February 6, 2020

NOTICE TO ALL CONTRACTORS:

Proposal #14:   1228-22-72, WISC 2020 042
IH 43 North South Freeway
Hampton Rd to Bender Rd
IH 43
Milwaukee County

Letting of February 11, 2020

This is Addendum No. 02, which provides for the following:

Special Provisions:

Revised Special Provisions	
Article No.	Description
51	Dynamic Late Merge System, Item 643.1100.S
52	Portable Automated Real-Time Traffic Queue Warning System, item 643.1200.S

Plan Sheets:

Revised Plan Sheets	
Plan Sheet	Plan Sheet Title (brief description of changes to sheet)
331	Miscellaneous Quantities Traffic Control Items table needs to have two columns removed

Added Plan Sheets	
Plan Sheet	Plan Sheet Title (brief description of why sheet was added)
331A	Miscellaneous Quantities Tables for DLMS and QWS need to be added
535A	SDD – Dynamic Late Merge System

The responsibility for notifying potential subcontractors and suppliers of these changes remains with the prime contractor.

Sincerely,

Mike Coleman

Proposal Development Specialist
Proposal Management Section

Special Provisions

51. Dynamic Late Merge System, Item 643.1100.S.

Replace entire article language with the following:

A Description

This special provision describes providing, repositioning, operating, maintaining, monitoring, calibrating, testing and removing a dynamic late merge system (DLMS) capable of measuring vehicular speeds at downstream sections of the roadway and activating the system.

B Materials

Provide DLMS components and software that is National Transportation Communications for ITS Protocol (NCTIP) compliant.

B.1 Portable Changeable Message Signs (PCMS)

Provide PCMS conforming to standard spec 643. Ensure each PCMS is integrated with a portable traffic sensor, modem, and other equipment (e.g., automated system manager) mounted on it, and acts as a single device for communicating with similarly integrated devices and displaying real-time traffic conditions.

B.2 Portable Traffic Sensors (PTS)

Provide PTS that are nonintrusive and capable of capturing vehicle speed in mph and traffic volume. Integrate each sensor with a modem to communicate with the automated system manager (ASM).

B.3 Static Traffic Control Signs with Temporary Flashing Beacons
Provide static traffic control signs with temporary flashing beacon signs conforming to standard spec 658.2(2) for Traffic Signal Faces. Ensure each FBS is integrated with a PTS, modem, and other equipment (e.g., automated system manager) mounted on it, and acts as a single device for communicating with similarly integrated devices and displaying real-time traffic conditions.

B.4 Automated System Manager (ASM)

Provide an ASM that assesses current traffic data captured by the PTS, determines the appropriate merging strategy based upon predetermined speed thresholds, and communicates appropriate messages to the motorists through the PCMS and FBS.

B.5 System Communications

Ensure DLMS communications meet the following requirements:

1. Perform required configuration of the DLMS communication system automatically during system initialization.
2. Communication between the server and any individual PCMS or PTS are independent through the full range of deployed locations, and do not rely upon communications with any other PCMS or PTS.
3. Incorporate an error detection/correction mechanism into the DLMS communication system to ensure the integrity of all traffic condition data and motorist information messages.

B.6 System Acceptance

Submit vendor verification to the engineer and Bureau of Traffic Operations (DOTWorkzone@dot.wi.gov) 14 calendar days before the pre-construction meeting that the system will adequately perform the functions specified in this special provision. Adequate verification includes past successful performance of the system, literature and references from successful use of the system by other agencies, and/or demonstration of the system.

Provide contact information for a designated representative responsible for monitoring the performance of the system and for making modifications to the operational settings as the engineer directs.

Provide all testing and calibration equipment.

C Construction

C.1 General

Install and reposition DLMS per plan and quantities or as the engineer directs. Place additional PTS near the lane closure taper and 0.5 miles upstream of lane closure taper. Provide plan to the engineer and Bureau of Traffic Operations (DOTWorkzone@dot.wi.gov) 14 calendar days before the pre-construction meeting.

Number the devices in chronological order so they are visible from the shoulder with 6-inch white high reflective sheeting.

Provide technical personnel for all system calibration, operation, maintenance, and timely on-call support services.

Promptly correct the system within 24 hours of becoming aware of a deficiency in the operation or individual part of the system. A minimum of three days before deployment, place the DLMS and demonstrate to the department that the DLMS is operational.

Maintain the DLMS for the duration of the project or as identified in the plans. Ensure the system operates continuously (24 hours, 7 days a week) in the automated mode throughout the duration of the project.

Remove the system upon project completion.

C.2 Reports

Provide an electronic copy of a weekly summary report via email to the engineer. Ensure the report includes, at a minimum, the average speed per sensor, traffic volume, time in congestive state per sensor and number of triggers per day.

C.3 Meetings

Attend mandatory in-person pre-construction meetings with the department. Attend additional meetings as deemed necessary by the department. These meetings may be held in person or via teleconference, as scheduled by the department.

C.4 Programming

C.4.1 General

Program the DLMS to ensure that the following general operations are performed:

1. Provide a password protected login to the ASM, website and all other databases.
2. The DLMS operates as a unit where the FBS and the PCMS activate at the same time for the same scenario. System operation may be based on as few as one PTS.
3. The ASM ensures that messages sent to the connected PCMS and FBS are synchronized so that all the messages on all the PCMS are for the same traffic conditions.
4. Provide real-time data from the ASM to a website with a full color mapping feature and refresh every 60 seconds. Make data on website available to the department at all times for the duration of the work zone activity. Ensure website includes at a minimum:
    – Vehicle speeds
    – PCMS messaging
    – Device locations
    – Traffic volume
5. Archive all traffic data and PCMS messages in a Microsoft Excel format with date and time stamps.
6. Configure the website to quantify system failures, which includes communication disruption between any devices in the system configuration, PCMS malfunctioning, PTS malfunction, loss of power, low battery, etc.
7. Provide default and advisory messages automatically based on traffic conditions.
8. Ensure the system autonomously restarts in case of any power failure.

9. Provide the department access to manually override PCMS messages for a user-specified duration, after which automatic operation will resume display of messages appropriate to the prevailing traffic conditions. Document all override messages.

C.4.2 System Operation Strategy

Arrange for the vendor/manufacturer to coordinate system operation, detection, trends/thresholds, and messaging parameters with the engineer.

The sequences that are a minimum requirement, but can be adjusted at the discretion of the engineer, are as follows:

Free Flow:

If the current PTS-measured speed near the lane closure tape is at or above 40 mph, display no lane use messages, and therefore allow traffic to resume typical early merge operation.

Congestion:

If the current PTS-measured speed near the lane closure tape is at or below 39 mph, the following two-phase messages shall be displayed on the upstream PMCS as shown below:

- Point of merge:

FRAME 1	FRAME 2
MERGE HERE	TAKE TURNS

- Intermediate PCMS:

FRAME 1	FRAME 2
STAY IN LANE	DO NOT MERGE

- PCMS located beyond estimated maximum queue length for two-lane configuration:

FRAME 1	FRAME 2
STOPPED TRAFFIC AHEAD	USE BOTH LANES

- PCMS located beyond estimated maximum queue length for three-lane configuration:

FRAME 1	FRAME 2
STOPPED TRAFFIC AHEAD	USE ALL LANES

C.5 Calibration and Testing

At the beginning of the project and monthly throughout the duration of the project, perform a successful field test and calibration at the DLMS location to verify the system is detecting accurate vehicle speeds and volumes, and accurately relaying the information to the ASM, PCMS and FBS.

Send email of successful calibration and testing to the engineer.

D Measurement

The department will measure Dynamic Late Merge System by the day, acceptably completed, measured as each complete system per roadway.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
643.1100.S	Dynamic Late Merge System	DAY

Payment is full compensation for providing, repositioning, operating, maintaining, monitoring, calibrating, testing, and removing the complete system consisting of PCMS, FBS, PTS, ASM, and system communications.

Failure to correct a deficiency to the PCMS, FBS, PTS, or ASM within 24 hours after notification from the engineer or the department will result in a one-day deduction of the measured quantity for each day in which the deficiency is not corrected.

Failure to correct the website within 24 hours after notification from the engineer will result in a 10% reduction of the day quantity for each day the website is down.

The engineer will have sole discretion to assess the deductions for an improperly working DLMS.

stp-643-040 (20191121)

52. Portable Automated Real-Time Traffic Queue Warning System, Item 643.1200.S.

Replace entire article language with the following:

A Description

This special provision describes providing, repositioning, operating, maintaining, monitoring, calibrating, testing and removing a portable automated real-time traffic queue warning system (QWS) capable of measuring vehicular speeds at downstream sections of a roadway, and displaying the speed information on portable changeable message signs (PCMS) at upstream locations.

B Materials

Provide QWS components and software that is National Transportation Communications for ITS Protocol (NTCIP) compliant.

B.1 Portable Changeable Message Signs (PCMS)

Provide PCMS conforming to standard spec 643. Ensure each PCMS is integrated with a portable traffic sensor, modem, and other equipment (e.g., automated system manager) mounted on it, and acts as a single "device" for communicating with similarly integrated "devices" and displaying real-time traffic condition information.

B.2 Portable Traffic Sensors (PTS)

Provide PTS that are nonintrusive and capable of capturing individual vehicle speed (mph) and traffic volume. Integrate each sensor with a modem to communicate with the automated system manager (ASM).

B.3 Automated System Manager (ASM)

Provide an ASM that assesses current traffic data captured by the system PTS and communicates appropriate messages to the motorists through PCMS based on predetermined speed thresholds and messages.

B.4 System Communications

Ensure QWS communications meet the following requirements:

1. Perform required configuration of the QWS's communication system automatically during system initialization.

2. Communication between the server and any individual PCMS or PTS are independent through the full range of deployed locations, and do not rely upon communications with any other PCMS or PTS.
3. Incorporate an error detection/correction mechanism into the QWS communication system to ensure the integrity of all traffic condition data and motorist information messages.

B.5 System Acceptance

Submit vendor verification to the engineer and Bureau of Traffic Operations (DOTWorkzone@dot.wi.gov) 14 calendar days before the pre-construction meeting that the system will adequately perform the functions specified in this special provision. Adequate verification includes past successful performance of the system, literature and references from successful use of the system by other agencies, and/or demonstration of the system.

Provide contact information for a designated representative responsible for monitoring the performance of the system and for making modifications to the operational settings as the engineer directs.

Provide all testing and calibration equipment.

C Construction

C.1 General

Install and reposition Portable Automated Real-Time Queue Warning System per quantities with PCMS and PTS spaced every mile starting one mile upstream of the taper and one PTS near the lane closure taper or as the engineer directs. Provide plan to the engineer and Bureau of Traffic Operations (DOTWorkzone@dot.wi.gov) 14 calendar days before the pre-construction meeting.

Number the devices in chronological order so they are visible from the shoulder with 6-inch white high reflective sheeting.

Provide technical personnel for all system calibration, operation, maintenance, and timely on-call support services.

Promptly correct the system within 24 hours of becoming aware of a deficiency in the operation or individual part of the system. A minimum of three days before deployment, place the QWS and demonstrate to the department that the QWS is operational.

Maintain the QWS for the duration of the project. Ensure the system operates continuously (24 hours, 7 days a week) in the automated mode throughout the duration of the project.

Remove the system upon project completion.

C.2 Reports

Provide an electronic copy of a weekly summary report of all data via email to the engineer. Ensure the report includes, at a minimum, the average speed per sensor, traffic volume, time in congestive state per sensor and number of triggers per day.

C.3 Meetings

Attend mandatory in-person pre-construction meetings with the department. Attend additional meetings as deemed necessary by the department. These meetings may be held in person or via teleconference, as scheduled by the department.

C.4 Programming

C.4.1 General

Program the QWS to ensure that the following general operations are performed:

1. Provide a password protected login to the ASM, website and all other databases.
2. Provide real-time data from the ASM to a website with a full color mapping feature and refresh every 60 seconds. Make data on website available to the department staff at all times for the duration of the work zone activity. Ensure website includes:
    - Vehicle speeds

- PCMS messaging
- Device locations
- Traffic volume

3. Archive all traffic data and PCMS messages in a Microsoft Excel format with date and time stamps.
4. Configure the website to quantify system failures which includes communication disruption between any devices in the system configuration, PCMS malfunctioning, PTS malfunction, loss of power, low battery, etc.
5. Automatically generate and send an email alert any time a user specified queue is detected by the system.
6. Provide default and advisory messages automatically based on traffic conditions.
7. Ensure the system autonomously restarts in case of any power failure.
8. Provide the department access to manually override PCMS messages for a user-specified duration, after which automatic operation will resume display of messages appropriate to the prevailing traffic conditions. Document all override messages.

C.4.2 System Operation Strategy

Arrange for the vendor/manufacturer to coordinate system operation, detection, trends/thresholds, and messaging parameters with the engineer.

The sequences below are a minimum requirement and can be adjusted by the engineer at their discretion.

Free Flow:

If the current speed on a roadway section is at or above 40 mph, the upstream PCMS will display nothing except for lighting the four corners to show that it is on.

Slow Traffic:

If the current speed on any downstream section of the roadway is between the 39 mph and 20 mph (for example, 35 mph), the following two phase messages will be displayed on the upstream PCMS as shown below:

EVENT	FRAME 1	FRAME 2
Speeds 20 mph to 39 mph	SLOW TRAFFIC AHEAD	PREPARE TO STOP

Stopped Traffic:

If the current speed on a roadway section of the roadway drops below 20 mph, the following two phase messages will be displayed on the upstream PCMS as shown below:

EVENT	FRAME 1	FRAME 2
Speeds 0 mph to 19 mph	TRAFFIC STOPPED AHEAD	EXPECT DELAYS

C.5 Calibration and Testing

At the beginning of the project and monthly throughout the duration of the project, perform a successful field test and calibration at the QWS location to verify the system is detecting accurate vehicle speeds and volumes, and accurately relaying the information to the ASM and the PCMS.

Send email of successful calibration and testing to the engineer.

D Measurement

The department will measure Portable Automated Real-Time Traffic Queue Warning System by the day, acceptably completed, measured as each complete system per roadway.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
643.1200.S	Portable Automated Real-Time Traffic Queue Warning System	DAY

Payment is full compensation for providing, repositioning, operating, maintaining, monitoring, calibrating, testing, and removing the complete system consisting of PCMS, PTS, ASM, and system communications.

Failure to correct a deficiency to the PCMS, PTS, or ASM within 24 hours after notification from the engineer or the department will result in a one-day deduction of the measured quantity for each day in which the deficiency is not corrected.

Failure to correct the website within 24 hours after notification from the engineer will result in a 10% reduction of the day quantity for each day the website is down.

The engineer will have sole discretion to assess the deductions for an improperly working QWS.

stp-643-045 (20191121)

Plan Sheets
The following 8½ x 11-inch sheets are attached and made part of the plans for this proposal:
Revised: 331
Added: 331A, and 535A

<div align="center">END OF ADDENDUM</div>

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TRAFFIC CONTROL ITEMS

CATEGORY	STAGE	LOCATION	STAGE DURATION DAYS	643.0300 DRUMS EACH**	DAY	643.0420 BARRICADES TYPE III EACH**	DAY	643.0500 FLEXIBLE TUBULAR MARKER POSTS EACH	643.0600 FLEXIBLE TUBULAR MARKER BASES EACH	643.0705 WARNING LIGHTS TYPE A EACH**	DAY	643.0715 WARNING LIGHTS TYPE C EACH**	DAY	643.0800 ARROW BOARDS EACH**	DAY	643.0900 SIGNS EACH**	DAY	643.1050 SIGNS PCMS EACH*	DAY	643.1100.S DYNAMIC LATE MERGE SYSTEM DAY	643.1200.S PORTABLE AUTOMATED REAL-TIME TRAFFIC QUEUE WARNING SYSTEM DAY	643.4100.S INTERIM LANE CLOSURE EACH	643.5000 TRAFFIC CONTROL EACH	SPV.0060.0002 TRAFFIC CONTROL LOCAL ROAD LANE CLOSURES EACH
1000	1A	IH 43 NB	25	257	6425	21	525	--	--	40	1000	44	1100	2	50	97	2425	2	6	25	25	2	--	--
	1A	IH 43 SB	29	150	4350	10	290	--	--	20	580	31	899	0	0	36	1044	1	3			2	--	--
	1A	SS RAMP B CLOSED	17	--	--	--	--	--	--	--	--	28	364	--	--	31	527	1	7			--	--	--
	1A	SS RAMP B PARTIAL OPEN	13	57	741	2	26	--	--	2	26	28	364	--	--	23	299	--	--			--	--	--
	1A	SILVER SPRING SB ON RAMP	29	18	522	9	261	--	--	18	522	--	--	--	--	60	1740	1	7			--	--	2
	1A	PORT WASHINGTON RD LANE CLOSURE	2	36	72	2	4	--	--	4	8	10	20	1	2	10	20	1	7			--	--	--
	1B	IH 43 NB	25	178	4450	12	300	--	--	20	500	53	1325	2	50	102	2550	1	3	25	25	2	--	--
	1B	IH 43 SB	29	122	3538	10	290	--	--	20	580	24	696	--	--	40	1160	1	3			2	--	--
	1B	SS RAMP D CLOSED	20	28	560	6	120	--	--	12	240	--	--	--	--	54	1080	1	7			--	--	--
	1A/1B	IH 43 NB/SB SINGLE LANE CLOSURE	20	51	1020	2	40	--	--	4	80	14	280	1	20	6	120	--	--			20	--	--
	2A	PORT WASHINGTON RD/HAMPTON AVE	25	245	6125	76	1900	--	--	44	1100	49	1225	4	100	154	3850	4	12			--	--	4
	2B	PORT WASHINGTON RD/HAMPTON AVE	25	186	4650	20	500	--	--	40	1000	32	800	4	100	53	1325	4	12			--	--	4
	2	PORT WASHINGTON RD CLOSURE	2	71	142	25	50	--	--	50	100	28	56	1	2	142	284	3	21			--	--	4
	3	IH 43 SB	14	130	1820	5	70	--	--	10	140	15	210	--	--	21	294	1	3			1	--	--
	3A	LEXINGTON BLVD	5	20	100	13	65	--	--	26	130	--	--	--	--	21	105	2	16			--	--	1
	3B	LEXINGTON BLVD	4	20	80	13	52	11	11	26	104	--	--	--	--	37	148	2	8			--	--	4
	3C	LEXINGTON BLVD	5	18	90	11	55	13	13	22	110	--	--	--	--	19	95	2	10			--	--	1
	4	SS RAMP B PARTIAL CLOSED	38	46	1748	5	190	--	--	10	380	--	--	--	--	10	380	1	7			--	--	--
	4	SS RAMP D CLOSED	38	28	1064	6	228	--	--	12	456	--	--	--	--	54	2052	1	7			--	--	--
	4A	SILVER SPRING DR	15	91	1365	25	375	--	--	50	750	14	210	1	15	53	795	2	6			--	--	2
	4B	SILVER SPRING DR	4	234	936	39	156	--	--	78	312	46	184	3	12	78	312	2	6			--	--	8
	4C	SILVER SPRING DR	15	82	1230	26	390	--	--	52	780	16	240	1	15	49	735	2	6			--	--	2
	4D	SILVER SPRING DR	4	103	412	41	164	--	--	82	328	35	140	2	8	56	224	2	6			--	--	8
		SUBTOTAL			41440		6051	24	24		9226		7749		374		21564		163	50	50	29	--	40
		UNDISTRIBUTED			4144		606	3	3		923		775		38		2157		17	5	5	3	1	4
		TOTAL			45584		6657	27	27		10149		8524		412		23721		180	55	55	32	1	44

**FOR INFROMATION ONLY

3

DYNAMIC LATE MERGE SYSTEM (DLMS)

CATEGORY	LOCATION	STAGE	DISTANCE MILES	643.1100.S DYNAMIC LATE MERGE SYSTEM DAY
1000	IH 43 NB	1A,1B	2.0	55
TOTAL				55

PORTABLE AUTOMATED REAL-TIME TRAFFIC QUEUE WARNING SYSTEM (QWS)

CATEGORY	LOCATION	STAGE	DISTANCE MILES	643.1200.S QUEUE WARNING SYSTEM DAY
1000	IH 43 NB	1A,1B	2.0	55
TOTAL				55

Addendum No. 02
ID 1228-22-72
Added Sheet 535A
February 6, 2020

LEGEND

⊥⊥	TYPE III BARRICADE WITH ATTACHED SIGN
⊙	SIGN ON PERMANENT SUPPORT
◆	TRAFFIC CONTROL DRUM WITH TYPE "C" STEADY BURN LIGHT
●	TRAFFIC CONTROL DRUM
☀	TYPE "A" WARNING LIGHT (FLASHING)
✳-✳-✳	REMOVING PAVEMENT MARKING
⇧	DIRECTION OF TRAFFIC
▨	WORK AREA
◤	FLASHING ARROW BOARD
PCMS	PORTABLE CHANGEABLE MESSAGE SIGN
FBS	FLASHING BEACON SIGNS

STOPPED OR SLOW TRAFFIC WHEN FLASHING
W8-76
60x36

GENERAL NOTES

THE EXACT NUMBER, LOCATION, AND SPACING OF ALL SIGNS AND DEVICES SHALL BE ADJUSTED TO FIT FIELD CONDITIONS AS APPROVED BY THE ENGINEER.

THE SPACING BETWEEN SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 200 FEET (500 FEET DESIRABLE) CLEARANCE TO EXISTING SIGNS.

ALL SIGNS ARE 48" X 48" UNLESS OTHERWISE NOTED.

"WO" IS THE SAME AS "W" EXCEPT THE BACKGROUND IS ORANGE.

ANY SIGNS TEMPORARY OR EXISTING, WHICH CONFLICT WITH TRAFFIC CONTROL "IN USE" SHALL BE REMOVED OR COVERED AS NEEDED OR AS APPROVED BY THE ENGINEER.

FOR A LANE CLOSURE THAT IS IN PLACE LESS THAN 7 CONTINUOUS DAYS AND NIGHTS, THE ADVANCED WARNING SIGNS MAY BE MOUNTED ON PORTABLE SUPPORTS.

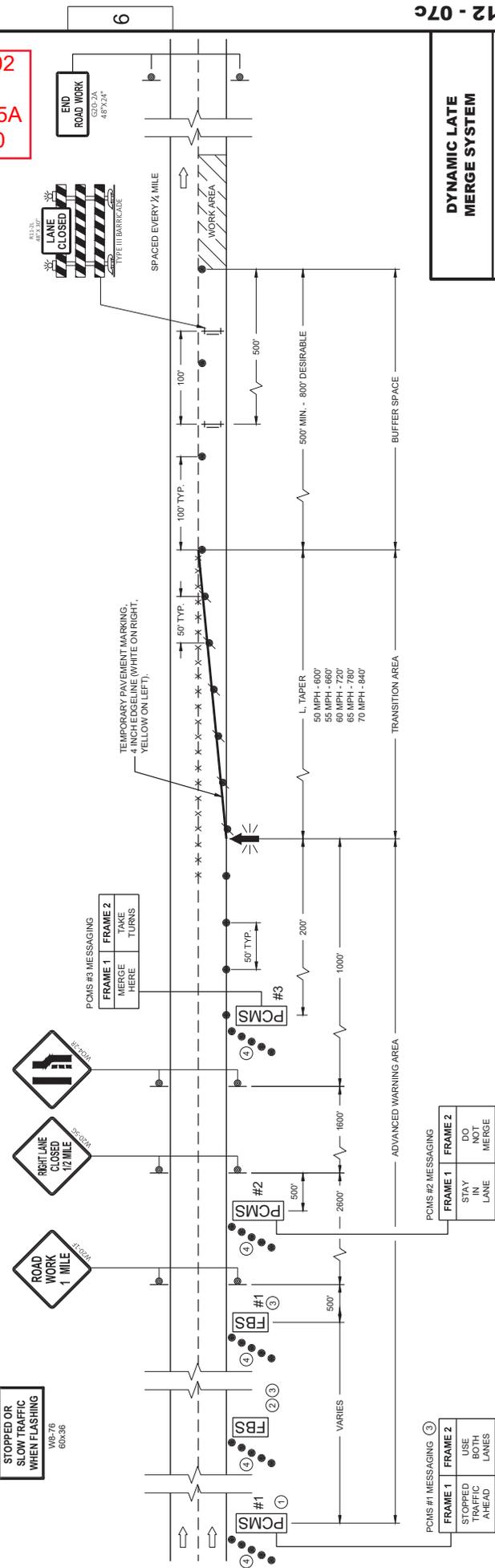REMOVE PAVEMENT MARKINGS IF LANE CLOSURE IS TO BE IN PLACE 4 OR MORE CONTINUOUS DAYS AND NIGHTS.

IF THE HORIZONTAL ALIGNMENT IS SUCH THAT A CURVE MAY REQUIRE ADDITIONAL DELINEATION, THE DEVICE SPACING MAY BE DECREASED TO 50 FEET.

WARNING LIGHTS ARE NOT REQUIRED IF THE LANE CLOSURE IS A DAYTIME ONLY OPERATION.

ADJUSTMENTS IN BUFFER SPACE NEED TO BE INCORPORATED WHEN THE LANE CLOSURE OCCURS NEAR AN INTERCHANGE EXIT OR ENTRANCE RAMP OR INTERSECTION. THE LANE CLOSURE MUST TAKE PLACE FAR ENOUGH IN ADVANCE OF AN EXIT OR ENTRANCE RAMP TO STILL ALLOW FOR ADEQUATE BUFFER SPACE. THE MINIMUM LENGTH OF THE BUFFER SPACE BEFORE AN EXIT RAMP SHOULD BE ONE HALF THE LENGTH OF THE TRANSITION AREA. THE ENTRANCE RAMP SHOULD BE FOLLOWED BY THE ORIGINAL BUFFER SPACE LENGTH OF 800 FEET DESIRABLE PRIOR TO ANOTHER TRAFFIC CONTROL CHANGE SUCH AS A CROSSOVER MANEUVER.

CONSIDER ROADWAY GEOMETRICS WHEN LOCATING SIGNS AND ARROW BOARD SO THE DRIVER HAS A CLEAR VIEW OF THE ARROW BOARD AND LANE CLOSURE DRUMS.

① PLACE PCMS #1 ONE MILE BEYOND ESTIMATED MAXIMUM QUEUE LENGTH. PLACE FLASHING BEACON SIGNS EVERY ONE MILE BETWEEN THE W20 - 1F AND PCMS #1 BEYOND ESTIMATED QUEUE.

② PLACE FLASHING BEACON SIGNS EVERY ONE MILE BETWEEN PCMS #1 AND FBS #1.

③ FOR THREE LANE CONFIGURATION, PLACE FBS ON BOTH SIDES OF ROADWAY. CHANGE PCMS #1 FRAME 2 MESSAGE TO "USE ALL LANES".

④ 5 DRUMS SPACED @ 10' INTERVALS AS NEEDED.

END ROAD WORK
G20-2A
48"X24"

LANE CLOSED
R11-2L
48"X30"

TYPE III BARRICADE

SPACED EVERY ¼ MILE

WORK AREA

500'

500' MIN. - 800' DESIRABLE

BUFFER SPACE

100'

100' TYP.

50' TYP.

L, TAPER
50 MPH - 600'
55 MPH - 660'
60 MPH - 720'
65 MPH - 780'
70 MPH - 840'

TRANSITION AREA

TEMPORARY PAVEMENT MARKING, 4 INCH EDGELINE (WHITE ON RIGHT, YELLOW ON LEFT)

50' TYP.

200'

1000'

PCMS #3 MESSAGING	
FRAME 1	FRAME 2
MERGE HERE	TAKE TURNS

PCMS #3

WO4-2R

1600'

RIGHT LANE CLOSED 1/2 MILE
WO-2C

500'

2600'

PCMS #2 MESSAGING	
FRAME 1	FRAME 2
STAY IN LANE	DO NOT MERGE

PCMS #2

ADVANCED WARNING AREA

ROAD WORK 1 MILE
W1-G0A

500'

FBS #1

PCMS #1 MESSAGING	
FRAME 1	FRAME 2
STOPPED TRAFFIC AHEAD	USE BOTH LANES

PCMS #1

FBS

VARIES

DYNAMIC LATE MERGE SYSTEM

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED
November 2018   /S/ Andrew Heidtke
DATE   WORK ZONE ENGINEER
FHWA

535A