

SECTION 15

CONCRETE SIDEWALKS SPECIFICATIONS

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SECTION 15

CONCRETE SIDEWALKS SPECIFICATIONS

15.01 GENERAL

Unless otherwise specified herein or shown on the Plans, all materials, procedures, and workmanship shall conform to the requirements of the current MDOT Standard Specifications for Construction.

15.02 DESCRIPTIONS

The work shall consist of a concrete sidewalk of the required cross section, without steel reinforcement, constructed on the prepared subgrade.

15.03 MATERIALS

15.03.01 The cement shall be Portland Cement, Type I, and shall comply with the Standard Specifications for Portland Cement (ASTM C150), or the Standard Specifications for Air-Entraining Portland Cement (ASTM C175). The air-entraining content of concrete shall be 6.5 +/- 1.5 percent. Concrete placed with slipform placement and having a slump of 1-1/2 inches or less, may have a minimum 4.5 percent entrained air.

15.03.02 The concrete shall be mixed in an approved mixing device prepared for this purpose and produce a homogenous mass which can be deposited in the forms, without segregation. The concrete mixes shall meet the requirements for Grade P1, S1, or S2 concrete as specified by the MDOT Standard Specifications for Construction. The concrete shall have not less than six (6) bags of cement per cubic yard. Grade P1 concrete and Grade S2 concrete shall have 28-day compressive strengths of not less than 3,500 psi. Grade S1 concrete shall have a 28-day compressive strength of not less than 4,000 psi.

15.03.03 Water used in mixing concrete shall be clean and free from deleterious amounts of acids, alkalis or organic materials.

15.03.04 Coarse Aggregate shall be 6A in accordance with the current MDOT Standard Specifications for Construction.

15.03.05 Fine Aggregate shall be 2NS in accordance with the current MDOT Standard Specifications for Construction.

15.03.06 Expansion Joint Material. Expansion joint material shall be a non-extruding and resilient type. This material shall be premolded and composed of fiber of a cellular nature and asphalt, ground cork or other approved materials. The expansion joint material shall conform to the requirements of ASTM D- 1751.

15.04 CONSTRUCTION METHODS

15.04.01 The subgrade shall be formed by trenching or filling to the required elevation for bottom of concrete or to the bottom of the subbase, if a subbase is specified. All unsuitable material under the concrete shall be replaced with granular material after trenching or before filling. The subgrade shall be thoroughly tamped or otherwise compacted.

Before concrete is placed, the subgrade shall be thoroughly wetted so that the subgrade is uniformly moist, without forming wet or muddy spots. No concrete shall be placed on a frozen subgrade.

15.04.02 Subbase, where required, consisting of sand or sand gravel, shall be placed under the structure to the thickness shown on the Plans.

15.04.03 Use either slip-form or fixed-forms. The fixed-forms shall be of metal, straight and free from distortion, and of sufficient strength to resist springing during the process of depositing and finishing the concrete. The fixed-forms shall be the full depth of the concrete. They shall be set firmly on the subgrade, true to the required line and grade, and be held in place by adequate stakes, and shall be thoroughly clean and free from foreign material. Approved flexible steel or wood forms may be used for sharp curves or special sections.

15.04.04 Minimum thickness shall be four (4) inches. The minimum thickness of the walk shall not be less than six (6) inches for residential or commercial driveways.

Width of walk shall be five (5) feet, except as shown on the plans or as designated by the Engineer.

15.04.05 The concrete shall be thoroughly spaded along the forms and joints before finishing operations are started. The concrete shall be alternately tamped and struck off with a proper strike board until all the voids are removed and the surface has the required grade and cross section. The surface shall be floated with a steel float just enough to produce a smooth surface free from irregularities.

All edges on all sidewalks shall be rounded to a radius of 1/4 inch with an approved finishing tool. All joints shall be rounded with an approved double edging tool having a radius of 1/4 inch on each side. The surface shall then be brushed lightly to produce a slightly roughened surface and remove the finishing tool marks.

Texture the surface of sidewalk ramps with a coarse broom transverse to the ramp slope.

15.04.06 Joints shall be constructed to provide for expansion and contraction of the concrete as follows:

- a. Joints shall be constructed true to line, with their faces perpendicular to the surface of the concrete. Transverse joints shall be constructed at right angles to the centerline of a sidewalk, and longitudinal joints shall be constructed parallel to the centerline, unless otherwise required. When a sidewalk is constructed in partial-width slabs, transverse joints in the succeeding slab shall be placed in line with like joints in the adjacent slab. In the case of widening an existing sidewalk, transverse joints shall be placed in line with the like joints in the existing sidewalk. All standard linear sidewalk shall have transverse joints located at 5 foot intervals.
- b. Expansion joints, 1/2 inch thick, extending to the full depth of the concrete, shall be placed between the concrete and the back of the abutting curb or gutter at intersections and at those locations where the concrete extends from a building or other rigid structure to the curb, and at intervals of no greater than 50 feet. Expansion joint material shall extend to the full depth of the joint and the top shall be slightly below the finished surface.
- c. Contraction joints shall be constructed by dividing the sidewalk into areas of approximately 25 square feet unless otherwise shown on the Plans. Insofar as feasible, the unit areas shall be square of not less than 16 square feet and not more than 36 square feet. The unit areas shall be produced by use of slab division templates extending the full depth of the concrete. These slab division templates shall be of steel not less than 1/8 inch nor more than 1/4 inch thick. They shall be left in place until the concrete has set sufficiently to hold its shape, but shall be removed while the forms are still in place.
- d. Joints in concrete driveway and alley approaches shall be full depth joints.

15.04.07 Curing of concrete shall be performed as specified in the current MDOT Standard Specifications for Construction.

15.04.08 Protection of concrete shall be performed in the following manner:

- a. The Contractor shall be responsible for the proper protection of the sidewalk until it has sufficiently cured. Walk must be properly barricaded and lighted during darkness. Failure to comply will result in the municipality placing these items for precaution at the expense of the Contractor.

- b. Protection Against Rain -- The Contractor shall take such precautions as are necessary to protect the concrete from damage.
- c. Hot Weather Limitations -- Casting of concrete during hot weather shall be limited by the temperature of the concrete at the time of placing. Concrete shall not be cast when the temperature of the concrete is above 90EF.
- d. Cold Weather Limitations -- No concrete shall be placed unless the temperature of the air in the shade and away from artificial heat is at least 35EF and rising unless specifically approved. Do not place concrete if portions of the base, subbase, or subgrade layer are frozen, or if the grade exhibits poor stability from excessive moisture levels.
- e. Protection From Cold Weather -- The Contractor shall be responsible for the concrete placed during cold weather and any concrete injured by frost action shall be removed and replaced at his expense.

15.04.09 All sidewalks shall be constructed to a line and grade as established by the Engineer. Shut-off boxes, manholes and other structures in the walk must be set to the true grade of the walk before placing concrete.

15.04.10 After the forms have been set, the owner shall be notified either by telephone or in person, for an inspection of the work to be made before concrete is placed. Each job will require the above mentioned inspection. Subsequent inspection of the finished sidewalks will be made at the discretion of the owner.

15.04.11 Backfilling shall be performed after the concrete has gained sufficient strength. The fixed forms may then be removed. The space on both sides of the walk shall be backfilled with sound earth which shall be compacted and trimmed to conform to the cross section shown on the Plans.

15.04.12 Clean-up shall be completed before final acceptance of the work. The Contractor shall clean the street surface, walks, gutters, fences, lawns, private property, right-of-way, and structures, leaving them in as good condition as originally found, and shall remove all machinery, tools, surplus materials, temporary buildings and other temporary structures from the site.

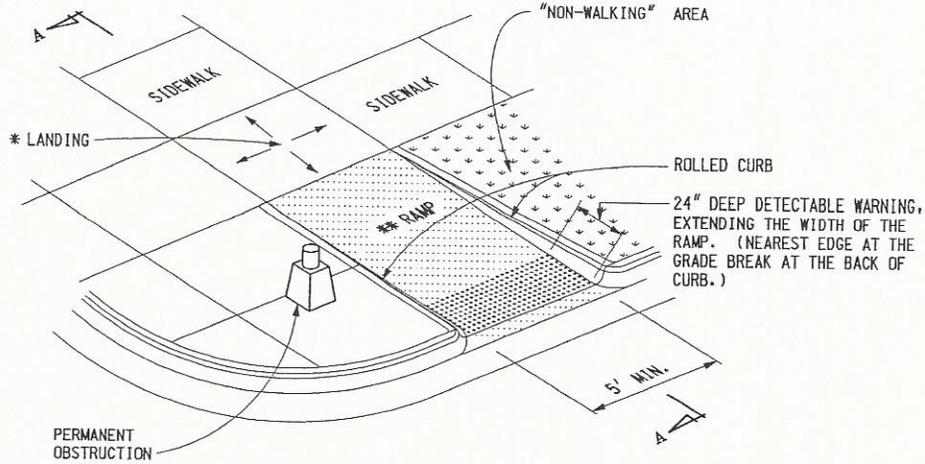
15.05 MEASUREMENT AND PAYMENT

The work shall be measured in the unit specified for each item in the Proposal. The contract unit price for each item or the lump sum price for an item thus designated shall be payment in full for furnishing all labor, equipment, and materials, and completing the work as specified.

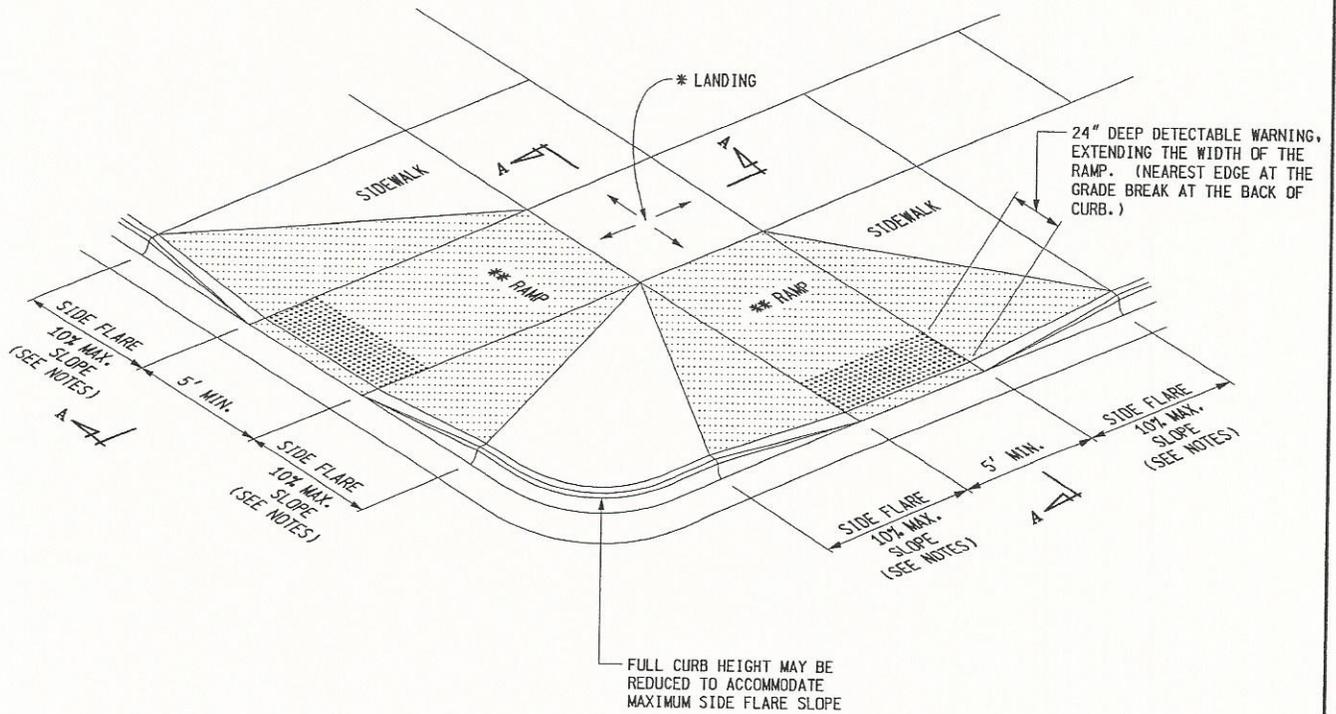
END OF SECTION

* MAXIMUM LANDING SLOPE IN ANY DIRECTION IS 2.0%. MINIMUM LANDING DIMENSIONS 5' x 5'.

** MAXIMUM CROSS SLOPE ON RAMP IS THE SAME AS THAT FOR SIDEWALK (2.0%). RUNNING SLOPE 5% - 7% (8.3% MAXIMUM) SEE NOTES.



SIDEWALK RAMP TYPE R
(ROLLED SIDES)



SIDEWALK RAMP TYPE F
(FLARED SIDES, TWO RAMPS SHOWN)



PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: John C. Friend
ENGINEER OF DELIVERY

APPROVED BY: John P. ...
ENGINEER OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**SIDEWALK RAMP AND
DETECTABLE WARNING DETAILS**

10-21-2008
F.H.W.A. APPROVAL

6-20-2008
PLAN DATE

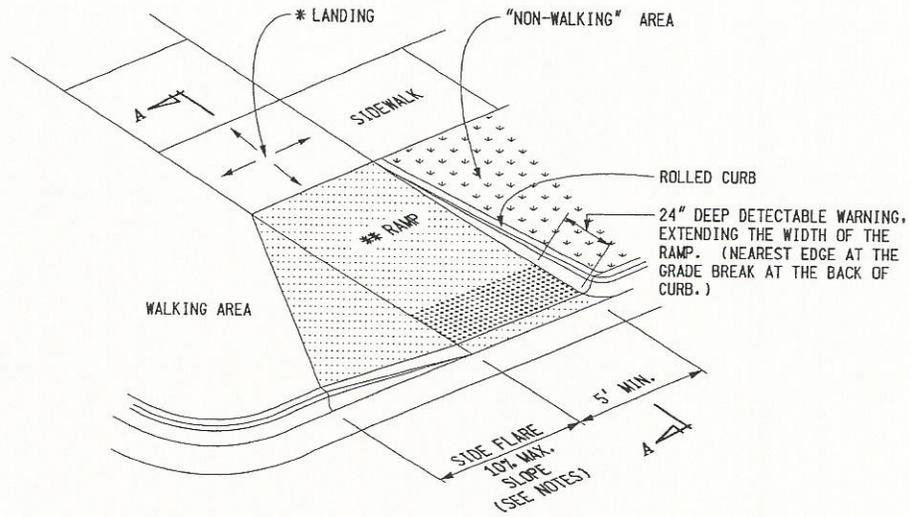
R-28-F

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1 OF 7

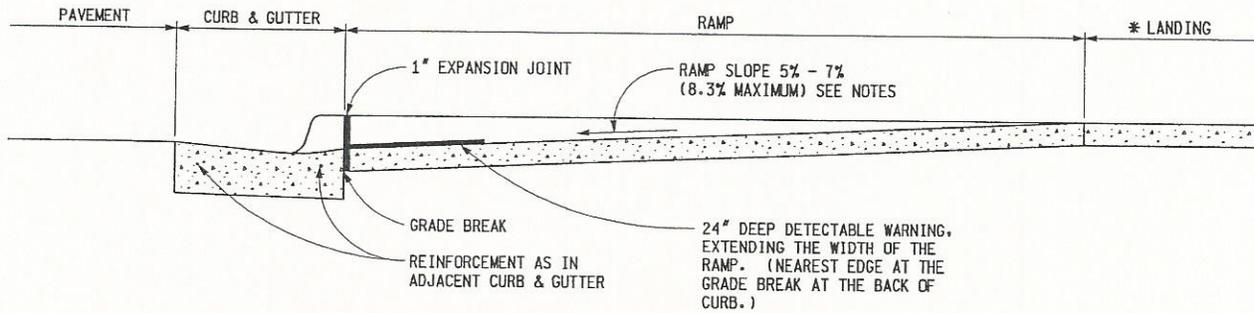
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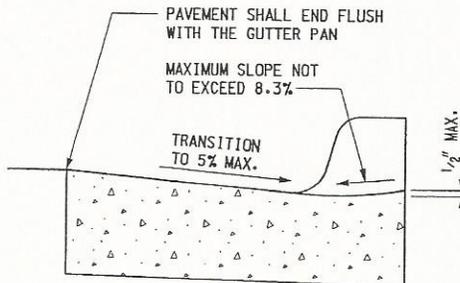
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SIDEWALK RAMP TYPE RF
(ROLLED / FLARED SIDES)



SECTION A-A



SECTION THROUGH CURB CUT
(TYPICAL ALL RAMP TYPES)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

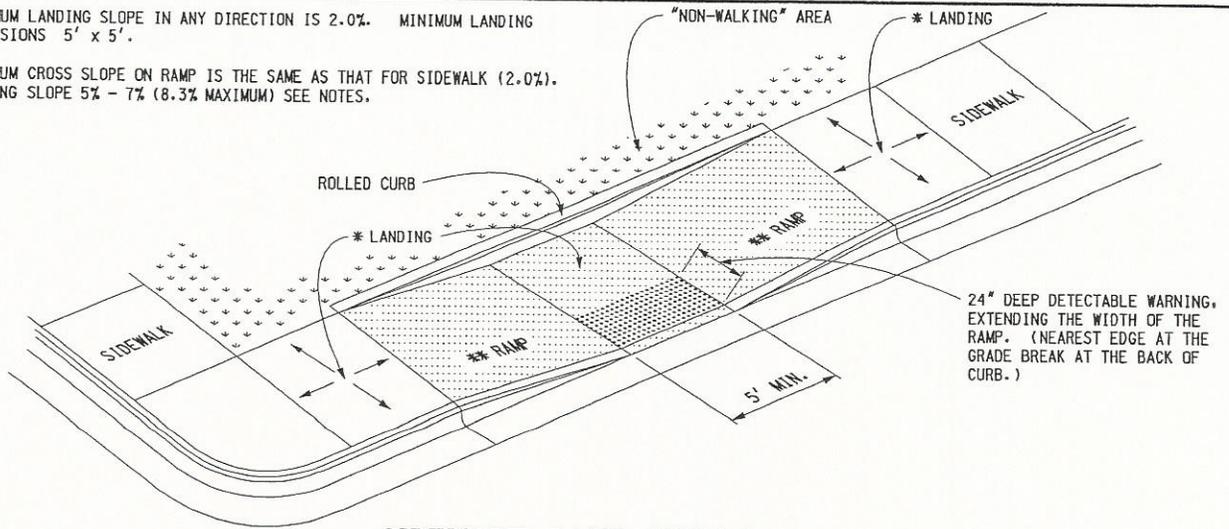
**SIDEWALK RAMP AND
DETECTABLE WARNING DETAILS**

10-21-2008 F.H.W.A. APPROVAL	6-20-2008 PLAN DATE	R-28-F	SHEET 2 OF 7
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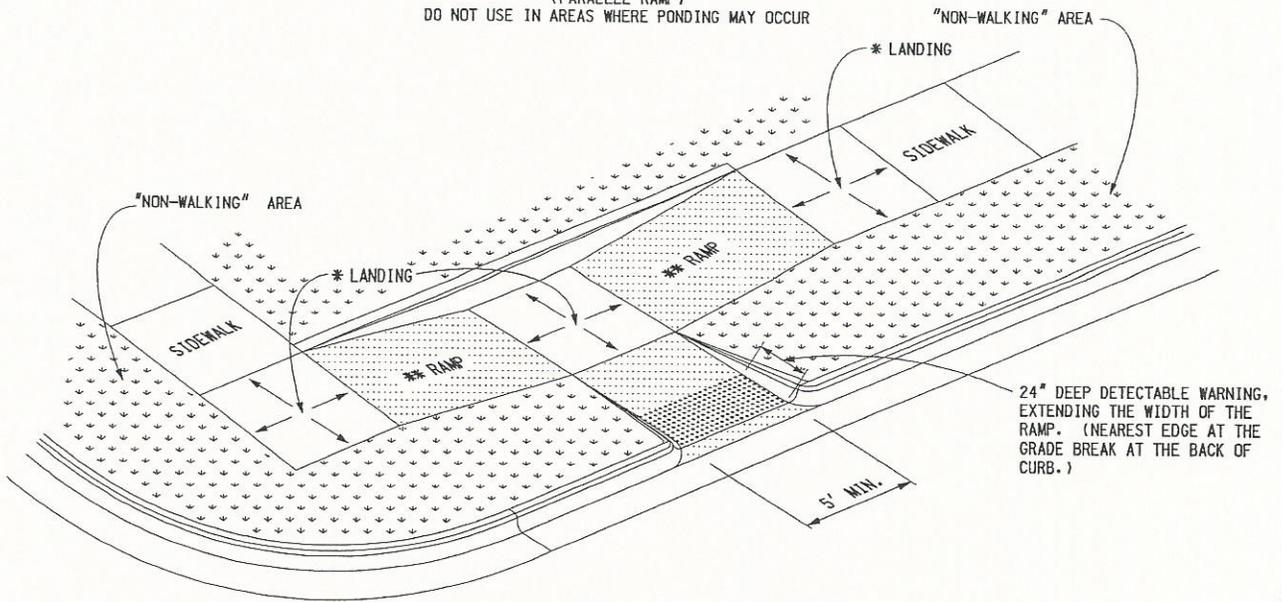
** MAXIMUM CROSS SLOPE ON RAMP IS THE SAME AS THAT FOR SIDEWALK (2.0%), RUNNING SLOPE 5% - 7% (8.3% MAXIMUM) SEE NOTES.



SIDEWALK RAMP TYPE P

(PARALLEL RAMP)

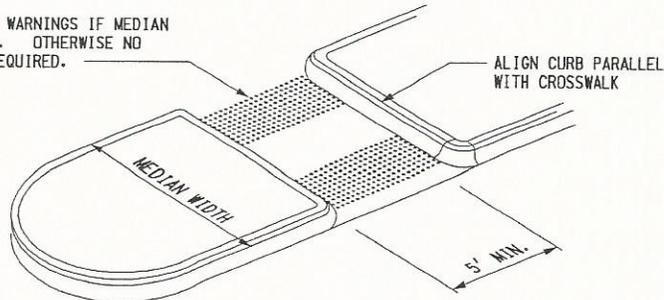
DO NOT USE IN AREAS WHERE PONDING MAY OCCUR



SIDEWALK RAMP TYPE C

(COMBINATION RAMP)

USE 24" DEEP DETECTABLE WARNINGS IF MEDIAN WIDTH IS AT LEAST 6'-0". OTHERWISE NO DETECTABLE WARNING IS REQUIRED.



SIDEWALK RAMP TYPE M

(MEDIAN ISLAND)

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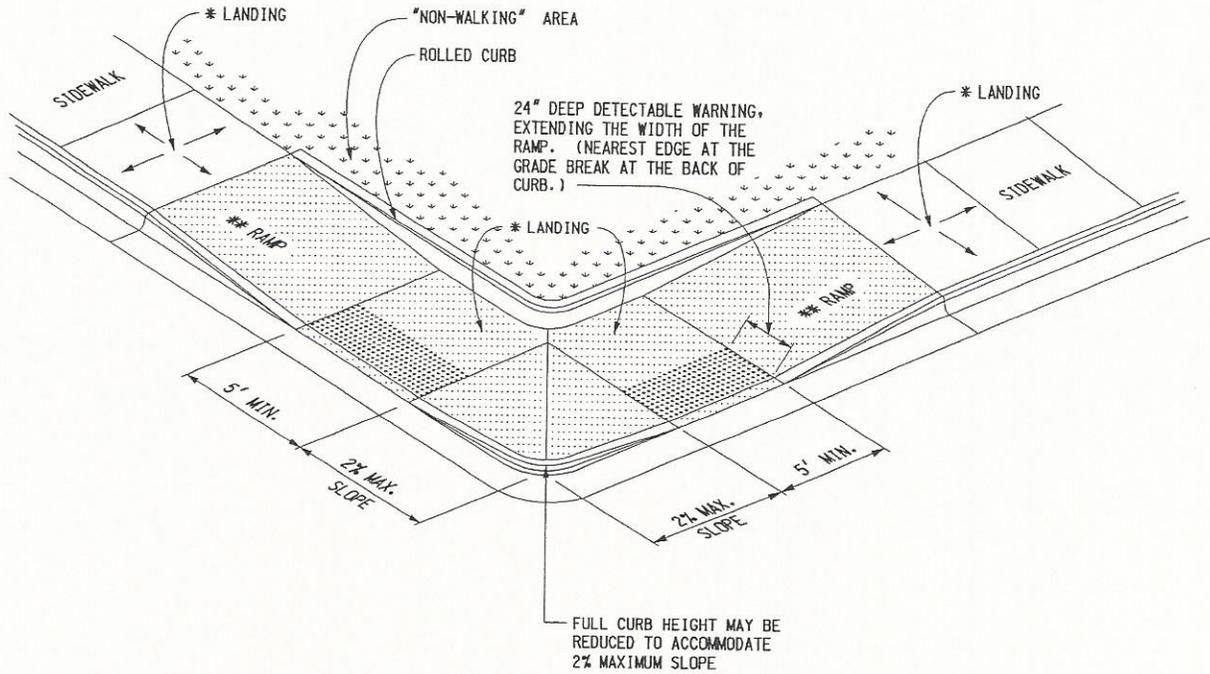
R-28-F

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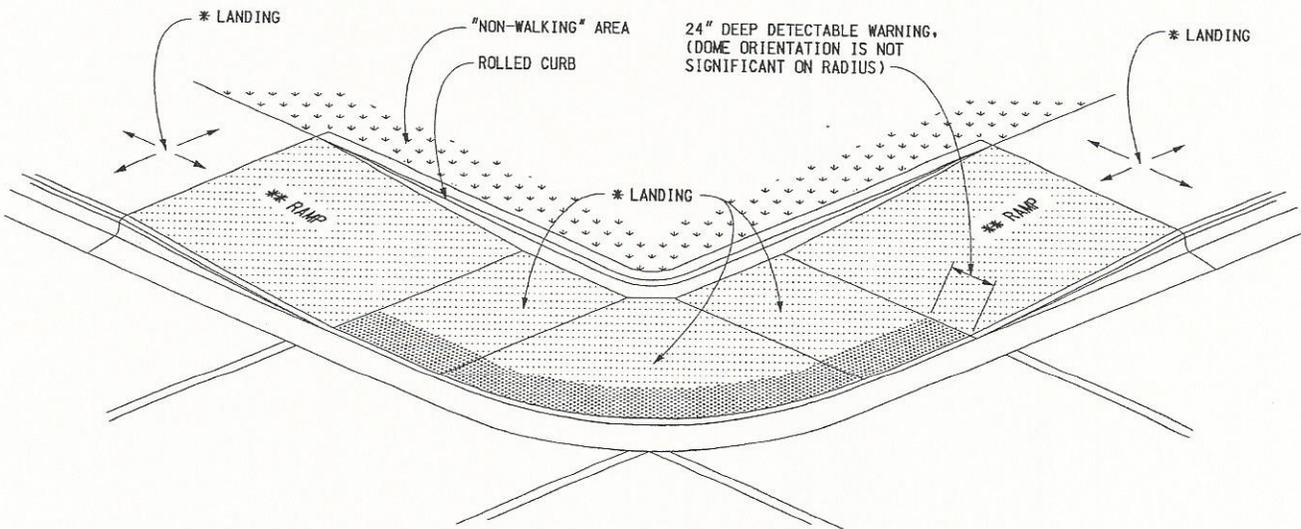
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SIDEWALK RAMP TYPE PF
(PARALLEL WITH FLARE)



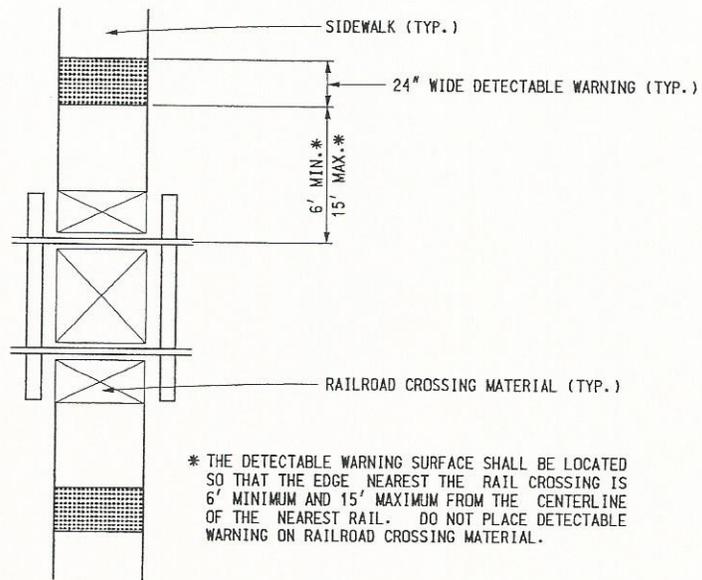
SIDEWALK RAMP TYPE D
(DEPRESSED CORNER)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

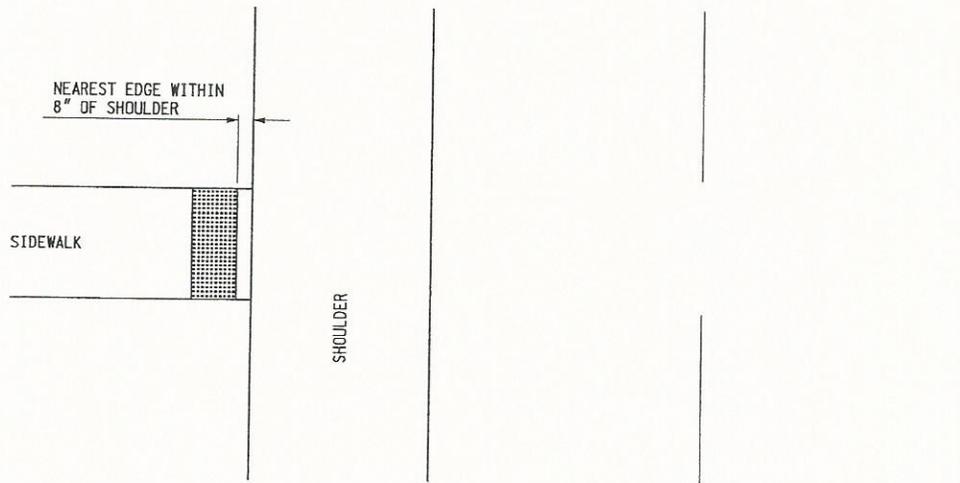
**SIDEWALK RAMP AND
DETECTABLE WARNING DETAILS**

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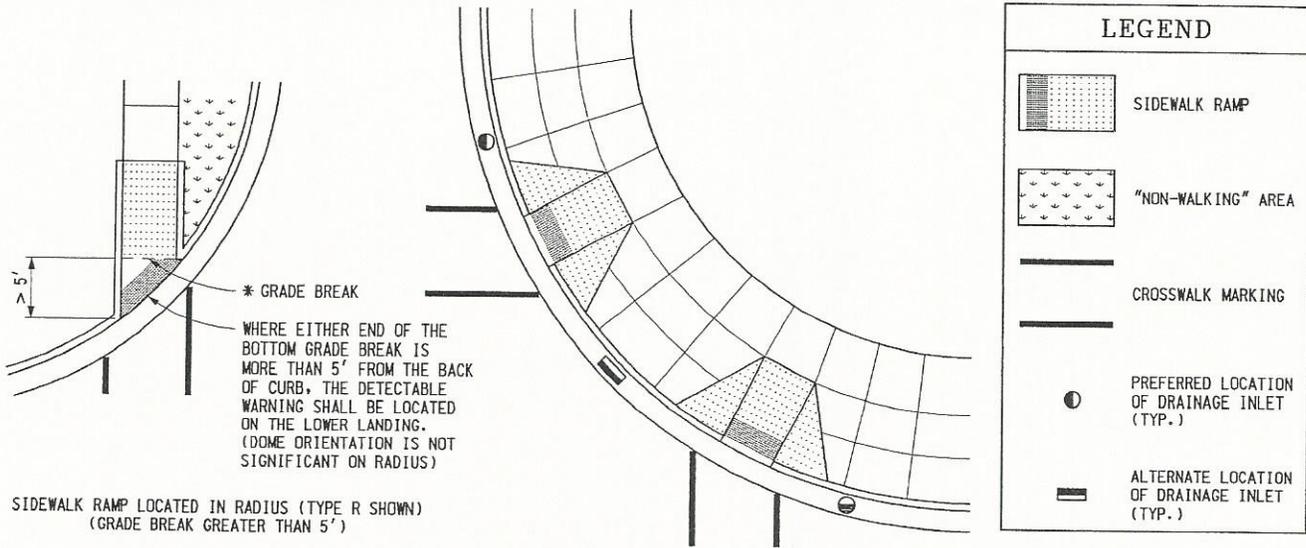
SIDEWALK RAMP TYPE RR
(DETECTABLE WARNING AT RAILROAD CROSSING)



SIDEWALK RAMP TYPE FS
(DETECTABLE WARNING AT FLUSH SHOULDER)

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SIDEWALK RAMP AND DETECTABLE WARNING DETAILS			
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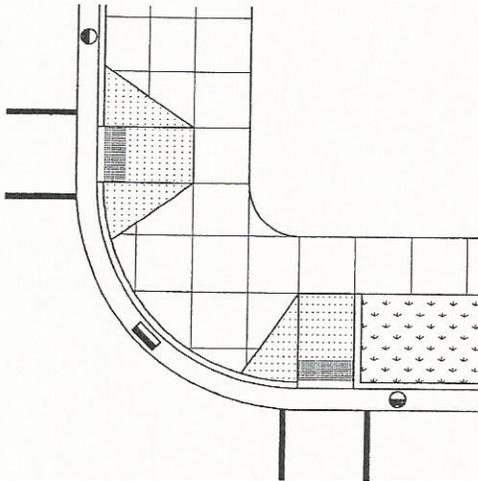
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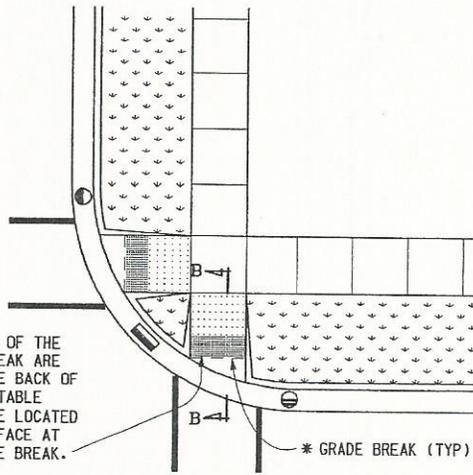
SIDEWALK RAMP LOCATED IN RADIUS (TYPE R SHOWN)
(GRADE BREAK GREATER THAN 5')

SIDEWALK RAMP PERPENDICULAR TO RADIAL CURB (TYPE F SHOWN)

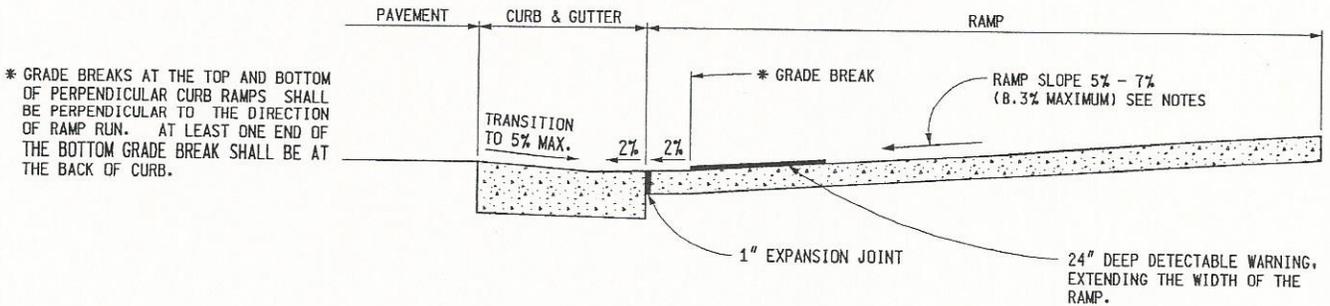
(USE WITH RADIAL CURB WHEN THE CROSSWALK AND SIDEWALK RAMP ARE NOT ALIGNED)



SIDEWALK RAMP PERPENDICULAR TO TANGENT CURB
(TYPE F AND TYPE RF SHOWN)



SIDEWALK RAMP LOCATED IN RADIUS (TYPE R SHOWN)
(GRADE BREAK LESS THAN 5')



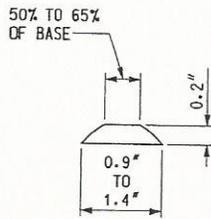
SECTION B-B
SIDEWALK RAMP ORIENTATION

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

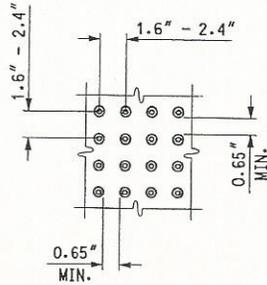
**SIDEWALK RAMP AND
DETECTABLE WARNING DETAILS**

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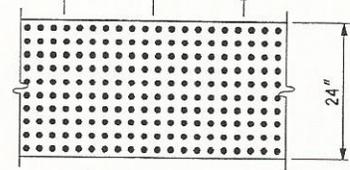


DOME SECTION

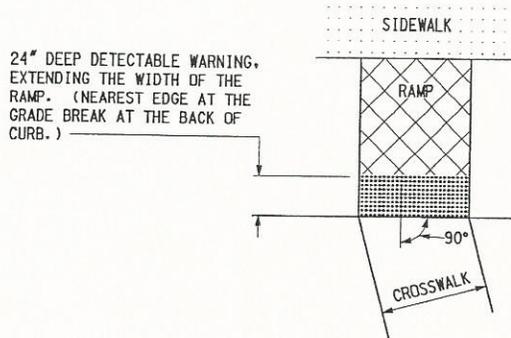


DOME SPACING

ALIGNED IN DIRECTION OF TRAVEL AND PERPENDICULAR (OR RADIAL) TO GRADE BREAK



DOME ALIGNMENT



DETECTABLE WARNING DETAILS

NOTES:

DETAILS SPECIFIED ON THIS PLAN APPLY TO ALL CONSTRUCTION, RECONSTRUCTION, OR ALTERATION OF STREETS, CURBS, OR SIDEWALKS BY ALL PUBLIC AGENCIES AND BY ALL PRIVATE ORGANIZATIONS CONSTRUCTING FACILITIES FOR PUBLIC USE.

SIDEWALK RAMPS ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

RAMPS SHALL BE PROVIDED AT ALL CORNERS OF AN INTERSECTION WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMPS SHALL ALSO BE PROVIDED AT WALK LOCATIONS IN MID-BLOCK IN THE VICINITIES OF HOSPITALS, MEDICAL CENTERS, AND LARGE ATHLETIC FACILITIES.

SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING, TRANSVERSE TO THE SLOPE OF RAMP.

SIDEWALK SHALL BE RAMPED WHERE THE DRIVEWAY CURB IS EXTENDED ACROSS THE WALK.

CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP, FREE OF SAGS AND SHORT GRADE CHANGES. WHERE CONDITIONS PERMIT, IT IS DESIRABLE THAT THE SLOPE OF THE RAMP BE IN ONLY ONE DIRECTION, PARALLEL TO THE DIRECTION OF TRAVEL.

RAMP WIDTH SHALL BE INCREASED, IF NECESSARY, TO ACCOMMODATE SIDEWALK SNOW REMOVAL EQUIPMENT NORMALLY USED BY THE MUNICIPALITY.

THE MAXIMUM RUNNING SLOPE OF 8.3% IS RELATIVE TO A FLAT (0%) REFERENCE. HOWEVER, IT SHALL NOT REQUIRE ANY RAMP OR SINGLE RAMP WITHIN A COMBINATION OF RAMPS TO EXCEED 15 FEET IN LENGTH.

IF POSSIBLE, DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMPS. EXCEPT WHERE EXISTING DRAINAGE STRUCTURES ARE BEING UTILIZED IN THE NEW CONSTRUCTION, LOCATION OF THE RAMP SHOULD TAKE PRECEDENCE OVER LOCATION OF DRAINAGE STRUCTURE.

THE SLOPE OF THE GUTTER PAN SHALL BE TRANSITIONED TO A MAXIMUM OF 5% IN THE AREA OF THE CURB CUT OF THE SIDEWALK RAMP. MAINTAIN THE NORMAL GUTTER PAN SLOPE ACROSS THE DRAINAGE STRUCTURE INLETS.

THE TOP OF THE JOINT FILLER FOR ALL RAMP TYPES SHALL BE FLUSH WITH THE ADJACENT CONCRETE.

CROSSWALK AND STOP LINE MARKINGS, IF USED, SHALL BE SO LOCATED AS TO STOP TRAFFIC SHORT OF RAMP CROSSINGS. SPECIFIC DETAILS FOR MARKING APPLICATIONS ARE GIVEN IN THE "MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES".

FLARED SIDES WITH A SLOPE OF 10% MAXIMUM, MEASURED ALONG THE CURB LINE, SHALL BE PROVIDED WHERE A CIRCULATION PATH CROSSES THE SIDEWALK RAMP. FLARED SIDES ARE NOT REQUIRED WHERE THE EDGES OF A SIDEWALK RAMP ARE PROTECTED BY LANDSCAPING OR OTHER BARRIERS TO TRAVEL BY WHEELCHAIR USERS OR PEDESTRIANS ACROSS THE EDGE OF THE SIDEWALK RAMP.

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR			
SIDEWALK RAMP AND DETECTABLE WARNING DETAILS			
10-21-2008 F.H.W.A. APPROVAL	6-20-2008 PLAN DATE	R-28-F	SHEET 7 OF 7

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