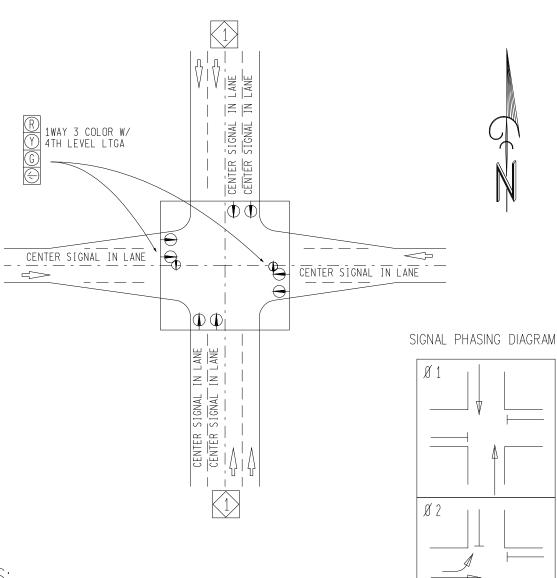


- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- 2 in THE ABSENCE OF A STOP BAR, THE CURB RADII SPRING POINT SHOULD BE USED.
- 3 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.

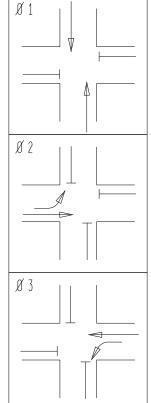
Michigan Department of Transportation

SHEET 1 OF 26

HEAD PLACEMENT DIAGRAM



- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- 2 in THE ABSENCE OF A STOP BAR, THE CURB RADII SPRING POINT SHOULD BE USED.
- 3 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- UTILIZE A 4TH LEVEL LTGA FOR THE EAST & WEST 4 PROTECTED LEFT MOVEMENTS.

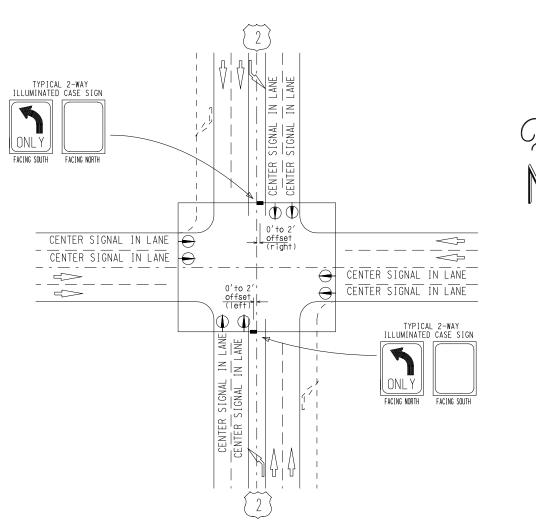


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SHEET 2 OF 26

HEAD PLACEMENT DIAGRAM

3 PHASE OPERATION SPLIT PHASE

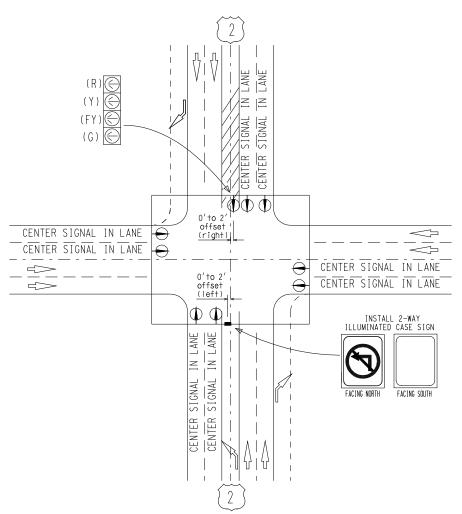


- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- 2 in THE ABSENCE OF A STOP BAR, THE CURB RADII SPRING POINT SHOULD BE USED.
- 3 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- THE APPROACH LEGEND OF THE NEAR SIDE CASE SIGN SHOULD BE BLANKED OUT SO DRIVERS ONLY READ THE THE CASE SIGN LEGEND ON THE FAR SIDE OF THE INTERSECTION.

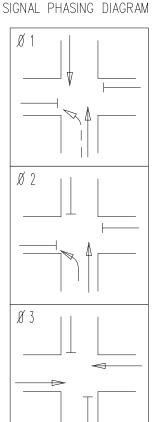
Michigan Department of Transportation

SHEET 3 OF 26

HEAD PLACEMENT DIAGRAM







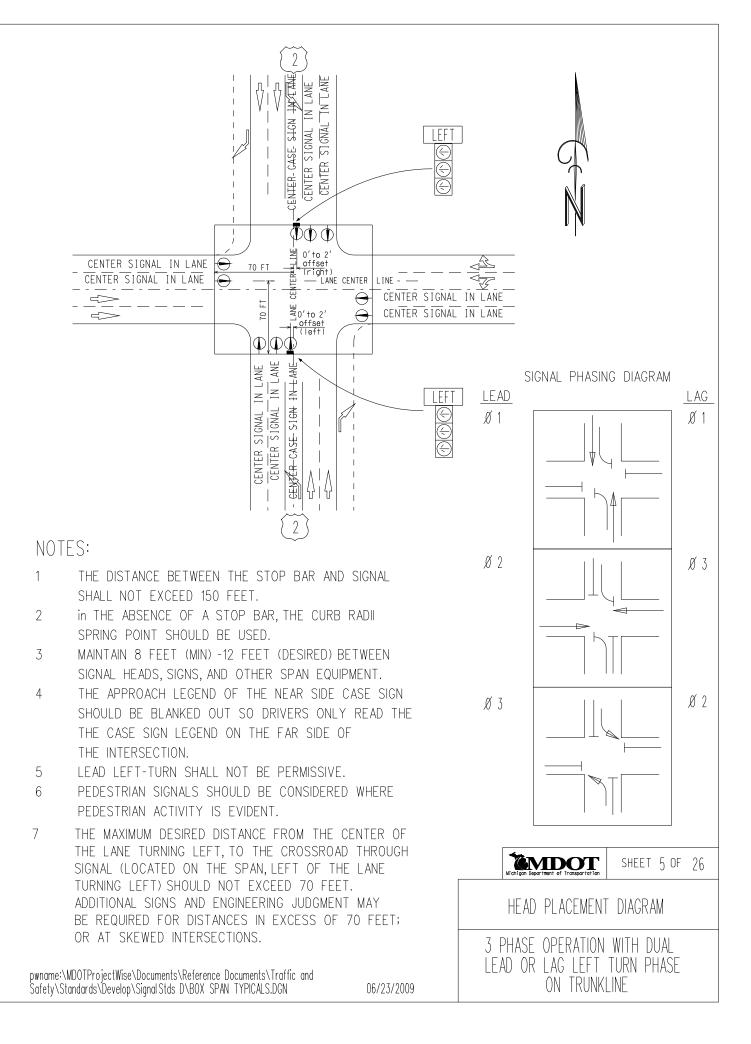
- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- 2 in THE ABSENCE OF A STOP BAR, THE CURB RADII SPRING POINT SHOULD BE USED.
- 3 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- THE APPROACH LEGEND OF THE NEAR SIDE CASE SIGN SHOULD BE BLANKED OUT SO DRIVERS ONLY READ THE THE CASE SIGN LEGEND ON THE FAR SIDE OF THE INTERSECTION.
- 5 USE PERMISSIVE FLASHING YELLOW LEFT TURN.

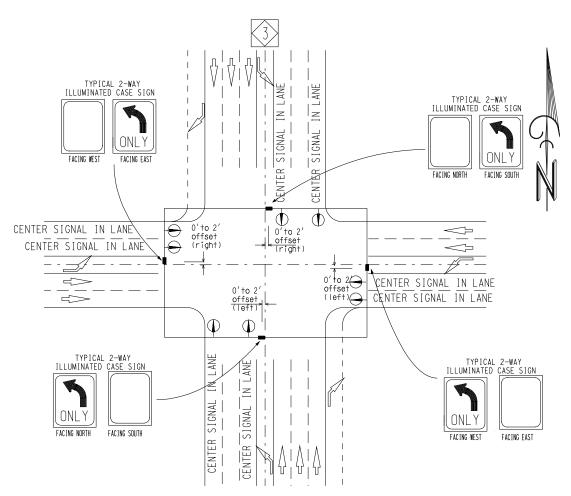


SHEET 4 OF 26

HEAD PLACEMENT DIAGRAM

3 PHASE OPERATION WITH SINGLE LAGGING LEFT TURN PHASE ON TRUNKLINE

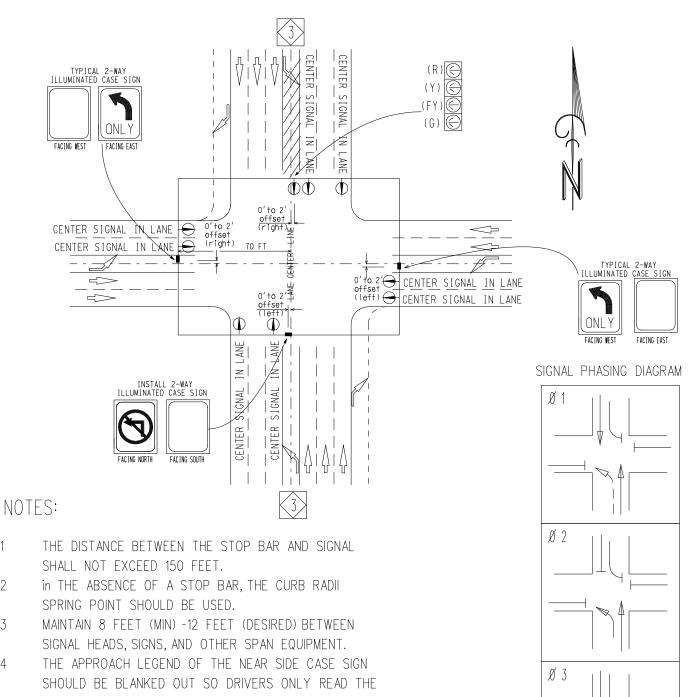




- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- 2 in THE ABSENCE OF A STOP BAR, THE CURB RADII SPRING POINT SHOULD BE USED.
- 3 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- THE APPROACH LEGEND OF THE NEAR SIDE CASE SIGN SHOULD BE BLANKED OUT SO DRIVERS ONLY READ THE THE CASE SIGN LEGEND ON THE FAR SIDE OF THE INTERSECTION.
- 5 PEDESTRIAN SIGNALS OPTIONAL.

HEAD PLACEMENT DIAGRAM

2 PHASE OPERATION



3

2

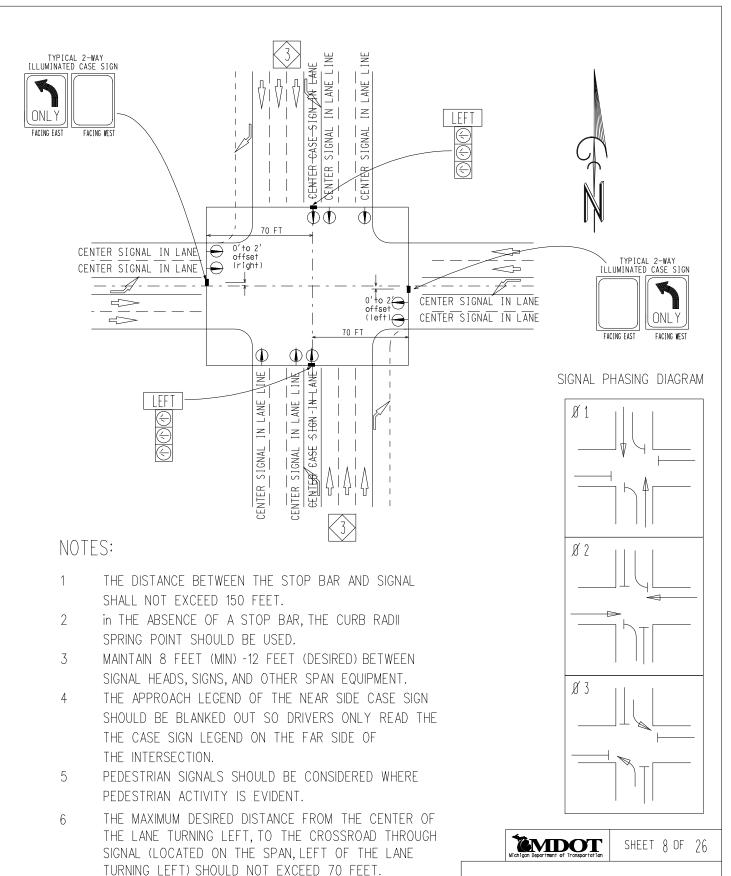
- 4 THE CASE SIGN LEGEND ON THE FAR SIDE OF THE INTERSECTION.
- 5 PEDESTRIAN SIGNALS SHOULD BE CONSIDERED WHERE PEDESTRIAN ACTIVITY IS EVIDENT.
- 6 THE MAXIMUM DESIRED DISTANCE FROM THE CENTER OF THE LANE TURNING LEFT, TO THE CROSSROAD THROUGH SIGNAL (LOCATED ON THE SPAN, LEFT OF THE LANE TURNING LEFT) SHOULD NOT EXCEED 70 FEET. ADDITIONAL SIGNS AND ENGINEERING JUDGMENT MAY BE REQUIRED FOR DISTANCES IN EXCESS OF 70 FEET; OR AT SKEWED INTERSECTIONS.

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HEAD PLACEMENT DIAGRAM

3 PHASE OPERATION WITH SINGLE LAGGING LEFT TURN PHASE ON TRUNKLINE



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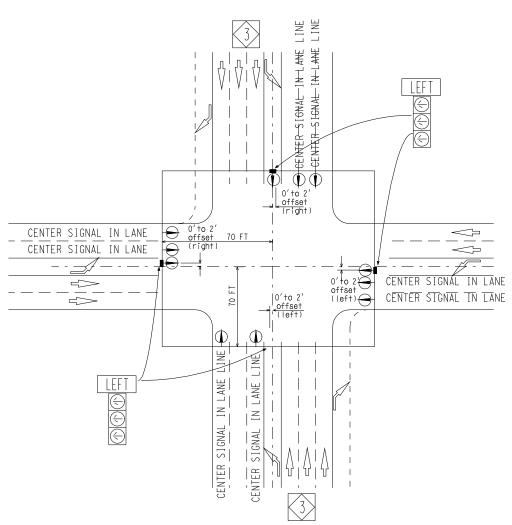
OR AT SKEWED INTERSECTIONS.

ADDITIONAL SIGNS AND ENGINEERING JUDGMENT MAY BE REQUIRED FOR DISTANCES IN EXCESS OF 70 FEET;

06/23/2009

HEAD PLACEMENT DIAGRAM

3 PHASE OPERATION WITH DUAL LEADING LEFT TURN PHASING ON TRUNKLINE

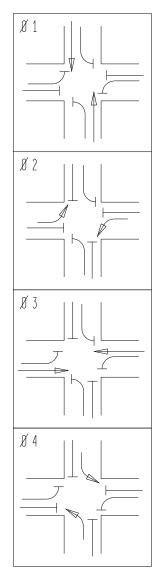




- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- 2 in THE ABSENCE OF A STOP BAR, THE CURB RADII SPRING POINT SHOULD BE USED.
- 3 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- 4 PEDESTRIAN SIGNALS SHOULD BE CONSIDERED WHERE PEDESTRIAN ACTIVITY IS EVIDENT.
- THE MAXIMUM DESIRED DISTANCE FROM THE CENTER OF THE LANE TURNING LEFT, TO THE CROSSROAD THROUGH SIGNAL (LOCATED ON THE SPAN, LEFT OF THE LANE TURNING LEFT) SHOULD NOT EXCEED 70 FEET. ADDITIONAL SIGNS AND ENGINEERING JUDGMENT MAY BE REQUIRED FOR DISTANCES IN EXCESS OF 70 FEET; OR AT SKEWED INTERSECTIONS.



SIGNAL PHASING DIAGRAM



MIchigan Department of Transportation

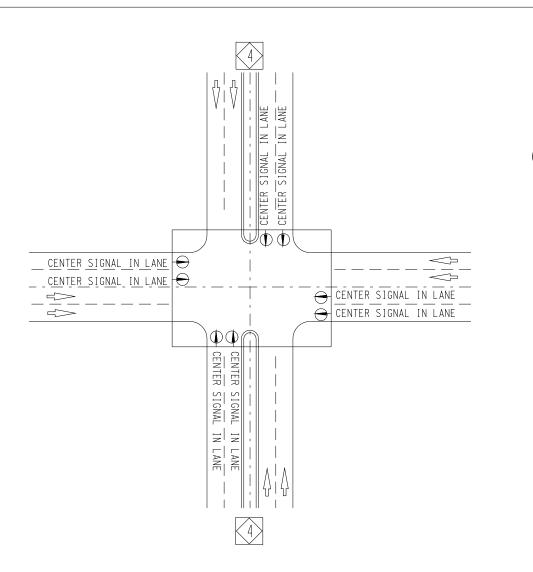
SHEET 9 OF 26

HEAD PLACEMENT DIAGRAM

4 PHASE OPERATION WITH LEADING LEFT TURNS FOR BOTH ROADS (SAME OPERATION AS 8 PHASE)

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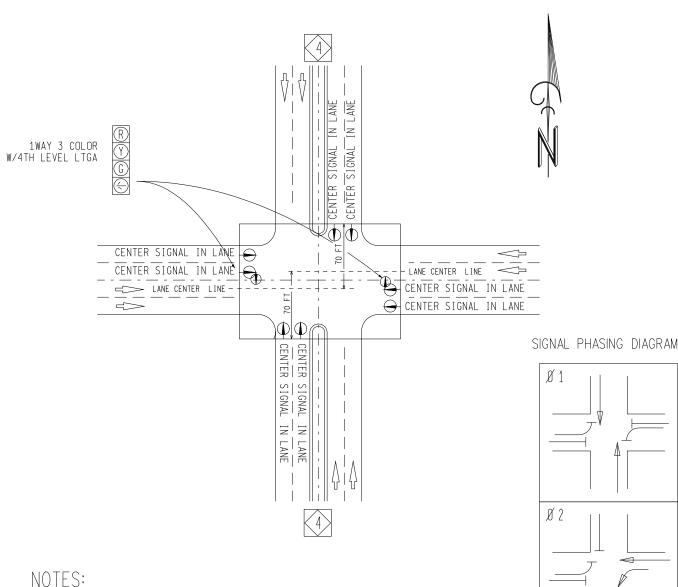


- 1 MEDIAN WIDTH LESS THAN 30'.
- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- in the absence of a stop bar, the curb radii spring point should be used.
- 4 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.

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HEAD PLACEMENT DIAGRAM



- MEDIAN WIDTH LESS THAN 30'.
- 2 THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- 3 in THE ABSENCE OF A STOP BAR, THE CURB RADII SPRING POINT SHOULD BE USED.
- 4 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- UTILIZE A 4TH LEVEL LTGA FOR THE EAST & WEST 5 PROTECTED LEFT MOVEMENTS.
- THE MAXIMUM DESIRED DISTANCE FROM THE CENTER OF 6 THE LANE TURNING LEFT, TO THE CROSSROAD THROUGH SIGNAL (LOCATED ON THE SPAN, LEFT OF THE LANE TURNING LEFT) SHOULD NOT EXCEED 70 FEET. ADDITIONAL SIGNS AND ENGINEERING JUDGMENT MAY BE REQUIRED FOR DISTANCES IN EXCESS OF 70 FEET; OR AT SKEWED INTERSECTIONS.

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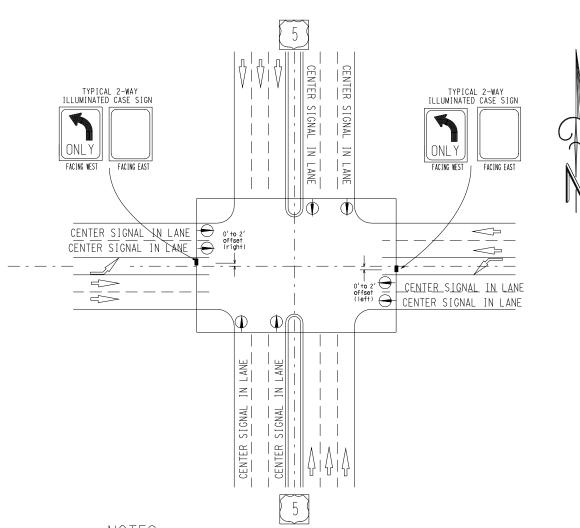
SHEET 11 OF 26

HEAD PLACEMENT DIAGRAM

PHASE OPERATION SPLIT PHASE

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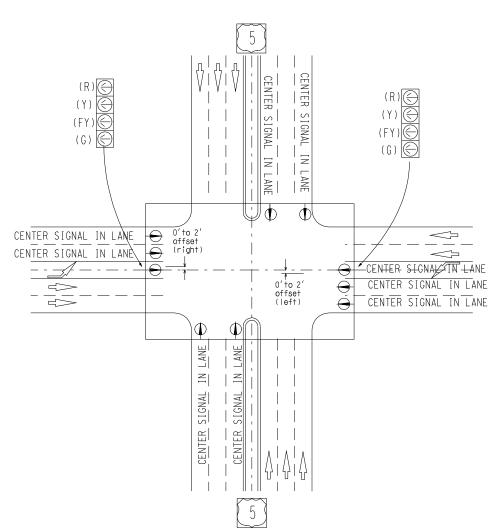


- 1 MEDIAN WIDTH LESS THAN 30'.
- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- in the absence of a stop bar, the curb radii spring point should be used.
- 4 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- THE APPROACH LEGEND OF THE NEAR SIDE CASE SIGN SHOULD BE BLANKED OUT SO DRIVERS ONLY READ THE THE CASE SIGN LEGEND ON THE FAR SIDE OF THE INTERSECTION.

Michigan Department of Transportation

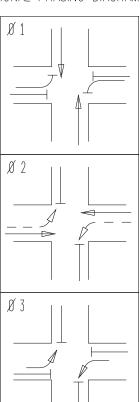
SHEET 12 OF 26

HEAD PLACEMENT DIAGRAM





SIGNAL PHASING DIAGRAM



#### NOTES:

- 1 MEDIAN WIDTH LESS THAN 30'.
- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- in the absence of a stop bar, the curb radii spring point should be used.
- 4 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- THE APPROACH LEGEND OF THE NEAR SIDE CASE SIGN SHOULD BE BLANKED OUT SO DRIVERS ONLY READ THE THE CASE SIGN LEGEND ON THE FAR SIDE OF THE INTERSECTION.
- 6 PEDESTRIAN SIGNALS SHOULD BE CONSIDERED WHERE PEDESTRIAN ACTIVITY IS EVIDENT.
- 7 USE PERMISSIVE FLASHING YELLOW LEFT TURN.

Michigan Department of Transportation

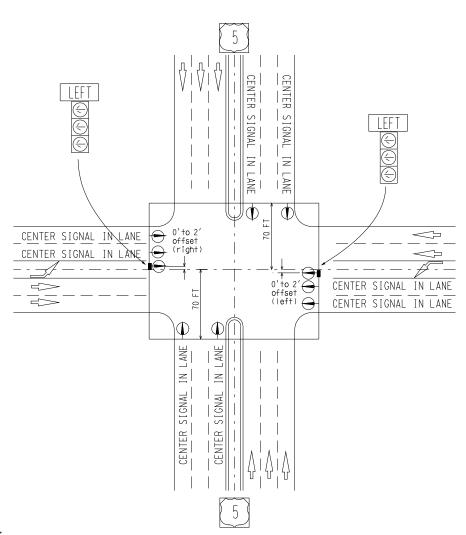
SHEET 13 OF 26

HEAD PLACEMENT DIAGRAM

3 PHASE OPERATION WITH DUAL LAGGING LEFT TURN PHASE ON X-RD

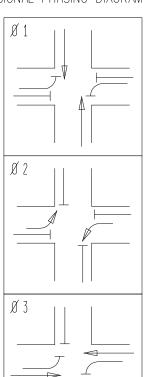
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SIGNAL PHASING DIAGRAM



#### NOTES:

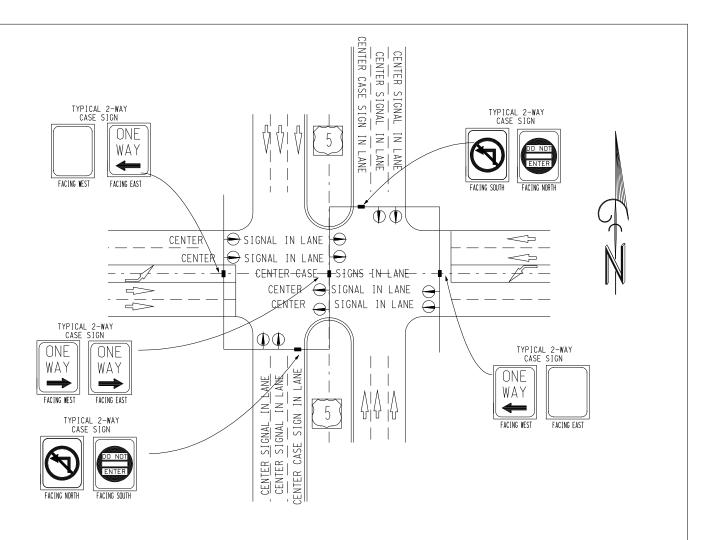
- 1 MEDIAN WIDTH LESS THAN 30'.
- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- in the absence of a stop bar, the curb radii spring point should be used.
- 4 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- 5 LEAD LEFT-TURN SHALL NOT BE PERMISSIVE.
- 6 PEDESTRIAN SIGNALS SHOULD BE CONSIDERED WHERE PEDESTRIAN ACTIVITY IS EVIDENT.
- THE MAXIMUM DESIRED DISTANCE FROM THE CENTER OF THE LANE TURNING LEFT, TO THE CROSSROAD THROUGH SIGNAL (LOCATED ON THE SPAN, LEFT OF THE LANE TURNING LEFT) SHOULD NOT EXCEED 70 FEET. ADDITIONAL SIGNS AND ENGINEERING JUDGMENT MAY BE REQUIRED FOR DISTANCES IN EXCESS OF 70 FEET; OR AT SKEWED INTERSECTIONS.

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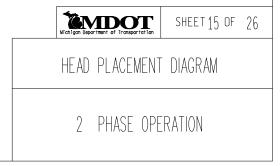
HEAD PLACEMENT DIAGRAM

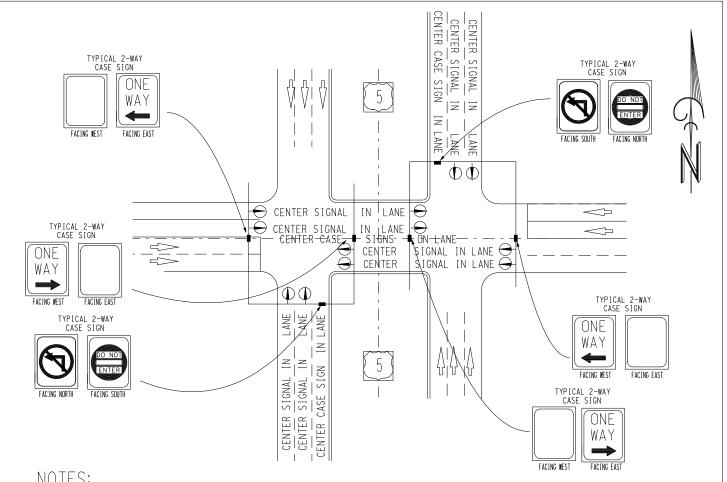
3 PHASE OPERATION WITH DUAL LEADING LEFT TURN PHASE FOR X-RD



- MEDIAN WIDTH IS 30'OR MORE, AND THE DISTANCE FROM THE X-ROAD STOP BAR TO THE MEDIAN SIGNAL IS LESS THAN OR EQUAL TO 150 FEET.
- 2 in THE ABSENCE OF A STOP BAR, THE CURB RADII SPRING POINT SHOULD BE USED.
- 3 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- THE APPROACH LEGEND OF THE NEAR SIDE CASE SIGN SHOULD BE BLANKED OUT SO DRIVERS ONLY READ THE THE CASE SIGN LEGEND ON THE FAR SIDE OF THE INTERSECTION.
- 5 PEDESTRIAN SIGNALS SHOULD BE CONSIDERED WHERE PEDESTRIAN ACTIVITY IS EVIDENT.

- WHILE PHASING IS POSSIBLE FOR EITHER ROADWAY, USUALLY LEFT TURNS ARE PROHIBITED AT THE INTERSECTION PROPER AND REDIRECTED THROUGH MEDIAN CROSSOVERS. THE MAIN PROBLEM IS THE INTERLOCKING OF LEFT TURN MOVEMENTS.
- 7 TO REDUCE THE NUMBER OF CONDUCTOR CABLES
  CROSSSING A SPAN, CONSIDERATION SHOULD BE GIVEN
  TO PLACING THE CONTROLLER IN THE MEDIAN.
- A DIRECTIONAL BORE CONDUIT MAY BE REQUIRED TO REDUCE THE NUMBER OF OVERHEAD CONDUCTORS CABLES CROSSING THE SPAN TO 10 OR LESS.



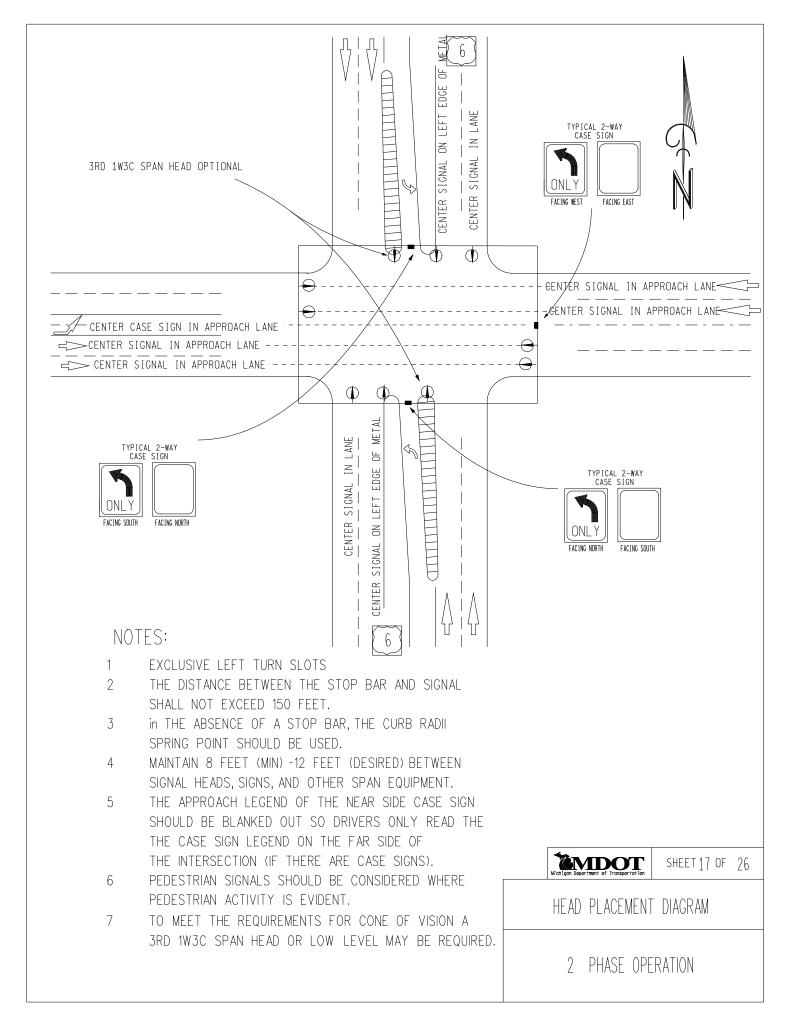


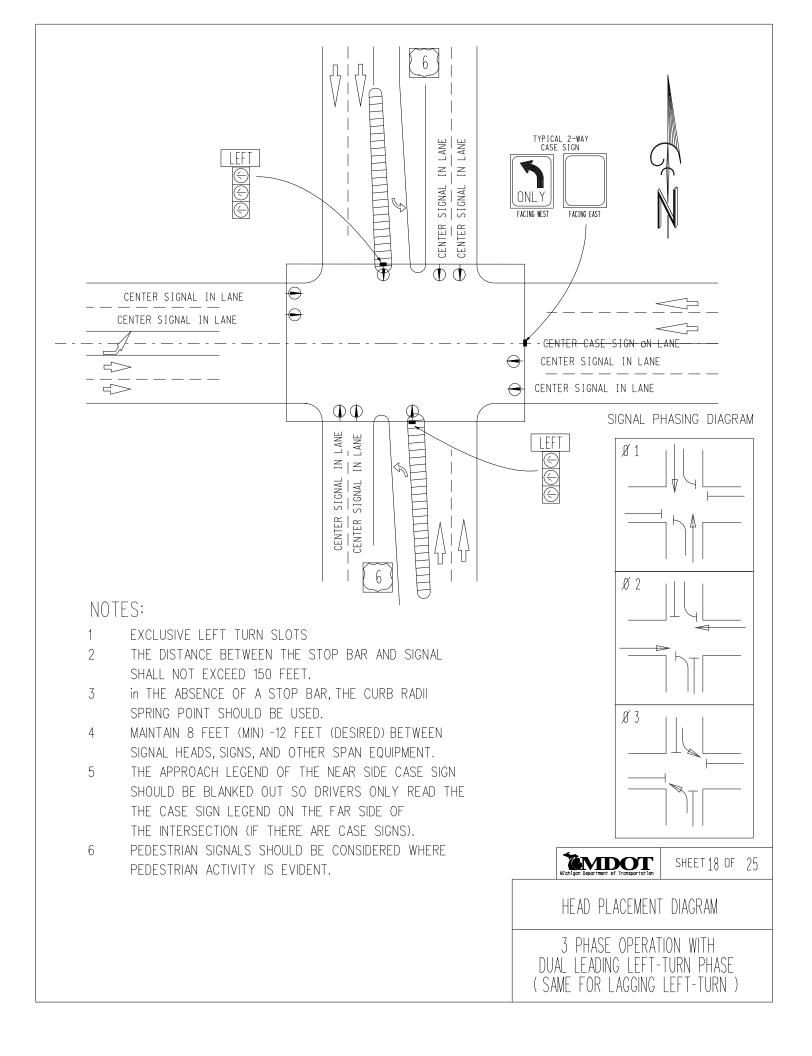
- MEDIAN WIDTH IS 30'OR MORE, AND THE DISTANCE 1 FROM THE X-ROAD STOP BAR TO THE CENTER LINE OF THE MEDIAN IS GREATER THAN 150 FEET
- 2 DESIGN AS TWO SEPARATE INTERSECTIONS.
- 3 THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- in THE ABSENCE OF A STOP BAR, THE CURB RADII 4 SPRING POINT SHOULD BE USED.
- 5 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- 6 THE APPROACH LEGEND OF THE NEAR SIDE CASE SIGN SHOULD BE BLANKED OUT SO DRIVERS ONLY READ THE THE CASE SIGN LEGEND ON THE FAR SIDE OF THE INTERSECTION.

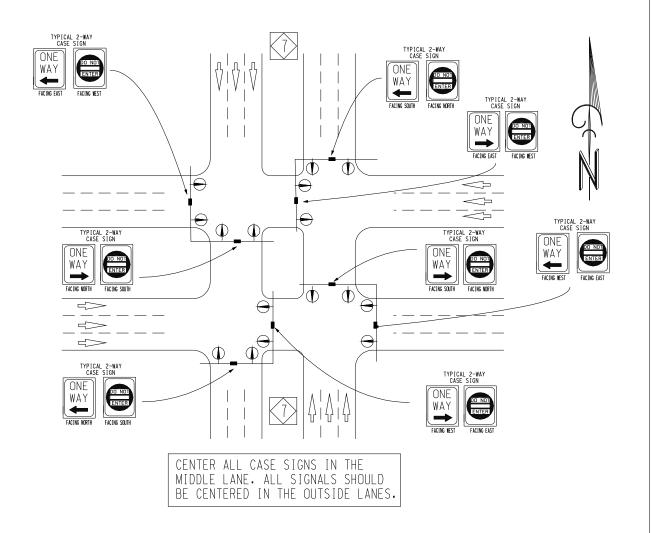
- 7 WHILE PHASING IS POSSIBLE FOR EITHER ROADWAY. USUALLY LEFT TURNS ARE PROHIBITED AT THE INTERSECTION PROPER AND REDIRECTED THROUGH MEDIAN CROSSOVERS. THE MAIN PROBLEM IS THE INTERLOCKING OF LEFT TURN MOVEMENTS.
- 8 PEDESTRIAN SIGNALS SHOULD BE CONSIDERED WHERE PEDESTRIAN ACTIVITY IS EVIDENT.
- 9 A BASE MOUNTED CABINET MAY BE REQUIRED
- 10 TO REDUCE THE NUMBER OF CONDUCTOR CABLES CROSSSING A SPAN, CONSIDERATION SHOULD BE GIVEN TO PLACING THE CONTROLLER IN THE MEDIAN.
- 11 A DIRECTIONAL BORE CONDUIT MAY BE REQUIRED TO REDUCE THE NUMBER OF OVERHEAD CONDUCTORS CABLES CROSSING THE SPAN TO 10 OR LESS.

**EMDOT** SHEET 16 OF 26

HEAD PLACEMENT DIAGRAM

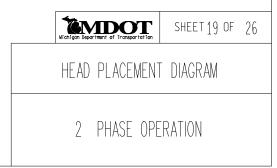


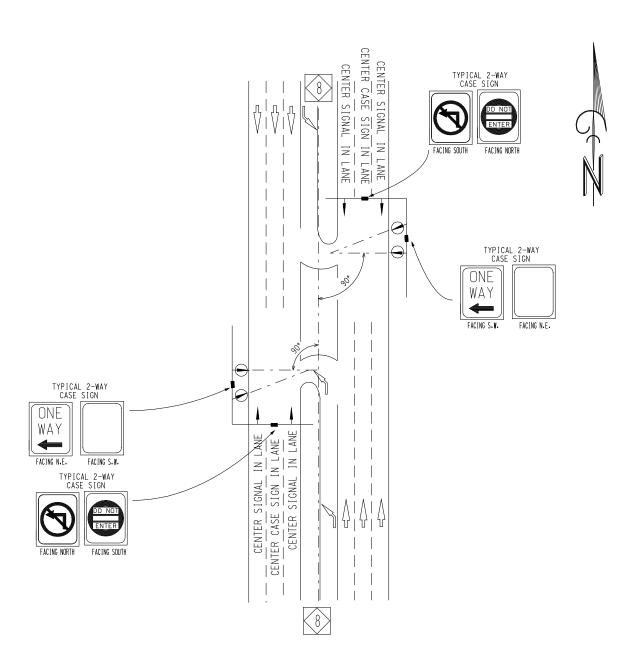




- MEDIAN WIDTH IS 30'OR MORE, AND THE DISTANCE FROM THE X-ROAD STOP BAR TO THE MEDIAN SIGNAL IS GREATER THAN 150 FEET.
- 2 DESIGN AS FOUR SEPARATE INTERSECTIONS
- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- 4 in THE ABSENCE OF A STOP BAR, THE CURB RADII SPRING POINT SHOULD BE USED.
- 5 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- 6 PEDESTRIAN SIGNALS SHOULD BE CONSIDERED WHERE PEDESTRIAN ACTIVITY IS EVIDENT.

- 7 WHILE PHASING IS POSSIBLE FOR EITHER ROADWAY, USUALLY LEFT TURNS ARE PROHIBITED AT THE INTERSECTION PROPER AND REDIRECTED THROUGH MEDIAN CROSSOVERS. THE MAIN PROBLEM IS THE INTERLOCKING OF LEFT TURN MOVEMENTS.
  - TO REDUCE THE NUMBER OF CONDUCTOR CABLES
    CROSSSING A SPAN, CONSIDERATION SHOULD BE GIVEN
    TO PLACING THE CONTROLLER IN THE MEDIAN.
  - 9 A BASE MOUNTED CABINET MAY BE REQUIRED

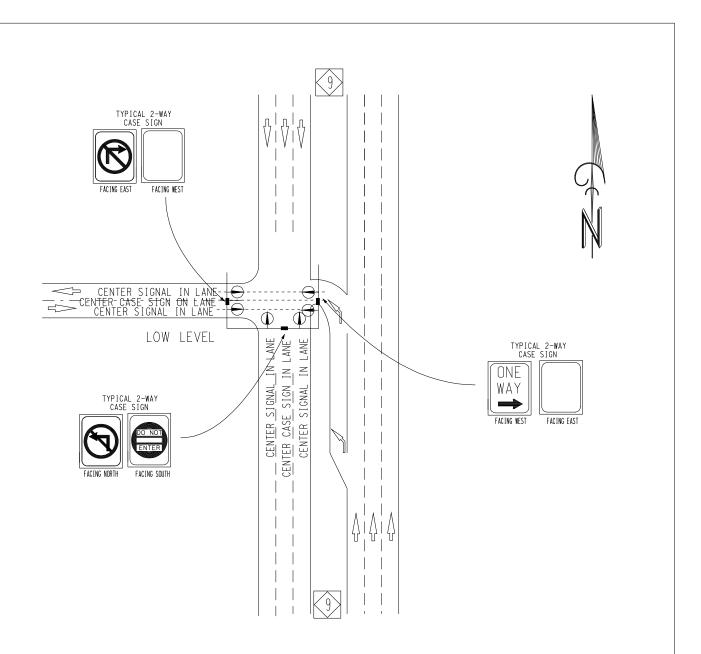




- TREAT EACH CROSS OVER AS A SEPARATE INTERSECTION
- 2 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.

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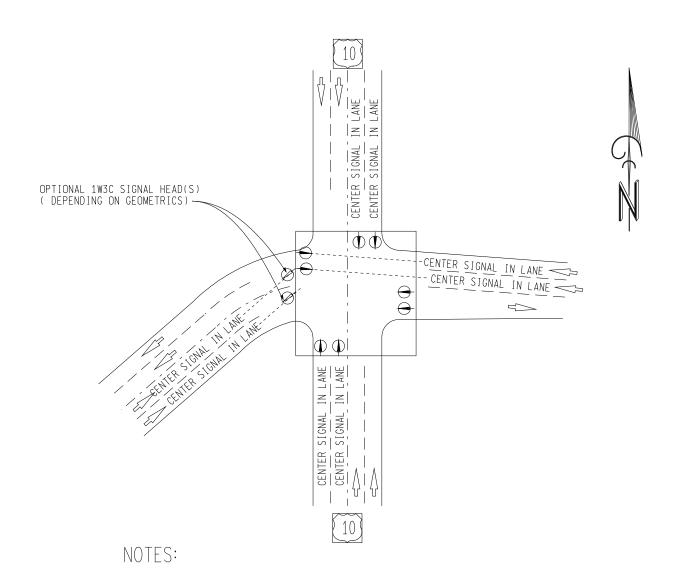
HEAD PLACEMENT DIAGRAM



MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.

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HEAD PLACEMENT DIAGRAM

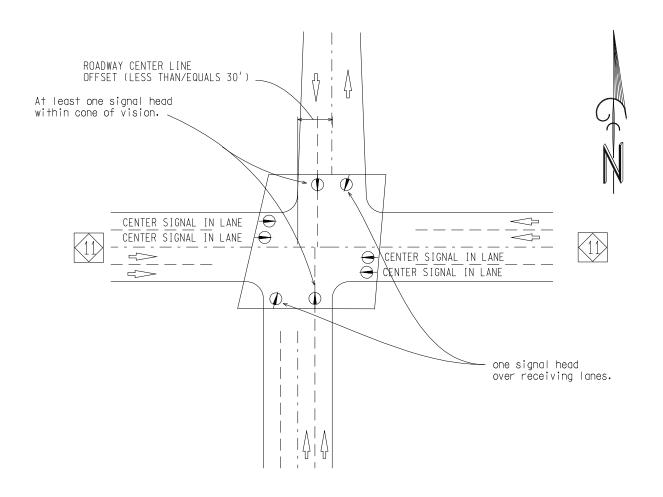


- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- 2 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- TO MEET THE REQUIREMENTS FOR CONE OF VISION 1W3C SPAN HEADS OR LOW LEVEL MAY BE REQUIRED.

Wichigan Department of Transportation

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HEAD PLACEMENT DIAGRAM

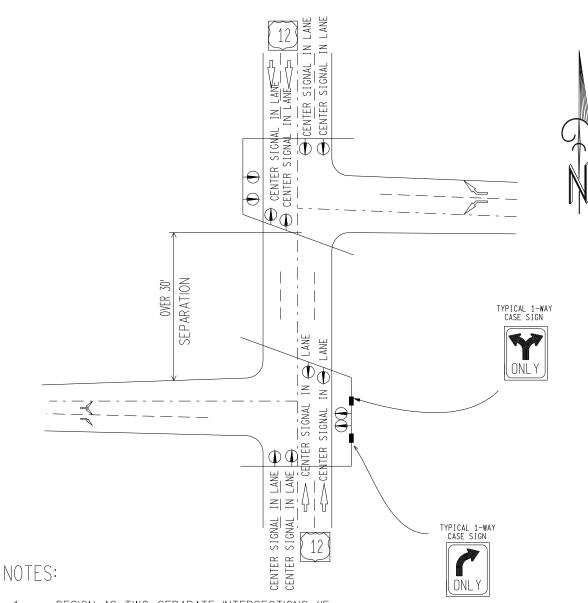


- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- 2 in THE ABSENCE OF A STOP BAR, THE CURB RADII SPRING POINT SHOULD BE USED.
- 3 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.

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HEAD PLACEMENT DIAGRAM

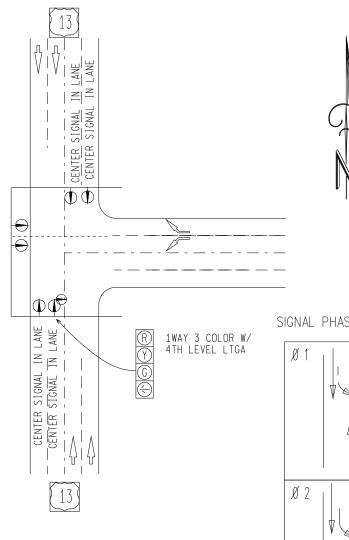


- DESIGN AS TWO SEPARATE INTERSECTIONS (IF SEPARATION IS 30 'OR MORE)
- DESIGN AS ONE INTERSECTION (IF SEPARATION IS LESS THAN 30').
- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- 4 in THE ABSENCE OF A STOP BAR, THE CURB RADII SPRING POINT SHOULD BE USED.
- 5 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- 6 No case sign is necessary unless one of the approach lanes is a combination lane

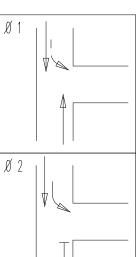
Wichlagon Department of Transportation

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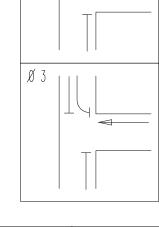
HEAD PLACEMENT DIAGRAM







- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- 2 in THE ABSENCE OF A STOP BAR, THE CURB RADII SPRING POINT SHOULD BE USED.
- 3 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- 4 PEDESTRIAN SIGNALS REQUIRED UNLESS OTHERWISE DIRECTED.
- 5 UTILIZE A 4TH LEVEL LTGA FOR THE SOUTH PROTECTED LEFT MOVEMENTS.

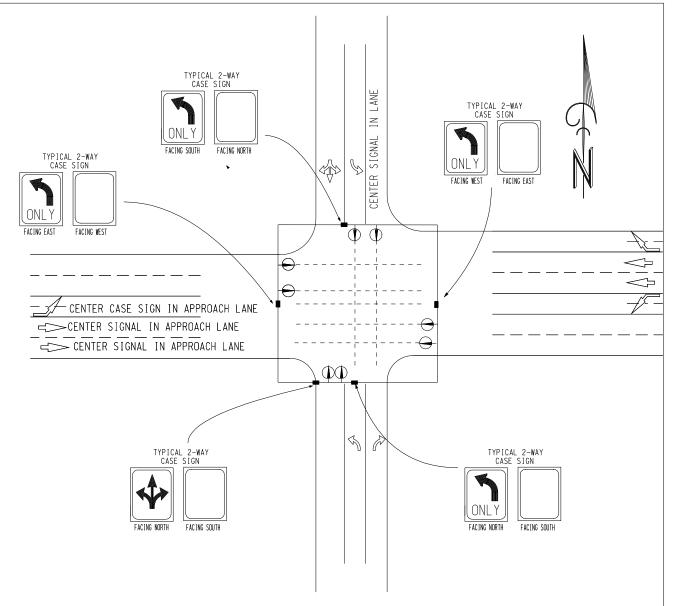


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HEAD PLACEMENT DIAGRAM

3 PHASE OPERATION WITH SINGLE LAGGING LEFT-TURN PHASE ON TRUNKLINE



- 1 EXCLUSIVE LEFT TURN SLOTS
- THE DISTANCE BETWEEN THE STOP BAR AND SIGNAL SHALL NOT EXCEED 150 FEET.
- 3 in THE ABSENCE OF A STOP BAR, THE CURB RADII SPRING POINT SHOULD BE USED.
- 4 MAINTAIN 8 FEET (MIN) -12 FEET (DESIRED) BETWEEN SIGNAL HEADS, SIGNS, AND OTHER SPAN EQUIPMENT.
- 5 THE APPROACH LEGEND OF THE NEAR SIDE CASE SIGN SHOULD BE BLANKED OUT SO DRIVERS ONLY READ THE THE CASE SIGN LEGEND ON THE FAR SIDE OF THE INTERSECTION (IF THERE ARE CASE SIGNS).
- 6 PEDESTRIAN SIGNALS SHOULD BE CONSIDERED WHERE PEDESTRIAN ACTIVITY IS EVIDENT.

Nichigan Department of Transportation

SHEET 26 OF 26

HEAD PLACEMENT DIAGRAM