DATE: November 10, 2009

TO: Region Engineers
    Region Development Engineers
    Region Delivery Engineers
    TSC Development Engineers
    TSC Managers
    Resident/Project Engineers
    Region Construction Engineers
    Region Traffic & Safety Engineers
    TSC Traffic & Safety Engineers
    Region Maintenance Engineers

FROM: Gregory C. Johnson
      Chief Operations Officer

      John C. Friend
      Engineer of Delivery

SUBJECT: Bureau of Highway Instructional Memorandum 2009-08
         Base Mounted Controller Cabinets & Box Span Displays for Traffic Signals

The Engineering Operations Committee approved the use of the box span signal layout in 2005 as the department’s standard design for all trunkline intersections being constructed or modernized. For a typical intersection, the box span design requires four support structures (one structure in each quadrant of the intersection) and a base mounted controller cabinet. This design style is credited with improving motorist visibility, thus providing a positive contribution to the department’s senior mobility initiatives. This signal layout also improves worker safety during signal maintenance.

Two specific signal operations, the flashing yellow left-turn arrow and traffic/pedestrian actuation, in many cases, require a base mounted controller cabinet, which is larger than the pole mounted cabinet used in diagonal span displays. The larger cabinet accommodates additional load switches, provides more reliable monitoring of the signal operation and provides the necessary wiring capacity. The large base mounted cabinet can visually impact the intersection and the adjacent businesses. In some instances, a sight restriction may occur.

Attached are “Guidelines for Traffic Signal Design – Box Span Display.” These guidelines provide direction for project development. These guidelines will also be further modified when required.
If you have any questions, please contact Paula Corlett, Signal Operations Engineer at 517-373-2324 or corlettp@michigan.gov.

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Subject Index: Traffic Control

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Attachment
The box span design is the department’s standard traffic control signal design for all trunkline intersections being signalized or modernized. Exceptions may be granted when one of the following conditions exist:

1. Cost Prohibitive: The estimated costs exceed the cost of the diagonal span by more than $50,000. This includes:
   - Cost for right-of-way to accommodate the box span display.
   - Cost for relocation of conflicting underground or overhead utilities.

2. Time Delay: A long delay to install the devices because of the need for utility relocation or right-of-way purchase. The delay may be deemed unacceptable due to public safety considerations.

3. Visual Impact/Sight Restrictions: Placement of a base mounted cabinet in urban areas sometimes cannot be accommodated without significant visual impact to the intersection. Pole mounted cabinets do not always allow for the necessary box span wiring, and can only accommodate limited vehicular and/or pedestrian actuation. Traffic signal designers shall contact the local TSC development engineer to review urban signal design layouts. As part of this review, every effort should be made to optimize placement of the cabinet to minimize impacts to business and site distance. For locations where the base mounted cabinets are deemed unworkable because of visibility or other impacts, fixed time operation and diagonal span display may be recommended to the Region Traffic and Safety/Operations Engineer.

Exceptions must have the concurrence of the Region Engineer and the Director of the Bureau of Highways-Delivery.

General Notes
1. For most installations, the box span design will require a ground-mounted controller cabinet due to the additional wiring necessary for this design.
2. Flashing yellow arrow for left turn operation requires a base mounted controller and cabinet due to required additional load switches.
3. Actuation (either vehicular, pedestrian or both) can only be accommodated in a limited fashion without a base mounted cabinet. This is due to the need for space for load switches.
4. For overhead flashing beacon installations, box span designs are not to be used.
5. If the distance from the stop bar to the signal indication for any approach exceeds 150 feet (cone of vision requirement), the box span design shall not be used.
6. Special considerations may be applied to corridor signal modernization or corridor construction projects to assure consistency along the corridor.