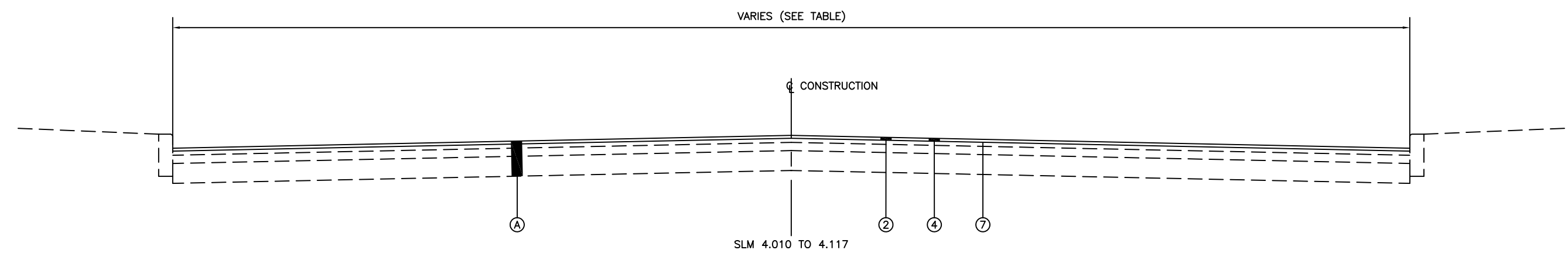
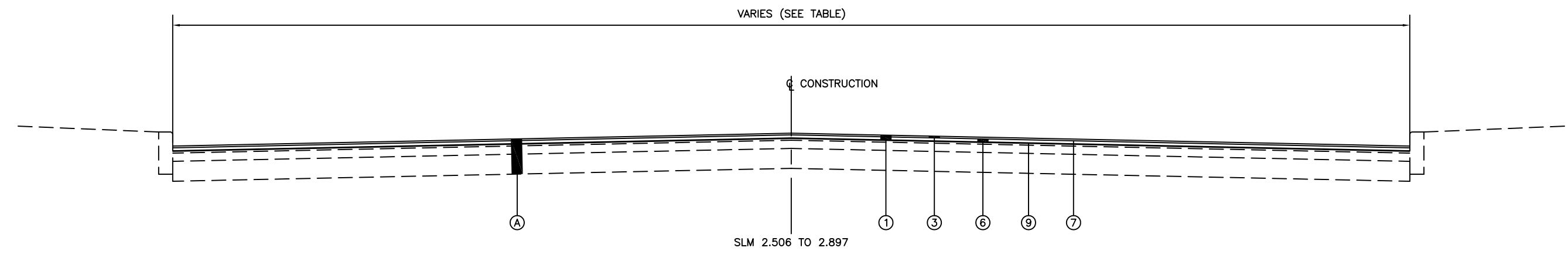
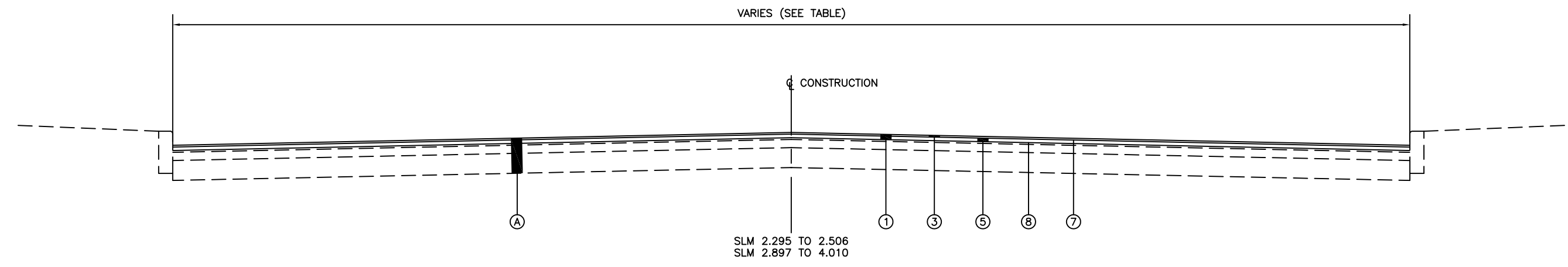




TYPICAL SECTION  
 FULTON RD. NW PAVING PROJECT



LEGEND

- ① 254 - 2 1/4" PAVEMENT PLANING, ASPHALT CONCRETE, AS PER PLAN
- ② 254 - 1 1/4" PAVEMENT PLANING, ASPHALT CONCRETE, AS PER PLAN
- ③ 424 - 3/4" FINE GRADED POLYMER ASPHALT CONCRETE, TYPE A
- ④ 424 - 1 1/4" FINE GRADED POLYMER ASPHALT CONCRETE, TYPE B
- ⑤ 441 - 1 1/2" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 1, (448)
- ⑥ 441 - 1 1/4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 1, (448)
- ⑦ 407 - TACK COAT
- ⑧ 407 - TACK COAT FOR INTERMEDIATE COURSE
- ⑨ SPEC - FIBER REINFORCED BITUMINOUS MEMBRANE SURFACE TREATMENT, TYPE B
- (A) EXISTING COMPOSITE PAVEMENT (BRICK OR CONCRETE UNDER ASPHALT)

PAVEMENT WIDTH		
STATION		WIDTH
FROM	TO	(FEET)
2.295	2.506	54
2.506	2.825	46
2.825	3.409	37
3.409	3.789	37
3.789	3.884	36
3.884	4.010	30
4.010	4.117	36

DATE:	REVISIONS	DESCRIPTION	BY
12/30/14			
H. SCALE: N/A			
V. SCALE: N/A			
SHEET 2 OF 13			

DRAWN BY:	APPROVED BY:	FIELD BOOK:	FILE NAME:
N/L		TYPICAL SECTION	



CONSTRUCTION INCIDENTALS (CONTINUED):

SALVAGED CASTINGS:

WHEN DIRECTED BY THE CITY ENGINEER, ALL CASTINGS SHALL BE CAREFULLY REMOVED AND STORED ON SITE OR DELIVERED TO A LOCATION DESIGNATED BY THE CITY ENGINEER.

CONSTRUCTION LAYOUT:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION LAYOUT UTILIZING PERTINENT PLAN DATA. THE CITY ENGINEER WILL NOT BE RESPONSIBLE FOR STAKING HORIZONTAL OR VERTICAL CONTROL. CONSTRUCTION LAYOUT SHALL BE IN ACCORDANCE WITH ODOT 623 CONSTRUCTION LAYOUT STAKES.

AT THE CITY ENGINEER'S REQUEST THE CONTRACTOR SHALL MAKE AVAILABLE ALL SURVEY FIELD NOTES FOR REVIEW.

EXISTING MONUMENTATION:

THE CONTRACTOR SHALL PRESERVE ALL CORNERSTONES, IRON PINS, CONCRETE MONUMENTS AND/OR ANY TYPE OF LAND MONUMENT. (HE SHALL HAVE ALL MONUMENTS IN THE PROXIMITY OF THE WORK REFERENCED.) THE CONTRACTOR SHALL REPLACE/RESET ANY DISTURBED OR DAMAGED MONUMENTS AND SHALL FURNISH A CERTIFICATION BY A REGISTERED SURVEYOR THAT THE MONUMENTS HAVE BEEN RESTORED.

DEWATERING OPERATIONS:

WHEN DEEMED NECESSARY, THE CONTRACTOR MAY INSTALL DEWATERING EQUIPMENT PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

THE PROPOSED LOCATION OF WELL POINTS, HEADER PIPE, ELECTRICAL DISTRIBUTION, GENERATORS AND DISCHARGE PIPES, ETC. SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMITS FOR THE INSTALLATION AND SUBSEQUENT REMOVAL OF DEWATERING EQUIPMENT AS MAY BE NECESSARY PER STATE AND LOCAL GOVERNING AGENCIES.

INSTALLATION OF ALL ELECTRICAL EQUIPMENT, INCLUDING GROUNDING AND PROTECTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

CONTRACTOR SHALL PROVIDE ALL COMBUSTIBLE ENGINE DRIVEN GENERATORS WITH "HOSPITAL GRADE" MUFFLERS. MUFFLERS SHALL BE RATED, AT A MAXIMUM OF 67 dB AT 23 FEET AWAY RUNNING FULL LOAD.

INSPECTION:

ALL WORK REQUIRED FOR THIS IMPROVEMENT SHALL BE SUBJECT TO INSPECTION BY THE CITY OF CANTON OR THEIR DESIGNATED REPRESENTATIVE. THE CONTRACTOR SHALL GIVE A 48 HOUR NOTICE BEFORE STARTING ANY WORK ON THIS PROJECT AND SHALL KEEP THE CITY INFORMED OF HIS/HER CONSTRUCTION SCHEDULE. NO WORK SHALL BE PERFORMED UNLESS AN AUTHORIZED INSPECTOR IS PRESENT.

EARTHWORK / SITE WORK

EASEMENTS AND RIGHT-OF-WAY:

THE CONTRACTOR SHALL STAY WITHIN THE PROPERTIES, EASEMENTS, AND/OR RIGHT-OF-WAY PROVIDED AT ALL TIMES. NO MATERIAL SHALL BE STORED NOR ANY WORK PERFORMED ON PRIVATE PROPERTY. DISTURBANCE OF EXISTING FEATURES AND/OR IMPROVEMENTS SHALL BE KEPT TO AN ABSOLUTE MINIMUM AND AS APPROVED BY THE CITY ENGINEER/PROPERTY OWNER.

SUITABILITY OF SITE:

THE CITY OF CANTON WILL NOT BE RESPONSIBLE FOR THE TYPE AND/OR SUITABILITY OF THE MATERIAL UNDERLYING THE PROJECT SITE. THE CONTRACTOR MUST APPRAISE THEMSELVES OF ANY EXISTING SITE CONDITIONS WHICH MAY AFFECT THEIR BID OR THE PERFORMANCE OF THE REQUIRED WORK. THE CONTRACTOR SHALL PERFORM ANY INVESTIGATIONS AND/OR TESTING NECESSARY TO ADEQUATELY DETERMINE/ESTIMATE TO THEIR SATISFACTION OF ALL SITE CONDITIONS WHICH COULD AFFECT THE PERFORMANCE OF THE PROPOSED IMPROVEMENTS. THIS COULD INCLUDE BUT NOT BE LIMITED TO UNSUITABLE AND/OR UNSTABLE SOIL/SUBSURFACE CONDITIONS, ROCK, WATER (PERCHED OR FREE), SPRINGS, ETC.

REMOVAL/REPLACEMENT OF UNSUITABLE MATERIAL:

THE CONTRACTOR SHALL UNDERCUT AND REPLACE UNSUITABLE MATERIAL ENCOUNTERED DURING INSTALLATION OF THE PROPOSED UTILITIES AND ROADWAY IN ACCORDANCE WITH O.D.O.T. ITEM NO. 603 AND 203, OR AS FURTHER DESCRIBED HEREIN.

IF PLANS ALLOW FOR A CONTINGENCY ITEM FOR SUCH REMOVAL/REPLACEMENT, THE CITY WILL DOCUMENT THE LOCATION OF AREAS OF SUCH REMOVAL/REPLACEMENT FOR FINAL QUANTITY TABULATION.

RESTORATION OF DISTURBED AREAS:

EXISTING DRIVES, BERMS, LAWNS, PAVEMENTS, CURBS, SIDEWALKS, SIGNS, MAILBOXES OR OTHER APPURTENANCES DISTURBED DURING CONSTRUCTION BUT NOT SPECIFICALLY DESIGNATED FOR REMOVAL/REPLACEMENT SHALL BE RESTORED TO A CONDITION EQUAL TO THAT WHICH EXISTED PRIOR TO CONSTRUCTION AND TO THE COMPLETE SATISFACTION OF THE CITY ENGINEER. RESTORATION OF EXISTING ROADWAYS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY, TOWNSHIP, COUNTY, AND/OR OTHER AGENCIES HAVING AUTHORITY. COST FOR THE RESTORATION OF THESE ITEMS WILL BE THE RESPONSIBILITY OF THE DEVELOPER/CONTRACTOR. NO PUBLIC ROADWAY SHALL BE DISTURBED WITHOUT PRIOR WRITTEN APPROVAL FROM THE GOVERNING AGENCY AND ACQUISITION OF NECESSARY PERMITS.

ROADWAY / PAVEMENT / WALK / CURB

ASPHALT CONCRETE:

CONTRACTOR SHALL SUBMIT APPLICABLE APPROVED JMF FOR ACCEPTANCE BY THE ENGINEER PRIOR TO USE. ASSOCIATED REPORTS AND DAILY PLANT PRODUCTION REPORTS SHALL BE SUBMITTED. ASPHALT DELIVERY TICKETS SHALL INCLUDE JMF NUMBER.

ASPHALT BINDER PRICE ADJUSTMENT:

THIS PROJECT WILL COMPLY WITH CMS 401.20 ASPHALT BINDER PRICE ADJUSTMENT.

AGGREGATE BASE, AS PER PLAN:

THE REQUIREMENTS OF ODOT 304 SHALL APPLY; DEVIATIONS FROM THIS ARE AS FOLLOWS;

- (1) NO OPEN HEARTH BASIC-OXYGEN STEEL OR GRANULAR SLAG SHALL BE PERMITTED.

CONCRETE WALK AND DRIVE APPROACHES AS PER PLAN:

THE REQUIREMENTS OF ODOT 608 CONCRETE WALKS AND RAMPS SHALL APPLY; DEVIATIONS FROM THIS ARE AS FOLLOWS:

- (1) CONCRETE MIX COARSE AGGREGATE SHALL BE LIMESTONE ONLY.
- (2) EXPANSION JOINTS (1/2") SHALL BE PLACED AT THE TRANSVERSE JOINTS OF THE WALK AT INTERVALS NOT TO EXCEED 30 FEET IN LENGTH.

CAST IN PLACE CONCRETE CURB, AS PER PLAN:

REQUIREMENTS OF ODOT 609 SHALL APPLY; DEVIATIONS FROM THIS ARE AS FOLLOWS:

- (1) CONCRETE MIX COARSE AGGREGATE SHALL BE LIMESTONE ONLY.
- (2) CONSTRUCTION JOINTS FOR STAND-UP CURB AND COMBINATION CURB/GUTTER SHALL BE DOWELED. DOWELS SHALL BE (2) #5 BAR, 18" IN LENGTH EQUALLY SPACED.
- (3) CURB SHALL BE CORED OR SLEEVED 3-1/2" FOR 3" DRAIN OUTLETS AT THE LOCATIONS DETERMINED BY CITY ENGINEER OR DEVELOPER, OR AS SPECIFIED ON PLAN. NOTCH CUTTING OF CURB IS PROHIBITED.

RESTRICTED WORK SCHEDULE:

NO CONCRETE FINISH WORK OR PERMANENT ASPHALT SHALL BE PLACED FROM NOVEMBER 15TH TO APRIL 15TH UNLESS WRITTEN APPROVAL IS GRANTED BY THE CITY ENGINEER.

ASPHALT/CONCRETE:

IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ENGINEER 48 HOURS IN ADVANCE OF BEGINNING WORK WHICH REQUIRES COMPACTION TESTING AND/OR PRE-POUR INSPECTION PRIOR TO PLACEMENT OF ASPHALT OR CONCRETE. WORK WILL NOT PROCEED UNTIL TESTING AND/OR INSPECTION HAS BEEN COMPLETED AND APPROVED BY THE CITY ENGINEER.

PROFILE AND ALIGNMENT:

PLACE THE PROPOSED PAVEMENT TO FOLLOW THE ALIGNMENT AND PROFILE OF THE EXISTING PAVEMENT. PLAVE THE PROPOSED ASPHALT CONCRETE OVERLAY AS SHOWN ON THE TYPICAL SECTIONS.

ITEM 254 - PAVEMENT PLANING, ASPHALT CONCRETE, AS PER PLAN:

THIS ITEM OF WORK SHALL BE PERFORMED IN CONFORMANCE WITH ITEM 254 IN THE CMS EXCEPT THE DEPTH SHALL VARY; PLANE TO THE DEPTH SPECIFIED IN THE TYPICAL SECTION OR TO THE TOP OF EXISTING BRICK OR CONCRETE WHICHEVER IS FIRST. THIS WORK SHALL BE PERFORMED SO THAT THE BRICK OR CONCRETE BASE IS NOT DISTURBED. ALL EQUIPMENT, LABOR, TOOLS, AND OTHER INCIDENTALS REQUIRED TO PERFORM THIS WORK SHALL BE INCLUDED IN THE UNIT BID PRICE FOR EACH ITEM 254, PAVEMENT PLANING, ASPHALT CONCRETE, AS PER PLAN.

PARTIAL DEPTH PAVEMENT REPAIR:

A QUANTITY OF THIS ITEM SHALL BE PROVIDED FOR USE AS DIRECTED BY THE ENGINEER. THE ITEM CONSIST OF REPAIRING EXISTING LOCATIONS EXHIBITING SURFACE DETERIORATION. REPAIR SHALL BE PERFORMED AS FOLLOWS:

REMOVE EXISTING ASPHALT BASE AND REPLACE WITH 3" OF ITEM 448 ASPHALT CONCRETE, TYPE 2. THE ASPHALT CONCRETE SHALL BE COMPACTED WITH A TYPE 1 PNEUMATIC TIRE ROLLER AND A STEEL WHEEL ROLLER AS PER 401.13.

IT IS NOT THE INTENT TO REPAIR EVERY DETERIORATED AREA WITHIN THE PROJECT. THE ENGINEER SHALL DETERMINE WHICH AREAS ARE TO BE REPAIRED. UNLESS OTHERWISE DIRECTED BY THE ENGINEER, THIS ITEM SHALL BE PERFORMED AFTER THE COMPLETION OF PAVEMENT PLANING. ALSO, THIS ITEM SHALL COMMENCE WITHIN 7 DAYS OF THE COMPLETION OF PAVEMENT PLANING. PAYMENT SHALL BE BASED ON THE ACTUAL NUMBER OF SQUARE YARDS OF PAVEMENT REPAIR. THE FOLLOWING ESTIMATED QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY:

ITEM 251, PARTIAL DEPTH PAVEMENT REPAIR 2400 SQ. YD.

PAVEMENT REPAIR:

A QUANTITY OF THIS ITEM SHALL BE PROVIDED FOR USE AS DIRECTED BY THE ENGINEER. THE ITEM CONSIST OF CUTTING AND REMOVING DETERIORATED PAVEMENT FULL DEPTH AND REPLACING WITH NEW MATERIAL AS FOLLOWS:

COMPOSITE BRICK AND COMPOSITE CONCRETE PAVEMENT: REMOVE BRICK/CONCRETE AND BASE MATERIAL UP TO 12" AND REPLACE WITH LIKE DEPTH OF ITEM 304 AGGREGATE BASE AND 452 CONCRETE. CONCRETE DEPTH SHALL BE 6" MIN AND 9" MAX.

ASPHALT PAVEMENT: REMOVE EXISTING ASPHALT BASE UP TO 12" AND REPLACE WITH ITEM 201 ASPHALT CONCRETE BASE, P664-22. THE MAXIMUM COMPACTED DEPTH OF ANY ONE LAYER SHALL BE 6 INCHES.

IT IS NOT THE INTENT TO REPAIR EVERY DETERIORATED AREA WITHIN THE PROJECT. THE ENGINEER SHALL DETERMINE WHICH AREAS ARE TO BE REPAIRED. UNLESS OTHERWISE DIRECTED BY THE ENGINEER, THIS ITEM SHALL BE PERFORMED AFTER THE COMPLETION OF PAVEMENT PLANING. ALSO, THIS ITEM SHALL COMMENCE WITHIN 7 DAYS OF THE COMPLETION OF PAVEMENT PLANING. PAYMENT SHALL BE BASED ON THE ACTUAL NUMBER OF SQUARE YARDS OF PAVEMENT REMOVED AND REPLACED TO THE LIMITS DESIGNATED BY THE ENGINEER. THE FOLLOWING ESTIMATED QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY:

ITEM 252, FULL DEPTH PAVEMENT SAWING 2000 FT.  
ITEM 253, PAVEMENT REPAIR 500 SQ. YD.

WALK AND CURB REPLACEMENT

IT MAY BE NECESSARY TO REPLACE WALK AND CURB ADJACENT TO RECONSTRUCTED CATCH BASINS. THE FOLLOWING ESTIMATED QUANTITIES HAVE BEEN CARRIED TO THE GENERAL SUMMARY FOR USE IN SUCH SITUATIONS AS DIRECTED BY THE ENGINEER.

202, WALK REMOVED 500 S.F.  
202, CURB REMOVED 500 FEET  
608, 5" CONCRETE WALK 500 S.F.  
609, CURB MISC.: CANTON CITY STANDARD 500 FEET

ITEM 609 - CURB MISC.: CANTON CITY STANDARD

THIS ITEM SHALL CONFORM TO CANTON CITY STANDARD DRAWING 42. THE TYPE SHALL BE DETERMINED IN THE FIELD AND SHALL MATCH ADJACENT CURB TYPE.

ITEM 608 - CURB RAMPS, AS PER PLAN

CURB RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH CANTON CITY STANDARD DRAWING #33. CURB RAMP TYPE AT EACH LOCATION SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR WITH CONCURRENCE BY THE ENGINEER.

UNLESS OTHERWISE DIRECTED BY THE ENGINEER, CURB RAMPS SHALL BE INSTALLED PRIOR TO RESURFACING.

ITEM 608 - DETECTABLE WARNING, AS PER PLAN

WET SET PANELS SHALL BE USED FOR DETECTABLE WARNING, AS DEFINED IN CANTON CITY STANDARD DRAWING #33. OTHER TYPES OF DETECTABLE WARNING REFERENCED IN THE STANDARD DRAWING SHALL NOT BE USED ON THIS PROJECT.

CONCRETE CROSSWALKS

CONCRETE CROSSWALKS SHALL BE CONSTRUCTED AT LOCATIONS SPECIFIED IN THE PLANS. THE CROSSWALKS SHALL BE CONSTRUCTED AS PER CANTON CITY STANDARD DRAWING #34 WITH THE FOLLOWING MODIFICATION. THE CONCRETE SHALL BE PAID UNDER ITEM 452 INSTEAD OF ITEM 305.

ITEM 611 - MANHOLE RECONSTRUCTED TO GRADE:

THIS ITEM SHALL INCLUDE ALL NECESSARY MATERIALS AS PER THE CMS. THE CITY MAY PROVIDE CASTINGS. IF THE ENGINEER DETERMINES THAT A CASTING MUST BE REPLACED AND CASTING IS NOT PROVIDED BY THE CITY, PAYMENT FOR THE CASTING WILL BE MADE UNDER ITEM 611 - SPECIAL - MISCELLANEOUS METAL.

THE FOLLOWING ESTIMATED QUANTITIES HAVE BEEN CARRIED TO THE GENERAL SUMMARY FOR USE AS DIRECTED BY THE ENGINEER.

611, MANHOLE RECONSTRUCTED TO GRADE 5 EACH

ITEM 611 - CATCH BASIN RECONSTRUCTED TO GRADE:

THIS ITEM SHALL INCLUDE ALL NECESSARY MATERIALS AS PER THE CMS. THE CITY MAY PROVIDE CASTINGS. IF THE ENGINEER DETERMINES THAT A CASTING MUST BE REPLACED AND CASTING IS NOT PROVIDED BY THE CITY, PAYMENT FOR THE CASTING WILL BE MADE UNDER ITEM 611 - SPECIAL - MISCELLANEOUS METAL.

THE FOLLOWING ESTIMATED QUANTITIES HAVE BEEN CARRIED TO THE GENERAL SUMMARY FOR USE AS DIRECTED BY THE ENGINEER.

611, CATCH BASIN RECONSTRUCTED TO GRADE 5 EACH

ITEM 611 - MANHOLE ADJUSTED TO GRADE, AS PER PLAN:

MANHOLE ADJUSTMENTS SHALL BE PERFORMED AS PER CITY OF CANTON STANDARD DRAWING #13. THIS ITEM SHALL INCLUDE ALL MATERIALS REQUIRED AS PER THE STANDARD DRAWING. IF THE ENGINEER DETERMINES THAT AN EXISTING CASTING MUST BE REPLACED THE CITY MAY PROVIDE A NEW CASTING. IF THE ENGINEER DETERMINES THAT A CASTING MUST BE REPLACED AND CASTING IS NOT PROVIDED BY THE CITY, PAYMENT FOR THE CASTING WILL BE MADE UNDER ITEM 611 - SPECIAL - MISCELLANEOUS METAL.

THE FOLLOWING ESTIMATED QUANTITIES HAVE BEEN CARRIED TO THE GENERAL SUMMARY FOR USE AS DIRECTED BY THE ENGINEER.

611, MANHOLE ADJUSTED TO GRADE, AS PER PLAN 89 EACH

ITEM 611 - CATCH BASIN ADJUSTED TO GRADE:

THIS ITEM SHALL INCLUDE ALL NECESSARY MATERIALS AS PER THE CMS. THE CITY MAY PROVIDE CASTINGS. IF THE ENGINEER DETERMINES THAT A CASTING MUST BE REPLACED AND CASTING IS NOT PROVIDED BY THE CITY, PAYMENT FOR THE CASTING WILL BE MADE UNDER ITEM 611 - SPECIAL - MISCELLANEOUS METAL.

THE FOLLOWING ESTIMATED QUANTITIES HAVE BEEN CARRIED TO THE GENERAL SUMMARY FOR USE AS DIRECTED BY THE ENGINEER.

611, CATCH BASIN ADJUSTED TO GRADE 20 EACH

OFFICE OF THE CITY ENGINEER CANTON, OHIO		DANIEL J. MOEGLIN, P.E., CITY ENGINEER 2436 30th STREET N.E. 44705 (330)488-3381	
GENERAL NOTES		FULTON RD. NW PAVING PROJECT	
DATE: 12/30/14	H. SCALE: N/A	BY:	
V. SCALE: N/A	FIELD BOOK:	DATE:	
SHEET 4 OF 13	FILE NAME: GENERAL NOTES 2	REVISIONS:	
DRAWN BY: NUL	APPROVED BY:	DESCRIPTION:	

**ROADWAY / PAVEMENT / WALK / CURB (CONTINUED)**

**ITEM 203 – EXCAVATION:**

THIS ITEM OF WORK SHALL CONSIST OF REMOVING AND DISPOSING OF ALL UNSUITABLE MATERIAL BY EXCAVATING THE EXISTING SUBGRADE AND SUBBASE TO AN AVERAGE DEPTH OF 6" OR AS DIRECTED BY THE ENGINEER. EXACT LIMITS OF REMOVAL SHALL BE DETERMINED BY THE ENGINEER. ALL EQUIPMENT, LABOR, TOOLS, AND INCIDENTALS NECESSARY TO COMPLETE THIS ITEM SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 203, EXCAVATION. THE FOLLOWING ESTIMATED QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY:

ITEM 203, EXCAVATION 100 CU. YD.

**ITEM 304 – AGGREGATE BASE:**

THE FOLLOWING ESTIMATED QUANTITY HAS BEEN PROVIDED AND SHALL BE USED AS DIRECTED BY THE ENGINEER TO BACKFILL AREAS WHICH WERE EXCAVATED UNDER ITEM 203 EXCAVATION. THE FOLLOWING ESTIMATED QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY:

ITEM 304, AGGREGATE BASE, AS PER PLAN 100 CU. YD.

**ITEM 604 – SPECIAL – MISCELLANEOUS METAL:**

EXISTING CASTINGS MAY PROVE TO BE UNSUITABLE FOR REUSE, AS DETERMINED BY THE ENGINEER. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE THE CASTINGS OF THE REQUIRED TYPE, SIZE, AND STRENGTH (HEAVY OR LIGHT DUTY) FOR THE PARTICULAR STRUCTURE IN QUESTION. ALL MATERIAL SHALL MEET CITY STANDARDS AND ITEM 611 OF THE CMS AND SHALL HAVE THE PRIOR APPROVAL OF THE ENGINEER.

THE FOLLOWING ESTIMATED QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY FOR USE AS DIRECTED BY THE ENGINEER.

604, SPECIAL – MISCELLANEOUS METAL 20,000 POUNDS

THE CONTRACTOR IS CAUTIONED TO USE EXTREME CARE IN THE REMOVAL, STORAGE AND REPLACEMENT OF ALL EXISTING CASTINGS. CASTINGS DAMAGED BY THE NEGLIGENCE OF THE CONTRACTOR, AS DETERMINED BY THE ENGINEER, SHALL BE REPLACED WITH THE PROPER NEW CASTING AT THE EXPENSE OF THE CONTRACTOR.

**WATER VALVE BOX ADJUSTMENTS:**

THE CANTON WATER DEPARTMENT IS RESPONSIBLE FOR THE ADJUSTMENT OF WATER VALVES BOXES. THE CONTRACTOR SHALL COORDINATE WITH THE CITY WATER DEPARTMENT ON ALL WATER VALVE ADJUSTMENTS.

IF THE CITY WATER DEPARTMENT CANNOT PERFORM THE WORK ON ANY VALVE BOXES THAT REQUIRES ADJUSTMENT, THE CONTRACTOR SHALL MAKE NECESSARY ADJUSTMENTS AS DIRECTED BY THE ENGINEER. THE CANTON WATER DEPARTMENT WILL PROVIDE THE NECESSARY CASTINGS TO THE CONTRACTOR. PAYMENT FOR SUCH WORK WILL BE PERFORMED UNDER ITEM 638 – VALVE BOX ADJUSTED TO GRADE.

THE FOLLOWING ESTIMATED QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY FOR USE AS DIRECTED BY THE ENGINEER.

638, VALVE BOX ADJUSTED TO GRADE 5 EACH

**ITEM SPECIAL – FIBER REINFORCED BITUMINOUS MEMBRANE SURFACE TREATMENT, TYPE B:**

THIS ITEM SHALL BE GOVERNED BY CITY OF CANTON SUPPLEMENTAL SPECIFICATION SS-06.

**CONCRETE CROSSWALKS:**

CONCRETE CROSSWALKS SHALL BE INSTALLED AT LOCATIONS WHERE BRICK STREETS INTERSECT THE MAINLINE. CROSSWALKS SHALL BE CONSTRUCTED AS PER CITY OF CANTON STANDARD DRAWING #34. APPLICABLE PAY ITEMS AND QUANTITIES ARE SHOWN IN THE PLAN SUBSUMMARIES.

**TRAFFIC:**

**EXISTING STREET NAME AND TRAFFIC CONTROL SIGNS:**

WHERE WORK REQUIRES THE MOVEMENT OF EXISTING SIGNS (STOP SIGNS, SPEED LIMIT SIGNS, NO PARKING SIGNS, ETC.). THE CONTRACTOR IS REQUIRED TO MAINTAIN THE FUNCTION OF ALL TRAFFIC CONTROL SIGNS. ALL SIGNS REMOVED BY THE CONTRACTOR SHALL BE STORED ON SITE AND REINSTALLED BY THE CONTRACTOR.

**VEHICLE DETECTION**

EXISTING LOOP DETECTORS WILL BE DESTROYED DURING CONSTRUCTION OPERATIONS. LOOPS DETECTORS WILL BE REPLACED WITH VIDEO DETECTION UNITS AS DESCRIBED BELOW.

**ITEM 816 – VIDEO DETECTION SYSTEM, AS PER PLAN**

THIS ITEM OF WORK SHALL MEET STATE OF OHIO DEPARTMENT OF TRANSPORTATION (ODOT) SUPPLEMENTAL SPECIFICATION 816, VIDEO DETECTION SYSTEM. IN ADDITION TO THE REQUIREMENTS OF ODOT'S SUPPLEMENTAL SPECIFICATION 907 THE FOLLOWING REQUIREMENTS SHALL ALSO APPLY:

THE THERMAL TRAFFIC SENSOR AND DETECTION MODULE MUST BE INTEGRATED IN ONE HOUSING WITHOUT THE NEED FOR ANY ADDITIONAL DETECTION SOFTWARE OUTSIDE OF THIS HOUSING. BY USING ONE OR MORE PREDEFINED DETECTION ZONES, THE DETECTION SOFTWARE WILL HAVE THE ABILITY TO DETECT VEHICLES AND BICYCLES ON MULTIPLE LANES. BICYCLE DETECTION ZONES WILL BE SEPARATE FROM VEHICLE DETECTION ZONES AND WILL UTILIZE A DIFFERENT SET OF DETECTION ALGORITHMS.

THE THERMAL IMAGING SENSOR SHALL BE FLIR ITS TRAFISENSE, BOSCH MODEL VOT-320 THERMAL IP, OR WTI MODEL C-MAX THERMAL SERIES 320.

THE DETECTION SOFTWARE WILL HAVE THE ABILITY TO DIFFERENTIATE BETWEEN VEHICLES AND BICYCLES WITH A HIGH LEVEL OF ACCURACY AND ALLOW FOR SEPARATE OUTPUTS TO BE USED FOR VEHICLE PRESENCE AND BICYCLE PRESENCE.

THE DETECTION SYSTEM SHALL GENERATE SEPARATE VEHICLE AND BICYCLE PRESENCE EVENTS AND COUNTING DATA. THE GENERATED VEHICLE AND BICYCLE PRESENCE EVENTS WILL BE SENT TO A TRAFFIC SIGNAL CONTROLLER.

IT MUST BE POSSIBLE TO PUT 4 VIRTUAL BICYCLE PRESENCE DETECTION ZONES IN THE IMAGE. STORAGE OF BICYCLE COUNT INFORMATION SHALL BE POSSIBLE.

THE NECESSARY VIDEO DETECTION CAMERAS MUST PROVIDE A COMMUNICATIONS INTERFACE THAT FULLY SUPPORTS AN ETHERNET IEEE 802.3 COMPLIANT 10/100BASE T AUTO SENSING PORT FOR ADVANCED SYSTEMS COMMUNICATIONS. THE ETHERNET PORT SHALL PROVIDE AN UPSTREAM CONNECTION TO OTHER ETHERNET DEVICES IN THE CABINET. AN INDUSTRY STANDARD RJ-45 TYPE CONNECTOR SHALL BE INCLUDED THAT SUPPORTS A SIMPLE CAT5 SE PATCH CABLE INTERFACE.

THE THERMAL TRAFFIC SENSOR SHALL INCLUDE A 10-YEAR WARRANTY ON THE THERMAL DETECTOR.

THE VIDEO DETECTION CAMERAS SHALL ALSO HAVE THE CAPABILITIES TO DETECT BICYCLES.

ALL SOFTWARE UPGRADES NECESSARY TO MAINTAIN THE FUNCTIONALITY OF THIS ITEM IS INCLUDED IN THE COST OF THIS ITEM.

ALL CAMERAS SHALL HAVE THE CAPABILITY TO REACH 350 FEET TO DETECT SYSTEM DETECTION ZONES.

THE SUPPLIER SHALL PROVIDE VIDEO DETECTION TRAINING TO THE CITY OF CANTON WITHIN FIVE (5) DAYS OF SYSTEM ACCEPTANCE. TRAINING SHALL BE DIVIDED INTO TWO (2) COURSES, MAINTENANCE TRAINING AND OPERATION TRAINING, AND SHALL INCLUDE, BUT NOT LIMITED TO, THE SOFTWARE AND TROUBLESHOOTING. TRAINING SHALL BE CONDUCTED AT A LOCATION DESIGNATED BY THE CITY OF CANTON. TRAINING COURSES SHALL ACCOMMODATE UP TO TEN (10) PEOPLE AND SHALL CONSIST OF A MINIMUM FOUR (4) HOURS EACH. THE LENGTH OF EACH TRAINING COURSE IS AT THE DISCRETION OF THE CITY OF CANTON. THE COST FOR TRAINING SHALL BE INCIDENTAL TO THE CONTROLLER BID ITEMS (BID ITEMS 633).

PAYMENT FOR ITEM 816 – VIDEO DETECTION SYSTEM, AS PER PLAN SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH VIDEO DETECTION CAMERA IN PLACE AND FULLY OPERATIONAL AS SHOWN IN THE PLANS. ALL MATERIALS AND WORK REQUIRED TO COMPLETE THIS ITEM, INCLUDING ATTACHMENT BRACKETS, SHALL BE INCLUDED IN THE UNIT COST.

VIDEO DETECTION WILL BE INSTALLED AS DIRECTED BY THE ENGINEERING AT THE FOLLOWING INTERSECTIONS :

- 25TH STREET (3 UNITS)
- 18TH STREET (2 UNITS)
- 14TH STREET (2 UNITS)
- 10TH STREET (2 UNITS)
- 7TH STREET (2 UNITS)
- 4TH STREET (2 UNITS)
- TUSCARAWAS ST. (1 UNITS)

THE FOLLOWING QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY:

ITEM 816 – VIDEO DETECTION SYSTEM, AS PER PLAN 14 EACH

**ALTERNATE BID ITEM**

**ITEM 816 – VIDEO DETECTION SYSTEM, (TRAFICON), AS PER PLAN**  
THIS VIDEO DETECTION SYSTEM ITEM SHALL HAVE THE SAME SPECIFICATIONS AS ITEM 633 – VIDEO DETECTION SYSTEM, AS PER PLAN EXCEPT FOR THE FOLLOWING:

1. THE DETECTION SHALL USE THE TRAFICON USA TRAFFIC VIDEO DETECTION.
2. THE VIDEO DETECTION CAMERAS SHALL BE THERMAL CAMERAS MANUFACTURED BY FLIR.

**ITEM 614 – LONGITUDINAL CHANNELIZER**

LONGITUDINAL CHANNELIZERS SHALL BE PROVIDED AS CALLED FOR IN THE PLANS. A LONGITUDINAL CHANNELIZER CONSISTS OF A COMBINATION OF VERTICAL COMPONENTS AND LONGITUDINAL BASE COMPONENTS, FIT TOGETHER TO CREATE A CONTINUOUS CHANNELIZING DEVICE, AS DETAILED IN PIS 2010180. USE OF TUBULAR MARKERS, AS IDENTIFIED IN THE OMUTCD, FIGURE 6F-7, SHALL NOT QUALIFY FOR USE AS A LONGITUDINAL CHANNELIZER.

THE VERTICAL COMPONENT SHALL BE EQUIPPED WITH TWO 3-INCH WIDE RETROREFLECTIVE BANDS, PLACED A MAXIMUM OF 2 INCHES FROM THE TOP, WITH A MAXIMUM OF 6 INCHES BETWEEN THE BANDS. THE LONGITUDINAL BASE COMPONENTS SHALL BE EQUIPPED WITH REFLECTORS.

THE LONGITUDINAL CHANNELIZER SHALL BE NCHRP 350 COMPLIANT.

THE COLOR OF ALL COMPONENTS SHALL BE YELLOW.

THIS CHANNELIZER IS INTENDED TO BE A PERMANENT INSTALLATION.

FOR INSTALLATION PROCEDURES, FOLLOW THE MANUFACTURER'S INSTRUCTIONS.

PAYMENT FOR PROVIDING AND INSTALLING THIS CHANNELIZER WILL BE MADE AT THE UNIT PRICE PER FOOT.

**ALTERNATE BID**

**ITEM 614 – LONGITUDINAL CHANNELIZER, (QWICK KURB)**  
ITEM SHALL HAVE THE SAME SPECIFICATIONS AS ITEM 614 – LONGITUDINAL CHANNELIZER, BUT SHALL BE "QWICK KURB" AS MANUFACTURED BY QWICK KURB, INC., 1916 U.S. 41 SOUTH, RUSKIN, FL 33570

**POST CONSTRUCTION INCIDENTALS**

**RELEASE OF RETAINER/BONDS:**

PRIOR TO THE RELEASE OF RETAINER/CONSTRUCTION BOND BY THE CITY OF CANTON, THE CONTRACTOR SHALL HAVE COMPLETED THE ENGINEER'S PROJECT PUNCHLIST AND SUBMIT. FINAL WAIVER OF LIEN, IN ACCORDANCE WITH CITY SS 01-00.

DATE: 12/30/14	DRAWN BY: N/L	REVISIONS	BY	DATE	OFFICE OF THE CITY ENGINEER CANTON, OHIO
H. SCALE: N/A	APPROVED BY:				DANIEL J. MOEGLIN, P.E., CITY ENGINEER 2436 30th STREET N.E. 44705 (330)488-3381
V. SCALE: N/A	FIELD BOOK:				GENERAL NOTES
SHEET 5 OF 13	FILE NAME: GENERAL NOTES 3				FULTON RD. NW PAVING PROJECT

**MAINTAINING TRAFFIC:**

THE CONTRACTOR SHALL MAINTAIN TRAFFIC ADJACENT TO AND THROUGH THE PROJECT AS DESCRIBED BELOW AND IN ACCORDANCE WITH THE REQUIREMENTS OF THE OHIO DEPARTMENT OF TRANSPORTATION MANUAL OF CONSTRUCTION AND MATERIALS SPECIFICATIONS ITEM 614 MAINTAINING TRAFFIC. THE CONTRACTOR SHALL FURNISH, MAINTAIN, AND REMOVE ALL SIGNS, FLAGS, FLAGMEN, WATCHMEN, BARRICADES, SIGN SUPPORTS, CONES, BARRELS, AND INCIDENTALS IN CONFORMANCE WITH THE MOST RECENT REVISIONS OF THE CURRENT EDITION OF THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS AND THE FOLLOWING:

**PAVING OPERATIONS**

1. THE CONTRACTOR MUST MAINTAIN TWO-WAY TRAFFIC ON FULTON RD. AT ALL TIMES. DURING WORKING HOURS, IF ONE LANE IN EACH DIRECTION CAN NOT BE MAINTAINED, FLAGGERS MAY BE USED. DURING NON-WORKING HOURS, A MINIMUM OF ONE TEN FOOT LANE IN EACH DIRECTION SHALL BE MAINTAINED ON FULTON RD. ON THE EXISTING PAVEMENT OR COMPLETED PAVEMENT AT ALL TIMES.

2. CONES SHALL NOT BE ACCEPTABLE TRAFFIC CONTROL DEVICES FOR LANE RESTRICTIONS OR LANE REDUCTIONS THAT ARE IN OPERATION ONE-HALF HOUR AFTER SUNSET OR ONE-HALF HOUR BEFORE SUNRISE. ALL NIGHTTIME LANE RESTRICTIONS SHALL REQUIRE DRUMS OR BARRICADES AT A MINIMUM SPACING OF FIFTY (50) FEET.

3. LANE RESTRICTIONS OR LANE REDUCTIONS SHALL NOT BE PERMITTED AFTER NORMAL WORKING HOURS. NORMAL WORKING HOURS SHALL BE THSE HOURS DURING WHICH THE CONTRACTOR HAS A FULL COMPLEMENT OF EMPLOYEES AND EQUIPMENT ACTIVELY REMOVING AND/OR PLACING MATERIALS.

4. THE CONTRACTOR SHALL FURNISH, ERECT, MAINTAIN, AND SUBSEQUENTLY REMOVE ALL FLAGS, BARRICADES, SIGNS, AND SIGN SUPPORTS AND FURNISH AND MAINTAIN ALL FLAGGERS, WATCHERS AND INCIDENTALS RELATED THERETO.

5. ALL FULL DEPTH PAVEMENT REMOVAL AND REPLACEMENT OPERATIONS SHALL BE COMPLETED THE SAME DAY THE EXCAVATION IS MADE. IF THE CONTRACTOR CANNOT COMPLETE THE WORK, THE EXCAVATION SHALL BE BACKFILLED.

6. ONLY DURING OFF-PEAK PERIODS (I.E. ANY PERIOD OTHER THAN 6-8AM AND 3-6PM) SHALL THE CONTRACTOR INSTALL AND SUBSEQUENTLY RESET ALL TRAFFIC CONTROL NECESSARY FOR THE WORK ZONE FOR EACH CONSTRUCTION PHASE.

7. IN ADDITION TO THE REQUIREMENTS OF 614 WORK ZONE PAVEMENT MARKINGS (<614.11>), AT THE END OF EACH DAY OF WORK, THE CONTRACTOR SHALL REPLACE (WITH WORK ZONE MARKINGS) ALL LANE, CENTER, STOP OR CHANNELIZING LANES THAT WERE REMOVED OR COVERED DURING THE PAVEMENT REMOVAL OR PAVEMENT PLACING OPERATIONS. QUANTITIES FOR SUCH PLACEMENT ARE CARRIED AS PART OF THE ITEMS LISTED UNDER 614 WORK ZONE PAVEMENT MARKINGS.

8. A QUANTITY OF 50 CU. YD. OF 614 ASPHALT CONCRETE FOR MAINTAINING TRAFFIC SHALL BE PROVIDED FOR USE IN MAINTAINING PAVEMENT, SHOULDERS, AND OTHER LOCATIONS PRIOR TO RESURFACING, AS DIRECTED BY THE ENGINEER.

9. PRIOR TO OPENING TO TRAFFIC EACH LANE SHALL BE IN A SAFE, PASSABLE CONDITION. ALL TRANSVERSE JOINTS SHALL EXTEND ACROSS THE FULL LANE WIDTH AND EACH LANE SHALL BE FREE FROM UNEVEN LONGITUDINAL JOINTS. THE CONTRACTOR SHALL PROVIDE ASPHALT WEDGES FOR TRANSVERSE JOINTS WHEREVER THERE ARE PAVEMENT ELEVATION DIFFERENCES.

10. ACCESS SHALL BE MAINTAINED AT ALL TIMES FOR EMERGENCY AND FIRE DEPARTMENT VEHICLES.

11. THE CONTRACTOR SHALL MAINTAIN ACCESS TO LOCAL RESIDENCES AND BUSINESSES DURING CONSTRUCTION. IN THE EVENT A DRIVE ACCESS NEEDS TO BE CLOSED, THE CONTRACTOR SHALL GIVE NOTICE OF CLOSURE AND DURATION TO THE PROPERTY OWNER 24 HOURS IN ADVANCE. CONTRACTOR SHALL ARRANGE FOR ALTERNATE PARKING AND REASONABLE ACCESS FOR THOSE PROPERTY OWNERS AFFECTED BY DRIVE CLOSURES.

12. A QUANTITY OF ITEM 614 WORK ZONE MARKING SIGN HAS BEEN INCLUDED IN THE PLAN. THE QUANTITY SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING SIGNS: W8-1 [BUMP], W8-11 [UNEVEN LANES SYMBOL]. THESE QUANTITIES SHALL BE AS PER <614.04>.

THE FOLLOWING QUANTITIES SHALL BE USED FOR THE MAINTENANCE OF TRAFFIC ON THIS PROJECT:

- PHASE 1 - PLANED SURFACE
- 614, WORK ZONE CENTER LINE, CLASS II, 1.86 MILE
  - 614, WORK ZONE LANE LINE, CLASS II, 1.02 MILE
  - 614, WORK ZONE CHANNELIZING LINE, CLASS I, 1090 FT.
  - 614, WORK ZONE STOP LINE, CLASS I, 290 FT.
  - 614, WORK ZONE MARKING SIGN (ALL PHASES), 16 EACH

- PHASE 2 - INTERMEDIATE COURSE
- 614, WORK ZONE CENTER LINE, CLASS II, 1.97 MILE
  - 614, WORK ZONE LANE LINE, CLASS II, 1.13 MILE
  - 614, WORK ZONE CHANNELIZING LINE, CLASS I, 1245 FT.
  - 614, WORK ZONE STOP LINE, CLASS I, 355 FT.

- PHASE 3 - SURFACE COURSE
- 614, WORK ZONE CENTER LINE, CLASS II, 1.97 MILE
  - 614, WORK ZONE LANE LINE, CLASS II, 1.13 MILE
  - 614, WORK ZONE CHANNELIZING LINE, CLASS I, 1245 FT.
  - 614, WORK ZONE STOP LINE, CLASS I, 355 FT.

**TRAFFIC CONTROL INSPECTOR:**

THE CONTRACTOR SHALL DESIGNATE AN INDIVIDUAL OTHER THAN THE SUPERINTENDENT AND SUBJECT TO THE APPROVAL OF THE ENGINEER, TO CONTINUOUSLY INSPECT ALL TRAFFIC CONTROL DEVICES WHENEVER CONSTRUCTION WORK IS BEING PERFORMED WITHIN THE WORK LIMITS OF THE PROJECT. THE DESIGNATED INDIVIDUAL SHALL ALSO INSPECT ALL TRAFFIC DEVICES AT THE BEGINNING AND AT THE END OF EACH WORK DAY. THE DESIGNATED INDIVIDUAL OR QUALIFIED REPRESENTATIVE SHALL ALSO BE AVAILABLE ON AN AROUND THE CLOCK BASIS TO REPAIR AND/OR REPLACE DAMAGED OR MISSING TRAFFIC CONTROL DEVICES. THESE INDIVIDUALS SHALL BE EQUIPPED WITH CELLULAR PHONES AND THEIR NAMES AND PHONE NUMBERS SHALL BE GIVEN TO THE PROJECT ENGINEER AT THE PRE-CONSTRUCTION MEETING. THE DESIGNATED INDIVIDUAL MAY HAVE OTHER CONSTRUCTION RELATED DUTIES AS LONG AS IMMEDIATE ATTENTION IS GIVEN TO TRAFFIC CONTROL. PAYMENT FOR THE SERVICES OF THE TRAFFIC CONTROL INSPECTOR SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR ITEM 614 MAINTAINING TRAFFIC.

**ITEM 614 - LAW ENFORCEMENT OFFICER WITH PARTOL CAR:**

IN ADDITION TO THE REQUIREMENTS OF CMS 614 AND THE OMTCD, A UNIFORMED LAW ENFORCEMENT OFFICER (LEO) WITH AN OFFICIAL PATROL CAR (CAR WITH TOP-MOUNTED EMERGENCY FLASHING LIGHTS AND COMPLETE MARKINGS OF THE APPROPRIATE LAW ENFORCEMENT AGENCY) SHALL BE PROVIDED FOR CONTROLLING TRAFFIC AS DIRECTED BY THE ENGINEER FOR THE FOLLOWING TASKS:

1. FOR LANE CLOSURES: DURING INITIAL SET-UP PERIODS, TEAR DOWN PERIODS, SUBSTANTIAL SHIFTS OF A CLOSURE POINT OR WHEN NEW LANE CLOSURE ARRANGEMENTS ARE INITIATED.

LAW ENFORCEMENT OFFICERS SHOULD NOT BE USED WHERE THE OMTCD INTENDS THAT FLAGGERS BE USED. THE LEO'S ARE CONSIDERED TO BE EMPLOYED BY THE CONTRACTOR AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR THEIR ACTIONS. ALTHOUGH THEY ARE EMPLOYED BY THE CONTRACTOR, THE PROJECT ENGINEER SHALL HAVE CONTROL OVER THEIR PLACEMENT. THE OFFICAL PARTOL CAR SHALL BE A PUBLIC SAFETY VEHICLE AS REQUIRED BY THE OHIO REVISED CODE.

THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR THESE SERVICES WITH:

CITY OF CANTON POLICE DEPARTMENT  
221 THIRD STREET S.W.  
CANTON, OHIO 44702  
330-489-3111

LAW ENFORCEMENT OFFICERS WITH PATROL CAR REQUIRED BY THE TRAFFIC MAINTENANCE TASKS ABOVE SHALL BE PAID FOR ON A UNIT PRICE (HOURLY) BASIS UNDER ITEM 614, LAW ENFORCEMENT OFFICER WITH PATROL CAR. THE FOLLOWING ESTIMATED QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY:  
ITEM 614, LAW ENFORCEMENT OFFICER WITH PATROL CAR 200 HOURS

THE HOURS PAID SHALL INCLUDE MINIMUM SHOW-UP TIME REQUIRED BY THE LAW ENFORCEMENT AGENCY INVOLVED.

IF THE CONTRACTOR WISHES TO UTILIZE LEO'S FOR FLAGGING AND TRAFFIC CONTROL OTHER THAN FOR THAT REQUIRED IN THESE PLANS, HE MAY DO SO AT HIS OWN EXPENSE. PAYMENT FOR THE EXCESS ABOVE THE CONTRACT REQUIREMENTS WILL BE INCLUDED UNDER ITEM 614 MAINTAINING TRAFFIC.

**CONTRACTOR'S EQUIPMENT - OPERATION AND STORAGE:**

A QUALIFIED FLAGGER SHALL BE EMPLOYED WHERE THE CONTRACTOR'S EQUIPMENT MUST MERGE WITH THE TRAFFIC STREAM. THE CONTRACTOR'S EQUIPMENT SHALL BE EQUIPPED WITH AT LEAST ONE AMBER FLASHING LIGHT. PAVERS, ROLLERS AND OTHER EQUIPMENT MAY NOT BE PARKED ON CLEVELAND AVENUE, BUT MAY BE PARKED ON SIDE STREETS, WITH THE ENGINEER'S APPROVAL, WHEN PAVING OPERATIONS ARE SCHEDULED TO CONTINUE WITHIN THE NEXT WORKDAY. OTHERWISE THE EQUIPMENT SHALL BE STORED AT A STORAGE AREA OUTSIDE THE R/W, THE LOCATION OF WHICH SHALL HAVE PRIOR APPROVAL OF THE ENGINEER. WHEN PARKING ALONG A SIDE STREET, ADEQUATE BARRICADES AND LIGHTS SHALL BE PLACED ON THE PAVEMENT SIDE OF THE EQUIPMENT TO IDENTIFY THE LIMITS OF THE EQUIPMENT. ALL OTHER EQUIPMENT, INCLUDING PRIVATE VEHICLES, SHALL BE STORAGE AT THE APPROVED CONTRACTOR'S STORAGE AREA. NO EQUIPMENT SHALL BE PARKED ON PRIVATE PROPERTY UNLESS PRIOR APPROVAL OF THE OWNER AND THE PROJECT ENGINEER HAS BEEN GRANTED.

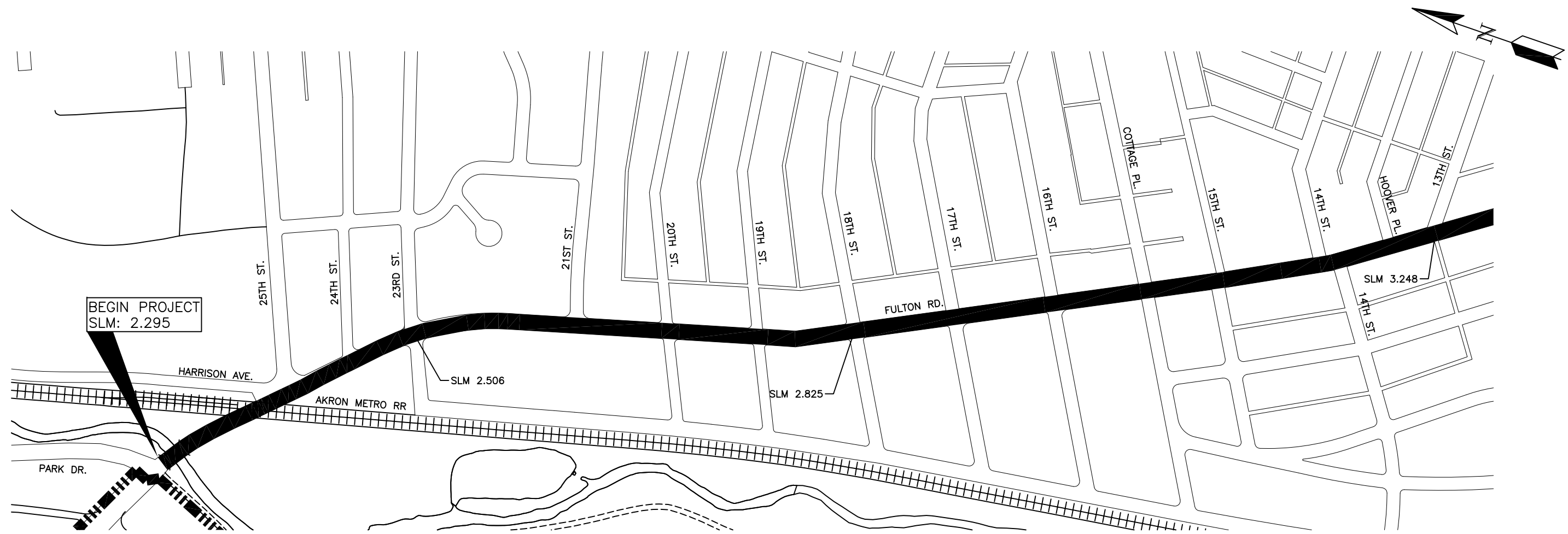
DATE: 1/13/15		DRAWN BY: NUL		REVISIONS		OFFICE OF THE CITY ENGINEER CANTON, OHIO	
H. SCALE: N/A		APPROVED BY:		DESCRIPTION		MAINTENANCE OF TRAFFIC	
V. SCALE: N/A		FIELD BOOK:		DATE		FULTON RD. NW PAVING PROJECT	
SHEET 6 OF 13		FILE NAME: MOT 1		BY		DANIEL J. MOEGLIN, P.E., CITY ENGINEER 2436 30th STREET N.E. 44705 (330)489-3381	

	4	5	6	8	9	13		ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	SEE SHEET NO.
												ROADWAY	
				65	63			202	23000	128	SY	PAVEMENT REMOVED	
	500			2392	2301			202	30000	5193	SF	WALK REMOVED	
	500			278	400			202	32000	1178	FT	CURB REMOVED	
				122				202	32500	122	FT	CURB AND GUTTER REMOVED	
		100						203	30000	100	CY	EXCAVATION	
	500				25			608	12000	525	SF	5" CONCRETE WALK	
				2672	2628			608	52001	5300	SF	CURB RAMP, AS PER PLAN	4
				216	272			608	53021	488	SF	DETECTABLE WARNING, AS PER PLAN	4
	500							609	98000	500	FT	CURB MISC.: CANTON CITY STANDARD	4
				38	51			659	10000	89	SY	SEEDING AND MULCHING	
												PAVEMENT	
	2400							251	01000	2400	SY	PARTIAL DEPTH PAVEMENT REPAIR	
	2000							252	01500	2000	FT	FULL DEPTH PAVEMENT SAWING	
	500							253	01000	500	SY	PAVEMENT REPAIR	
				24917	18459			254	01001	43,376	SY	PAVEMENT PLANING, ASPHALT CONCRETE, AS PER PLAN	4
		100		2	2			304	20001	104	CY	AGGREGATE BASE, AS PER PLAN	4
				3697	2425			407	13900	6122	GAL	TACK COAT, 702.13	
				987	738			407	14000	1725	GAL	TACK COAT FOR INTERMEDIATE COURSE	
				519	337			424	10000	856	CY	FINE GRADED POLYMER ASPHALT CONCRETE, TYPE A	
					79			424	10000	79	CY	FINE GRADED POLYMER ASPHALT CONCRETE, TYPE B	
				966	674			441	46020	1640	CY	ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 1, (448)	
				10437	0			SPEC	46020	10,437	CY	FIBER REINFORCED BITUMINOUS MEMBRANE SURFACE TREATMENT, TYPE B	5
				21	18			452	13000	39	SY	9" NON-REINFORCED CONCRETE PAVEMENT	
												SEWERS & WATER	
	20							611	98630	20	EACH	CATCH BASIN ADJUSTED TO GRADE	
	5							611	98634	5	EACH	CATCH BASIN RECONSTRUCTED TO GRADE	
	89							611	99655	89	EACH	MANHOLE ADJUSTED TO GRADE, AS PER PLAN	4
	5							611	99660	5	EACH	MANHOLE RECONSTRUCTED TO GRADE	
		20000						611	99820	20,000	POUNDS	SPECIAL - MISCELLANEOUS METAL	5
		5						638	10800	5	EACH	VALVE BOX ADJUSTED TO GRADE	5
												TRAFFIC CONTROL	
		14						816	30001	14	EACH	VIDEO DETECTION SYSTEM, AS PER PLAN	5
						1.13		644	00200	1.13	MILE	LANE LINE	
						1.97		644	00300	1.97	MILE	CENTER LINE	
						1245		644	00400	1245	FT	CHANNELIZING LINE, 6"	
						355		644	00500	355	FT	STOP LINE	
						1350		644	00600	1350	FT	CROSSWALK LINE	
						210		644	00700	210	FT	TRANSVERSE/DIAGONAL LINE	
						2		644	01000	2	EACH	RAILROAD SYMBOL MARKING	
						31		644	01300	31	EACH	LANE ARROW	
						210		614	40000	210	FT	LONGITUDINAL CHANNELIZER	5
												MAINTENANCE OF TRAFFIC	
			200					614	11100	200	HOUR	LAW ENFORCEMENT OFFICER WITH PATROL CAR	
			50					614	12460	50	EACH	ASPHALT CONCRETE FOR MAINTAINING TRAFFIC	
			16					614	13000	16	EACH	WORK ZONE SIGN (ALL PHASES)	
			3.28					614	20400	3.28	MILE	WORK ZONE LANE LINE, CLASS II	
			5.80					614	21400	5.80	MILE	WORK ZONE CENTER LINE, CLASS II	
			3580					614	23000	3580	FT	WORK ZONE CHANNELIZING LINE, CLASS I	
			1000					614	26000	1000	FT	WORK ZONE STOP LINE, CLASS I	
												MISCELLANEOUS	
								614	11000	LUMP		MAINTAINING TRAFFIC	
								619	16010	6	MONTH	FIELD OFFICE, TYPE B	
								623	10000	LUMP		CONSTRUCTION LAYOUT STAKING	
								624	10000	LUMP		MOBILIZATION	
												ALTERNATE BIDS	
								816	30001	14	EACH	VIDEO DETECTION SYSTEM, (TRAFICON), AS PER PLAN	5
								614	40000	210	FT	LONGITUDINAL CHANNELIZER, (QWICK KURB)	5

DATE: 12/30/14	REVISIONS	DESCRIPTION	BY
H. SCALE: N/A			
V. SCALE: N/A			
SHEET 7 OF 13			

**OFFICE OF THE CITY ENGINEER**  
**CANTON, OHIO**  
 DANIEL J. MOEGLIN, P.E., CITY ENGINEER  
 2436 30th STREET N.E. 44705 (330)488-3381

**GENERAL SUMMARY**  
**FULTON RD. NW PAVING PROJECT**



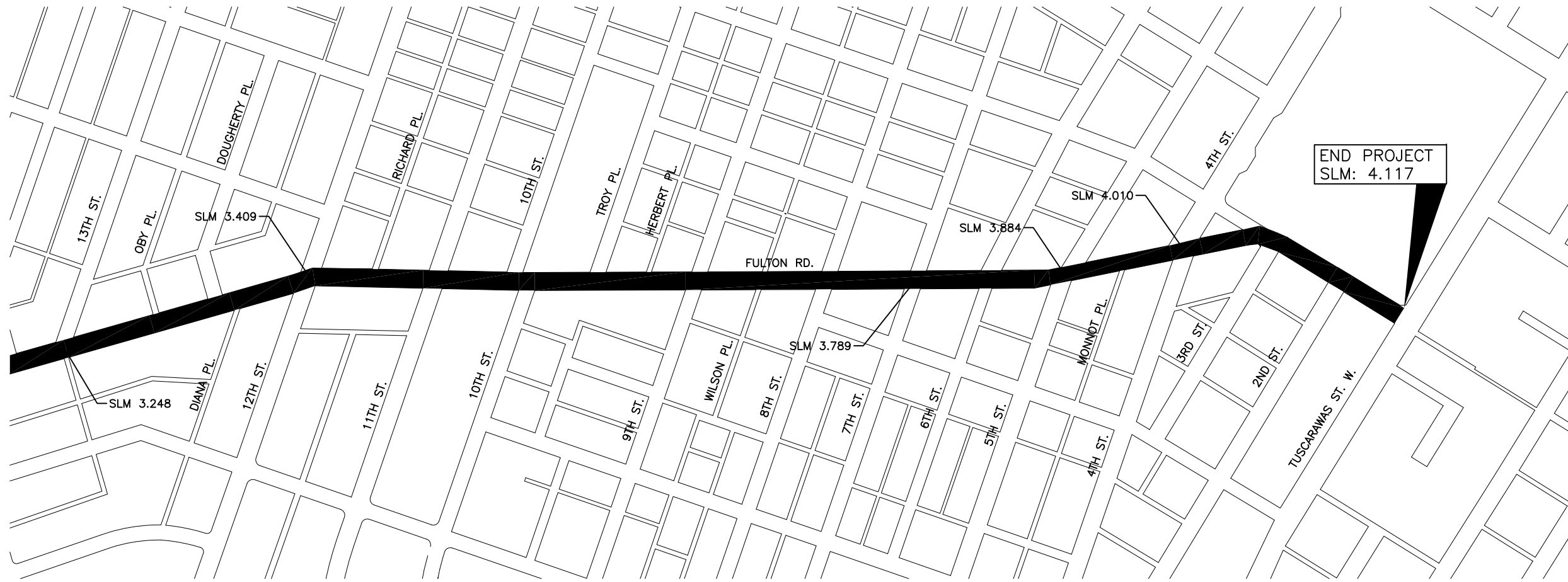
OFFICE OF THE CITY ENGINEER  
 CANTON, OHIO  
 DANIEL J. MOEGLIN, P.E., CITY ENGINEER  
 2436 30th STREET N.E. 44705 (330)488-3381

FULTON RD. NW PAVING PROJECT

STATION	TO	DISTANCE (D) FT	AVERAGE WIDTH (W) FT	SURFACE AREA (A) A=DxW SQ FT	254		407		407		441		441		424		424		SPEC	448		305		202		202		202		202		608		608		608		452		304		659	
					PAVEMENT PLANING, ASPH. CONC., APP A/9	TACK COAT, 702.13 (0.15 GAL/SY) 0.15*A/9	TACK COAT FOR INTER. (0.04 GAL/SY) 0.04*A/9	ASPH. CONC. INTERM. COURSE (1 1/2") 1.5*A/12*27	ASPH. CONC. INTERM. COURSE (1 1/2") 1.25*A/12*27	FINE GRADED POLYMER A.C., TYPE A (3/4") 0.75*A/12*27	FINE GRADED POLYMER A.C., TYPE B (1 1/4") 1.25*A/12*27	FIBER REINFORCED BITUMINOUS MEMBRANE SURFACE TREATMENT, TYPE B	A.C. SURF. COURSE (2 1/2") (FOR CURB RAMP RESTORATION)	CONCRETE BASE (6") (FOR CURB RAMP RESTORATION)	PAVEMENT REMOVED	WALK REMOVED	CURB REMOVED	CURB AND GUTTER REMOVED	5" CONCRETE WALK	CURB RAMP, AS PER PLAN	DETECTABLE WARNING	9" NON-REINFORCED CONCRETE PAVEMENT (CROSSWALK)	AGGREGATE BASE (CROSSWALK)	SEEDING AND MULCHING																			
2.295	TO	2.506	1114	54	60156	6684	1003	267	279		139																																
2.506	TO	2.825	1684	46	77464	8607		344		299	179																																
2.825	TO	2.897	380	42	15967	1774		71		62	37																																
2.897	TO	3.248	1853	37	68571	7619		1143	305	317	159																																
SUBTOTALS					24686	3671	987	596	361	514		10381																															
INTERSECTIONS																																											
HARRISON AVE.					150	16.7	2.5	0.7	0.7		0.3									0.3	5.3	5.3	320	0	48	0	480	24											1.5				
25TH ST.					173	19.2	2.9	0.8	0.8		0.4									0.2	2.9	2.9	100	0	26	0	220	16												3			
24TH ST.					129	14.3	2.2	0.6	0.6		0.3									0.2	3.6	3.6	320	0	32	0	320	16												3			
23RD ST.					248	27.5	4.1	1.1	1.1		0.6									0.3	5.3	5.3	288	32	16	0	288	24												4.5			
21ST ST.					120	13.3		0.5		0.5	0.3		13.3							0.2	3.6	3.6	224	32	0	0	224	16													3		
20TH ST.					96	10.7		0.4		0.4	0.2		10.7							0.2	3.6	3.6	224	32	0	0	224	16												3			
19TH ST.					96	10.7		0.4		0.4	0.2		10.7							0.2	2.9	2.9	146	26	0	0	146	16												3			
18TH ST.					195	21.7		0.9		0.8	0.5		21.7							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
17TH ST.					135	15.0	2.3	0.6	0.6		0.3									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
16TH ST.					150	16.7	2.5	0.7	0.7		0.3									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
COTTAGE PL.					135	15.0	2.3	0.6	0.6		0.3									0.3	5.3	5.3	288	48	0	0	288	24												4.5			
15TH ST.					60	6.7	1.0	0.3	0.3		0.1										0.2	3.6	3.6	120	32	0	0	120	16												3		
14TH ST.					180	20.0	3.0	0.8	0.8		0.4										0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
HOOVER PL.					60	6.7	1.0	0.3	0.3		0.1										1.5	24	24	100	32	0	0	100	16												3		
13TH ST.					150	16.7	2.5	0.7	0.7		0.3										0.3	4.9	4.9	262	44	0	0	262	32												6		
SUBTOTALS					230.9	26.3	9.4	7.2	2.1	4.6		56.4									3.9	65	65	2392	278	122	0	2672	316											37.5			
TOTALS CARRIED TO GENERAL SUMMARY					24917	3697	987		966		519	0	10437								4	65	65	2392	278	122	0	2672	216											38			

DATE: 12/31/14	REVISIONS	DESCRIPTION	DRAWN BY: NJL	BY
H. SCALE:			APPROVED BY:	DATE
V. SCALE:			FIELD BOOK:	
SHEET 8 OF 13			FILE NAME: Plan 1	





OFFICE OF THE CITY ENGINEER  
 CANTON, OHIO  
 DANIEL J. MOEGLIN, P.E., CITY ENGINEER  
 2436 30th STREET N.E. 44705 (330)488-3381

FULTON RD. NW PAVING PROJECT

			254	407	407	441	441	424	424	SPEC		448	305		202	202	202	202		608	608	608	452	304		659		
			PAVEMENT PLANING, ASPH. CONC., APP A/9	TACK COAT, 702.13 (0.15 GAL/SY) 0.15*A 9	TACK COAT FOR INTER. (0.04 GAL/SY) 0.04*A 9	ASPH. CONC. INTERM. COURSE (1 1/2") 1.5*A 12*27	ASPH. CONC. INTERM. COURSE (1 1/2") 1.5*A 12*27	FINE GRADED POLYMER A.C., TYPE A (3/4") 0.75*A 12*27	FINE GRADED POLYMER A.C., TYPE B (1 1/4") 1.25*A 12*27	FIBER REINFORCED BITUMINOUS MEMBRANE SURFACE TREATMENT, TYPE B		A.C. SURF. COURSE (2 1/2") (FOR CURB RAMP RESTORATION)	CONCRETE BASE (6") (FOR CURB RAMP RESTORATION)		PAVEMENT REMOVED	WALK REMOVED	CURB REMOVED	CURB AND GUTTER REMOVED		5" CONCRETE WALK	CURB RAMP, AS PER PLAN	DETECTABLE WARNING	9" NON-REINFORCED CONCRETE PAVEMENT (CROSSWALK)	AGGREGATE BASE (CROSSWALK)		SEEDING AND MULCHING		
FT	FT	SQ FT	SQ YD	GAL	GAL	CU YD	CU YD	CU YD	CU YD	SQ YD		CU YD	SQ YD		SQ YD	SQ FT	FT	FT		SQ FT	SQ FT	SQ FT	SQ YD	CU YD		SQ YD		
3.248	TO	3.409	850	37	31450	3494	524	140	146																			
3.409	TO	3.789	2006	37	74222	8247	1237	330	344																			
3.789	TO	3.884	502	36	18072	2008	301	80	84																			
3.884	TO	4.010	665	30	19950	2217	333	89	92																			
4.010	TO	4.117	565	36	20340	2260	333	90	92																			
SUBTOTALS			18226	2395	729	666	0	333	78	0																		
INTERSECTIONS																												
OBY PL.			38	4.2	0.6	0.2	0.2		0.1			0.1	1.3		1.3	100	12	0		0	100	16					3	
DOUGHERTY PL.			69	7.7	1.2	0.3	0.3		0.2			0.1	1.3		1.3	100	12	0		0	100	16					3	
DIANA PL.			53	5.8	0.9	0.2	0.2		0.1			0.1	1.3		1.3	100	12	0		0	100	16					3	
12TH ST.			0	0	0	0	0		0			0	0		0	0	0	0		0	100	0					0	
RICHARD PL.			66	7.3	1.1	0.3	0.3		0.2			1.3	20		20	100	12	0		0	100	16	18	2			3	
11TH ST.			150	16.7	2.5	0.7	0.7		0.3			0.4	7.1		7.1	384	64	0		0	384	32					6	
10TH ST.			180	20.0	3.0	0.8	0.8		0.4			0	0		0	0	0	0		0	0	0					0	
TROY PL.			81	9.0	1.4	0.4	0.4		0.2			0.1	1.8		1.8	75	16	0		25	50	8					1.5	
HERBERT PL.			38	4.2	0.6	0.2	0.2		0.1			0.1	1.3		1.3	100	12	0		0	100	16					3	
9TH ST.			180	20.0	3.0	0.8	0.8		0.4			0.3	5.3		5.3	288	48	0		0	288	24					4.5	
WILSON PL.			180	20.0	3.0	0.8	0.8		0.4			0.2	2.7		2.7	200	24	0		0	200	32					6	
8TH ST.			210	23.3	3.5	0.9	1.0		0.5			0.4	7.1		7.1	384	64	0		0	384	32					6	
7TH ST.			158	17.5	2.6	0.7	0.7		0.4			0	0		0	0	0	0		0	0	0					0	
6TH ST.			180	20.0	3.0	0.8	0.8		0.4			0.4	7.1		7.1	240	64	0		0	384	32					6	
5TH ST.			165	18.3	2.8	0.7	0.6		0.4			0.3	5.3		5.3	180	48	0		0	288	24					4.5	
MONNOT PL.			38	4.2	0.6	0.2	0.2		0.1			0.1	1.3		1.3	50	12	0		0	50	8					1.5	
4TH ST.			210	23.3	3.5	0.9	1.0		0.5			0	0		0	0	0	0		0	0	0					0	
2ND ST.			105	11.7	1.7	0.5	0.5		0.2			0	0		0	0	0	0		0	0	0					0	
SUBTOTALS			233.2	29.8	9.1	8		4.2				3.9	62.9		62.9	2301	400	0		0	2628	272	18	2			51	
TOTALS CARRIED TO GENERAL SUMMARY			18459	2425	738	674		337	79	0		4	63		63	2301	400	0		25	2628	272	18	2			51	

DATE: 12/31/14  
 H. SCALE:  
 V. SCALE:  
 SHEET 9 OF 13

REVISIONS

NO.	DATE	BY	DESCRIPTION

DRAWN BY: NJL  
 APPROVED BY:  
 FIELD BOOK:  
 FILE NAME: Plan 2

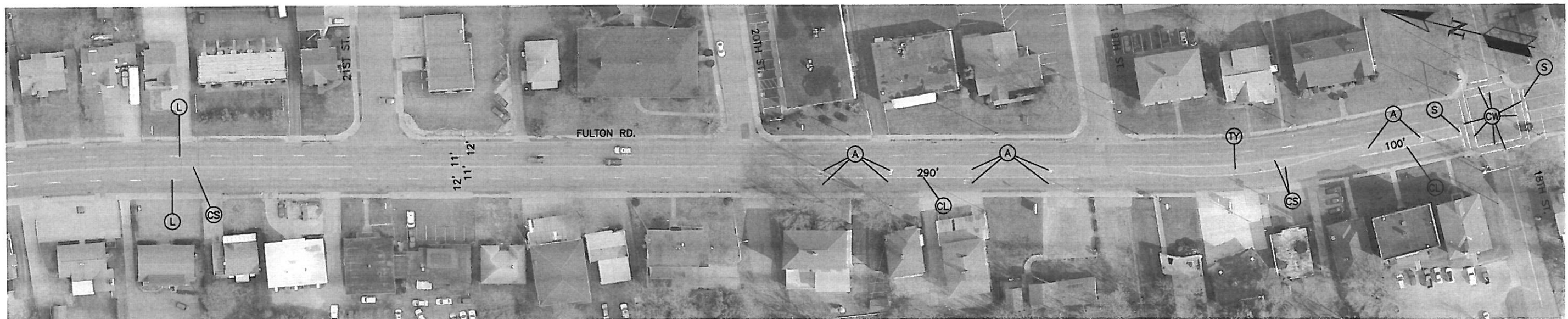
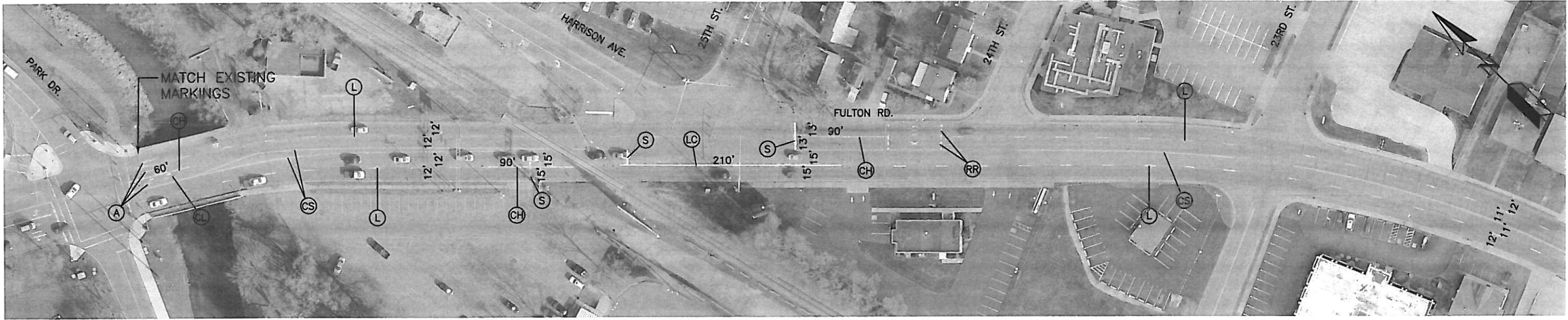
PAVEMENT MARKING LEGEND

- (L) LANE LINE
- (CS) CENTER LINE, DOUBLE, SOLID
- (CH) CHANNELIZING LINE
- (S) STOP LINE
- (CW) CROSSWALK LINE
- (TY) TRANSVERSE LINE, (YELLOW), 12' C/C
- (TW) TRANSVERSE LINE, (WHITE), 12' C/C
- (RR) RAILROAD SYMBOL MARKING
- (SC) SCHOOL SYMBOL MARKING, 72 INCH
- (A) LANE ARROW
- (LC) LONGITUDINAL CHANNELIZER



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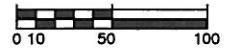
PAVEMENT MARKINGS  
 FULTON RD. NW PAVING PROJECT



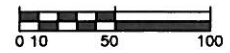
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H. SCALE:	APPROVED BY:	DESCRIPTION		
V. SCALE:	FIELD BOOK:			
SHEET 10 OF 13	FILE NAME: Pavement Markings 1			

PAVEMENT MARKING LEGEND

- (L) LANE LINE
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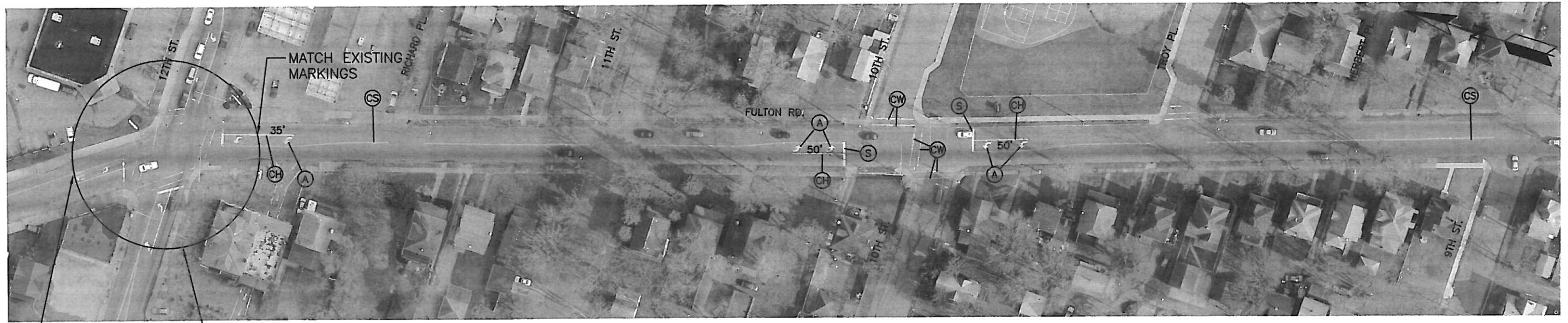


DATE: 1/5/15 H. SCALE: V. SCALE: SHEET 11 OF 13	DRAWN BY: NUL APPROVED BY: FIELD BOOK: FILE NAME: Pavement Markings 2	REVISIONS DESCRIPTION DATE BY	OFFICE OF THE CITY ENGINEER CANTON, OHIO DANIEL J. MOEGLIN, P.E., CITY ENGINEER 2406 30th STREET N.E. 44705 (330)469-3381
PAVEMENT MARKINGS FULTON RD. NW PAVING PROJECT			



**PAVEMENT MARKING LEGEND**

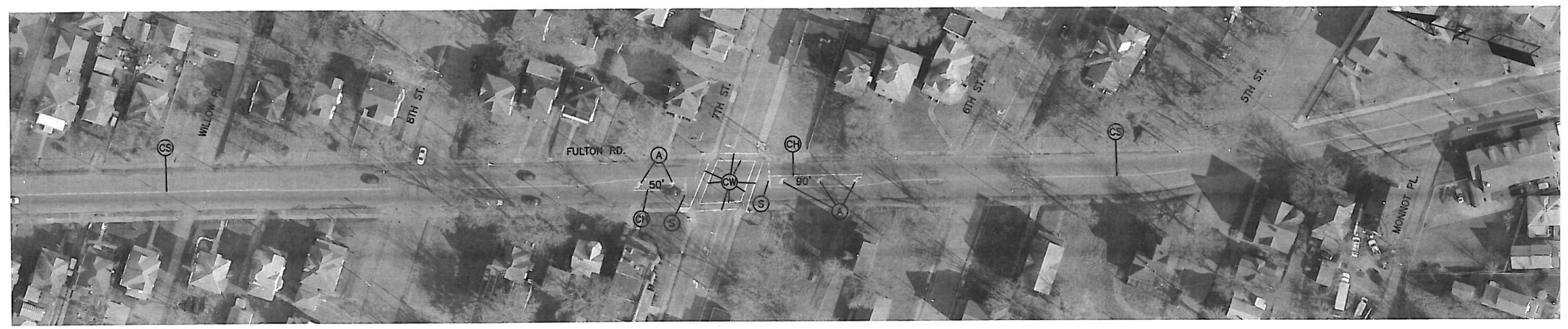
- (L) LANE LINE
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- (SC) SCHOOL SYMBOL MARKING, 72 INCH
- (A) LANE ARROW
- (LC) LONGITUDINAL CHANNELIZER



MATCH EXISTING MARKINGS

INTERSECTION TO BE RECONSTRUCTED WITH 12TH ST. PROJECT.

NOTE: CENTER THE CENTER LINE IN THIS SECTION THE ROADWAY EXCEPT AT INTERSECTIONS WITH LEFT TURN LANES.



NOTE: CENTER THE CENTER LINE IN THIS SECTION THE ROADWAY EXCEPT AT INTERSECTIONS WITH LEFT TURN LANES.

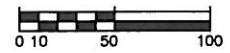
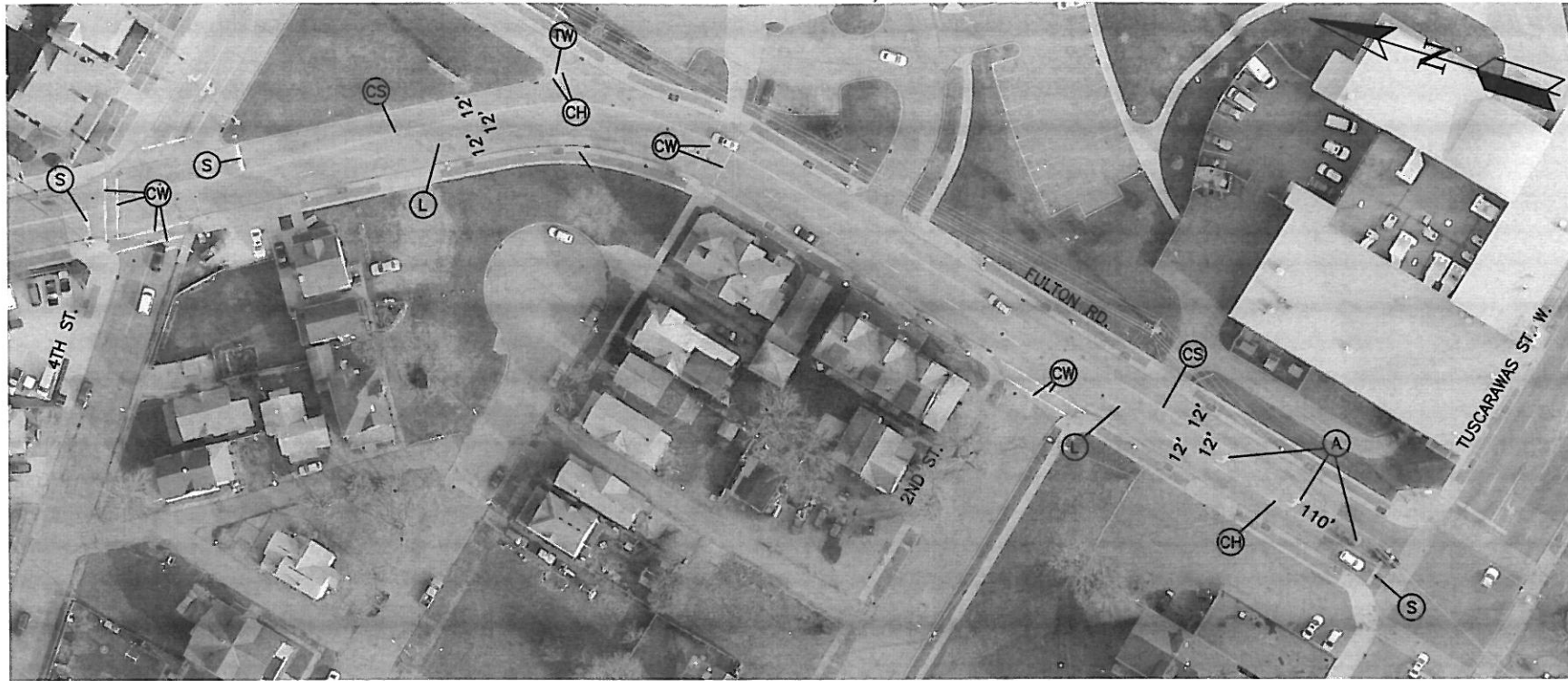
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**PAVEMENT MARKINGS**  
**FULTON RD. NW PAVING PROJECT**

DATE	REVISIONS	DESCRIPTION	DATE	BY
1/5/15				

DRAWN BY: NUL	APPROVED BY:	FIELD BOOK:	FILE NAME: Pavement Markings 3
H. SCALE:			
V. SCALE:			
SHEET 12 OF 13			



**PAVEMENT MARKING LEGEND**

- (L) LANE LINE
- (CS) CENTER LINE, DOUBLE, SOLID
- (CH) CHANNELIZING LINE
- (S) STOP LINE
- (CW) CROSSWALK LINE
- (TY) TRANSVERSE LINE, (YELLOW), 12' C/C
- (TW) TRANSVERSE LINE, (WHITE), 12' C/C
- (RR) RAILROAD SYMBOL MARKING
- (SC) SCHOOL SYMBOL MARKING, 72 INCH
- (A) LANE ARROW
- (LC) LONGITUDINAL CHANNELIZER

CENTER LINE					
LOG	FROM	LOG	TO	TOTAL MILES	COMMENTS
2.295	PARK DR.	4.117	TUSCARAWAS ST.	1.822	
2.312	SOUTH OF PARK DR.	2.375	AKRON METRO RR TRACKS	0.063	
2.755	19TH ST.	2.795	NORTH OF 18TH ST.	0.040	
2.852	SOUTH OF 18TH ST.	2.897	17TH ST.	0.045	
<b>TOTAL</b>				<b>1.97</b>	

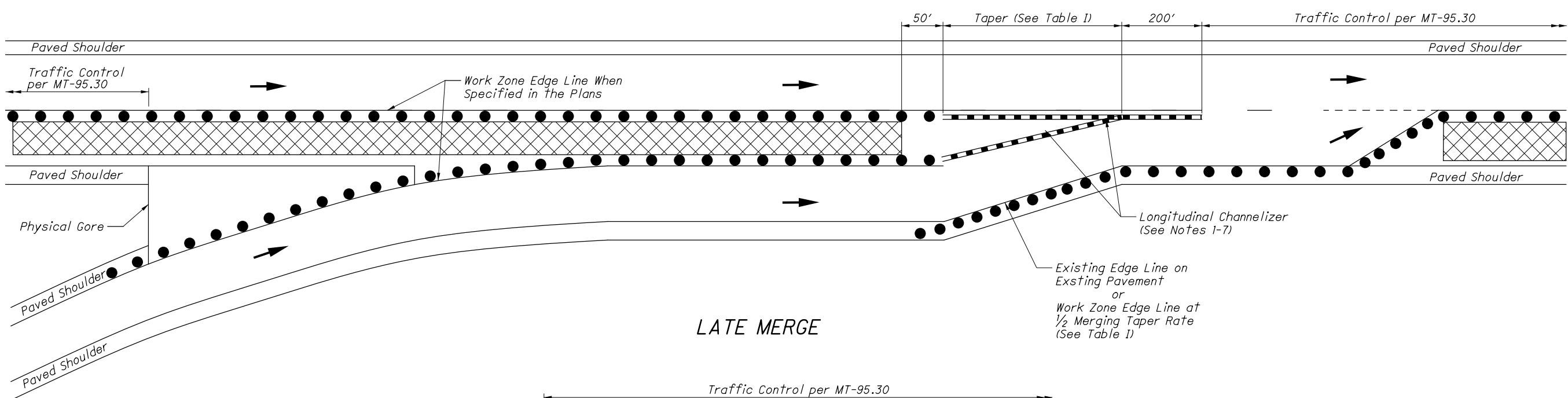
LANE LINE					
LOG	FROM	LOG	TO	TOTAL MILES	COMMENTS
2.295	PARK DR.	2.755	19TH ST.	0.92	NB AND SB
2.755	19TH ST.	2.825	18TH ST.	0.07	NB ONLY
2.825	18TH ST.	2.852	SOUTH OF 18TH ST.	0.03	NB ONLY
4.010	4TH ST.	4.117	TUSCARAWAS ST.	0.11	SB ONLY
<b>TOTAL</b>				<b>1.13</b>	

AUXILIARY														
LOCATION	LOG	CHANNEL LINE	STOP LINE	TRANSVERSE DIAGONAL LINES		CROSS WALK LINES	LANE ARROWS				SYMBOL MARKINGS		LONG. CHANNEL.	COMMENTS
				WHITE	YELLOW		LEFT	THRU	RIGHT	COMBIN.	RXR	SCHOOL		
				FT	FT		EACH	EACH	EACH	EACH	EACH	72"		
PARK DR.		60					2	1			1			
25TH ST. & HARRISON AVE.		180	71										210	
2400 BLOCK											2			
1900 BLOCK		290					4	4						
1800 BLOCK					70									
18TH ST.		215	56			380	4							
1700 BLOCK					130									
14TH ST.		70	48			160	2							
12TH ST.		35					1							
10TH ST.		100	48			244	4							
7TH ST.		140	48			348	5							
4TH ST.			36			156								
300 BLOCK		45			10									
200 BLOCK						72								
2ND ST.						90								
TUSCARAWAS ST.		110	48				3							
<b>TOTAL</b>		<b>1245</b>	<b>355</b>	<b>10</b>	<b>200</b>	<b>1350</b>	<b>25</b>	<b>5</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>210</b>	

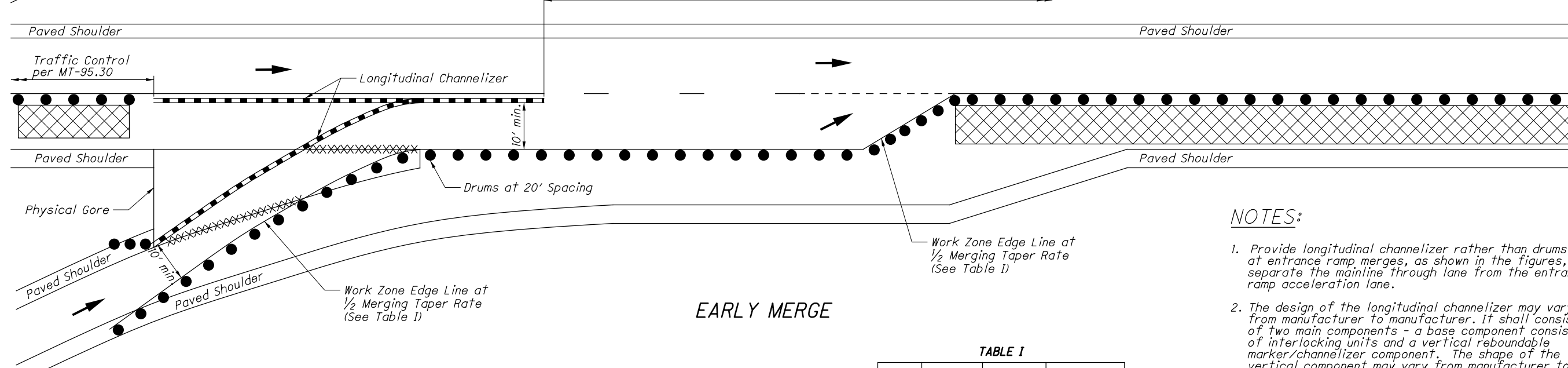
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**PAVEMENT MARKINGS**  
**FULTON RD. NW PAVING PROJECT**

DATE: 1/5/15	H. SCALE:	V. SCALE:	SHEET 13 OF 13	DRAWN BY: NUL	APPROVED BY:	FIELD BOOK:	FILE NAME: Pavement Markings 4
REVISIONS				BY	DATE		
				DESCRIPTION			



LATE MERGE



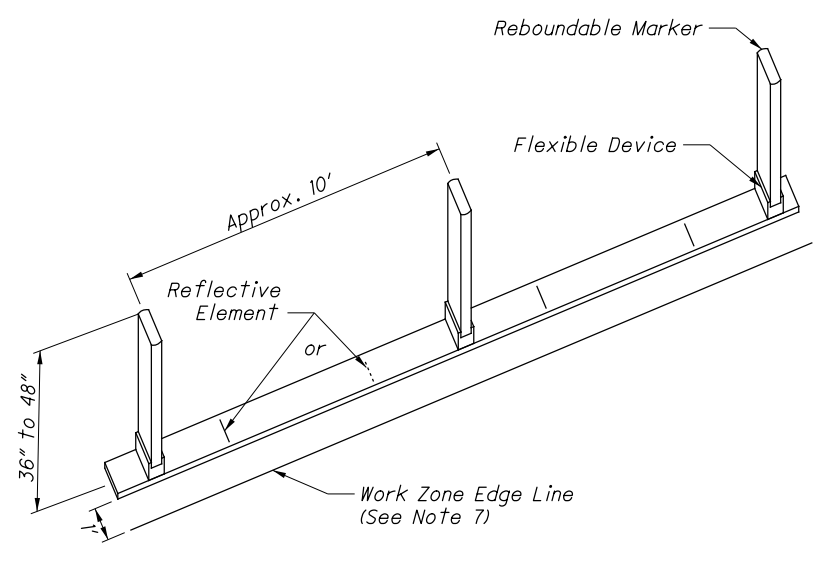
EARLY MERGE

NOTES:

1. Provide longitudinal channelizer rather than drums at entrance ramp merges, as shown in the figures, to separate the mainline through lane from the entrance ramp acceleration lane.
2. The design of the longitudinal channelizer may vary from manufacturer to manufacturer. It shall consist of two main components - a base component consisting of interlocking units and a vertical reboundable marker/channelizer component. The shape of the vertical component may vary from manufacturer to manufacturer. The width shall be approximately 8" to 9" for elliptical designs and 4" to 6" for round (tubular) designs. The height of the vertical component shall be within the range of 36" minimum to 48" maximum.
3. The longitudinal channelizer shall be NCHRP 350 compliant.
4. The vertical component shall be equipped with retroreflective sheeting or with retroreflective stripes. Where stripes are used, the stripes shall consist of two 3" wide bands placed a maximum of 2" from the top with a maximum of 6" between the bands.
5. The base component shall be equipped with reflectors.
6. The color of the base component, including the attached reflectors, and of the retroreflective sheeting or bands for the vertical components shall be in conformance with the pavement marking colors established in the Ohio Manual of Uniform Traffic Control Devices.
7. Where edge line is provided adjacent to the longitudinal channelizer, the edge line should be located 1' from the longitudinal channelizer. The edge line should be provided if the resulting lane width would be 11' or greater.
8. For additional information regarding traffic control at entrance ramps, see Standard Construction Drawings MT-98.10 and MT-98.11.

TABLE I

SPEED LIMIT (MPH)	MERGING TAPER RATE MINIMUM	1/2 MERGING TAPER RATE MINIMUM	SHOULDER TAPER RATE MINIMUM
25	11:1	6:1	4:1
30	15:1	8:1	5:1
35	21:1	11:1	7:1
40	27:1	14:1	9:1
45	45:1	23:1	15:1
50	50:1	25:1	17:1
55	55:1	28:1	19:1
60	60:1	30:1	20:1
65	65:1	33:1	22:1
70	70:1	35:1	24:1



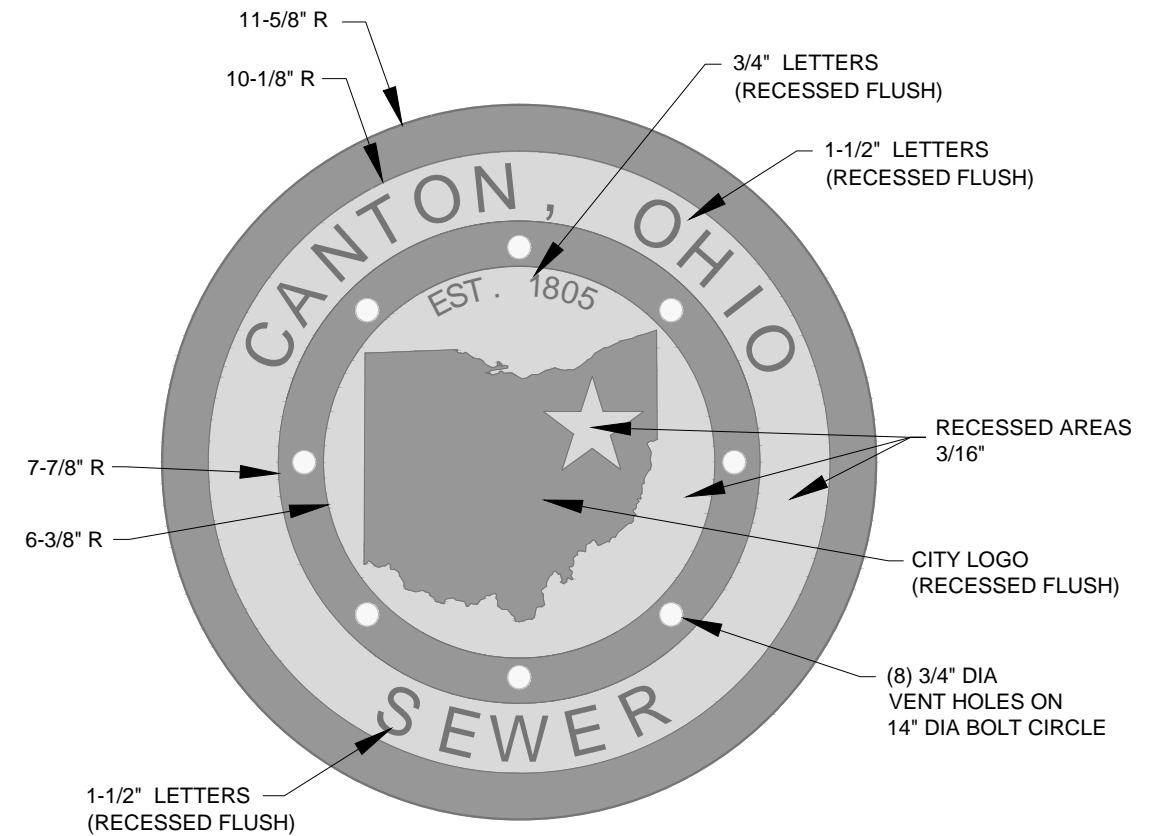
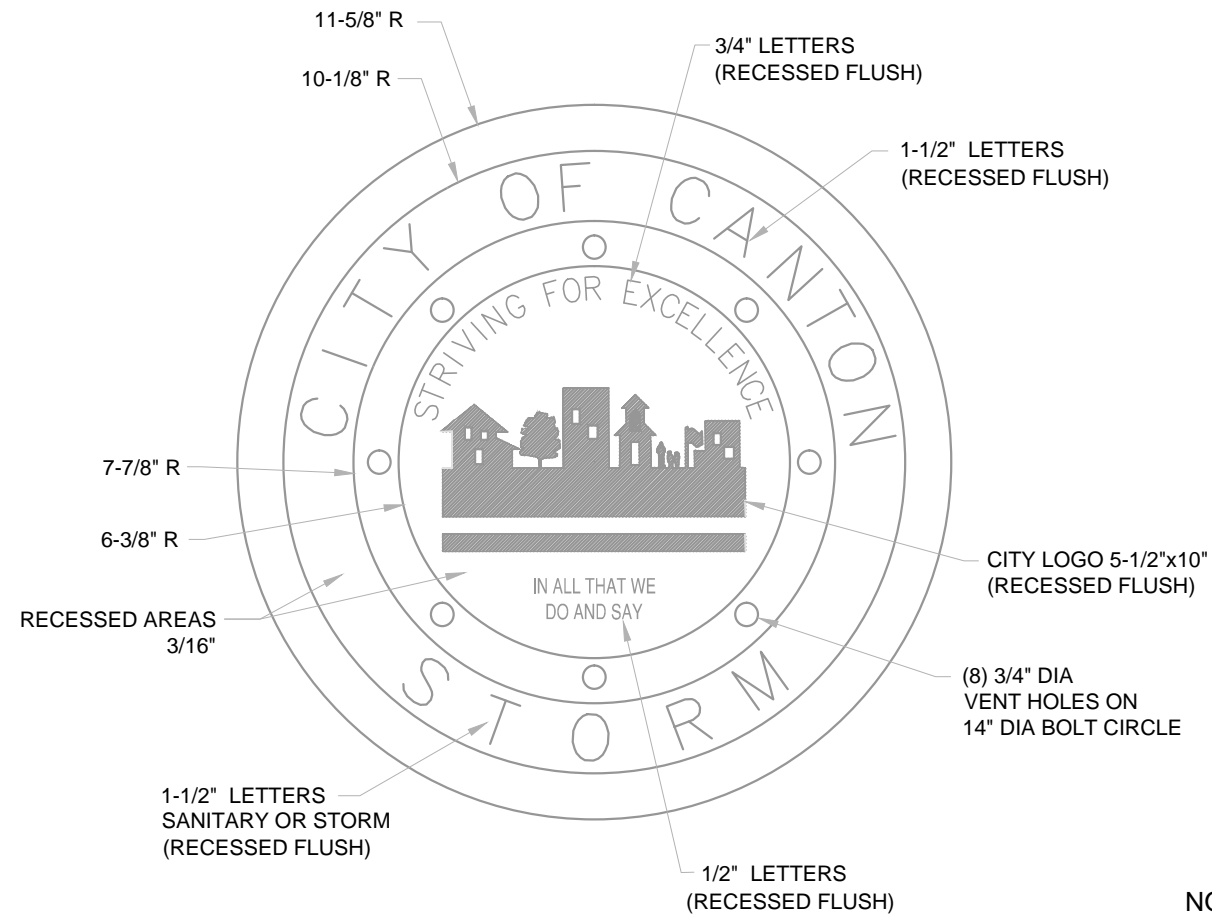
LONGITUDINAL CHANNELIZER

LEGEND

WORK AREA	
DRUMS	
LONGITUDINAL CHANNELIZER	
REMOVE EXISTING MARKINGS	
DIRECTION OF TRAVEL	

TOP OF MANHOLE COVER (OLD)  
(prior to 2014)

TOP OF MANHOLE COVER (NEW)  
(2014 Projects and Forward)



NOTES:

1. COVER AND FRAME TO BE CAST OF GRAY IRON IN COMPLIANCE WITH ASTM SPEC. ASTM A-48 CLASS 35 AND AASHTO M 306. CASTINGS SHALL BE OF THE HEAVY DUTY RATING.
2. EAST JORDAN 1850 B VENTED COVER (PRODUCT NO. 185026) AND 1850 FRAME, OR NEENAH R-1654 FRAME AND VENTED LID, OR EQUAL APPROVED BY CITY ENGINEER.
3. MACHINE BEARING SURFACES BETWEEN LID AND FRAME.
4. CONTACT CITY ENGINEER FOR CAD DRAWING OF CITY LOGO.
5. CONTRACTORS/SUPPLIER MAY USE COVERS IN STOCK WITH OLD CITY LOGO AS PERMITTED BY THE CITY ENGINEER. OTHERWISE, PROJECTS MUST USE COVERS WITH NEW LOGO.
6. CASTINGS ARE NOT REQUIRED TO BE PAINTED.
7. ALTERNATE FRAMES, SUITABLE WITH EJ COVER, FOR USE AS DIRECTED BY THE CITY ENGINEER:  
 EAST JORDAN 2015 (10-1/2" FRAME HEIGHT)  
 EAST JORDAN 1622 (5" FRAME HEIGHT, OR FLAT IF FRAME IS INVERTED)



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APPROVED DATE: JAN 2012

APPROVED BY: CDB, RMB, SLH

DRAWING FILE NAME: ce\_12.dwg

REVISIONS

DESCRIPTION	DATE	BY
MH COVER CITYLOGO	2/28/2014	RMB

STANDARD DRAWING NO. 12

MANHOLE COVER

SHEET 1 OF 1

1. CUT AND REMOVE THE ASPHALT PAVEMENT, AROUND THE EXISTING MANHOLE CASTING, IN A CIRCULAR FASHION WITH A MINIMUM DIAMETER OF 54" AND CENTERED ABOUT THE CASTING. DISPOSE OF THE ASPHALT.
2. REMOVE THE CASTING (MANHOLE RIM AND COVER) FROM THE TOP OF THE MANHOLE. INSPECT THE RIM AND COVER FOR DEFECTS. IF DEFECTS ARE PRESENT, REPLACE WITH NEW RIM/COVER AS NEEDED. IF DEFECTS ARE NOT PRESENT, CLEAN & RETAIN FOR USE IN RECONSTRUCTION.
3. CONCRETE MANHOLE  
REMOVE ALL ADJUSTING RINGS TO THE TOP OF THE CONCRETE CONE. DISPOSE OF THIS MATERIAL.  
MASONRY MANHOLE  
REMOVE MASONRY TO THE LEVEL SPECIFIED IN FIG. 2.M. DISPOSE OF THIS MATERIAL.
4. REMOVE ALL AGGREGATE AROUND THE MANHOLE THAT HAS BEEN EXPOSED BY THE ASPHALT REMOVAL AND DISPOSE OF THIS AGGREGATE. THE AGGREGATE MUST BE REMOVED TO A MINIMUM OF 3" BELOW THE LEVEL OF THE TOP OF THE CONCRETE CONE/REMAINING MASONRY.
5. CONCRETE MANHOLE  
CLEAN AND INSPECT THE TOP SURFACE OF THE CONCRETE CONE. THE SURFACE SHOULD BE SMOOTH AND FREE OF BUMPS AND PITS THAT MAY PREVENT A GOOD WATER TIGHT SEAL. GRIND THE SURFACE AS NEEDED TO REMOVE PROTRUSIONS. UTILIZE COMPRESSED AIR TO BLOW DUST AND DEBRIS FROM THE SURFACE AFTER GRINDING. CLEAN THE SURFACE WITH ACETONE. UTILIZE A HYDRAULIC CEMENT, ACCORDING TO MANUFACTURERS RECOMMENDATIONS, TO FILL IN DEPRESSIONS.  
MASONRY MANHOLE  
CLEAN AND INSPECT THE TOP SURFACE OF THE MASONRY. THE SURFACE MUST BE STRUCTURALLY SOUND. UTILIZE COMPRESSED AIR TO BLOW DUST AND DEBRIS FROM THE SURFACE. THE ENGINEER SHALL INSPECT THE MASONRY MANHOLE FOR STRUCTURAL INTEGRITY. THE REMEDIATION WILL ONLY BE AS SOUND AS THE MASONRY MANHOLE IT RESTS UPON.
6. BRING THE AREA AROUND THE CONE/MASONRY BACK TO FLUSH WITH THE TOP OF THE MASONRY USING ODOT #57 AGGREGATE.

Existing Manhole (Sectional View)

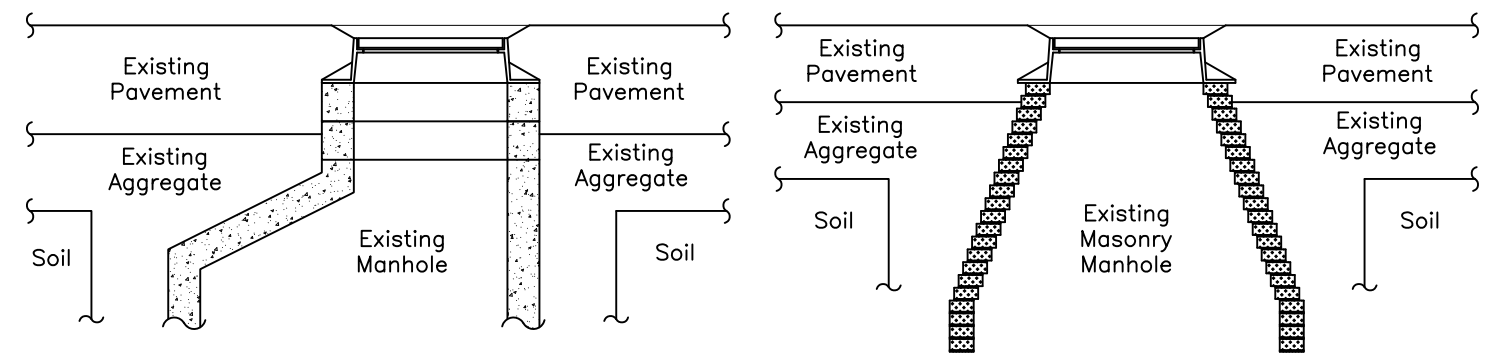


FIG. 1.C

FIG. 1.M

Legend

- = Concrete
- = Masonry

Chimney Removed (Sectional View)

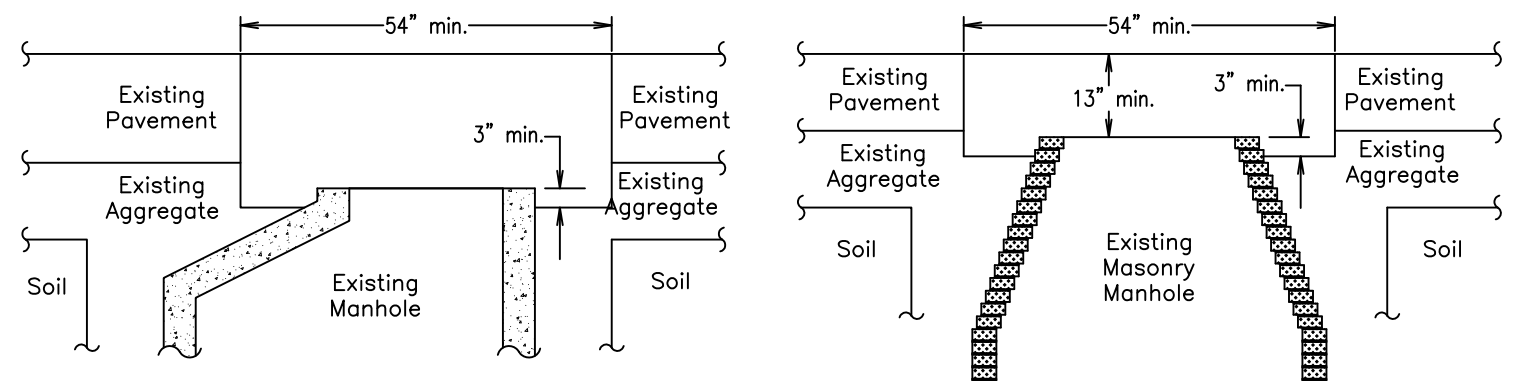


FIG. 2.C

FIG. 2.M



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APPROVED DATE: APRIL 2015

APPROVED BY: NJL

DRAWING FILE NAME: ce\_13.dwg

REVISIONS

DESCRIPTION	DATE	BY

STANDARD DRAWING NO. 13

MANHOLE ADJUSTMENTS

SHEET 1 OF 2



7. APPLY MORTAR TO THE TOP OF THE MASONRY AND IMMEDIATELY INSTALL A CONCRETE COLLAR/ADJUSTING RING (2" MIN. THICKNESS) ON TOP OF THE MORTAR. THE CONCRETE COLLAR/ADJUSTING RING MUST HAVE AN INSIDE DIAMETER OF 24 INCHES. THE OUTSIDE DIAMETER MUST BE SUCH THAT THERE IS A MINIMUM OF 3 INCHES OF THE CONCRETE COLLAR/ADJUSTING RING BEARING ON MASONRY ALL THE WAY AROUND THE MANHOLE. (MASONRY MANHOLES ONLY)
8. A PVC PIPE SHALL BE USED AS A CHIMNEY LINER (SEE CHIMNEY LINER SPECIFICATIONS) AND MUST BE CUT TO THE EXACT PROFILE OF THE ROAD IN ALL DIRECTIONS SUCH THAT WHEN THE MANHOLE RIM AND COVER ARE RESTING ON TOP OF THE LINER, THE TOP OF THE CASTING SHALL BE EXACTLY 0.25" BELOW FLUSH WITH THE PAVEMENT SURFACE IN ALL DIRECTIONS.
9. THE LINER SHALL BE MARKED IN SUCH A WAY, UPON COMPLETION OF THE CUTTING PROCESS, THAT ROTATION DOES NOT OCCUR, WHICH COULD BE DETRIMENTAL TO THE END PRODUCT. THE TOP AND/OR BOTTOM OF THE LINER SHALL ALSO BE MARKED TO PREVENT THE LINER FROM BEING INSTALLED UP SIDE DOWN, WHICH COULD BE DETRIMENTAL TO THE END PRODUCT.
10. APPLY A LIBERAL AMOUNT OF SEALANT TO THE BOTTOM OF THE LINER AND SET IN PLACE ON TOP OF THE CONCRETE COLLAR/ADJUSTING RING WHILE MAKING SURE IT IS PROPERLY ALIGNED. THIS WILL CREATE A WATER TIGHT SEAL BETWEEN THE LINER AND THE CONCRETE COLLAR/ADJUSTING RING.
11. APPLY A LIBERAL AMOUNT OF SEALANT TO THE TOP OF THE LINER. SET THE MANHOLE RIM CASTING ON THE LINER WHILE MAKING SURE IT IS PROPERLY ALIGNED. THIS WILL CREATE A WATER TIGHT SEAL BETWEEN THE LINER AND THE MANHOLE RIM CASTING.
12. PLACE THE MANHOLE LID ON THE RIM CASTING TO LESSEN THE POSSIBILITY OF DEBRIS ENTERING THE MANHOLE.
13. PLACE EPOXY COATED #3 REBARS AS SHOWN IN FIG. 3.C & 3.M. THE CIRCULAR SHAPED REBARS SHALL HAVE A 6" MINIMUM OVERLAP.
14. APPLY WATERSTOP AS SHOWN IN FIG. 3.C & 3.M AND SPECIFIED IN THIS STANDARD DRAWING. THIS WILL ADD AN ADDITIONAL WATER TIGHT SEAL WHERE THE LINER MEETS THE CONCRETE COLLAR/ADJUSTING RING.
15. UTILIZE ODOT-CLASS C CONCRETE WITH BLACK DYE TO CAST A CONCRETE COLLAR AROUND THE RIM CASTING AND LINER. THE SURFACE OF THE CONCRETE SHALL BE FINISHED FROM FLUSH WITH THE PAVEMENT TO FLUSH WITH THE RIM CASTING. THE EDGE OF THE CONCRETE SHALL BE ROUNDED (1/4" RADIUS) WHERE IT MEETS THE ASPHALT. THIS WILL CREATE A SMALL GROOVE FOR A JOINT SEALER AT THIS LOCATION.
16. FILL THE GROOVE WITH A COLD POUR CRACK SEALER. THIS WILL PREVENT WATER FROM ENTERING THE CIRCULAR SEAM WHERE THE CONCRETE COLLAR MEETS THE ASPHALT.
17. APPLY AN ACRYLIC POLYMER CONCRETE CURING AND SEALING COMPOUND TO THE SURFACE OF THE CONCRETE COLLAR.
18. BARRICADE THE AREA AROUND THE CONCRETE TO PROTECT IT UNTIL THE CONCRETE ATTAINS A MODULUS OF RUPTURE OF 400 POUNDS PER SQUARE INCH. A CHEMICAL ADMIXTURE THAT ACTS AS A CONCRETE ACCELERATOR MAY BE USED TO SPEED UP THE PROCESS IF THE ROADWAY NEEDS TO BE OPENED SOONER.
19. IN ORDER TO MINIMIZE INCONVENIENCE TO MOTORISTS, THE CONTRACTOR PERFORMING THE WORK DESCRIBED IN THIS SPECIFICATION MUST BE CAPABLE OF PERFORMING ALL OF BOTH STEPS OF THIS SPECIFICATION IN 1.5 HOURS OR LESS.
20. THE CONTRACTOR SHALL WARRANT THE RECONSTRUCTED MANHOLE CHIMNEY TO BE LEAK FREE AND STRUCTURALLY SOUND FOR A MINIMUM OF 5 YEARS FROM THE DATE OF RECONSTRUCTION.

## Chimney Reconstruction (Sectional View)

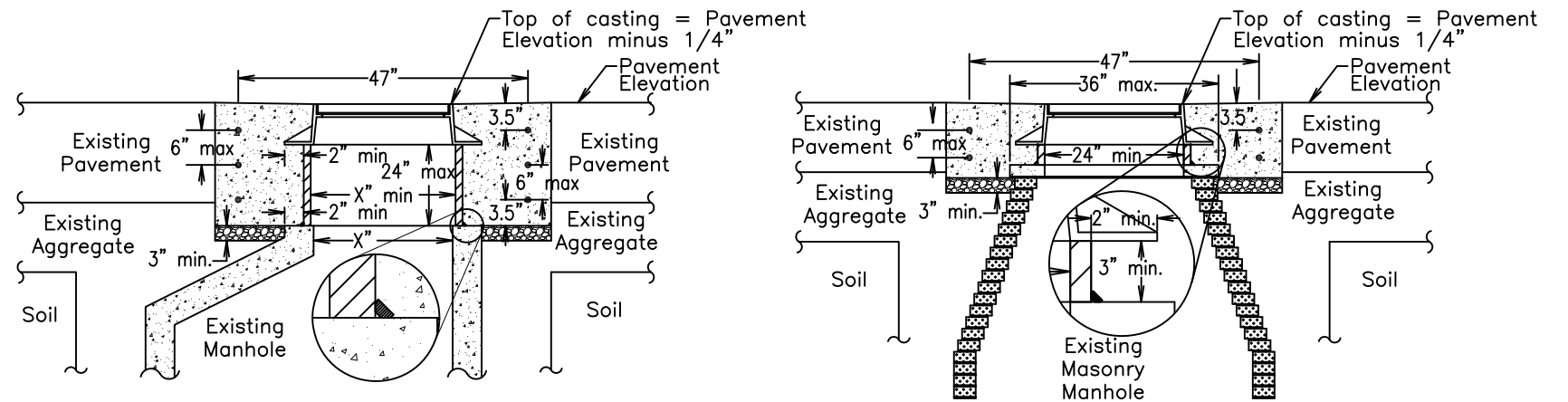


FIG. 3.C

FIG. 3.M

### Legend

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #cccccc; border: 1px solid black; margin-right: 5px;"></span> = Concrete</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid black; border-style: dashed; margin-right: 5px;"></span> = Epoxy Coated #3 Rebar</li> <li><span style="display: inline-block; width: 15px; height: 10px; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px); border: 1px solid black; margin-right: 5px;"></span> = PVC pipe</li> </ul> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background: radial-gradient(circle, black 1px, transparent 1px); background-size: 4px 4px; border: 1px solid black; margin-right: 5px;"></span> = ODOT #57 Aggregate</li> <li><span style="display: inline-block; width: 15px; height: 10px; background: linear-gradient(to top right, transparent 49%, black 49%, black 51%, transparent 51%); background-size: 4px 4px; border: 1px solid black; margin-right: 5px;"></span> = Waterstop</li> <li><span style="display: inline-block; width: 15px; height: 10px; background: repeating-linear-gradient(-45deg, transparent, transparent 2px, black 2px, black 4px); border: 1px solid black; margin-right: 5px;"></span> = Masonry</li> </ul> |
|--|---|

#### CHIMNEY LINER SPECIFICATIONS:

THE CHIMNEY LINER MUST BE MADE FROM POLYVINYL CHLORIDE COMPOUNDS WHICH COMPLY WITH THE REQUIREMENTS FOR A MINIMUM CELL CLASSIFICATION OF 12364 AS DEFINED BY ASTM D-1784.

THE CHIMNEY LINER MUST ALSO MEET ALL THE FOLLOWING PHYSICAL REQUIREMENTS:

PIPE STIFFNESS – MINIMUM PIPE STIFFNESS SHALL BE 46 PSI WHEN TESTED IN ACCORDANCE WITH ASTM D-2412

IMPACT RESISTANCE – NO VISUAL CRACKING OR SPLITTING OF THE WATERWAY WALL SHALL BE EVIDENCED WHEN TESTED IN ACCORDANCE WITH ASTM D-2444 WITH A 20 LB. WEIGHT, TUP B, FLAT PLATE HOLDER B TO A LEVEL OF 220 FT. LBS.

FUSION QUALITY – THERE SHALL BE NO SIGN OF FLAKING OR DISINTEGRATION WHEN IMMERSED IN ANHYDROUS ACETONE FOR 20 MINUTES AS DESCRIBED IN ASTM D-2152.

DUCTILITY – THERE SHALL BE NO EVIDENCE OF CRACKING OR SPLITTING WHEN PIPE IS FLATTENED IN A CIRCUMFERENTIAL ORIENTATION BETWEEN TWO FLAT PLATES BY SIXTY PERCENT (60%) OF THE ORIGINAL DIAMETER.

AIR TIGHTNESS – EACH LENGTH OF PIPE SHALL PASS A FACTORY 3.5 PSI AIR TEST AS DESCRIBED IN ASTM F-1803.

#### WATERSTOP SPECIFICATIONS:

THE WATERSTOP MUST MEET ALL OF THE FOLLOWING PHYSICAL REQUIREMENTS:

SPECIFIC GRAVITY – SHALL BE 1.55 +/- 5% WHEN TESTED IN ACCORDANCE WITH ASTM D-71.

VOLATILE MATTER – SHALL NOT EXCEED 1% WHEN TESTED IN ACCORDANCE WITH ASTM D-6.

APPLICATION TEMPERATURE – MUST BE ABLE TO BE APPLIED FROM -10 DEGREES F TO 125 DEGREES F AS A MINIMUM.

SERVICE TEMPERATURE – MUST BE ABLE TO FUNCTION PROPERLY IN SERVICE FROM -30 DEGREES F TO 180 DEGREES F AS A MINIMUM.



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APPROVED BY: NJL

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#### REVISIONS

DESCRIPTION	DATE	BY

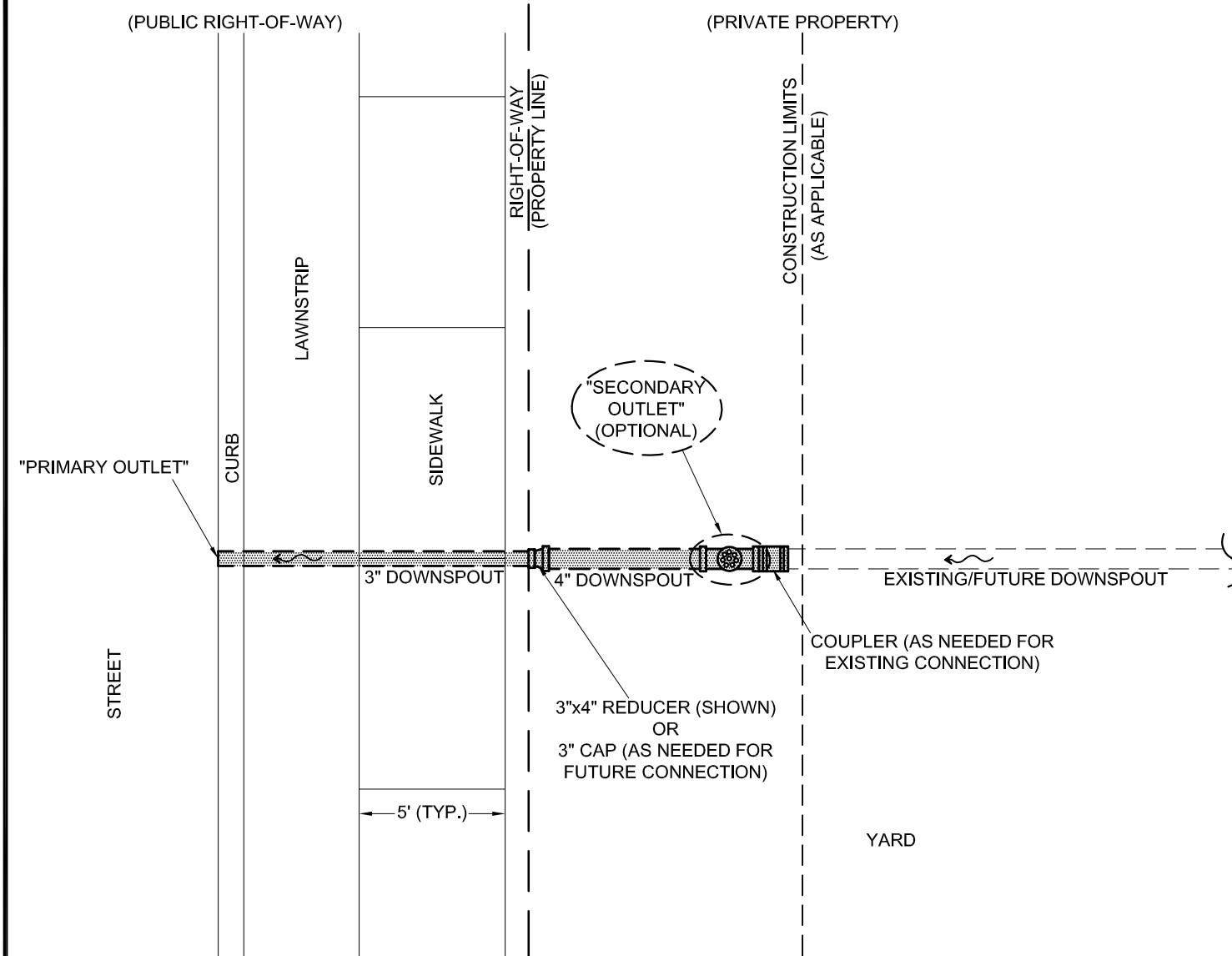
**STANDARD DRAWING NO. 13**

**MANHOLE ADJUSTMENTS**

SHEET 2 OF 2

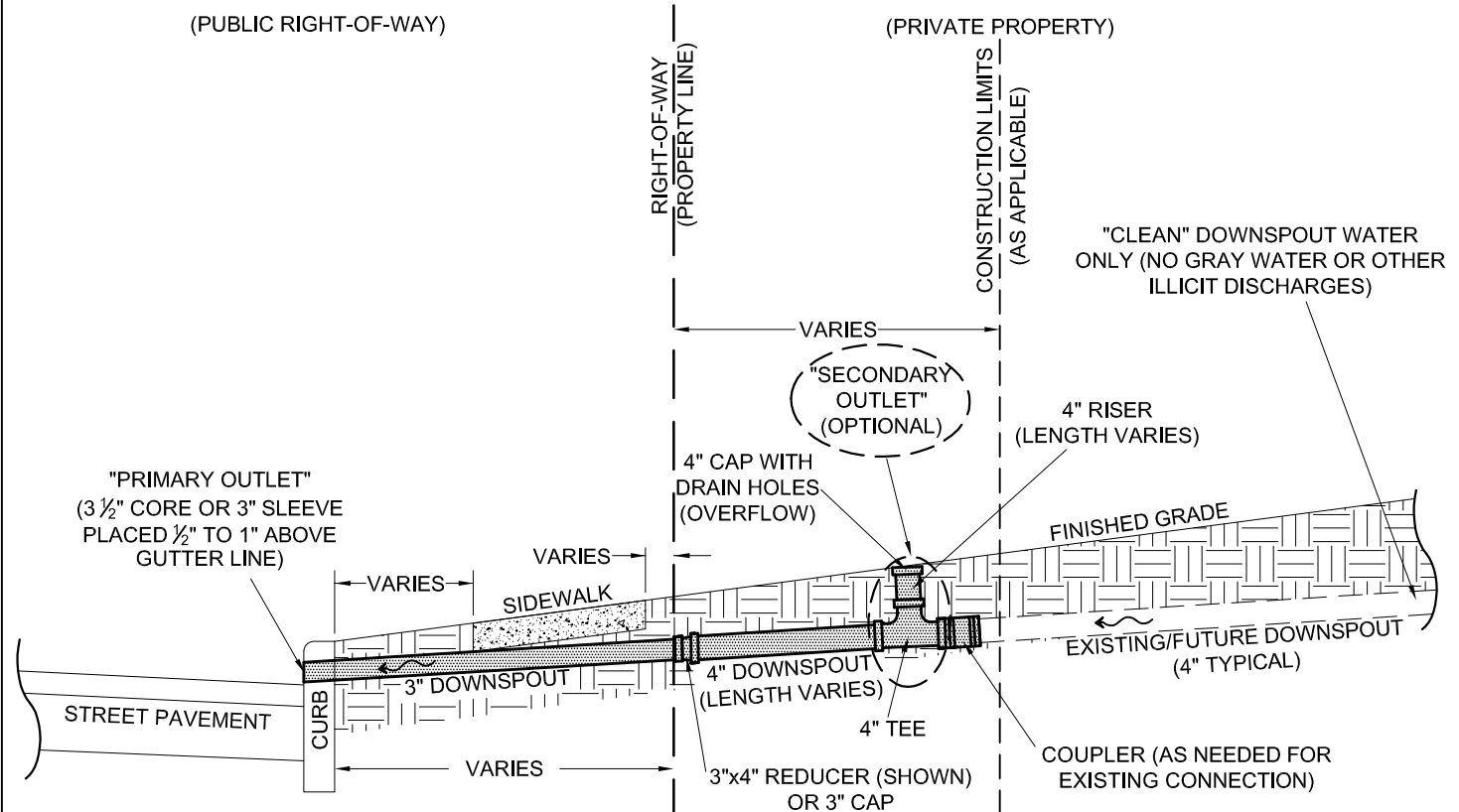
# PLAN VIEW

NOT TO SCALE



# PROFILE VIEW

NOT TO SCALE



ITEMS, MATERIALS, AND QUANTITIES PER RESIDENTIAL DOWNSPOUT OUTLET

ITEM	MATERIAL TYPE	QUANTITY	UNIT
3" DOWNSPOUT	PVC SCH. 40 (707.43 OR 707.45)	VARIES	FT.
3" CAP (AS NEEDED)	PVC (707.43 OR 707.45) OR HDPE (707.32 OR 707.33)	1	EACH
3"x4" REDUCER (AS NEEDED)	PVC (707.43 OR 707.45) OR HDPE (707.32 OR 707.33)	1	EACH
4" DOWNSPOUT (AS NEEDED)	PVC (707.43 OR 707.45) OR HDPE (707.32 OR 707.33)	VARIES	FT.
4" TEE (OPTIONAL), CONTINGENCY	PVC (707.43 OR 707.45) OR HDPE (707.32 OR 707.33)	1	EACH
4" RISER (OPTIONAL), CONTINGENCY	PVC (707.43 OR 707.45) OR HDPE (707.32 OR 707.33)	VARIES	FT.
4" CAP WITH DRAIN HOLES (OPTIONAL), CONTINGENCY	PVC (707.43 OR 707.45) OR HDPE (707.32 OR 707.33)	1	EACH
COUPLER (AS NEEDED)	NEOPRENE WITH STAINLESS STEEL CLAMPS	1	EACH

**NOTES:**

- FOR CITY PROJECTS: WHERE THERE ARE EXISTING DOWNSPOUTS WITHIN CONSTRUCTION LIMITS, CONTRACTOR SHALL INSTALL 3" DOWNSPOUT WITHIN PUBLIC RIGHT-OF-WAY AS DIRECTED OR AS INDICATED ON PLANS. AS NEEDED, CONTRACTOR SHALL INSTALL A 3"x4" REDUCER, 4" DOWNSPOUT, AND COUPLER TO CONNECT TO EXISTING DOWNSPOUTS. THE SECONDARY OUTLET (TEE, RISER, 4" CAP WITH HOLES) IS OPTIONAL AND SHALL BE CONSTRUCTED ONLY AS DIRECTED. IF DOWNSPOUT CONTAINS GROUNDWATER FLOWS, SEE NOTE 11. APPROPRIATE QUANTITIES, PAY ITEMS, AND NOTES SHALL BE PROVIDED ON THE CONSTRUCTION PLANS.
- FOR NEW SUBDIVISIONS AND PRIVATE WORK: HOMEOWNER/BUILDER IS RESPONSIBLE FOR CONSTRUCTING DOWNSPOUT OUTLET. THE 3" DOWNSPOUT WITHIN PUBLIC RIGHT-OF-WAY IS REQUIRED WHERE APPLICABLE. THE CONFIGURATION, ITEMS, AND MATERIALS SHOWN OUTSIDE OF THE RIGHT-OF-WAY ARE RECOMMENDED UNLESS OTHERWISE REQUIRED BY THE CITY ENGINEER AS A CONDITION FOR ISSUING APPLICABLE PERMITS. IF DOWNSPOUT CONTAINS GROUNDWATER FLOWS, SEE NOTE 11.
- ALL ITEMS EXCEPT THE 3" DOWNSPOUT SHALL BE LOCATED OUTSIDE OF THE PUBLIC RIGHT-OF-WAY.
- WHEN SIDEWALK IS PRESENT/PROPOSED AND WHEN THE 3" PVC DOWNSPOUT WILL BE WITHIN THE CONCRETE OF THE SIDEWALK, THE CONTRACTOR SHALL INSTALL A CONTROL JOINT IN THE SIDEWALK OVER THE DOWNSPOUT. THE THICKNESS OF THE CONCRETE SIDEWALK OVER THE DOWNSPOUT SHALL NOT BE LESS THAN 2", OR A STEEL TROUGH OR TRENCH DRAIN MAY BE USED AS APPROVED BY THE CITY ENGINEER.
- ALL PIPE AND COMPONENTS OF DOWNSPOUT SYSTEM ARE PRIVATELY OWNED AND MAINTAINED.
- THE FOLLOWING DISCHARGE CONDITIONS APPLY:
  - DOWNSPOUT SHALL NOT DIRECTLY DISCHARGE OVER ANY PUBLIC SIDEWALK OF THE CITY (REF. CODIFIED ORDINANCE 1335.01)

- OR ONTO A SIDEWALK, STREET, OR PUBLIC GROUND WITHIN THE CITY, WHEN IN THE OPINION OF THE CITY ENGINEER A PUBLIC NUISANCE IS CAUSED BY DOING SO (REF. CODIFIED ORDINANCE 903.02).
  - DOWNSPOUT DISCHARGES SHALL NOT CONTAIN ANY GRAY WATER OR OTHER ILLICIT DISCHARGES.
  - DOWNSPOUTS SHALL NOT BE CONNECTED TO A SANITARY SEWER.
- A "STREET OPENING PERMIT" IS REQUIRED FROM THE ENGINEERING DEPARTMENT FOR ANY EXCAVATION WITHIN CITY RIGHT-OF-WAY OR OTHER CITY-OWNED PROPERTY (REF. CODIFIED ORDINANCE CHAPTER 909).
  - A "SEWER CONNECTION PERMIT" IS REQUIRED FROM THE ENGINEERING DEPARTMENT FOR ANY DIRECT OR INDIRECT CONNECTION OF A PIPE TO A CITY-OWNED STORM SEWER, CATCH BASIN, OR MANHOLE.
  - MODIFICATIONS TO THE CONFIGURATION, ITEMS, AND MATERIALS SHOWN MAY BE ALLOWED OR REQUIRED BY THE CITY ENGINEER.
  - FOR DOWNSPOUTS THAT ARE DIRECTED TO DISCHARGE TOWARD A CITY STREET WITHOUT CURB, SEE CITY STD. DWG. NO. 22.
  - FOR DOWNSPOUTS THAT CONTAIN GROUNDWATER DISCHARGES (FROM SUMP PUMPS OR GRAVITY FLOW):
    - PRIMARY OUTLET SHOULD BE DIRECTLY CONNECTED TO CATCH BASIN OR MANHOLE, IF POSSIBLE, IN LIEU OF CURB OUTLET SHOWN. DIRECT CONNECTION TO CATCH BASIN OR MANHOLE SHALL BE BY AN APPROVED CORE-AND-SEAL BOOT. APPROPRIATE PERMITS MUST BE OBTAINED FROM THE CITY ENGINEERING DEPARTMENT AND THE WORK MUST BE INSPECTED.
    - IF CATCH BASIN OR MANHOLE IS UNAVAILABLE BUT STORM SEWER IS AVAILABLE FOR DOWNSPOUT PRIMARY OUTLET DIRECT CONNECTION, CONSTRUCT DOWNSPOUT OUTLET PER CITY STANDARD DRAWING NO. 24.
    - IF NO STORM SEWER, CATCH BASIN, OR MANHOLE IS AVAILABLE FOR DIRECT CONNECTION, DOWNSPOUT OUTLET MAY BE CONSTRUCTED PER THIS DRAWING CONTINGENT UPON SATISFYING ALL STATED DISCHARGE CONDITIONS.



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APPROVED DATE: MAR. 2012

APPROVED BY: CDB, RMB, SLH

DRAWING FILE NAME: ce\_23.dwg

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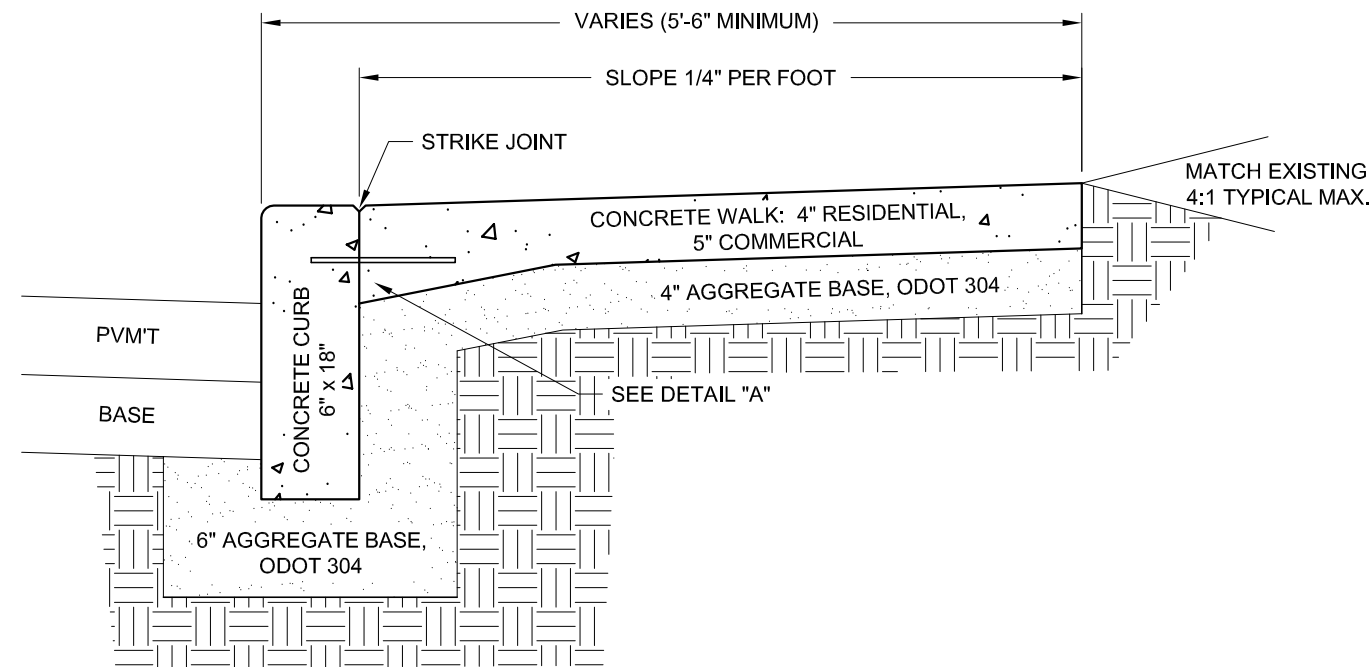
DESCRIPTION	DATE	BY

STANDARD DRAWING NO. 23

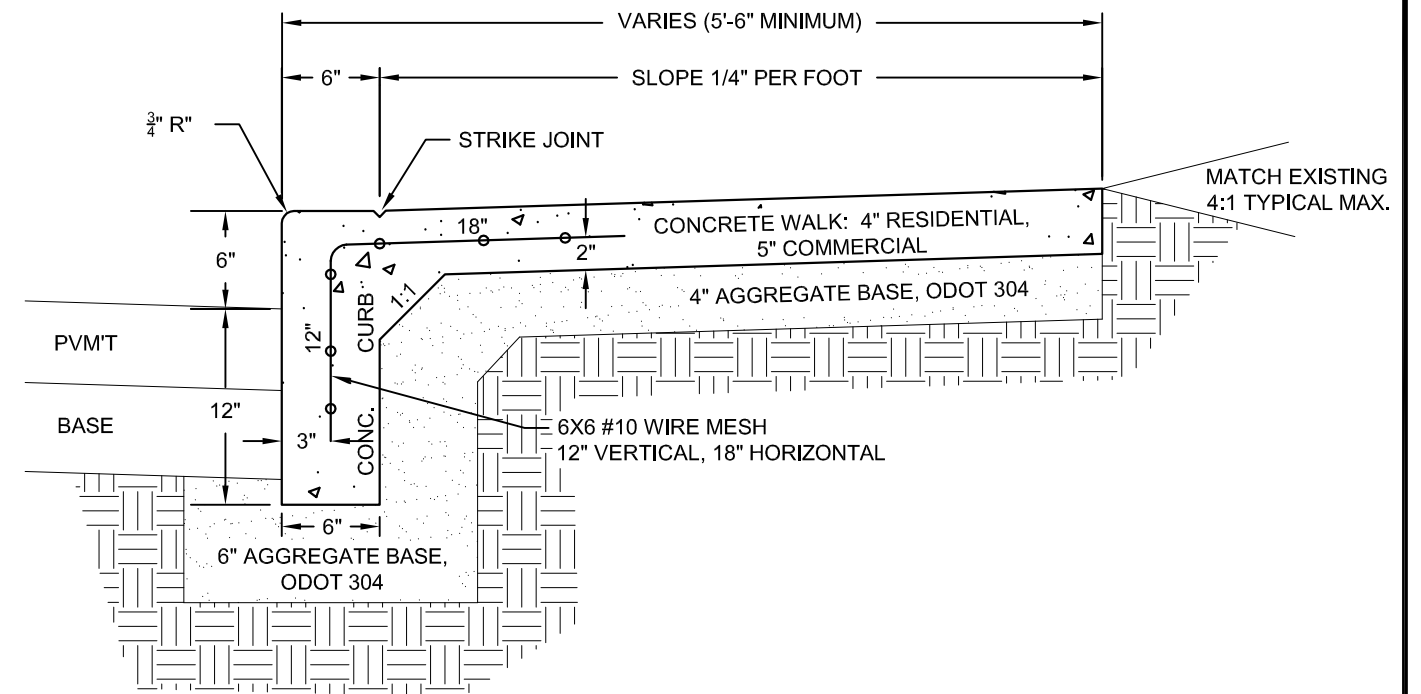
DOWNSPOUT OUTLET  
(CURBED STREET)

SHEET 1 OF 1

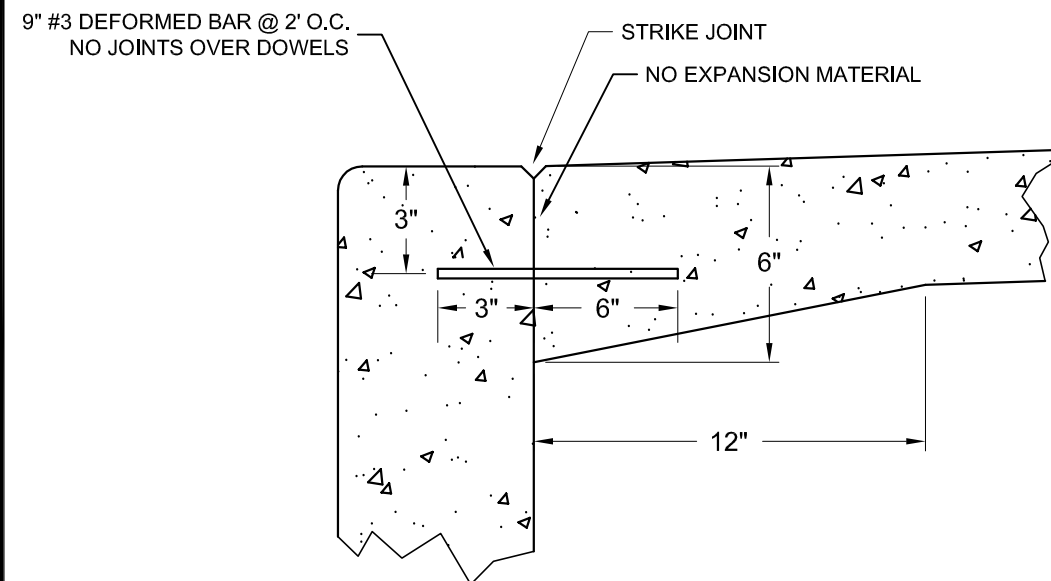
TYPE A  
CONCRETE WALK  
ADJACENT TO CURB



TYPE B  
INTEGRAL CONCRETE WALK  
AND CURB



DETAIL "A"



NOTES:

1. CURB CONSTRUCTION MUST TO CONFORM TO ODOT 609 AND THE CURRENT CITY OF CANTON SPECIFICATIONS FOR THE CONSTRUCTION, REPAIR, AND REPLACEMENT OF SIDEWALKS, CURBS, AND DRIVEWAYS.
2. CONCRETE MATERIAL FOR CURB AND WALK MUST BE ODOT 499 CLASS 'C' CONCRETE WITH LIMESTONE AGGREGATE.
3. NO FOUNDRY SAND OR SLAG PERMITTED IN AGGREGATE BASE, ODOT 304.
4. CONCRETE WALK REPLACED OR INSTALLED ADJACENT TO EXISTING CONCRETE CURB MUST BE DOWELED TO THE EXISTING CURB, UNLESS DETERMINED OTHERWISE BY THE CITY ENGINEER.
5. CURB CONTRACTION JOINT MUST BE SPACED 10 FEET TYPICALLY; WALK CONTRACTION JOINTS MUST BE SPACED 5 FEET TYPICALLY, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. CURB EXPANSION JOINTS MUST BE INSTALLED AT CURB INLET CATCH BASIN AND AT ANY OTHER RIGID STRUCTURES. CURB EXPANSION AND CONSTRUCTION JOINTS MUST BE DOWELED WITH TWO (2) #5 THRU #8 SMOOTH BARS, 18" LONG, EXTENDING 9" INTO EACH CURB.
6. ODOT REFERENCES ARE FROM THE CURRENT ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS. ANY DISCREPANCIES SHALL BE SUBJECT TO THE CITY ENGINEER'S DISCRETION.



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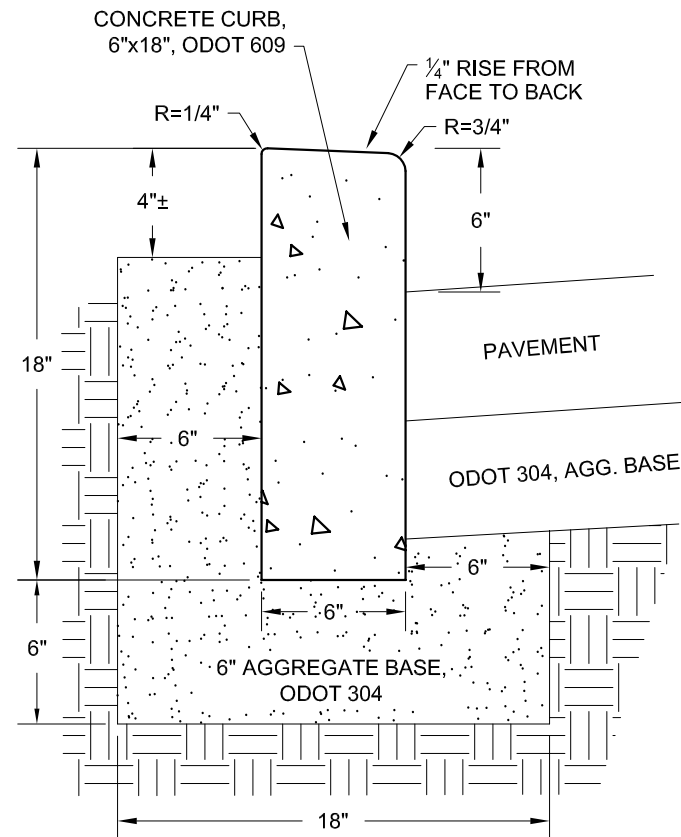
DESCRIPTION	DATE	BY

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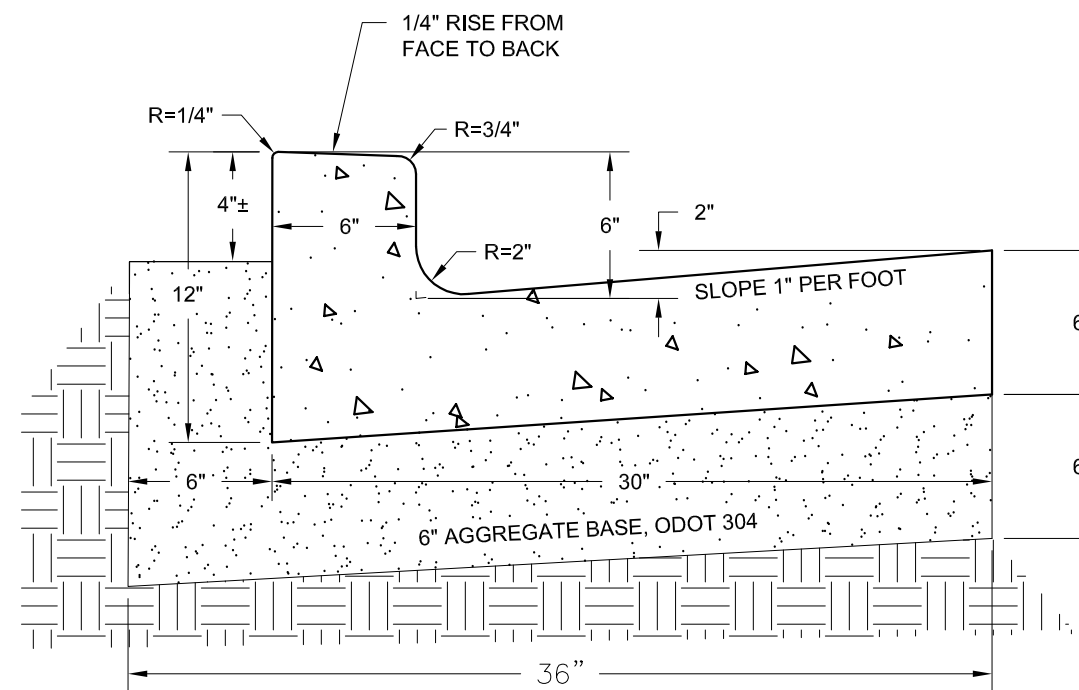
COMBINED CURB & WALK

SHEET 1 OF 1

CANTON TYPE 1  
STANDARD CONCRETE CURB



CANTON TYPE 2  
STANDARD CONCRETE COMBINED  
CONCRETE & GUTTER



NOTES:

1. CURB CONSTRUCTION MUST TO CONFORM TO ODOT 609 AND THE CURRENT CITY OF CANTON SPECIFICATIONS FOR THE CONSTRUCTION, REPAIR, AND REPLACEMENT OF SIDEWALKS, CURBS, AND DRIVEWAYS.
2. CONCRETE MATERIAL FOR CURB AND WALK MUST BE ODOT 499 CLASS 'C' CONCRETE WITH LIMESTONE AGGREGATE.
3. NO FOUNDRY SAND OR SLAG PERMITTED IN AGGREGATE BASE, ODOT 304.
4. CURB CONTRACTION JOINT MUST BE SPACED 10 FEET TYPICALLY; WALK CONTRACTION JOINTS MUST BE SPACED 5 FEET TYPICALLY, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. CURB EXPANSION JOINTS MUST BE INSTALLED AT CURB INLET CATCH BASIN AND AT ANY OTHER RIGID STRUCTURES. CURB EXPANSION AND CONSTRUCTION JOINTS MUST BE DOWELED WITH TWO (2) #5 THRU #8 SMOOTH BARS, 18" LONG, EXTENDING 9" INTO EACH CURB.
5. CONCRETE WALK REPLACED OR INSTALLED ADJACENT TO EXISTING CONCRETE CURB MUST BE DOWELED TO THE EXISTING CURB, UNLESS DETERMINED OTHERWISE BY THE CITY ENGINEER (SEE CITY STD. DWG. 29).
6. ODOT REFERENCES ARE FROM THE CURRENT ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS. ANY DISCREPANCIES SHALL BE SUBJECT TO THE CITY ENGINEER'S DISCRETION.
7. ODOT CURB TYPE 6 AND TYPE 2 (ODOT STD CONST. DWG. BP-5.1) ARE ACCEPTABLE OPTIONS RESPECTIVELY TO CITY STANDARD CURB TYPE 1 AND 2 FOR NEW ROADWAY OR CITY PROJECTS, AS APPROVED BY THE CITY ENGINEER. WHEN A CANTON CURB TYPE ABUTS AN ODOT CURB TYPE, THE CONTACTOR MUST TRANSITION THE CURB FACE AND TOP TO MATCH THE EXISTING CURB FACE AND TOP WITHIN A 4' LENGTH, BUT NOT LESS THAN 1' LENGTH.



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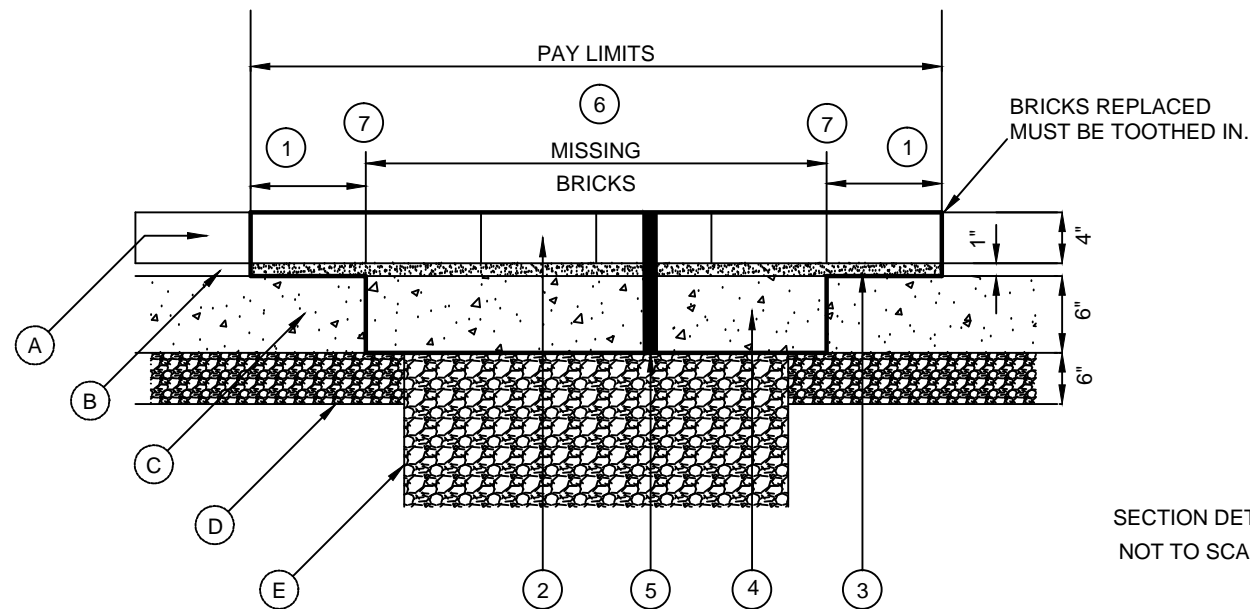
REVISIONS

DESCRIPTION	DATE	BY

**STANDARD DRAWING NO. 30**  
**CONCRETE CURB AND**  
**COMBINED CURB & GUTTER**

SHEET 1 OF 1

## EXISTING BRICK SURFACE PAVEMENT REPAIR



SECTION DETAIL  
NOT TO SCALE

- |  |   |
|--|---|
| (A) EXISTING BRICK PAVERS  | (1) VARIES, 0" TO 12" MAX - EX. BRICK TO BE REMOVED AND RESET AS NEEDED, TO ACCESS EX. CONC. BASE. DO NOT SAW CUT BRICK.        |
| (B) EXISTING SAND BEDDING LAYER  | (2) REPLACE/RESET 4" X 8" BRICK PAVERS, SEE NOTE SHT. 2/2 FOR CITY PROVIDED BRICK.  |
| (C) EXISTING CONCRETE BASE - DEPTH AND TYPE VARIES   | (3) 1" CONCRETE SAND/CEMENT (3:1) BED 703.02 ASTM C-33  |
| (D) EXISTING AGGREGATE BASE  | (4) 6" CONCRETE BASE, CLASS "C", ODOT ITEM 305  |
| (E) EXISTING RANDOM MATERIAL. SUB-GRADE OR FOR NEW TRENCH COMPACTED TYPE I BACKFILL TRENCH REPAIR PER CITY STD. DWG. 19 - ODOT 304 OR 613. | (5) BRICK PAVEMENT REPLACEMENT SECTION PAYMENT ONLY FOR REPAIR AREAS, PAYMENT INCLUDED IN COST OF PIPE FOR NEW TRENCH.          |
|  | (6) BROOM SURFACE W/ TECHNI-SEAL POLYMERIC SAND OR EQUAL TO FILL JOINTS. PLATE TAMP W/ MATT PROTECTION & DAMPEN PER MFG. SPEC.  |
|  | (7) FOR BRICK PAVEMENT REPAIR SAW CUT A CLEAN EDGE FULL DEPTH TO REMOVE FAILED CONC. BASE AND/OR FAILED AGG. BASE AS DIRECTED . |

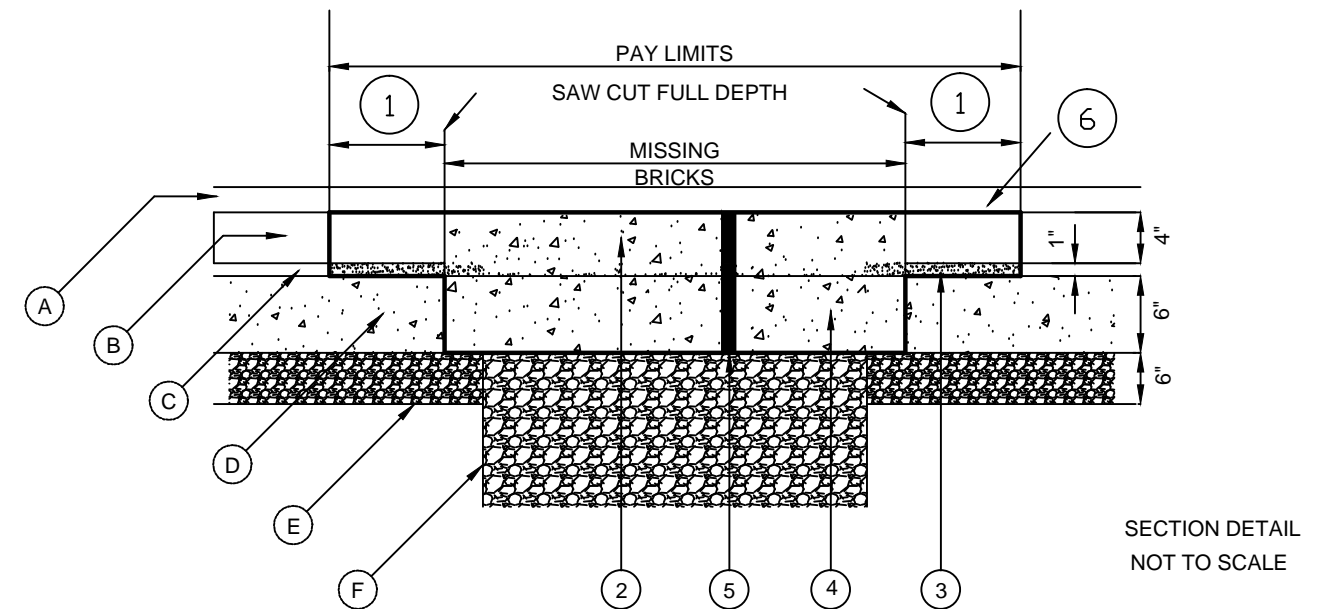
ODOT REFERENCES ARE FROM THE CURRENT ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS. ANY DISCREPANCIES SHALL BE SUBJECT TO THE CITY ENGINEER'S DISCRETION.

NO FOUNDRY SAND OR SLAG PERMITTED IN AGGREGATE BASE, ODOT ITEM 304, OR LOW STRENGTH MORTAR BACKFILL, ODOT ITEM 613.

PAVEMENT REPLACEMENT SECTION PAYMENT IS FOR CITY PROJ. REPAIR AREAS, PAYMENT INCLUDED IN COST OF PIPE FOR NEW TRENCH.

FOR NEW TRENCH PER STD. DW'G 19, SAW CUT FULL DEPTH TO THE LIMITS SHOWN.

## EXISTING ASPHALT OVER BRICK PAVEMENT SURFACE REPAIR



SECTION DETAIL  
NOT TO SCALE

- |  |   |
|--|---|
| (A) EXISTING ASPHALT SURFACE   | (1) VARIES, 0" TO 12" MAX - EX. BRICK TO BE REMOVED AND RESET AS NEEDED, TO TOOTH IN & ACCESS EX. CONC. BASE. SAW CUT BRICK IF NEEDED.  |
| (B) EXISTING BRICK PAVERS  | (2) CONCRETE BASE, CLASS "C", ODOT ITEM 305 TO TOP OF BRICK   |
| (C) EXISTING SAND BEDDING LAYER  | (3) REMOVE EXISTING SAND BED BETWEEN BRICK  |
| (D) EXISTING CONCRETE BASE - DEPTH AND TYPE VARIES   | (4) EXCAVATE FOR MINIMUM 6" CONCRETE BASE   |
| (E) EX. AGGREGATE BASE   | (5) CONCRETE BASE, CLASS "C", ODOT ITEM 305, REPLACEMENT SECTION  |
| (F) EX. RANDOM MAT'L. SUB-GRADE OR FOR NEW TRENCH COMPACTED TYPE I BACKFILL TRENCH REPAIR PER CITY STD. DW'G 19 - ODOT 304(M) OR 613(M) LSM. LOW STRENGTH MORTAR | (6) ASPHALT REPLACEMENT (IN KIND DEPTH) MAXIMUM 2" SURFACE COURSE, ODOT 448 TYPE I, OVER INTERMEDIATE COURSE, ODOT 448 TYPE I, AS NEEDED FOR IN KIND ASPHALT SECTION (ASPHALT SURFACE MUST BE "IN KIND" - OTHER THAN 448 MAY BE REQUIRED) ASPHALT TO EXTEND TO A NEAT SAW-CUT LINE. SEAL EDGES WITH ASTM D-3405 HOT OR ASTM C-90 COLD ASPHALT CEMENT. |

PAVEMENT REPLACEMENT SECTION PAYMENT IS FOR CITY PROJ. REPAIR AREAS, PAYMENT INCLUDED IN COST OF PIPE FOR NEW TRENCH.

ALL RESTORATION/REPLACEMENT WORK TO BE AS DIRECTED AND APPROVED BY THE ENGINEER



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### REVISIONS

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CONSISTENCY REVIEW	2/1/13	JTD

**STANDARD DRAWING NO. 31**

**PAVEMENT REPAIR**

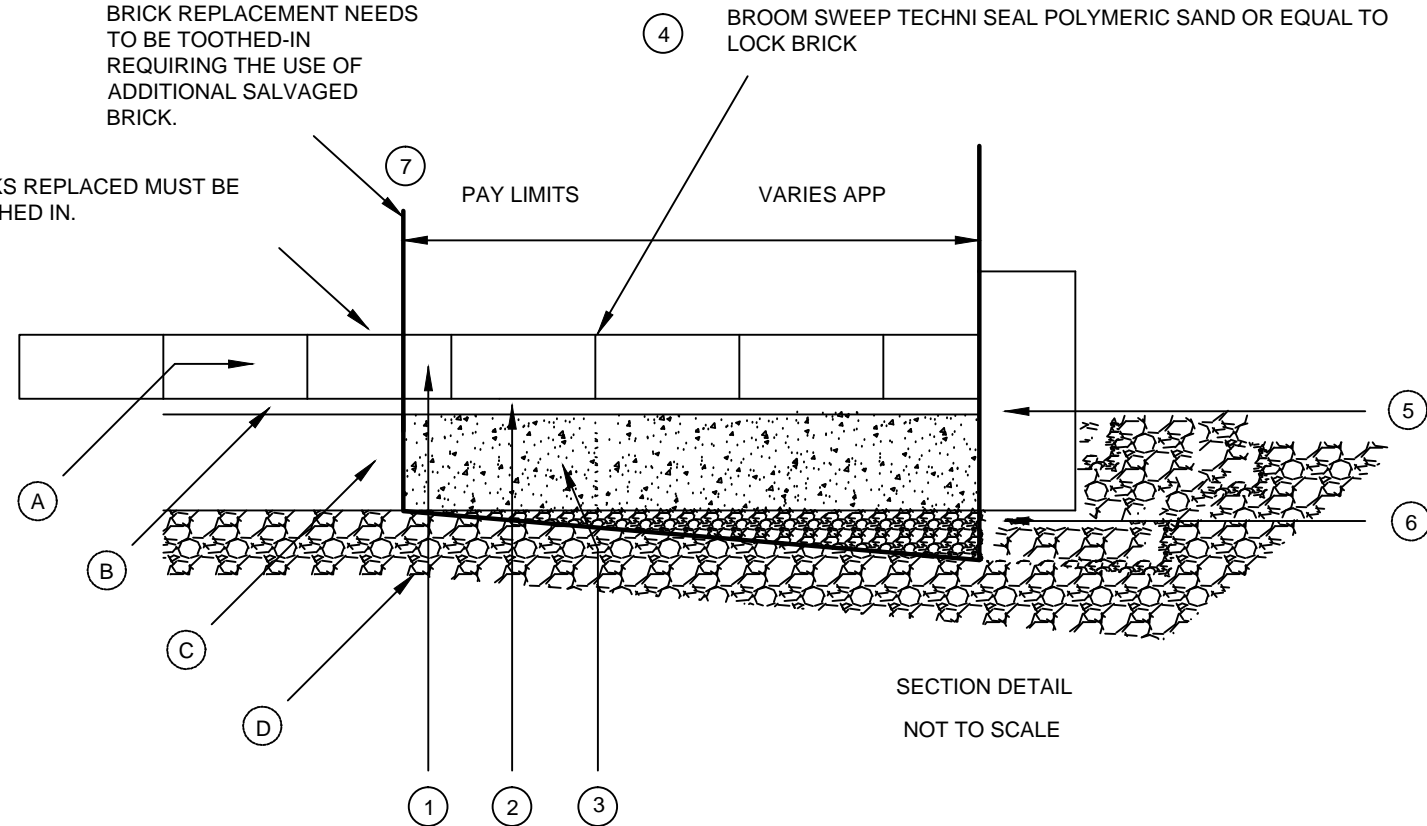
SHEET 1 OF 2

ODOT REFERENCES ARE FROM THE CURRENT ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS. ANY DISCREPANCIES SHALL BE SUBJECT TO THE CITY ENGINEER'S DISCRETION.

REMOVE BRICK PRIOR TO SAWCUT APP.

IF THE BRICK IS SAWCUT, THE BRICK REPLACEMENT NEEDS TO BE TOOTHED-IN REQUIRING THE USE OF ADDITIONAL SALVAGED BRICK.

BRICKS REPLACED MUST BE TOOTHED IN.



NO FOUNDRY SAND, ACBFS, GRANULATED SLAG OR OTHER SLAG PERMITTED IN ODOT 304, OR LOW STRENGTH MORTAR BACKFILL, ODOT 613

- (A) EX. BRICK PAVERS
- (B) EX. SAND BEDDING LAYER
- (C) EX. CONCRETE BASE - DEPTH AND TYPE VARIES
- (D) EX. AGGREGATE OR RANDOM MATERIAL SUB-GRADE

PAVEMENT REPLACEMENT SECTION PAYMENT IS FOR CITY PROJ. REPAIR AREAS, PAYMENT FOR CONC. BASE INCLUDED IN COST OF NEW CURB.

COST FOR ITEMS 1-2-3-4-6-7 ABOVE ARE CONSIDERED AS 1 PAY ITEM UNDER ROAD PAVEMENT REPLACEMENT QTY.

- (1) RE-SET BRICK PAVERS, TOOTH IN BRICK TO MATCH EXISTING BRICK PAVEMENT.
- (2) PROPOSED 1" SAND/CEMENT (3:1) SETTING BED ODOT 703.02 - ASTM C 33
- (3) PROPOSED 6" CONCRETE BASE CLASS "C" - NO. 57 OR NO. 67 LIMESTONE ONLY
- (4) BROOM SWEEP TECHNI SEAL POLYMERIC SAND OR EQUAL TO LOCK BRICK. PLATE TAMP W/ MATT PROTECTION & DAMPEN PER MFG SPEC.
- (5) NEW OR EXIST. CURB - IF NEW SEE STD. DW'G. 29 & 30
- (6) REPAIR/REPLACE FAILED BASE WITH 304 CRUSHED AGGREGATE, 411 LIMESTONE OR 613 LSM IF APPROVED BY THE ENGINEER. CONCRETE AND AGGREGATE BASE TO BE REPAIRED AS DIRECTED BY THE ENGINEER INCLUDING CONCRETE REPLACEMENT AS NEEDED.
- (7) FOR BRICK PAVEMENT REPAIR SAW CUT A CLEAN EDGE FULL DEPTH TO REMOVE FAILED CONC. BASE AND/OR FAILED AGG. BASE AS DIRECTED.

### THIS EXHIBIT IS FOR BRICK PAVEMENT REPLACEMENT ALONG CURB OR GUTTER PLATE

BRICKS REMOVED ARE TO BE STORED FOR RE-USE – CITY WILL PROVIDE BRICKS AS NEEDED  
 CONTRACTOR IS TO PICK UP BRICK AT CITY SERVICE CENTER YARD  
 CONTRACTOR SHOULD BE PREPARED TO SORT BRICK FROM EXISTING STOCKPILES IF NECESSARY



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APPROVED DATE: JAN 2012

APPROVED BY: CDB, RMB, SLH

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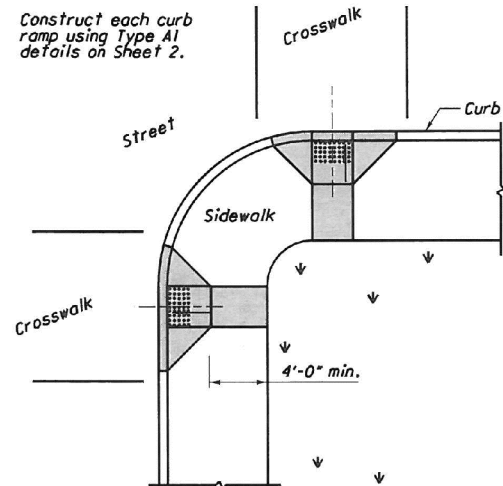
#### REVISIONS

DESCRIPTION	DATE	BY
CONSISTENCY REVIEW	2/1/13	JTD

**STANDARD DRAWING NO. 31**

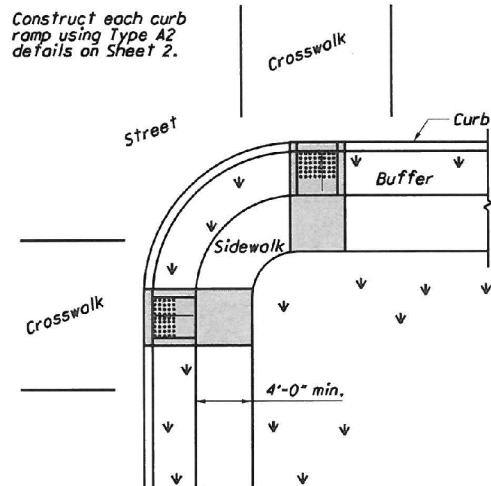
**PAVEMENT REPAIR**

SHEET 2 OF 2



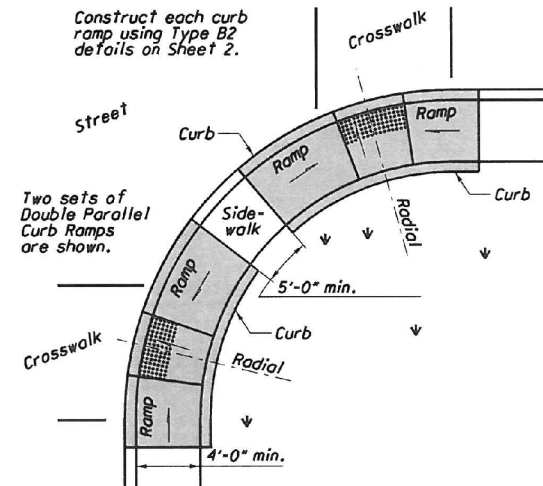
Use curb ramps with flared sides at locations with wide sidewalks.

PERPENDICULAR CURB RAMPS



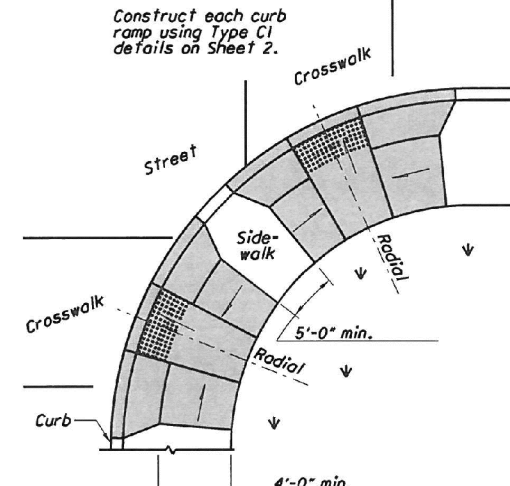
Use curb ramps with returned curbs where buffer is wide enough to accommodate ramp slope.

PREFERRED CONSTRUCTION PLACEMENT



Place on streets having wide turning radius and where sidewalks are narrow.

PARALLEL CURB RAMPS



Curb ramp placement where streets have wide turning radius, and sufficient sidewalks width.

COMBINATION CURB RAMPS

NOTES

**GENERAL:** This drawing shows curb ramp types details and placement examples for curb ramp construction, including the installation of detectable warnings.

Curb ramp types are shown on Sheet 2 and include Perpendicular, Parallel, and Combined types as specified to be constructed in the locations shown on the project plans.

Curb ramps added to an existing intersection or walk should be individually detailed on the project plans to assure that the design is appropriate for site constraints and all items can be constructed to ADA standards. The contractor may adjust the placement of curb ramps if existing field conditions warrant with the approval of the Engineer.

**DETECTABLE WARNINGS:** Install Detectable Warnings on each curb ramp with approved materials, as shown on Sheet 3. Install these proprietary products as per manufacturer's written instructions.

**DRAINAGE:** Contractor is to ensure the base of each constructed curb ramp allows for proper drainage, without exceeding allowable cross slope or ramp slopes. Vertical change in level exceeding 1/8" between the pavement and gutter, and 2" gutter and ramp, are not allowed.

**SURFACE TEXTURE:** Texture concrete surfaces by coarse brooming transverse to the ramp slopes to be rougher than the adjacent walk.

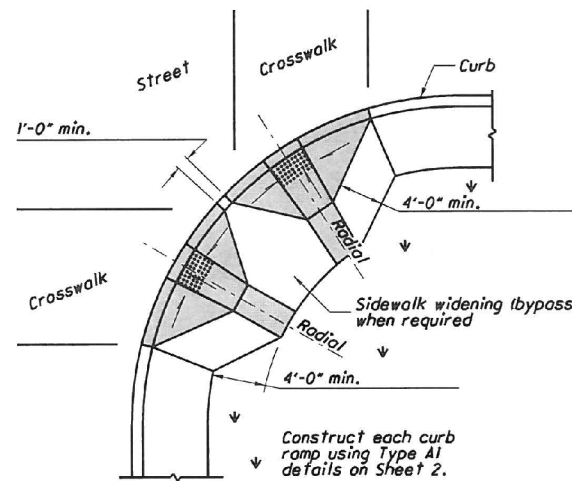
**JOINTS:** Provide expansion joints in the curb ramp as extensions of walk joints and consistent with Item 608.03 requirements for a new concrete walk. Provide a 1/2" Item 705.03 expansion joint filler around the edge of ramps built in existing concrete walks. Lines shown on this drawing indicate the ramp edges and slope changes, and do not necessarily indicate joint lines.

**PAYMENT:** Measure and pay for the ramp area within the shaded limits of this drawing as Item 608 Curb Ramp, Square Foot. This includes the cost of the ramp curbing, detectable warnings, landing areas and any additional materials, installation, grading, forming, and finishing required within the shaded area.

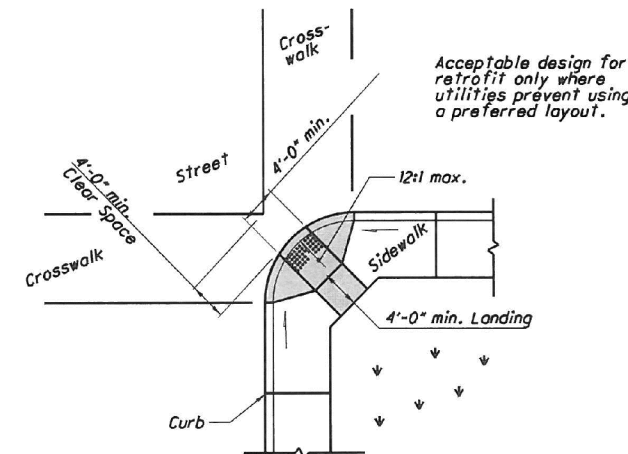
Work beyond the shaded ramp/landing area is paid for as curb (609) and walk (608). Removal of existing curb, walk (or existing curb ramps) are paid under Item 202.

For at-grade crossing locations where only detectable warnings are required in order to achieve ADA compliance, measure and pay for the strip of detectable warnings as Item 608 Detectable Warning, Square Foot. The work to cast the tiles in place will also require removal of existing pavement (Item 202) to the nearest joint, or if no joint exists, a minimum of 4 feet.

Acceptable design on corners with wide turning radius where user is able to maneuver within crosswalk limits so as not to encroach into adjacent traveled lanes.



PERPENDICULAR RAMPS



Use this design only for existing walks, and when site constraints prohibit other designs. The diagonal Type D ramp may be constructed as either a Perpendicular, Parallel or Combination curb ramp type. Avoid using where curb radii are less than 20'-0".

DIAGONAL RAMP (Type D)

ACCEPTABLE CONSTRUCTION PLACEMENT

THIS DRAWING REPLACES BP-7.1 DATED 1-19-07.

STANDARD ROADWAY CONSTRUCTION DRAWING  
NEW CURB RAMPS  
(with Detectable Warnings)

SD NUMBER  
BP-7.1

1 / 3

STATE OF OHIO DEPARTMENT OF TRANSPORTATION

STATUS  
ENGINEER

OFFICE OF  
ROADWAY  
ENGINEERING

DATE  
10-15-10

ADMINISTRATOR  
D. B. Deane

THE CITY'S STANDARD WHEEL CHAIR RAMP IS THE ODOT BP-7.1 WITH THE MODIFICATIONS NOTED.  
SEE SHEET 4 OF 4 FOR CITY'S APPROVED TRUNCATED DOME PRODUCTS.



OFFICE OF THE CITY ENGINEER  
CANTON, OHIO  
DANIEL J. MOEGLIN, P.E., CITY ENGINEER  
2436 30th St. NE 44705 : 330-489-3381 : www.cantonohio.gov/engineering

APPROVED DATE: MAY 2012

APPROVED BY: RMB

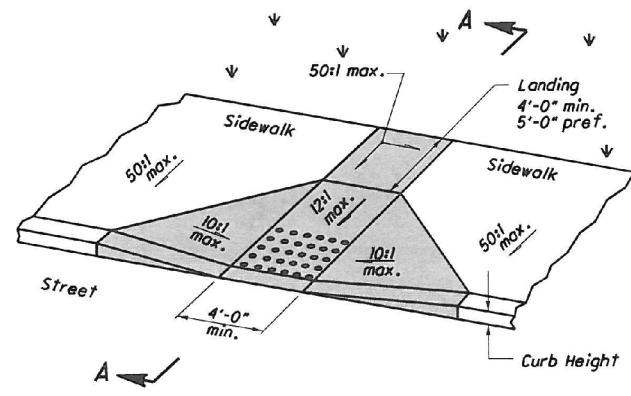
DRAWING FILE NAME: ce\_33.dwg

REVISIONS

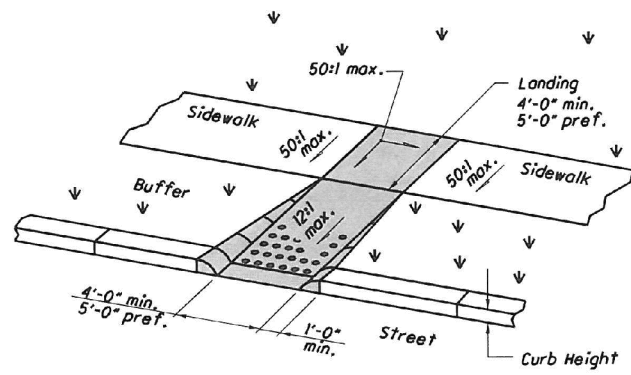
DESCRIPTION	DATE	BY
REVISIONS	6/29/12	RMB

STANDARD DRAWING NO. 33

WHEEL CHAIR RAMP

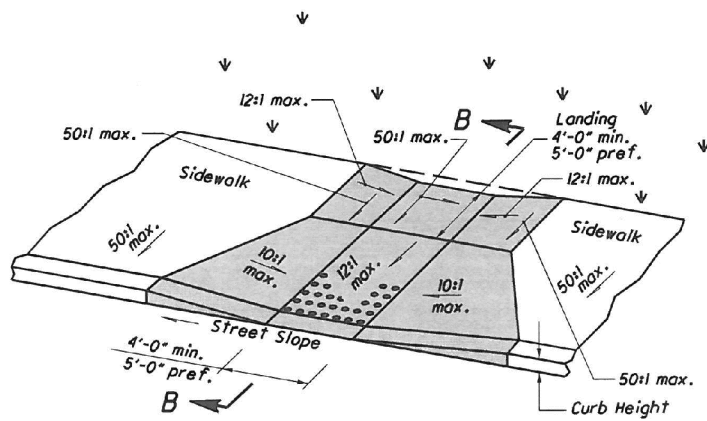


Type A1 (Perpendicular with flared sides)

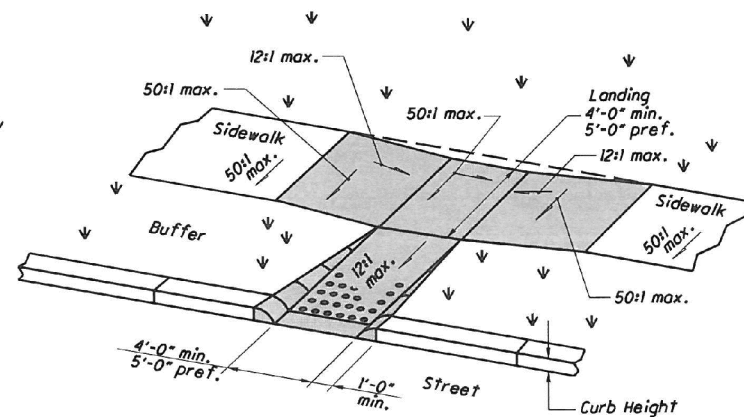


Type A2 (Perpendicular with returned curb)

PERPENDICULAR CURB RAMP DETAILS

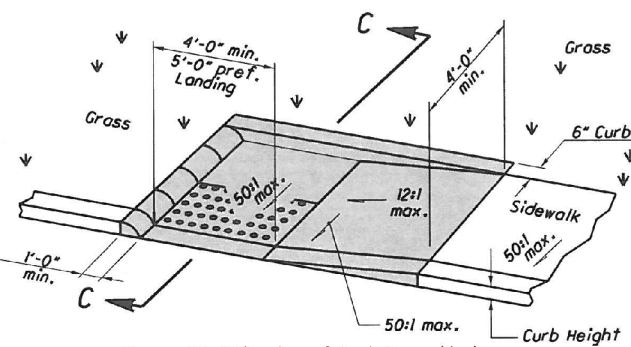


Type C1 (Combined with flared sides)

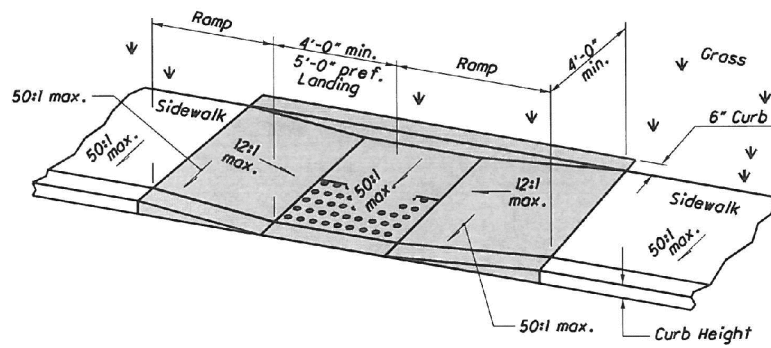


Type C2 (Combined with returned curb)

COMBINED CURB RAMP DETAILS

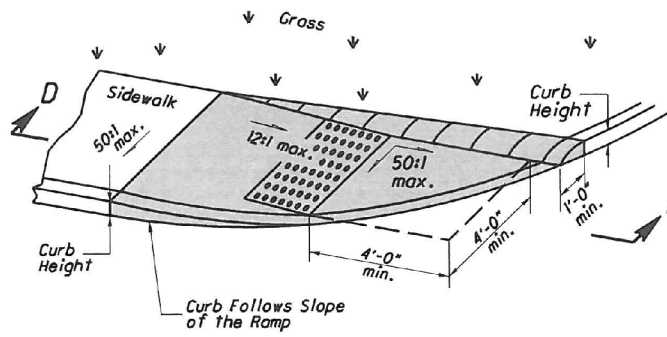


Type B1 (Single sided Parallel)



Type B2 (Double sided Parallel)

PARALLEL CURB RAMP DETAILS



Type B3 (Single sided Parallel)

NOTES

The running slope of the ramp is preferred to be 12:1 or flatter. In existing sidewalks, where the maximum ramp slope is not feasible due to site constraints (e.g. utility poles or vaults, right-of-way limits) it may be reduced as follows:

- A) 10:1 for a max. rise of 6".
- B) 8:1 for a max. rise of 3".
- C) 6:1 over a max. run of 2'-0" for historic areas where a flatter slope is not feasible.

To prevent chasing the grade indefinitely, the transition from existing sidewalk to the shaded curb ramp area is not required to exceed 15 feet in length.

While ramps may be skewed to the crosswalk, the entire lower landing area must fall within the cross walk that the ramp serves and cannot be located in the traveled lane of opposing traffic.

The counter slope of the gutter or street at the foot of a curb ramp, landing, or blended transitions shall be 20:1 or flatter.

The bottom edge of the ramp shall change planes perpendicular to the landing.

The edge of the curb shall be flush with the edge of the adjacent pavement and gutter and surface slopes that meet grade breaks shall also be flush.

Ramp landings shall be 4' min. x 4' min. with a 50:1 or flatter cross slope and running slope.

See Sheet 3 for Sections.

THIS DRAWING REPLACES BP-7.1 DATED 1-19-07.

STANDARD ROADWAY CONSTRUCTION DRAWING  
NEW CURB RAMPS  
(with Detectable Warnings)

BP-7.1

2 / 3

STATE OF OHIO DEPARTMENT OF TRANSPORTATION  
10-15-10  
DATE  
ADMINISTRATOR  
M. Blaine

OFFICE OF  
ROADWAY  
ENGINEERING

THE CITY'S STANDARD WHEEL CHAIR RAMP IS THE ODOT BP-7.1 WITH THE MODIFICATIONS NOTED.  
SEE SHEET 4 OF 4 FOR CITY'S APPROVED TRUNCATED DOME PRODUCTS.



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APPROVED DATE: MAY 2012

APPROVED BY: RMB

DRAWING FILE NAME: ce\_33.dwg

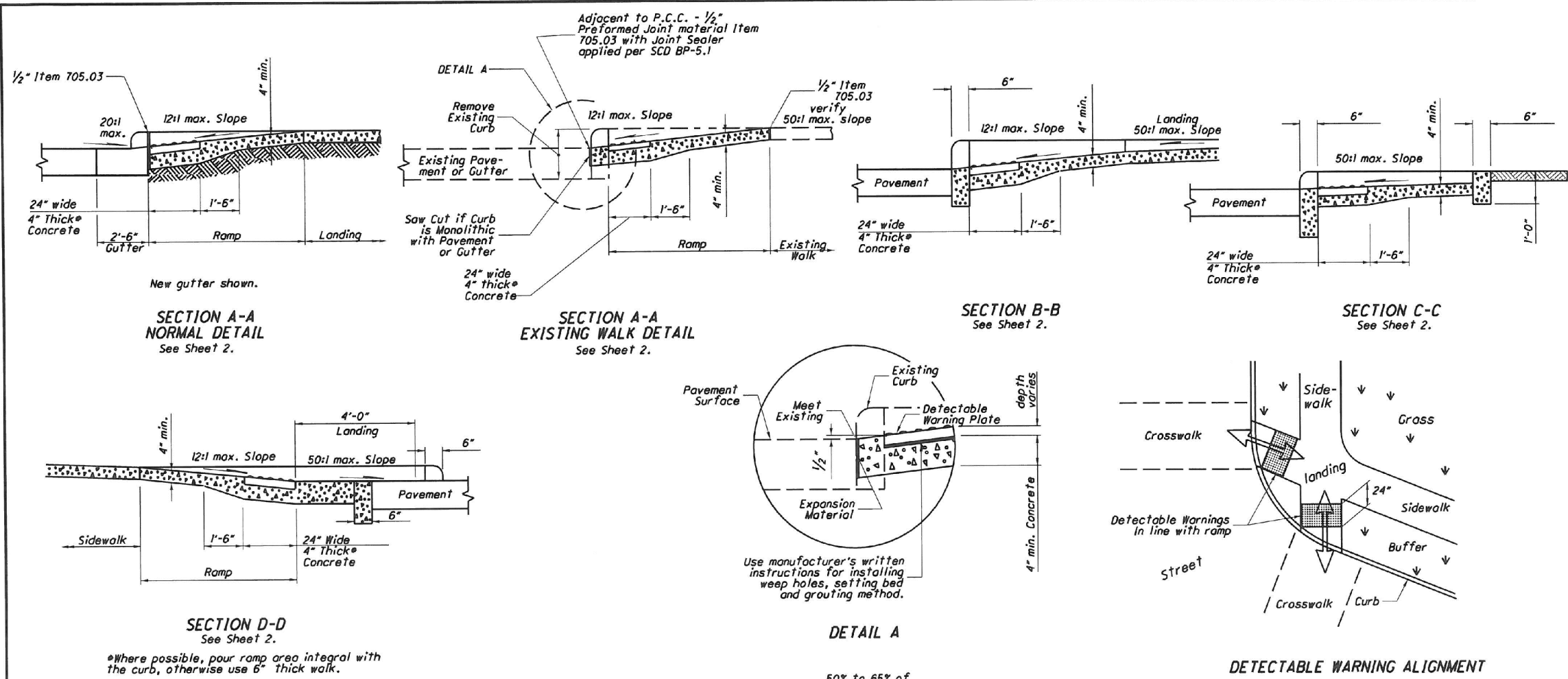
REVISIONS

REVISIONS	DESCRIPTION	DATE	BY
		6/29/12	RMB

STANDARD DRAWING NO. 33

WHEEL CHAIR RAMP





**DETECTABLE WARNINGS NOTES**

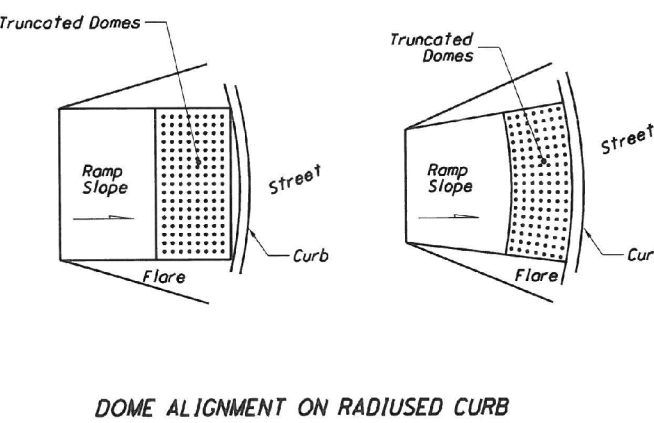
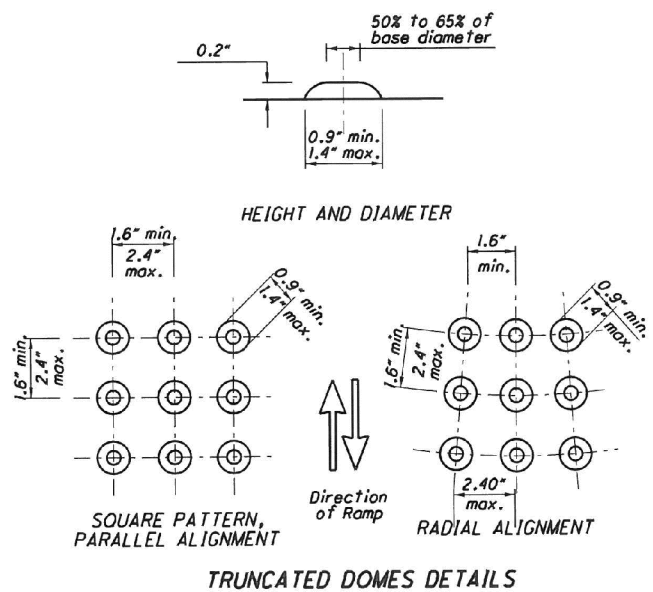
**GENERAL:** Detectable Warnings are a distinctive surface pattern of truncated domes which are detectable by cane or underfoot to alert people with vision impairments of their approach to streets and hazardous drop-offs.

**PLACEMENT:** Detectable warnings are to be installed at any location where pedestrians might cross paths with vehicular traffic lanes, such as the base of curb ramps or at blended curbs. A 24\"/>

The depth of concrete underneath detectable warning products shall be a minimum of 4\"/>

**ALIGNMENT:** Truncated domes should be aligned with the primary direction of the ramp as shown on the DETECTABLE WARNING ALIGNMENT Detail. Normally the detectable warnings should be flush with the back of the curb, but in skewed conditions at least one corner of the 24\"/>

**PRODUCTS & COLORS:** Color of the detectable warnings should contrast with surrounding concrete walk and ramp. Black is not an acceptable color. Approved products and guidance on color may be found on the Office of Roadway Engineering Service's Detectable Warnings Approved List. Install products as per manufacturer's printed instructions.



**SEE SHEET 4 OF 4 FOR CITY'S APPROVED TRUNCATED DOME PRODUCTS.**

STATE OF OHIO DEPARTMENT OF TRANSPORTATION  
 OFFICE OF ROADWAY ENGINEERING  
 STANDARD ROADWAY CONSTRUCTION DRAWING  
 NEW CURB RAMPS  
 (with Detectable Warnings)  
 THIS DRAWING REPLACES BP-7.1 DATED 1-19-07.  
 SCD NUMBER BP-7.1  
 3 / 3

DATE 10-15-10  
 ADMINISTRATOR  
 M. Blime

**THE CITY'S STANDARD WHEEL CHAIR RAMP IS THE ODOT BP-7.1 WITH THE MODIFICATIONS NOTED. SEE SHEET 4 OF 4 FOR CITY'S APPROVED TRUNCATED DOME PRODUCTS.**



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APPROVED DATE: MAY 2012  
 APPROVED BY: RMB  
 DRAWING FILE NAME: ce\_33.dwg

REVISIONS		
DESCRIPTION	DATE	BY
REVISIONS	6/29/12	RMB

**STANDARD DRAWING NO. 33**  
**WHEEL CHAIR RAMP**

DETECTABLE WARNING DOMES

PANELS, WET SET

REPLACEABLE TRUNCATED DOME PANELS SET IN WET CONCRETE MUST BE USED IN RAMPS WITHIN THE CITY OF CANTON, UNLESS APPROVED OTHERWISE BY THE CITY ENGINEER.

Acceptable manufacturers and products are:

- 1) Armorcast Products Company  
North Hollywood, CA 818-982-3800  
Armorcast Detectable Warning Panels (Wet Set Panels)  
24"x24", 24"x36", 24"x48"; also 6'-15' Radius  
Polymer Concrete, Red Brick color
- 2) ADA Solutions, Inc.  
N. Billerica, MA 01862  
Cast-in-Place Replaceable Tactile (Wet Set)  
2'x3', 2'x4', 2'x5', and 2' w/radius  
Glass and Carbon Composite, Brick Red color

OR APPROVED EQUAL

BRICK PAVERS

TRUNCATED DOME BRICK PAVERS ARE ONLY TO BE USED/INSTALLED AT THE DISCRETION OR APPROVAL OF THE CITY ENGINEER.

Brick Pavers will meet ASTM C 902 Class SX, Type 1, or C 936, or C 1272 Type R.

Acceptable manufacturers and products are:

- 1) Whitacre-Greer Fireproofing Company,  
1400 S. Mahoning Ave, Alliance, OH, 44601, (800) WG PAVER  
ADA Paver, 4"x8"x2-1/4", Clear Red (Rustic) #30.
- 2) The Belden Brick Company  
PO Box 20910, Canton, OH 44701 330-456-0031  
City Line ADA Paver, Regimental Red 2-1/4"x4"x8" or 2-1/4"x8"x8"

OR APPROVED EQUAL.

Pavers will be laid on top of a 4" unreinforced concrete base. Setting bed to be mortared in accordance with manufacturer's instruction, or with a maximum 1/2" thick bed of latex modified cement mortar. SWEEP POLYMERIC SAND (TECHNI SEAL OR APPROVED EQUAL) INTO JOINTS. Joint width must not exceed 1/8" or be less than 1/16" wide.

Pavers shall be laid such that joints are level with adjoining joints so as to provide a smooth transition from brick to brick and brick to concrete surface.

The surface of any two adjacent units should not differ by more than 1/8" [3] in height. Bricks shall be placed in a running bond pattern. Face of all brick shall be clean of cement and protected so as to avoid chipping during construction.

ADHESIVE MATS

REPLACEABLE TRUNCATED DOME MATS THAT SET ON CONCRETE RAMPS BY ADHESIVE WILL ONLY BE CONSIDERED IN THE EVENT AN EXISTING WHEEL CHAIR RAMP NEEDS DETECTABLE WARNING DOMES INSTALLED AND THE RAMP REQUIRES NO OTHER MODIFICATIONS. USE OR INSTALLATION OF ADHESIVE MATS IS SUBJECT TO THE CITY ENGINEER'S DISCRETION OR APPROVAL.

Acceptable manufacturers and products are:

- 1) Submit product specification, color and sample for review/approval by the City Engineer



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APPROVED DATE: MAY 2012

APPROVED BY: RMB

DRAWING FILE NAME: ce\_33.dwg

**REVISIONS**

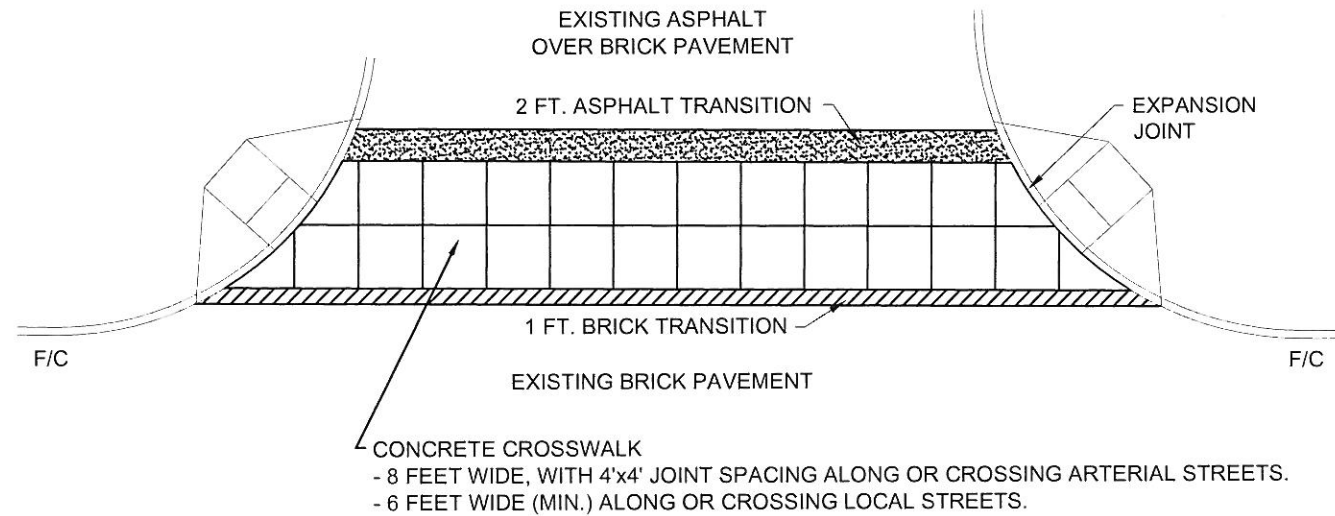
DESCRIPTION	DATE	BY
REVISIONS	6/29/12	RMB
WET PANELS PRIMARY DOME MAT	JAN 2015	RMB

**STANDARD DRAWING NO. 33**

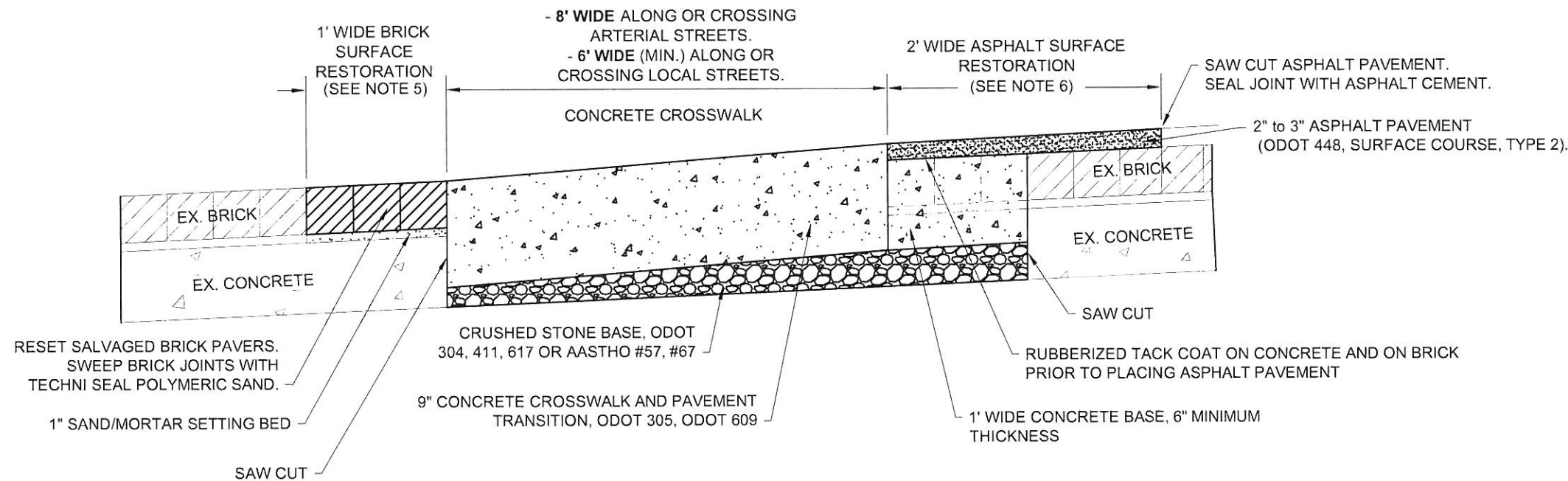
**WHEEL CHAIR RAMP**

SHEET 4 OF 4

PLAN VIEW



SECTION VIEW



NOTES:

1. CONCRETE CROSS WALKS MUST BE CONSTRUCTED IN THE ROADWAY WHEN EXISTING PAVEMENT IS DISTURBED WHERE BRICK ROADS TRANSITION TO ASPHALT ROADS BY OVERLAY OF ASPHALT ON BRICK PAVERS; UNLESS DETERMINED OTHERWISE BY THE CITY ENGINEER.
2. CROSS WALK CONSTRUCTION MUST CONFORM TO ODOT 608 AND THE CURRENT CITY OF CANTON SPECIFICATIONS FOR THE CONSTRUCTION, REPAIR, AND REPLACEMENT OF SIDEWALKS, CURBS, AND DRIVEWAYS.
3. SECTION PROFILE OF CROSS WALK TO BE FIELD DETERMINED BASED ON EXISTING ASPHALT AND BRICK PAVEMENT ELEVATIONS. PROFILE OF THE CROSSWALK MUST BE SET IN A MANNER THAT DOES NOT IMPEDE THE STORMWATER DRAINAGE.
4. DURING REMOVAL OF PAVEMENT FOR INSTALLATION OF NEW CONCRETE CROSS WALK, CONTRACTOR MUST STABILIZE BRICK PAVERS AND PREVENT BRICKS, THAT ARE TO REMAIN IN PLACE, FROM COMING LOOSE.
5. CONTRACTOR TO REPLACE BRICK PAVEMENT WITH SALVAGED BRICK SET ON A 6" CONCRETE BASE AND 1" SAND/MORTAR SETTING BED. REUSE OF EXISTING CONCRETE BASE UNDER BRICK IS ACCEPTABLE IF CITY ENGINEER DEEMS EXISITING CONCRETE BASE IS IN SATISFACTORY CONDITION; OTHERWISE NEW CONCRETE BASE MAY BE REQUIRED. SWEEP BRICK JOINTS WITH TECHNI-SEAL POLYMERIC SAND (OR APPROVED EQUAL). ALL BRICK PAVERS RESET MUST MEET THE GRADES ESTABLISHED BY THE ENGINEER. SURFACE ELEVATION FROM BRICK TO BRICK, OR BRICK TO CONCRETE MUST NOT EXCEED 1/8".
6. CONTRACTOR MUST PLACE TRANSITIONAL ASPHALT PAVEMENT (ODOT 448, SURFACE COURSE, TYPE 2) MATCHING THE SURFACE OF THE NEW CONCRETE CROSS WALK AND EXISTING ASPHALT PAVEMENT. ASPHALT PAVEMENT THICKNESS MUST NOT BE LESS THAN 2", OR GREATER THAN 3". ASPHALT PAVEMENT MUST BE SET ON A CONCRETE BASE WITH A MINIMUM THICKNESS OF 6". THE CONCRETE BASE MUST LOCK-IN THE EXISTING BRICK PAVERS. APPLY RUBBERIZED TACK COAT ON CONCRETE BASE AND BRICK BASE PRIOR TO INSTALLING ASPHALT PAVEMENT.
7. CONCRETE MATERIAL FOR CROSS WALK AND BASE MUST BE ODOT 499 CLASS 'C' CONCRETE WITH LIMESTONE AGGREGATE.
8. NO FOUNDRY SAND OR SLAG PERMITTED IN AGGREGATE BASE.
9. ODOT REFERENCES ARE FROM THE CURRENT ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS. ANY DISCREPANCIES SHALL BE SUBJECT TO THE CITY ENGINEER'S DISCRETION.



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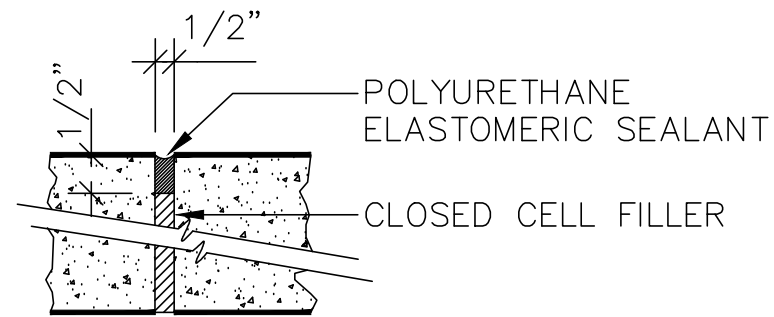
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DESCRIPTION	DATE	BY
REVISIONS	7/20/12	RMB

STANDARD DRAWING NO. 34

CONCRETE CROSSWALK  
AND PAVEMENT TRANSITION

SHEET 1 OF 1



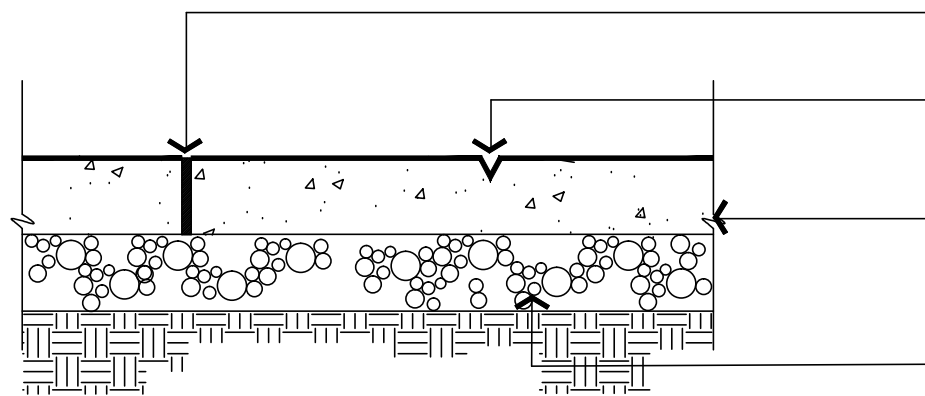
EXPANSION JOINT DETAIL  
NOT TO SCALE

NOTES:

- EXPANSION JOINTS TO BE 60' MAX. O.C. CONTROL JOINTS TO BE @ 4' O.C. OR AS SHOWN ON PLAN OR DIRECTED BY ENGINEER.
- PROVIDE LIGHT BROOM FINISH ON ALL CONCRETE SURFACES AFTER JOINT & EDGE TOOLING. PROVIDE 1/4" RADIUS ON ALL SLAB EDGES.

SAWCUT CONTROL JOINTS MAY BE PERMITTED IN STREETScape AREAS IF APPROVED BY THE PROJECT ARCHITECT/ENGINEER AND THE CITY ENGINEER PRIOR TO BID AND CONSTRUCTION.

CONCRETE WALK TO BE CLASS "C" ODOT 499 NO. 57 OR 67 LIMESTONE (SEE BELOW) NO EXPANSION JOINTS ARE TO BE PLACED AGAINST BRICK PAVER SECTIONS



1/2" CLOSED CELL EXPANSION JOINT FILLER IN WALK AND AGAINST BUILDINGS TO BE SEALTIGHT CERAMAR FOAM OR EQUAL, 1/2" PEEL STRIP CUT EXPANSION JOINT AT 60' MAX. O.C.

TYPICAL TOOLED AND CUT CONTROL JOINT, 1/5 DEPTH OF SLAB W/POLYURETHANE ELASTOMERIC SEALANT  
- TREMCO THC 900 / 901 OR EQUAL  
5" PLAIN PORTLAND CEMENT CONCRETE PAVEMENT, ODOT ITEM 608 AND 499, AS PER PLAN.

4" COMPACTED THICKNESS AGGREGATE BASE COURSE, ODOT ITEM #304.

NOTE: NO FOUNDRY SAND OR SLAG IS PERMITTED IN AGGREGATE BASE (304).  
AGGREGATE IN SURFACE CONCRETE SHALL BE AASHTO M NO. 57 OR 67 LIMESTONE ONLY.  
ALL CONCRETE FOR CURB AND WALKS SHALL BE ODOT 499, CLASS C.  
CLASS C OPTION 1 MAY BE USED BETWEEN MAY 1 AND OCTOBER 15.  
AGGREGATE IN SURFACE CONCRETE SHALL BE NO. 57 OR 67 LIMESTONE ONLY.

ODOT REFERENCES ARE FROM THE CURRENT ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS. ANY DISCREPANCIES SHALL BE SUBJECT TO THE CITY ENGINEER'S DISCRETION.

ALL CONCRETE CONSTRUCTION TO CONFORM TO CURRENT CITY OF CANTON SPECIFICATIONS FOR CONSTRUCTION, REPAIR AND REPLACEMENT OF SIDEWALKS, CURBS AND DRIVEWAYS.



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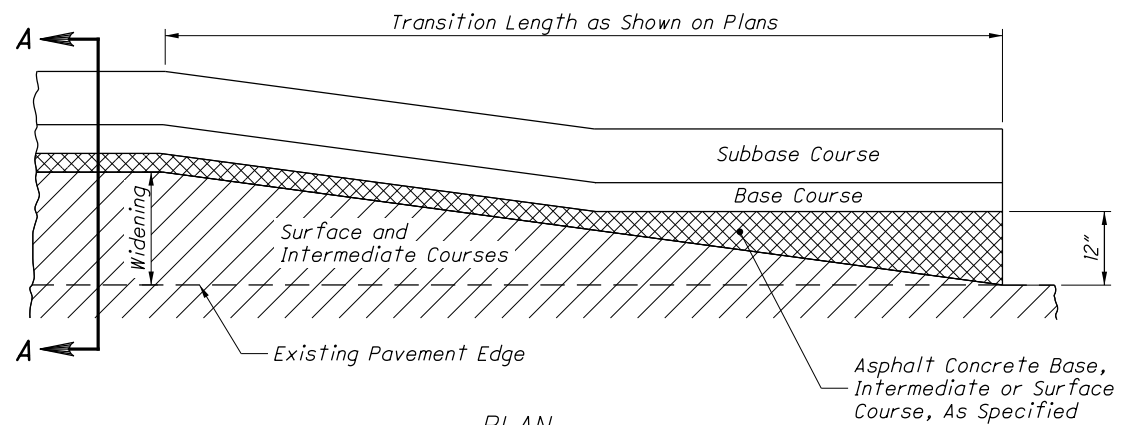
REVISIONS

DESCRIPTION	DATE	BY

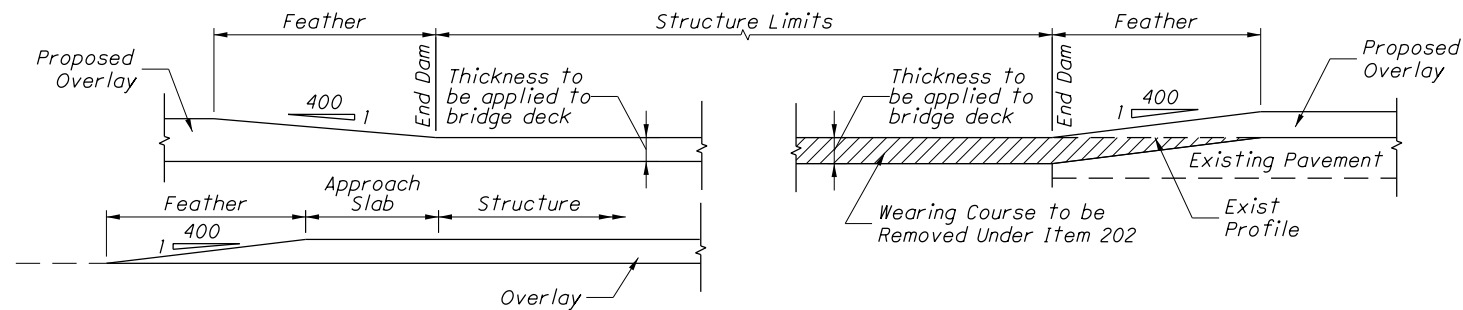
**STANDARD DRAWING NO. 42**

**STREETScape CONCRETE  
WALK PAVEMENT DETAILS**

SHEET 1 OF 1

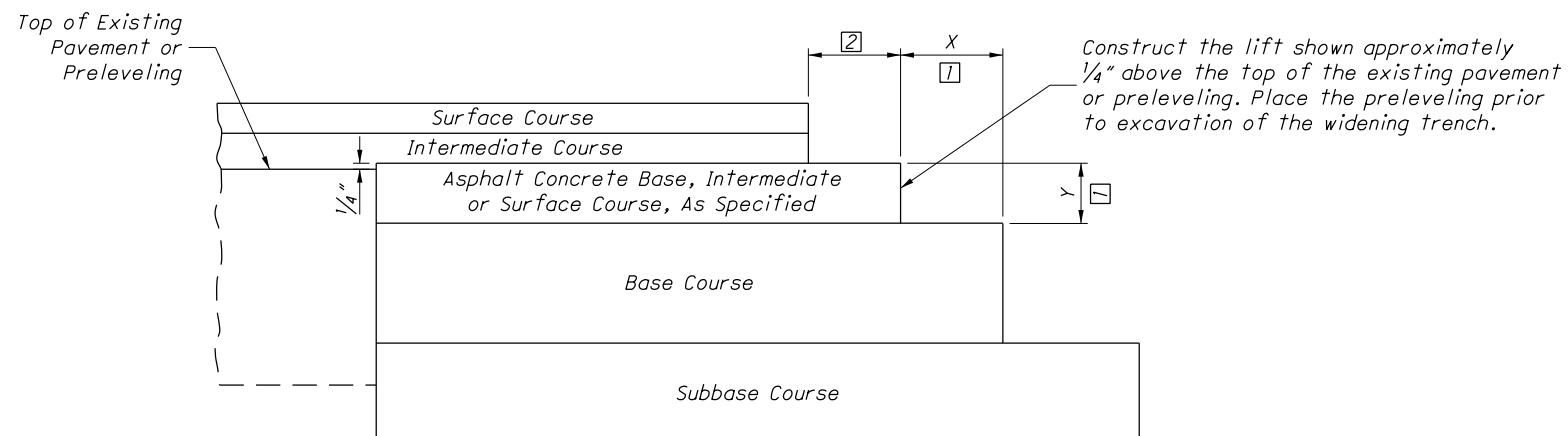


PLAN  
**MERGING EDGE OF PAVEMENT WIDENING WITH EDGE OF EXISTING PAVEMENT**

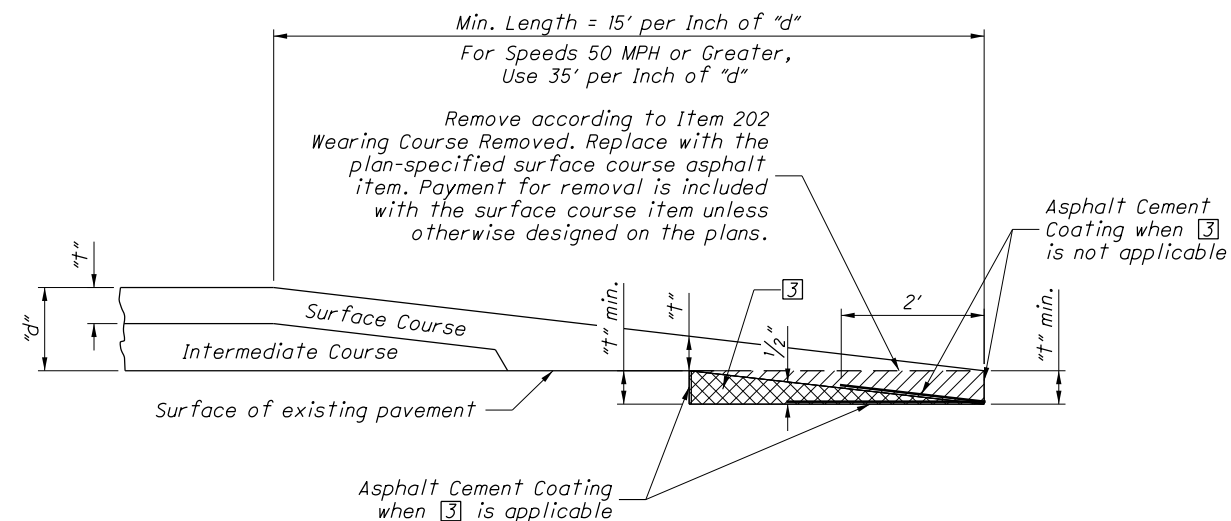


Details assume non-settled approach slabs. Smoothing of the profile for Settlement is required per plan grades or as directed by the Engineer.

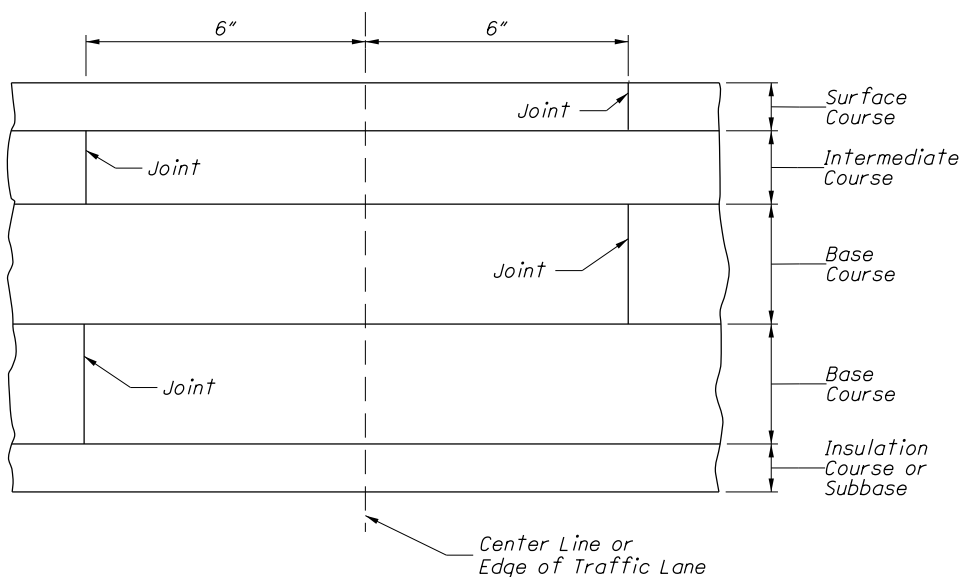
**FEATHERING AT STRUCTURES**



SECTION A-A  
**COURSE DETAIL FOR WIDENING**



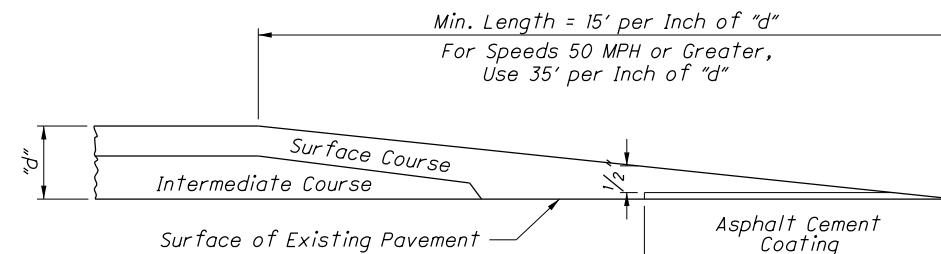
**BUTT JOINT TYPE**



**Lapping Longitudinal Joints**

**LEGEND**

- ① The extended width (X) of a base or subbase lift shall be equal to the depth (Y) of the overlying lift or 6", whichever is greater, or as shown on the plans.
- ② The extended width shall be equal to the combined thickness of the surface and intermediate courses, or 4", whichever is greater.
- ③ Permissible removal and replacement

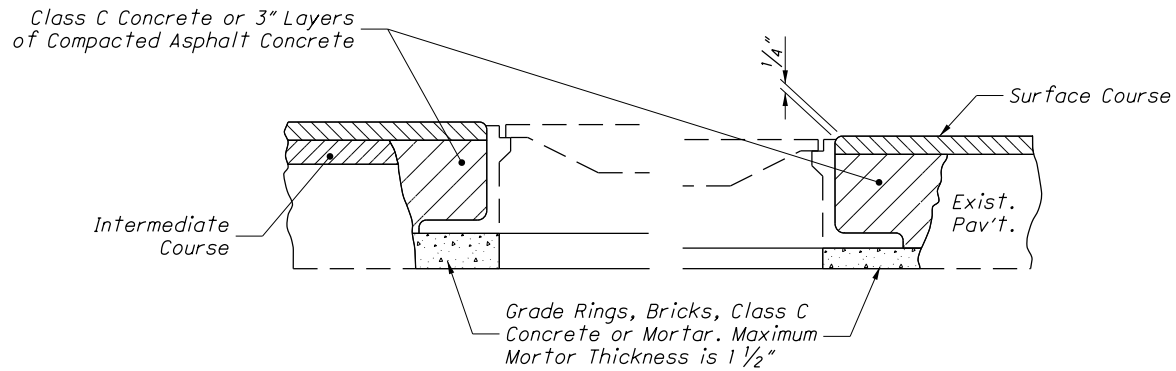


**TAPER EDGE TYPE**

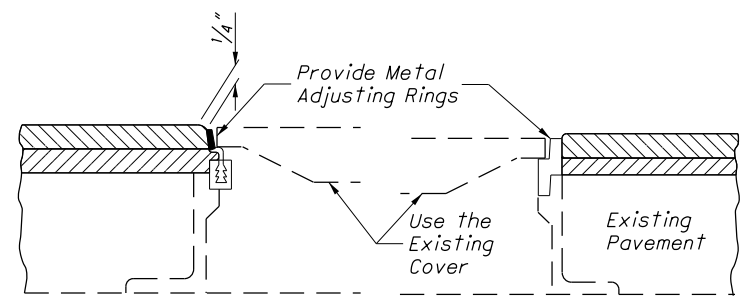
NOTE: **Butt joint is required unless the taper edge is specified in the plans or approved by the Engineer.**

**PLACING FEATHERED AREAS**

Values for "t" and "d" are obtained from the plan.



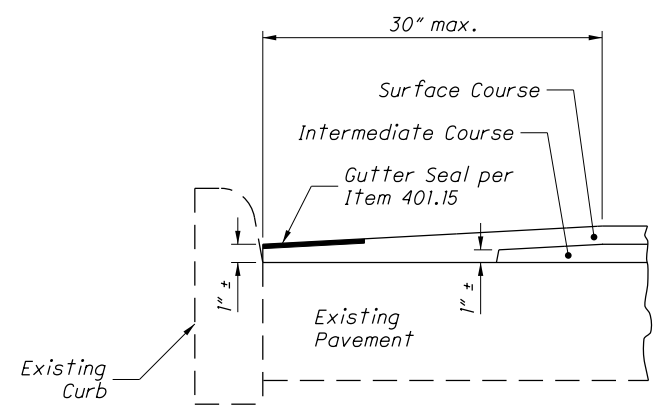
USING CONCRETE OR MORTAR



USING METAL ADJUSTING RINGS

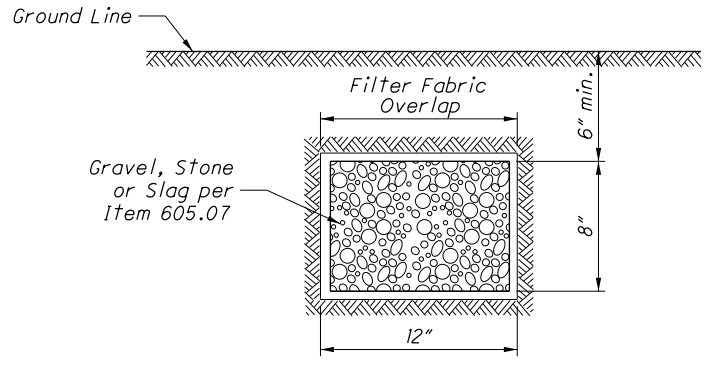
Metal adjusting rings shall:  
 (a) Attach securely to the existing frame by welding or mechanical devices;  
 (b) Consist either of cast metal having an integral rim and seat, or be fabricated metal with a sturdy connection between the seat and rim; and  
 (c) Provide an even seat for the manhole cover.  
 In addition, the adjusting ring type shall be a design acceptable to the local governmental agency responsible for street and sewer maintenance. Any installation unacceptable to the Engineer shall be replaced by the Contractor at his expense.

MANHOLES ADJUSTED TO GRADE



Special care shall be taken during construction to obtain maximum compaction of asphalt concrete in gutters.

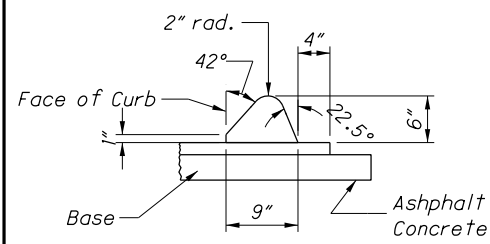
GUTTER FINISH



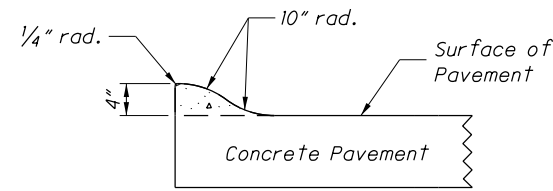
Aggregate drains to be placed where and as directed by Engineer. Provide Filter Fabric when specified as a separate pay item.

AGGREGATE DRAIN

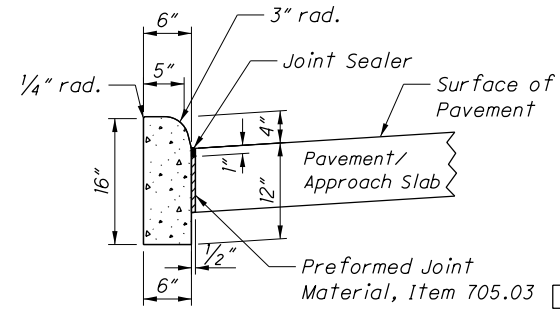
THIS DRAWING REPLACES BP-3.1 DATED 04-20-2012.



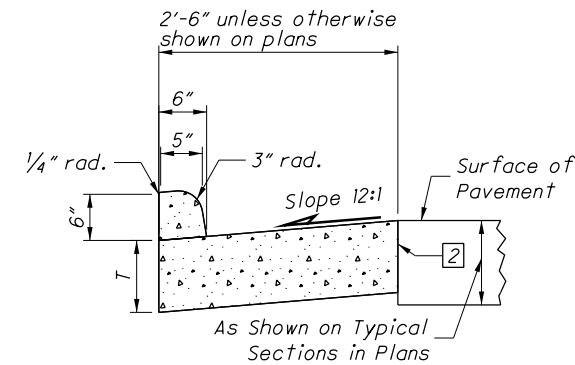
TYPE 1



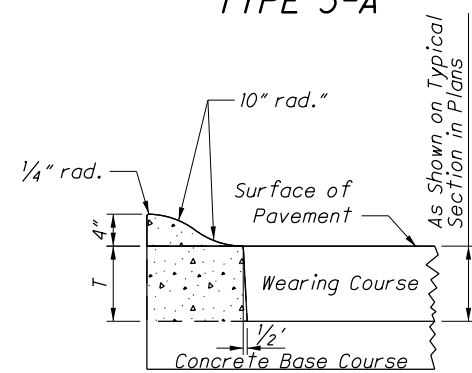
TYPE 3-A



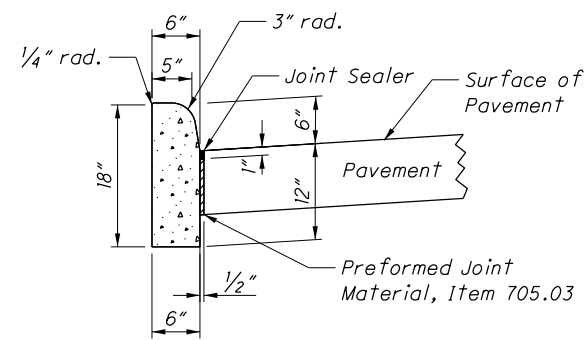
TYPE 4-C



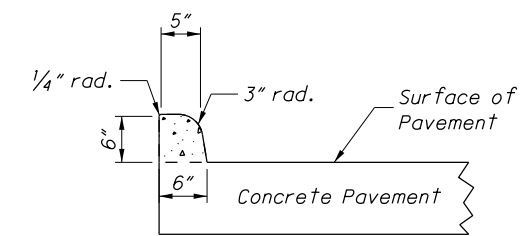
TYPE 2



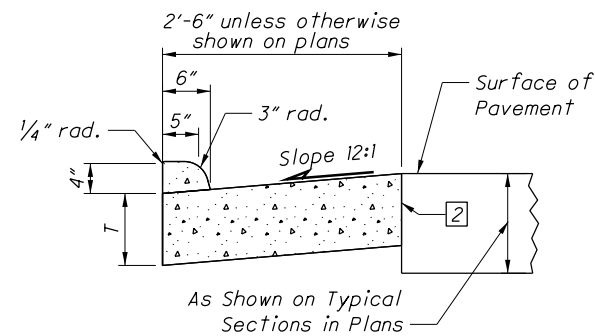
TYPE 3-B



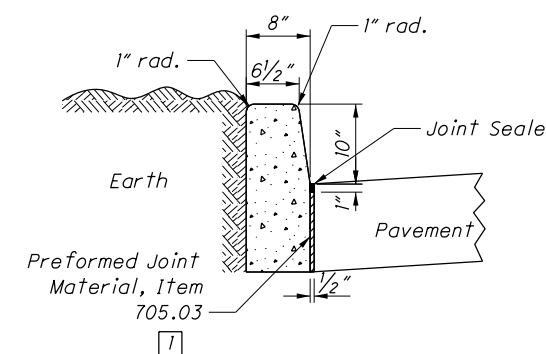
TYPE 6



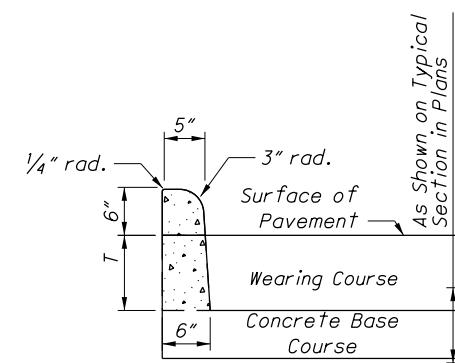
TYPE 2-A



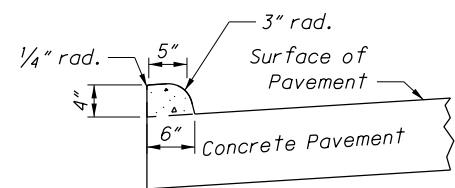
TYPE 4



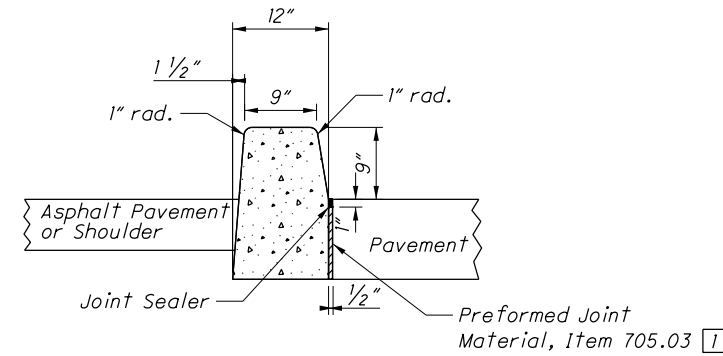
TYPE 7



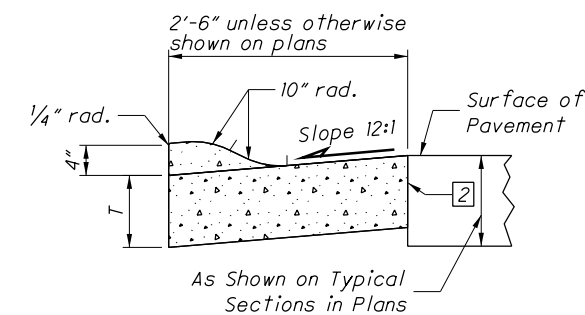
TYPE 2-B



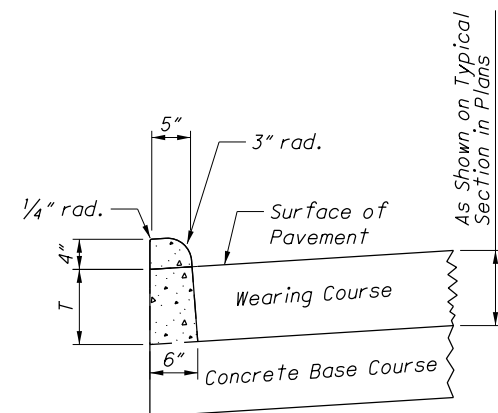
TYPE 4-A



TYPE 8



TYPE 3



TYPE 4-B

NOTES

**GENERAL:** This drawing shows alternate types of curb that may be used on various types of pavement. The typical section of the project shows the type to be used, also the thickness of the edge of the pavement or the edge of the curb and gutter section.

**JOINTS:** 1" expansion joints shall extend up to the top of the curb and shall be constructed in the curb and gutter section in such a manner that the joint seal will extend the full width of the gutter and into the curb face a sufficient distance to seal the joint to an elevation of a least 2" above the flow line of the gutter. Dowel bars shall be used in the curb and gutter section at expansion joints and to the surface of the pavement.

Transverse expansion joint material shall meet the requirements of Item 705.03.

**GUTTER PLATE THICKNESS:** Thickness of gutter plate "T" shall be 9" unless otherwise shown on the plans.

**TOLERANCES:** Dimensional tolerances are as follows:

Curbs:  $-1/32"$  to  $+1/4"$ .

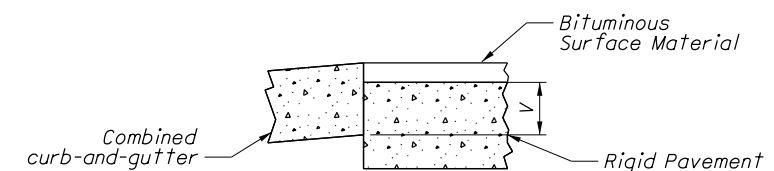
Gutters: 0 to  $+1/2"$ .

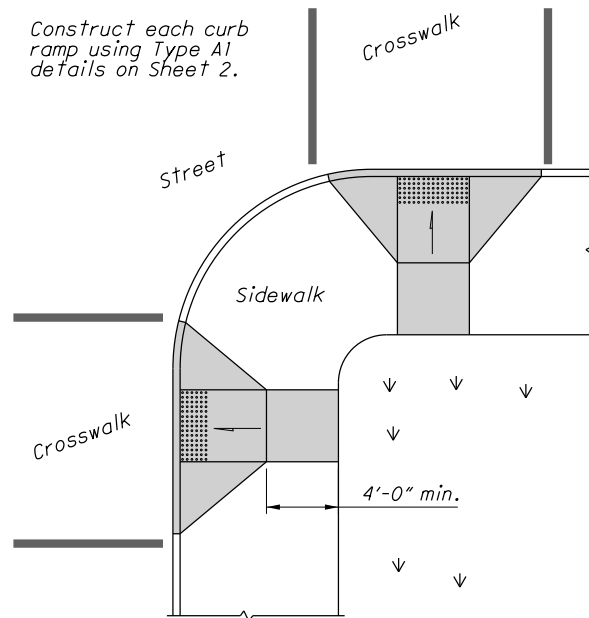
LEGEND

[1] Expansion joint material and joint sealer are not required for the portion of the curb that is adjacent to a flexible pavement type. Both materials are required, as detailed, for the full height of rigid pavement and concrete bases.

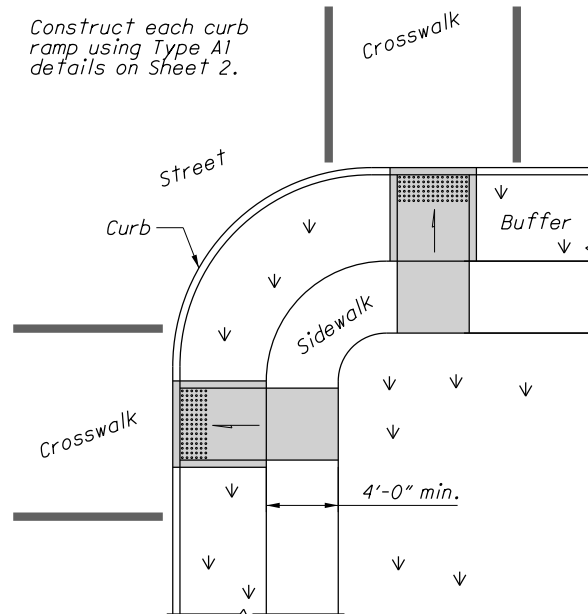
[2] Butt joints shall be provided between combined curb-and-gutter and new or existing rigid pavements, with tie bars or hook bolts provided at intervals of 5'. See SCD BP-2.1 for details of tie bars and hook bolts.

If the combined curb-and-gutter adjoins a new rigid base or an existing rigid base or pavement that is to be surfaced with bituminous material, a butt joint shall also be provided. However, tie bars or hook bolts shall be omitted when the vertical overlap ("V" in detail below) between the curb-and-gutter and rigid pavement is less than 7".

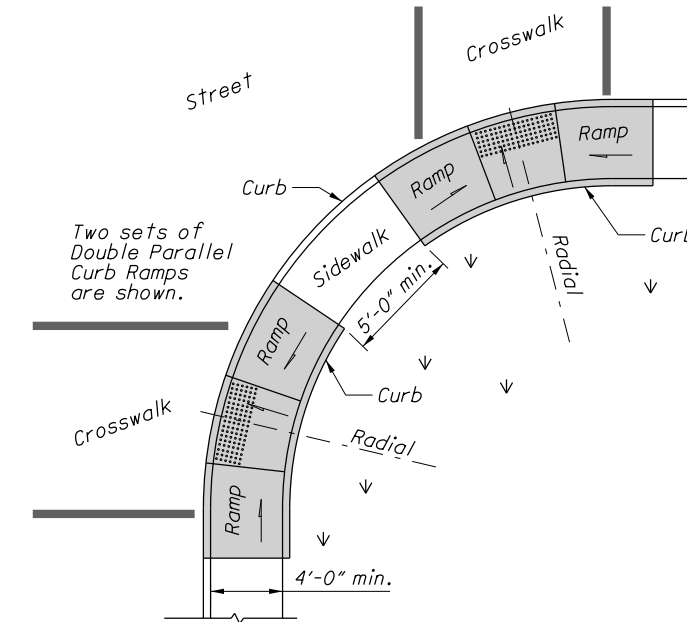




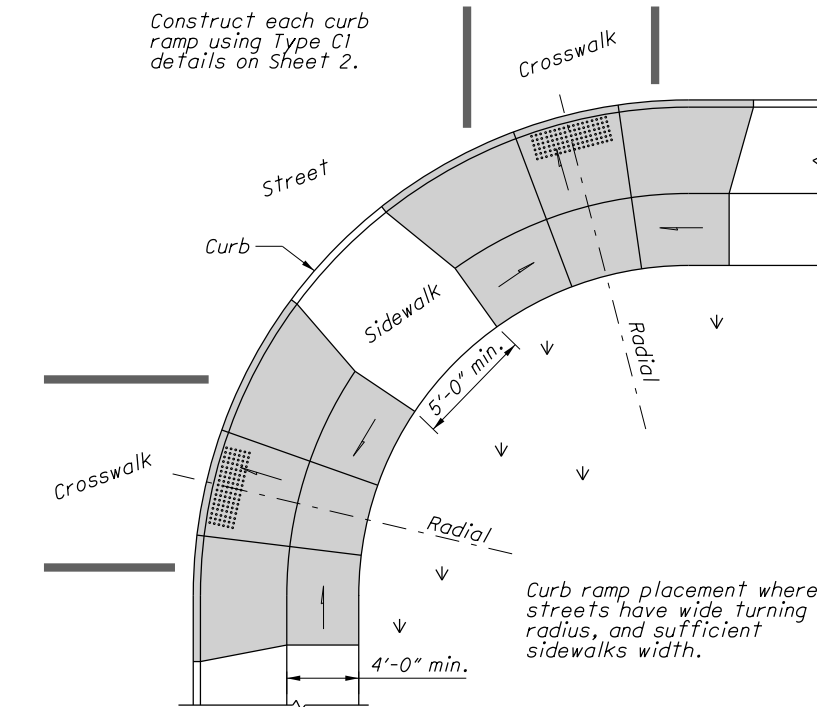
Construct each curb ramp using Type A1 details on Sheet 2.



Construct each curb ramp using Type A1 details on Sheet 2.



Two sets of Double Parallel Curb Ramps are shown.



Construct each curb ramp using Type C1 details on Sheet 2.

Curb ramp placement where streets have wide turning radius, and sufficient sidewalks width.

Use curb ramps with flared sides at locations with wide sidewalks.

Use curb ramps with returned curbs where buffer is wide enough to accommodate ramp slope.

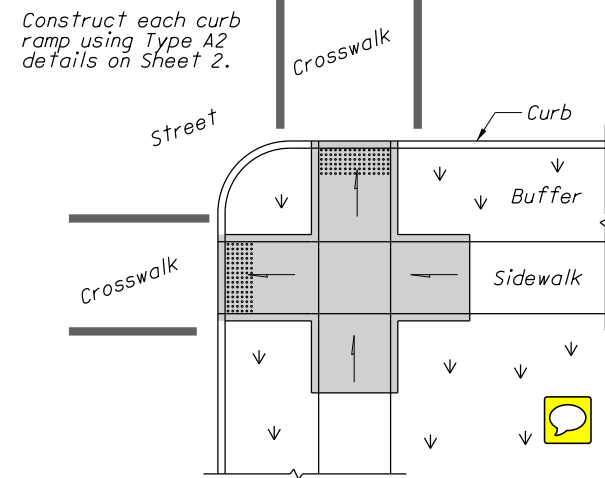
Place on streets having wide turning radius and where sidewalks are narrow.

**PERPENDICULAR CURB RAMPS**

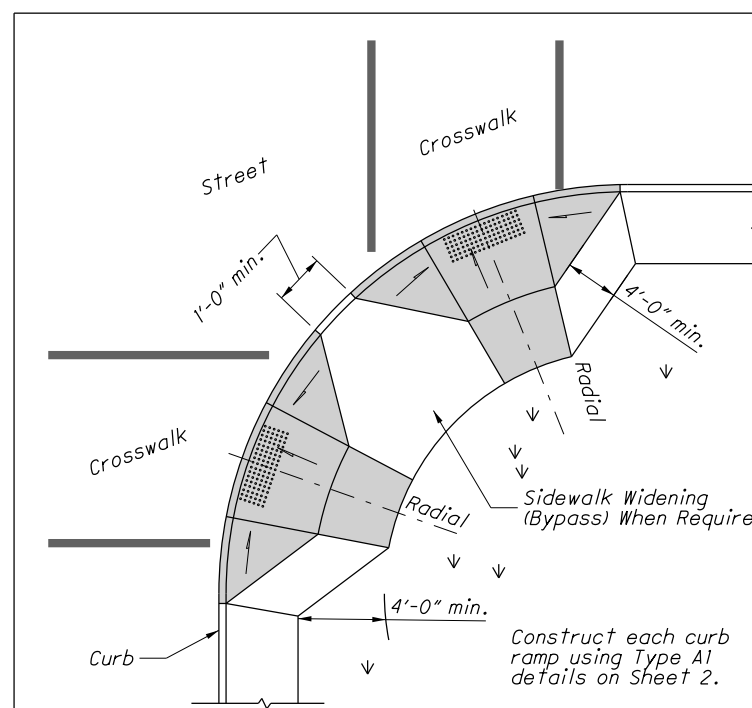
**PARALLEL CURB RAMPS**

**COMBINATION CURB RAMPS**

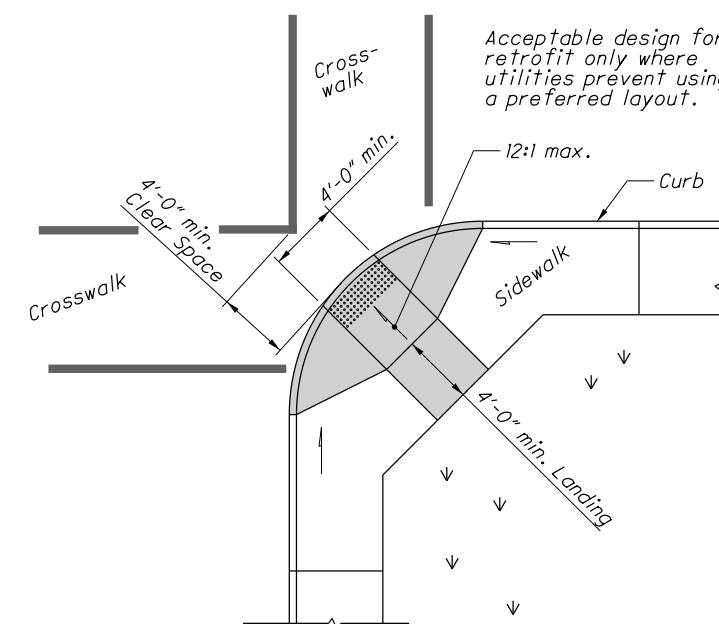
**PREFERRED CONSTRUCTION PLACEMENT**



Construct each curb ramp using Type A2 details on Sheet 2.



Acceptable design on corners with wide turning radius where user is able to maneuver within crosswalk limits so as not to encroach into adjacent traveled lanes.



Acceptable design for retrofit only where utilities prevent using a preferred layout.

Use this design only for existing walks, and when site constraints prohibit other designs. The diagonal Type D ramp may be constructed as either a Perpendicular, Parallel or Combination curb ramp type. Avoid using where curb radii are less than 20'-0".

**PERPENDICULAR RAMPS**

**DIAGONAL RAMP (Type D)**

**ACCEPTABLE CONSTRUCTION PLACEMENT**

**NOTES**

**GENERAL:** This drawing shows curb ramp types details and placement examples for curb ramp construction, including the installation of detectable warnings.

Curb ramp types are shown on Sheet 2 and include Perpendicular, Parallel, and Combined types as specified to be constructed in the locations shown on the project plans.

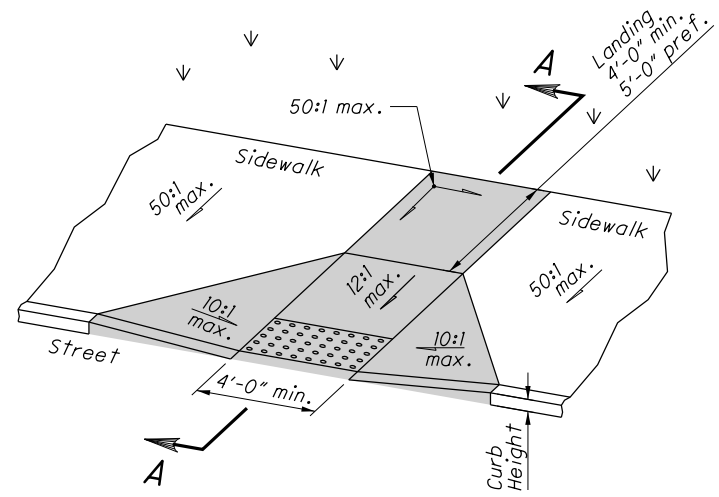
Curb ramps added to an existing intersection or walk should be individually detailed on the project plans to assure that the design is appropriate for site constraints and all items can be constructed to ADA standards. The contractor may adjust the placement of curb ramps if existing field conditions warrant with the approval of the Engineer.

**PAYMENT:** Measure and pay for the ramp area within the shaded limits of this drawing as Item 608 Curb Ramp, Square Foot. This includes the cost of **any curb or curb and gutter, detectable warnings, landing areas and any additional materials, installation, grading, forming, and finishing required within the shaded area.**

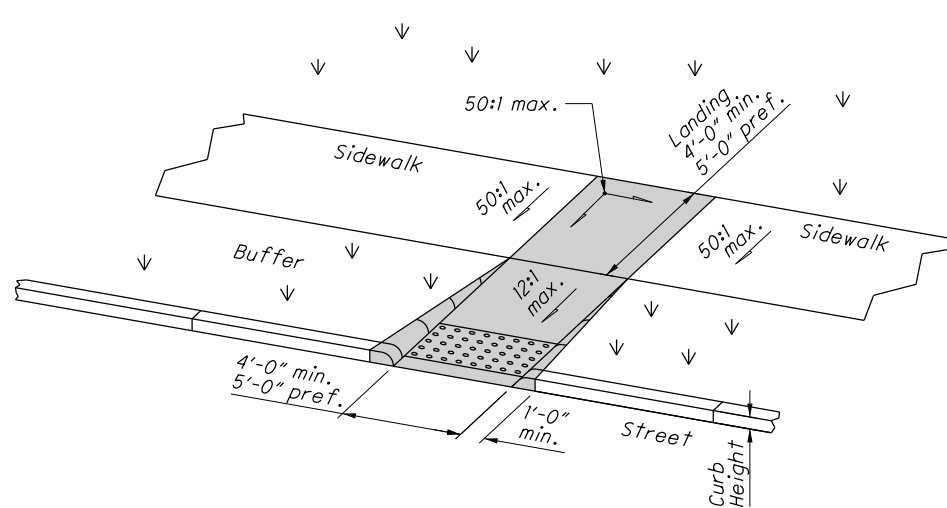
Work beyond the shaded ramp/landing area is paid for as curb (609) and walk (608). Removal of existing curb, walk (or existing curb ramps) are paid under Item 202.

For at-grade crossing locations where only detectable warnings are required in order to achieve ADA compliance, measure and pay for the strip of detectable warnings as Item 608 Detectable Warning, Square Foot. The work to cast the tiles in place will also require removal of existing pavement (Item 202) to the nearest joint, or if no joint exists, a minimum of 4 feet.



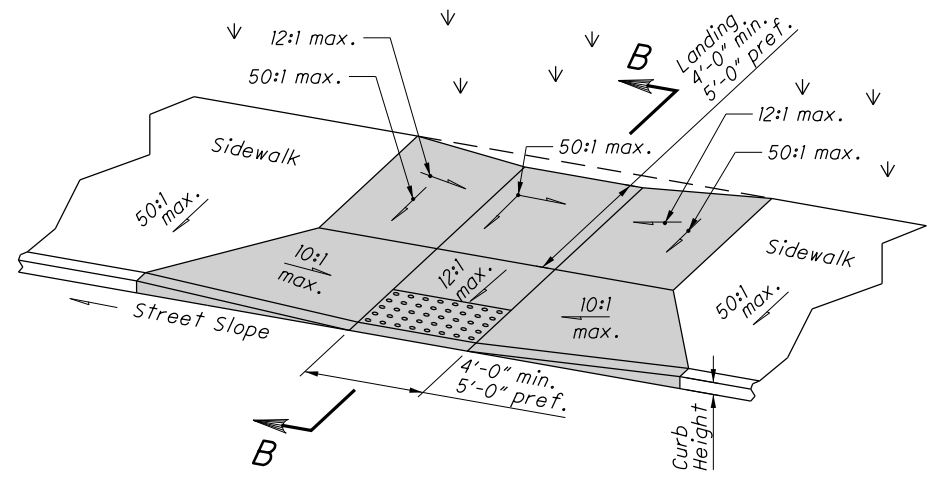


Type A1 (Perpendicular with flared sides)

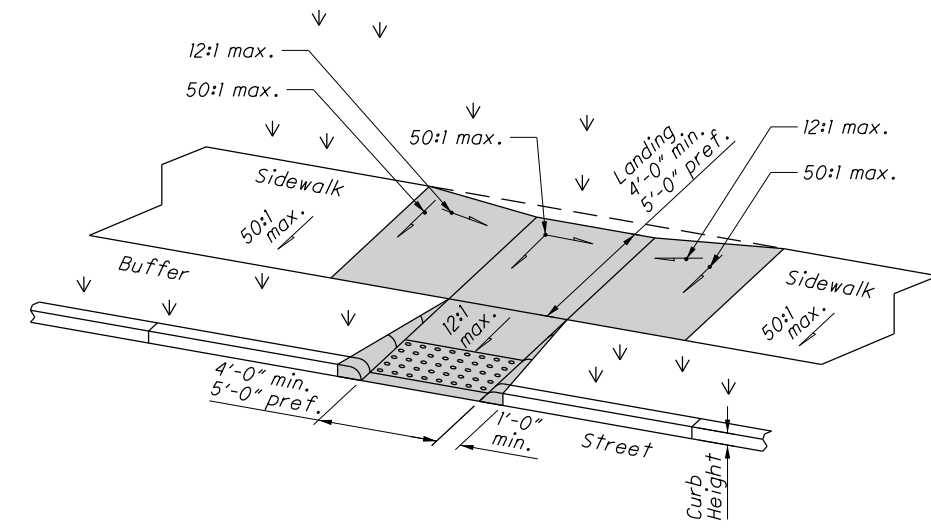


Type A2 (Perpendicular with returned curb)

PERPENDICULAR CURB RAMP DETAILS

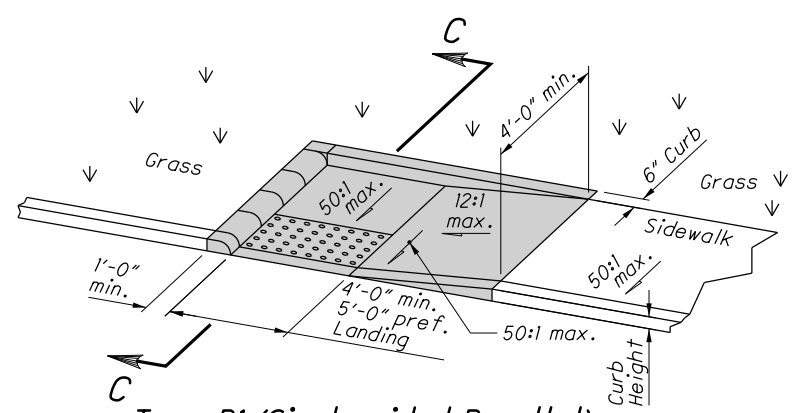


Type C1 (Combined with flared sides)

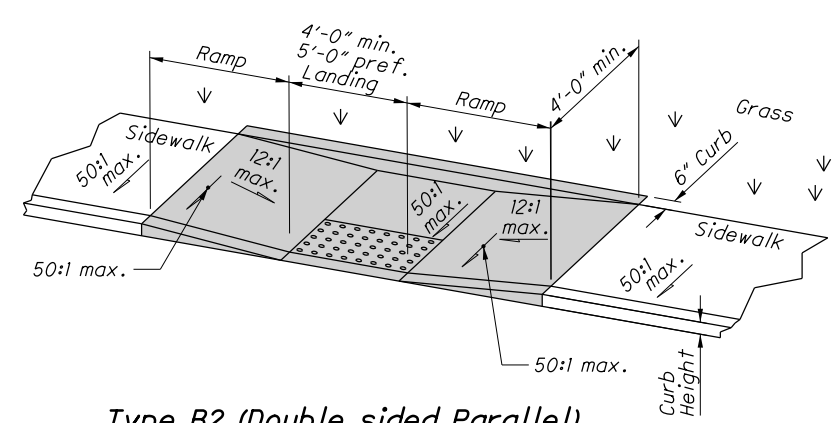


Type C2 (Combined with returned curb)

COMBINED CURB RAMP DETAILS

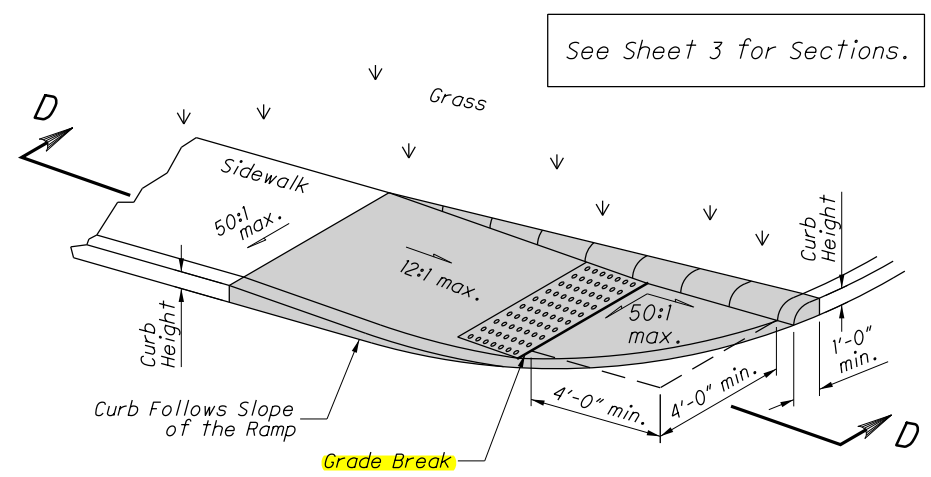


Type B1 (Single sided Parallel)



Type B2 (Double sided Parallel)

PARALLEL CURB RAMP DETAILS



Type B3 (Single sided Parallel)

NOTES CONTINUED

The running slope of the ramp is preferred to be 12:1 or flatter. In existing sidewalks, where the maximum ramp slope is not feasible due to site constraints (e.g. utility poles or vaults, right-of-way limits) it may be reduced as follows:

- A) 10:1 for a max. rise of 6",
- B) 8:1 for a max. rise of 3",
- C) 6:1 over a max. run of 2'-0" for historic areas where a flatter slope is not feasible.

To prevent chasing the grade indefinitely, the transition from existing sidewalk to the shaded curb ramp area is not required to exceed 15 feet in length.

While ramps may be skewed to the crosswalk, the entire lower landing area must fall within the cross walk that the ramp serves and cannot be located in the traveled lane of opposing traffic.

The counter slope of the gutter or street at the foot of a curb ramp, landing, or blended transitions shall be 20:1 or flatter.

The bottom edge of the ramp shall change planes perpendicular to the landing.

The edge of the curb shall be flush with the edge of the adjacent pavement and gutter and surface slopes that meet grade breaks shall also be flush.

Ramp landings shall be 4' min. x 4' min. with a 50:1 or flatter cross slope and running slope.

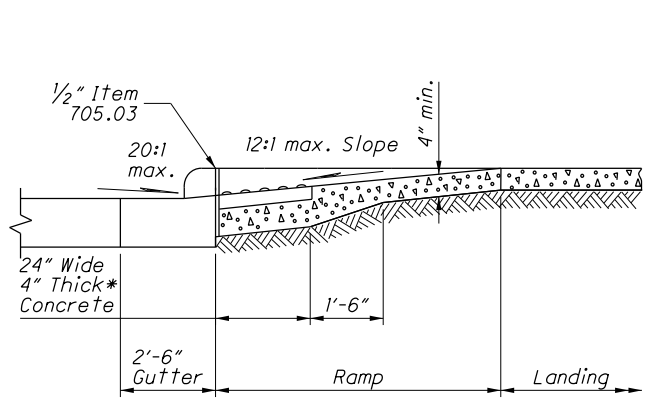
**DETECTABLE WARNINGS:** Install Detectable Warnings on each curb ramp with approved materials, as shown on Sheet 3. Install these proprietary products as per manufacturer's written instructions.

**DRAINAGE:** Contractor is to ensure the base of each constructed curb ramp allows for proper drainage, without exceeding allowable cross slope or ramp slopes. Vertical change in level exceeding 1/8" between the 1) pavement and gutter, and 2) gutter and ramp, are not allowed.

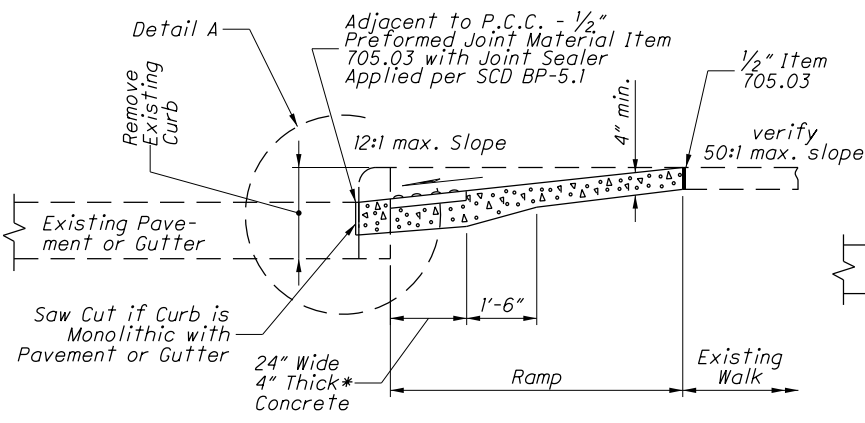
**SURFACE TEXTURE:** Texture concrete surfaces by coarse brooming transverse to the ramp slopes to be rougher than the adjacent walk.

**JOINTS:** Provide expansion joints in the curb ramp as extensions of walk joints and consistent with Item 608.03 requirements for a new concrete walk. Provide a 1/2" Item 705.03 expansion joint filler around the edge of ramps built in existing concrete walks. Lines shown on this drawing indicate the ramp edges and slope changes, and do not necessarily indicate joint lines.

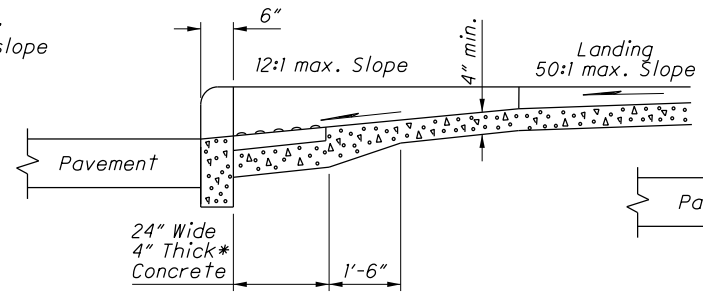
See Sheet 3 for Sections.



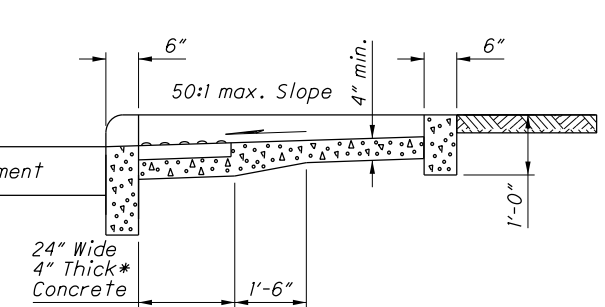
New gutter shown.  
**SECTION A-A  
 NORMAL DETAIL**  
 See Sheet 2.



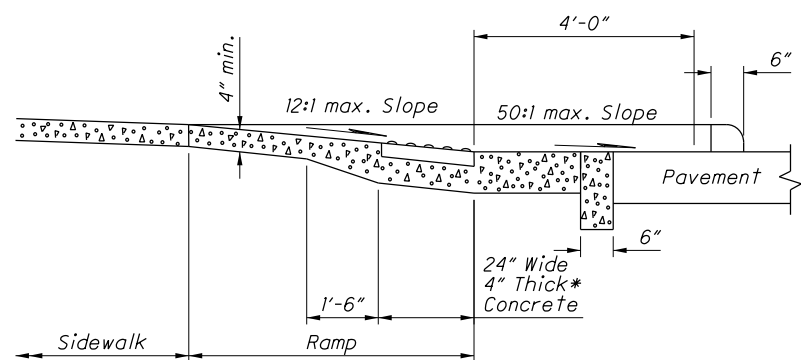
**SECTION A-A  
 EXISTING WALK DETAIL**  
 See Sheet 2.



**SECTION B-B**  
 See Sheet 2.

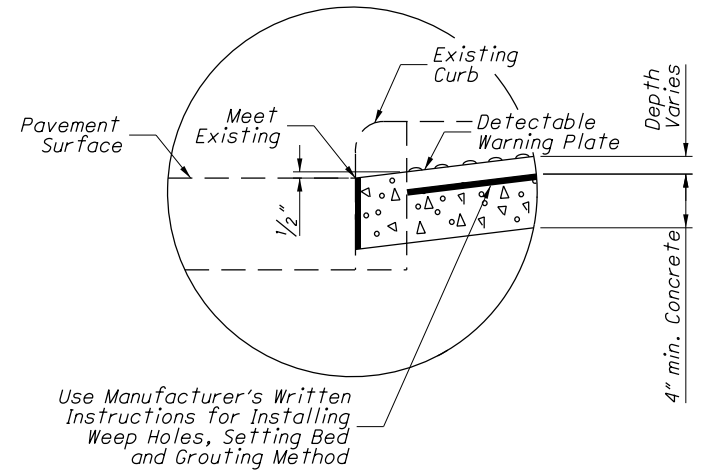


**SECTION C-C**  
 See Sheet 2.



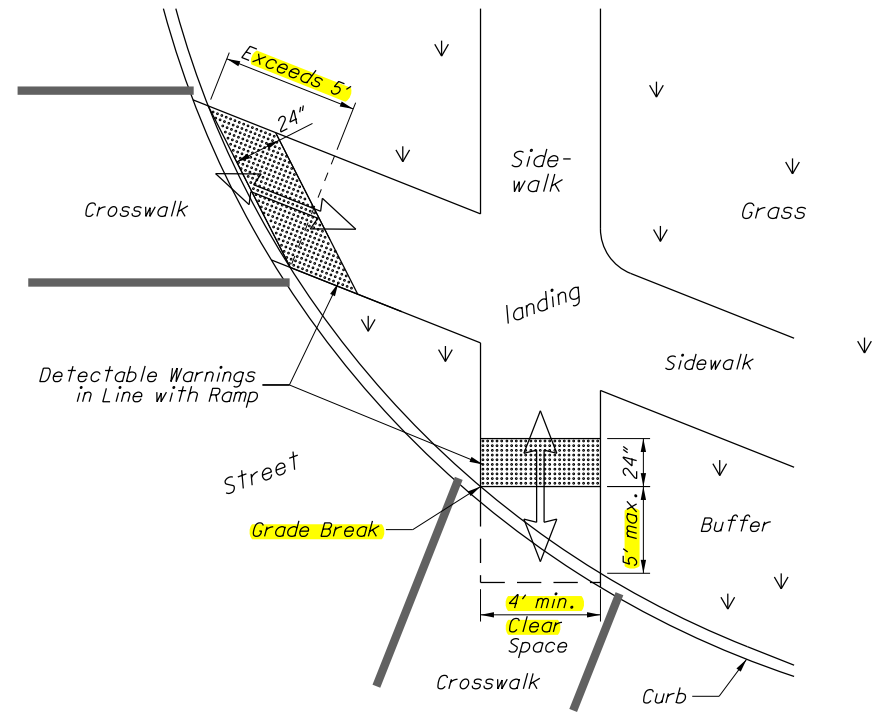
**SECTION D-D**  
 See Sheet 2.

\*Where possible, pour ramp area integral with the curb, otherwise use 6" thick walk.



**DETAIL A**

Use Manufacturer's Written Instructions for Installing Weep Holes, Setting Bed and Grouting Method



**DETECTABLE WARNING ALIGNMENT**

**DETECTABLE WARNINGS NOTES**

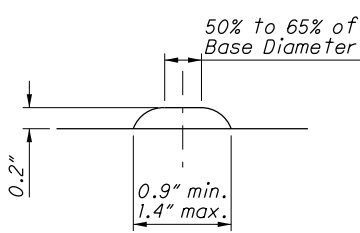
**GENERAL:** Detectable Warnings are a distinctive surface pattern of truncated domes which are detectable by cane or underfoot to alert people with vision impairments of their approach to streets and hazardous drop-offs.

**PLACEMENT:** Detectable warnings are to be installed at any location where pedestrians might cross paths with vehicular traffic lanes, such as the base of curb ramps or at blended curbs. A 24" strip of domes is to be installed for the full width of the ramp or walk. Typical street corner placement locations are shown on Sheet 1.

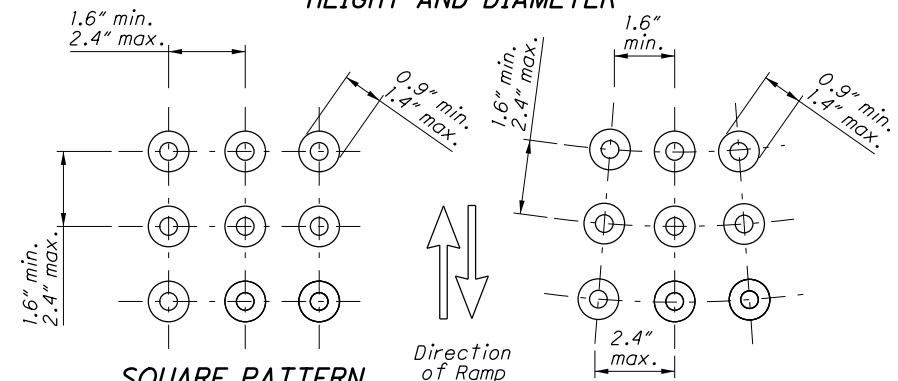
The depth of concrete underneath detectable warning products shall be a minimum of 4". See DETAIL A.

**ALIGNMENT:** Truncated domes should be aligned with the primary direction of the ramp as shown on the DETECTABLE WARNING ALIGNMENT Detail. Normally the detectable warnings should be flush with the back of the curb, **but for skewed conditions see DETECTABLE WARNING ALIGNMENT Detail.** For non-standard layouts, detectable warning materials may have to be mitered and placed segmentally.

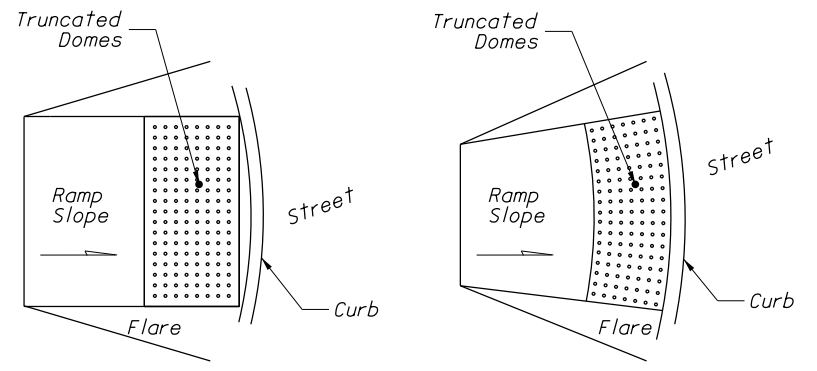
**PRODUCTS & COLORS:** Color of the detectable warnings should contrast with surrounding concrete walk and ramp. Black is not an acceptable color. Approved products and guidance on color may be found on the Office of Roadway Engineering Service's Detectable Warnings Approved List. Install products as per manufacturer's printed instructions.



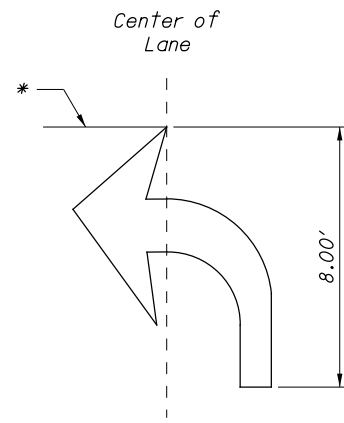
**HEIGHT AND DIAMETER**



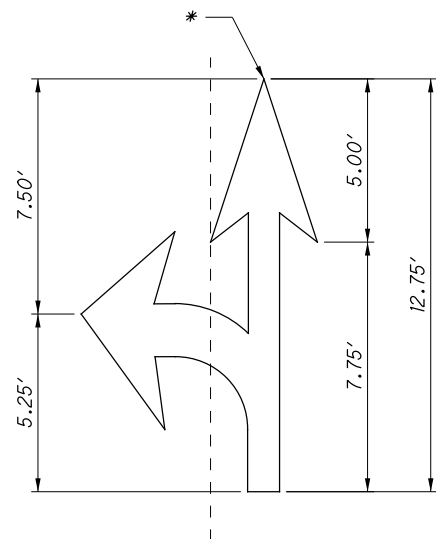
**SQUARE PATTERN,  
 PARALLEL ALIGNMENT**  
**RADIAL ALIGNMENT**  
**TRUNCATED DOMES DETAILS**



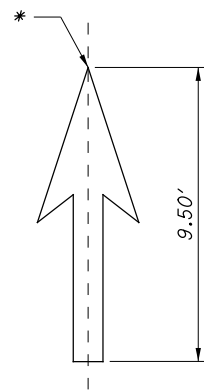
**DOME ALIGNMENT ON RADIUSSED CURB**



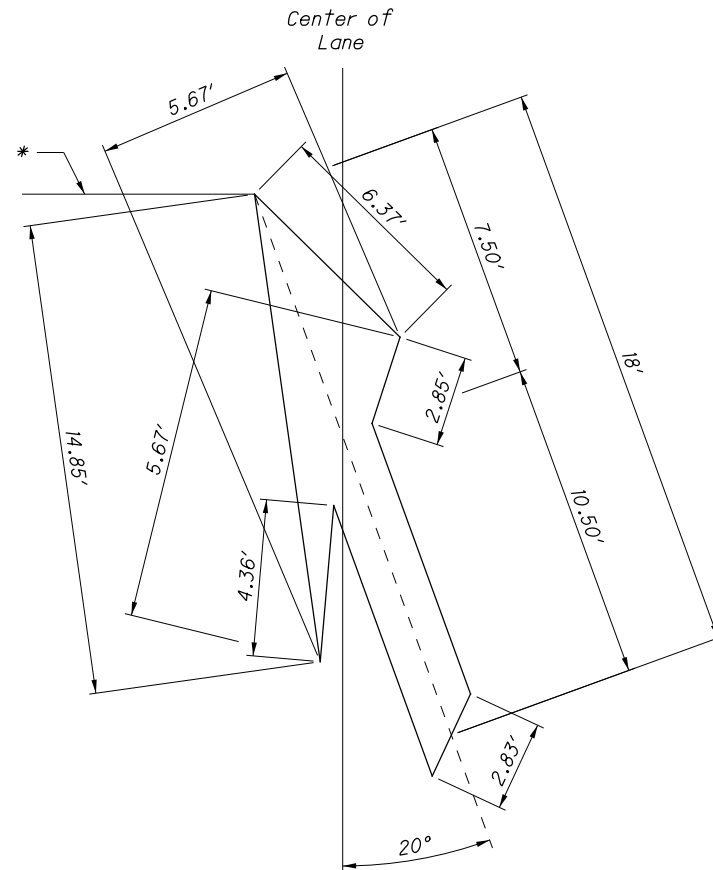
**TURN ARROW**  
(Right Arrow Opposite)



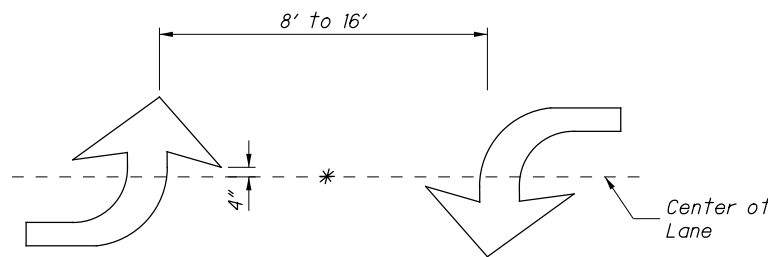
**TURN AND THROUGH ARROW**  
(Three-Headed Directional Arrows Can be Achieved by the Combination of Turn Arrows.)



**THROUGH ARROW**



**LANE-REDUCTION ARROW**  
(For Left Lane, Use Mirror Image)

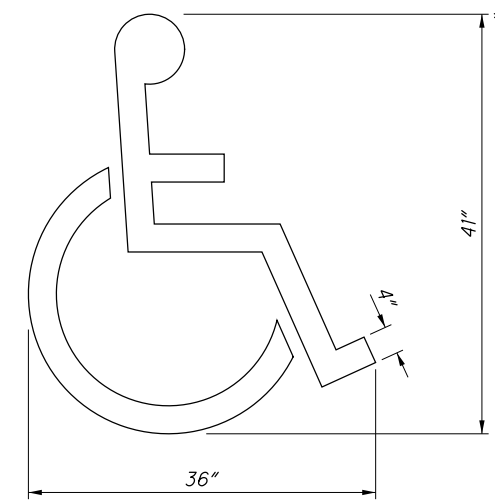


**TWO-WAY LEFT-TURN ARROWS**  
(See Note 6)

**TABLE 1 - LANE-USE ARROWS**

ARROW TYPE	SIZE (FT)	AREA (SQ FT)
Turn Arrow	8.00	17
Through Arrow	9.50	13
Turn and Through Arrow	12.75	28
Lane-Reduction Arrow	18.00	46

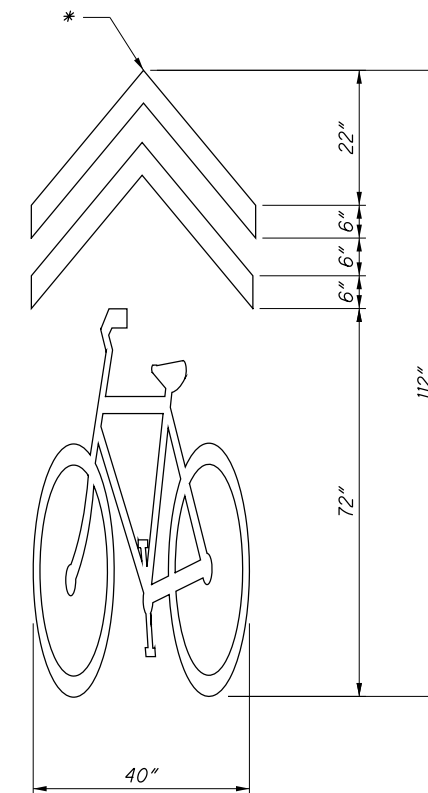
\* - Indicates Station Reference Point



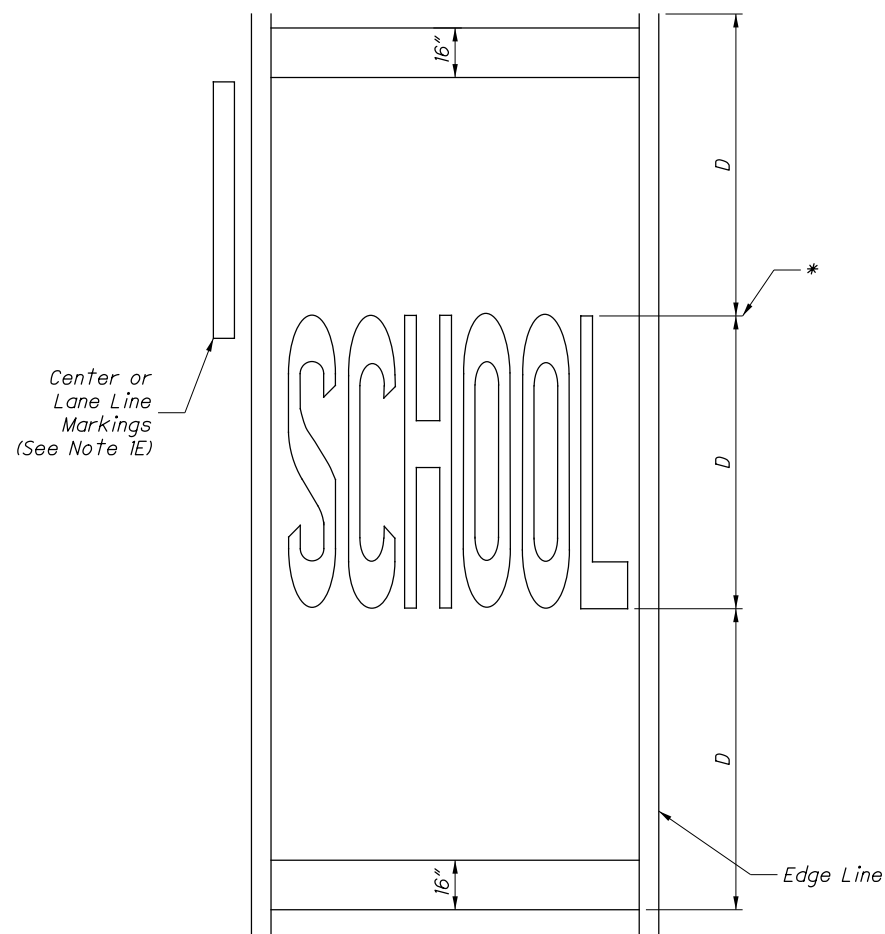
**HANDICAP SYMBOL MARKING**

**TABLE 2 - HANDICAP, BIKE & CHEVRON MARKINGS**

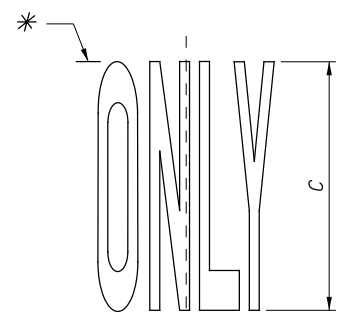
SYMBOL	HEIGHT (IN)	WIDTH (IN)	AREA (SQ FT)
HANDICAP	41	36	2.7
BIKE	72	40	16
CHEVRON	40	40	3.3 (.83 x 4)



**SHARED LANE MARKING**  
(See Note 7)



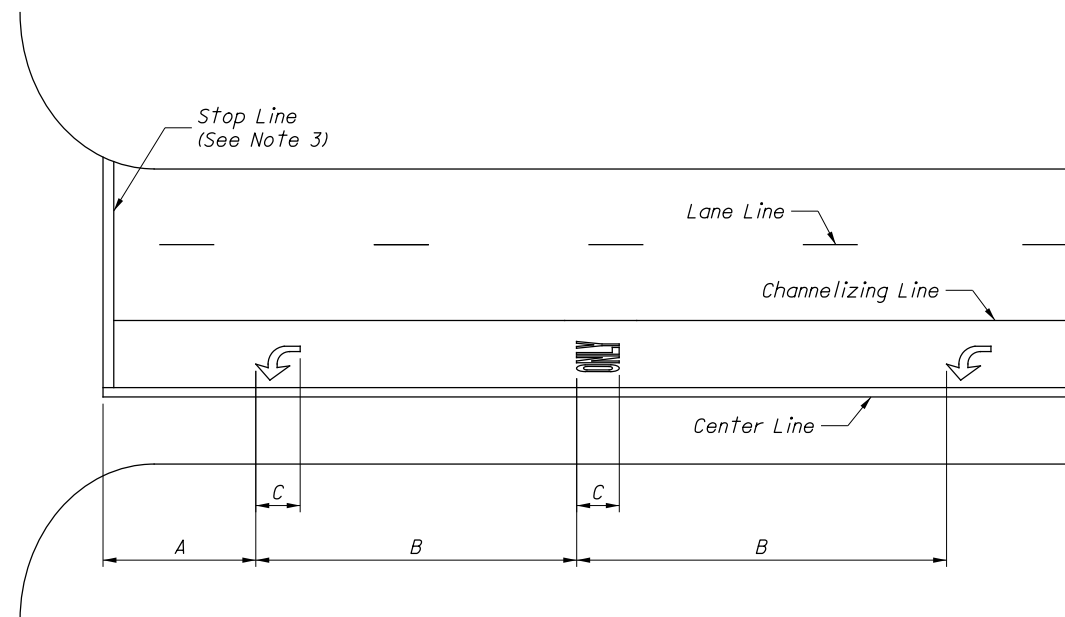
**SCHOOL WORD MARKING**  
(See Note 1)



**ONLY WORD MARKING**  
(See Note 4)

**TABLE 3 - WORDS (SQ FT)**

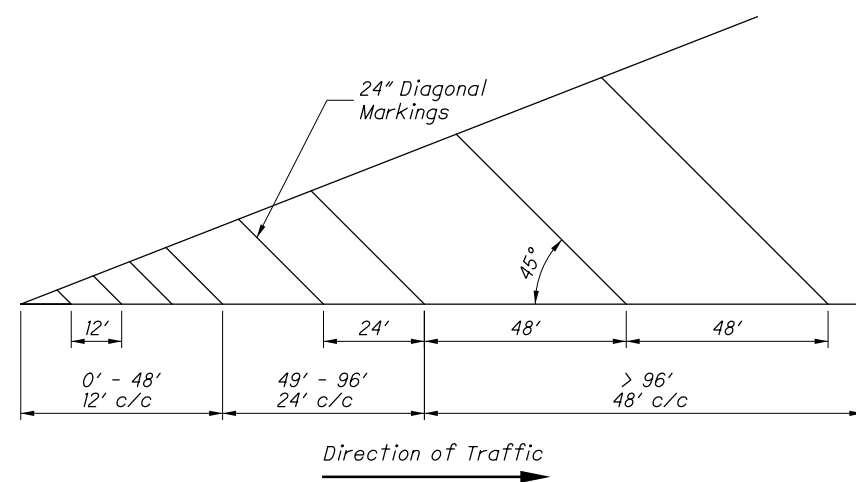
WORD	HEIGHT (C, D)		
	URBAN 6'	RURAL 8'	MULTI-LANE 10'
ONLY (C)	17	23	N/A
SCHOOL (D)	27	37	90



**TABLE 4 - LANE USE MARKINGS**

ROADWAY TYPE	DIMENSIONS (FT)		
	A (MIN.)	B	C
RURAL	30	88	8
URBAN	10	66	6

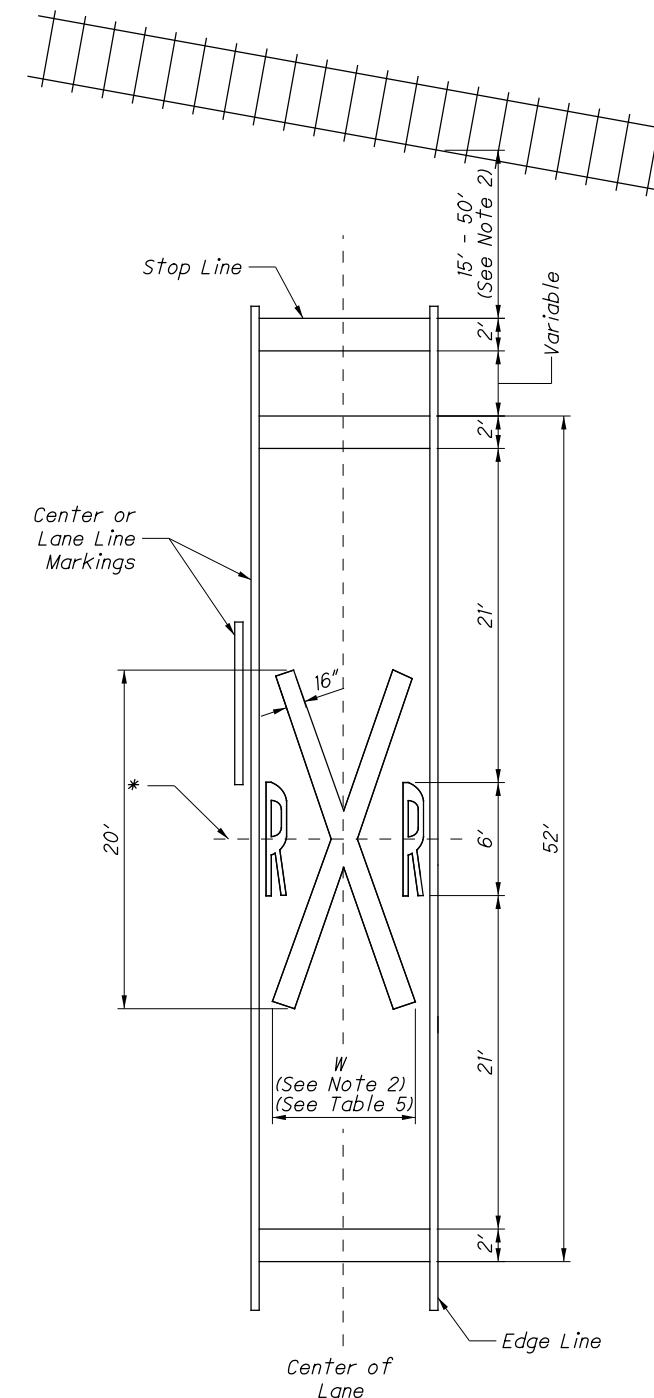
(See Note 5)



**TYPICAL SPACING DETAIL FOR 24" DIAGONAL MARKINGS**

(Chevron Markings, Including a Spacing Table, are Shown on SCD TC-72.20.)

\* - Indicates Station Reference Point



**RAILROAD SYMBOL MARKING**  
(See Note 2)

**TABLE 5 - R X R SYMBOL**

WIDTH (W) (FT)	8	9	10	11	12
AREA (SQ FT)	67	68	70	71	72

THIS DRAWING REPLACES TC-71.10 DATED 10-19-2012.

SCD NUMBER

**TC-71.10**

STANDARD ROADWAY CONSTRUCTION DRAWING

**WORD AND SYMBOL PAVEMENT MARKINGS**

**OFFICE OF ROADWAY ENGINEERING**

STCS ENGINEER  
P. Singh

STATE OF OHIO DEPARTMENT OF TRANSPORTATION  
ADMINISTRATOR  
Ryszardo Stangell  
01-17-2014  
DATE

NOTES:

SCHOOL Marking

- 1A. The SCHOOL markings shall be installed on all paved approaches in advance of all School Zones.
- 1B. The SCHOOL markings should be placed at least 100' in advance of the School Zone. The preferred placement of the SCHOOL marking is adjacent to the School Zone Advance sign.
- 1C. On two-way, two-lane highways the following shall apply:
  - 1.) When the approach lane to the School Zone is 11' or more in width -
    - a.) The SCHOOL word marking and transverse lines shall be contained in, and centered in, the lane.
    - b.) The character height shall be 6' for urban areas and 8' for rural areas.
  - 2.) When the approach lane to the School Zone is less than 11' in width -
    - a.) One installation of the SCHOOL word marking and transverse lines shall extend across both lanes of traffic.
    - b.) The characters shall be 10' in height.
- 1D. On multi-lane approaches the following shall apply -
  - 1.) When the approach lanes to the School Zone are 11' or more in width -
    - a.) The SCHOOL word marking and transverse lines shall be contained in, and centered in, each lane.
    - b.) The character height shall be 6' for urban areas and 8' for rural areas.
  - 2.) When the approach lanes to the School Zone are less than 11' in width -
    - a.) One installation of the SCHOOL word marking shall extend to the width of two approach lanes.
    - b.) Transverse lines shall extend across all approach lanes of traffic.
    - c.) The characters shall be 10' in height.
- 1E. Center or lane lines shall not pass through the SCHOOL word marking.
- 1F. 6' and 8' high SCHOOL word marking shall be marked with 4" strokes.  
  
10' high SCHOOL word marking shall be marked with 8" strokes.
- 1G. The area of the transverse lines varies with the width of the pavement; therefore, the area must be added to the value in Table 3 (sheet 2).

Railroad Crossing Markings

- 2A. On multi-lane approaches, markings shall be as follows -
  - a.) The RXR symbol shall be placed in each approach lane.
  - b.) Transverse lines used with the railroad symbols shall extend across all approach lanes.
- 2B. The railroad symbol should be located so that the Railroad Advance Warning (W10-1) sign is within the two transverse boundary lines of the railroad symbol.
- 2C. The stop line shall be located for best sight distance between 15' - 50' of the near edge of the tracks.
- 2D. The stop line shall be approximately 8' from a gate (if present).
- 2E. Width (W) of the "X" will vary according to the lane width.
- 2F. The height of the "R" shall be 6'.
- 2G. The area of the transverse lines and stop lines varies with the width of the pavement; therefore the area must be added to the value in Table 5 (sheet 2).

Stop Line Marking

- 3A. Except as specified in Notes 3B and 3C, the stop line should be placed as follows:
  - a.) The stop line should be placed where cross-corner vision is maximum.
  - b.) In no case shall the stop line be placed more than 30' or less than 4' from the nearest edge of the intersecting roadway.
  - c.) For normal intersections the maximum distance should be 10'.
- 3B. If a marked crosswalk is present the stop line should be placed 4' in advance of, and parallel to, the nearest crosswalk line.
- 3C. For signalized intersections the stop line should be placed at a minimum distance of 40' from the nearest signal head.

ONLY Word Marking

- 4A. The ONLY word marking is optional.
- 4B. Where used, the spacing between ONLY and arrow markings should be based on Table 4 (sheet 2).
- 4C. When lane-use arrow markings are used and the ONLY marking is not, an additional lane-use arrow should be used in its place to retain the spacing as shown in Table 4 (sheet 2).

Lane-Use Arrow Markings

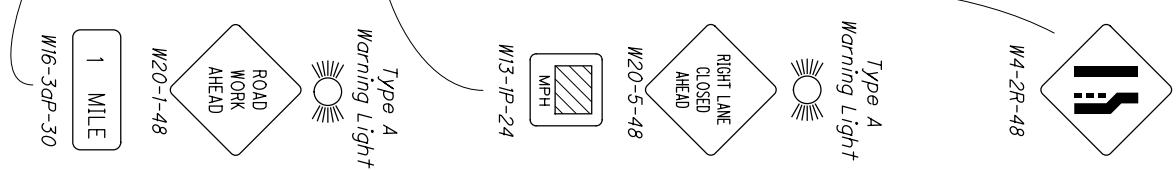
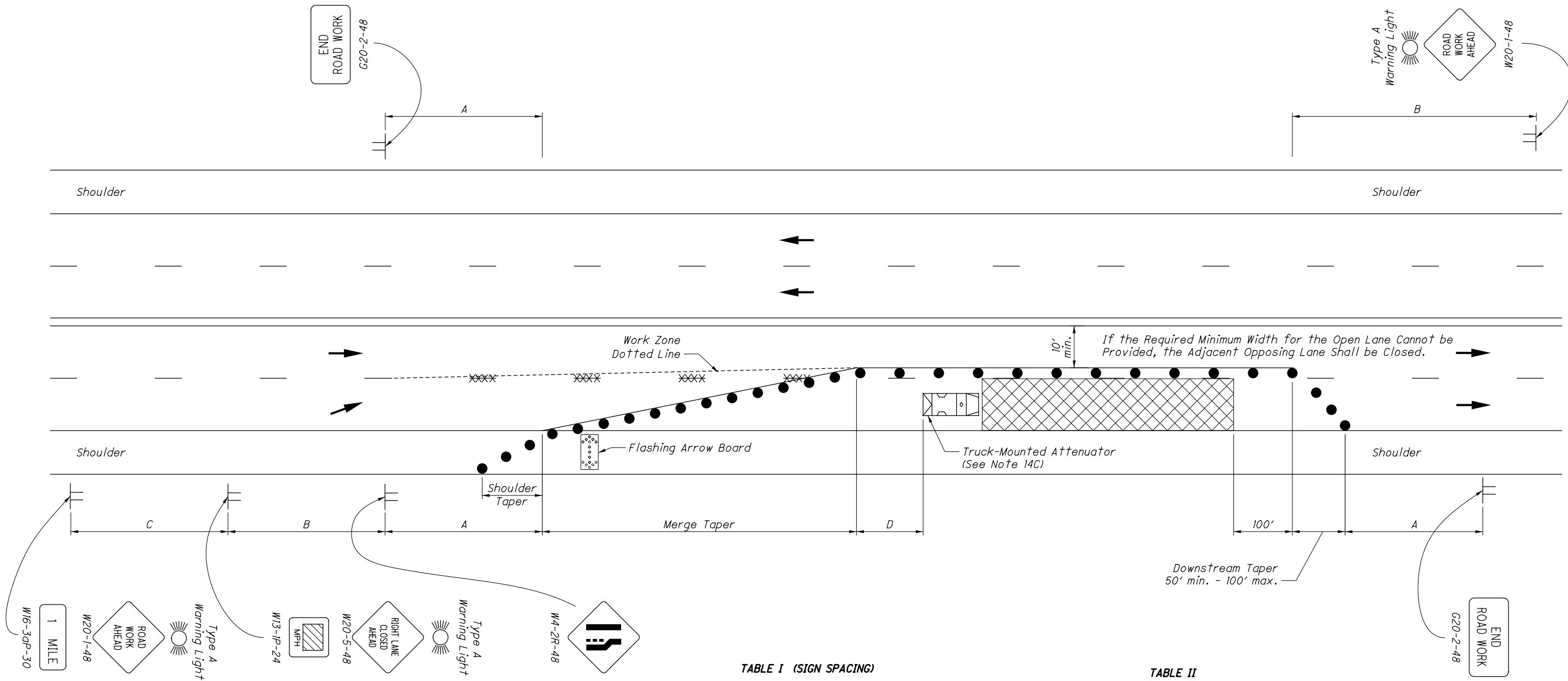
- 5A. Lane-use arrow markings are optional except where a through traffic lane(s) approaching an intersection becomes a mandatory turn lane(s).
- 5B. Where used, the spacing between markings should be based on Table 4 (sheet 2). However, based on the turn lane length, the spacing between the markings may be adjusted.

Two-Way Left-Turn Only (TWLTO) Arrows

- 6A. Arrow sets should be longitudinally spaced at intervals of:
  - a.) 500' - 1000' for speeds less than or equal to 40 mph,
  - b.) 1000' - 1500' for speeds over 40 mph
- 6B. In addition, an arrow set should be placed:
  - a.) 100' - 200' from the near edge of an intersecting roadway, or
  - b.) Inside both ends of TWLTO lanes.

Shared Lane Marking

- 7A. When chevron markings are used, its area must be added to the value of the bike symbol markings (see Table 2 on sheet 1).
- 7B. When used, the shared lane marking should be placed immediately after an intersection and spaced at intervals not greater than 250' thereafter.



**LEGEND**

- WORK AREA
- DRUMS/CONES
- REMOVE EXISTING MARKINGS
- DIRECTION OF TRAVEL
- SHADOW VEHICLE

**TABLE I (SIGN SPACING)**

ROAD TYPE	DISTANCE BETWEEN SIGNS (FT)		
	A	B	C
MAJOR CONVENTIONAL	500	500	500
FREEWAY & EXPRESSWAY	1000	1500	2640

**TABLE II**

SPEED LIMIT (MPH)	MERGING TAPER RATE MINIMUM	SHOULDER TAPER RATE MINIMUM	MAXIMUM DRUM SPACING (FT)		BUFFER (D) (FT) MINIMUM
			TAPER SEC.	TANGENT SEC.	
25	11:1	4:1	25	40	155
30	15:1	5:1	30	40	200
35	21:1	7:1	35	40	250
40	27:1	9:1	40	80	305
45	45:1	15:1	45	80	360
50	50:1	17:1	50	80	425
55	55:1	19:1	55	80	495

THIS DRAWING REPLACES MT-95.31 DATED 07-19-2013.  
STANDARD ROADWAY CONSTRUCTION DRAWING

SCD NUMBER  
**MT-95.31**

**CLOSING RIGHT LANE OF A MULTI-LANE UNDIVIDED HIGHWAY WITH DRUMS**

OFFICE OF ROADWAY ENGINEERING

STCS ENGINEER  
Soisson

STATE OF OHIO DEPARTMENT OF TRANSPORTATION  
ADMINISTRATOR  
Pyraldo Stangell  
07-18-2014  
DATE

NOTES:

DESIGN SPEED

- 1. The design speed used for taper rates should typically be the permanent legal speed. However, on construction projects for which the speed limit is reduced, the reduced speed may be used in determining the taper rate when the taper is not the first active construction area within the project.

TAPERS

- 2A. The minimum acceptable length for the merge taper shall be determined by multiplying the width of offset by the merge taper rate. The merge taper rate is provided in Table II.
- 2B. The minimum acceptable length for the shoulder taper shall be determined by multiplying the width of the shoulder by the shoulder taper rate. The shoulder taper rate is provided in Table II.

SIGN SPACING

- 3A. The work zone sign spacings shown in Table I are minimums. Maximum spacing should not be greater than 1.5 times the distances shown in Table I.
- 3B. Sign spacing should be adjusted to avoid conflict with existing signs. Minimum spacing to existing signs shall be 200' for speeds of 45 mph or less and a minimum of 400' for speeds 50 mph or greater.

ADJUSTMENTS FOR SIGHT DISTANCE

- 4. The location of the merging taper and the advance warning signs should be adjusted to provide for adequate sight distance for the existing vertical and horizontal roadway alignment.

BASIC SIGNING

- 5A. ROAD WORK AHEAD (W20-1) signs shall be provided on entrance ramps or roadways entering the work limits.
- 5B. END ROAD WORK (G20-2) signs are only required for lane closures of more than 1 day. It is intended that these signs be placed on the mainline, on all exit ramps, and on roadways exiting the work limits.
- 5C. Overlapping of signing for adjacent projects should be avoided where the messages could be confusing. Any W20-1 or G20-2 signs which falls within the limits of another traffic control zone shall be omitted or covered during the period when both projects are active.

SIGNING DETAILS

- 6A. The Advisory Speed (W13-1P) plaque shall be used when specified in the plan.
- 6B. When the approach speed limit is 40 mph or less, 36" warning signs may be used.
- 6C. The distance plaque W16-3aP (or W16-2aP if the distance shown is in feet) shall indicate the distance to the beginning of the merging taper. Distances less than 1 mile may be expressed in feet. The plaque may be omitted if Extra Advance Sign Groups are not used.
- 6D. Provide signing on the inactive side of the highway, as shown, when specified in the plans.

EXTRA ADVANCE WARNING SIGNING

- 7. Extra Advance Warning Sign Groups consisting of ROAD WORK AHEAD (W20-1), LANE CLOSED AHEAD (W20-5) and WATCH FOR STOPPED TRAFFIC (W3-H4b) signs plus Distance plaques may be specified in the plans or may be required to be erected, as determined by the Engineer (See Standard Construction Drawing (SCD) MT-95.50).

PAVEMENT MARKINGS / RPMs

- 8A. If the construction operation requires a lane closure for more than 1 day, the existing conflicting reflectors shall be removed from the raised pavement markers (RPMs).
- 8B. Additionally, if a lane closure of greater than 3 days is required, the following shall be performed:
  - a) The appropriate color work zone edge lines shall be applied along the taper.
  - b) The existing conflicting pavement markings shall be removed or covered per CMS 614.11G.
  - c) Work zone dotted lines, 3' in length separated by 9' gaps, shall be provided to identify the merge.
- 8C. Work zone edge lines shall be provided along the tangent section when specified in the plans.
- 8D. Work zone pavement markings which would conflict with final traffic lanes shall be removable tape (CMS 740.06, Type I) unless the area will be resurfaced prior to project completion.
- 8E. After completion of the work, pavement markings other than CMS 740.06, Type I shall be removed in accordance with CMS 614.11 I. The original markings and raised pavement marker reflectors shall be restored at no additional cost unless separately itemized in the plans.

(RESERVED FOR FUTURE USE)

- 9A. (intentionally blank)

FLASHING ARROW BOARD

- 10. The flashing arrow board shall be chosen from the ODOT approved list and follow the guidelines in Supplemental Specification 821.

FLASHING WARNING LIGHTS

- 11. Type A flashing warning lights shown on the ROAD WORK AHEAD (W20-1) signs and on the LANE CLOSED AHEAD (W20-5) signs are required whenever a night lane closure is necessary.

INTERSECTION / DRIVEWAY ACCESS

- 12. Within the length of the closure, provision shall be made to control traffic entering from intersecting streets and major drives as necessary to prevent wrong-way movements and to keep vehicles off of new pavement not ready for traffic. The Contractor shall:
  - a) Place across the closed lane, either 3 drums (cones) or barricades, and/or
  - b) Provide an additional flagger at every public street intersection and major driveway.

Drums (cones) placed across the closed lane shall be located 25' beyond the projected pavement edges of the driveway or cross highway, as shown in SCD MT-97.11. For barricades, see SCD MT-101.60.

Existing STOP signs shall be relocated as necessary to assure proper location for the traffic conditions.

The method of control shall be subject to the approval of the Engineer.

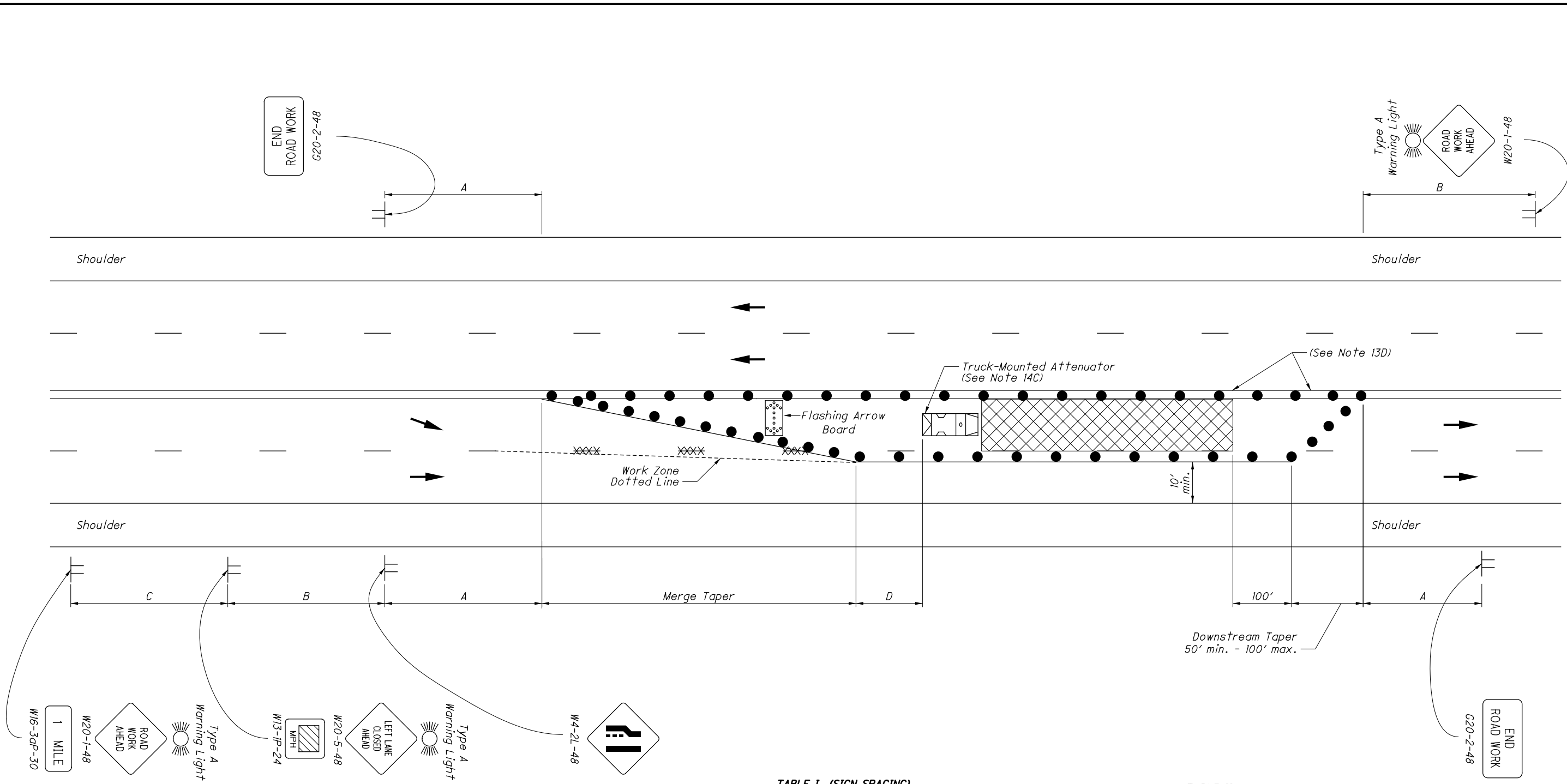
DRUMS / CONES

- 13A. The maximum drum spacing along tapers and along tangent sections shall be as shown in Table II. A minimum of 5 drums shall be used to close the upstream shoulder. The downstream taper drum spacing shall be approximately 20'.
- 13B. Cones may be substituted for drums as follows:
  - a) Use of cones is permissible for either daytime operation or for nighttime operation, but shall not be used continuously, day and night. Upon completion of work within the work period, the cones shall be removed. They may again be placed on the highway in order to resume work in the following such work period.
  - b) Cones used for daytime traffic control shall have a minimum height of 28".
  - c) Cones used for nighttime traffic control shall have a minimum height of 42".
  - d) Use of cones at night shall be prohibited along tapers.
  - e) Cone spacing at night shall be at a maximum of 40'.
  - f) Where cones are substituted for drums along tangents, intermixing of channelizing devices within the same run will not be permitted. Either cones shall be used for the entire length of the tangent section, or drums shall be used for the entire length.

- 13C. Provisions shall be made to stabilize the cones and drums to prevent them from blowing over.

SHADOW VEHICLE

- 14A. The shadow vehicle shall be in place and unoccupied whenever workers are in the work area. This vehicle shall be removed from the pavement whenever workers are not in the work area.
- 14B. The shadow vehicle shall be equipped with a high-intensity yellow rotating, flashing, oscillating, or strobe light(s).
- 14C. The vehicle shall be equipped with a truck-mounted attenuator when specified in the plans.



**LEGEND**

- WORK AREA
- DRUMS/CONES
- REMOVE EXISTING MARKINGS
- DIRECTION OF TRAVEL
- SHADOW VEHICLE

**TABLE I (SIGN SPACING)**

ROAD TYPE	DISTANCE BETWEEN SIGNS (FT)		
	A	B	C
MAJOR CONVENTIONAL	500	500	500
FREEWAY & EXPRESSWAY	1000	1500	2640

**TABLE II**

SPEED LIMIT (MPH)	MERGING TAPER RATE MINIMUM	SHOULDER TAPER RATE MINIMUM	MAXIMUM DRUM SPACING (FT)		BUFFER (D) (FT) MINIMUM
			TAPER SEC.	TANGENT SEC.	
25	11:1	4:1	25	40	155
30	15:1	5:1	30	40	200
35	21:1	7:1	35	40	250
40	27:1	9:1	40	80	305
45	45:1	15:1	45	80	360
50	50:1	17:1	50	80	425
55	55:1	19:1	55	80	495

THIS DRAWING REPLACES MT-95.32 DATED 07-19-2013.



## NOTES:

### DESIGN SPEED

1. The design speed used for taper rates should typically be the permanent legal speed. However, on construction projects for which the speed limit is reduced, the reduced speed may be used in determining the taper rate when the taper is not the first active construction area within the project.

### TAPERS

- 2A. The minimum acceptable length for the merge taper shall be determined by multiplying the width of offset by the merge taper rate. The merge taper rate is provided in Table II.
- 2B. The minimum acceptable length for the shoulder taper shall be determined by multiplying the width of the shoulder by the shoulder taper rate. The shoulder taper rate is provided in Table II.

### SIGN SPACING

- 3A. The work zone sign spacings shown in Table I are minimums. Maximum spacing should not be greater than 1.5 times the distances shown in Table I.
- 3B. Sign spacing should be adjusted to avoid conflict with existing signs. Minimum spacing to existing signs shall be 200' for speeds of 45 mph or less and a minimum of 400' for speeds 50 mph or greater.

### ADJUSTMENTS FOR SIGHT DISTANCE

4. The location of the merging taper and the advance warning signs should be adjusted to provide for adequate sight distance for the existing vertical and horizontal roadway alignment.

### BASIC SIGNING

- 5A. ROAD WORK AHEAD (W20-1) signs shall be provided on entrance ramps or roadways entering the work limits.
- 5B. END ROAD WORK (G20-2) signs are only required for lane closures of more than 1 day. It is intended that these signs be placed on the mainline, on all exit ramps, and on roadways exiting the work limits.
- 5C. Overlapping of signing for adjacent projects should be avoided where the messages could be confusing. Any W20-1 or G20-2 signs which falls within the limits of another traffic control zone shall be omitted or covered during the period when both projects are active.

### SIGNING DETAILS

- 6A. The Advisory Speed (W13-1P) plaque shall be used when specified in the plan.
- 6B. When the approach speed limit is 40 mph or less, 36" warning signs may be used.
- 6C. The distance plaque W16-3aP (or W16-2aP if the distance shown is in feet) shall indicate the distance to the beginning of the merging taper. Distances less than 1 mile may be expressed in feet. The plaque may be omitted if Extra Advance Sign Groups are not used.
- 6D. Provide signing on the inactive side of the highway, as shown, when specified in the plans.

### EXTRA ADVANCE WARNING SIGNING

7. Extra Advance Warning Sign Groups consisting of ROAD WORK AHEAD (W20-1), LANE CLOSED AHEAD (W20-5) and WATCH FOR STOPPED TRAFFIC (W3-H4b) signs plus Distance plaques may be specified in the plans or may be required to be erected, as determined by the Engineer (see Standard Construction Drawing (SCD) MT-95.50).

### PAVEMENT MARKINGS / RPMs

- 8A. If the construction operation requires a lane closure for more than 1 day, the existing conflicting reflectors shall be removed from the raised pavement markers (RPMs).
- 8B. Additionally, if a lane closure of greater than 3 days is required, the following shall be performed:
  - a) The appropriate color work zone edge lines shall be applied along the taper.
  - b) The existing conflicting pavement markings shall be removed or covered per CMS 614.11G.
  - c) Work zone dotted lines, 3' in length separated by 9' gaps, shall be provided to identify the merge.
- 8C. Work zone edge lines shall be provided along the tangent section when specified in the plans.
- 8D. Work zone pavement markings which would conflict with final traffic lanes shall be removable tape (CMS 740.06, Type I) unless the area will be resurfaced prior to project completion.
- 8E. After completion of the work, pavement markings other than CMS 740.06, Type I shall be removed in accordance with CMS 614.11 I. The original markings and raised pavement marker reflectors shall be restored at no additional cost unless separately itemized in the plans.

### (RESERVED FOR FUTURE USE)

- 9A. (intentionally blank)

### FLASHING ARROW BOARD

10. The flashing arrow board shall be chosen from the ODOT approved list and follow the guidelines in Supplemental Specification 821.

### FLASHING WARNING LIGHTS

11. Type A flashing warning lights shown on the ROAD WORK AHEAD (W20-1) signs and on the LANE CLOSED AHEAD (W20-5) signs are required whenever a night lane closure is necessary.

### INTERSECTION / DRIVEWAY ACCESS

12. Within the length of the closure, provision shall be made to control traffic entering from intersecting streets and major drives as necessary to prevent wrong-way movements and to keep vehicles off of new pavement not ready for traffic. The Contractor shall:
  - a) Place across the closed lane, either 3 drums (cones) or barricades, and/or
  - b) Provide an additional flagger at every public street intersection and major driveway.

Drums (cones) placed across the closed lane shall be located 25' beyond the projected pavement edges of the driveway or cross highway, as shown in SCD MT-97.11. For barricades, see SCD MT-101.60.

Existing STOP signs shall be relocated as necessary to assure proper location for the traffic conditions.

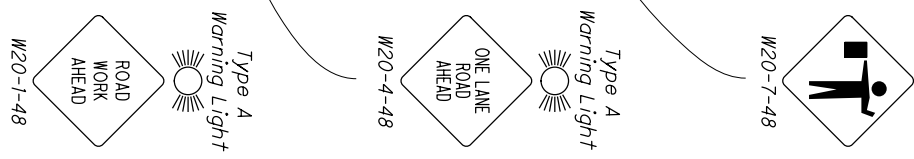
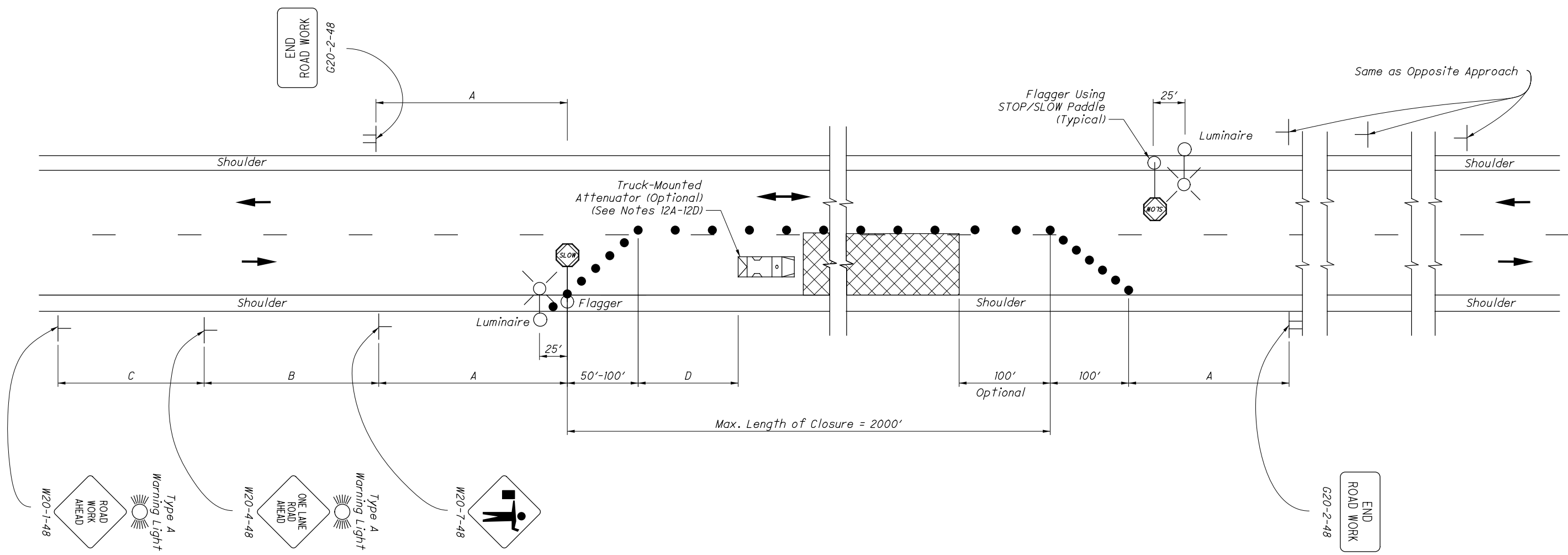
The method of control shall be subject to the approval of the Engineer.

### DRUMS / CONES

- 13A. The maximum drum spacing along tapers and along tangent sections shall be as shown in Table II. A minimum of 5 drums shall be used to close the upstream shoulder. The downstream taper drum spacing shall be approximately 20'.
- 13B. Cones may be substituted for drums as follows:
  - a) Use of cones is permissible for either daytime operation or for nighttime operation, but shall not be used continuously, day and night. Upon completion of work within the work period, the cones shall be removed. They may again be placed on the highway in order to resume work in the following such work period.
  - b) Cones used for daytime traffic control shall have a minimum height of 28".
  - c) Cones used for nighttime traffic control shall have a minimum height of 42".
  - d) Use of cones at night shall be prohibited along tapers.
  - e) Cone spacing at night shall be at a maximum of 40'.
  - f) Where cones are substituted for drums along tangents, intermixing of channelizing devices within the same run will not be permitted. Either cones shall be used for the entire length of the tangent section, or drums shall be used for the entire length.
- 13C. Provisions shall be made to stabilize the cones and drums to prevent them from blowing over.
- 13D. Drums shall not encroach into the opposing lane of traffic. If drums encroach into the opposing lane, the lane shall be closed.

### SHADOW VEHICLE

- 14A. The shadow vehicle shall be in place and unoccupied whenever workers are in the work area. This vehicle shall be removed from the pavement whenever workers are not in the work area.
- 14B. The shadow vehicle shall be equipped with a high-intensity yellow rotating, flashing, oscillating, or strobe light(s).
- 14C. The vehicle shall be equipped with a truck-mounted attenuator when specified in the plans.



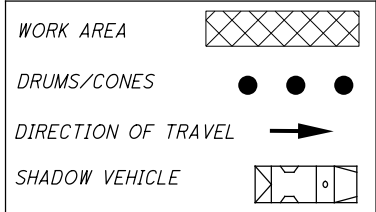
**TABLE I (SIGN SPACING)**

ROAD TYPE	DISTANCE BETWEEN SIGNS (FT)		
	A	B	C
Two-Lane (< 40 MPH)	100	100	100
Two-Lane (45-50 MPH)	350	350	350
Two-Lane (55-60 MPH)	500	500	500

**TABLE II**

SPEED LIMIT (MPH)	BUFFER (D) (FT) MIN.
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570

**LEGEND**



THIS DRAWING REPLACES MT-97.10 DATED 07-19-2013.

STANDARD ROADWAY CONSTRUCTION DRAWING

**FLAGGER CLOSING 1 LANE OF A 2-LANE HIGHWAY - STATIONARY OPERATION**

**MT-97.10**

**OFFICE OF ROADWAY ENGINEERING**

STCS ENGINEER  
Soisson

STATE OF OHIO DEPARTMENT OF TRANSPORTATION  
ADMINISTRATOR  
Raynaldo Stangell  
07-18-2014  
DATE

NOTES:

FLAGGERS

- 1. *Flaggers, one for each direction, shall be used to control traffic continuously for as long as a one lane operation is in effect. The flaggers shall be able to communicate with each other at all times.*

LENGTH OF CLOSURE

- 2. *Several small work areas close together should be combined into one work zone. However, the closure shall not be more than 2000' long unless approved by the Engineer. The minimum length between closures shall be 2000'. Only one side of the road shall be closed in any one work zone.*

SIGN LOCATION AND SPACING

- 3A. *The minimum spacing between work zone signs is shown in Table 1. Maximum spacing should not be greater than 1.5 times the distances shown in Table 1.*
- 3B. *Sign spacing should be adjusted to avoid conflict with existing signs. Minimum spacing to existing signs shall be 200' for speeds of 45 mph or less and a minimum of 400' for speeds of 50 mph or greater.*
- 3C. *The location of the advance warning signs should be adjusted to provide for adequate sight distance for the existing vertical and horizontal roadway alignment.*

ADJUSTMENTS FOR SIGHT DISTANCE

- 4. *The location of the flagger station and the advance warning signs should be adjusted to provide for adequate sight distance for the existing vertical and horizontal roadway alignment.*

BASIC SIGNING

- 5A. *ROAD WORK AHEAD (W20-1) signs shall be provided on entrance ramps or roadways entering the work limits.*
- 5B. *END ROAD WORK (G20-2) signs are only required for lane closures of more than 1 day. If is intended that these signs be placed on the mainline, on all exit ramps, and on roadways exiting the work limits.*
- 5C. *Overlapping of signing for adjacent projects should be avoided where the messages could be confusing. Any ROAD WORK AHEAD (W20-1) or END ROAD WORK (G20-2) sign which falls within the limits of another traffic control zone shall be omitted or covered during the period when both projects are active.*

SIGNING DETAILS

- 6A. *The Advisory Speed (W13-1P) plaque shall be used when specified in the plan.*
- 6B. *36" warning signs may be used when the approach speed limit is 40 mph or less.*

FLASHING WARNING LIGHTS

- 7. *Type A flashing warning lights shown on the ROAD WORK AHEAD (W20-1) signs and on the LANE CLOSED AHEAD (W20-5) signs are required whenever a night lane closure is necessary.*

DRUMS / CONES

- 8A. *Drum spacing shall be as follows:*
  - a) *Spacing along the closure shall be 40' center-to-center.*
  - b) *Spacing along the approach taper shall be 10' center-to-center.*
- 8B. *Cones may be substituted for drums as follows:*
  - a) *Cones used for daytime traffic control shall have a minimum height of 28".*
  - b) *Cones used for nighttime traffic control shall have a minimum height of 42".*
  - c) *Use of cones at night shall be prohibited along tapers.*
- 8C. *Provisions shall be made to stabilize the cones and drums to prevent them from blowing over.*
- 8D. *A minimum of two drums shall be used to close the paved shoulder.*

(RESERVED FOR FUTURE USE)

- 9A. *(intentionally blank)*

AREA ILLUMINATION

- 10A. *Adequate area illumination of each flagger station shall be provided at night. Use of portable flood lighting is acceptable. Luminaires shall be located adjacent to each flagger station.*
- 10B. *To ensure the adequacy of floodlight placement and the elimination of glare, the Contractor and the Engineer shall drive through the worksite each night when the lighting is in place. Light placement and shielding shall be adjusted to the satisfaction of the Engineer.*

INTERSECTION / DRIVEWAY ACCESS

- 11. *Within the length of closure, provision shall be made to control traffic entering from intersecting streets and major drives as necessary to prevent wrong-way movements and to keep vehicles off of new pavement not ready for traffic. The Contractor shall:*
  - a) *Place across the closed lane, either three drums (cones) or barricades, and/or*
  - b) *Provide an additional flagger at every public street intersection and major driveway.*

*Drums (cones) placed across the closed lane shall be located 25' beyond the projected pavement edges of the driveway or cross highway, as shown in Standard Construction Drawings (SCDs) MT-97.11 or MT-97.12. For barricades, see SCD MT-101.60.*

*Existing STOP signs shall be relocated as necessary to assure proper location for the traffic conditions.*

*The method of control shall be subject to the approval of the Engineer.*

SHADOW VEHICLE

- 12A. *The shadow vehicle shall be in place and unoccupied whenever workers are in the work area. This vehicle shall be removed from the pavement whenever workers are not in the work area.*
- 12B. *The shadow vehicle shall be equipped with a high-intensity yellow rotating, flashing, oscillating, or strobe light(s).*
- 12C. *The vehicle shall be equipped with a truck-mounted attenuator when called for in the plans.*
- 12D. *Other protective devices may be used in lieu of the shadow vehicle shown when approved by the Engineer.*

CHIP SEAL OPERATIONS

- 13. *For chip seal operations, additional signing shall be incorporated in the advanced warning area.*
  - a) *The LOOSE GRAVEL (W8-7) and FRESH TAR (W21-2) signs shall both be used in advance of the chip seal operation.*
  - b) *Repeat the LOOSE GRAVEL sign with a 35 mph Advisory Speed (W13-1) plaque every half mile per CMS 422.09.*
  - c) *The FRESH TAR and the LOOSE GRAVEL signs shall both be used for signing of side roads intersecting the work area.*

THIS DRAWING REPLACES MT-97.10 DATED 07-19-2013.

SCD NUMBER

**MT - 97 . 10**

STANDARD ROADWAY CONSTRUCTION DRAWING

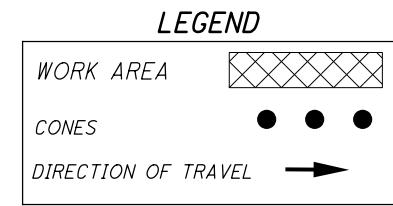
**FLAGGER CLOSING 1 LANE OF A 2-LANE HIGHWAY - STATIONARY OPERATION**

**OFFICE OF ROADWAY ENGINEERING**

STATE ENGINEER  
Soisson

STATE OF OHIO DEPARTMENT OF TRANSPORTATION  
*Raynaldo Stangell*  
ADMINISTRATOR

DATE  
07-18-2014

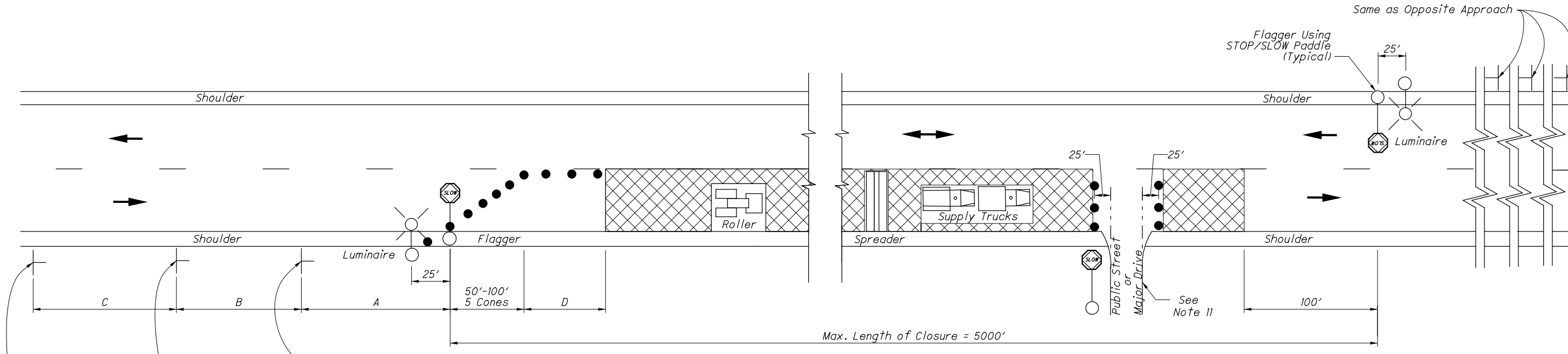


**TABLE I (SIGN SPACING)**

ROAD TYPE	DISTANCE BETWEEN SIGNS (FT)		
	A	B	C
Two Lane ≤ 40 MPH	100	100	100
Two Lane 45-50 MPH	350	350	350
Two Lane 55-60 MPH	500	500	500

**TABLE II**

SPEED LIMIT (MPH)	BUFFER (D) (FT) MIN.
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570



THIS DRAWING REPLACES MT-97.11 DATED 07-19-2013.

STANDARD ROADWAY CONSTRUCTION DRAWING

**FLAGGER CLOSING 1 LANE OF A 2-LANE HIGHWAY FOR PAVING OPERATIONS (NON-FED ONLY)**

SD NUMBER  
**MT-97.11**

**OFFICE OF ROADWAY ENGINEERING**

STATE ENGINEER  
Soisson

STATE OF OHIO DEPARTMENT OF TRANSPORTATION  
ADMINISTRATOR  
Raynaldo Stangell  
DATE 07-18-2014

NOTES:

FLAGGERS

- 1. *Flaggers, one for each direction, shall be used to control traffic continuously for as long as a one lane operation is in effect. The flaggers shall be able to communicate with each other at all times.*

LENGTH OF CLOSURE

- 2. *It is required that the length of closure be kept to a minimum at all times, as directed by the Engineer, with a maximum allowable length of 5000'.*

*When the ambient temperature exceeds 80 degrees Fahrenheit the Engineer may increase the maximum allowable length of closure to allow for sufficient cooling of new pavement.*

*The Engineer may shorten the maximum allowable length of closure to relieve excessive traffic backups or to improve traffic operation.*

SIGN LOCATION AND SPACING

- 3A. *The minimum spacing between work zone signs is shown in Table I. Maximum spacing should not be greater than 1.5 times the distances shown in Table I.*
- 3B. *Sign spacing should be adjusted to avoid conflict with existing signs. Minimum spacing to existing signs shall be 200' for speeds of 45 mph or less and a minimum of 400' for speeds of 50 mph or greater.*
- 3C. *The location of the advance warning signs should be adjusted to provide for adequate sight distance for the existing vertical and horizontal roadway alignment.*

ADJUSTMENTS FOR SIGHT DISTANCE

- 4. *The location of the flagger station and the advance warning signs should be adjusted to provide for adequate sight distance for the existing vertical and horizontal roadway alignment.*

BASIC SIGNING

- 5A. *ROAD WORK AHEAD (W20-1) signs shall be provided on entrance ramps or roadways entering the work limits.*
- 5B. *END ROAD WORK (G20-2) signs are only required for lane closures of more than 1 day. If is intended that these signs be placed on the mainline, on all exit ramps, and on roadways exiting the work limits.*
- 5C. *Overlapping of signing for adjacent projects should be avoided where the messages could be confusing. Any ROAD WORK AHEAD or END ROAD WORK sign which falls within the limits of another traffic control zone shall be omitted or covered during the period when both projects are active.*

SIGNING DETAILS

- 6A. *The Advisory Speed (W13-1P) plaque shall be used when specified in the plan.*
- 6B. *36" warning signs may be used when the approach speed limit is 40 mph or less.*

FLASHING WARNING LIGHTS

- 7. *Type A flashing warning lights shown on the ROAD WORK AHEAD (W20-1) signs and on the LANE CLOSED AHEAD (W20-5) signs are required whenever a night lane closure is necessary.*

CONES

- 8A. *Cone spacing shall be as follows:*
  - a) *Spacing along the buffer shall be 40' center-to-center.*
  - b) *Spacing along the approach taper shall be 10' center-to-center.*
- 8B. *Cone sizes shall be as follows:*
  - a) *Cones used for daytime traffic control shall have a minimum height of 28".*
  - b) *Cones used for nighttime traffic control shall have a minimum height of 42".*
- 8C. *Provisions shall be made to stabilize the cones to prevent them from blowing over.*
- 8D. *A minimum of two cones shall be used to close the paved shoulder.*

(RESERVED FOR FUTURE USE)

- 9A. *(intentionally blank)*

AREA ILLUMINATION

- 10A. *Adequate area illumination of each flagger station shall be provided at night. Use of portable flood lighting is acceptable.*
- 10B. *To ensure the adequacy of floodlight placement and the elimination of glare, the Contractor and the Engineer shall drive through the worksite each night when the lighting is in place. Light placement and shielding shall be adjusted to the satisfaction of the Engineer.*

INTERSECTION / DRIVEWAY ACCESS

- 11. *Within the length of closure, provision shall be made to control traffic entering from intersecting streets and major drives as necessary to prevent wrong-way movements and to keep vehicles off of new pavement not ready for traffic. The Contractor shall:*
    - a) *Place across the closed lane, either three cones or barricades, and/or*
    - b) *Provide an additional flagger at every public street intersection and major driveway.*
- Cones placed across the closed lane shall be located 25' beyond the projected pavement edges of the driveway or cross highway. For barricades, see Standard Construction Drawing MT-101.60.*

*Existing STOP signs shall be relocated as necessary to assure proper location for the traffic conditions.*

*The method of control shall be subject to the approval of the Engineer.*

CHIP SEAL OPERATION

- 12. *For chip seal operations, additional signing shall be incorporated in the advance warning area.*
  - a) *The LOOSE GRAVEL (W8-7) and FRESH TAR (W21-2) signs shall both be used in advance of the chip seal operation.*
  - b) *Repeat the LOOSE GRAVEL sign with a 35 mph Advisory Speed (W13-1) plaque every half mile per CMS 422.09.*
  - c) *The LOOSE GRAVEL and FRESH TAR signs shall both be used for signing of side roads intersecting the work area.*

THIS DRAWING REPLACES MT-97.11 DATED 07-19-2013.

STANDARD ROADWAY CONSTRUCTION DRAWING

FLAGGER CLOSING 1 LANE OF A 2-LANE HIGHWAY FOR PAVING OPERATIONS (NON-FED ONLY)

OFFICE OF ROADWAY ENGINEERING

STATUS ENGINEER Soisson

STATE OF OHIO DEPARTMENT OF TRANSPORTATION  
ADMINISTRATOR  
Raynaldo Stangell  
07-18-2014  
DATE

MT-97.11

SD NUMBER

2 / 2

# PAVEMENT MARKING OPERATION PROCEDURES

## NOTES:

### GENERAL

- 1A. In addition to CMS 614, traffic shall be maintained in accordance with the following requirements.
- 1B. The purpose of the following requirements for traffic control for pavement marking operations is to provide safety for highway users, workers and equipment and to protect the markings from damage during application.
- 1C. These requirements are the required minimums. If at any time during the application of markings it is found by the Engineer that these minimum traffic control requirements are not achieving the necessary safety and marking protection, additional traffic control shall be implemented at no additional cost.
- 1D. The Engineer may suspend work in order to relieve traffic congestion at any time.
- 1E. No work shall be done during peak hours or during any other times which could result in excessive queuing, as determined by the Engineer.
- 1F. Vehicles transporting flammable pavement marking materials (material supply vehicles) shall not be utilized for lead or trail vehicles or for power broom equipment.
- 1G. All pavement marking application, protection and support equipment following the line marking machine shall have the traffic control equipment of a shadow vehicle.
- 1H. Line marking machines shall not be used for sign and cone placement.

### CONES AND WET PAINT - KEEP OFF SIGNS

- 2A. Cones and WET PAINT - KEEP OFF (R11-H6-24) signs shall be placed to protect the line whenever the track-free time exceeds 2 minutes.
- 2B. These devices shall not be removed until the line has dried to a track-free condition.
- 2C. Retrieval equipment shall have the traffic control equipment of a shadow vehicle.
- 2D. Cones shall have a minimum height of 28".
- 2E. Cones shall be spaced at a maximum distance of 200' to protect the wet line. In areas of traffic congestion, on curves, and at other locations where tracking of the wet line is expected, closer spacings may be required.
- 2F. The WET PAINT - KEEP OFF (R11-H6-24) signs shall be placed facing traffic as follows:
  - a) The beginning and end of line application,
  - b) All side and cross roads, and
  - c) Maximum intervals of one mile.
- 2G. When line markings require greater than a two minute drying time or when the actual field conditions exceed two minute drying time, the lane from which the line marking machine applies line markings shall be closed until the line has dried to a totally track-free condition.

### IMMOBILE OPERATIONS

- 3A. When loading material, cleaning or performing other operations in the field, every effort shall be made to have all equipment completely off of the traveled way.
- 3B. When it becomes necessary to enter upon private property, permission shall be obtained in advance.
- 3C. When the Contractor cannot remove his equipment from the traveled way, all traffic control devices on the vehicles shall be in operation and flaggers and vehicles shall be stationed to protect the work site and the traveling public.
- 3D. Two-way traffic shall be maintained.
- 3E. Flaggers shall be equipped in accordance with CMS 614.08.

### AUXILIARY MARKINGS

- 4. Pavement preparation and placing of auxiliary markings are considered to be stationary operations and traffic control shall be in accordance with plan details, standard construction drawings and the Ohio Manual of Uniform Traffic Control Devices (OMUTCD).

### NIGHTTIME OPERATION

- 5A. Nighttime operation is defined to include the time from sunset to sunrise, and at any other time when there are unfavorable atmospheric conditions or when there is not sufficient natural light to render discernable persons, vehicles, and substantial objects on the highway at a distance of 1000'.
- 5B. During nighttime conditions the following traffic control shall be provided:
  - a) Cones shall be reflectorized or equipped with lighting devices for maximum visibility (see OMUTCD 6F.64), and
  - b) The guide and side-mounted carriages shall be illuminated.
- 5C. The presence of highway lighting does not waive these requirements.

### FLASHING ARROW BOARD

- 6A. A Type B flashing arrow board shall be from the ODOT approved list. For more information, refer to Supplemental Specification 921 "Arrow Boards."
- 6B. Arrow boards, when used on two-lane, two-way roadways shall be displayed only in the caution mode.
- 6C. When not in use, arrow boards shall be tilted horizontally or covered.

### TRUCK-MOUNTED ATTENUATOR (TMA)

- 7A. When called for in the plans the shadow vehicle(s) shall be equipped with a TMA. The TMA must bring a vehicle weighing about 1800 to 4500 pounds and traveling at 60 mph to a safe, controlled stop, per NCHRP criteria.
- 7B. A shadow vehicle with TMA should be used in accordance with manufacturer's specifications and must meet NCHRP 350 with acceptable written manufacturer certification submitted to the Engineer before the devices are used on the project.

THIS DRAWING REPLACES MT-99.20 DATED 07-20-2012.

STANDARD ROADWAY CONSTRUCTION DRAWING  
TRAFFIC CONTROL FOR LONG LINE  
PAVEMENT MARKING OPERATIONS

SD NUMBER  
**MT - 99.20**

OFFICE OF  
ROADWAY  
ENGINEERING

STATE ENGINEER  
Stargell

STATE OF OHIO DEPARTMENT OF TRANSPORTATION  
*Michael Blune*  
ADMINISTRATOR  
7-19-2013  
DATE

# PAVEMENT MARKING VEHICLES AND EQUIPMENT

## LEAD VEHICLE

- 8A. A lead vehicle shall be used to warn opposing traffic of the approach of center line and other marking equipment when this equipment extends into the adjacent opposing traffic lane.
- 8B. The lead vehicle shall precede the "left-of-center" marking equipment a distance that will provide advance safe warning to approaching traffic.
- 8C. The operator of this unit shall drive ahead of the crest of a vertical curve or around a horizontal curve and wait until the "left-of-center" marking equipment nears and then proceed, maintaining an advance location of 400' to 600'.
- 8D. A lead vehicle shall be equipped with the following traffic control devices:
  - a) A high-intensity yellow rotating, flashing, oscillating, or strobe light(s), clearly visible a minimum of one quarter mile.
  - b) Lighted headlights and taillights, and
  - c) A KEEP RIGHT (W24-H4-48) sign and WET PAINT (W24-H3-48) sign mounted a minimum of 5' above the road surface measured to the bottom of the sign, and visible to opposing traffic.

## POWER BROOM EQUIPMENT

- 9. Power broom equipment shall be equipped and operated during pavement preparations with the following traffic control devices:
  - a) A high-intensity yellow rotating, flashing, oscillating, or strobe light(s), clearly visible a minimum of one quarter mile.
  - b) Lighted headlights and taillights, and
  - c) A Type B flashing arrow board, displayed to the rear, mounted a minimum of 7' above the road surface, measured to the bottom of the board.

## VEHICLE FOR LAYOUT AND PREMARKING

- 10. The vehicle used in layout and premarking shall be equipped and operated with the following equipment:
  - a) A high-intensity yellow rotating, flashing, oscillating, or strobe light(s), clearly visible a minimum of one quarter mile.
  - b) Lighted headlights and taillights, and
  - c) A KEEP RIGHT (W24-H4-48) sign mounted a minimum of 5' above the road surface measured to the bottom of the sign, and visible to opposing traffic.

## LINE MARKING MACHINE

- 11A. All traffic line marking machines shall be equipped and operated with the following traffic control equipment:
  - a) Three high-intensity yellow rotating, flashing, oscillating, or strobe lights, clearly visible a minimum of one quarter mile, one forward, one on the right rear and one on the left rear of the vehicle.

b) Any one of the following two:

- 1) A Type B flashing arrow board displayed to the rear, mounted a minimum of 7' above the road surface, measured to the bottom of the board.

or

- 2) A DO NOT PASS (R11-H7-48) sign visible to the rear during center line marking on two-lane, two-way roadways and mounted a minimum of 7' above the road surface, measured to the bottom of the sign. This sign may be used to cover the arrow board when used on two-lane, two-way roadways.

11B. A WET PAINT with Arrow (W24-H2a-24 or W24-H2-48) sign shall face the rear as follows:

- a) The sign shall be positioned with the arrow pointing to the wet line.
- b) When used, a W24-H2a-24 sign shall be mounted on the side of the vehicle nearest the wet marking material.
- c) W24-H2a-24 and W24-H2-48 signs shall be mounted a minimum of 1' above the road surface, measured to the bottom of the signs.

11C. A KEEP RIGHT (W24-H4-48) sign and WET PAINT (W24-H3-48) sign mounted a minimum of 5' above the road surface, measured to the bottom of the sign facing opposing traffic when this unit extends into the adjacent opposing traffic lane.

11D. The guide and side-mounted marking carriages shall each be equipped with a clean red flag not less than 24" square and fastened to a staff of sufficient length so as to permit the flag to move freely of any obstruction.

## SHADOW VEHICLE

12A. When required, a shadow vehicle shall be positioned at the track-free end of the wet line.

12B. Shadow vehicles shall be equipped and operated with the following traffic control equipment (Also see Figure 6H-17 & 6H-35 in the OMUTCD):

- a) A high-intensity yellow rotating, flashing, oscillating, or strobe light(s), clearly visible a minimum of one quarter mile.
- b) Any one of the following two:
  - 1) A Type B flashing arrow board, displayed to the rear, mounted a minimum of 7' above the road surface, measured to the bottom of the board.

or

- 2) A DO NOT PASS (R11-H7-48) sign visible to the rear during center line marking on two-lane, two-way roadways and mounted a minimum of 7' above the road surface, measured to the bottom of the sign. This sign may be used to cover the arrow panel when used on two-lane, two-way roadways.

12C. A WET PAINT with Arrow (W24-H2a-24 or W24-H2-48) sign shall face the rear as follows:

- a) The sign shall be positioned with the arrow pointing to the wet line.
- b) When used, W24-H2a-24 shall be mounted on the side of the vehicle nearest the wet marking material.
- c) W24-H2a-24 signs shall be mounted a minimum of 1' above the road surface and W24-H2-48 shall be mounted a minimum of 5' above the road surface, both measured to the bottom of the sign.

# MINIMUM PAVEMENT MARKING TRAFFIC CONTROL EQUIPMENT REQUIREMENTS

This table indicates the traffic control equipment which shall be furnished for each type of long line pavement marking operation. In addition, the type of traffic control equipment which shall be furnished when directed by the Engineer is indicated.

EQUIPMENT	PAVEMENT MARKING LINE TYPE ①					
	CENTER LINE		EDGE LINE		LANE LINE ② CHANNELIZING LINE ③	
	LONGER THAN 2 MIN. DRY	2 MIN. OR LESS DRY	LONGER THAN 2 MIN. DRY	2 MIN. OR LESS DRY	LONGER THAN 2 MIN. DRY	2 MIN. OR LESS DRY
LEAD VEHICLE	A	A	C	C	C	C
POWER BROOM EQUIPMENT	B	B	A	A	B	B
LINE MARKING MACHINE	A	A	A	A	A	A
SHADOW VEHICLE	D	A	D	A	LANE CLOSURE REQUIRED (28" CONES REQUIRED)	A
SHADOW VEHICLE (ADDITIONAL)	C	B	C	B		A
SHADOW VEHICLE (SIGN AND CONE RETRIEVAL)	A	C	A	C		C
SHADOW VEHICLE (SHADOW FOR RETRIEVAL)	A	C	A	C		C

- ① For equipment requirements for auxiliary marking operations see the plans and OMUTCD Part 6.
- ② Includes both dashed and solid lane lines.
- ③ Channelizing line segments of 200' or less shall be considered auxiliary markings, except when applied as components of gore markings sprayed in moving operations separate from the application of transverse lines.

A	Required equipment
B	Equipment required when directed by the engineer
C	Not required
D	Required equipment for sign and cone placement

STATE OF OHIO DEPARTMENT OF TRANSPORTATION  
 Michael Blune  
 ADMINISTRATOR  
 7-19-2013  
 DATE  
 STARGELL  
 ENGINEER  
 OFFICE OF ROADWAY ENGINEERING  
 STANDARD ROADWAY CONSTRUCTION DRAWING  
 TRAFFIC CONTROL FOR LONG LINE PAVEMENT MARKING OPERATIONS  
 THIS DRAWING REPLACES MT-99.20 DATED 07-20-2012.  
 SCD NUMBER  
 MT-99.20  
 2 / 2

### CONDITION I

DROP-OFFS BETWEEN ADJACENT TRAVELED LANE(S) / PAVED SHOULDER  
(Freeways, Expressways, other Roadways  $\geq$  45 mph)

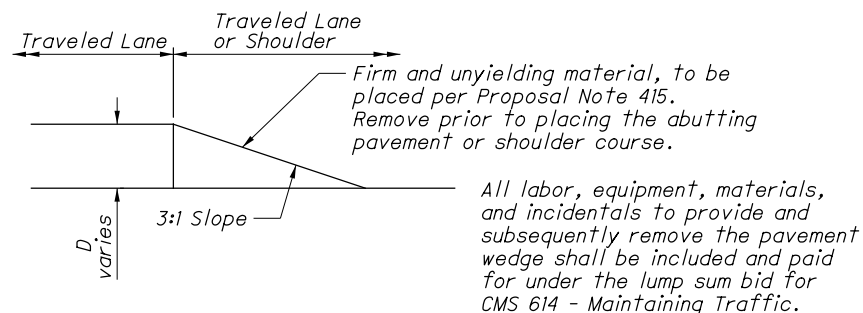
These treatments are to be used for resurfacing or pavement planing, etc. where a drop-off is located between or within traveled lanes and/or shoulder.

D	Treatment
$\leq 1\frac{1}{2}"$	Erect W8-11 or W8-9 sign as appropriate.
$> 1\frac{1}{2}" - \leq 3"$	1) Optional Wedge Treatment; or, 2) Close a lane and/or shoulder per Condition II.
$> 3"$	Close a lane and/or shoulder per Condition II.

### OPTIONAL WEDGE TREATMENT

(MILLING OR RESURFACING)

- W8-9/W8-11 sign shall be used as appropriate.
- This treatment shall not be used where a hot longitudinal joint per CMS 446 is required.

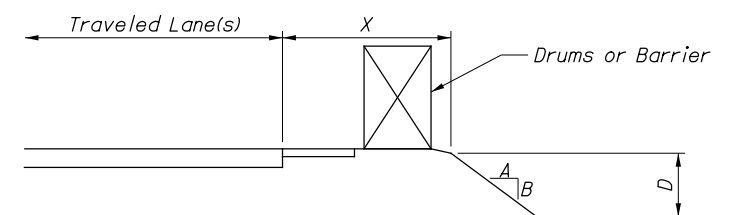
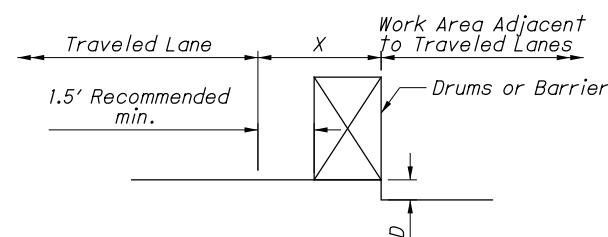


### CONDITION II

DROP-OFFS BEYOND EDGE OF TRAVELED LANES / PAVED SHOULDER  
(Freeways, Expressways, other Roadways  $\geq$  45 mph and minimal driveways)

- The treatments indicated below are for use in conjunction with resurfacing, planing, or excavations located beyond the edge line of the traveled lanes.
- The treatments indicated below are applicable for pavement/shoulder drop-offs and for locations where foreslopes "A/B" are steeper than 3:1.
- Where the drop-off is located outside the clear zone, no treatment is necessary (see Table II and SCDs MT-95.30, 95.40, or 102.10).
- Where foreslopes "A/B" are 3:1 or flatter, no treatment is necessary.

D	Method of Drop-off Protection to be used to separate the traffic from the drop-off						
	Drop-off location "X" from traveled lane <4'	Drop-off location "X" from traveled lane 4' - 12'		Drop-off location "X" from traveled lane 12' - 20'		Drop-off location "X" from traveled lane 20' - 30'	
		Daytime Only	Night	Daytime Only	Night	Daytime Only	Night
$\leq 3"$	DRUMS or OPTIONAL WEDGE TREATMENT	NONE	NONE	NONE	NONE	NONE	NONE
$> 3" - \leq 5"$	DRUMS or OPTIONAL WEDGE TREATMENT	DRUMS	DRUMS	NONE	NONE	NONE	NONE
$> 5" - \leq 12"$	PB	DRUMS	DRUMS	NONE	NONE	NONE	NONE
$> 12" - \leq 24"$	PB	DRUMS	PB	DRUMS	DRUMS	NONE	NONE
$> 24"$	PB	DRUMS	PB	DRUMS	PB	DRUMS	PB



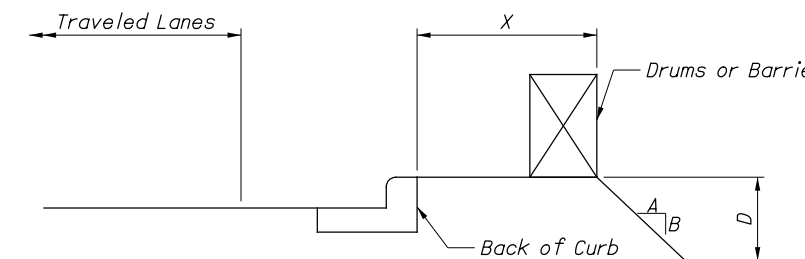
### NOTES:

- It is intended that this drawing be used for treatment of drop-offs that develop during construction operations and that are not otherwise provided for in the construction plans. Where the plans do not provide specific items for labor, equipment, or materials to implement the drop-off treatments specified herein, they shall be included for payment in the lump sum bid for CMS 614 - Maintaining Traffic.
- Minimum lane widths shall be 10' unless otherwise specified in the plans.
- While the need for certain advisory signing is noted herein, it is not intended that this be indicative of all signing that may be required to advise or warn motorists, and all requirements of the Ohio Manual of Uniform Traffic Control Devices (OMUTCD) must be fulfilled.
- In urban or otherwise heavily developed areas where intersections, driveways, pedestrians and/or bicyclists may be present in significant numbers, additional signing and protective measures other than those shown herein may be required.
- The drop-off treatment selected for use at any given location shall be as appropriate for the prevailing conditions at the site.
- Where portable barrier is specified, it shall be in accordance with SCD RM-4.1 or 4.2 and with CMS 622.
- For locations such as at ramps, lane shifts, lane closures, etc., where traffic is required to negotiate a difference in elevation between pavements, the Optional Wedge Treatment shall be provided.

- Pavement Repairs (or similar work):
  - Lengths greater than 60' - utilize appropriate treatment from Condition I.
  - Lengths of 60' or less - repairs shall be effected in accordance with CMS 255.08. Drums may be used as a separator adjacent to the traveled lane.
- When drums are specified for a drop-off condition, a minimum number of 4 drums shall be used. Spacing shall be as indicated in the plans or as specified in the OMUTCD. Provisions shall be made to stabilize the drums (cones) to prevent them from blowing over.
- When UNEVEN LANES (W8-11) signs or LOW SHOULDER (W8-9) signs are required, they shall be placed 750' in advance of the condition on all intersecting entrance ramps within the limits of the condition. When the drop-off condition extends more than 0.5 miles, additional signs should be erected at intervals of 1.0 mile or less.
- Cones may be substituted for drums as follows:
  - Cones used for daytime traffic control shall have a minimum height of 28".
  - Cones used for nighttime traffic control shall have a minimum height of 42".
  - Cones used at night shall be reflectorized.
  - Use of cones at night shall be prohibited along tapers.
  - Intermixing of drums and cones within the same run of barrier protection shall not be permitted.
- Where drums are used and their presence would reduce traveled lane widths to less than 10', drums may be placed on the opposite level from that of traffic, provided the drop-off depth does not exceed 5" and approval is granted by the Project Engineer.
- Portable barrier shall be placed on the same level as the traffic surface and shall not encroach on width(s) designated as the minimum required for traffic use.

### CONDITION III

DROP-OFFS BEHIND CURB WHERE CURB IS 6" OR GREATER IN HEIGHT AND THE LEGAL SPEED IS 40 MPH OR LESS



X	D	A/B	Treatment Required	
			Day	Night
0' - 10'	$\leq 12"$	Any	None	Drums
0' - 10'	$> 12"$	Any	Drums	Drums
$> 10'$	Any	Any	None	None



# TEMPORARY SIGN SUPPORT REQUIREMENTS

## PLACEMENT OF SIGNS

- 1A. Lateral placement to nearest edge of signs shall be as follows:
- a) On the right side of the road for approaching traffic (except for dual-mounted signs and signs designated in the plans for left-side mounting).
  - b) Curbed roadway - minimum 2' behind face of curb.
  - c) Uncurbed roadway - 12' from edge of traffic lane or 6' from edge of paved or useable shoulder, whichever is greater.
  - d) Behind guardrail or portable barrier - See table

SIGN OFFSET

Barrier Type Support Class	BEHIND FACE OF GUARDRAIL	BEHIND FACE OF PORTABLE BARRIER
Class A Supports	2' Preferred 1' Minimum	1' Minimum*
Class B Supports	6.5' Minimum	1' Minimum*

\*unless barrier top mounting is required by the plans

- 1B. Vertical clearance of signs, as measured from near side roadway edge, shall be as follows:
- a) Rural - 5' when parked cars, construction equipment, etc. will not obscure sign visibility.
  - b) Rural areas with parked cars or construction equipment - 7'
  - c) Urban - 7'
  - d) Care shall be taken to assure that signs will not be obscured by construction equipment, trees, weeds or other obstacles. Brush, weeds or grass within the right-of-way shall be trimmed as necessary.
  - e) For signing which will remain for three days or less, minimum vertical clearance shall be 1' from the roadway to bottom of sign.

## CLASSES OF SUPPORTS

- 2A. The Contractor shall choose sign supports of adequate strength and with adequate foundations and anchorage to support the sign sizes erected. Sign supports which fail under typical wind load conditions shall be immediately modified or replaced with a support of adequate strength.
- 2B. All temporary sign supports shall be of the following types:

### CLASS A:

Class A supports shall include the following:

- a) All No. 2 and No. 3 posts when installed singly or in pairs (side-by-side) according to the details of Standard Construction Drawings (SCDs) TC-41.10 and TC-41.20.
- b) Wood posts as shown in Solid Wood Posts detail.
- c) All breakaway connection beam supports, when installed according to the proper details shown on SCD TC-41.10 with a minimum clear distance between supports of 7' for supports larger than 6 x 9.
- d) Any breakaway post or post and connection which are certified as per CMS 614.03.
- e) Portable supports.

Use of Class A supports shall be required at unprotected locations on ODOT's roadway system. They may also be used on other roadway systems.

### CLASS B:

Class B supports shall include the following:

- a) All beam type supports without breakaway connections.
- b) Supports similar to but larger than permitted for Class A.

Class B supports shall be used only at the following locations:

- a) Within the clear zone where protected by guardrail or concrete barrier or where positively protected from traffic such as on retaining walls.
- b) Outside the clear zone.

- 2C. All Class A and B supports shall be NCHRP 350 compliant.

### SUPPORTS AND SIGNS

- 3A. Supports for signs which will remain in place more than three days should be fixed rather than portable except in situations where the sign must rest on permanent pavement or other surface which would be damaged by insertion of post type supports.
- 3B. Portable signing, including portable supports, ballasting of the supports, and signs shall be NCHRP 350 compliant.
- 3C. Ballasting of portable supports shall be in accordance with NCHRP 350 testing of the subject support.

THIS DRAWING REPLACES MT-105.10 DATED 07-20-2012.

SCD NUMBER

**MT - 105.10**

STANDARD ROADWAY CONSTRUCTION DRAWING

**TEMPORARY SIGN SUPPORT**

**OFFICE OF  
ROADWAY  
ENGINEERING**

STATE  
ENGINEER

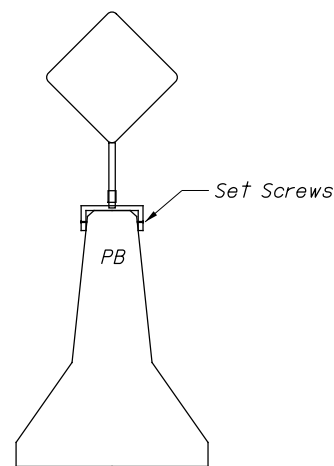
Stargell

STATE OF OHIO DEPARTMENT OF TRANSPORTATION

Michael Blune  
ADMINISTRATOR

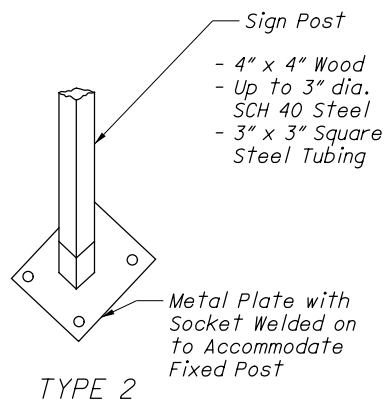
7-19-2013  
DATE

**CLASS A SUPPORTS  
FIXED**



TYPE 1

Fasten to Top of PB with Expansion Bolts, etc.



TYPE 2

- Sign Post
- 4" x 4" Wood
- Up to 3" dia. SCH 40 Steel
- 3" x 3" Square Steel Tubing

Metal Plate with Socket Welded on to Accommodate Fixed Post

**SOLID WOOD POSTS**

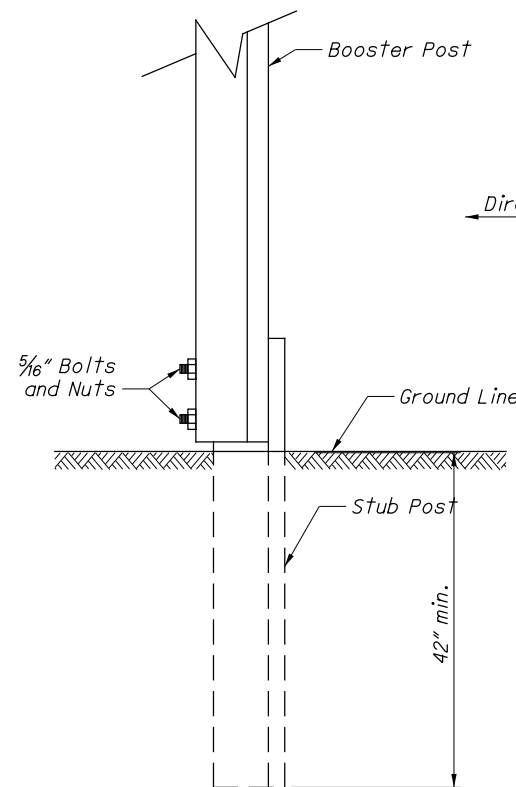


TOP VIEW

When flat sheet signing is provided, bolt the flat sheet directly to the wood posts. Do not use U-Channels.

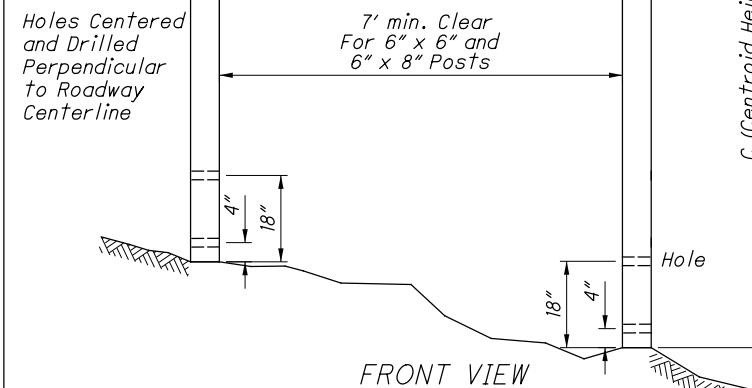
NORMAL POST SIZE (IN)	HOLE DIAMETER (IN)	NO. OF POSTS PERMITTED IN 7' PATH IN EXPOSED LOCATIONS	MINIMUM RECOMMENDED EMBEDMENT DEPTH (FT)
4 X 4	NONE	2	3.5
4 X 6	1 1/2	2	4
6 X 6	2	1	4.5
6 X 8	3	1	5

**CLASS A SUPPORTS  
STUBBING STANDARD**



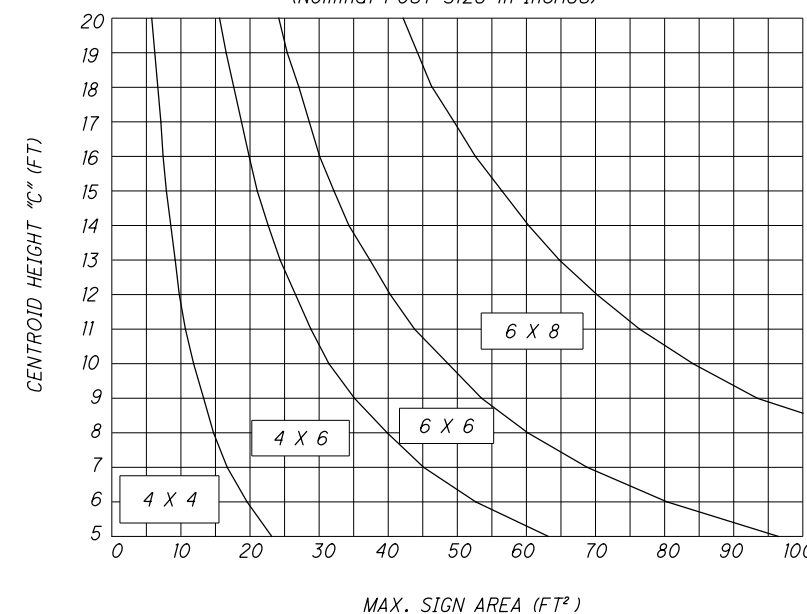
**NOTES:**

1. For use with No. 2 or No. 3 posts.
2. Booster post shall be the same or 1 lb/ft less than stub post.
3. When the booster post is smaller than the stub post, the booster post shall be mounted in front of the stub post.
4. When the booster post is the same size as the stub post, the booster post shall be mounted behind the stub post.
5. Bolts and nuts and other fasteners shall be steel or aluminum.
6. A minimum of two bolts and nuts or other fasteners shall be used per post assembly.
7. With steel bolts, the minimum center-to-center spacing between bolts shall be 4".
8. Stub height should be limited to 4" above the ground when using the aluminum bolts for the connection.



FRONT VIEW

**DESIGN CHART FOR WOOD POSTS  
TWO-POST INSTALLATIONS**  
(Nominal Post Size in Inches)



THIS DRAWING REPLACES MT-105.10 DATED 07-20-2012.

SCD NUMBER  
**MT-105.10**

STANDARD ROADWAY CONSTRUCTION DRAWING  
**TEMPORARY SIGN SUPPORT**

**OFFICE OF  
ROADWAY  
ENGINEERING**

STDS  
ENGINEER  
Stargell

STATE OF OHIO DEPARTMENT OF TRANSPORTATION  
Michael Blune  
ADMINISTRATOR  
7-19-2013  
DATE

**STATE OF OHIO  
DEPARTMENT OF TRANSPORTATION**

**SUPPLEMENTAL SPECIFICATION 816  
VIDEO DETECTION SYSTEM**

**January 20, 2012**

- 816.01 Description**
- 816.02 Materials**
- 816.03 Documentation and Testing**
- 816.04 Installation Requirements**
- 816.05 Training**
- 816.06 Method of Measurement**
- 816.07 Basis of Payment**

**816.01 Description.** This work consists of furnishing and installing video detection equipment complete and ready for service.

**816.02 Materials.** The video detection system shall consist of power supply, hard-wired video cameras, all necessary video and power cabling with end connectors, mounting brackets, surge protection as recommended by the manufacturer, video detection processors/extension modules capable of processing the number of camera and phase combination video sources shown on the project plans. Provide sufficient number of cameras to process vehicle presence, passage and system detection zones as shown on the project plans.

Furnish materials from the Department’s Qualified Products List (QPL) conforming to the following:

Video Detection System.....907

**816.03 Documentation and Testing.** All product documentation shall be written in the English language. Provide one bound copy and one PDF version of the user’s manual.

Perform functional tests and 10-day performance test according to 632.28.

**816.04 Installation Requirements.** Run all cables serving the cameras unspliced between the camera and controller cabinet, with ten feet of slack provided in the controller cabinet.

**816.05 Training.** Furnish two days of training in the operation, setup and maintenance of the video detection system installed as part of the Contract. Furnish all handouts, manuals and product information. For the training, use the same models of equipment furnished for the project. The maintaining agency shall furnish the facilities in which the training will take place.

Furnish all media and test equipment needed to present the training.

Coordinate video detection training with the Engineer a minimum of 30 days in advance of proposed date of training.

**816.06 Method of Measurement.** The Department will measure Video Detection System by each intersection shown on the plans, in place, complete and ready for service and will include all materials, testing, labor and software.

The Department will measure Training on a lump sum basis, and will include providing the instruction materials, instructor travel expenses and test or media equipment for presenting the training material.

**816.07 Basis of Payment.** The Department will pay for accepted quantities at the contract prices as follows:

<b>Item</b>	<b>Unit</b>	<b>Description</b>
816	Each	Video Detection System
816	Lump	Training for Video Detection System

**STATE OF OHIO  
DEPARTMENT OF TRANSPORTATION**

**SUPPLEMENTAL SPECIFICATION 907  
VIDEO DETECTION SYSTEM**

**January 20, 2012**

Provide a 60-month warranty or the manufacturer's standard warranty, whichever is greater, for the following equipment:

1. Camera Heads
2. Combined Camera Head/Processor Units
3. Processors
4. Rack Mount Cards
5. Hubs
6. Portable Interface Devices

Ensure that the warranty period begins on the date of shipment to the project. Ensure that each system has a permanent label or stamp indicating the date of shipment.

The warranty to include technical support which shall be available from the supplier, at no cost, via telephone within 4 hours of the time a call is made, from factory-certified personnel or factory certified installers.

The warranty is to include updates to the video detection processor firmware and application software which shall be available from the manufacturer without charge.

**A. Functional Capabilities.** Provide camera systems able to transmit video signals up to 1,000 feet.

Furnished video detection system configuration shall utilize video processors with 1 or more video inputs and 1 video output, responding to specific site applications, camera locations and detection zones shown on the project plans.

**B. Interface.** Provide video inputs that accept signals from an external video source. Provide an interface connector located on the front of the video processing unit.

Provide an indication of the presence of the video signal. The indicator shall assert upon valid video synchronization and turn off when the presence of a valid video signal is removed.

Provide one video output per processor module. The video output shall have the capability to show text and graphical overlays to aid in system setup. The overlays shall display real-time actuation of detection zones upon vehicle detection or presence. Control of the overlays and video switching shall also be provided. The video output interface connector shall be BNC, RCA, VGA, or DVI type.

Provide a communications port on the front panel. The port shall use a DB9 or RJ45 type connector. The communications interface shall allow the user to remotely configure the system and/or to extract calculated vehicle/roadway information.

Furnish interface software. The interface protocol shall support multi-drop or point-to multipoint communications. Each video detection system shall have the capability to be individually IP addressable either built in or with third party video server units.

Provide open collector outputs meeting NEMA TS2 requirements. The open collector output will be used for vehicle detection indicators as well as discrete outputs for alarm conditions.

Provide LED status indicators on the front panel. The LEDs shall illuminate when an output is asserted. Provide one output LED for each output.

Provide a dedicated mouse compatible port on the front panel of the video processing unit. The mouse port shall be used as part of the system setup and configuration. Provide a compatible mouse with each video detection system.

**C. Functionality.** Detection zones shall be programmed via an on-board menu displayed on a video monitor and a pointing device connected to the video detection processor. The menu shall facilitate placement of detection zones and setting of zone parameters or to view system parameters.

The video detection processor shall detect vehicles in real time as they travel across each detection zone and provide indication on the video display.

The video detection processor shall default to a safe condition, such as minimum recall, fixed recall or a constant call on each active detection channel, in the event of unacceptable interference with the video signal or low visibility conditions.

A user-selected output shall be active during the low-visibility condition that can be used to modify the controller operation if connected to the appropriate controller input modifier(s). The system shall automatically revert to normal detection mode when the low-visibility condition no longer exists.

A minimum of 24 detection zones per camera input shall be possible, and each detection zone shall be capable of being sized to suit the site and the desired vehicle detection region/type.

The video detection processor's memory shall be non-volatile to prevent data loss during power outages.

The video detection processor shall maintain normal operation of existing detection zones when one zone is being added or modified. The video detection processor shall output a constant call on any detector channel corresponding to a zone being modified and shall resume normal operation upon completion.

The video detection processor shall output minimum recall, fixed recall or constant call for each enabled detector output channel if a loss of video signal occurs. The recall behavior shall be user selectable for each output. The video detection processor shall output a constant call during the background "learning" period.

Detection zone outputs shall be configurable to allow the selection of presence, pulse, extend, and delay outputs. Timing parameters of pulse, extend, and delay outputs shall be user definable between 0.1 to 25.0 seconds.

Up to six detection zones per camera view shall have the capability to count the number of vehicles detected, measure classification and speed. The data values shall be internally stored within the processor module for later retrieval through the communication port. The data collection interval shall be user

definable in periods of 5, 15, 30, or 60 minutes or by intersection cycle. Real-time data shall be retrieved by the PC-based software provided with the system.

Cameras shall be completely compatible with the video detection processor and shall be certified by the manufacturer to ensure proper system operation.

The camera shall use a color CCD sensing element with resolution of no less than 470 lines horizontal and 400 lines vertical.

The camera shall include mechanisms to compensate for changing of lighting by using an electronic shutter and/or auto-iris lens.

The camera shall include a motorized variable focal length lens with factory preset focus that requires no field adjustment. If zooming of the camera lens to suit the site geometry by means of a portable interface device is required, the portable interface shall be provided. The horizontal field of view shall be adjustable from 10 to 45 degrees minimum.

The camera electronics shall include automatic gain control (AGC) to produce a satisfactory image at night.

The camera shall be housed in a weather-tight sealed enclosure. The housing shall be field rotatable to allow proper alignment between the camera and the traveled road surface.

The camera enclosure shall be equipped with a sunshield. The sunshield shall include a provision for water diversion to prevent water from flowing in the camera's field of view.

The camera enclosure shall include a thermostatically controlled heater to assure proper operation of the lens shutter at low temperatures and prevent moisture condensation on the optical faceplate of the enclosure.

When mounted outdoors in the enclosure, the camera shall operate satisfactorily in a temperature range from -30°F to +140°F (-34 °C to +60 °C) and a humidity range from 0% RH to 100% RH.

The camera enclosure shall be equipped with weather-tight connections for all cables.

The cable provided shall be as recommended by the manufacturer for optimal video detection performance. The cable shall be either multi-paired jacketed cable or coaxial cable. Coaxial cable can be used between the camera and the video detection processor in the traffic signal controller cabinet and shall be as recommended by the manufacturer, or a Department approved 75 ohm precision video cable with 20 AWG solid bare copper conductor (9.9 ohms/M), RG-59, U-Type, solid polyethylene insulating dielectric, 98% (min) tinned copper double-braided shield and light blue polyethylene jacket previously proven to provide successful operation with the video detection system.

For coaxial cable, the signal attenuation shall not exceed 0.78 dB per 100 feet (30 m) at 10 MHz.

Coaxial cable shall be suitable for installation in conduit and in exposed sunlight environment. 75-ohm BNC plug connectors shall be used at both the camera and cabinet ends. The coaxial cable, BNC connector, and crimping tool recommended by the manufacturer of the video detection system shall be used and installed per the manufacturer's recommended instructions to ensure proper connection.

Multi-paired jacketed cable shall include a minimum of four individually paired No. 19 AWG communication cables with an overall shield. Pairs shall not be individually shielded. Paired cable and power cables may be installed under the same outer jacket.

Power cable, if required, shall be rated for 90°C, 300 volt, 16 AWG, stranded, three conductor cable with a nominal outside diameter of approximately 0.330 inches (8 mm). Conductor insulation color code shall be black, white and green. Outside jacket shall be black.

Camera power cable shall be suitable for installation in conduit and in exposed sunlight environment, and UL listed.

The power and video cable may be installed under the same outer jacket.

Provide surge protection devices for all new or added video detection devices as recommended by the manufacturer. Coaxial cable shall be protected with an inline or panel mounted surge suppressor as recommended by the manufacturer, or approved equal. Surge suppressor shall be installed and grounded per video detection manufacturer's recommendations.