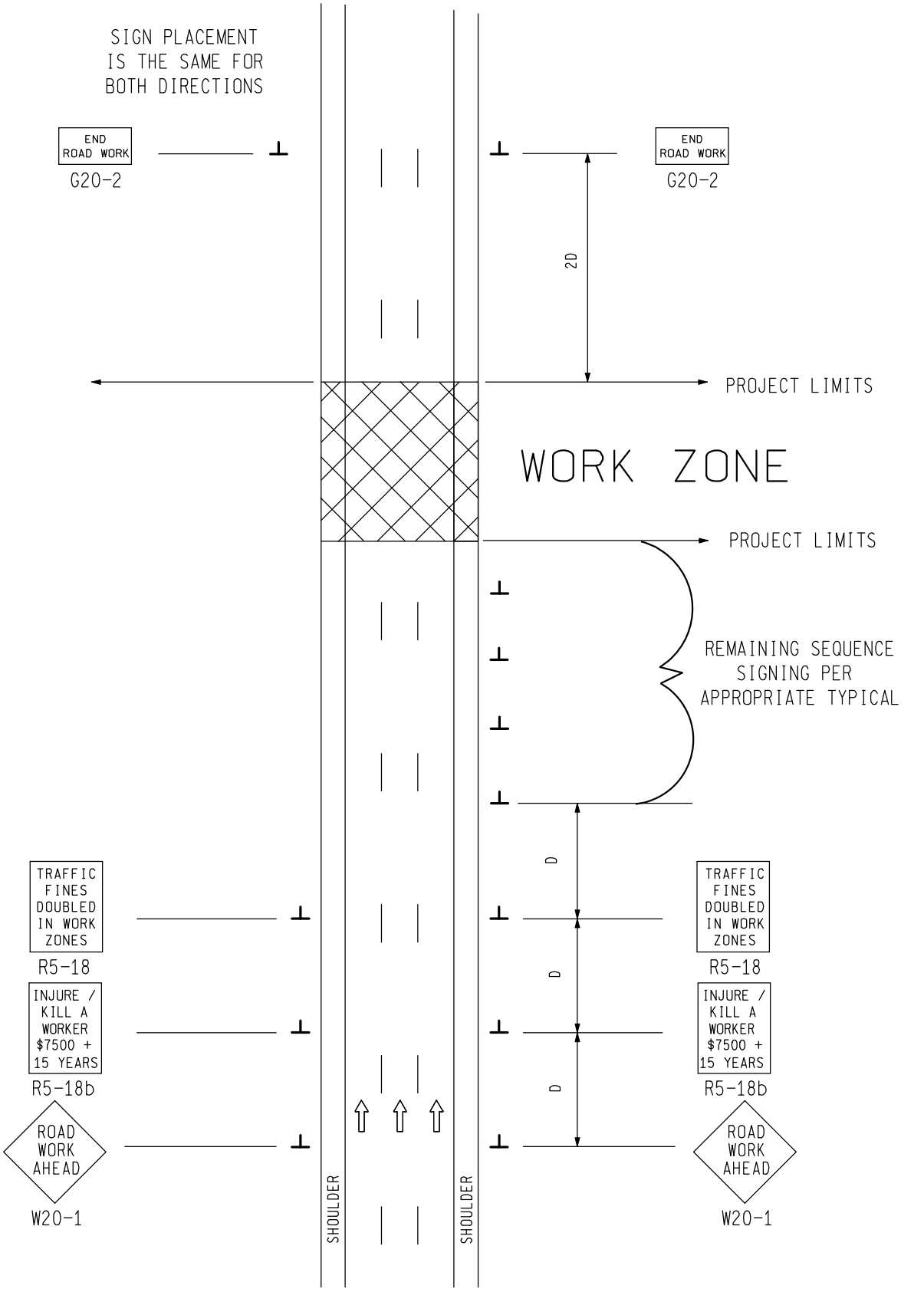
* POSTED SPEED, OFF PEAK 85TH PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED

1 BASED UPON AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) BRAKING DISTANCE PORTION OF STOPPING SIGHT DISTANCE FOR WET AND LEVEL PAVEMENTS (A POLICY ON GEOMETRIC DESIGN OF HIGHWAY AND STREETS), AASHTO. THIS AASHTO DOCUMENT ALSO RECOMMENDS ADJUSTMENTS FOR THE EFFECT OF GRADE ON STOPPING AND VARIATION FOR TRUCKS.

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TABLES FOR "L", "D" AND "B" VALUES

DRAWN BY: CON:AE:djf	JUNE 2006	M0020a	SHEET 2 OF 2
CHECKED BY: BMM	PLAN DATE:		
FILE: K:/DGN/TSR/STDS/ENGLISH/MNTTRF/M0020a.dgn	REV. 08/21/2006		



SIGN = 96 ft2 - TYPE B
FOR ONE DIRECTION OF TRAFFIC
W20-1 QUANTITY INCLUDED WITH
APPROPRIATE TYPICAL FOR
SEQUENCE SIGNING

NOT TO SCALE

MDOT
Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC
TYPICAL

TYPICAL ADVANCE SIGNING TREATMENT FOR INTERMEDIATE AND SHORT TERM STATIONARY WORK ZONE OPERATIONS WHERE ALL TRAFFIC CONTROL DEVICES ARE REMOVED AT END OF EACH WORK DAY ON A DIVIDED ROADWAY

DRAWN BY: CON:AE:djf	JUNE 2006	M0080a	SHEET 1 OF 2
CHECKED BY: BMM	PLAN DATE:		

FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0080a.dgn REV. 08/15/2007

NOTES

30. THE APPROPRIATE ADVANCE SIGNING SEQUENCE(S), (M0030a THROUGH M0080a) SHALL BE USED ON ALL PROJECTS.

35. THESE SIGNS ARE INTENDED TO BE USED WITHIN THE LIMITS OF THE TEMPORARY SEQUENCE SIGNING AS IS SHOWN ON 1 OF 2. THESE SIGNS ARE NOT TO BE INTERMINGLED WITH ANY OTHER TEMPORARY SEQUENCE SIGNING EXCEPT AS SHOWN.

SIGN SIZES

G20-2	-	48″ x 24″
R5-18	-	48″ x 60″
R5-18b	-	48″ x 60″
W20-1	-	48″ x 48″

NOT TO SCALE

MDOT Michigan Department of Transportation

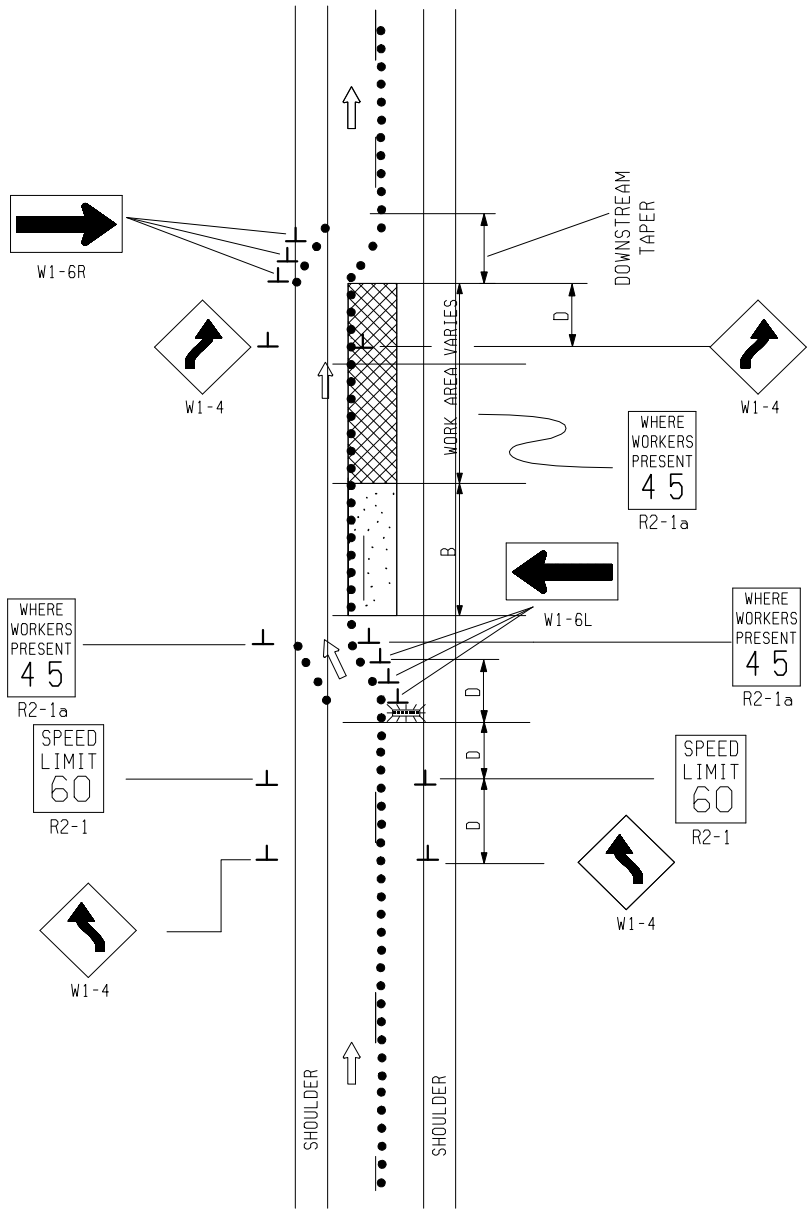
TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

TYPICAL ADVANCE SIGNING TREATMENT FOR INTERMEDIATE AND SHORT TERM STATIONARY WORK ZONE OPERATIONS WHERE ALL TRAFFIC CONTROL DEVICES ARE REMOVED AT END OF EACH WORK DAY ON A DIVIDED ROADWAY

DRAWN BY: CON:AE:djf	JUNE 2006	M0080a	SHEET 2 OF 2
CHECKED BY: BMM	PLAN DATE:		

FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0080a.dgn REV. 08/15/2007



KEY

- CHANNELIZING DEVICES
- LIGHTED ARROW PANEL (CAUTION MODE)
- TRAFFIC FLOW

NOT TO SCALE

MDOT Michigan Department of Transportation

TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

TYPICAL EXTENDED TEMPORARY TRAFFIC CONTROL FOR ONE LANE SHIFT WITHIN A LANE CLOUSURE USING A REDUCED SPEED LIMIT

DRAWN BY: DLL	APRIL 2008	M081b-MOD 1	SHEET 1 OF 2
CHECKED BY: AMK	PLAN DATE:		
FILE: M081b-MOD 1.dgn		REV. 04/07/2008	

NOTES

1G. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
L = MINIMUM LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER
SEE M0020e FOR "D," "L," AND "B" VALUES

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

4D. THE SPACING OF CHANNELLING DEVICES SHOULD NOT EXCEED 45 FEET WHEN USED FOR TAPER CHANNELIZATION, AND SHOULD NOT EXCEED 90 FEET WHEN USED FOR TANGENT CHANNELIZATION.

5. FOR OVERNIGHT CLOSURES, CHANNELIZING DEVICES SHALL BE LIGHTED PLASTIC DRUMS.

6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.

8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.

16C. ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED SHALL BE PLACED AFTER EACH ENTRANCE RAMP THAT COMES ONTO THE FREEWAY WHERE THE REDUCED SPEED IS IN EFFECT.

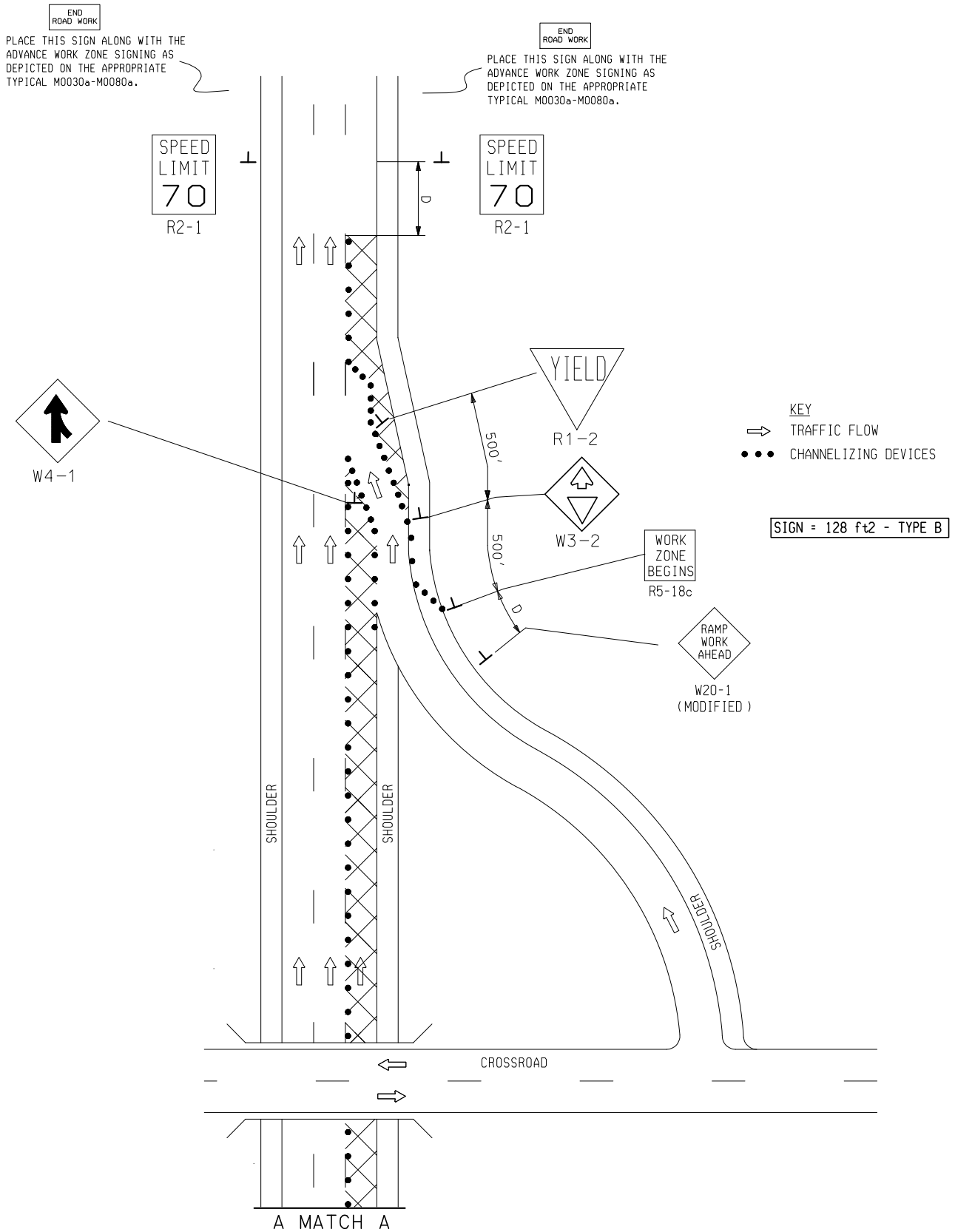
21. ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS, SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.

SIGN SIZES

RECTANGULAR REGULATORY - 48" x 60"
DIAMOND WARNING - 48" x 48"
W 1-6 DIRECTIONAL ARROW - 48" x 24"

NOT TO SCALE

MDOT Michigan Department of Transportation TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TYPICAL EXTENDED TEMPORARY TRAFFIC CONTROL FOR ONE LANE SHIFT WITHIN A LANE CLOUSURE USING A REDUCED SPEED LIMIT		
DRAWN BY: DLL CHECKED BY: AMK	2008 PLAN DATE:	M081b-MOD 1	SHEET 2 OF 2
FILE: M081b-MOD 1.dgn		REV. 04/07/2008	



NOT TO SCALE

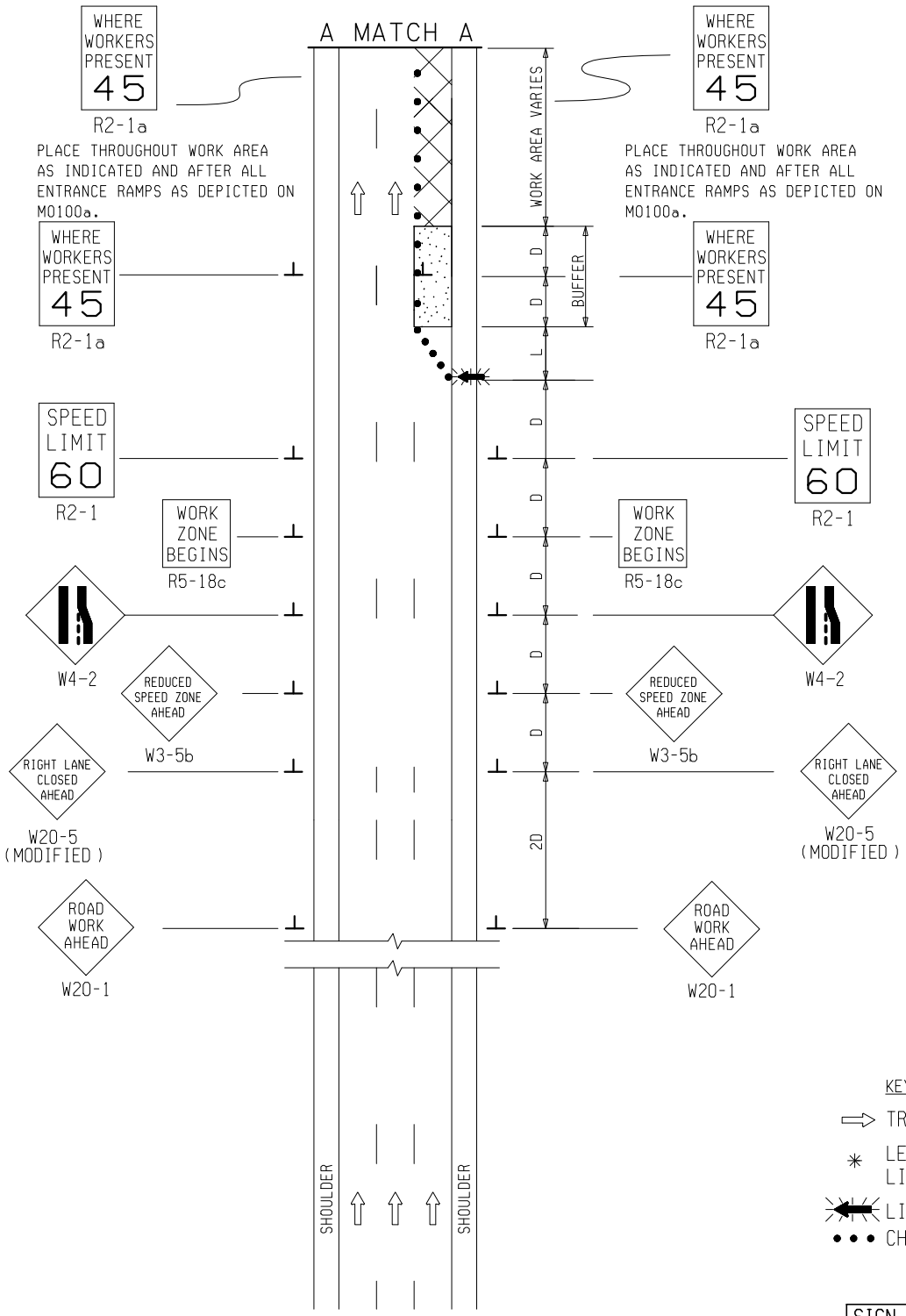
MDOT Michigan Department of Transportation

TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR AN ENTRANCE RAMP TO A MAINLINE RIGHT LANE CLOSURE

DRAWN BY: DLL	APRIL 2008	M081e-MOD 1	SHEET 1 OF 3
CHECKED BY: AMK	PLAN DATE:		
FILE: M081e-MOD 1.DGN		REV. 04/07/2008	



KEY

- TRAFFIC FLOW
- ✳ LEGEND REFLECTS SPEED LIMIT BEYOND WORK AREA
- LIGHTED ARROW PANEL
- • • • CHANNELIZING DEVICES

SIGN = 312 ft2 - TYPE B
PLUS ADDITIONAL R2-1's
THROUGHOUT WORK AREA

NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR AN ENTRANCE RAMP TO A MAINLINE RIGHT LANE CLOSURE

DRAWN BY: DLL	APRIL 2008	M081e-MOD 1	SHEET 2 OF 3
CHECKED BY: AMK	PLAN DATE:		
FILE: M081e-MOD 1.DGN		REV. 04/07/2008	

NOTES

1G. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
L = MINIMUM LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER
SEE M0020a FOR "D," "L," AND "B" VALUES

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.

4D. THE SPACING OF CHANNELIZING DEVICES SHOULD NOT EXCEED 45 FEET FOR TAPER CHANNELIZATION, AND SHOULD NOT EXCEED 90 FEET WHEN USED FOR TANGENT CHANNELIZATION.

5. FOR OVERNIGHT CLOSURES, CHANNELIZING DEVICES SHALL BE LIGHTED PLASTIC DRUMS.

6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.

7. ALL 4' x 4' WARNING SIGNS, TYPE III BARRICADES, THEIR TEMPORARY SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL BE FABRICATED IN ACCORDANCE WITH THE CURRENT STANDARD PLAN.

8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.

16C. ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED SHALL BE PLACED AFTER EACH ENTRANCE RAMP THAT COMES ONTO THE FREEWAY WHERE THE REDUCED SPEED IS IN EFFECT.

21. ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS, SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.

26. THE LIGHTED ARROW PANEL SHALL BE LOCATED AT THE BEGINNING OF THE TAPER AS SHOWN. WHEN PHYSICAL LIMITATIONS RESTRICT ITS PLACEMENT AS INDICATED, THEN IT SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE.

SIGN SIZES

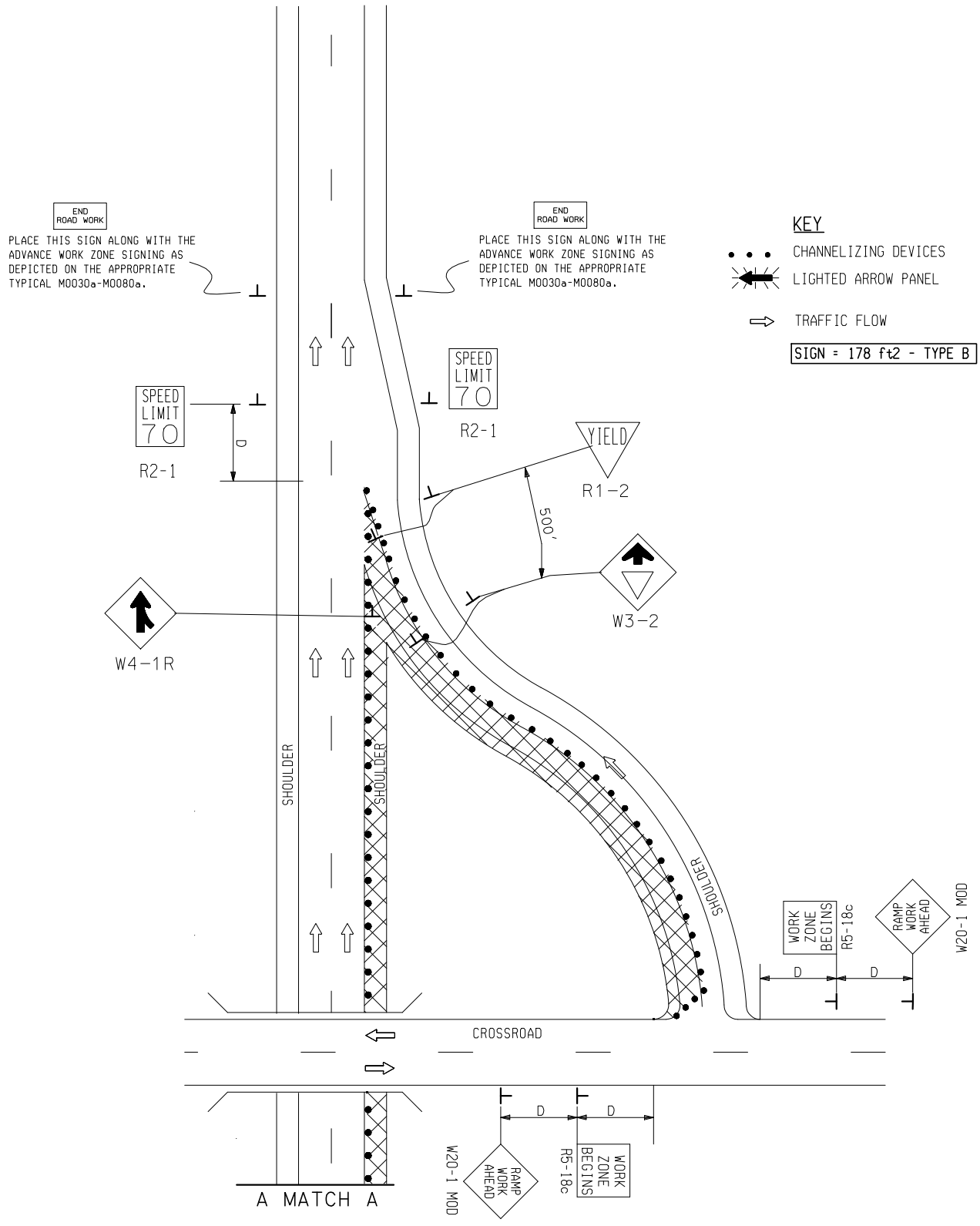
DIAMOND WARNING - 48 " x 48 "
RECTANGULAR REGULATORY - 48 " x 60 "
R5-18c REGULATORY - 48 " x 48 "
R1-2 YIELD - 48" x 48" x 48"

NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR AN ENTRANCE RAMP TO A MAINLINE RIGHT LANE CLOSURE

DRAWN BY: DLL	APRIL 2008	M081e-MOD 1	SHEET 3 OF 3
CHECKED BY: AMK	PLAN DATE:		
FILE: M081e-MOD 1.DGN		REV. 04/07/2008	



NOT TO SCALE

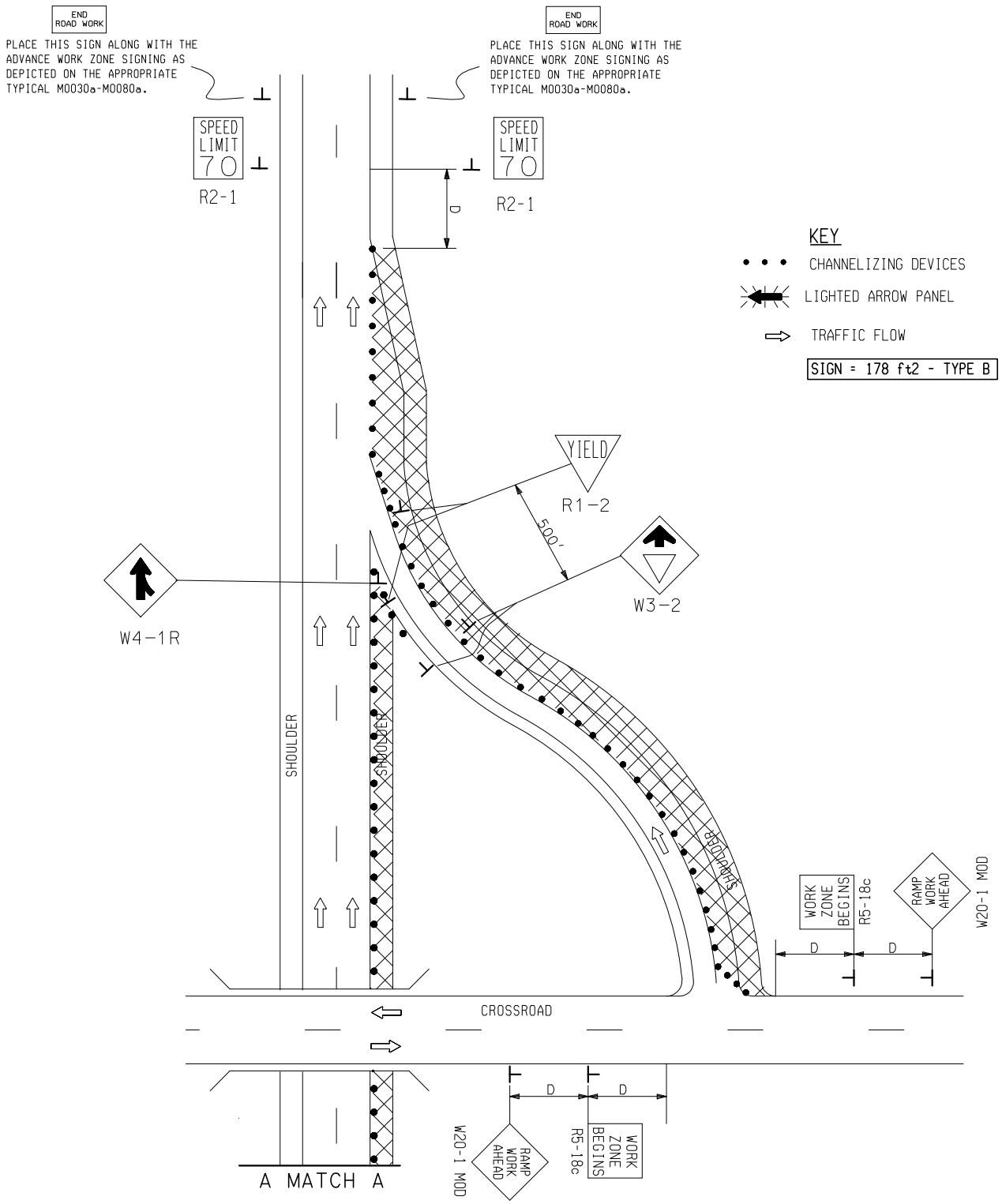
MDOT Michigan Department of Transportation

TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR AN ENTRANCE RAMP TO A MAINLINE RIGHT LANE CLOSURE

DRAWN BY: DLL	APRIL 2008	M081e-MOD 2	SHEET 1 OF 4
CHECKED BY: AMK	PLAN DATE:		
FILE: M081e-MOD 2.DGN		REV. 04/07/2008	



NOT TO SCALE

MDOT Michigan Department of Transportation

TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

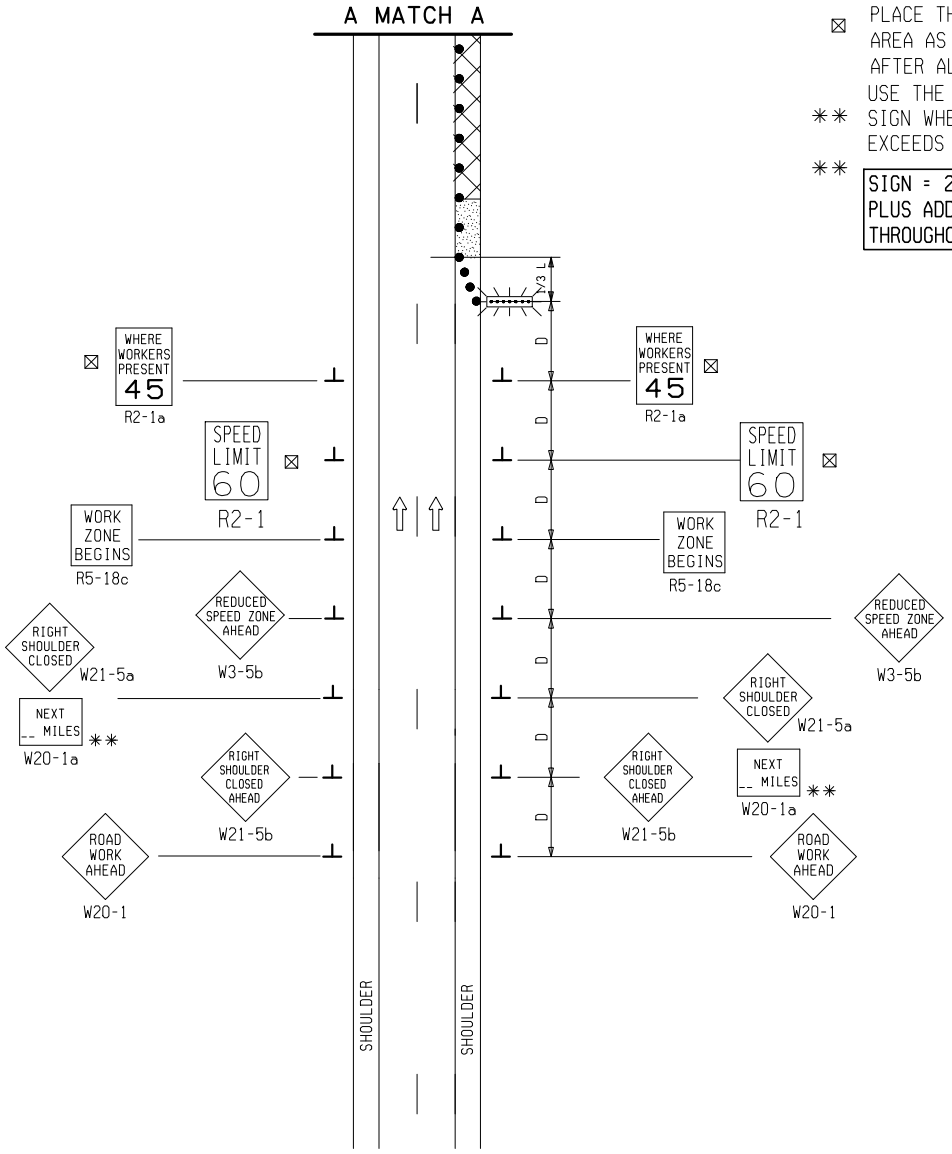
TYPICAL TEMPORARY TRAFFIC CONTROL FOR AN ENTRANCE RAMP TO A MAINLINE RIGHT LANE CLOSURE

DRAWN BY: DLL	APRIL 2008	M081e-MOD 2	SHEET 2 OF 4
CHECKED BY: AMK	PLAN DATE:		
FILE: M081e-MOD 2.DGN		REV. 04/07/2008	

KEY

- • • • CHANNELIZING DEVICES
- LIGHTED ARROW PANEL
- ⇨ TRAFFIC FLOW
- △ SEE SHEET 2 OF 2
- ✳ LEGEND REFLECTS SPEED LIMIT BEYOND WORK AREA
- ⊠ PLACE THROUGHOUT WORK AREA AS INDICATED AND AFTER ALL ENTRANCE RAMPS
- ✳✳ USE THE "NEXT __ MILES" SIGN WHEN SHOULDER CLOSURE EXCEEDS 1 MILE IN LENGTH

SIGN = 248 ft2 - TYPE B
PLUS ADDITIONAL R2-1's
THROUGHOUT WORK AREA



NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR AN ENTRANCE RAMP TO A MAINLINE RIGHT LANE CLOSURE

DRAWN BY: DLL	APRIL 2008	M081e-MOD 2	SHEET 3 OF 4
CHECKED BY: AMK	PLAN DATE:		
FILE: M081e-MOD 2.DGN		REV. 04/07/2008	

NOTES

1G. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
L = MINIMUM LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER
SEE M0020a FOR "D," "L," AND "B" VALUES

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.

4D. THE SPACING OF CHANNELIZING DEVICES SHOULD NOT EXCEED 45 FEET WHEN USED FOR TAPER CHANNELIZATION, AND SHOULD NOT EXCEED 90 FEET WHEN USED FOR TANGENT CHANNELIZATION.

5. FOR OVERNIGHT CLOSURES, CHANNELIZING DEVICES SHALL BE LIGHTED PLASTIC DRUMS.

6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.

7. ALL 4' x 4' WARNING SIGNS, TYPE III BARRICADES, THEIR TEMPORARY SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL BE FABRICATED IN ACCORDANCE WITH THE CURRENT STANDARD PLAN.

8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.

16C. ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED SHALL BE PLACED AFTER EACH ENTRANCE RAMP THAT COMES ONTO THE FREEWAY WHERE THE REDUCED SPEED IS IN EFFECT.

21. ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS, SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.

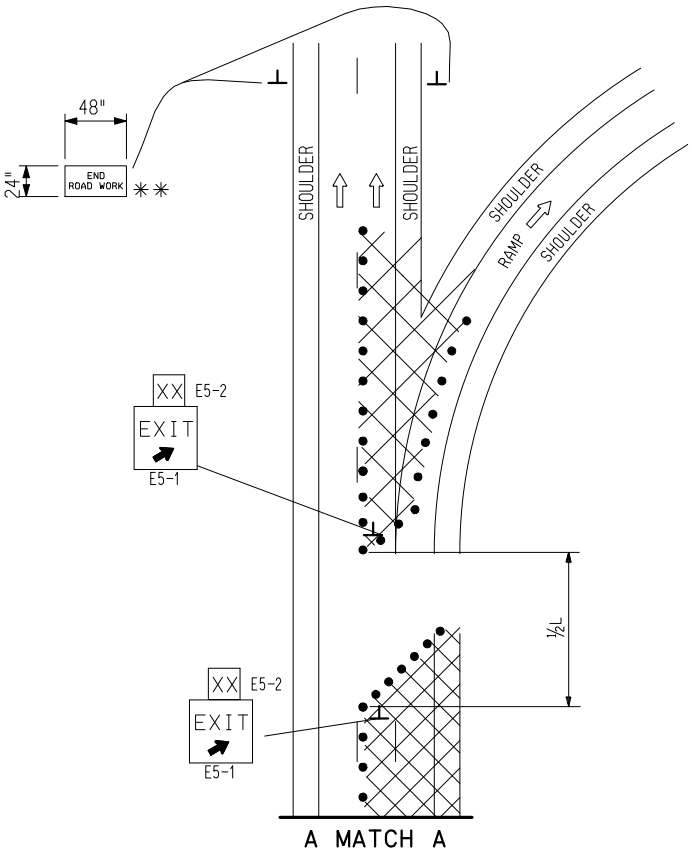
26. THE LIGHTED ARROW PANEL SHALL BE LOCATED AT THE BEGINNING OF THE TAPER AS SHOWN. WHEN PHYSICAL LIMITATIONS RESTRICT ITS PLACEMENT AS INDICATED, THEN IT SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE.

SIGN SIZES

DIAMOND WARNING - 48 " x 48 "
RECTANGULAR REGULATORY - 48 " x 60 "
R5-18c REGULATORY - 48 " x 48 "
R1-2 YIELD - 48" x 48" x 48"

NOT TO SCALE

MDOT Michigan Department of Transportation TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TYPICAL TEMPORARY TRAFFIC CONTROL FOR AN ENTRANCE RAMP TO A MAINLINE RIGHT LANE CLOSURE		
DRAWN BY: DLL CHECKED BY: AMK	APRIL 2008 PLAN DATE:	M081e-MOD 2	SHEET 4 OF 4
FILE: M081e-MOD 2.DGN		REV. 04/07/2008	



KEY

- CHANNELIZING DEVICES
- LIGHTED ARROW PANEL
- TRAFFIC FLOW
- ▲ SEE SHEET 2 OF 2
- * LEGEND REFLECTS SPEED LIMIT BEYOND WORK AREA
- ⊠ PLACE ADDITIONAL SUPPLEMENTAL SETS OF SPEED LIMIT SIGNS THROUGHOUT THE WORK AREA AS DEPICTED ON TYPICAL M0100a.
- ** PLACE THIS SIGN ALONG WITH THE ADVANCE WORK ZONE SIGNING AS DEPICTED ON THE APPROPRIATE TYPICAL M0030a-M0080a.

SIGN = 56 ft2 - TYPE B
PLUS ADDITIONAL R2-1's
THROUGHOUT WORK AREA

NOT TO SCALE

MDOT Michigan Department of Transportation

TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

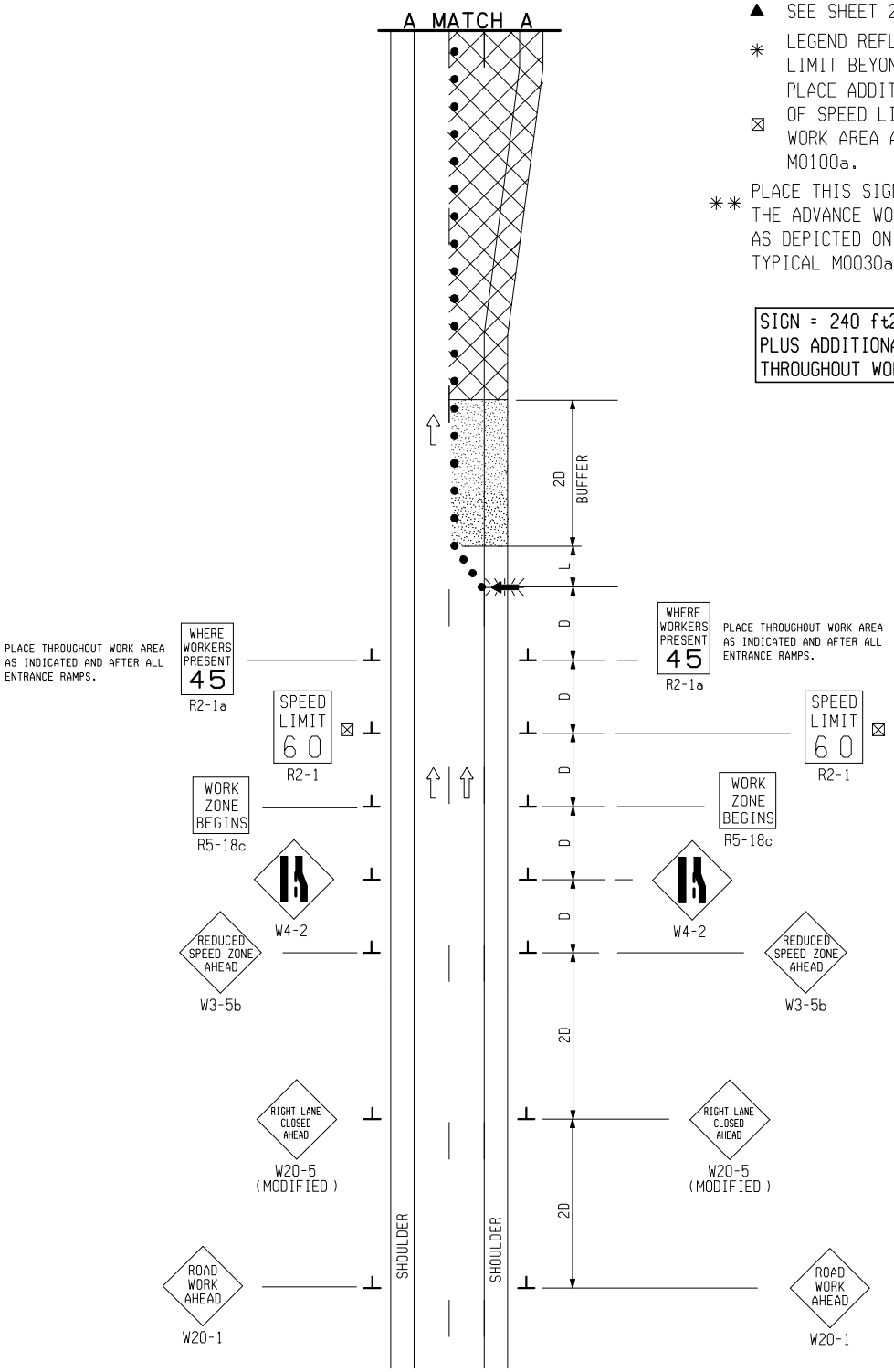
TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A ROADWAY IN ADVANCE OF A GORE AREA AT A MINOR DIVERGENCE USING A REDUCED SPEED LIMIT WHERE WORKERS PRESENT

DRAWN BY: DLL	APRIL 2008	M099e MOD	SHEET 1 OF 3
CHECKED BY: AMK	PLAN DATE:		
FILE: M099e-MOD.DGN		REV. 04/07/2008	

KEY

- CHANNELIZING DEVICES
- LIGHTED ARROW PANEL
- TRAFFIC FLOW
- ▲ SEE SHEET 2 OF 2
- ✳ LEGEND REFLECTS SPEED LIMIT BEYOND WORK AREA PLACE ADDITIONAL SUPPLEMENTAL SETS OF SPEED LIMIT SIGNS THROUGHOUT THE WORK AREA AS DEPICTED ON TYPICAL M0100a.
- ✳✳ PLACE THIS SIGN ALONG WITH THE ADVANCE WORK ZONE SIGNING AS DEPICTED ON THE APPROPRIATE TYPICAL M0030a-M0080a.

SIGN = 240 ft2 - TYPE B
PLUS ADDITIONAL R2-1's
THROUGHOUT WORK AREA



NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A ROADWAY IN ADVANCE OF A GORE AREA AT A MINOR DIVERGENCE USING A REDUCED SPEED LIMIT WHERE WORKERS PRESENT

DRAWN BY: DLL	APRIL 2008	M099e MOD	SHEET 2 OF 3
CHECKED BY: AMK	PLAN DATE:		
FILE: M099e-MOD.DGN		REV. 04/07/2008	

NOTES

1G. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
L & 1/2 L = MINIMUM LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER
SEE **M0020a** FOR "D," "L," AND "B" VALUES

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.

4D. THE SPACING OF CHANNELIZING DEVICES SHOULD NOT EXCEED 45 FEET WHEN USED FOR TAPER CHANNELIZATION, AND SHOULD NOT EXCEED 90 FEET WHEN USED FOR TANGENT CHANNELIZATION.

5. FOR OVERNIGHT CLOSURES, CHANNELIZING DEVICES SHALL BE LIGHTED PLASTIC DRUMS.

6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.

7. ALL 4' x 4' WARNING SIGNS, TYPE III BARRICADES, THEIR TEMPORARY SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL BE FABRICATED IN ACCORDANCE WITH THE CURRENT STANDARD PLAN.

8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

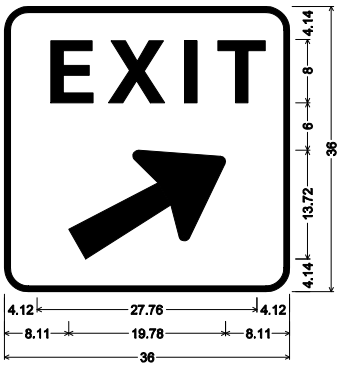
16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.

16C. ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED SHALL BE PLACED AFTER EACH ENTRANCE RAMP THAT COMES ONTO THE FREEWAY WHERE THE REDUCED SPEED IS IN EFFECT.

21. ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS, SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.

26. THE LIGHTED ARROW PANEL SHALL BE LOCATED AT THE BEGINNING OF THE TAPER AS SHOWN. WHEN PHYSICAL LIMITATIONS RESTRICT ITS PLACEMENT AS INDICATED, THEN IT SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE.

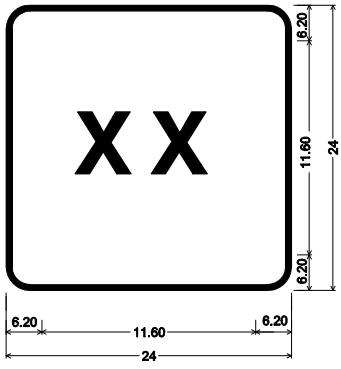
SIGN DETAIL



E5-1;
3.00" Radius, 0.75" Border, Black on Orange;
[EXIT] ClearviewHwy-6-W;
Arrow B-13 - 21.50" 30°;
Table of widths and spaces.

	E		X		I		T	
4.12	5.47	1.95	7.36	2.54	1.62	2.67	6.15	4.12

8.11	19.78	8.11



E5-2;
1.50" Radius, 0.5" Border,
Black on Orange;
"XX" E;
Table of widths and spaces.

	X		X	
6.20	5.20	1.20	5.20	6.20

COLORS

LEGEND AND BORDER - BLACK (NON-REFLECTORIZED)
BACKGROUND - ORANGE (REFLECTORIZED)

SIGN SIZES

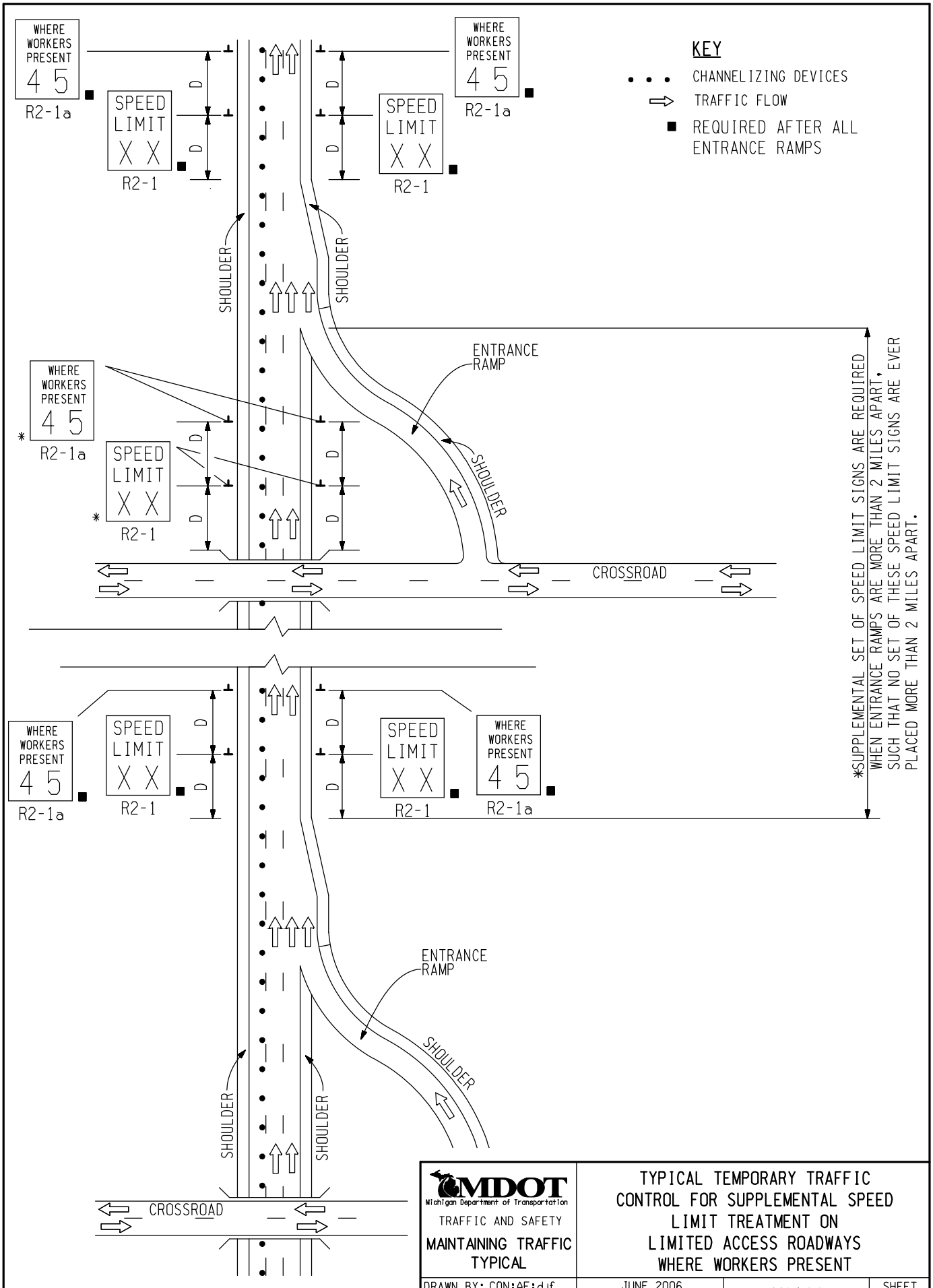
DIAMOND WARNING - 48" x 48"
RECTANGULAR REGULATORY - 48" x 60"
R5-18c REGULATORY - 48" x 48"
R2-1a REGULATORY - 48" x 60"
E5-1 "EXIT" ARROW - 60" x 48"
E5-2 EXIT NUMBERS - 24" x 24"
G20-2 "END ROAD WORK" - 48" x 24"

NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A ROADWAY IN ADVANCE OF A GORE AREA AT A MINOR DIVERGENCE USING A REDUCED SPEED LIMIT WHERE WORKERS PRESENT

DRAWN BY: DLL	APRIL 2008	M099e MOD	SHEET 3 OF 3
CHECKED BY: AMK	PLAN DATE:		
FILE: M099e-MOD.DGN		REV. 04/07/2008	



MDOT Michigan Department of Transportation

TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR SUPPLEMENTAL SPEED LIMIT TREATMENT ON LIMITED ACCESS ROADWAYS WHERE WORKERS PRESENT

DRAWN BY: CON:AE:djf	JUNE 2006	M0100a	SHEET 1 OF 2
CHECKED BY: BMM	PLAN DATE:		

FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0100a.dgn REV. 08/21/2007

NOTES

1N. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
SEE **M0020a** FOR "D" VALUES

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

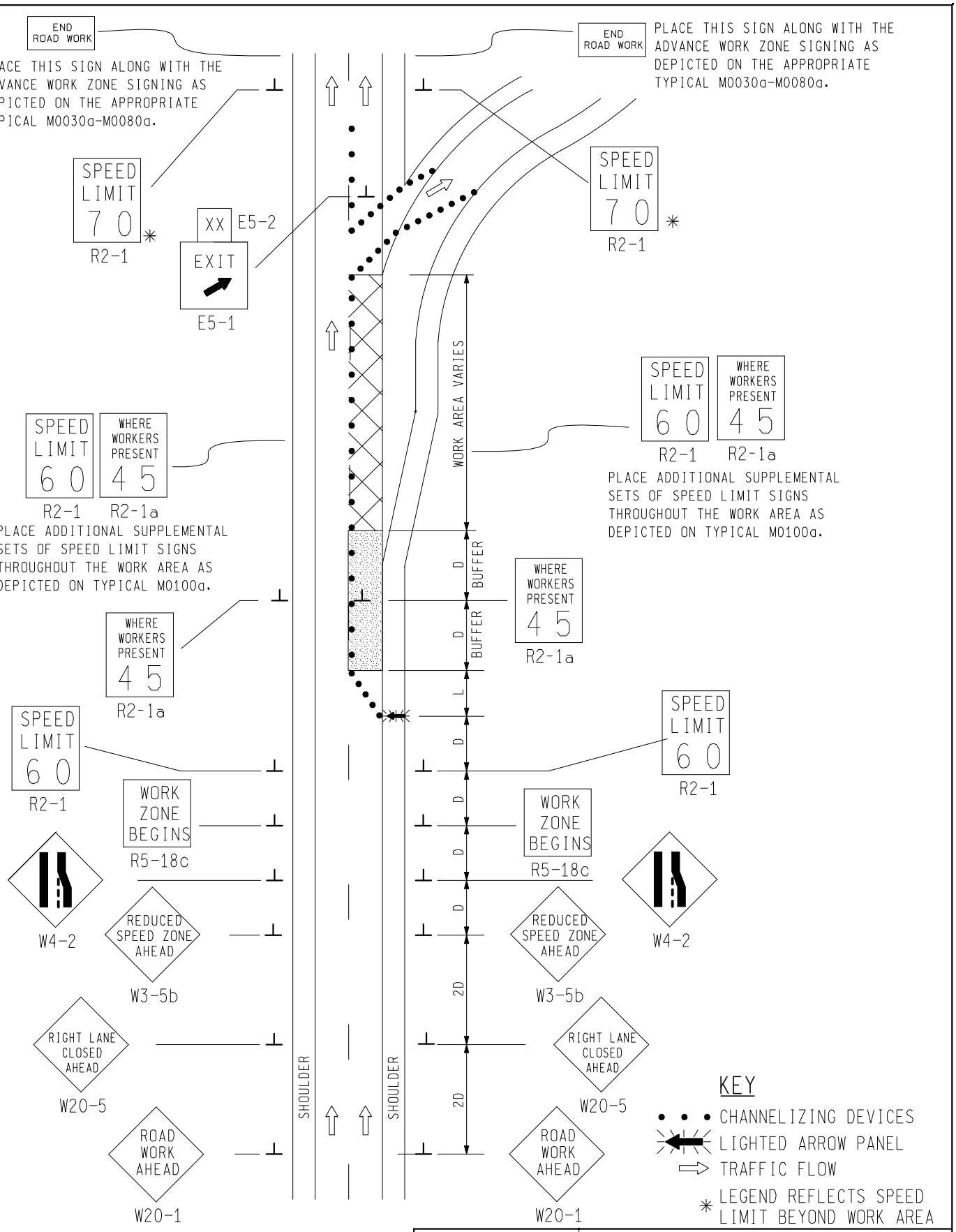
3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE 2005 EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

NOT TO SCALE

MDOT Michigan Department of Transportation TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TYPICAL TEMPORARY TRAFFIC CONTROL FOR SUPPLEMENTAL SPEED LIMIT TREATMENT ON LIMITED ACCESS ROADWAYS WHERE WORKERS PRESENT		
DRAWN BY: CON:AE:djf CHECKED BY: BMM	JUNE 2006 PLAN DATE:	M0100a	SHEET 2 OF 2
FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0100a.dgn REV. 08/21/2007			



SIGN = 289 ft2 - TYPE B
PLUS ADDITIONAL SPEED LIMIT SIGNING THROUGHOUT WORK AREA

NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A FREEWAY WITH AN EXIT RAMP USING REDUCED SPEED LIMIT WHERE WORKERS PRESENT

DRAWN BY: DLL	APRIL 2008	M0950a-MOD	SHEET 1 OF 2
CHECKED BY: AMK	PLAN DATE:		
FILE: M0950a MOD.dgn		REV. 04/07/2008	

NOTES

1G. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES AND LENGTH OF LONGITUDINAL BUFFERS
L = MINIMUM LENGTH OF TAPER
SEE M0020a FOR "D" AND "L" VALUES

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.

4D. THE SPACING OF CHANNELIZING DEVICES SHOULD NOT EXCEED 45 FEET WHEN USED FOR TAPER CHANNELIZATION, AND SHOULD NOT EXCEED 90 FEET WHEN USED FOR TANGENT CHANNELIZATION.

5. FOR OVERNIGHT CLOSURES, CHANNELIZING DEVICES SHALL BE LIGHTED PLASTIC DRUMS.

6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.

7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE 2005 EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

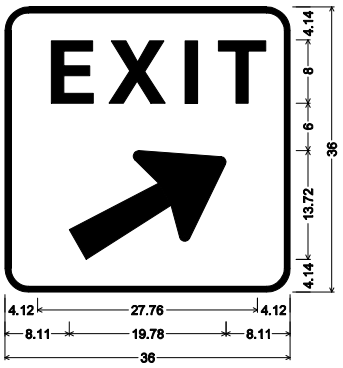
8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.

21. ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS, SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.

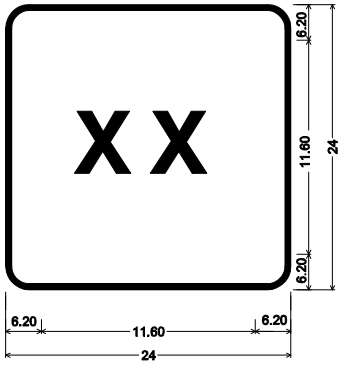
26. THE LIGHTED ARROW PANEL SHALL BE LOCATED AT THE BEGINNING OF THE TAPER AS SHOWN. WHEN PHYSICAL LIMITATIONS RESTRICT ITS PLACEMENT AS INDICATED, THEN IT SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE.

SIGN DETAIL



E5-1;
3.00" Radius, 0.75" Border, Black on Orange;
[EXIT] ClearviewHwy-6-W;
Arrow B-13 - 21.50" 30°;
Table of widths and spaces.

4.12	E 5.47	1.95	X 7.36	2.54	I 1.62	2.67	T 6.15	4.12
8.11	19.78	8.11						



E5-2;
1.50" Radius, 0.5" Border, Black on Orange;
"XX" E;
Table of widths and spaces.

6.20	X 5.20	1.20	X 5.20	6.20

COLORS

LEGEND AND BORDER - BLACK (NON-REFLECTORIZED)
BACKGROUND - ORANGE (REFLECTORIZED)

SIGN SIZES

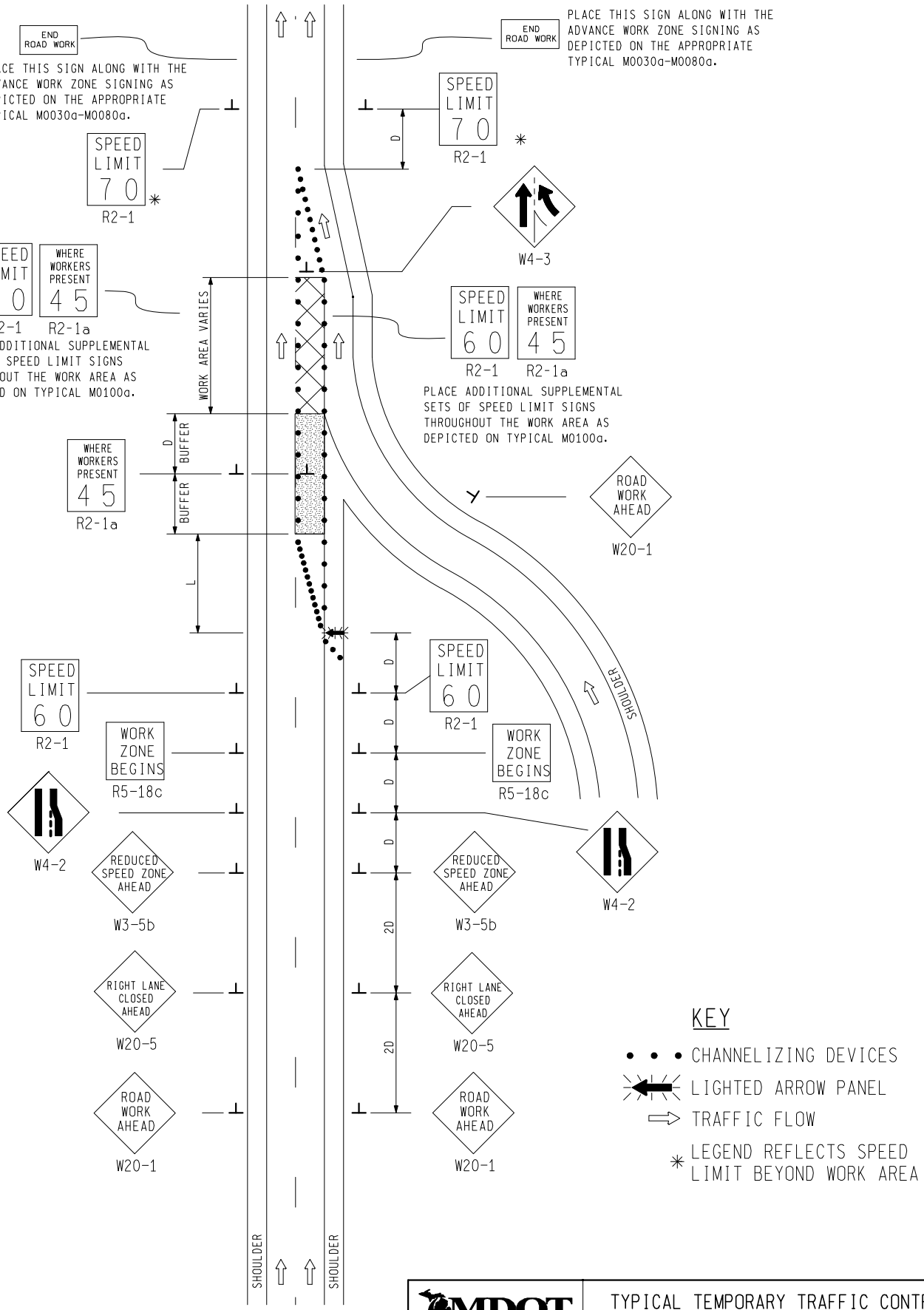
DIAMOND WARNING - 48" x 48"
RECTANGULAR REGULATORY - 48" x 60"
R5-18c REGULATORY - 48" x 48"
E5-2 EXIT NUMBERS - 24" x 24"

NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A FREEWAY WITH AN EXIT RAMP USING REDUCED SPEED LIMIT WHERE WORKERS PRESENT

DRAWN BY: DLL	APRIL 2008	M0950a-MOD	SHEET 2 OF 2
CHECKED BY: AMK	PLAN DATE:		
FILE: M0950a MOD.dgn		REV. 04/07/2008	



SIGN = 312 ft2 - TYPE B
PLUS ADDITIONAL SPEED LIMIT SIGNING THROUGHOUT WORK AREA

NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A FREEWAY WITH AN ENTRANCE RAMP USING REDUCED SPEED LIMIT WHERE WORKERS PRESENT

DRAWN BY: DLL	APRIL 2008	M0960a MOD 1	SHEET 1 OF 2
CHECKED BY: AMK	PLAN DATE:		
FILE: M0960a MOD 1.dgn		REV. 04/07/2008	

NOTES

1G. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
AND LENGTH OF LONGITUDINAL BUFFERS
L = MINIMUM LENGTH OF TAPER
SEE M0020a FOR "D" AND "L" VALUES

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.

4D. THE SPACING OF CHANNELIZING DEVICES SHOULD NOT EXCEED 45 FEET WHEN USED FOR TAPER CHANNELIZATION, AND SHOULD NOT EXCEED 90 FEET WHEN USED FOR TANGENT CHANNELIZATION.

5. FOR OVERNIGHT CLOSURES, CHANNELIZING DEVICES SHALL BE LIGHTED PLASTIC DRUMS.

6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.

7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE 2005 EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.

21. ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS, SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.

26. THE LIGHTED ARROW PANEL SHALL BE LOCATED AT THE BEGINNING OF THE TAPER AS SHOWN. WHEN PHYSICAL LIMITATIONS RESTRICT ITS PLACEMENT AS INDICATED, THEN IT SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE.

SIGN SIZES

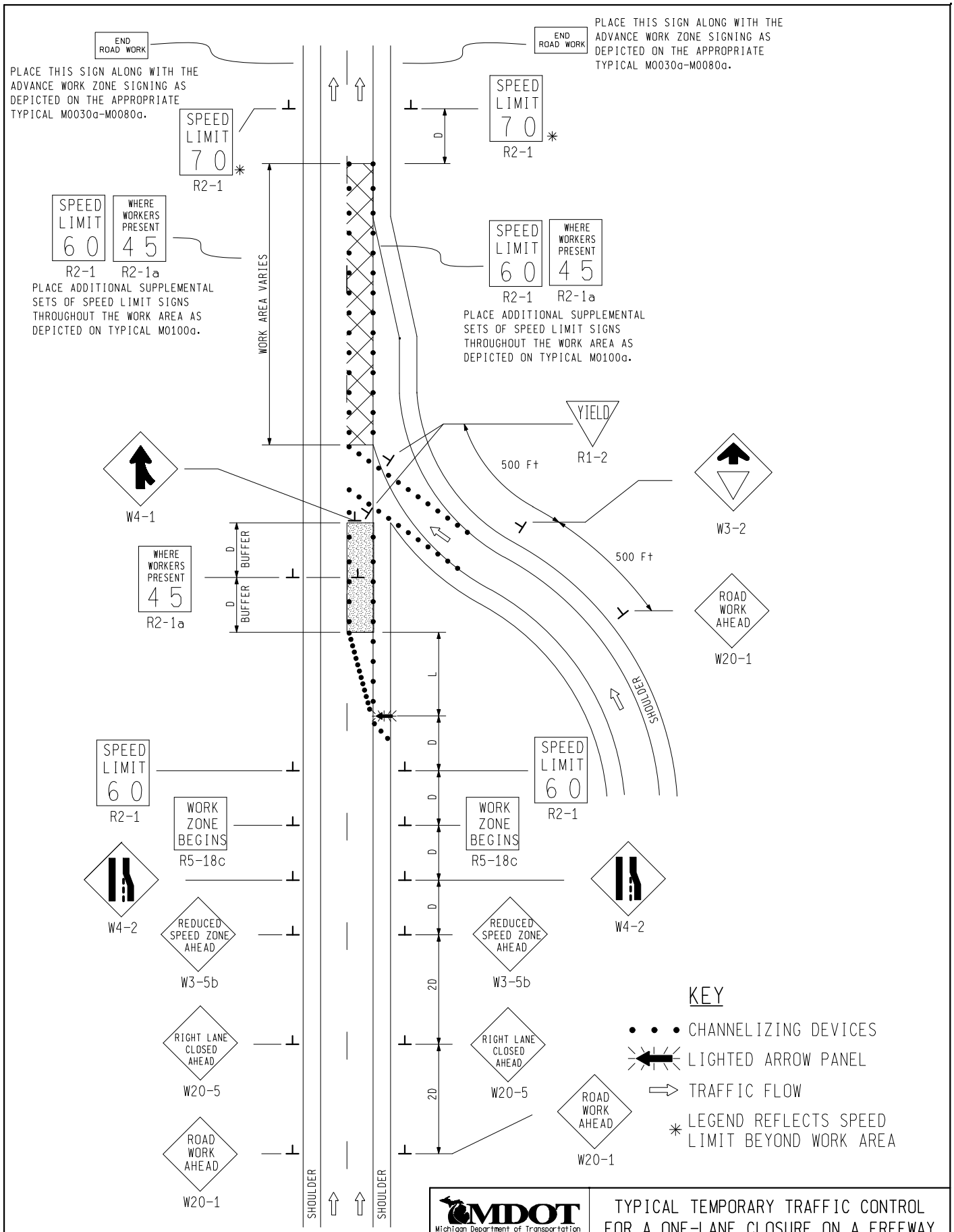
DIAMOND WARNING	- 48" x 48"
RECTANGULAR REGULATORY	- 48" x 60"
R5-18c REGULATORY	- 48" x 48"

NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A FREEWAY WITH AN ENTRANCE RAMP USING REDUCED SPEED LIMIT WHERE WORKERS PRESENT

DRAWN BY: DLL	APRIL 2008	M0960a MOD 1	SHEET 2 OF 2
CHECKED BY: AMK	PLAN DATE:		
FILE: M0960a MOD 1.dgn		REV.04/07/2008	



SIGN = 328 ft2 - TYPE B
SIGN = 7 ft2 - TYPE A
PLUS ADDITIONAL SPEED LIMIT SIGNING THROUGHOUT WORK AREA

NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A FREEWAY WITH AN ENTRANCE RAMP USING REDUCED SPEED LIMIT WHERE WORKERS PRESENT

DRAWN BY: DLL	APRIL 2008	M0960a-MOD 2	SHEET 1 OF 2
CHECKED BY: AMK	PLAN DATE:		
FILE: M0960a MOD 2.dgn		REV. 04/07/2008	

NOTES

1I. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
AND LENGTH OF LONGITUDINAL BUFFERS
L = MINIMUM LENGTH OF TAPER
SEE M0020a FOR "D" AND "L" VALUES

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4D. THE SPACING OF CHANNELIZING DEVICES SHOULD NOT EXCEED 45 FEET WHEN USED FOR TAPER CHANNELIZATION, AND SHOULD NOT EXCEED 90 FEET WHEN USED FOR TANGENT CHANNELIZATION.

5. FOR OVERNIGHT CLOSURES, CHANNELIZING DEVICES SHALL BE LIGHTED PLASTIC DRUMS.

6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.

7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE 2005 EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.

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SIGN SIZES

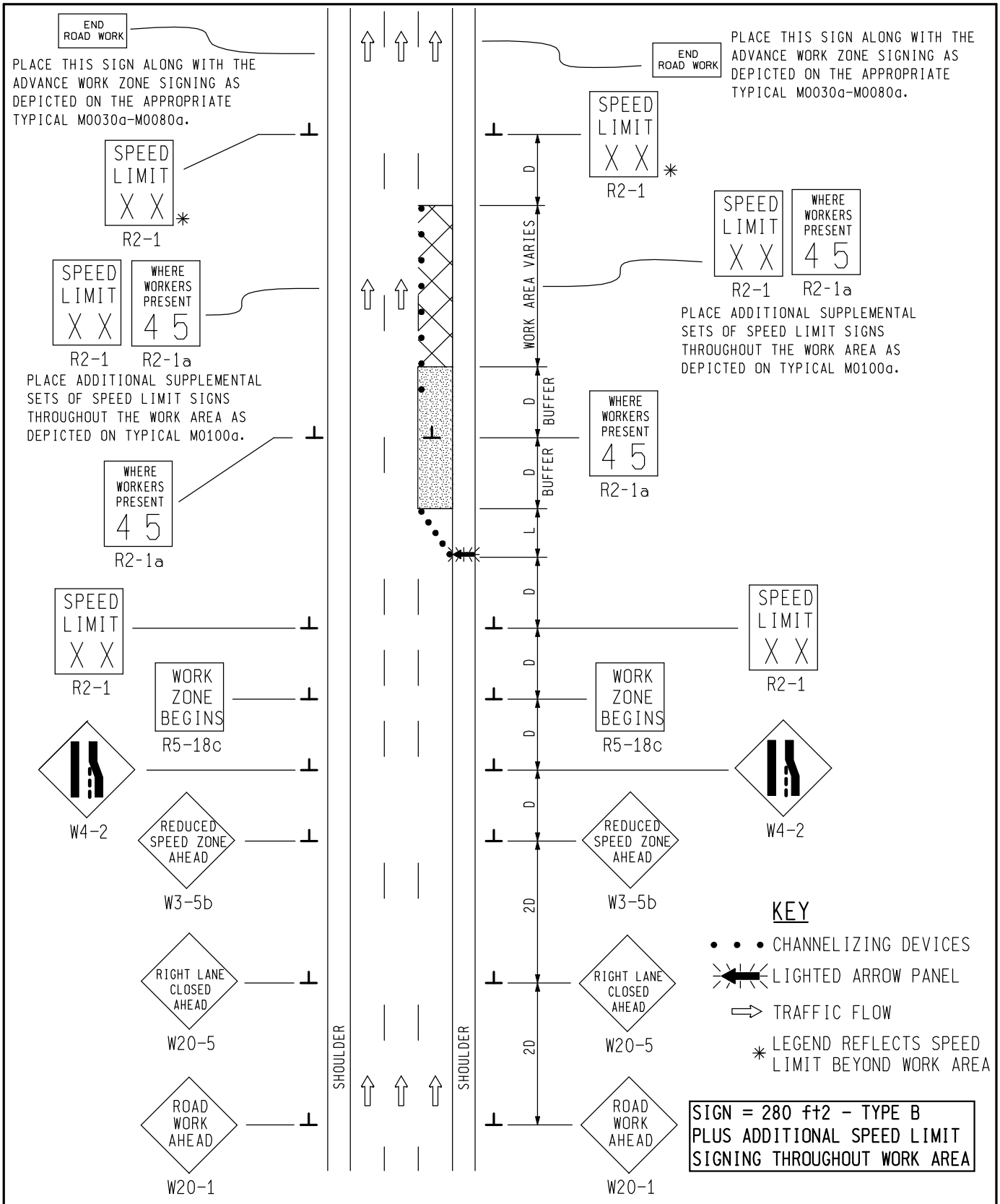
DIAMOND WARNING	- 48" x 48"
RECTANGULAR REGULATORY	- 48" x 60"
R5-18c REGULATORY	- 48" x 48"
R1-2 REGULATORY	- 48" x 48" x 48"

NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A FREEWAY WITH AN ENTRANCE RAMP USING REDUCED SPEED LIMIT WHERE WORKERS PRESENT

DRAWN BY: DLL	APRIL 2008	M0960a-MOD 2	SHEET 2 OF 2
CHECKED BY: AMK	PLAN DATE:		
FILE: M0960a MOD 2.dgn		REV. 04/07/2008	



NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A FREEWAY USING REDUCED SPEED LIMIT WHERE WORKERS PRESENT

DRAWN BY: CON:AE:djf	JUNE 2006	M0990a	SHEET 1 OF 2
CHECKED BY: BMM	PLAN DATE:		
FILE: K:-DGN-TSR-STDS-ENGLISH-MNTTRF-M0990a.dgn	REV. 08/13/2007		

NOTES

1I. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
AND LENGTH OF LONGITUDINAL BUFFERS
L = MINIMUM LENGTH OF TAPER
SEE **M0020a** FOR "D" AND "L" VALUES

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4D. THE SPACING OF CHANNELIZING DEVICES SHOULD NOT EXCEED 45 FEET WHEN USED FOR TAPER CHANNELIZATION, AND SHOULD NOT EXCEED 90 FEET WHEN USED FOR TANGENT CHANNELIZATION.

5. FOR OVERNIGHT CLOSURES, CHANNELIZING DEVICES SHALL BE LIGHTED PLASTIC DRUMS.

6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.

7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE 2005 EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.

21. ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS, SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.

26. THE LIGHTED ARROW PANEL SHALL BE LOCATED AT THE BEGINNING OF THE TAPER AS SHOWN. WHEN PHYSICAL LIMITATIONS RESTRICT ITS PLACEMENT AS INDICATED, THEN IT SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE TAPER AS POSSIBLE.

SIGN SIZES

DIAMOND WARNING	- 48" x 48"
RECTANGULAR REGULATORY	- 48" x 60"
R5-18c REGULATORY	- 48" x 48"

NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A FREEWAY USING REDUCED SPEED LIMIT WHERE WORKERS PRESENT

DRAWN BY: CON:AE:djf	JUNE 2006	M0990a	SHEET 2 OF 2
CHECKED BY: BMM	PLAN DATE:		
FILE: K:-DGN-TSR-STDS-ENGLISH-MNTTRF-M0990a.dgn	REV. 08/13/2007		

F.Design Plans/Typical

MICHIGAN
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED BRIDGE REPLACEMENT

MICHIGAN PROJECT

CONTROL SECTION 13081

JOB NUMBER 75047A

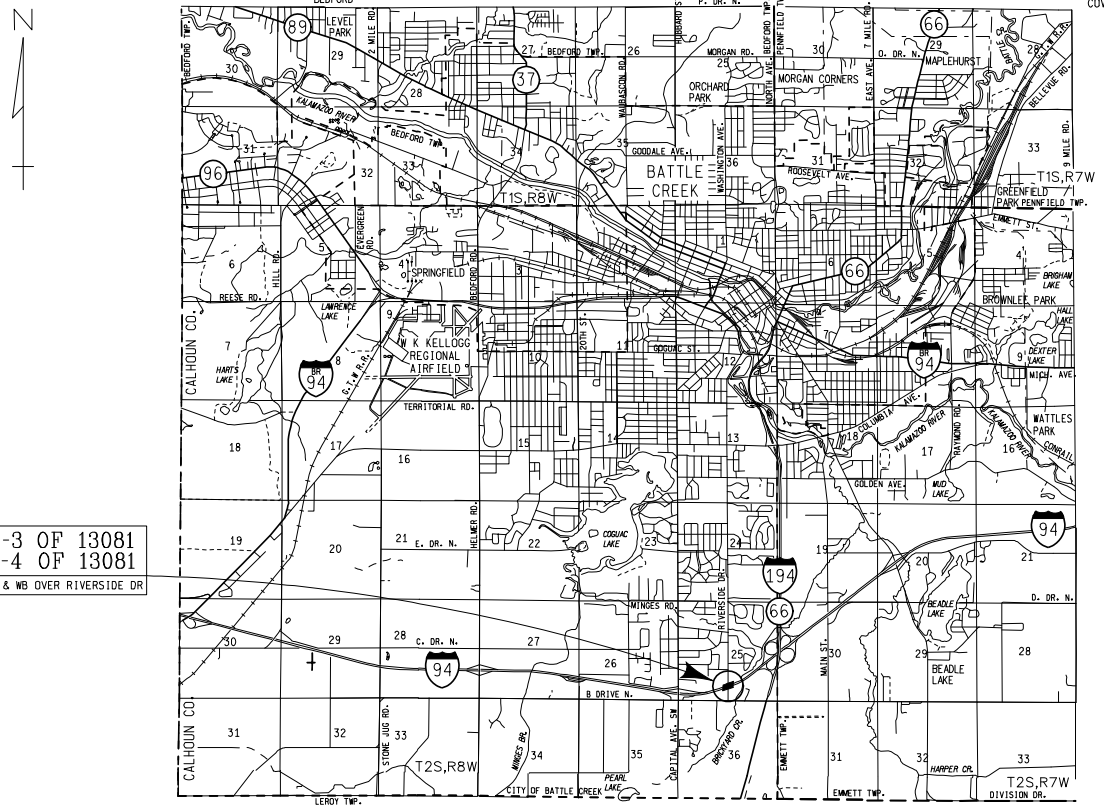
I-94

CITY OF BATTLE CREEK

CALHOUN COUNTY

PLAN INDEX	
SH. NO.	DESCRIPTION

FOR STANDARD PLANS SEE ROAD NOTE SHEET



S05-3 OF 13081
S05-4 OF 13081
I-94 EB & WB OVER RIVERSIDE DR

TITLE SHEET LEGEND

- PROPOSED BRIDGE PROJECT
- EXISTING ROADS
  - CITY STREET
  - COUNTY
  - STATE ROUTES
  - FEDERAL DIVIDED ROUTES
  - FEDERAL DIVIDED INTERSTATE ROUTES
  - HOT MIX ASPHALT
  - GRAVEL
- SECTION LINE
- CITY, VILLAGE OR TOWNSHIP LIMITS
- RAILROADS

GENERAL NOTES

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO LRFD BRIDGE SPECIFICATION HL-93 MODIFIED LOADING. LIVE LOAD PLUS DYNAMIC LOAD ALLOWANCE DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH. THE MODIFIED LOAD AND RESISTANCE FACTOR METHOD OF DESIGN WAS USED FOR THIS STRUCTURE.

EXCEPT WHERE OTHERWISE INDICATED ON THESE PLANS, OR IN THE PROPOSAL AND SUPPLEMENTAL SPECIFICATIONS CONTAINED HEREIN, ALL MATERIALS AND WORKMANSHIP SHALL BE ACCORDING TO THE MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION 2003 EDITION.

THE DESIGN OF THE STRUCTURAL MEMBERS IS BASED ON MATERIAL OF THE FOLLOWING GRADES AND STRESSES:

CONCRETE: GRADE S2	f'c = 3,000 PSI
CONCRETE: GRADE D	f'c = 4,000 PSI
STEEL REINFORCEMENT	fy = 60,000 PSI
STEEL REINFORCEMENT:	
STIRRUPS FOR PRESTRESSED BEAMS	fy = 60,000 PSI
PRESTRESSED CONCRETE	f'c = PSI
PRESTRESSING STRANDS	f's = 270,000 PSI

ALL EXPOSED CONCRETE CORNERS SHOWN SQUARE ON THE PLANS SHALL BE BEVELED WITH ½" TRIANGULAR MOLDINGS EXCEPT AS OTHERWISE NOTED.

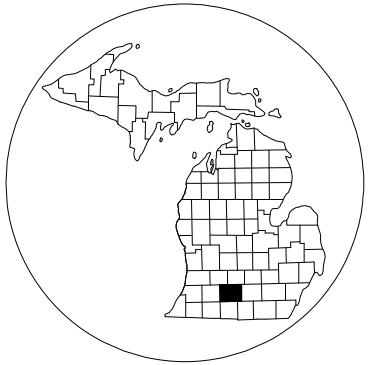
BIDDERS WILL BE FURNISHED WITH SCANNED IMAGES OF PLAN SHEETS OF THE EXISTING STRUCTURE IF REQUESTED.

THE DESIGN OF THE FOUNDATION PILING IS BASED ON MATERIAL OF THE FOLLOWING GRADES AND STRESSES:

FOUNDATION PILING (STEEL H-PILING):	
AASHTO M270 GRADE 50	Fy = 50,000 PSI

UNLESS OTHERWISE SHOWN ON THE PLANS PROVIDE MINIMUM CONCRETE CLEAR COVER FOR REINFORCEMENT ACCORDING TO THE FOLLOWING:

CONCRETE CAST AGAINST EARTH:	3 IN.
PRESTRESSED BEAMS:	1 IN.
ALL OTHER UNLESS SHOWN ON PLANS:	2 IN.



COUNTY KEY

CONTROL SECTION — JOB NUMBER
S05-3 & S05-4 OF 13081-75047A

DATE: CORRECTED BY:
DATE: CHECKED BY:
DATE: DRAWN BY: Eric R. McGowan

CONTRACT FOR: BRIDGE REPLACEMENT, APPROACH WORK AND MAINTAINING TRAFFIC.

APPROVALS

RECOMMENDED FOR APPROVAL _____ _____
PROJECT MANAGER DATE

RECOMMENDED FOR APPROVAL _____ _____
DELIVERY ENGINEER DATE

MICHIGAN
DEPARTMENT OF TRANSPORTATION
KIRK T. STEUDLE - DIRECTOR

APPROVED BY _____ _____
ENGINEER OF DEVELOPMENT DATE

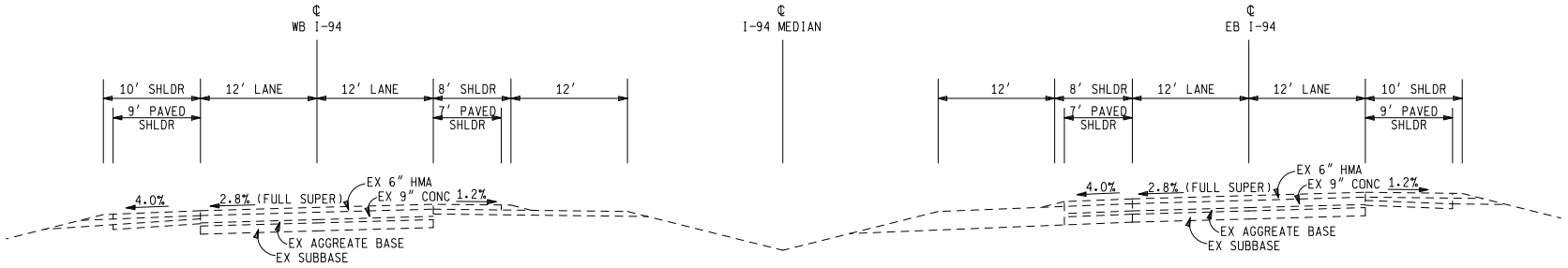
MDOT Michigan Department of Transportation

JILDEH/HUBBEL
DESIGN SQUAD

CONTROL SECTION	JOB NUMBER	FEDERAL NUMBERS PROJECT	ITEM	SHEET NO.
13081	75047A			1

FILE NAME: s05130811ts.dgn

AUTH	DATE	NO.	REVISION
			FINAL R.O.W.

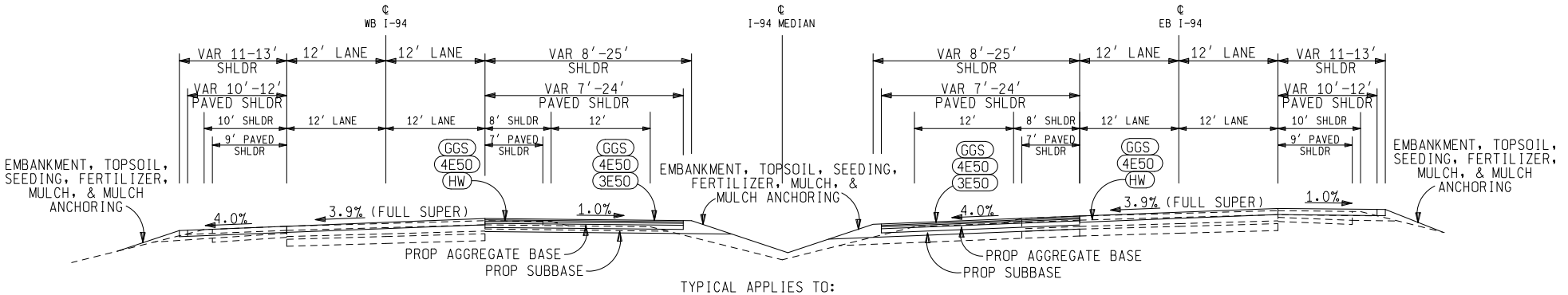


TYPICAL APPLIES TO:

STA 285+77.13 TO STA 297+77.13 WB
STA 298+50.88 TO STA 310+50.88 WB

STA 286+17.24 TO STA 298+17.24 EB
STA 298+94.96 TO STA 310+94.96 EB

Shoulders will be paved wider for a 2-3 foot paved shoulder while maintaining traffic,



TYPICAL APPLIES TO:

STA 285+77.13 TO STA 297+49.76 WB
STA 299+12.68 TO STA 310+50.88 WB

STA 286+17.24 TO STA 297+61.82 EB
STA 299+23.76 TO STA 310+94.96 EB

HMA APPLICATION ESTIMATE

IDENT NO.	ITEM	RATE PER SYD	PERFORMANCE GRADE	REMARKS
GGS	HMA, Gap-Graded Superpave	220 #	PG 70-28P	TOP COURSE, AWI=260
4E50	HMA, 4E50	220 #	PG 70-28P	LEVELING COURSE
3E50	HMA, 3E50	330#	PG 70-28P	BASE COURSE
HW	HMA, 4E50	0-220 #	PG 70-28P	HMA WEDGING
HA	HMA APPROACH	220 #	PG 64-28	USE HMA, 4E50
	BOND COAT	0.05-0.15 GAL		FOR INFORMATION ONLY

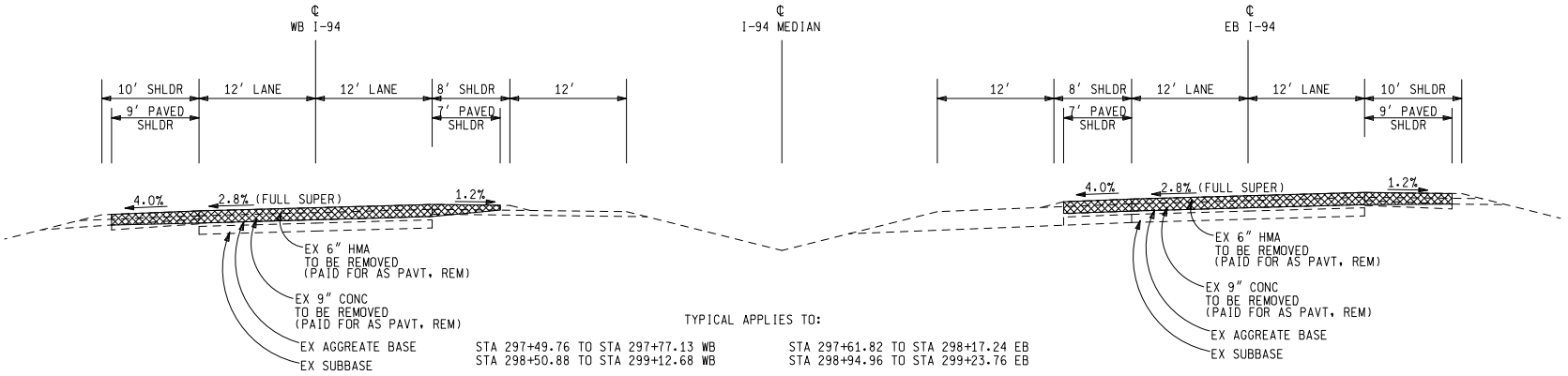
0 1 2 3 4 5 6
6 SCALE
(VERTICAL SCALE VARIES)

MDOT Michigan Department of Transportation

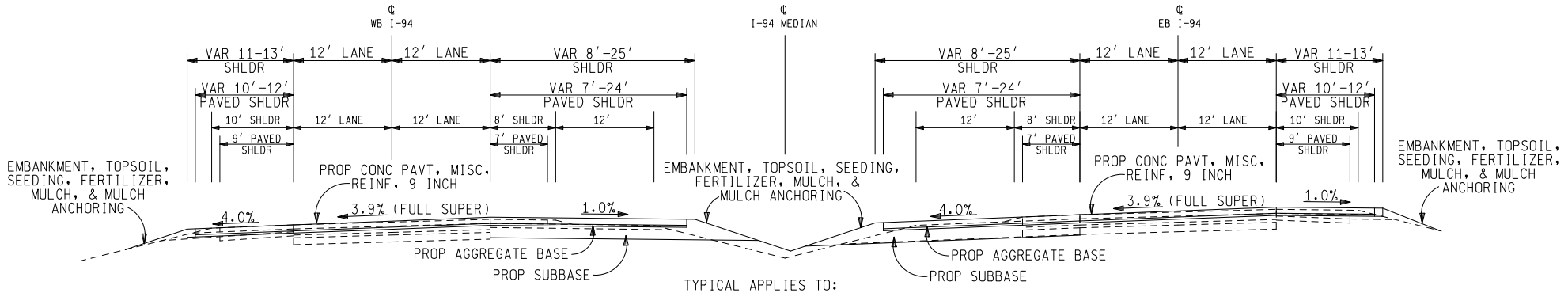
I-94 TYPICAL CROSS SECTIONS

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET NO. R.O.W	SHEET NO. CONST.
11/07/07	13081	75047A	HUBBELL		P2

AUTH	DATE	NO.	REVISION
			FINAL R.O.W.



Shoulders will be paved wider for a 2-3 foot paved shoulder while maintaining traffic,



0 1 2 3 4 5 6
6 SCALE
(VERTICAL SCALE VARIES)

MDOT Michigan Department of Transportation

I-94 TYPICAL CROSS SECTIONS

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET NO. R.O.W	SHEET NO. CONST.
11/07/07	13081	75047A	HUBBELL		P3

DATE: WORKED ON BY: DATE: WORKED ON BY: DATE: CHECKED BY: FILE NAME: 75047typical.dgn

AUTH	DATE	NO.	REVISION
			FINAL R.O.W.

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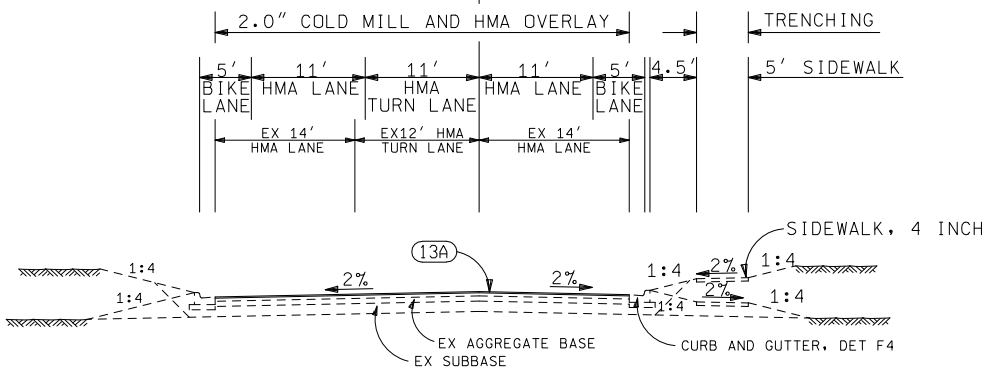
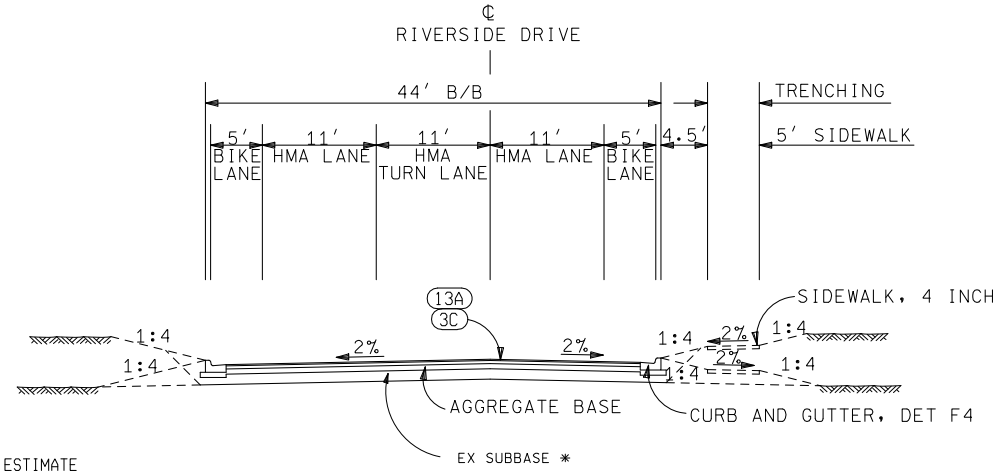
RIVERSIDE DRIVE



TYPICAL APPLIES TO:
POB STA 13+55 TO STA 17+20

℄
RIVERSIDE DRIVE



TYPICAL APPLIES TO:
STA 17+20 TO STA 21+35

HMA APPLICATION ESTIMATE

IDENT NO.	ITEM	RATE PER SYD	PERFORMANCE GRADE	REMARKS
13A	HMA, 13A	220 *	PG 64-28	TOP COURSE
3C	HMA, 3C	330 *	PG 58-28	BASE COURSE
HA	HMA APPROACH	220 *	PG 64-28	USE HMA, 13A
	BOND COAT	0.05-0.15 GAL		FOR INFORMATION ONLY

NOTE: * ADDITIONAL MATERIAL SHALL BE ADDED TO THE EX SUBBASE, TO RAISE THE GRADE TO THE PROPER ELEVATION, AS DIRECTED BY THE ENGINEER TO BE PAID FOR AS "SUBBASE, CIP".

0 1 2 3 4 5 6
6 SCALE
(VERTICAL SCALE VARIES)

MDOT Michigan Department of Transportation

RIVERSIDE TYPICAL CROSS SECTIONS

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET NO. R.O.W.	SHEET NO. CONST.
11/07/07	13081	75047A	HUBBELL		P4

DATE:
WORKED ON BY:
DATE:
WORKED ON BY:
DATE:
CHECKED BY:
FILE NAME: 75047typxsl.dgn

AUTH	DATE	NO.	REVISION
			FINAL R.O.W.

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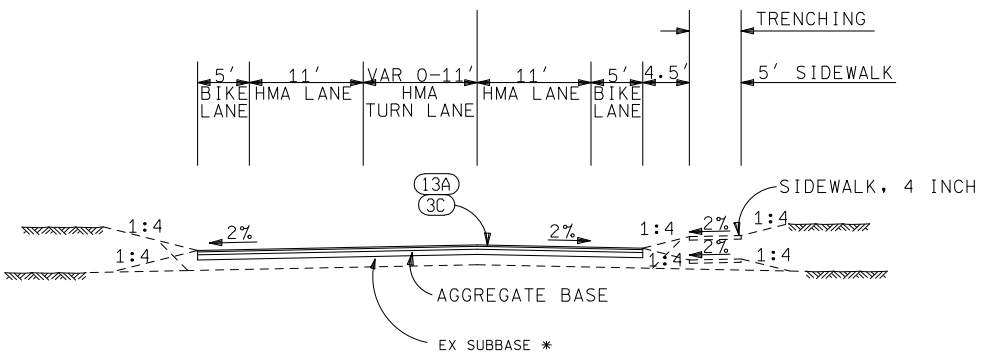
RIVERSIDE DRIVE



TYPICAL APPLIES TO:
STA 21+35 TO STA 23+00

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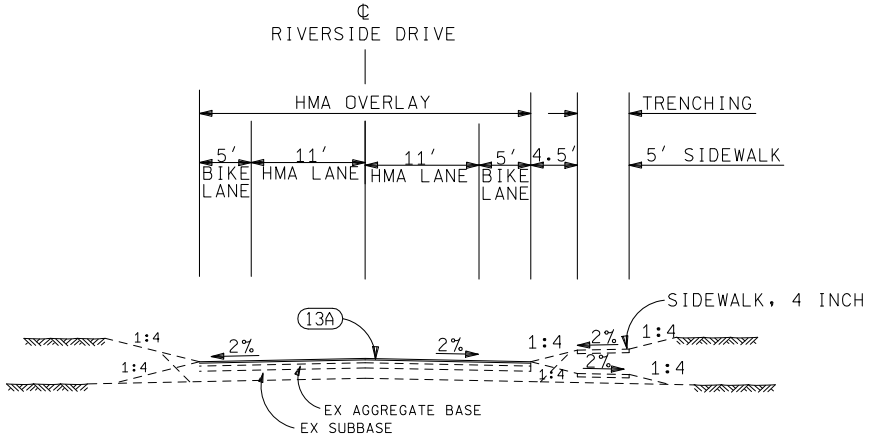
RIVERSIDE DRIVE



TYPICAL APPLIES TO:
STA 23+00 TO POE STA 28+82

NOTE: * ADDITIONAL MATERIAL SHALL BE ADDED TO THE EX SUBBASE, TO RAISE THE GRADE TO THE PROPER ELEVATION, AS DIRECTED BY THE ENGINEER TO BE PAID FOR AS "SUBBASE, CIP".

0 1 2 3 4 5 6
6 SCALE
(VERTICAL SCALE VARIES)

MDOT Michigan Department of Transportation

RIVERSIDE TYPICAL CROSS SECTIONS

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET NO. R.O.W.	SHEET NO. CONST.
11/07/07	13081	75047A	HUBBELL		P5

DATE:
WORKED ON BY:
DATE:
WORKED ON BY:
DATE:
CHECKED BY:
FILE NAME: 75047typcsl.dgn

ENGINEERING REPORT NO	ENVIRON IMPACT STMT	
METHOD OF SURVEY -	ALIGNMENT BEST FIT	YEAR 2007
SURVEY ORDER BOGREN 2006-0123-1	SURVEY CHIEF BILOW	YEAR 2007
AERIAL SURVEY NO NA		YEAR NA
HORIZ DATUM MCS 83, NAD 1983	VERT DATUM NAVD 88	
ROAD DESIGN INITIATED / /	COMPLETED / /	
PRELIMINARY PLANS BY HUBBELL/JILDEH	FINAL PLANS BY HUBBELL/JILDEH	
PLAN REVIEW BY RADKA TODOROVA	DATE 04/14/08	
FHWA AREA ENGINEER RON KRAUSS/SONNY JADUN		

GENERAL PLAN NOTES

UNDERGROUND UTILITIES

FOR PROTECTION OF UNDERGROUND UTILITIES AND IN CONFORMANCE WITH PUBLIC ACT 53, 1974, THE CONTRACTOR SHALL DIAL 1-800-482-7171 A MINIMUM OF THREE FULL WORKING DAYS, EXCLUDING SATURDAYS, SUNDAYS, AND HOLIDAYS PRIOR TO BEGINNING EACH EXCAVATION IN AREAS WHERE PUBLIC UTILITIES HAVE NOT BEEN PREVIOUSLY LOCATED. MEMBERS WILL THUS BE ROUTINELY NOTIFIED. THIS DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF NOTIFYING UTILITY OWNERS WHO MAY NOT BE A PART OF THE "MISS DIG" ALERT SYSTEM.

MDOT'S FREEWAY LIGHTING SYSTEM AND OTHER MISCELLANEOUS ELECTRICAL SYSTEMS ARE NOT A PART OF MISS DIG.

THEREFORE, CONTRACTORS SHALL CONTACT THE MAINTENANCE REPRESENTATIVE AT THE MDOT REGION/TSC OFFICE TO HAVE MDOT ELECTRICAL SYSTEMS STAKED.

ADJUSTING MONUMENT BOXES

ALL GOVERNMENT CORNERS ON THIS PROJECT SHALL BE PRESERVED, WHETHER SHOWN OR NOT. IT MAY BE NECESSARY TO PLACE OR ADJUST MONUMENT BOXES, AS REQUIRED.

BRIDGE APPROACH SLABS

THE CONCRETE APPROACH SLAB TO BRIDGES SHALL BE THICKENED TO MATCH THE EXISTING BRIDGE SEAT. THE ADDITIONAL STEEL REINFORCEMENT AND ADDITIONAL THICKNESS OF CONCRETE AS PER STANDARD PLAN R-45 SERIES IS INCLUDED IN THE APPROACH SLAB CONCRETE PAVEMENT PAY ITEM. NEW BRIDGE APPROACH SLABS TOP ELEVATION WILL APPROXIMATELY BE AT THE SAME ELEVATION AS THE EXISTING BRIDGE SLAB.

POST HOLES

POSTS PLACED WITHIN 3' OF EXISTING CULVERTS SHALL BE IN DRILLED HOLES AND SHALL NOT BE DRIVEN.

OLD ROAD PLANS

THE FOLLOWING OLD PLANS WERE REFERRED TO IN THE DESIGN OF THIS PROJECT.

CS 13081 - S05 B5 13-3-4

IN ADDITION, OTHER OLD PLANS THAT PREDATE THIS PROJECT MAY BE AVAILABLE. THESE PLANS MAY BE REVIEWED IN THE TRANSPORTATION SERVICE CENTER DURING NORMAL WORKING HOURS.

HAND FINISHING

HAND FINISHING OF CONCRETE POURS TO BE STRUCK OFF AND CONSOLIDATED BY HAND METHODS WILL BE PERMITTED ON VARIABLE WIDTH LANES AND LANES FORMED BY FLEXIBLE FORMS FOR SHORT RADIUS CURVES, AS DIRECTED BY THE ENGINEER.

8' GUARDRAIL POST

GUARDRAIL SHALL BE CONSTRUCTED USING 8 FOOT POSTS ON ALL OUTSIDE SLOPES EXCEPT IN APPROACH AND DEPARTING TERMINALS. THE ADDITIONAL POST LENGTH WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE APPROPRIATE GUARDRAIL PAY ITEM.

GUARDRAIL

GUARDRAIL SHALL BE EXTENDED PARALLEL TO EXISTING BRIDGE RAILING UNTIL PAST DOWNSPOUTS BEFORE FLARING TO SHOULDER.

SOIL EROSION MEASURES

APPROPRIATE SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO EARTH-DISTURBING ACTIVITIES. PLACE TURF ESTABLISHMENT ITEMS AS SOON AS POSSIBLE ON POTENTIAL ERODABLE SLOPES AS DIRECTED BY THE ENGINEER. CRITICAL DITCH GRADES SHALL BE PROTECTED WITH EITHER SOD OR SEED/MULCH OR MULCH BLANKET AS DIRECTED BY THE ENGINEER.
CONTRACTOR WILL BE REQUIRED TO MAINTAIN SOIL EROSION CONTROLS THOUGHOUT THE WINTER. MDOT WILL BE CONDUCTING NPDES INSPECTIONS ON A WEEKLY BASIS AND WILL NOTIFY THE CONTRACTOR WHEN CORRECTIVE ACTION IS REQUIRED.

EARTHWORK

EARTHWORK QUANTITIES ARE COMPUTED BASED UPON LIMITED SURVEY INFORMATION. THESE QUANTITIES ARE FOR BIDDING PURPOSES ONLY AND WILL BE ADJUSTED BY THE ENGINEER BASED UPON ACTUAL FIELD MEASUREMENTS.

EXISTING WATER MAINS AND SANITARY FORCE MAIN

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING WATERMAINS AND/OR EXISTING SANITARY FORCE MAINS DURING THE CONSTRUCTION OF THIS PROJECT.

PAVEMENT MARKINGS

ALL PERMANENT PAVEMENT MARKINGS, SHAPES, AND DIMENSIONS SHALL CONFORM WITH MDOT PAVEMENT MARKING TYPICALS V111-900 THRU 990 SERIES UNLESS SPECIFIED BY SPECIAL PROVISION. ALL EDGE LINES SHALL BE 6 INCHES AND ALL GORE MARKINGS SHALL BE 12 INCHES. OFFSETS FROM CONSTRUCTION JOINTS SHALL REMAIN AS NOTED IN THE PAVEMENT MARKING TYPICALS.

PERMANENT SIGNS

ANY PERMANENT SIGNS REQUIRING RELOCATION DUE TO CONTRACTOR OPERATIONS SHALL BE SALVAGED AND RESET BY THE CONTRACTOR AT LOCATIONS DESIGNATED BY THE ENGINEER. SIGNS AND POSTS DAMAGED DURING THE REMOVAL AND STORAGE OPERATIONS SHALL BE REPLACED WITH NEW SIGNS AND POSTS. THE COST OF THIS WORK SHALL BE BORNE BY THE CONTRACTOR.

AGGREGATE BASE UNDER HMA

AGGREGATE BASES TO BE SURFACED WITH HMA SHALL USE AGGREGATE 22A, UNLESS OTHERWISE SPECIFIED.

GENERAL PLAN NOTES CONT.

EMERALD ASH BORER

ALL MATERIALS GENERATED FROM REMOVING TREES OR STUMPS SHALL BE HANDLED AND DISPOSED OF AS PER THE MICHIGAN DEPARTMENT OF AGRICULTURE REQUIREMENTS. ANY ADDITIONAL COST SHALL BE INCLUDED IN THE PAY ITEMS FOR HORTICULTURAL WORK, TREE OR STUMP REMOVAL.

EARTH DISTURBANCE LIMITS

THE EARTH DISTURBANCE LIMIT FOR THIS PROJECT WILL BE LIMITED TO 10' BEYOND THE SLOPE STAKE LINE OR TO THE ROW LINE WHICHEVER IS LESS FOR ALL AREAS EXCEPT FOR WETLAND AREAS. FOR AREAS ADJACENT TO WETLANDS, THE EARTH DISTURBANCE LIMIT WILL BE LIMITED TO THE SLOPE STAKE LINE. RESTORATION MEASURES HAVE BEEN INCLUDED IN THIS SET OF PLANS FOR THE APPROVED AREAS OF DISTURBANCE. THE CONTRACTOR SHALL SUBMIT AN EARTH CHANGE PLAN FOR ANYWORK BEYOND THE APPROVED LIMITS TO THE ENGINEER TO REVIEW FOR APPROVAL PRIOR TO THE DISTURBANCE. ALL COSTS FOR OBTAINING AND EXECUTING AN APPROVED EARTH CHANGE PLAN, INCLUDING RESTORATION, SHALL BE AT THE CONTRACTOR'S EXPENSE.

SOIL BORING AND/OR PAVEMENT CORES

THE SOIL BORING LOGS/OR PAVEMENT CORES REPRESENT POINT INFORMATION. NO INFERENCE SHOULD BE MADE THAT SUBSURFACE OR PAVEMENT CONDITIONS ARE THE SAME AT OTHER LOCATIONS

SHOULDER CORRUGATIONS

SHOULDER CORRUGATIONS SHALL NOT BE GROUND OR CUT UNTIL AFTER ANY MAINENANCE OF TRAFFIC UTILIZING THE SHOULDER IS COMPLETED

RECREATIONAL PROPERTY

THE CONTRACTOR SHALL NOT PARK ANY VEHICLES OR STORE ANY EQUIPMENT ON PUBLIC RECREATIONAL AREA PROPERTY. ACCESS TO THE RECREATIONAL SITE MUST BE MAINTAINE AT ALL TIMES.

EROSION CONTROL CURB AND GUTTER

THE ADDITIONAL WIDENING OF THE CURB AND GUTTER FOR EROSION CONTROL TO MATCH THE BRIDGE APPROACH CURB AND GUTTER'S 8" OFFSET SHALL TRANSITION IN WIDTH OVER 12.5' TO MATCH THE CURB AND GUTTER WIDTH. THE EXTRA WIDTH OF CURB AND GUTTER WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE ITEM OF THE CURB AND GUTTER.

UTILITIES

THE EXISTING UTILITIES LISTED BELOW AND SHOWN ON THESE PLANS REPRESENT THE BEST INFORMATION AVAILABLE AS OBTAINED ON OUR SURVEYS DATED OCTOBER, 2007. THIS INFORMATION DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO BE SATISFIED AS TO ITS ACCURACY AND THE LOCATION OF EXISTING UTILITIES.

NAME OF OWNER	KIND OF UTILITY
BROADWING COMMUNICATIONS ATTN: MARLON COCKERELL OSP PROGRAM MANAGEMENT 1122 CAPITAL OF TEXAS HIGHWAY SOUTH AUSTIN, TEXAS 78746 512-742-1439	TELECOM
CONSUMERS ENERGY ATTN: CAREY WITFIELD BATTLE CREEK SERVICE CENTER 311 EAST MICHIGAN AVENUE BATTLE CREEK, MICHIGAN 49107 269-969-8686	ELECTRIC
LIGHTCORE, A CENTURYTEL COMPANY ATTN: KIRK THOELKE 14567 NORTH OUTER FORTY ROAD, SUITE 500 CHESTERFIELD, MISSOURI 63017 314-880-1637	TELECOM
US SIGNAL COMPANY LLC ATTN: TIM HALL 20 MONROE NW, SUITE 450 GRAND RAPIDS, MICHIGAN 49503 616-988-7035	TELECOM
CITY OF BATTLE CREEK ATTN: TODD J. GERBER DPW RECORDS MANAGER 150 S. KENDALL ST BATTLE CREEK, MICHIGAN 49015 269-966-3343	WATER, SEWER
ROGERS TELECOM INC ATTN: BRENT BEAVER 2550 VICTORIA PARK AVENUE, SUITE 200 NORTH YORK ONTARIO M2J-5E6 416-496-1644 EXT 5255	CATV
SEMCO ENERGY GAS COMPANY ATTN: MIKE KESSLER 55 HAMBLIN AVENUE BATTLE CREEK, MICHIGAN 49017 616-966-0404 EXT 5554	GAS

NOTES APPLYING TO ROAD STANDARD PLANS

WHERE THE FOLLOWING ITEMS ARE CALLED FOR ON PLANS, THEY ARE TO BE CONSTRUCTED ACCORDING TO THE STANDARD PLAN GIVEN BELOW OPPOSITE EACH ITEM UNLESS OTHERWISE INDICATED.

DRAINAGE STRUCTURES	R-1-D
MONUMENT BOXES	R-11-D
BRIDGE APPROACH CURB & GUTTER (USING EXISTING CATCH BASIN)	R-27-E
APPROACH CURB & GUTTER DOWNSPOUTS (FOR BRIDGE APPROACH CURB AND GUTTER)	R-32-E
TRANSVERSE PAVEMENT JOINTS	R-39-H
LOAD TRANSFER ASSEMBLIES FOR TRANSVERSE JOINTS	R-40-F
LONGITUDINAL PAVEMENT JOINTS	R-41-E
TYPICAL JOINT LAYOUTS FOR CONCRETE PAVEMENT	R-43-F*
CONVENTIONAL PAVEMENT REINFORCEMENT	R-45-E
TEMPORARY CONCRETE BARRIER	R-52-E
GUARDRAIL AT BRIDGES AND EMBANKMENTS	R-59-E
GUARDRAIL, TYPES A, B, BD, T, & TD	R-60-G
GUARDRAIL APPROACH TERMINAL TYPES 1B & 1T	R-61-G*
GUARDRAIL APPROACH TERMINAL TYPES 2B & 2T	R-62-F
GUARDRAIL DEPARTING TERMINAL TYPES B & T	R-66-D
GUARDRAIL ANCHORAGE, BRIDGE, DETAILS	R-67-F
SOIL EROSION & SEDIMENTATION CONTROL MEASURES	R-96-D
SODDING, SEEDING AND TREE PLANTING	R-100-E*
GRADING CROSS-SECTIONS	R-105-D
SUPERELEVATION AND PAVEMENT CROWNS	R-107-G*
SHOULDER CORRUGATIONS	R-112-F*
PLACEMENT OF TEMPORARY CONCRETE BARRIER	R-126-F

NOTES APPLYING TO TRAFFIC AND SAFETY STANDARD PLANS

WHERE THE FOLLOWING ITEMS ARE CALLED FOR ON PLANS, THEY ARE TO BE CONSTRUCTED ACCORDING TO THE TRAFFIC STANDARD GIVEN BELOW OPPOSITE EACH ITEM UNLESS OTHERWISE INDICATED.

GROUND DRIVEN SIGN SUPPORTS FOR TEMP SIGNS	WZD-100-A*
TEMPORARY TRAFFIC CONTROL DEVICES	WZD-125-D
LONGITUDINAL LINE TYPES AND PLACEMENT	PAVE-905-A*
FREEWAY AND RAMP PAVEMENT MARKINGS	PAVE-925-A*

* SPECIAL DETAIL

MISCELLANEOUS ESTIMATES

THE FOLLOWING ITEMS OF WORK SHALL BE DONE AS THEY APPLY THROUGHOUT THE PROJECT. THESE ITEMS ARE NOT DETAILED OR INCLUDED ON THE PLAN AND PROFILE SHEETS:

MISCELLANEOUS QUANTITIES (FOR JN 75047)

CALHOUN CO.
BATTLE CREEK
ACT 51

1 LS	Mobilization, Max.
1 LS	Contractor Staking
3 Hr	Staking Plan Errors and Extras, One Person
1 Hr	Staking Plan Errors and Extras, Two Person
2 Hr	Staking Plan Errors and Extras, Three Person
72104 Dlr	HMA Quality Initiative
Cyd	Conc Quality Assurance

THE FOLLOWING ITEMS OF WORK ARE ESTIMATED FOR THE ENTIRE PROJECT FOR THE PERMANENT PAVEMENT MARKING AND SIGNING AS DIRECTED BY THE ENGINEER (FOR JN 75047):

CALHOUN CO.
BATTLE CREEK
ACT 51 NON
PARTICIPATING ITEMS

~~82 Ft~~	~~Wet Retroflective Preformed Tape, 4 inch, White~~
~~82 Ft~~	~~Recessing Pavement Markings~~
2364 Ft	Pavt Mrkg, Waterborne, 4 inch, Yellow
325 Ft	Pavt Mrkg, Waterborne, 6 inch, White
1821 Ft	Pavt Mrkg, Waterborne, 6 inch, Yellow
2364 Ft	Pavt Mrkg, Waterborne, 2nd Application, 4 inch, Yellow
325 Ft	Pavt Mrkg, Waterborne, 2nd Application, 6 inch, White
1821 Ft	Pavt Mrkg, Waterborne, 2nd Application, 6 inch, Yellow

THE FOLLOWING ITEMS OF WORK ARE ESTIMATED FOR THE ENTIRE PROJECT FOR EROSION AND SEDIMENTATION CONTROL AND UNSTABLE SOILS AS DIRECTED BY THE ENGINEER (FOR JN 75047):

CALHOUN CO.
BATTLE CREEK
ACT 51

200 Ft	Erosion Control, Silt Fence

THE FOLLOWING ITEMS OF WORK ARE ESTIMATED FOR THE ENTIRE PROJECT FOR THE MAINTENANCE OF TRAFFICE DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER (FOR JN 75047):

CALHOUN CO.
BATTLE CREEK
ACT 51

4 Ea	Barricade, Type III, High Intensity, Lighted, Furn
4 Ea	Barricade, Type III, High Intensity, Lighted, Oper
350 Ft	Conc Barrier, Temp, Furn
350 Ft	Conc Barrier, Temp, Oper
350 Ft	Conc Barrier, Temp, Adjusted
350 Ft	Conc Barrier, Temp, Relocated
2 1 Ea	Temp Conc Barrier Ending, Detail 2, Furn
1 Ea	Temp Conc Barrier Ending, Detail 2, Oper
2 2 Ea	Lighted Arrow, Type C, Furn
2 Ea	Lighted Arrow, Type C, Oper
1 LS	Minor Traf Devices
125 Ft	Pavt Mrkg, Type R, 4 inch, White, Temp
183 Ft	Pavt Mrkg, Type R, 4 inch, Yellow, Temp
550 Ft	Pavt Mrkg, Type R, 4 inch, Grey, Temp
50 Ea	Plastic Drum, High Intensity, Lighted, Furn
50 Ea	Plastic Drum, High Intensity, Lighted, Oper
5 Ea	Sign Cover
Sft	Sign, Type A, Temp, Prismatic, Furn
Sft	Sign, Type A, Temp, Prismatic, Oper
1228 Sft	Sign, Type B, Temp, Prismatic, Furn
1228 Sft	Sign, Type B, Temp, Prismatic, Oper

PCMB's

MDOT Michigan Department of Transportation

NOTE SHEET

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET NO. R.O.W	SHEET NO. CONST.
11/08/07	13081	75047A	HUBBELL		P6

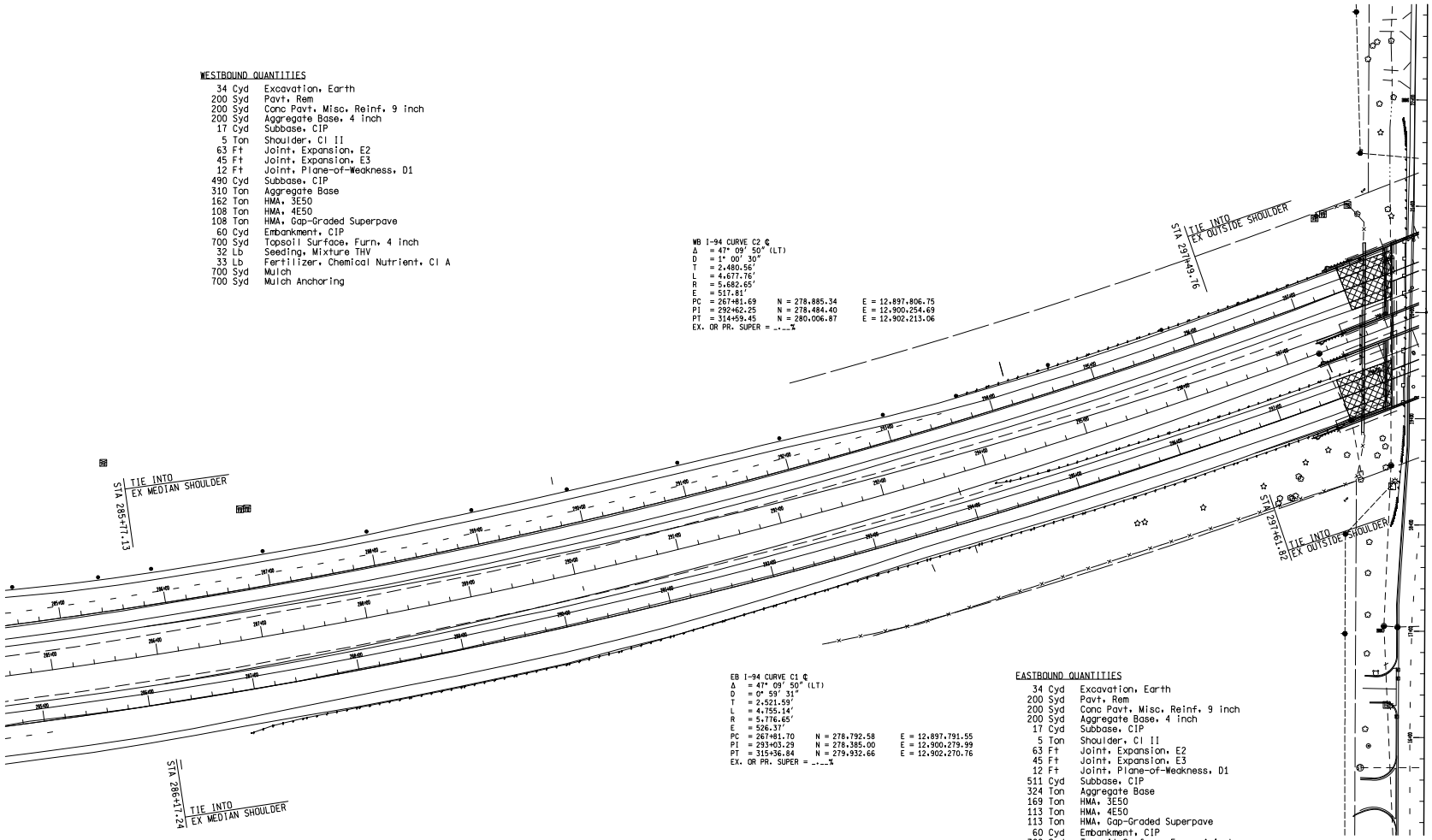
DATE: 11/08/07
WORKED ON BY: NM
DATE:
CHECKED BY:
FILE NAME: 75047notesheet.dgn

AUTH	DATE	NO.	REVISION
			FINAL R.O.W.

WESTBOUND QUANTITIES

34	Cyd	Excavation, Earth
200	Syd	Pavt, Rem
200	Syd	Conc Pavt, Misc, Reinf, 9 inch
200	Syd	Aggregate Base, 4 inch
17	Cyd	Subbase, CIP
5	Ton	Shoulder, Cl II
63	Ft	Joint, Expansion, E2
45	Ft	Joint, Expansion, E3
12	Ft	Joint, Plane-of-Weakness, D1
490	Cyd	Subbase, CIP
310	Ton	Aggregate Base
162	Ton	HMA, 3E50
108	Ton	HMA, 4E50
108	Ton	HMA, Gap-Graded Superpave
60	Cyd	Embankment, CIP
700	Syd	Topsoil Surface, Furn, 4 inch
32	Lb	Seeding, Mixture THV
33	Lb	Fertilizer, Chemical Nutrient, Cl A
700	Syd	Mulch
700	Syd	Mulch Anchoring

WB I-94 CURVE C2 ℄
Δ = 47° 09' 50" (LT)
D = 1° 00' 30"
T = 2,480.56'
L = 4,677.76'
R = 5,682.65'
E = 517.81'
PC = 267+81.69 N = 278,885.34 E = 12,897,806.75
PI = 292+62.25 N = 278,484.40 E = 12,900,254.69
PT = 314+59.45 N = 280,006.87 E = 12,902,213.06
EX. OR PR. SUPER = -.--%



EB I-94 CURVE C1 ℄
Δ = 47° 09' 50" (LT)
D = 0° 59' 31"
T = 2,521.59'
L = 4,755.14'
R = 5,776.65'
E = 526.37'
PC = 267+81.70 N = 278,792.58 E = 12,897,791.55
PI = 293+03.29 N = 278,385.00 E = 12,900,279.99
PT = 315+36.84 N = 279,932.66 E = 12,902,270.76
EX. OR PR. SUPER = -.--%

EASTBOUND QUANTITIES

34	Cyd	Excavation, Earth
200	Syd	Pavt, Rem
200	Syd	Conc Pavt, Misc, Reinf, 9 inch
200	Syd	Aggregate Base, 4 inch
17	Cyd	Subbase, CIP
5	Ton	Shoulder, Cl II
63	Ft	Joint, Expansion, E2
45	Ft	Joint, Expansion, E3
12	Ft	Joint, Plane-of-Weakness, D1
511	Cyd	Subbase, CIP
324	Ton	Aggregate Base
169	Ton	HMA, 3E50
113	Ton	HMA, 4E50
113	Ton	HMA, Gap-Graded Superpave
60	Cyd	Embankment, CIP
700	Syd	Topsoil Surface, Furn, 4 inch
32	Lb	Seeding, Mixture THV
33	Lb	Fertilizer, Chemical Nutrient, Cl A
700	Syd	Mulch
700	Syd	Mulch Anchoring

20 50 80
0 40 100
50 SCALE

REMOVAL AND CONSTRUCTION SHEET

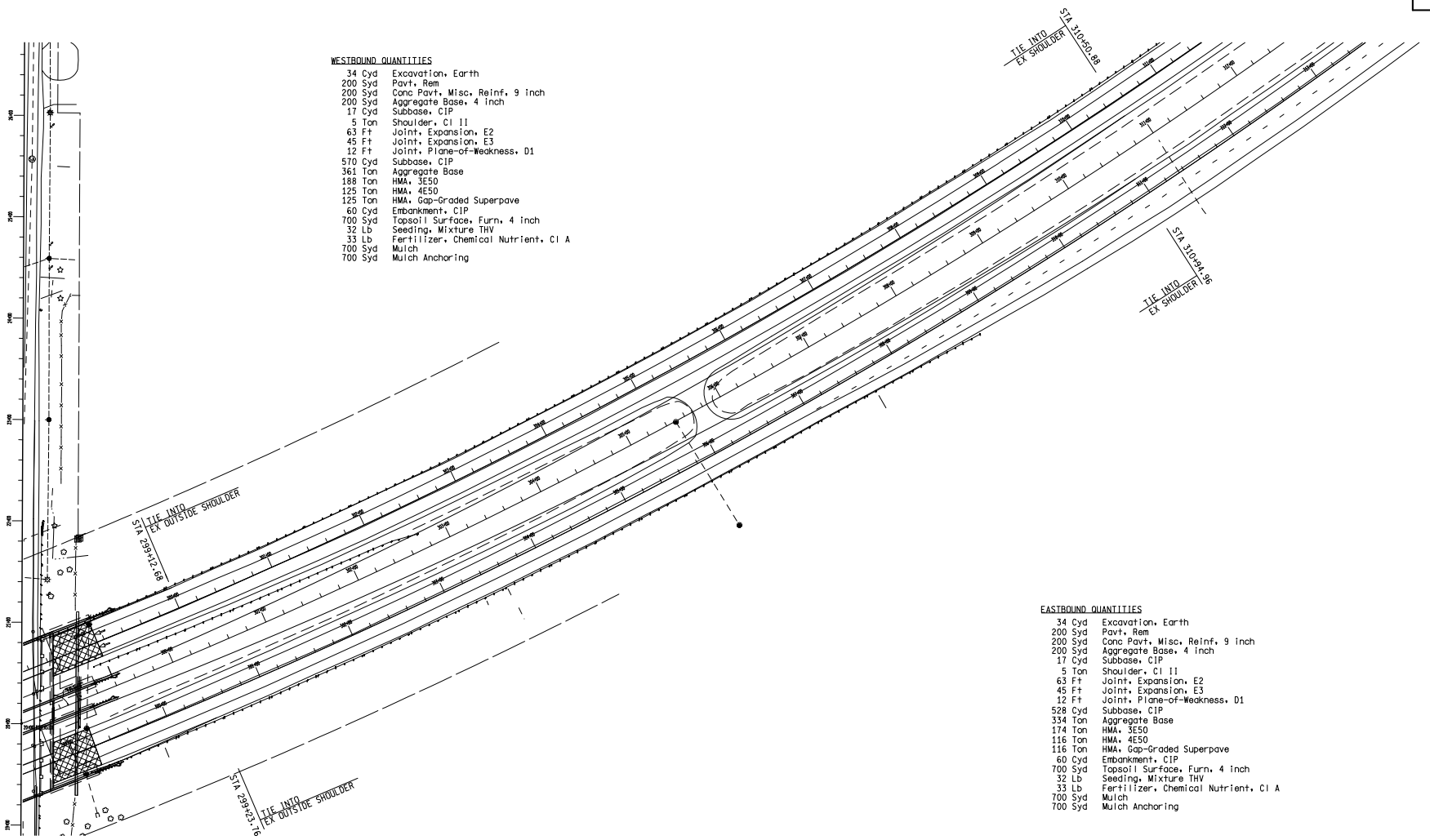
MDOT Michigan Department of Transportation

I-94 AT RIVERSIDE

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET NO. R.O.W.	SHEET NO. CONST.
03/20/08	13081	75047	HUBBELL		P7

DATE:
WORKED ON BY:
DATE:
CHECKED BY:
FILE NAME: 75047approach.dgn

			FINAL R.O.W.
AUTH	DATE	NO.	REVISION



WESTBOUND QUANTITIES

34	Cyd	Excavation, Earth
200	Syd	Pavt, Rem
200	Syd	Conc Pavt, Misc, Reinf, 9 inch
200	Syd	Aggregate Base, 4 inch
17	Cyd	Subbase, CIP
5	Ton	Shoulder, Cl II
63	Ft	Joint, Expansion, E2
45	Ft	Joint, Expansion, E3
12	Ft	Joint, Plane-of-Weakness, D1
570	Cyd	Subbase, CIP
361	Ton	Aggregate Base
188	Ton	HMA, 3E50
125	Ton	HMA, 4E50
125	Ton	HMA, Gap-Graded Superpave
60	Cyd	Embankment, CIP
700	Syd	Topsoil Surface, Furn, 4 inch
32	Lb	Seeding, Mixture THV
33	Lb	Fertilizer, Chemical Nutrient, Cl A
700	Syd	Mulch
700	Syd	Mulch Anchoring

EASTBOUND QUANTITIES

34	Cyd	Excavation, Earth
200	Syd	Pavt, Rem
200	Syd	Conc Pavt, Misc, Reinf, 9 inch
200	Syd	Aggregate Base, 4 inch
17	Cyd	Subbase, CIP
5	Ton	Shoulder, Cl II
63	Ft	Joint, Expansion, E2
45	Ft	Joint, Expansion, E3
12	Ft	Joint, Plane-of-Weakness, D1
528	Cyd	Subbase, CIP
334	Ton	Aggregate Base
174	Ton	HMA, 3E50
116	Ton	HMA, 4E50
116	Ton	HMA, Gap-Graded Superpave
60	Cyd	Embankment, CIP
700	Syd	Topsoil Surface, Furn, 4 inch
32	Lb	Seeding, Mixture THV
33	Lb	Fertilizer, Chemical Nutrient, Cl A
700	Syd	Mulch
700	Syd	Mulch Anchoring

20 50 80
0 40 100
50 SCALE

REMOVAL AND CONSTRUCTION SHEET

MDOT Michigan Department of Transportation

I-94 AT RIVERSIDE

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET NO. R.O.W.	SHEET NO. CONST.
03/20/08	13081	75047A	HUBBELL		P8

DATE:
WORKED ON BY:
DATE:
CHECKED BY:
FILE NAME: 75047approach.dgn

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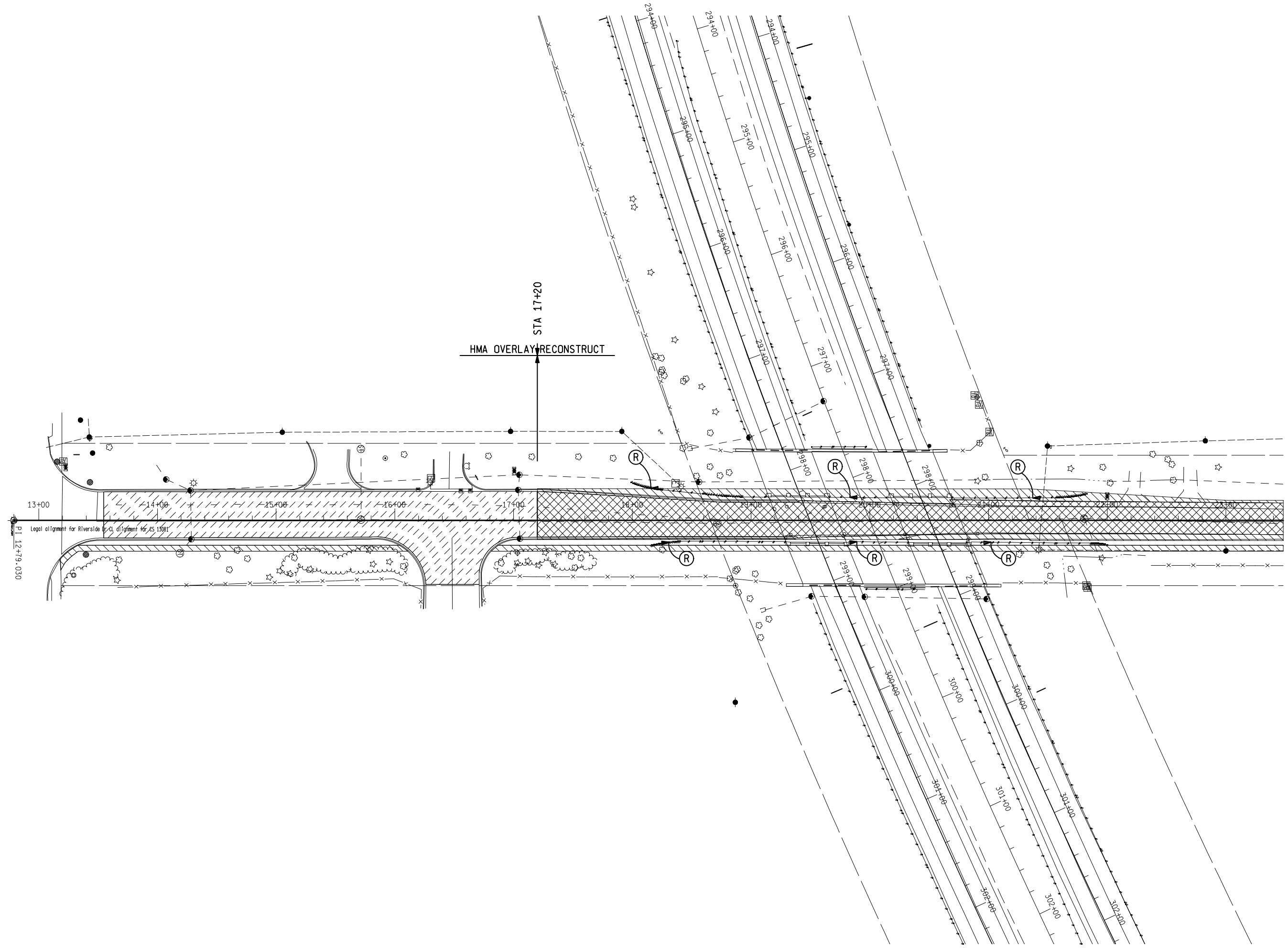


REMOVAL QUANTITIES

1832 Syd	Cold Milling HMA Surface
1606 Syd	Pavt, Rem
290 Cyd	Excavation, Earth
469 Ft	Curb and Gutter, Rem
564 Ft	Guardrail, Rem
9 Sta	Trenching

0 20 40 50 80 100
50 SCALE

REMOVAL SHEET

MDOT Michigan Department of Transportation

RIVERSIDE STA 13+00 TO STA 22+00

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET NO. R.O.W	SHEET NO. CONST.
03/05/08	13082	75047A	HUBBELL		P9

DATE:
WORKED ON BY:
DATE:
CHECKED BY:
FILE NAME: 75047 sta10.dgn

AUTH	DATE	NO.	REVISION
			FINAL R.O.W.

GUARDRAIL QUANTITIES 001

50 Ft	Guardrail, Type B
1 Ea	Guardrail Anch, Bridge, Det T2
1 Ea	Guardrail Approach Terminal, Type 1B
6 Ea	Guardrail Reflector

GUARDRAIL QUANTITIES 002

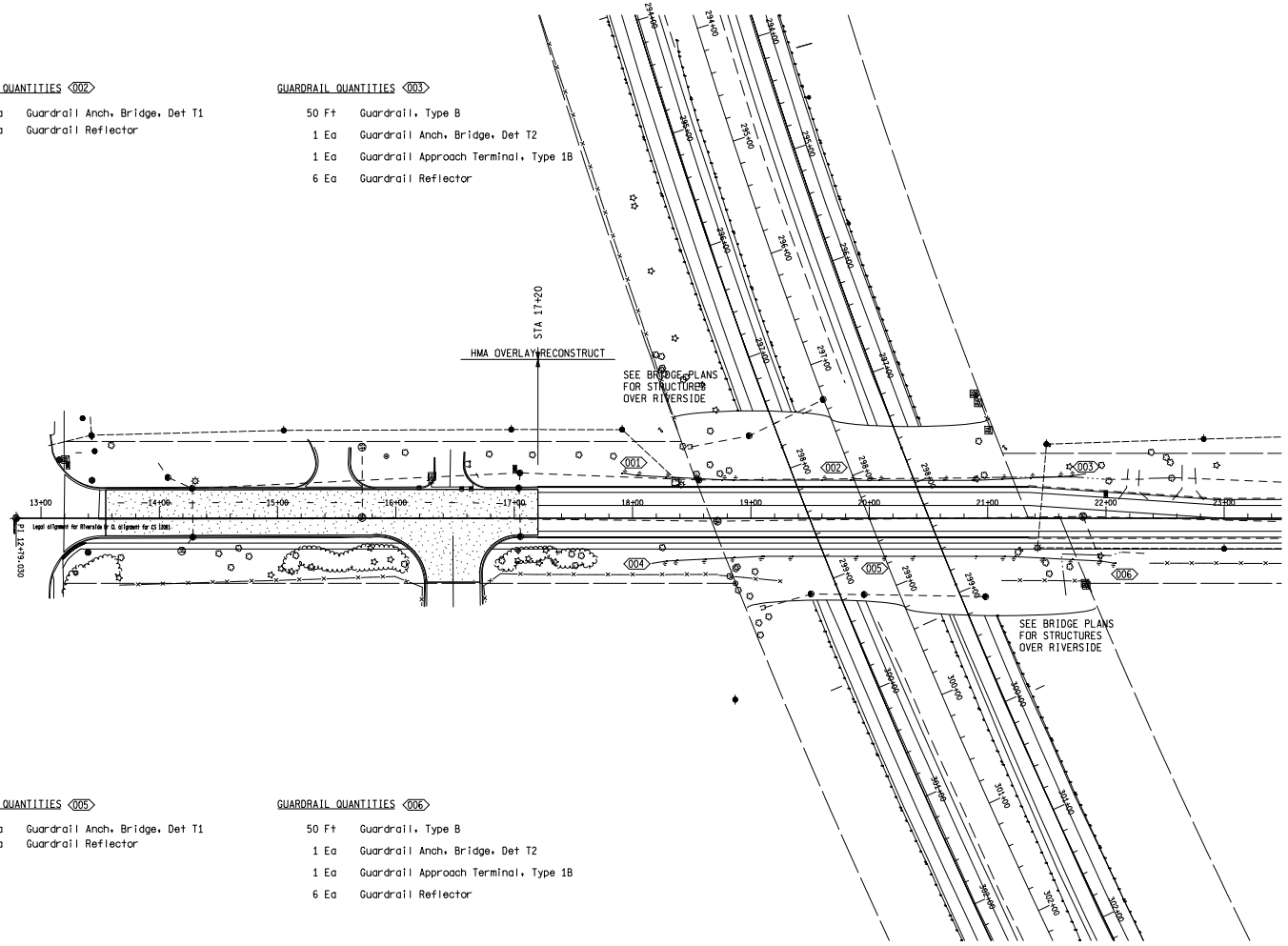
2 Ea	Guardrail Anch, Bridge, Det T1
2 Ea	Guardrail Reflector

GUARDRAIL QUANTITIES 003

50 Ft	Guardrail, Type B
1 Ea	Guardrail Anch, Bridge, Det T2
1 Ea	Guardrail Approach Terminal, Type 1B
6 Ea	Guardrail Reflector

RIVERSIDE QUANTITIES

178 Cyd	Subbase, CIP
448 Ton	Aggregate Base
378 Ton	HMA, 3C
454 Ton	HMA, 13A
3 Ton	Shoulder, CI II
830 Ft	Curb and Gutter, Conc, Det F4
4095 Sft	Sidewalk, Conc, 4 inch
44 Sft	Sidewalk Ramp, ADA



GUARDRAIL QUANTITIES 004

50 Ft	Guardrail, Type B
1 Ea	Guardrail Anch, Bridge, Det T2
1 Ea	Guardrail Approach Terminal, Type 1B
6 Ea	Guardrail Reflector

GUARDRAIL QUANTITIES 005

2 Ea	Guardrail Anch, Bridge, Det T1
2 Ea	Guardrail Reflector

GUARDRAIL QUANTITIES 006

50 Ft	Guardrail, Type B
1 Ea	Guardrail Anch, Bridge, Det T2
1 Ea	Guardrail Approach Terminal, Type 1B
6 Ea	Guardrail Reflector

20 50 80
0 40 100
50 SCALE

CONSTRUCTION SHEET

MDOT Michigan Department of Transportation

RIVERSIDE STA 13+00 TO STA 22+00

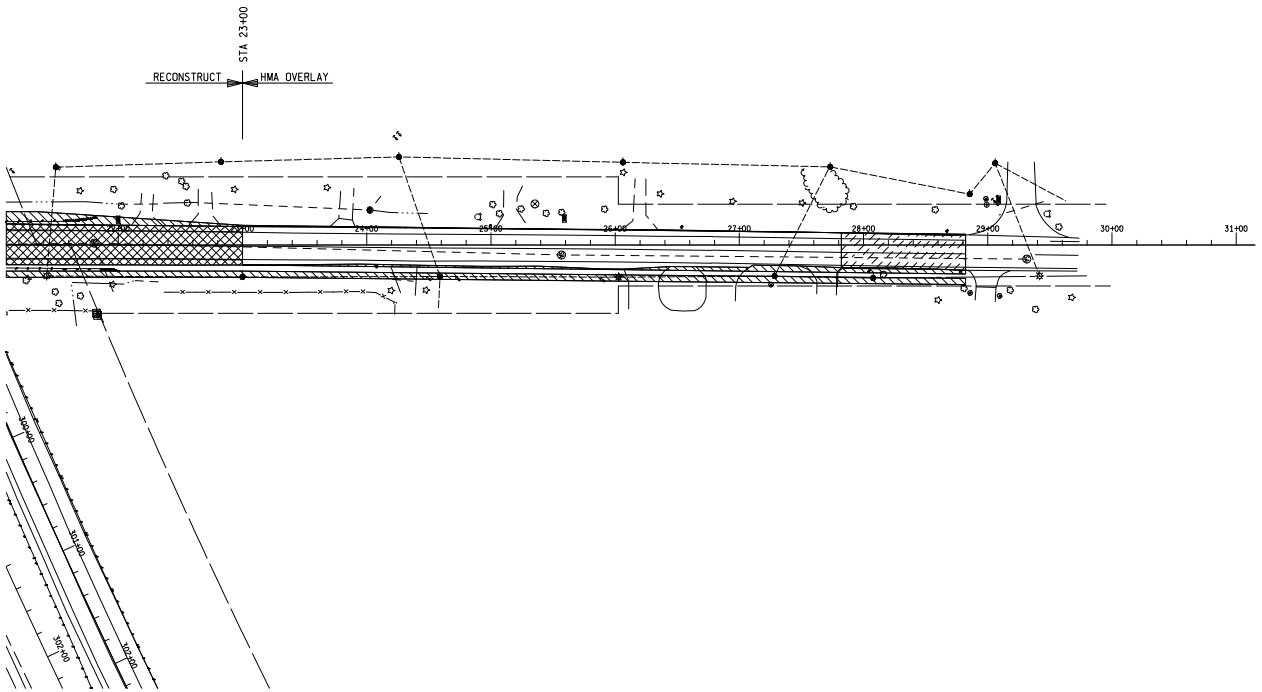
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET NO. R.O.W.	SHEET NO. CONST.
03/05/08	13082	75047A	HUBBELL		P10

DATE:
WORKED ON BY:
DATE:
CHECKED BY:
FILE NAME: 75047 sta10.dgn

AUTH	DATE	NO.	REVISION
			FINAL R.O.W.

REMOVAL QUANTITIES

353	Syd	Pavt, Rem
38	Cyd	Excavation, Earth
14	Sta	Trenching
307	Syd	Pavt for Butt Joints, Rem



20 50 80
0 40 100
50 SCALE

REMOVAL SHEET

MDOT Michigan Department of Transportation

RIVERSIDE STA 22+00 TO POE STA 28+82

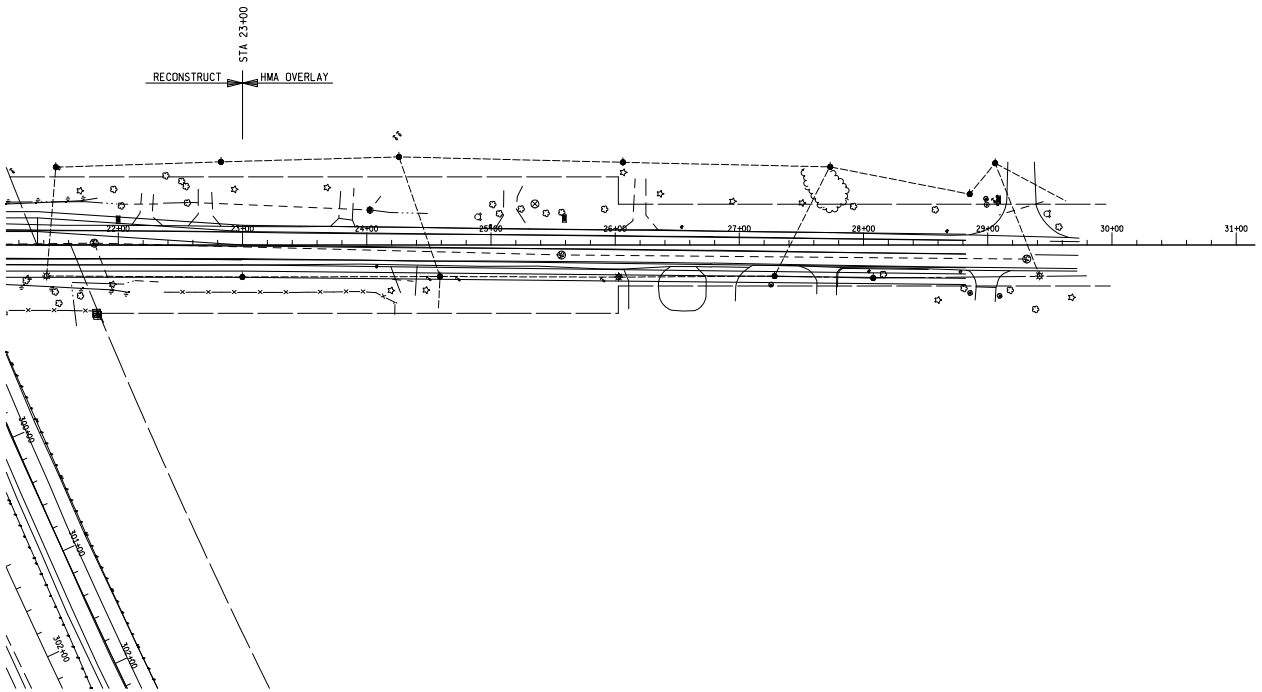
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET NO. R.O.W.	SHEET NO. CONST.
03/05/08	13082	75047A	HUBBELL		P11

DATE:
WORKED ON BY:
DATE:
CHECKED BY:
FILE NAME: 75047 sta11.dgn

AUTH	DATE	NO.	REVISION
			FINAL R.O.W.

RIVERSIDE QUANTITIES

22 Cyd	Subbase, CIP
104 Ton	Aggregate Base
65 Ton	HMA, 3C
307 Ton	HMA, 13A
25 Ton	Shoulder, Cl II
3849 Sft	Sidewalk, Conc, 4 inch



20 50 80
0 40 100
50 SCALE

CONSTRUCTION SHEET

MDOT Michigan Department of Transportation

RIVERSIDE STA 22+00 TO POE STA 28+82

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET NO. R.O.W.	SHEET NO. CONST.
03/05/08	13082	75047A	HUBBELL		P12

DATE:
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DATE:
CHECKED BY:
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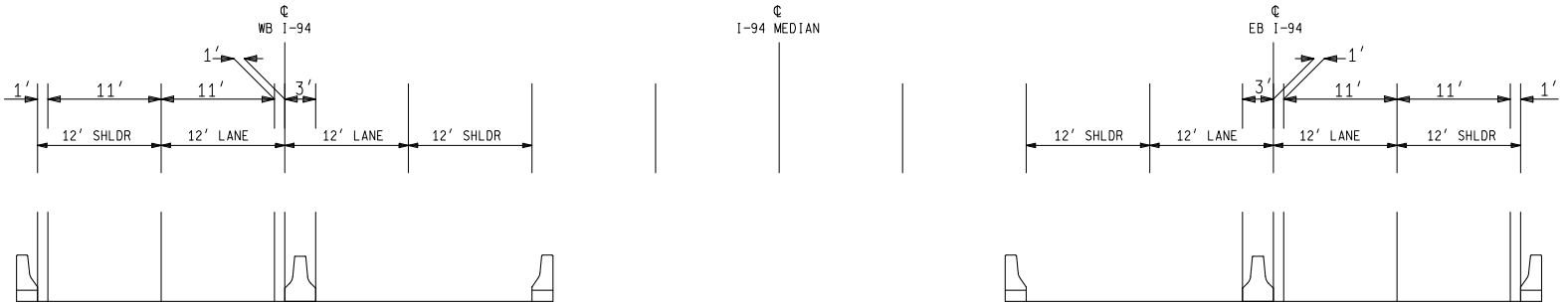
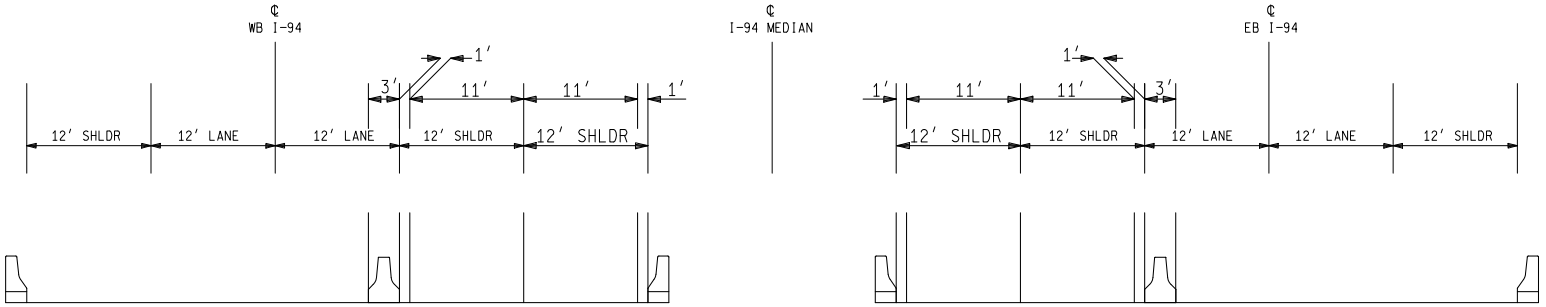
AUTH	DATE	NO.	REVISION
			FINAL R.O.W.



STAGE I
MAINTAIN TRAFFIC ON THE OUTSIDE



STAGE II
MAINTAIN TRAFFIC ON THE INSIDE

0 1 2 3 4 5 6
6 SCALE
(VERTICAL SCALE VARIES)

MDOT Michigan Department of Transportation

I-94 STAGING TYPICAL

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET NO. R.O.W.	SHEET NO. CONST.
03/25/08	13081	75047A	HUBBELL		P13

DATE:
WORKED ON BY:
DATE:
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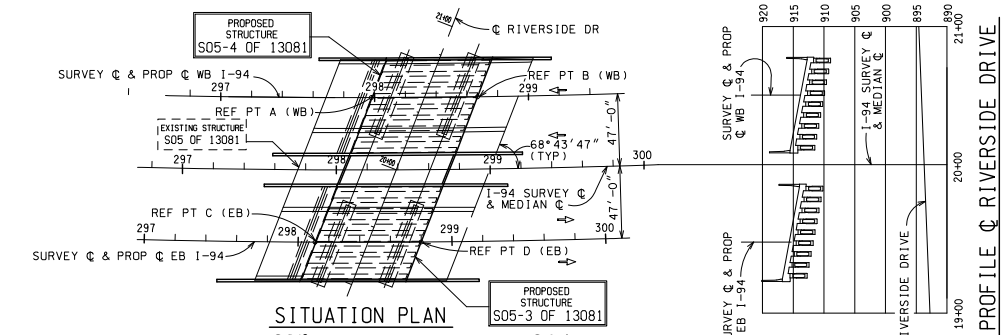
DATE:
CHECKED BY:
FILE NAME: 75047MDOTtypical.dgn



SITUATION PLAN

PROFILE ℄ RIVERSIDE DRIVE

WITNESSES	BENCH MARKS
FOR WITNESSES, SEE ROAD PLANS	FOR BENCH MARKS, SEE ROAD PLANS

REVISIONS			
NO.	DESCRIPTION	DATE	BY

UTILITIES

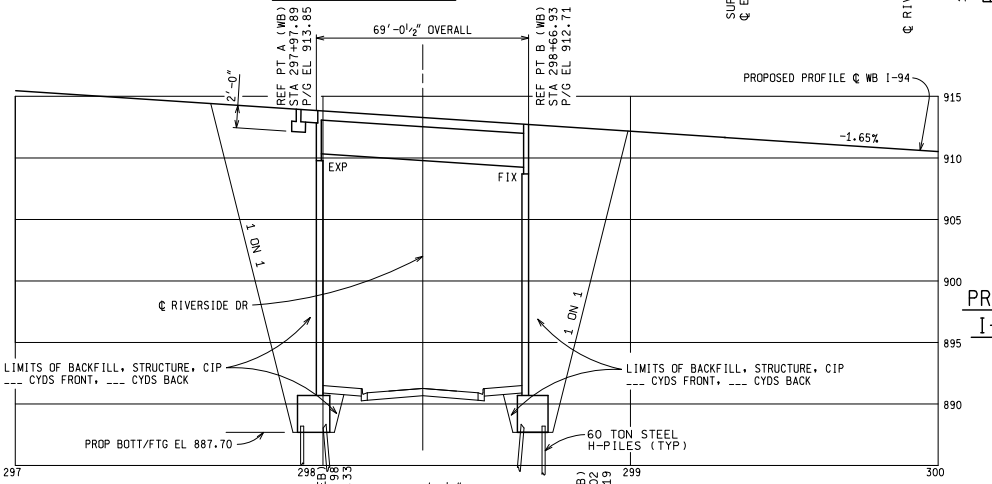
FOR UTILITIES, SEE ROAD PLANS

EXISTING STRUCTURE

THE EXISTING DUAL ROADWAY STRUCTURE IS A 3-SPAN SIMPLE SPAN T-BEAM BRIDGE HAVING A CLEAR ROADWAY WIDTH OF 42'-0" BOTH EAST AND WESTBOUND. THE OVERALL LENGTH OF THE EASTBOUND STRUCTURE IS 122'-8" AND THE OVERALL LENGTH OF THE WESTBOUND STRUCTURE IS 124'-9". THIS BRIDGE WAS BUILT IN 1960 AND WAS DESIGNED FOR H20-S16-44 LOADING.

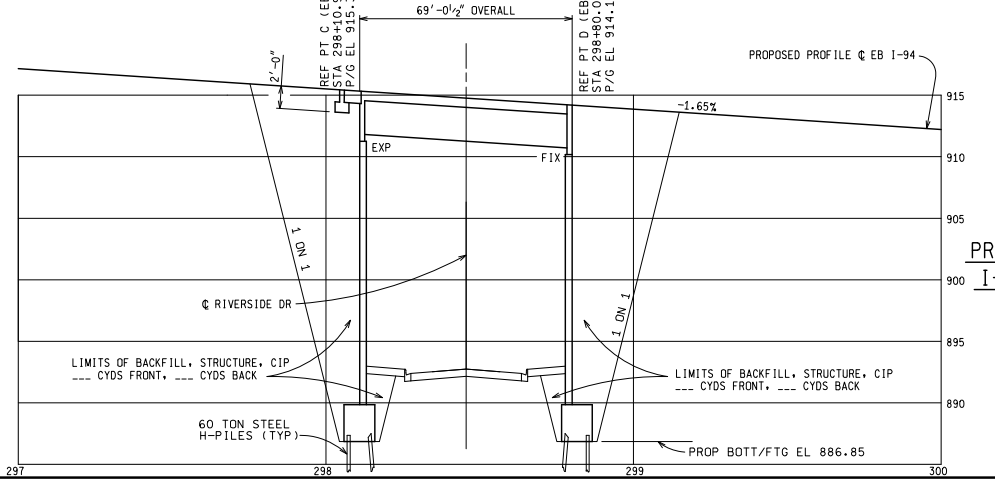
ESTIMATED TRAFFIC DISTRIBUTION

I-94 OVER RIVERSIDE DRIVE	2005	2009	2029
TOTAL AVERAGE DAILY TRAFFIC (ADT)	58,300	61,300	78,600
DIRECTIONAL AVERAGE DAILY TRAFFIC	29,150	30,650	39,300
% COMMERCIAL OF ADT	22%	22%	23%
TOTAL COMMERCIAL OF ADT	12,830	13,480	18,070



PROFILE WESTBOUND
I-94 STRUCTURE
(S05-4 OF 13081)

VERT SCALE-1"= 10'
HORZ SCALE-1"= 40'



PROFILE EASTBOUND
I-94 STRUCTURE
(S05-3 OF 13081)

VERT SCALE-1"= 10'
HORZ SCALE-1"= 40'

TYPICAL APPROACH SECTION I-94

NOTES:

THE WORK COVERED BY THESE PLANS INCLUDES MAINTAINING TRAFFIC, REMOVAL OF EXISTING STRUCTURES AND CONSTRUCTING PROPOSED STRUCTURES. ALL OTHER WORK IS INCLUDED IN THE ROAD PLANS THAT ARE A PART OF THIS CONTRACT.

THE CONTRACTOR SHALL LOCATE ALL ACTIVE UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED.

PLAN ELEVATIONS REFER TO NAVD 88 DATUM.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS FROM FALLING FROM THE STRUCTURE.

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO LRFD BRIDGE SPECIFICATIONS HL93 MODIFIED LOADING. LIVE LOAD PLUS IMPACT DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH. THE MODIFIED LOAD AND RESISTANCE FACTOR METHOD OF DESIGN WAS USED FOR THIS STRUCTURE.

FALSE DECKING SHALL INCLUDE THE AREA BOUNDED BY REFERENCE LINES A & B AND C & D AND OUTSIDE FLANGE FASCIAS OF BEAMS B1 & B9 AND B10 & B18. THE ESTIMATED AREA IS 5,916 SQUARE FEET ON WB STRUCTURE AND 5,819 SQUARE FEET ON THE EB STRUCTURE DURING REMOVAL

ALL AREA SHOWN IS WITHIN MDOT RIGHT OF WAY.

I-94 TRAFFIC IS TO BE MAINTAINED OVER THE BRIDGE BY PART-WIDTH CONSTRUCTION.

MDOT
Michigan Department of Transportation

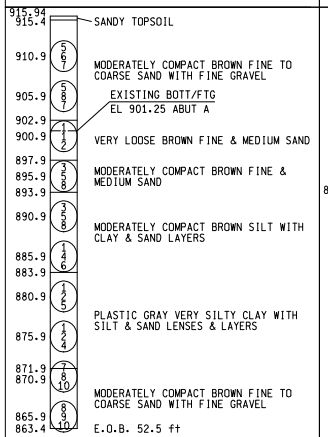
GENERAL PLAN OF SITE
I-94 EB & WB OVER RIVERSIDE DRIVE
CITY OF BATTLE CREEK, CALHOUN COUNTY

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
3-18-08	S05-3 OF 13081 S05-4 OF 13081	75047A	JILDEH	OF

DATE: DATE: CORRECTED BY: DATE: CHECKED BY: DATE: DRAWN BY: M LOUIS INGALLS FILE NAME: s0513081si.dgn

TEST HOLE NO. 6

LOCATION STATION: 297+47.0
2.0 ft LT OF I-94 SURVEY CENTERLINE
I-94 EB & WB OVER RIVERSIDE DR.
GROUND SURFACE ELEVATION: 915.94 ft



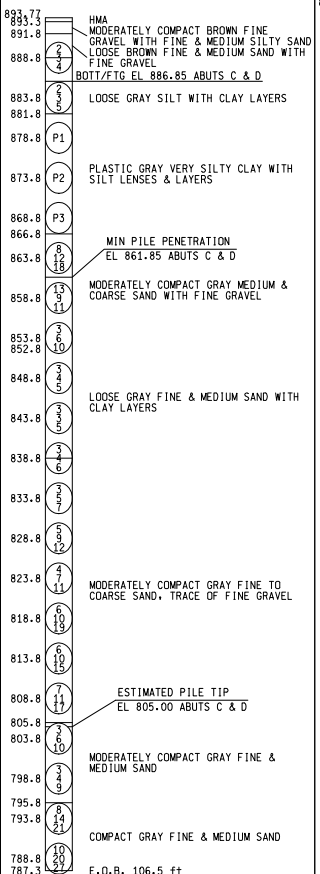
BORING DATE 8/15/07

FREE WATER FIRST NOTED BELOW GROUND SURFACE: 45 FT

WATER LEVEL BELOW GROUND AFTER COMPLETION: AUGERS OUT: 27 FT

TEST HOLE NO. 7

LOCATION STATION: 298+11.0
88.0 ft RT OF I-94 SURVEY CENTERLINE
I-94 EB & WB OVER RIVERSIDE DR.
GROUND SURFACE ELEVATION: 893.77 ft



BORING DATE 8/15/07

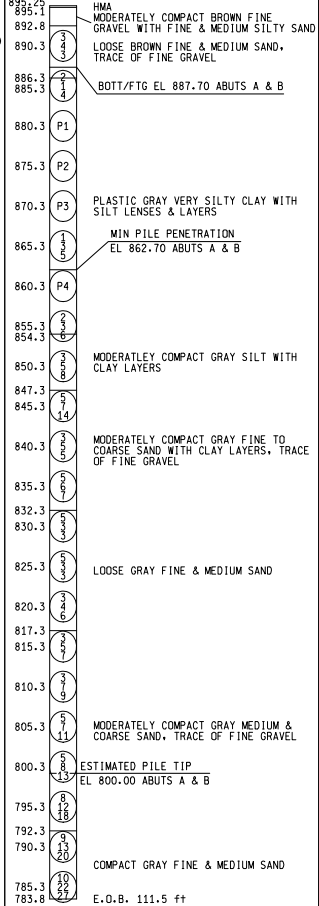
FREE WATER FIRST NOTED BELOW GROUND SURFACE: 27 FT

WATER LEVEL BELOW GROUND AFTER COMPLETION: AUGERS OUT: 5 FT

P1 THRU P3, PUSHED SHEAR, RECOVERY 18"

TEST HOLE NO. 8

LOCATION STATION: 299+01.0
103.0 ft LT OF I-94 SURVEY CENTERLINE
I-94 EB & WB OVER RIVERSIDE DR.
GROUND SURFACE ELEVATION: 895.25 ft



BORING DATE 8/14/07

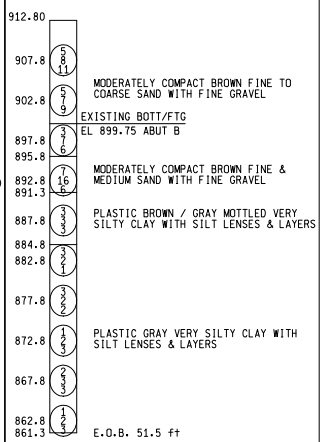
FREE WATER FIRST NOTED BELOW GROUND SURFACE: 41 FT

WATER LEVEL BELOW GROUND AFTER COMPLETION: AUGERS OUT: 6 FT

P1 THRU P4, PUSHED SHEAR, RECOVERY 18"

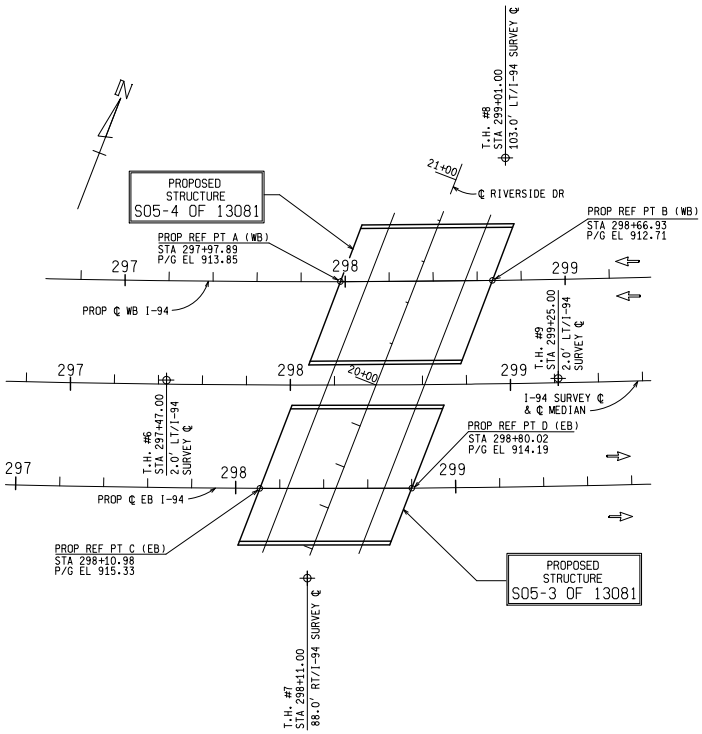
TEST HOLE NO. 9

LOCATION STATION: 299+25.0
2.0 ft LT OF I-94 SURVEY CENTERLINE
I-94 EB & WB OVER RIVERSIDE DR.
GROUND SURFACE ELEVATION: 912.80 ft



BORING DATE 8/14/07

WATER LEVEL BELOW GROUND AFTER COMPLETION: AUGERS OUT: 24 FT



SOIL BORING LOCATION PLAN

NOTES:

(0) 1st 6"
(0) 2nd 6"
(0) 3rd 6"

NUMBERS IN CIRCLES DENOTE NUMBER OF BLOWS REQUIRED TO DRIVE A 2" O.D. (1½" I.D.)SPLIT SPOON SAMPLER 3 SUCCESSIVE 6" INCREMENTS USING A 140# HAMMER FALLING 30".

CONSISTENCY WAS DETERMINED BY INSPECTION OF SAMPLES AND SUBSTANTIATED BY SOILS RESISTANCE TO DRILLING TOOLS.

THE SOIL BORING LOGS REPRESENT POINT INFORMATION. PRESENTATION OF THIS INFORMATION IN NO WAY IMPLIES THAT SUBSURFACE CONDITIONS ARE THE SAME AT LOCATIONS OTHER THAN THE EXACT LOCATION OF THE BORING.

SOIL BORING LOCATIONS ARE REFERENCED FROM THE MEDIAN ALIGNMENT.

REVISIONS			
NO.	DESCRIPTION	DATE	BY

MDOT Michigan Department of Transportation

SOIL BORING DATA

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
03/18/08	S05-3 OF 13081 S05-4 OF 13081	75047A	JILDEH	OF

DATE:
DATE:
CORRECTED BY:
DATE:
CHECKED BY:
DATE:
DRAWN BY: M LOUIS INGALLS
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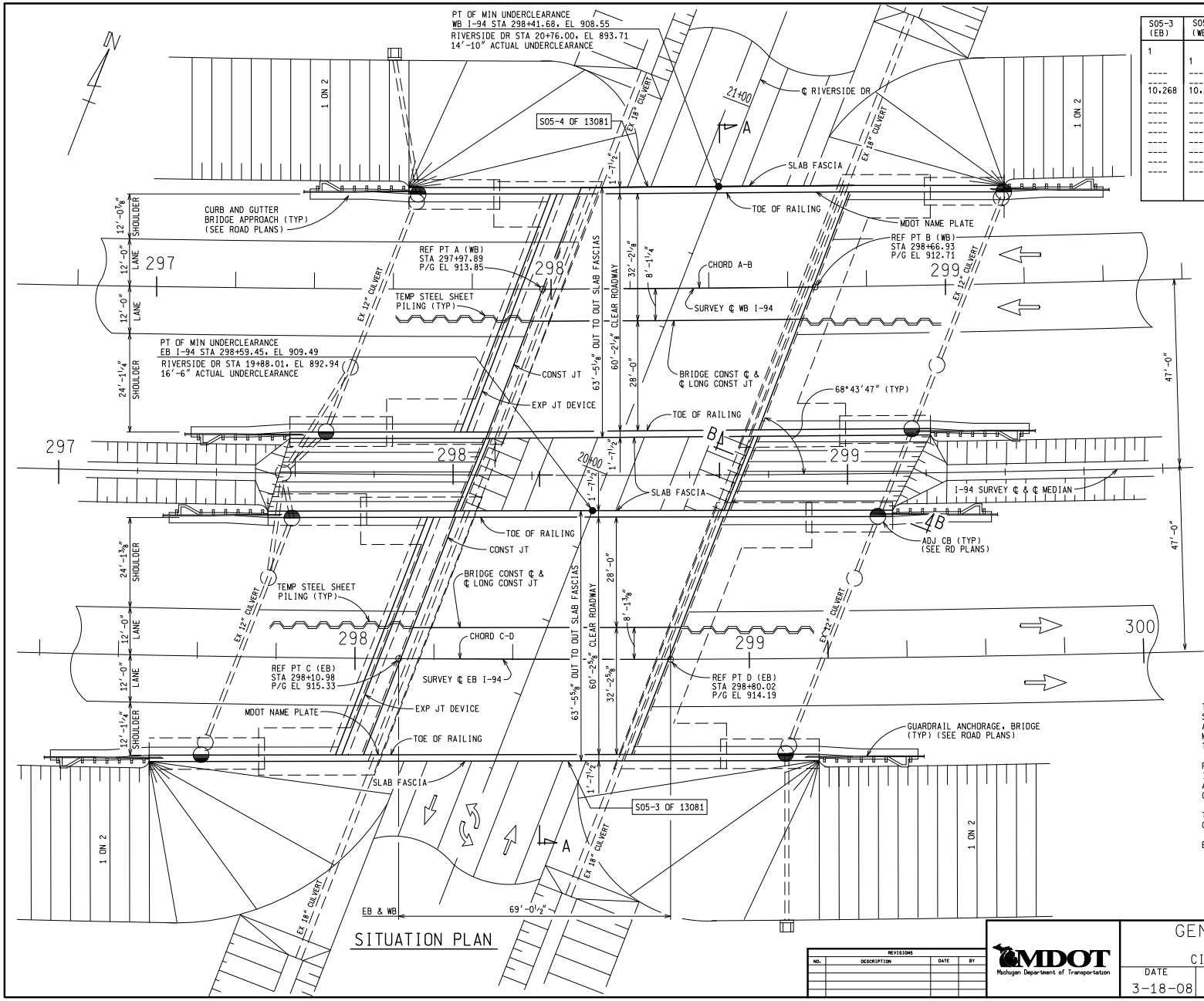


S05-3 (EB)	S05-4 (WB)	MISCELLANEOUS QUANTITIES	
1	1	LS	Structures, Rem (S05-3 OF 13081)
		LS	Structures, Rem (S05-4 OF 13081)
----	----	Ft	Underdrain, Fdn, 4 inch
----	----		
10,268	10,277	20,545 Sft	False Decking
----	----	Cyd	Backfill, Structure, CIP
----	----	Cyd	Excavation, Fdn
----	----	Dlr	Conc Quality Initiative
----	----	Cyd	Conc Quality Assurance, Structure
----	----	Sft	Steel Sheet Piling, Temp
----	----	Cyd	Fill, Lightweight, EPS Block
----	----	Syd	Liner, PVC, 30 mil
----	----	Syd	Conc Base Cse, Reinf, 4 inch

NOTES:

THE DESIGN OF THIS STRUCTURE IS BASED ON CURRENT AASHTO LRFD BRIDGE SPECIFICATION HL-93 MODIFIED LOADING. LIVE LOAD PLUS DYNAMIC LOAD ALLOWANCE DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH. THE MODIFIED LOAD AND RESISTANCE FACTOR METHOD OF DESIGN WAS USED FOR THIS STRUCTURE.

FALSE DECKING SHALL INCLUDE THE ENTIRE DECK AREA. THE ESTIMATED AREA IS 5,886 SQUARE FEET (EB) AND 5,897 SQUARE FEET (WB) DURING REMOVAL AND 4,382 SQUARE FEET (EB) AND 4,380 SQUARE FEET (WB) DURING CONSTRUCTION.

THE MAXIMUM FACTORED ABUTMENT FOUNDATION BEARING PRESSURES ARE CALCULATED TO BE PSF BASED ON SERVICE LIMIT STATE , AND PSF BASED ON STRENGTH LIMIT STATE , AND PSF BASED ON EXTREME EVENT LIMIT STATE .

REVISIONS			
NO.	DESCRIPTION	DATE	BY

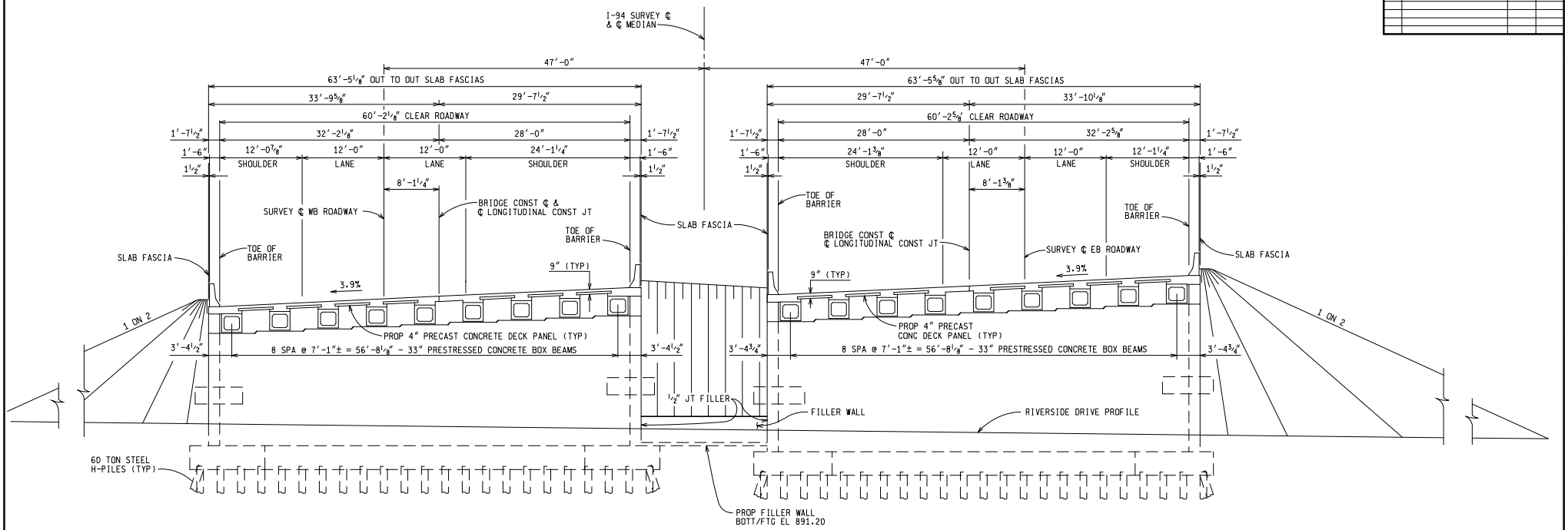
MDOT Michigan Department of Transportation

GENERAL PLAN OF STRUCTURE
I-94 EB & WB OVER RIVERSIDE DRIVE
CITY OF BATTLE CREEK, CALHOUN COUNTY

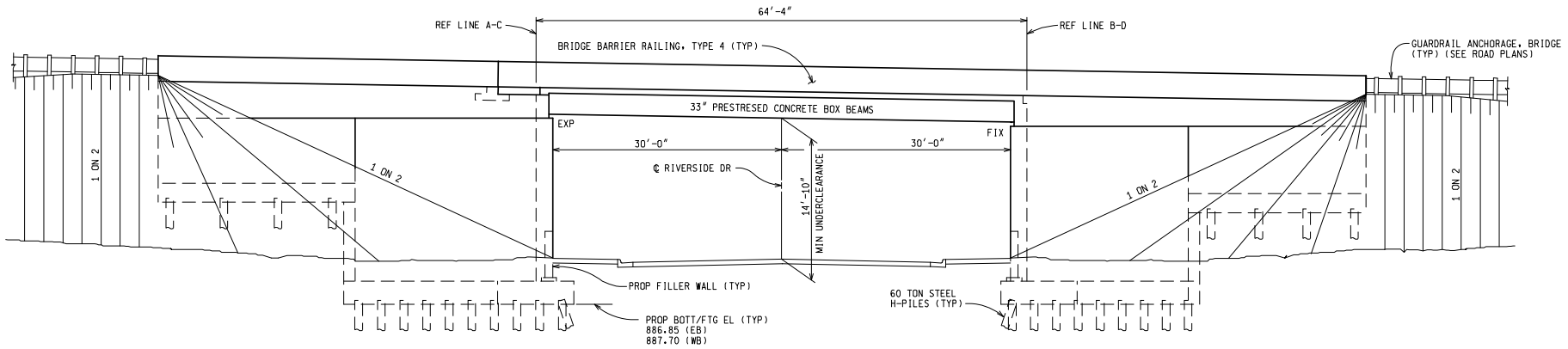
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET OF
3-18-08	S05-3 OF 13081 S05-4 OF 13081	75047A	JILDEH	

DATE: DATE: DATE: DATE:
CORRECTED BY: CHECKED BY: DRAWN BY: M LOUIS INGALLS
FILE NAME: s0513081st.dgn

REVISIONS			
NO.	DESCRIPTION	DATE	BY



SECTION A-A



ELEVATION

(VIEWED NORMAL TO REFERENCE LINES)

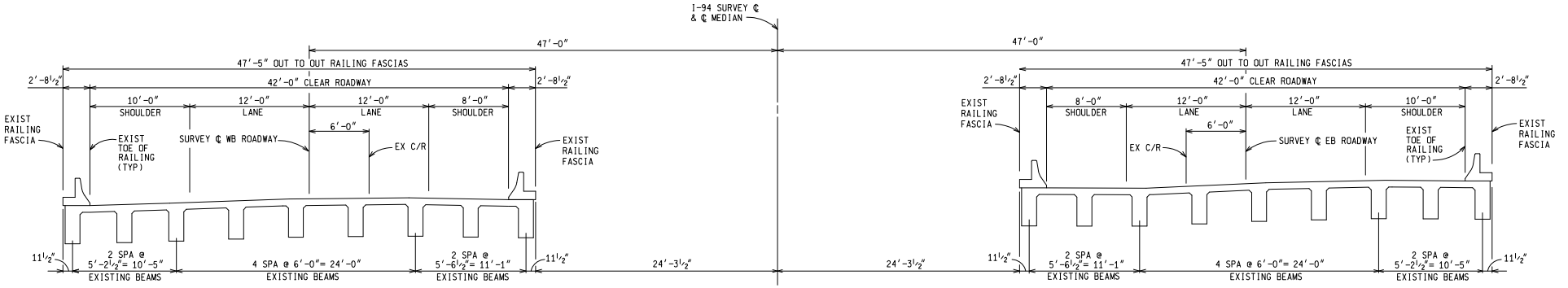
MDOT Michigan Department of Transportation

GENERAL PLAN OF STRUCTURE

I-94 EB & WB OVER RIVERSIDE DRIVE
CITY OF BATTLE CREEK, CALHOUN COUNTY

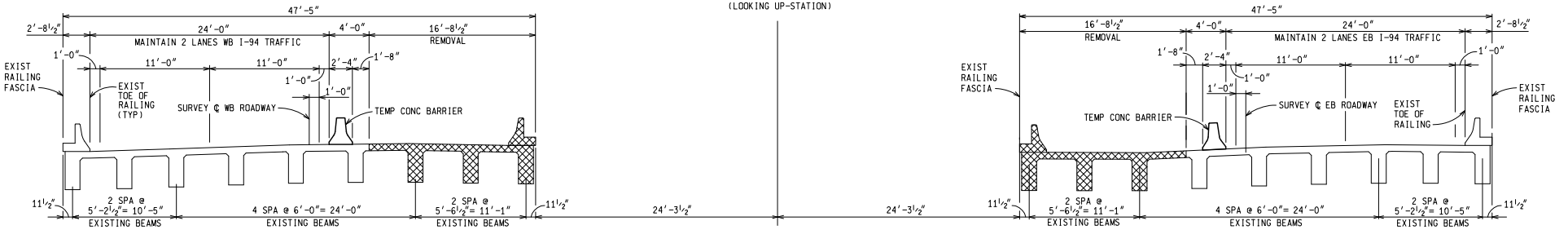
DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET
3-18-08	S05-3 OF 13081 S05-4 OF 13081	75047A	JILDEH	OF

DATE: CORRECTED BY: DATE: CHECKED BY: DATE: DRAWN BY: M LOUIS INGALLS FILE NAME: s05130811st.dgn



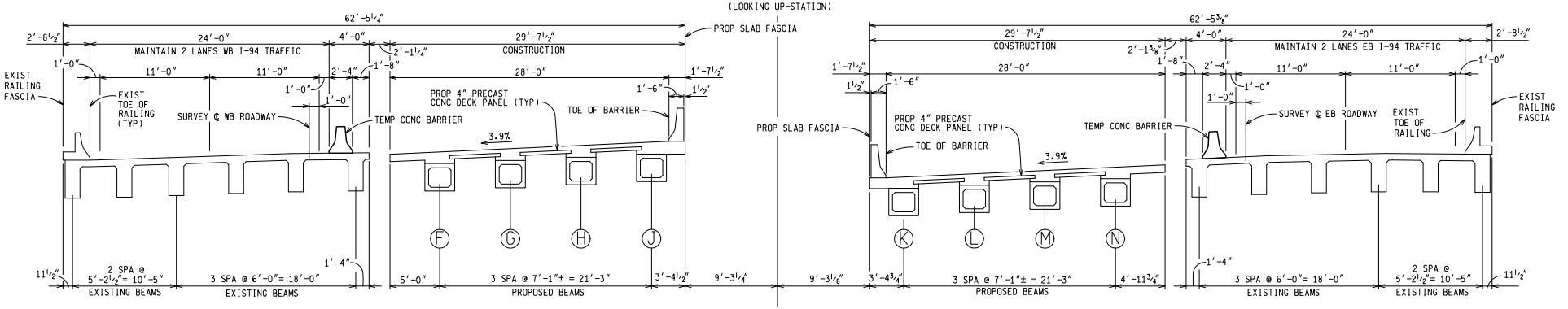
EXISTING DECK SECTION

(LOOKING UP-STATION)



STAGE I - REMOVAL

(LOOKING UP-STATION)



STAGE II - CONSTRUCTION

(LOOKING UP-STATION)

CROSS HATCHED PORTIONS OF THE EXISTING STRUCTURE SHALL BE REMOVED, AS SHOWN

REVISIONS			
NO.	DESCRIPTION	DATE	BY

MDOT Michigan Department of Transportation

CONSTRUCTION STAGING DETAILS

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET OF
3-8-08	S05-3 OF 13081 S05-4 OF 13081	75047A	JILDEH	

DATE:
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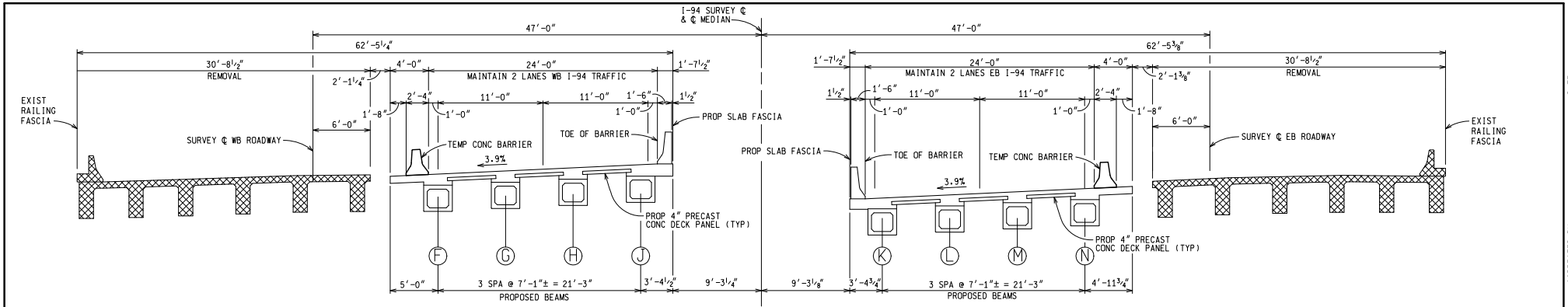
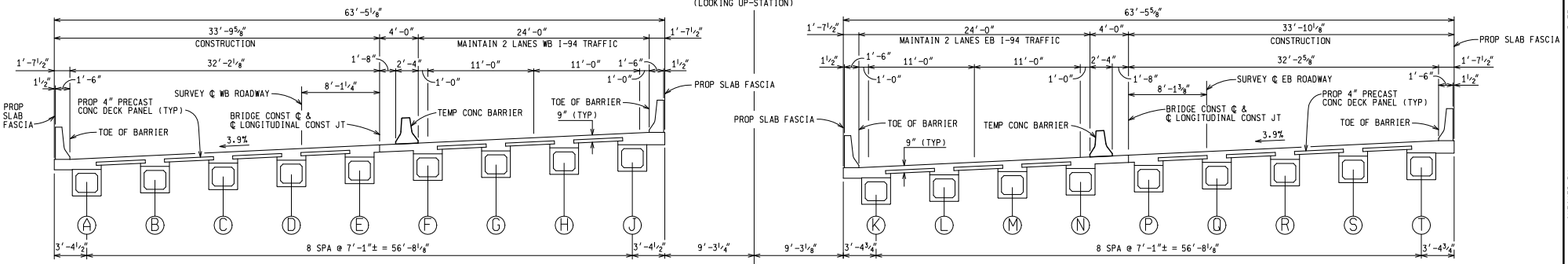
FILE NAME: s0513081cs.dgn



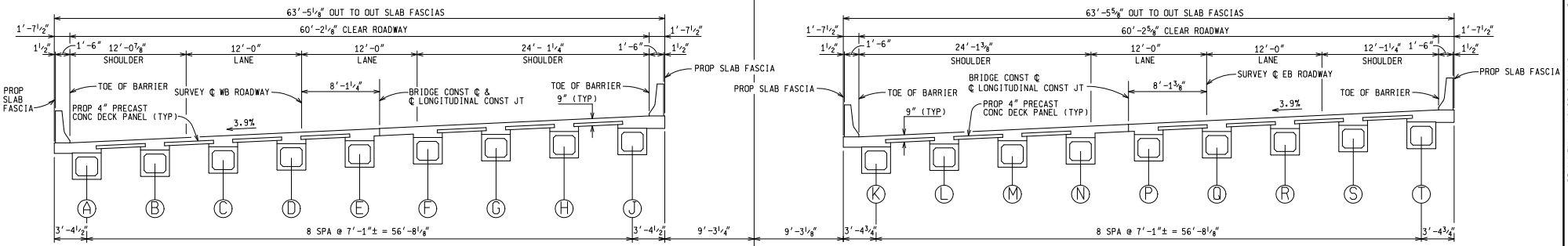
STAGE III – REMOVAL

(LOOKING UP-STATION)



STAGE IV – CONSTRUCTION

(LOOKING UP-STATION)



PROPOSED DECK SECTION

(LOOKING UP-STATION)

CROSS HATCHED PORTIONS OF THE EXISTING STRUCTURE SHALL BE REMOVED, AS SHOWN

REVISIONS			
NO.	DESCRIPTION	DATE	BY

MDOT Michigan Department of Transportation

CONSTRUCTION STAGING DETAILS

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET OF
3-8-08	S05-3 OF 13081 S05-4 OF 13081	75047A	JILDEH	

DATE:
CORRECTED BY:
DATE:
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DATE:
DRAWN BY: M LOUIS INGALLS
FILE NAME: s0513081cs.dgn

G. Safety and Mobility Peer Team Review

MDOT
Michigan Department of Transportation

OFFICE MEMORANDUM

DATE: May 9, 2008

To Brett Xxxx[1]
Manager
TSC

FROM: Greg Xxxx
Statewide Operations Engineer
Operations Division

SUBJECT: Safety and Mobility Peer Team Review (Statewide)
Transportation management Plan (TMP) Submittals

The May 2008 SPRT review of 2009 projects has been completed. Included with this memo is a copy of the completed review form(s) for each project listed below submitted by your office. Please review these forms and take any appropriate actions to enhance your projects.

Project CS	Project JN	Status
13082	103063	Green
13082,13083	75047,102807	Green
13082, 13083, 13073	74956,81723	Green

If your project(s) was rated as green, feedback to my office is not necessary. Please thoroughly consider any suggestions/comments on the review forms and file the review forms in the project files.

If your project(s) was rated as yellow, feedback to my office is required. Please thoroughly consider any suggestions/comments and provide feedback on what safety and mobility items were implemented in your respective TMP(s) based on the SPRT review. This information will be compiled and provided to MDOT Executive Staff and the Federal Highway Administration (FHWA).

If your project(s) was rated as red, re-submittal of the TMP to this office is required. Please address all critical issues and resubmit a revised TMP within the next 30 days.

If you have any questions or concerns with the review of your project(s), the review process or with this memorandum please contact me at your earliest convenience at 517-636-0463.

Statewide Operations Engineer

Attachment
cc: Richard Xxxx
Jason Xxxxx
James Xxxx

[1] Team member information is omitted

Safety and Mobility Peer Team (SMPT) Review					
Project Identification	**Control Section**: 1308 & 13083		**Job Number:** 75047 & 102807		**Route:** I-94
Location	I-94 EB & WB from Helmer Road to 61/2 Mile Road				
Work Description	Replacement of two bridges over Riverside Drive. CPM COLDMILL and HMA Overlay				
Contact	**Name**: Jason Xxxxx		**Phone**: 555-555-5555		
Review Team Members	Bill Xxxx, Bruhat Xxxxx, Heather Xxxx, Bil Xxxx, Dean Xxx, Sean Xxxxxxx				
Review Date:	05/06/08				
Operational Parameters	**V/C**	**LOS**	**Average Delay (Minutes)**		
Existing	0.9, 0.9, 0.75	D, E, C	N/A		
Work Zone	1.13, 1.57, 1.41	E, E, E	0.9, 1.4, 1.4		
TMP Package Complete	X YES		NO	X TTC	
Let Date	October 3, 2008			X TOP	
Construction Start Date	April 13, 2009			X PIP	
Construction End Date	May 30, 2010			X Vicinity Map	

SMPT Recommendation	SMPT Summary Comments:
Red Light: Not OK to Proceed *Review SPRT Comments;* *Region Engineer to Discuss with COO*	
Yellow Light: OK to Proceed *Review SPRT Comments; Region/TSC* *Incorporate Changes As Appropriate*	
X Green Light: OK to Proceed	

Traffic Mobility Analysis		
Item		**Comments**
X YES	Traffic data source(s) is appropriate and reasonable	
NO		
X YES	Traffic analysis methodology is appropriate and reasonable for the scope/complexity of the job location. The results are clear and understandable	
NO		
X YES	The delay assumptions and calculations are reasonable and the approach is consistent with current practice and policy	
NO		

Temporary Traffic Control			
		Item	**Comments**
X	YES	The TTC concept seems responsible and logical given the type of work, the system level, the duration of the project, and the traffic volumes	
	NO		
X	YES	Staging and constructability is well thought out and seems responsible.	
	NO		
X	YES	There is evidence of analysis with respect to similar projects and job specific characteristics (shy distance, slopes, attenuation, and horizontal/vertical sight distances); the work zone is designed accordingly.	
	NO		
X	YES	There is analysis of the alternatives considered, with an appropriate comparison of benefits and costs.	What is cost of widening bridge structure vs. user delay cost for one lane operation?
	NO		
X	YES	There is a work zone crash analysis and comparison to crash statistics for similar project types/locations. There are no elements of unacceptable risk for the public or highway workers.	Nice to see crash analysis included with packet
	NO		
X	YES	There is guidance on the development of an internal work zone (contractor's operation) traffic control plan for contractor ingress and egress.	
	NO		
X	YES	There is an appropriate plan to monitor safety and mobility and adjust the work zone/project during construction as needed.	
	NO		

Transportation Operations			
		Item	**Comments**
X	YES	TOP is complete and reasonable. It includes necessary provisions for pedestrians, emergency response, commercial vehicles, transit operations, etc., if necessary	
	NO		
X	YES	Delay mitigation techniques are evident and are applied appropriately. Are there any techniques that you would recommend be added to the project at this stage that the Region/TSC should consider?	No additional techniques are recommended
	NO		
X	YES	If applicable, is there adequate discussion of projects packaged or bundled with this project, an explanation of mobility influences beyond the project area?	N/A
	NO		

Public Information Plan			
X	YES	The Public Information Plan is appropriate for the scope of the Project	
	NO		

General TMP Comments			
X	YES	These are best practices in the area of mobility analysis, mitigation techniques, TTCP or TOP development evident in this TMP that should be shared with others.	
	NO		
	YES	These are recommended areas of focus for further review by the Region/TSC	
X	NO		
	YES	There are areas of concern that the team feels should be documented for review by either the Region Engineer or Chief Operations Officer	
X	NO		

U.S. Department of Transportation
Federal Highway Administration

Office of Transportation Operations
1200 New Jersey Ave., SE
Washington, D.C. 20590

www.fhwa.dot.gov/workzones

FHWA-HOP-11-003