

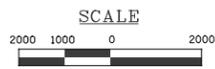
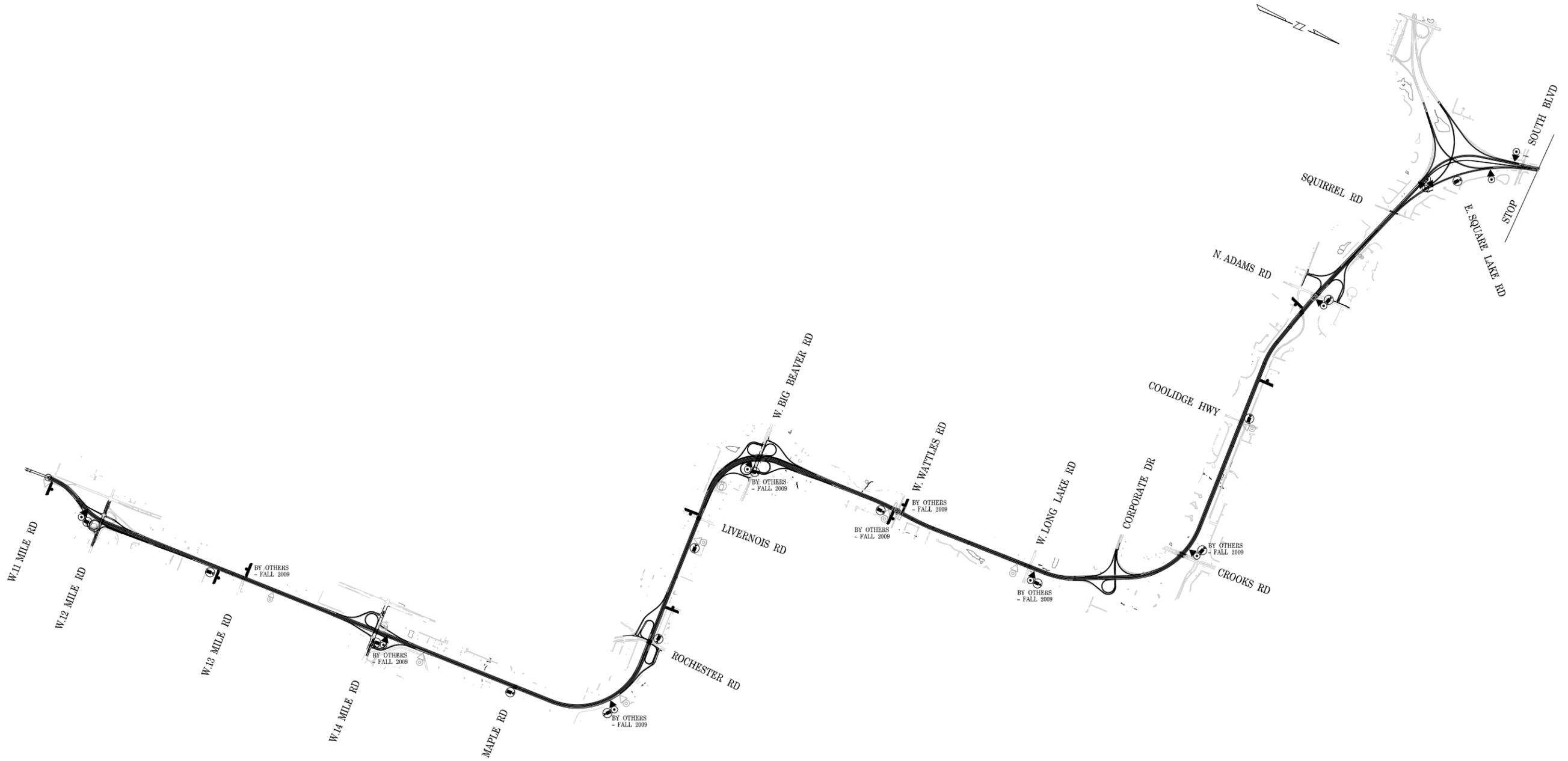
Appendix E: HOV Summary Tables

MDOT I-75 HOV Operational Concept HOV Facility Design Summary Table

	MINNESOTA	GEORGIA	VIRGINIA	CALIFORNIA	WASHINGTON
Facility	Twin Cities: I-35W HOV Lanes	Atlanta Region: I-20, I-75, I-85 HOV Lanes	Hampton Roads: I-64 HOV Lanes	State-wide	Puget Sound: I-90, I-405, I-5, SR 520 HOV Lanes
Type	Concurrent (median)	Concurrent (median)	I-64: Reversible I-64 south of I-264: Concurrent I-264: Concurrent	Concurrent (median) Reversible (I-15 HOT)	Concurrent (median) I-5 & I-90 Express Lanes: Reversible
Separation	Continuous access	Buffer-separated	I-64 Reversible: Concrete barrier I-64/I-264 Concurrent: Continuous access	Northern CA: Continuous access Southern CA: Buffer-separated I-15 HOT: Concrete barrier See report for exceptions)	In general: Continuous access SR-167 HOT Lanes: buffer-separated I-5 & I-90 Express Lanes: Concrete barrier
Eligibility	2+, transit buses, vanpools, motorcycles	2+, certified alternative fuel vehicles (special license plate required), motorcycles, emergency vehicles	2+, motorcycles, emergency vehicles, buses (16+ passengers), taxis, clean fuel vehicles (special license plate required)	2+ (some facilities are 3+), motorcycles, clean fuel vehicles (special vehicle sticker required; quantity limited to prevent degradation of HOV lane performance; stickers and program set to expire 1/1/2011).	2+ (one facility is 3+), buses, motorcycles, and emergency vehicles
Hours of operation	M-F: 6-9 am & 3-6 pm	24 hours/day, 7 days/week	Westbound 6-8 am & Eastbound 4-6 pm (See report for further details)	Northern CA: 2-5 hours in each the morning and evening peak hours, generally M-F between 5-10 am and 3-7 pm Southern CA: 24 hours, 7 days per week (See report for exceptions)	I-5 and SR-16: 24 hours/day, 7 days/week All other HOV: 5 am to 7 pm
Pavement markings	Skip-dash pavement striping separates the HOV lane from the two general purpose lanes	Double solid lines limit the continuous vehicular movement between the HOV lane and general purpose lanes.	I-64/I-264 Concurrent: Double skip-dash pavement striping separates the HOV lane from the general purpose lanes	Northern CA: Skip-dash pavement striping separates the HOV lane from the general purpose lanes Southern CA: Combination of reflective pavement markers and solid yellow and white painted stripes (See report for exceptions)	Continuous access: Skip-dash pavement striping separates the HOV lane from the general purpose lanes SR-167 HOT Lanes: Double solid lines limit the continuous vehicular movement between the HOV lane and general purpose lanes.
Jurisdiction	12 feet	11-12 feet	12 feet	12 feet (11 feet allowed, except far right lane)	11-12 feet
Buffer width	n/a	2 feet	I-64/I-264 Concurrent: 1 foot	Northern CA: n/a Southern CA: generally 4 feet or less; 12-16 feet occasionally used; 4-12 feet should not be used	Continuous access: 8 inches SR-167 HOT Lanes: 1 foot
Inside shoulder	Yes, varies 3-5 feet. Traffic needing to pull off to the shoulder must exit the HOV lane and cross the general purpose lanes to access the outside shoulder.	Minimum width of 4 feet. Inside shoulders are used for emergency pull offs and for enforcement purposes where sufficient shoulder width is available.	None	2-5 feet; some inside shoulders widened to 14 feet to provide pullouts for enforcement activities	2-10 feet
Pavement markings	Skip-dash pavement striping separates the HOV lane from the two general purpose lanes	Double solid lines limit the continuous vehicular movement between the HOV lane and general purpose lanes.	I-64/I-264 Concurrent: Double skip-dash pavement striping separates the HOV lane from the general purpose lanes	Northern CA: Skip-dash pavement striping separates the HOV lane from the general purpose lanes Southern CA: Combination of reflective pavement markers and solid yellow and white painted stripes (See report for exceptions)	Continuous access: Skip-dash pavement striping separates the HOV lane from the general purpose lanes SR-167 HOT Lanes: Double solid lines limit the continuous vehicular movement between the HOV lane and general purpose lanes.
Identifying violators	Routine roving patrols.	Routine roving patrols and patrol vehicles stationed at strategic locations (including on inside shoulder where sufficient width exists, at accident investigation locations in median, and on on-ramps that have HOV by-pass lanes).	Routine roving patrols and patrol vehicles stationed at strategic locations (including on inside shoulder where sufficient width exists).	Routine roving patrols.	Combination of routine enforcement, special enforcement, and selective enforcement techniques, and relies upon self-enforcement as well.
Design criteria for minimum length between ingress/egress points	None	None	None	None. Generally, access points are intended to serve 2-3 interchanges, thus access points are spaced approximately 1 to 2 miles apart.	None
ITS Elements	I-35 freeway management system: includes CCTV, vehicle detection, VMS, and freeway service patrol	VMS, CCTV, vehicle detection, and Georgia NaviGator traveler information website	VMS, CCTV, vehicle detection, and remote controlled gate system (for I-64 Reversible)	VMS, CCTV, vehicle detection	VMS, CCTV, vehicle detection, gate system (for I-5 & I-90 Express Lanes reversible facilities)

MDOT I-75 HOV Operational Concept HOV Facility Enforcement Summary Table

	MINNESOTA	GEORGIA	VIRGINIA	CALIFORNIA	WASHINGTON
Facility	Twin Cities: I-35W HOV Lanes	Atlanta Region: I-20, I-75, I-85 HOV Lanes	Hampton Roads: I-64 HOV Lanes	State-wide	Puget Sound: I-90, I-405, I-5, SR 520 HOV Lanes
Type	Concurrent (median)	Concurrent (median)	I-64: Reversible I-64 south of I-264: Concurrent I-264: Concurrent	Concurrent (median) Reversible (I-15 HOT)	Concurrent (median) I-5 & I-90 Express Lanes: Reversible
Separation	Continuous access	Buffer-separated	I-64 Reversible: Concrete barrier I-64/I-264 Concurrent: Continuous access	Northern CA: Continuous access Southern CA: Buffer-separated I-15 HOT: Concrete barrier See report for exceptions)	In general: Continuous access SR-167 HOT Lanes: buffer-separated I-5 & I-90 Express Lanes: Concrete barrier
Eligibility	2+, transit buses, vanpools, motorcycles	2+, certified alternative fuel vehicles (special license plate required), motorcycles, emergency vehicles	2+, motorcycles, emergency vehicles, buses (16+ passengers), taxis, clean fuel vehicles (special license plate required)	2+ (some facilities are 3+), motorcycles, clean fuel vehicles (special vehicle sticker required; quantity limited to prevent degradation of HOV lane performance: stickers and program set to expire 1/1/2011).	2+ (one facility is 3+), buses, motorcycles, and emergency vehicles
Hours of operation	M-F: 6-9 am & 3-6 pm	24 hours/day, 7 days/week	Westbound 6-8 am & Eastbound 4-6 pm (See report for further details)	Northern CA: 2-5 hours in each the morning and evening peak hours, generally M-F between 5-10 am and 3-7 pm Southern CA: 24 hours, 7 days per week (See report for exceptions)	I-5 and SR-16: 24 hours/day, 7 days/week All other HOV: 5 am to 7 pm
HOV lane width	12 feet	11 feet	12 feet	12 feet (11 feet allowed)	12 feet
General purpose lane width	12 feet	11-12 feet	12 feet	12 feet (11 feet allowed, except far right lane)	11-12 feet
Buffer width	n/a	2 feet	I-64/I-264 Concurrent: 1 foot	Northern CA: n/a Southern CA: generally 4 feet or less; 12-16 feet occasionally used; 4-12 feet should not be used	Continuous access: 8 inches SR-167 HOT Lanes: 1 foot
Inside shoulder	Yes, varies 3-5 feet. Traffic needing to pull off to the shoulder must exit the HOV lane and cross the general purpose lanes to access the outside shoulder.	Minimum width of 4 feet. Inside shoulders are used for emergency pull offs and for enforcement purposes where sufficient shoulder width is available.	None	2-5 feet; some inside shoulders widened to 14 feet to provide pullouts for enforcement activities	2-10 feet
Pavement markings	Skip-dash pavement striping separates the HOV lane from the two general purpose lanes	Double solid lines limit the continuous vehicular movement between the HOV lane and general purpose lanes.	I-64/I-264 Concurrent: Double skip-dash pavement striping separates the HOV lane from the general purpose lanes	Northern CA: Skip-dash pavement striping separates the HOV lane from the general purpose lanes Southern CA: Combination of reflective pavement markers and solid yellow and white painted stripes (See report for exceptions)	Continuous access: Skip-dash pavement striping separates the HOV lane from the general purpose lanes SR-167 HOT Lanes: Double solid lines limit the continuous vehicular movement between the HOV lane and general purpose lanes.
Jurisdiction	Minnesota State Patrol (MSP)	Georgia State Patrol (GSP)	Virginia State Police (VSP)	California Highway Patrol (CHP)	Washington State Patrol (WSP)
Identifying violators	Routine roving patrols.	Routine roving patrols and patrol vehicles stationed at strategic locations (including on inside shoulder where sufficient width exists, at accident investigation locations in median, and on on-ramps that have HOV by-pass lanes).	Routine roving patrols and patrol vehicles stationed at strategic locations (including on inside shoulder where sufficient width exists).	Routine roving patrols.	Combination of routine enforcement, special enforcement, and selective enforcement techniques, and relies upon self-enforcement as well.
Citing violators	Violators are pulled over to the right shoulder and issued a citation.	Violators are pulled over to the inside shoulder if sufficient shoulder width exists. Otherwise, patrol vehicles will pull violators over to the right shoulder or into an accident investigation site if possible	Violators are pulled over to the inside shoulder if sufficient shoulder width exists. Otherwise, patrol vehicles will pull violators over to the right shoulder.	Violators are pulled over to the inside shoulder if sufficient shoulder width exists. Otherwise, patrol vehicles will pull violators over to the right shoulder. CHP has recently indicated, mainly for safety reasons, that they will pull violators to the right regardless of the available space on the inside shoulder.	Violators are pulled over to the inside shoulder if sufficient shoulder width exists. Otherwise, patrol vehicles will pull violators over to the right shoulder.
Violation Penalty	\$130	\$101/\$126/\$176. Additionally, one point is issued for a fourth and subsequent offense in a 12-month period. Same applies for violators without special license plate for alternative fuel vehicles.	Currently, enforcement is conducted in law enforcement cruisers on periodic basis. Escalating fines are tracked for a five-year period from the first violation. Escalating fines (\$125, \$250, \$500, \$1,000) and point assessments (3 points for each violation after the first violation), but only in the northern Virginia region. Outside this area, HOV violations are a flat \$100 fine.	\$401 fine for each violation.	\$124 fine for each violation.



LEGEND

	PROPOSED	EXISTING
SURVEILLANCE SYSTEM		
MICROWAVE VEHICLE DETECTION SYSTEM		
DYNAMIC MESSAGE SIGN, LARGE		
LOOP DETECTORS	****	****

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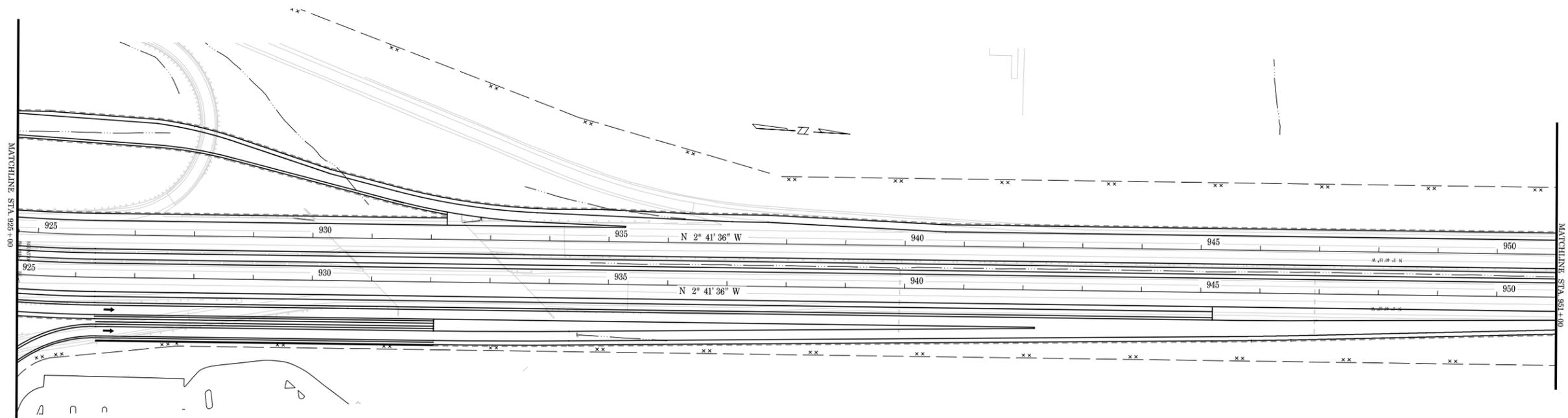
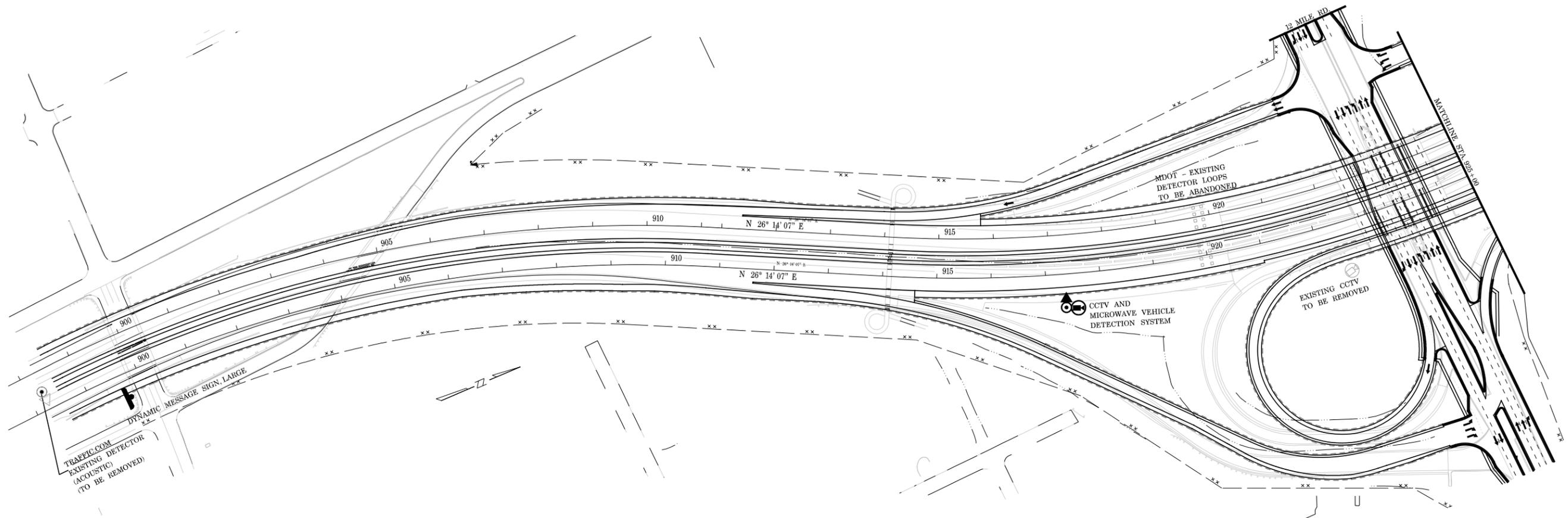


MDOT JOB NO.
88168
MDOT CONTROL
SECTION
63174

MICHIGAN DEPARTMENT OF TRANSPORTATION
1-75 ITS
HIGH OCCUPANCY VEHICLE LANE ADDITION

OVERALL VICINITY SHEET (FOR REFERENCE)

DATE: OCTOBER 15, 2009 SHEET: 1 OF 16



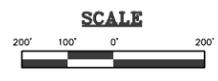
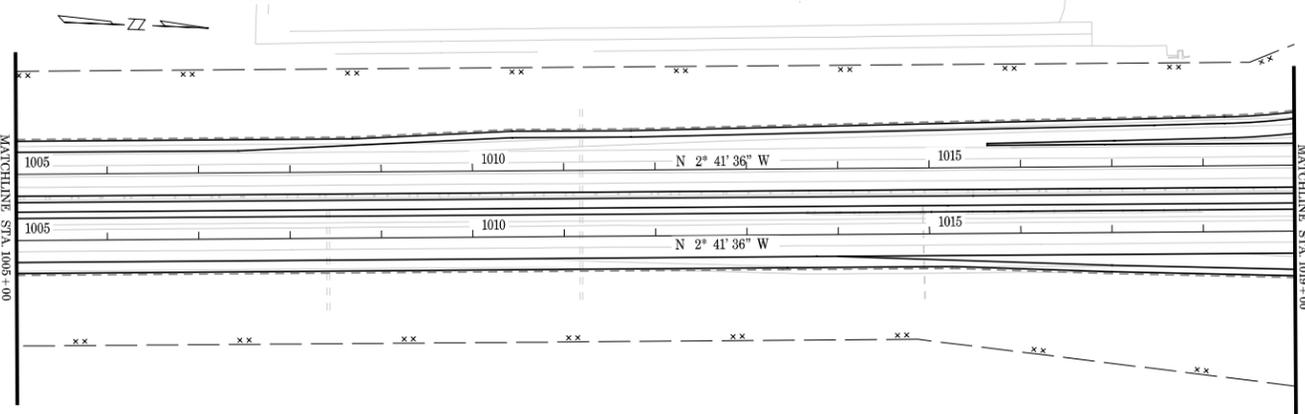
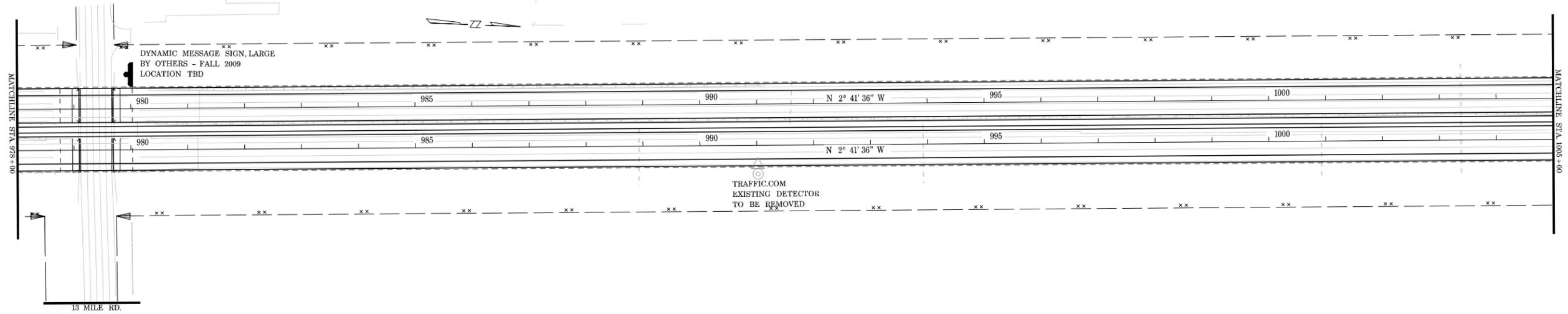
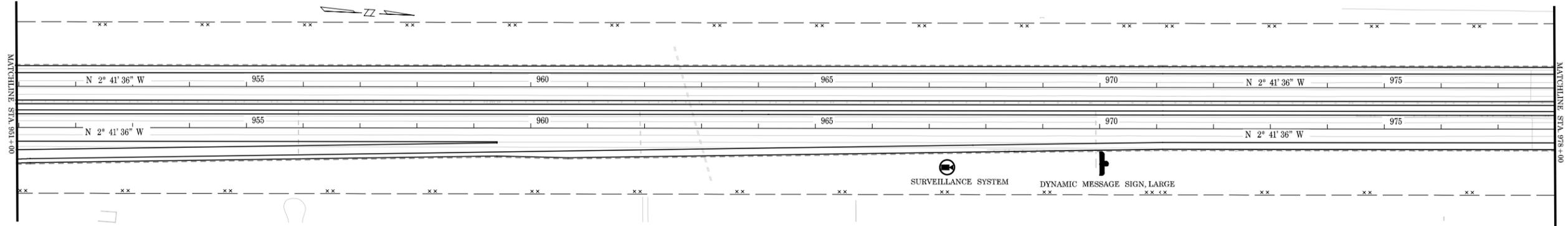
LEGEND	
PROPOSED	EXISTING

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MDOT JOB NO.
88168
MDOT CONTROL SECTION
63174

MICHIGAN DEPARTMENT OF TRANSPORTATION
1-75 ITS
HIGH OCCUPANCY VEHICLE LANE ADDITION
STA. 898+00 TO 951+00



LEGEND

	PROPOSED	EXISTING
SURVEILLANCE SYSTEM		
MICROWAVE VEHICLE DETECTION SYSTEM		
DYNAMIC MESSAGE SIGN, LARGE		
LOOP DETECTORS		

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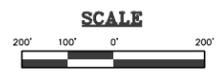
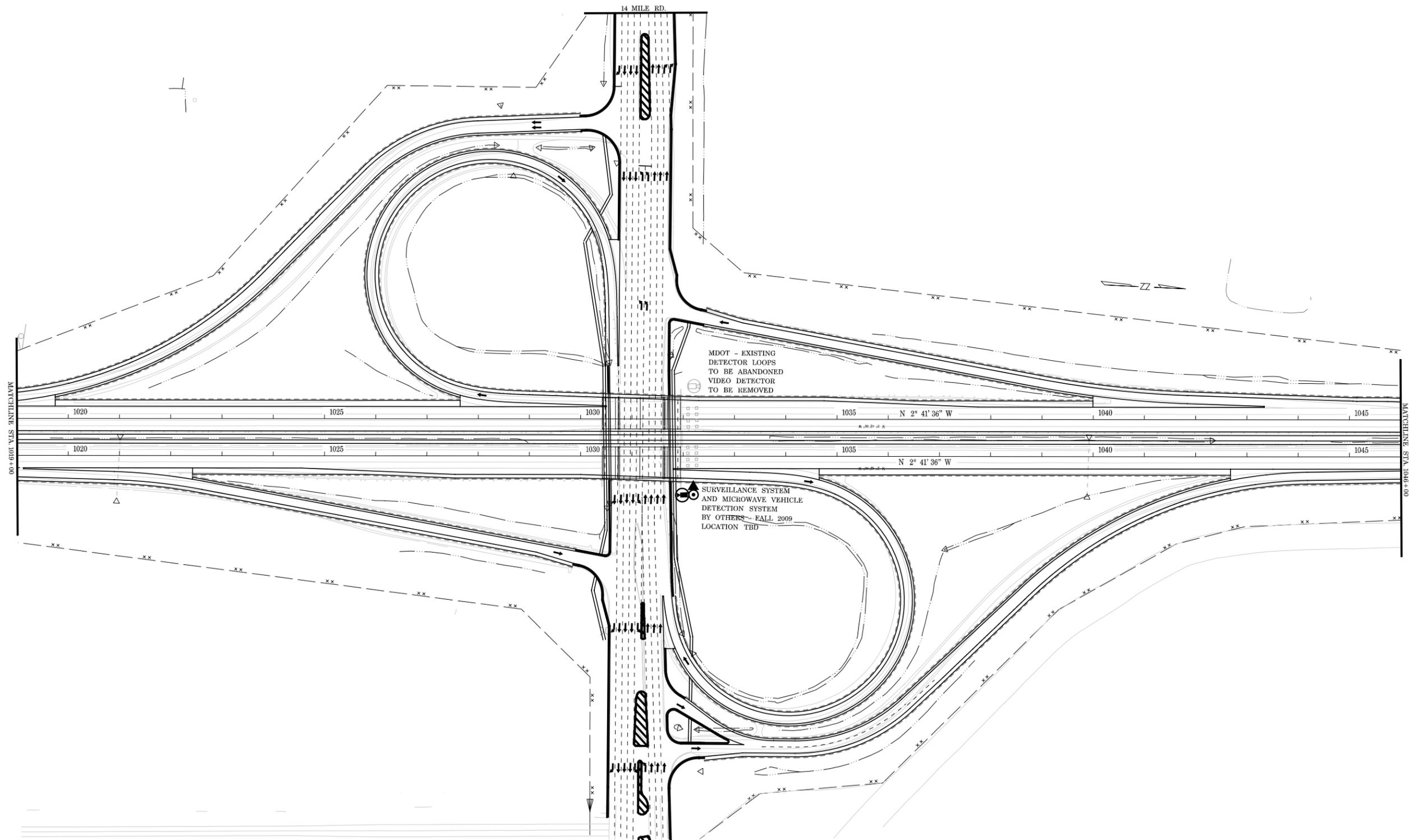
MDOT CONTROL SECTION
63174

MICHIGAN DEPARTMENT OF TRANSPORTATION
I-75 ITS
HIGH OCCUPANCY VEHICLE LANE ADDITION

STA. 951+00 TO 1019+00

DATE: OCTOBER 15, 2009

SHEET: 3 OF 16



LEGEND

	PROPOSED	EXISTING
SURVEILLANCE SYSTEM		
MICROWAVE VEHICLE DETECTION SYSTEM		
DYNAMIC MESSAGE SIGN, LARGE		
LOOP DETECTORS		

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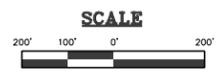
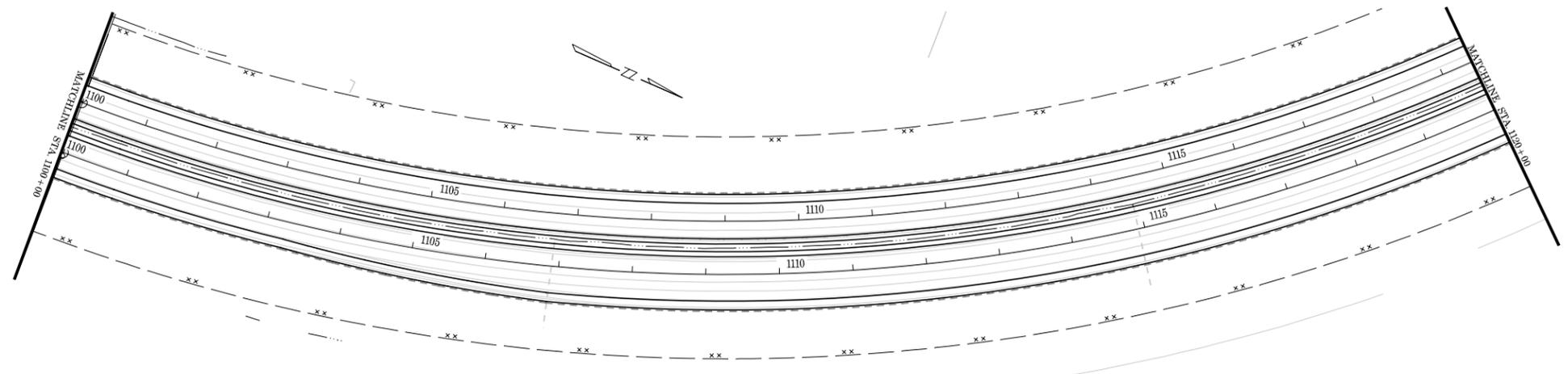
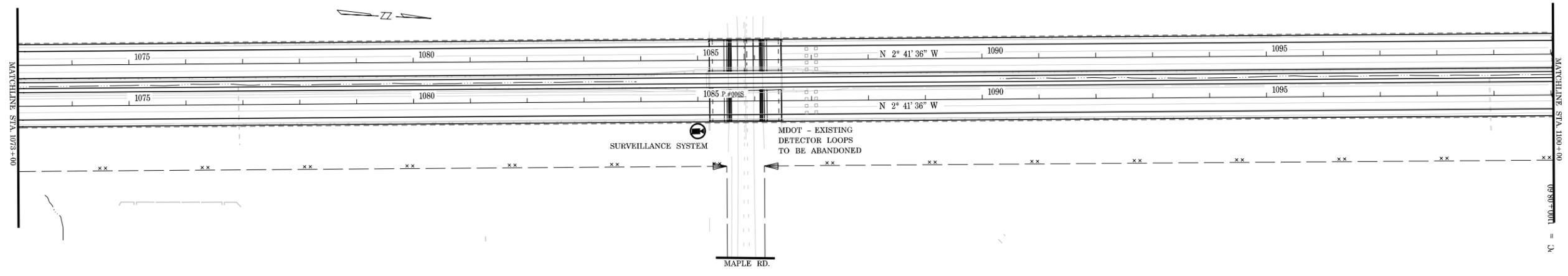
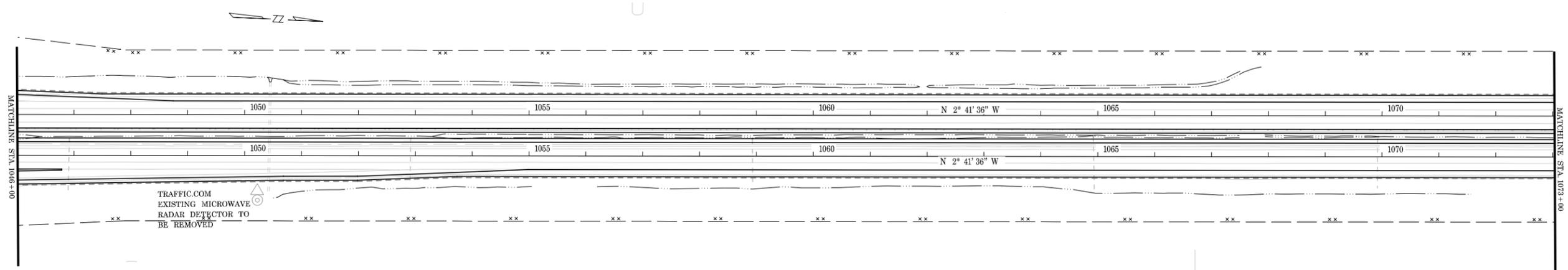
MDOT CONTROL SECTION
 63174

MICHIGAN DEPARTMENT OF TRANSPORTATION
 1-75 ITS
HIGH OCCUPANCY VEHICLE LANE ADDITION

STA. 1019+00 TO 1046+00

DATE: OCTOBER 15, 2009

SHEET: 4 OF 16



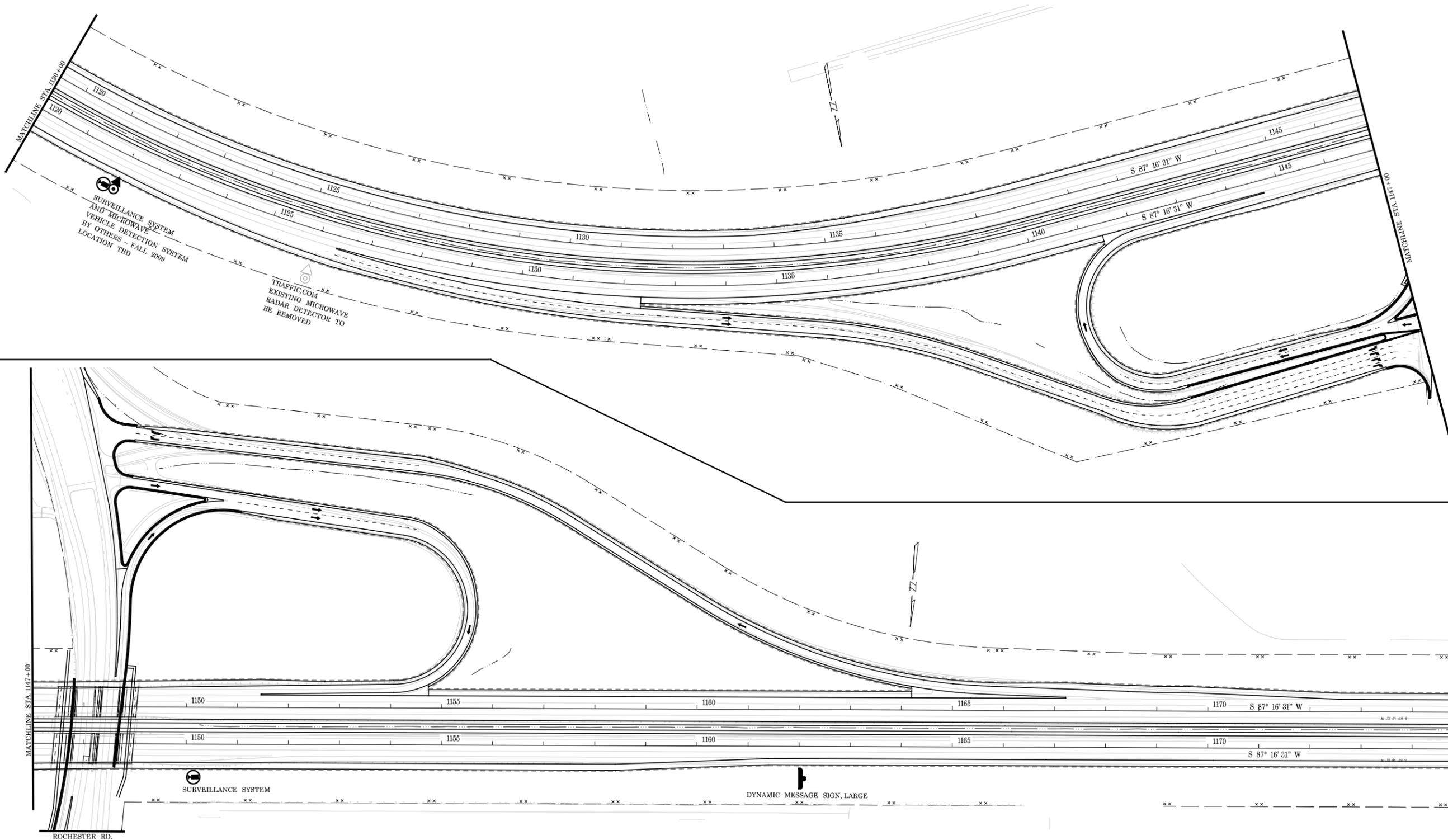
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PROPOSED	EXISTING

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88168
MDOT CONTROL
SECTION
63174

MICHIGAN DEPARTMENT OF TRANSPORTATION
1-75 ITS
HIGH OCCUPANCY VEHICLE LANE ADDITION
STA. 1043+00 TO 1120+00
DATE: OCTOBER 15, 2009
SHEET: 5 OF 16



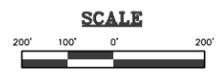
SURVEILLANCE SYSTEM AND MICROWAVE VEHICLE DETECTION SYSTEM BY OTHERS - FALL 2009 LOCATION TBD

TRAFFIC.COM EXISTING MICROWAVE RADAR DETECTOR TO BE REMOVED

SURVEILLANCE SYSTEM

DYNAMIC MESSAGE SIGN, LARGE

ROCHESTER RD.



LEGEND	
SURVEILLANCE SYSTEM	PROPOSED
MICROWAVE VEHICLE DETECTION SYSTEM	EXISTING
DYNAMIC MESSAGE SIGN, LARGE	
LOOP DETECTORS	

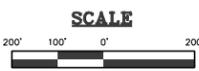
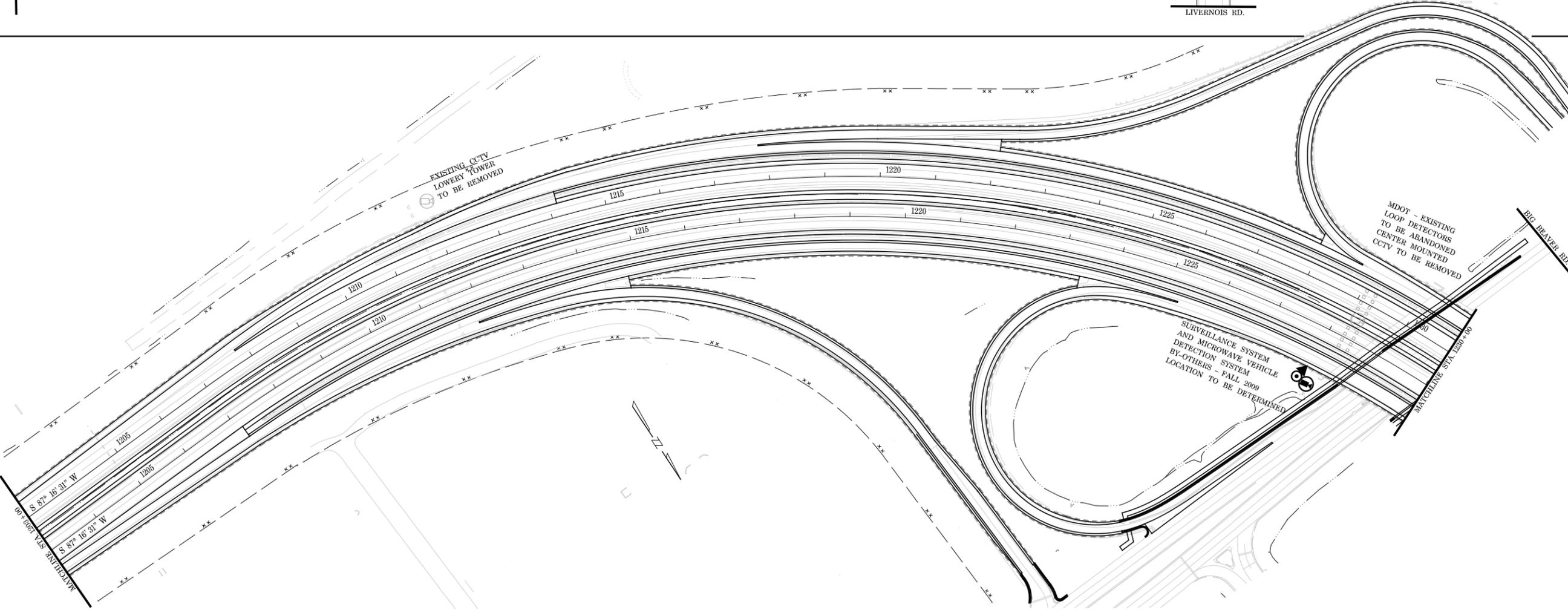
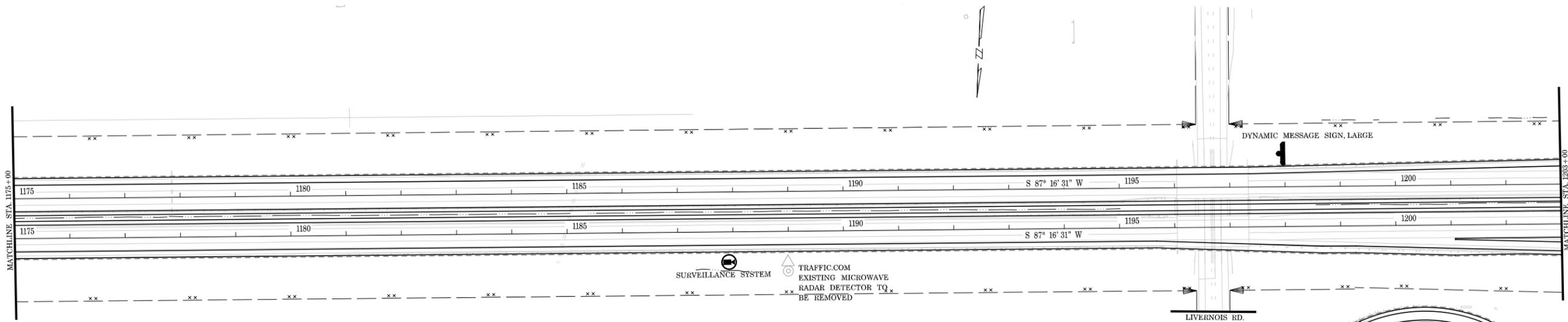
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MDOT JOB NO.
68168

MDOT CONTROL SECTION
63174

MICHIGAN DEPARTMENT OF TRANSPORTATION
1-75 ITS
HIGH OCCUPANCY VEHICLE LANE ADDITION
STA. 1120+00 TO 1175+00



LEGEND

	PROPOSED	EXISTING
SURVEILLANCE SYSTEM		
MICROWAVE VEHICLE DETECTION SYSTEM		
DYNAMIC MESSAGE SIGN, LARGE		
LOOP DETECTORS		

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Grand Rapids . Southfield .
Traverse City

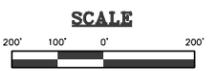
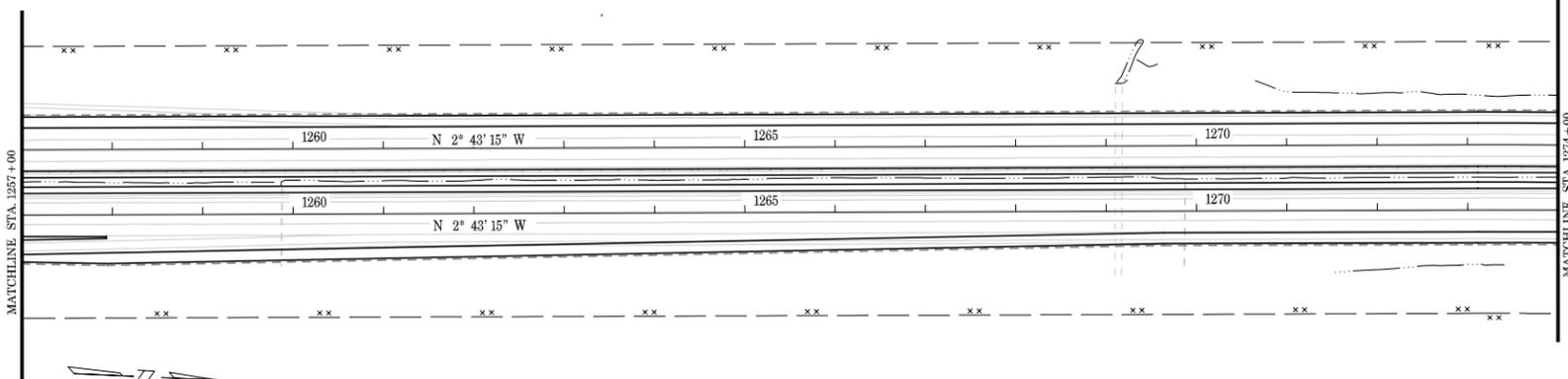
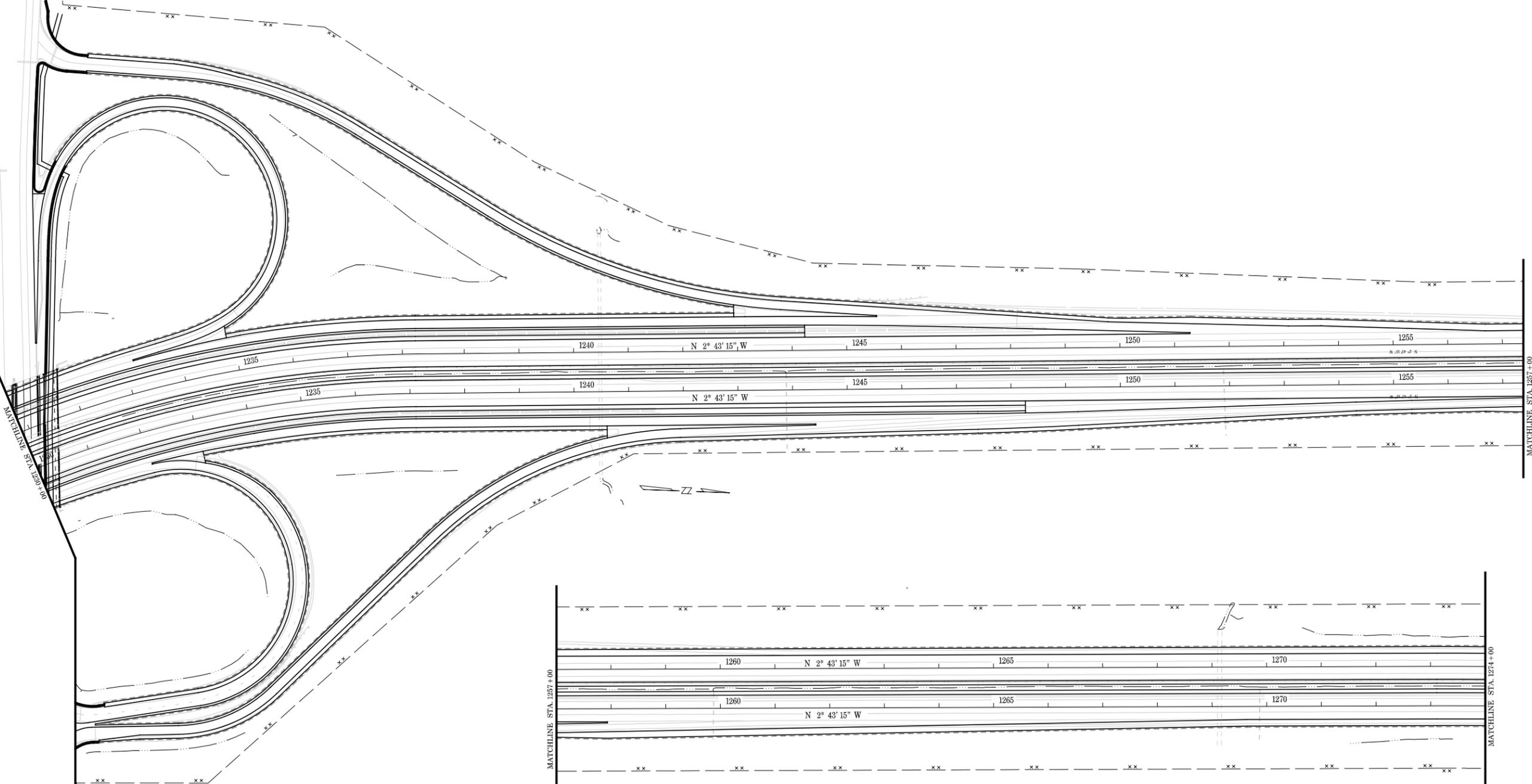


MDOT JOB NO.
88168
MDOT CONTROL SECTION
63174

MICHIGAN DEPARTMENT OF TRANSPORTATION
1-75 ITS
HIGH OCCUPANCY VEHICLE LANE ADDITION
STA. 1175+00 TO 1230+00

L75 PLOT 6.dgn 10/15/2009 4:54:33 PM

BIG BEAVER RD.



LEGEND

	PROPOSED	EXISTING
SURVEILLANCE SYSTEM		
MICROWAVE VEHICLE DETECTION SYSTEM		
DYNAMIC MESSAGE SIGN, LARGE		
LOOP DETECTORS		

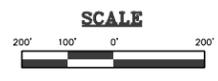
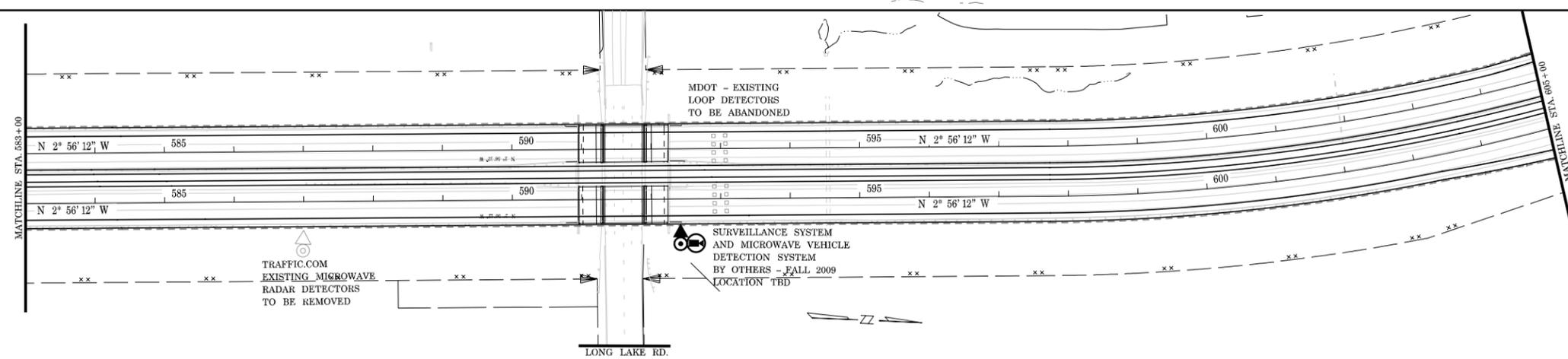
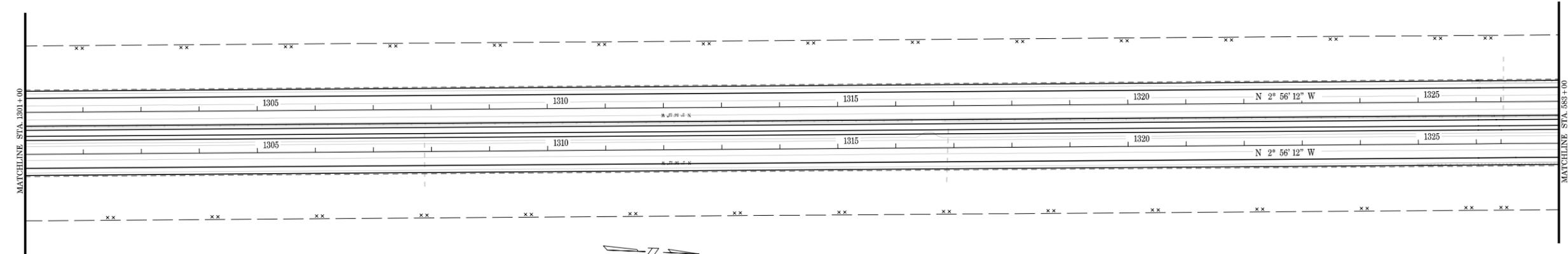
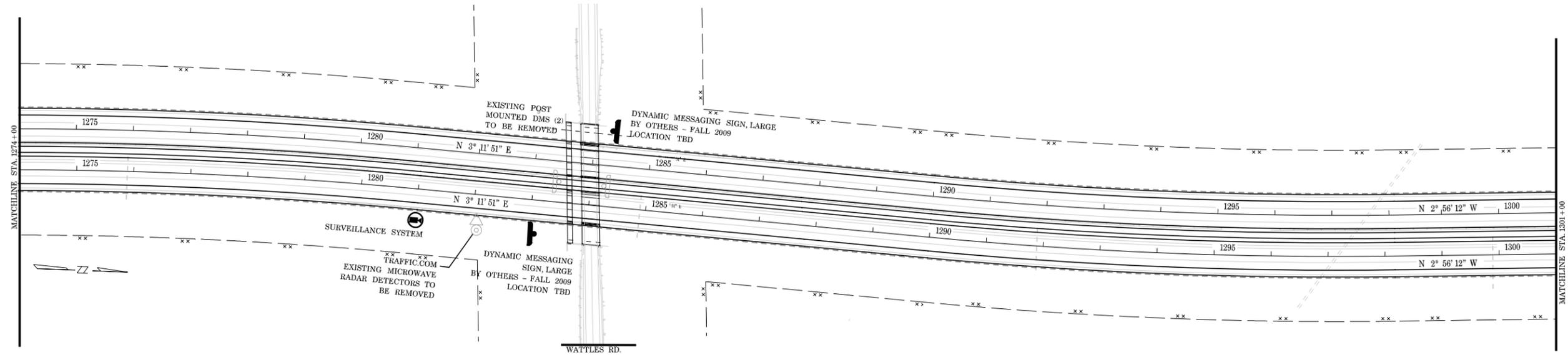
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Traverse City



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88168
MDOT CONTROL SECTION
63174

MICHIGAN DEPARTMENT OF TRANSPORTATION
I-75 ITS
HIGH OCCUPANCY VEHICLE LANE ADDITION
STA. 1230+00 TO 1274+00

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LEGEND

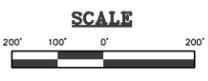
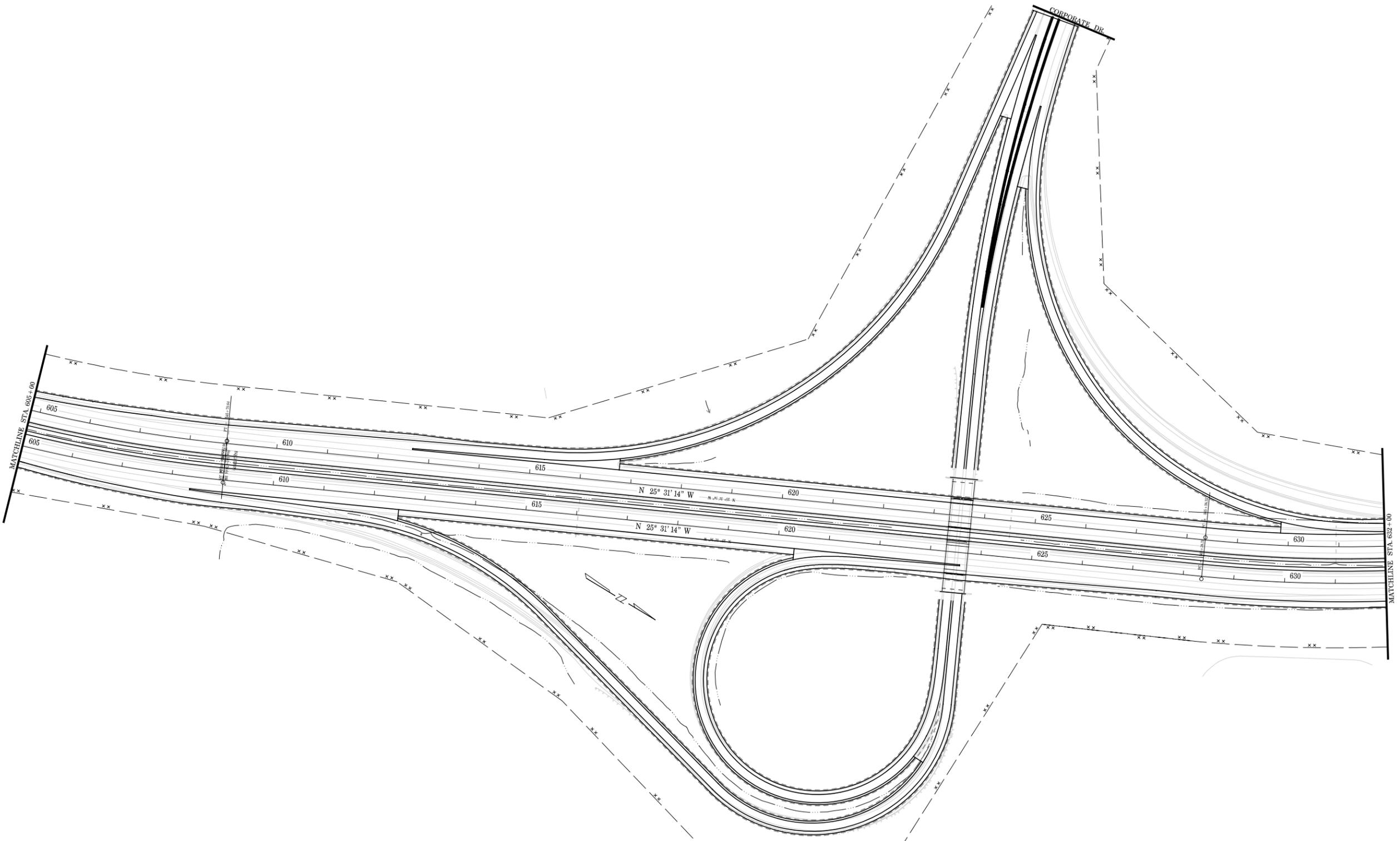
PROPOSED	EXISTING

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Traverse City



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88168
MDOT CONTROL SECTION
63174

MICHIGAN DEPARTMENT OF TRANSPORTATION
I-75 ITS
HIGH OCCUPANCY VEHICLE LANE ADDITION
STA. 1274+00 TO 605+00
DATE: OCTOBER 15, 2009
SHEET: 9 OF 16



LEGEND	
SURVEILLANCE SYSTEM	PROPOSED
MICROWAVE VEHICLE DETECTION SYSTEM	EXISTING
DYNAMIC MESSAGE SIGN, LARGE	
LOOP DETECTORS	

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 Surface Transportation
 Grand Rapids . Southfield .
 Traverse City



MDOT JOB NO.
 88168

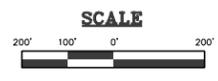
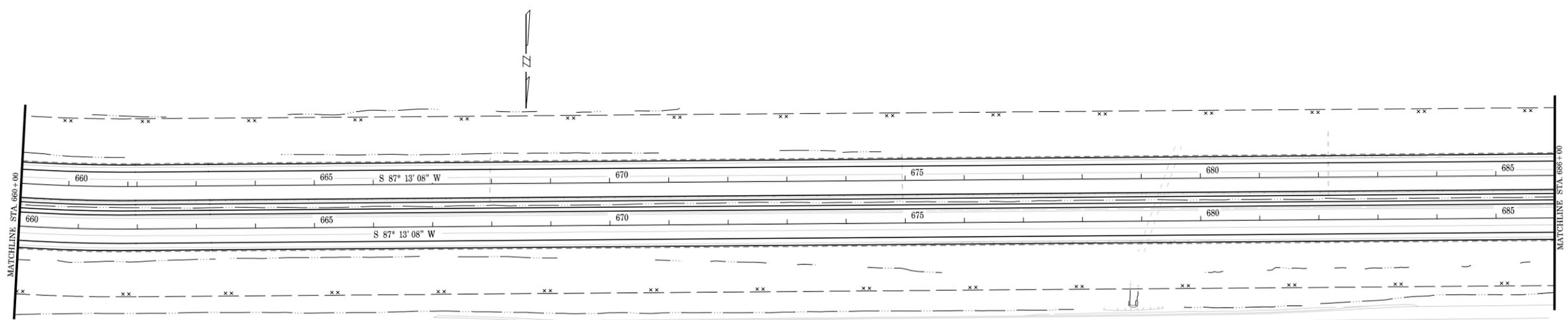
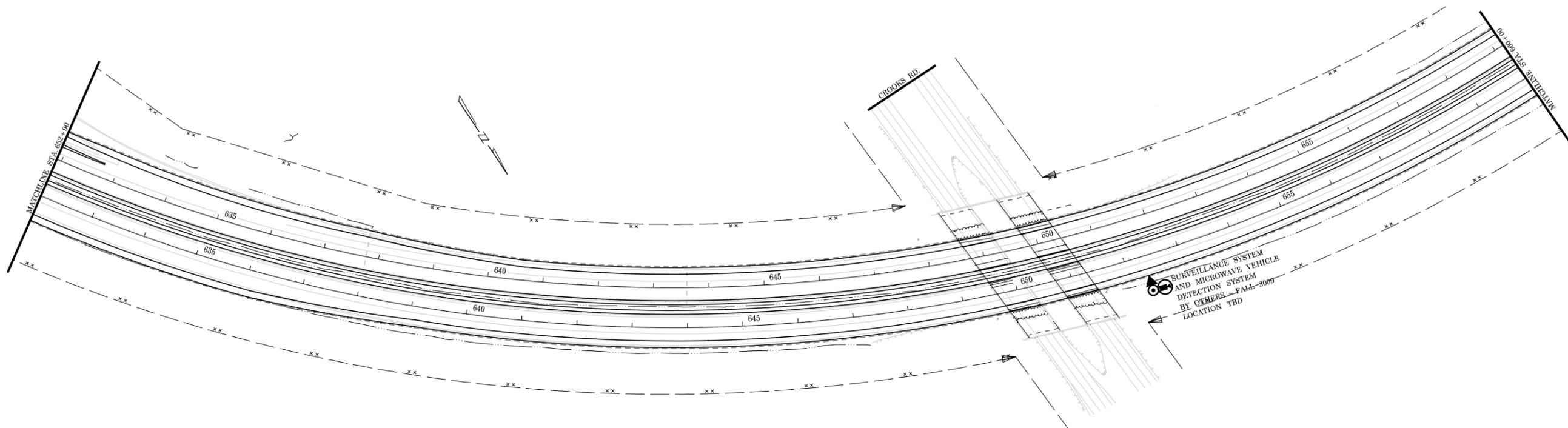
MDOT CONTROL SECTION
 63174

MICHIGAN DEPARTMENT OF TRANSPORTATION
 1-75 ITS
HIGH OCCUPANCY VEHICLE LANE ADDITION

STA. 605+00 TO 632+00

DATE: OCTOBER 15, 2009

SHEET: 10 OF 16



LEGEND

	PROPOSED	EXISTING
SURVEILLANCE SYSTEM		
MICROWAVE VEHICLE DETECTION SYSTEM		
DYNAMIC MESSAGE SIGN, LARGE		
LOOP DETECTORS		

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Traverse City



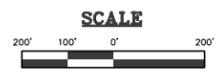
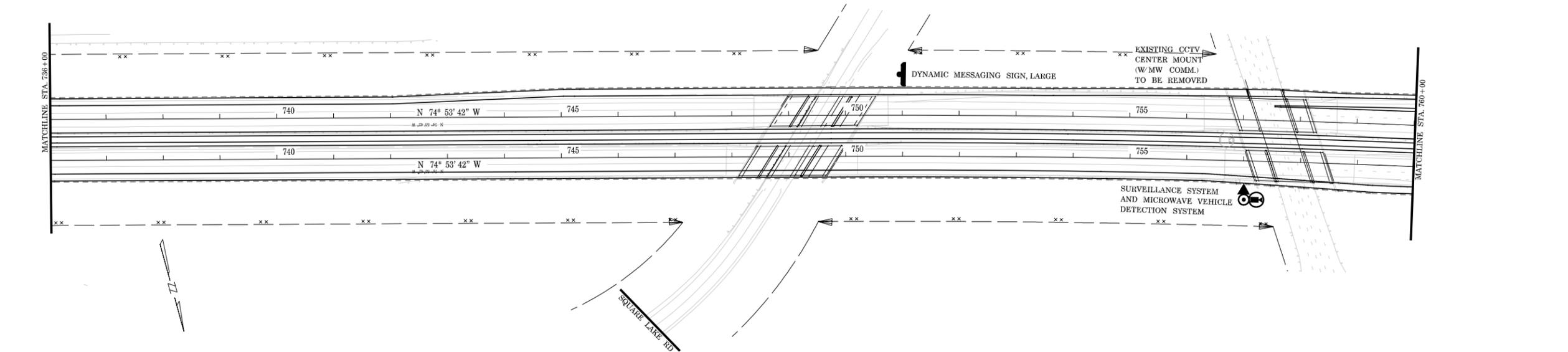
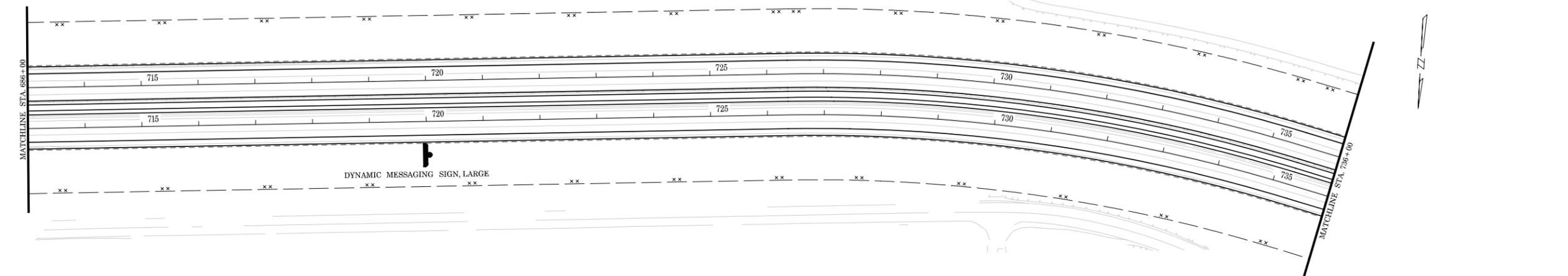
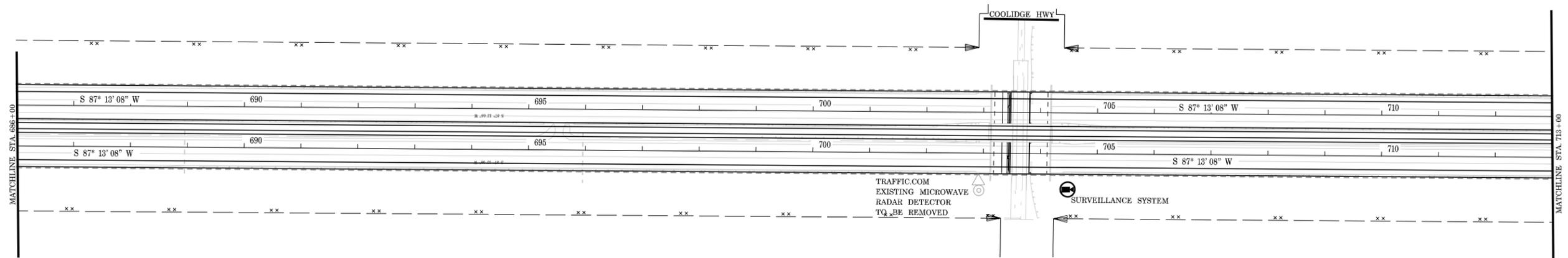
MDOT JOB NO.
88168

MDOT CONTROL SECTION
63174

MICHIGAN DEPARTMENT OF TRANSPORTATION
1-75 ITS
HIGH OCCUPANCY VEHICLE LANE ADDITION

STA. 632+00 TO 686+00

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LEGEND	
PROPOSED	EXISTING

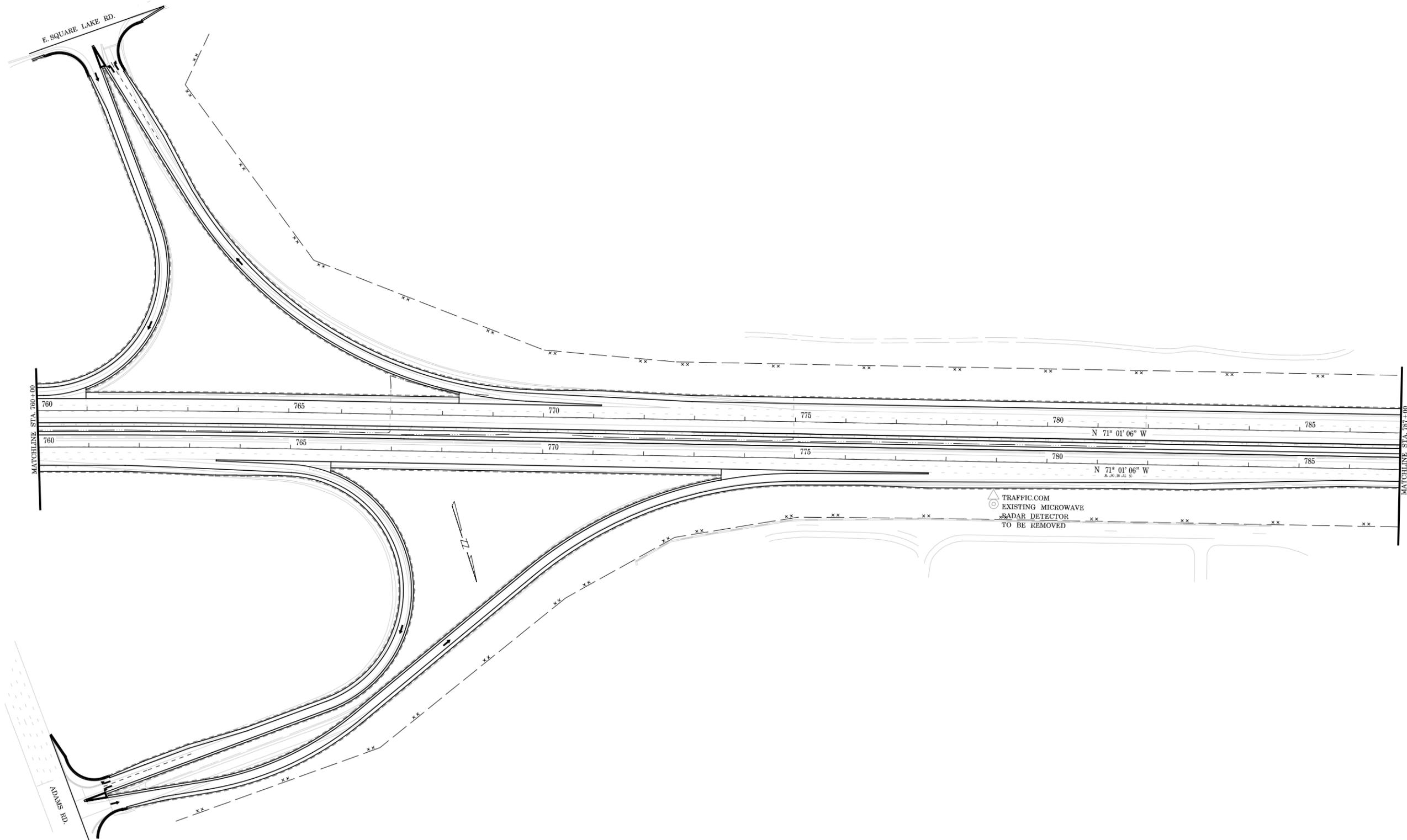
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Traverse City



MDOT JOB NO.
88168
MDOT CONTROL SECTION
63174

MICHIGAN DEPARTMENT OF TRANSPORTATION
1-75 ITS
HIGH OCCUPANCY VEHICLE LANE ADDITION
STA. 686+00 TO 760+00

L75 PLOT 11.dgn 10/15/2009 4:56:37 PM



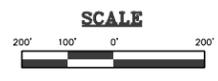
MATCHLINE STA. 760+00

MATCHLINE STA. 787+00

760 765 770 775 780 785
 760 765 770 775 780 785

TRAFFIC.COM
 EXISTING MICROWAVE
 RADAR DETECTOR
 TO BE REMOVED

N 71° 01' 06" W
 N 71° 01' 06" W



LEGEND

SURVEILLANCE SYSTEM	PROPOSED	EXISTING
MICROWAVE VEHICLE DETECTION SYSTEM		
DYNAMIC MESSAGE SIGN, LARGE		
LOOP DETECTORS		

URS
 Surface Transportation
 Grand Rapids . Southfield .
 Traverse City

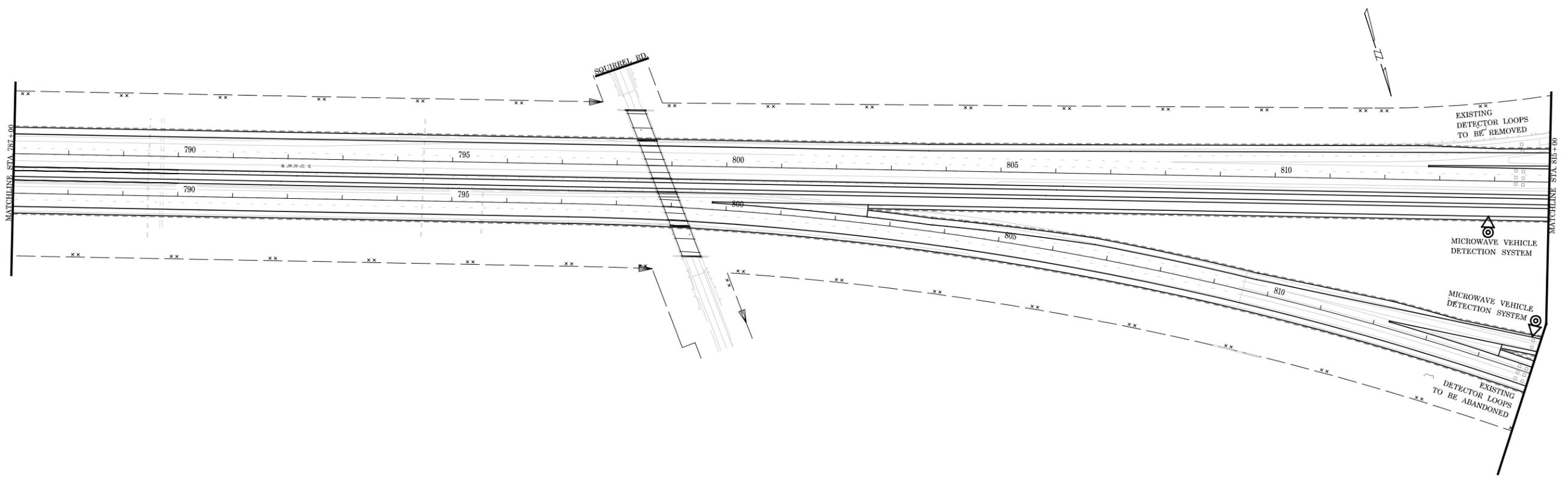


MDOT JOB NO.
88168

MDOT CONTROL
 SECTION
63174

MICHIGAN DEPARTMENT OF TRANSPORTATION
 I-75 ITS
 HIGH OCCUPANCY VEHICLE LANE ADDITION
 STA. 760+00 TO 787+00

DATE: OCTOBER 15, 2009 SHEET: 13 OF 16



LEGEND	
SURVEILLANCE SYSTEM	PROPOSED
MICROWAVE VEHICLE DETECTION SYSTEM	EXISTING
DYNAMIC MESSAGE SIGN, LARGE	
LOOP DETECTORS	

URS
 Surface Transportation
 Grand Rapids . Southfield .
 Traverse City



MDOT JOB NO.
 88168

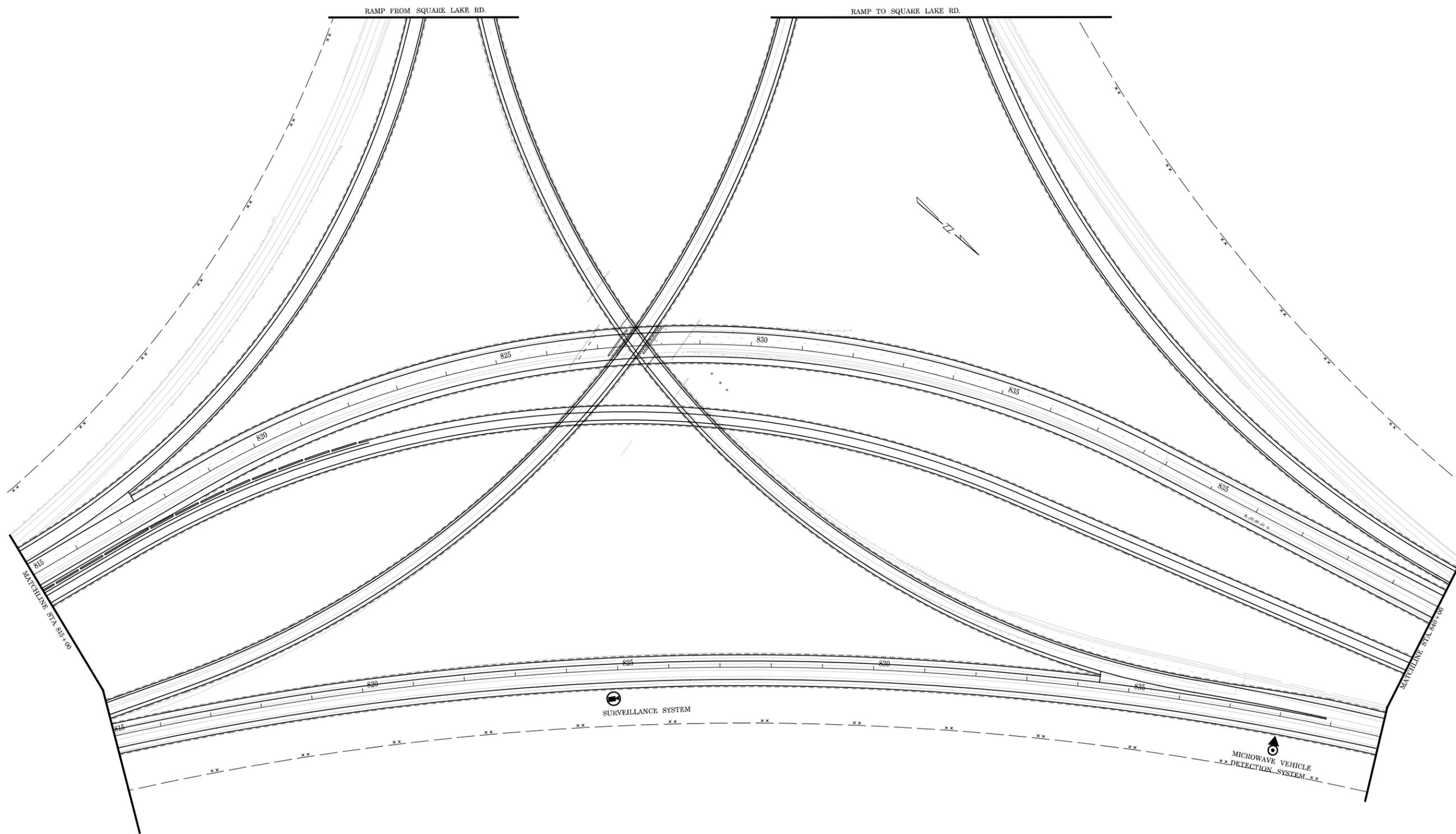
MDOT CONTROL SECTION
 63174

MICHIGAN DEPARTMENT OF TRANSPORTATION
 I-75 ITS
 HIGH OCCUPANCY VEHICLE LANE ADDITION

STA. 787+00 TO 815+00

DATE: OCTOBER 15, 2009

SHEET: 14 OF 16



LEGEND

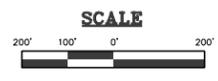
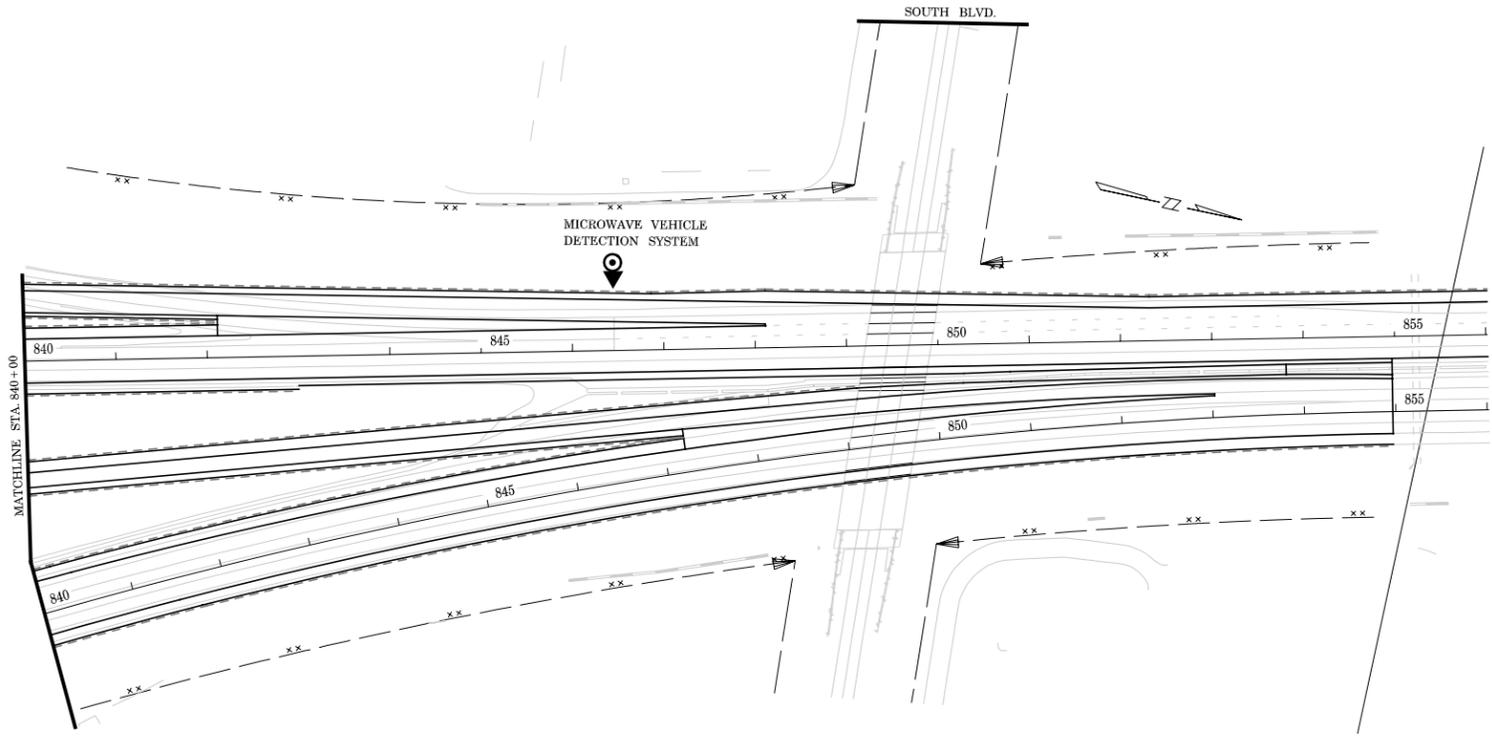
	PROPOSED	EXISTING
SURVEILLANCE SYSTEM		
MICROWAVE VEHICLE DETECTION SYSTEM		
DYNAMIC MESSAGE SIGN, LARGE		
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HIGH OCCUPANCY VEHICLE LANE ADDITION
STA. 815+00 TO 840+00



LEGEND	
SURVEILLANCE SYSTEM	PROPOSED
MICROWAVE VEHICLE DETECTION SYSTEM	EXISTING
DYNAMIC MESSAGE SIGN, LARGE	
LOOP DETECTORS	

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HIGH OCCUPANCY VEHICLE LANE ADDITION

STA. 840+00 TO 855+00

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