



Project Memo

To: Wisconsin Department of Transportation
Milwaukee County
City of Milwaukee

Date: February 15, 2013

From: IH 794 Lake Freeway Project Team

Subject: Intersection Mitigation
Improvements

The IH 794 Lake Freeway Reconstruction Project between the Milwaukee River and Carferry Drive is planned for reconstruction from the fall of 2013 to the fall of 2015. During this time period, traffic circulation in downtown Milwaukee and on selected north-south streets are expected to experience traffic volume changes due to freeway ramp closures and reduced mainline work zone capacity on IH 794. The construction staging has been developed with an initial pre-stage prior to the two main stages. During Stage 1, all freeway traffic will travel on the existing westbound lanes of IH 794. Stage 1 has been divided into sub-stages, 1A and 1B, to account for the time period when the St. Paul Avenue Bridge over the Milwaukee River will be closed for reconstruction. During Stage 2 all freeway traffic will be switched over to the completed eastbound lanes of IH 794.

This memorandum summarizes intersection and street segment capacity improvements to mitigate impacts from diverted work zone traffic. The improvements are listed by the construction staging sequence described below.

Pre-Stage:

Pre-stage construction will require closure of three IH 794 ramps within the project limits. The ramp modifications involve:

- Close the existing IH 794 eastbound off-ramp to Lincoln Memorial Drive
- Close the existing IH 794 eastbound on-ramp from Lincoln Memorial Drive
- Temporary closure of the existing IH 794 westbound on-ramp from Lincoln Memorial Drive

Stage 1A & 1B:

Several of the existing IH 794 on and off-ramps within the project limits will be closed or have their direction of travel reversed during Stage 1 construction. This will alter traffic patterns to/from downtown Milwaukee and apply to both sub-stages 1A and 1B. The ramp modifications involve:

- Close the existing IH 794 eastbound on-ramp from Broadway Street
- Close the existing IH 794 eastbound off-ramp to Van Buren Street
- Close the existing IH 794 eastbound off-ramp to Lincoln Memorial Drive
- Close the existing IH 794 eastbound on-ramp from Lincoln Memorial Drive
- Reverse the existing IH 794 westbound Milwaukee Street off-ramp to become an eastbound on-ramp
- Reverse the existing IH 794 westbound Jackson Street on-ramp to become an eastbound off-ramp to Van Buren Street
- Close the existing eastbound off-ramp at the Carferry Drive Interchange. Construct a temporary eastbound off-ramp to maintain traffic

Note: Temporary improvements at several existing ramp terminals will be required to maintain access.

Stage 2:

The ramp modifications during Stage 2 include:

- Close the existing IH 794 westbound off-ramp to Milwaukee Street
- Close the existing IH 794 westbound on-ramp from Jackson Street
- Close the existing IH 794 westbound on-ramp from Lincoln Memorial Drive
- Close the existing IH 794 westbound off-ramp to Lincoln Memorial Drive
- Reverse the IH 794 eastbound Van Buren Street off-ramp to become a westbound on-ramp from Jackson Street
- Reverse the IH 794 eastbound Lincoln Memorial Drive off-ramp to become an IH 794 westbound on-ramp
- Reverse the IH 794 eastbound Lincoln Memorial Drive on-ramp to become an IH 794 westbound off-ramp
- Close the IH 794 westbound on-ramp at the Carferry Drive Interchange. Construct a temporary westbound on-ramp to maintain traffic

Note: Temporary improvements at several existing ramp terminals will be required to maintain access.

Temporary IH 794 Regulatory City Street Traffic Diversion Changes Intersection Lane Controls, Signalization and On-Street Parking

The following summarizes intersection improvements to maximize city street system traffic capacity expected to be impacted by traffic diversion during each stage of IH 794 reconstruction activity. Exhibits are attached that illustrate the recommended changes.

Pre-Stage: October, 2013 – December, 2013 during closure of St. Paul Bridge at Milwaukee River (East segment is shown on Exhibit 1)

- **Michigan Street Corridor**
 - Broadway Street to Milwaukee Street:
 - Provide an exclusive left-turn lane, a through lane, and a shared through/right-turn lane on the westbound approach to Broadway Street
 - Restrict eastbound and westbound on-street parking from Broadway Street to Milwaukee Street (16 parking spaces)
- **Broadway Street Corridor**
 - Clybourn Street:
 - Provide dual southbound left-turn lanes onto the eastbound IH 794 on-ramp, a shared through/right-turn lane, and an exclusive right-turn lane
 - Restrict northbound and southbound on-street parking for the approximate southern half of the block between Michigan Street and Clybourn Street (6 parking spaces)
- **Lincoln Memorial Drive Corridor**
 - Michigan Street:
 - Temporary lane closures to construct intersection improvements

Traffic Signal Infrastructure Changes

- Michigan Street & Broadway Street:
 - Install additional traffic signal heads on westbound approach for protected/permitted left-turn phasing

- Lincoln Memorial Drive & Michigan Street:
 - Install additional traffic signal heads on northbound and southbound approaches for protected left-turn phasing
 - Install additional traffic signal poles/heads on southbound and eastbound approaches for right-turn overlap phasing

Heavy Vehicle Restrictions

- Clybourn Street & Broadway Street:
 - Install sign to restrict westbound right turn to Broadway Street for trucks

Stage 1A: December, 2013 – June, 2014 during closure of St. Paul Bridge at Milwaukee River (East segment is shown on Exhibit 2 with West segment shown on Exhibit 4)

• Michigan Street Corridor

- 5th Street:
 - Provide eastbound and westbound right turn lanes
 - Restrict on-street parking (5 parking spaces on both the eastbound and westbound approaches)
- 4th Street:
 - Provide eastbound right turn lane
 - Restrict on-street parking (5 parking spaces on the eastbound approach)
- Broadway Street:
 - Provide eastbound right turn lane
 - Restrict on-street parking (5 parking spaces on the eastbound approach)
- Milwaukee Street to Jefferson Street:
 - Provide an exclusive left-turn lane, a through lane, and a shared through/right-turn lane on the westbound approach to Milwaukee Street and the eastbound approach to Jefferson Street
 - Restrict on-street parking on both sides of the street for this block (16 total parking spaces eastbound and westbound between Milwaukee Street and Jefferson Street)
- Jackson Street to Van Buren Street:
 - Provide exclusive left-turn lane and two through lanes on the westbound approach to Jackson Street and the eastbound approach to Van Buren Street
 - Restrict on-street parking on both sides of the street for this block (22 total parking spaces eastbound and westbound between Jackson Street and Van Buren Street)

• Clybourn Street Corridor

- Van Buren Street:
 - Provide two through lanes and a shared through/right-turn lane at the westbound approach to Van Buren Street
 - Restrict on-street parking (15 total parking spaces eastbound and westbound between Lincoln Memorial Drive and Van Buren Street)
- Jackson Street:
 - Provide three through lanes and an exclusive left-turn lane at the westbound approach to Jackson Street
- Milwaukee Street:
 - Construct a temporary channelized left-turn connection onto the eastbound IH 794 on-ramp
 - Provide an exclusive westbound left-turn lane for the eastbound IH 794 on ramp, as shared left-turn/through lane, a through lane and an exclusive right-turn lane at the westbound approach to Milwaukee Street

- Restrict on-street parking on both sides of the street for this block (9 total parking spaces eastbound and westbound between Jefferson Street and Milwaukee Street)
 - Broadway Street:
 - Temporarily close the westbound left-turn lane onto the eastbound IH 794 on-ramp
- **St. Paul Avenue Corridor**
 - Milwaukee Street:
 - Restripe the eastbound St. Paul Avenue approach to provide a shared left-turn/through lane and a shared through/right-turn lane
- **Broadway Street Corridor**
 - Clybourn Street:
 - Temporarily close the southbound left-turn lane onto the eastbound IH 794 on-ramp.
 - Restrict northbound and southbound on-street parking for the southern portion of the block between Michigan Street and Clybourn Street (10 parking spaces).
- **Milwaukee Street Corridor**
 - Clybourn Street:
 - Shift traffic lanes to the east so that the southbound approach to Clybourn can provide an exclusive left-turn lane, a shared left-turn/through lane and a shared through/right-turn lane
 - Restrict northbound Milwaukee Street on-street parking between Clybourn Street and Michigan Street (6 parking spaces)
- **Jackson Street Corridor**
 - Clybourn Street:
 - Provide two through lanes and an exclusive right-turn lane on the southbound approach to Clybourn Street
- **Van Buren Street Corridor**
 - Michigan Street:
 - Restripe the far right lane to be an exclusive right-turn lane on the northbound approach of Van Buren Street
- **Lincoln Memorial Drive Corridor**
 - Michigan Street:
 - Provide an exclusive southbound left-turn lane, two through lanes, and an exclusive right-turn lane which requires modification to the existing pedestrian island on the southbound approach
 - Provide dual northbound left-turn lanes, a through lane, and an exclusive right-turn lane
 - Clybourn Street:
 - Provide an exclusive southbound through lane and an exclusive right-turn lane.
 - IH 794 Ramps:
 - Provide a southbound exclusive right-turn lane. The eastbound IH 794 on-ramp will be closed and therefore no through lanes will be needed at the southbound approach.
 - Install temporary signals for operation during special events for transit vehicles entering westbound IH 794 from Ted Seaver Drive
- **Kinnickinnic Avenue Corridor**
 - Howell Avenue:
 - Restrict on-street parking during the PM peak hour on the west side of Kinnickinnic Avenue to allow for improved operation of traffic making a southbound right turn onto Howell Avenue (6 parking spaces)

Traffic Signal Infrastructure Changes

- Michigan Street & Milwaukee Street:
 - Install additional traffic signal heads on westbound approach for protected/permitted left-turn phasing
- Michigan Street & Jefferson Street:
 - Install additional signal heads on eastbound approach for protected/permitted left-turn phasing
- Michigan Street & Jackson Street:
 - Install additional traffic signal heads on westbound approach for protected/permitted left-turn phasing
- Michigan Street & Van Buren Street:
 - Install additional traffic signal heads on eastbound approach for protected/permitted left-turn phasing. Change existing lagging left-turn phasing to leading
- Milwaukee Street & Clybourn Street:
 - Install additional traffic signal heads on southbound approach for left-turn phasing onto IH 794 eastbound ramp
- Lincoln Memorial Drive & Michigan Street:
 - Install additional signal heads on northbound and southbound approaches for protected left-turn phasing
 - Install additional signal poles/heads on southbound and eastbound approaches for right-turn overlap phasing

Stage 1B: July, 2014 – November, 2014 (East segment is shown on Exhibit 2 with West segment shown on Exhibit 4)

• Michigan Street Corridor

- Broadway Street:
 - Provide an eastbound right-turn lane
 - Restrict on-street parking (5 parking spaces on the eastbound approach)
- Milwaukee Street to Jefferson Street:
 - Provide an exclusive left-turn lane, through lane, and a shared through/right-turn lane on the westbound approach to Milwaukee Street and the eastbound approach to Jefferson Street
 - Restrict on-street parking on both sides of the street for this block (16 total parking spaces eastbound and westbound between Milwaukee Street and Jefferson Street)
- Jackson Street to Van Buren Street:
 - Provide exclusive left-turn lane and two through lanes on the westbound approach to Jackson Street and the eastbound approach to Van Buren Street
 - Restrict on-street parking on both sides of the street for this block (22 total parking spaces eastbound and westbound between Jackson Street and Van Buren Street)

• Clybourn Street Corridor

- Van Buren Street:
 - Provide two through lanes and a shared through/right-turn lane at the westbound approach to Van Buren Street
 - Restrict on-street parking (15 total parking spaces eastbound and westbound between Lincoln Memorial Drive and Van Buren Street)
- Jackson Street:
 - Provide three through lanes and an exclusive left-turn lane at the westbound approach to Jackson Street

- Milwaukee Street:
 - Construct a temporary channelized left-turn connection onto the eastbound IH 794 on-ramp
 - Provide an exclusive westbound left-turn lane for the eastbound IH 794 on ramp, as shared left-turn/through lane, a through lane and an exclusive right-turn lane at the westbound approach to Milwaukee Street
 - Restrict on-street parking on both sides of the street for this block (9 total parking spaces eastbound and westbound between Jefferson Street and Milwaukee Street)
- Broadway Street:
 - Temporarily close the westbound left-turn lane onto the eastbound IH 794 on-ramp
- **St. Paul Avenue Corridor**
 - Milwaukee Street:
 - Restripe the eastbound St. Paul Avenue approach to provide a shared left-turn/through lane and a shared through/right-turn lane
 - IH 794 Eastbound Off-Ramp:
 - Provide an exclusive left-turn lane and a shared left-turn/right-turn lane on the off-ramp approach to St. Paul Avenue
 - IH 794 Eastbound Off-Ramp to 2nd Street:
 - Shift the centerline on St. Paul Avenue to the north to provide one westbound travel lane and two eastbound travel lanes
- **Broadway Street Corridor**
 - Clybourn Street:
 - Temporarily close the southbound left-turn lane onto the eastbound IH 794 on-ramp
 - Restrict northbound and southbound on-street parking for the southern portion of the block between Michigan Street and Clybourn Street (10 parking spaces)
- **Milwaukee Street Corridor**
 - Clybourn Street:
 - Shift traffic lanes to the east so that the southbound approach to Clybourn can provide an exclusive left-turn lane, a shared left-turn/through lane and a shared through/right-turn lane
 - Restrict northbound Milwaukee Street on-street parking between Clybourn Street and Michigan Street (6 parking spaces)
- **Jackson Street Corridor**
 - Clybourn Street:
 - Provide two through lanes and an exclusive right-turn lane on the southbound approach to Clybourn Street
- **Van Buren Street Corridor**
 - Michigan Street:
 - Restripe the far right lane to be an exclusive right-turn lane on the northbound approach of Van Buren Street
- **Lincoln Memorial Drive Corridor**
 - Michigan Street:
 - Provide an exclusive southbound left-turn lane, two through lanes, and an exclusive right-turn lane which requires modification to the existing pedestrian island on the southbound approach
 - Provide dual northbound left-turn lanes, a through lane, and an exclusive right-turn lane
 - Clybourn Street:
 - Provide an exclusive southbound through lane and an exclusive right-turn lane

- IH 794 Ramps:
 - Provide a southbound exclusive right-turn lane. The eastbound IH 794 on-ramp will be closed and therefore no through lanes will be needed at the southbound approach
 - Install temporary traffic signals for operation during special events for transit vehicles entering westbound IH 794 from Ted Seaver Drive
- **Kinnickinnic Avenue Corridor**
 - Howell Avenue:
 - Restrict on-street parking during the PM peak hour on the west side of Kinnickinnic Avenue to allow for improved operation of traffic making a southbound right turn onto Howell Avenue (6 parking spaces)

Traffic Signal Infrastructure Changes

- Michigan Street & Milwaukee Street:
 - Install additional traffic signal heads on westbound approach for protected/permitted left-turn phasing
- Michigan Street & Jefferson Street:
 - Install additional traffic signal heads on eastbound approach for protected/permitted left-turn phasing
- Michigan Street & Jackson Street:
 - Install additional traffic signal heads on westbound approach for protected/permitted left-turn phasing
- Michigan Street & Van Buren Street:
 - Install additional traffic signal heads on eastbound approach for protected/permitted left-turn phasing. Change existing lagging left-turn phasing to leading
- Milwaukee Street & Clybourn Street:
 - Install additional traffic signal heads on southbound approach for left-turn phasing onto IH 794 eastbound ramp
- Lincoln Memorial Drive & Michigan Street:
 - Install additional traffic signal heads on northbound and southbound approaches for protected left-turn phasing
 - Install additional traffic signal poles/heads on southbound and eastbound approaches for right-turn overlap phasing

Stage 2: November, 2014 – December, 2015 (East segment is shown on Exhibit 3 with West segment shown on Exhibit 4)

- **Michigan Street Corridor**
 - Broadway Street to Jefferson Street:
 - Provide an exclusive left-turn lane, a through lane, and a shared through/right-turn lane on the westbound approach to Broadway Street, the westbound and eastbound approaches to Milwaukee Street, and the eastbound approach to Jefferson Street
 - Restrict eastbound and westbound on-street parking from Broadway Street to Jefferson Street. (32 parking spaces)
 - Restrict eastbound on-street parking during the peak hours for 100' on the eastbound approach to Broadway Street in advance of the intersection to allow traffic to make right turns. (5 spaces)
- **Clybourn Street Corridor**
 - Van Buren Street:
 - Provide two through lanes and a shared through/right-turn lane on the westbound approach to Van Buren Street

- Restrict eastbound and westbound on-street parking from Lincoln Memorial Drive to Van Buren Street (15 parking spaces)
 - Jackson Street:
 - Provide an exclusive left-turn lane and three through lanes at the westbound approach to Jackson Street
- **St. Paul Avenue Corridor**
 - Milwaukee Street:
 - Restripe the eastbound St. Paul Avenue approach to provide a shared left-turn/through lane and a shared through/right-turn lane
 - IH 794 Eastbound Off-Ramp:
 - Provide an exclusive left-turn lane and a shared left-turn/right-turn lane on the off-ramp approach to St. Paul Avenue
 - IH 794 Eastbound Off-Ramp to 2nd Street:
 - Shift the centerline on St. Paul Avenue to the north to provide one westbound travel lane and two eastbound travel lanes
- **Broadway Street Corridor**
 - Clybourn Street:
 - Provide dual southbound left-turn lanes onto the eastbound IH 794 on-ramp, a shared through/right-turn lane, and an exclusive right-turn lane
 - Restrict northbound and southbound on-street parking for the approximate southern half of the block between Michigan Street and Clybourn Street (6 parking spaces)
- **Jackson Street Corridor**
 - Eastbound IH 794 Off-Ramp:
 - Traffic flow on the eastbound IH 794 off-ramp will be reversed during this stage and will serve as a westbound IH 794 on-ramp
 - Provide a southbound exclusive through lane and an exclusive right-turn lane to the reversed westbound IH 794 on-ramp
- **Van Buren Street Corridor**
 - Michigan Street:
 - Restripe the far right lane as an exclusive right-turn lane at the northbound approach to Michigan Street
- **Lincoln Memorial Drive Corridor**
 - Michigan Street:
 - Provide an exclusive southbound left-turn lane, two through lanes, and an exclusive right-turn lane which requires modification to the existing pedestrian island on the southbound approach
 - Provide dual northbound left-turn lanes, a through lane, and an exclusive right-turn lane
 - Clybourn Street:
 - Provide an exclusive southbound through lane and an exclusive right-turn lane
 - IH 794 Ramps:
 - Provide a southbound exclusive right-turn lane. The eastbound IH 794 on-ramp will be closed and therefore no through lanes will be needed at the southbound approach
 - Install temporary traffic signals for operation during special events for transit vehicles entering westbound IH 794 from Ted Seaver Drive
- **Kinnickinnic Avenue Corridor**
 - Howell Avenue:
 - Restrict on-street parking during the PM peak hour on the west side of Kinnickinnic Avenue to allow for improved operation of traffic making a southbound right turn onto Howell Avenue (6 parking spaces)

Traffic Signal Infrastructure Changes

- Michigan Street & Broadway Street:
 - Install additional traffic signal heads on westbound approach for protected/permitted left-turn phasing
- Michigan Street & Milwaukee Street:
 - Install additional traffic signal heads on the eastbound and westbound approaches for protected/permitted left-turn phasing
- Michigan Street & Jefferson Street:
 - Install additional traffic signal heads on the eastbound approach for protected/permitted left-turn phasing
- Lincoln Memorial Drive & Michigan Street:
 - Install additional traffic signal heads on northbound and southbound approaches for protected left-turn phasing
 - Install additional traffic signal poles/heads on southbound and eastbound approaches for right-turn overlap phasing

Heavy Vehicle Restrictions

- Clybourn Street & Broadway Street:
 - Install sign to restrict westbound right turn to Broadway Street for trucks

On-Street Parking Impact Summary:

The intersection mitigation improvements described above are expected to require the restriction of on-street parking at selected locations. The following tables summarize the number of full daytime and AM/PM peak hour parking space restrictions recommended during each stage of the IH 794 project.

Table 1: All Day On-Street Parking Spaces Restrictions by IH 794 Construction Stage

	All Day			
	Pre-stage	Stage 1A	Stage 1B	Stage 2
Number of All Day Parking Spaces Restrictions	22	78	78	53

Table 2: Peak Hour On-Street Parking Spaces Restrictions by IH 794 Construction Stage

	Peak Hour			
	Pre-stage	Stage 1A	Stage 1B	Stage 2
Number of Peak Hour Parking Spaces Restrictions	0	26	11	11