630-5 Maintenance of Traffic Alternative Analysis (MOTAA)

As noted in ***Section 630-1 of the Traffic Engineering Manual*, Section 1400 of the L&D Manual** indicates that a Maintenance of Traffic Alternative Analysis (MOTAA) will be performed. This analysis shall be submitted during Step 6 for review and approval for any projects following the Major Plan Development Process (PDP). For projects following the Minor Plan Development Process, the analysis shall be submitted during Step 3. However, for Minor PDP projects, only work zones on the Interstate or Interstate look-alike system need to be analyzed. Like many analyses, the MOTAA may not be applicable to certain projects. Specifically on urban/downtown projects, the consultant should meet with Central Office and District personnel to determine how the MOTAA should be completed.

The purpose of the MOTAA is two fold. First, it provides information to the Department for determining if a part-width construction or crossover construction scenario is better for a given work zone. Secondly, it identifies potential problems; i.e., "constraints" with the various scenarios and allows the Department to make an informed decision on how to address these problems prior to the actual detailed design of plans.

A Maintenance of Traffic Alternative Analysis shall address the following requirements:

1. For Non-Interstate and Non-Interstate Look-alike Work Zones (Major PDP Projects):

    a. Investigate maintenance of traffic for each alternative.

    b. Include an evaluation of maintenance of traffic for ramps, local roads and cross streets.

    c. For each alternative determine:

        i. Number of lanes to be maintained.

        ii. Type of maintenance of traffic (i.e., signalized, detoured, part-width, runaround, crossover, etc.).

        iii. Lane widths.

        iv. Typical sections.

2. For Interstate and Interstate Look-alike Work Zones (Major and Minor PDP Projects):

    Analyze the maintenance of traffic for both part-width construction and crossover construction. Should the part-width and crossover alternatives prove to have significant maintenance of traffic constraints, or prove impractical or otherwise not possible to construct, the analysis should then include the contraflow technique as one of the possible alternatives.

    a. Provide a Lane Configuration Diagram (schematic or sketch) covering the entire project length. Include the following information on each Diagram (see example):

        i. Arrows showing lane use, including merging and diverging ramps in relation to work areas and barriers.

        ii. All bridges.

    b. Provide cross sections between every interchange, on every bridge, at merge and diverge points (ramps), where overpass piers are present, and at other "pinch" points. Where bridge widths vary, show the narrowest part of the bridge. Cross sections shall

be shown for all phases of all construction alternatives (part-width, crossover, contraflow, etc.) Existing cross sections shall also be included (see example).

The following shall be used to create the above cross sections:

i. The number of lanes to be provided during construction shall satisfy **ODOT's Policy 516-003(P), Traffic Management in Work Zones Interstate and Other Freeways (see *Sections 601-2 and 1311*).**

   The number of lanes required by this work zone policy is a starting point for the analysis. It is not meant to imply that a work zone policy exception will never be needed. In fact, ability to meet the work zone policy is one of the constraints that will be specifically examined in 2c. As noted in ***Sections 601-2 and 630-4***, the permitted lane closure maps (PLCM) on **ODOT's** web page define what hours a lane reduction is allowed on any segment of **Ohio's** Interstate and Interstate look-alike system. Any work zone that violates the PLCM will require a detailed queue analysis per the work zone policy and an exception request, if necessary, depending on the outcome of the queue analysis.

ii. Typically show 11 foot (3.3 meter) lanes unless a narrower lane(s) provides significant benefits in terms of mitigating maintenance of traffic constraints as discussed in 2c. It is permissible to utilize 10 foot (3 meter) lane (s) on bridges where insufficient space cannot provide for all lanes to be 11 foot (3.3 meter); however, the wider lanes are preferred whenever feasible. Show lane widths on cross sections.

iii. All exit and entrance ramps are to be maintained with the same number of lanes during construction as pre-construction.

iv. A minimum 1 foot (0.3 meter) clearance will be provided between lanes and barrier toes. Show all clearance/buffer widths on cross sections.

v. Show existing beam spacing on bridge decks.

vi. Show bridge deck cut lines in relationship to existing beams. Give the length of cantilevered section of bridge deck after the cut line.

vii. Show a 2 foot (0.6 meter) paved shoulder where possible; and indicate locations where this is not possible.

c. Provide a table of constraints for the two alternatives (part-width and crossover construction) in the form of a "Constraint Table" (see Form 696-1). Provide the same information for the contraflow alternative when applicable. In addition to this table, highlight any areas where the cross section required by **ODOT's Policy** cannot be provided (e.g., can not provide a 2 ft paved shoulder in a particular area.)

   All of the constraints should be explicitly covered in the analysis. Do not provide general responses such as "no difference between options". In addition, if a constraint is identified, indicate the magnitude where appropriate.

   Providing the required number of lanes, entrance ramp merge distance and maintaining the same number of exit ramps are important emphasis areas. Should it not be feasible or financially prudent to provide them, explain in detail the issues that preclude them from being provided.

The Constraint Table (Form 696-1) shall include the following categories:

i. Ability to comply with Work Zone **Policy 516-003(P).**

ii. Ability to maintain all entrance and exit ramps.

iii. Ability to provide required entrance ramp merge decision sight distance (***Sections 607-13 and 607-15***).

iv. Right-of-way impacts.

v. Environmental impacts.

vi. Bridge widths.

vii. Significant impacts for construction duration and construction costs.

viii. Significant impacts to earthwork, retaining walls, pier clearances, profile differences, etc.

ix. Ability to maintain existing drainage and lighting systems.

x. Constructability and construction equipment access.

xi. Location of crossovers.

xii. Access impacts to important traffic generators such as hospitals, fire departments, industries, sports arenas, etc.

xiii. Longitudinal joints for concrete pavement.

xiv. Estimated Maintenance of Traffic Costs

It is not the intent of the MOTAA to require a detailed design of each alternative's work zone. It is intended to identify and compare major potential constraints of the work zone alternatives.

The MOTAA may be a factor in choosing the preferred alternative and will serve as the basis for scoping the project's work zone design. The analysis should be a comparison of alternatives that documents maintenance of traffic constraints. It should address the benefits and problems between the alternatives.

The analysis shall be submitted concurrently to the **District** and the **Office of Traffic Engineering**. The analysis shall include a project description indicating the type of work. For Non-Interstate and Non-Interstate Look-alike Work Zones (Major Projects only) the information required in Item 1 of this section shall also be provided. For Interstate and Interstate Look-alike Work Zones, the following shall be included in the submission:

- **Background Information and Description of Alternatives**.

- **Lane Configuration Diagrams and Cross Sections.** Lane Configuration Diagrams (schematic or sketch) for the entire project length as described in 2a of this section. The cross sections shall be provided for the locations called for in 2b. In the Lane Configuration Diagram, along with each roadway schematic or sketch, the corresponding cross sections shall be displayed on the same sheet. Each cross section location shall have its own identifier, i.e., do not repeat section 'AA' at a different location (s). If a cross section is provided at the same

location in several phases, it shall be identified the same in each phase to provide easy identification.

- ***Form 696-1*, Work Zone Constraints Table**. This table shall be incorporated into the analysis report. The content of each box in the form should indicate if that work zone constraint will be an issue with each alternative (part-width or crossover, and contraflow when applicable) and the level of impact: Low, Medium, or High for Cost, Duration, and Constructability. Where a constraint is identified, it should be clear in which phase(s) of construction the constraint will be present. The constraint shall also be explained with sufficient information for **ODOT** to determine the magnitude of the constraint (see example).

- ***Form 696-2*, Bridge Table**. This table shall be incorporated into the analysis report if any bridges are included within the project limits. This includes underpasses and overpasses as well as pedestrian and bike bridges. The bridge table shall include extent of work being completed on the bridge, type of bridge (e.g. overpass, underpass), length of bridge, existing pier spacing, existing bridge widths, bridge widths needed for each MOT alternative, future bridge width, and additional costs associated with the MOT for each bridge in each MOT scheme. Columns may be added as needed to this table (see example).

- ***Form 696-3*, Ramp Table**. This table shall be incorporated into the analysis report. The table shall include ramp designation, the number of lanes, ramp volume, ramp truck volume, decision sight distance, whether ramp will be open or closed (if closed – duration of closure), and detours for closures. Columns may be added as needed to this table (see example).

- ***Form 696-4*, Cost Comparison Table**. A table comparing the cost and project duration for each alternative analyzed shall also be included. The costs are just best available engineering estimates. Major cost differences between alternatives should be noted (e.g. temporary bridge widening, temporary pavement, portable concrete barrier, additional right-of-way, retaining walls, etc (see example).

- **Rolled Plans for Complex Projects.** For complex projects, **ODOT** requires a set of rolled plans showing the entire length of the project. Each construction phase with its corresponding traffic phase should be color coded. A legend shall be provided showing different colors for permanent roadway, permanent bridge, temporary roadway, temporary bridge, etc. Cross-hatching shall be shown on each construction area that is critical for the next phase. Other items to be denoted using colors or symbols include ramp closure, structures to be removed or demolished, color coding for traffic routing and arrows showing direction of traffic flow.

  A rolled plan shall also be included showing the existing profile and the proposed final profile of the entire project.

  Complex projects, for this purpose, are defined as all urban projects, and non-urban projects which involve temporary pavements, significant localized alignment modifications from phase to phase, etc. Projects which involve significant modifications to interchanges with a high number of sub-phases, are also considered complex projects. Any project which involves more than two phases and a possible third phase to upgrade the shoulder could also be considered a complex project.

The Maintenance of Traffic Alternative Analysis shall include a summary. It is not the responsibility of the design team to determine if one alternative is not feasible and therefore should not be analyzed. The alternatives should be analyzed and the information included in the report. **ODOT** will determine, based upon the analysis, which is the preferred alternative.