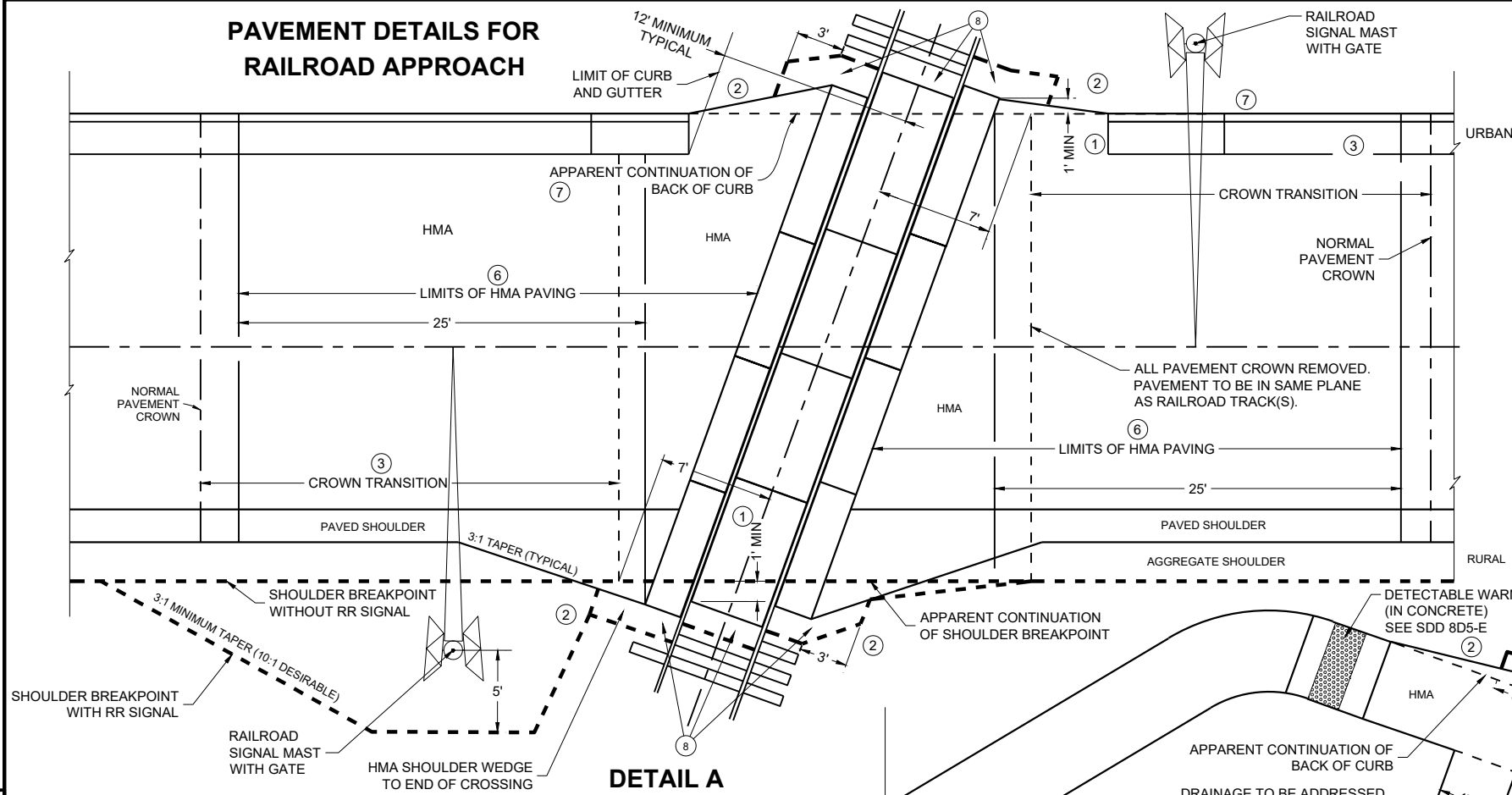


**PAVEMENT DETAILS FOR RAILROAD APPROACH**



**DETAIL A  
RAILROAD APPROACH**

**GENERAL NOTES**

PLANS AND SECTIONS ARE TYPICAL. DIMENSIONS VARY PER PROJECT.

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS, PROJECT PLANS, AND THE APPLICABLE SPECIAL PROVISIONS.

CROSSING SURFACE MATERIAL, RAILS, TIES, BALLAST, AND CROSSING DRAINAGE SYSTEM BY OTHERS UNLESS DIRECTED OTHERWISE. IF THE FINAL GRADES DON'T MATCH TO THE PLAN GRADES THEN GRADE ADJUSTMENTS WILL BE NECESSARY. CONFIRM NEW GRADES WITH PROJECT ENGINEER.

HMA PAVEMENT APPROACHES, HMA PAVEMENT CROSSING SURFACES, AND HMA FLANGWAY/FIELD FILLERS TO BE REPLACED BY ROADWAY CONTRACTOR UNLESS DIRECTED OTHERWISE BY THE PLANS, SPECIAL PROVISIONS, RAILROAD ENGINEER, OR PROJECT ENGINEER.

HMA PAVEMENT SHALL BE ROLLED PARALLEL TO THE TRACK.

WHEN THERE IS A SIDEWALK OR SHARED-USE PATH, ADD DETECTABLE WARNING FIELDS PER CURRENT STANDARD DETAIL DRAWING 8D5-E.

THE CROSSING SHALL NOT BE OPENED TO ANY TYPE OF TRAFFIC UNTIL IT IS FULLY PAVED AND COOLED SUFFICIENTLY UNLESS OTHERWISE APPROVED BY THE RAILROAD ENGINEER AND THE PROJECT ENGINEER.

NO NON-RUBBER TIERED OR TRACKED EQUIPMENT SHALL CROSS OR SIT ON THE CROSSING SURFACE WITHOUT PROTECTING THE CROSSING SURFACE WITH A METHOD APPROVED BY THE RAILROAD ENGINEER AND PROJECT ENGINEER.

PLACE BASE AGGREGATE DENSELY AROUND SIGNAL BASE. COORDINATE WITH THE RAILROAD ENGINEER.

HMA SHOULDER WEDGE TO END OF CROSSING  
DETECTABLE WARNING FIELD (IN CONCRETE) SEE SDD 8D5-E

DETECTABLE WARNING FIELD (IN CONCRETE) SEE SDD 8D5-E

CONCRETE OR HMA PAVEMENT

RAILROAD SIGNAL MAST WITH GATE

SIDEWALK/PATH

TERRACE

CANTILEVERED RAILROAD SIGNAL MAST

LIMIT OF CURB AND GUTTER

HMA

HMA

HMA

HMA

HMA

HMA

**DETAIL B  
MEDIAN AND SIDEWALK/SHARED-USE PATH APPROACH**

**GENERAL NOTES CONTINUED**

- ① 1' MINIMUM CROSSING SURFACE COVERAGE PAST THE APPARENT CONTINUATION OF SHOULDER BREAKPOINT, BACK OF CURB, OR OUTSIDE EDGE OF SIDEWALK/PATH. INDIVIDUAL RAILROADS MAY HAVE DIFFERENT MINIMUM STANDARDS.
- ② HMA FLARE FROM OUTSIDE EDGE OF SIDEWALK/PATH, BACK OF CURB, OR AGGREGATE SHOULDER BREAKPOINT TO THE END OF CROSSING SURFACE MATERIAL.
- ③ CROWN TRANSITION LENGTH SHOWN ELSEWHERE IN THE PLAN.
- ④ NEAR EDGE OF PATH TO THE CENTER OF SIGNAL OR GATE MAST SHOULD BE A MINIMUM OF 5'-0". FOR SIDEWALK, THE NEAR EDGE SHOULD BE A MINIMUM OF 3'-0" TO THE CENTER OF SIGNAL OR GATE. NEAR EDGE OF SIDEWALK TO A NON-GATED MAST OR CANTILEVER SHOULD BE A MINIMUM OF 2'-6". SEE PLAN FOR RAILROAD SIGNAL AND GATE LOCATION IF THEY ARE NOT ALREADY INSTALLED.
- ⑤ TERRACE WIDTH VARIES. SEE PLAN FOR RAILROAD SIGNAL AND GATE LOCATIONS. PER PLAN OR PROJECT ENGINEER THE TERRACE AND SIDEWALK/PATH GRADES SHALL BE TRANSITIONED TO MATCH THE GRADE OF THE TRACK. FIELD FIT TO AVOID PONDING.
- ⑥ 25' MINIMUM HMA PAVING MEASURED PARALLEL TO THE ROAD OR 10' MINIMUM MEASURED PERPENDICULAR TO THE TRACK FROM THE EDGE OF THE CROSSING SURFACE, WHICHEVER IS GREATER.
- ⑦ REFERENCE SDD 8-D-01 END SECTION CURB AND GUTTER. MEDIAN END NEAR THE TRACK SHOULD BE PARALLEL TO THE TRACK. 6'-0" TAPER FOR A MEDIAN SHOULD BE REDUCED TO GET FULL HEIGHT CURB WHERE THE GATE COMES DOWN. DESIGN OPTION TO POUR MEDIAN TAPER IN ONE PIECE. BUILD PER PLAN UNLESS OTHERWISE APPROVED BY THE RAILROAD ENGINEER AND THE PROJECT ENGINEER.
- ⑧ IF METAL END PLATES ARE NOT INSTALLED BY THE RAILROAD THEN HMA PAVEMENT WEDGE SHALL BE PLACED AT THE END OF THE LAST PANEL TAPERED TO BACK EDGE OF NEXT TIE AND THOROUGHLY COMPACTED. SEE DETAIL G.

6

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SDD 13B01-11a

SDD 13B01-11a

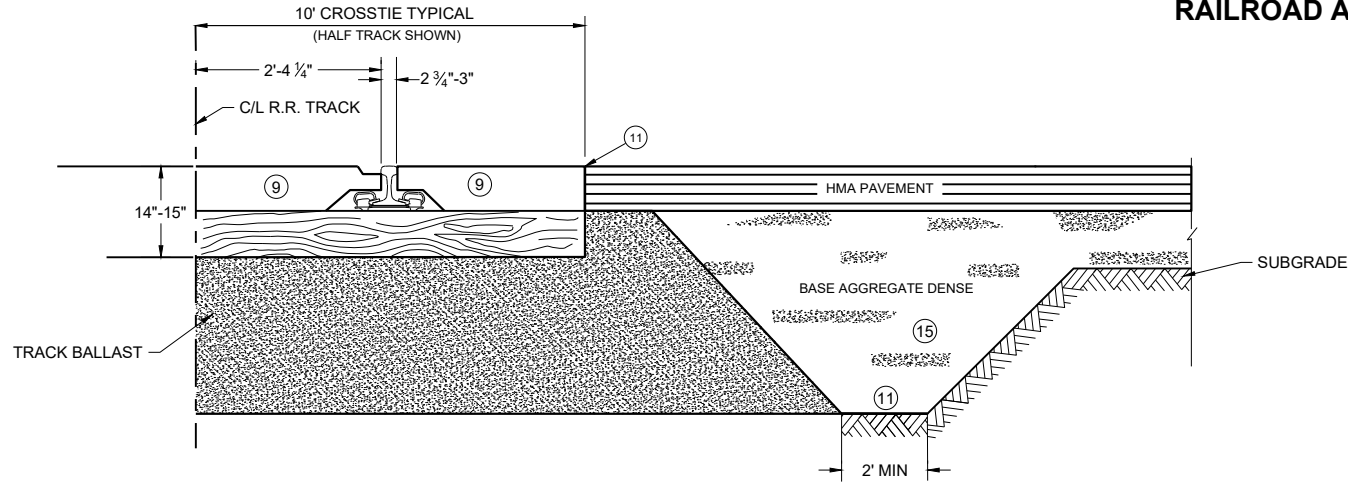
**PAVEMENT DETAILS FOR RAILROAD APPROACH**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

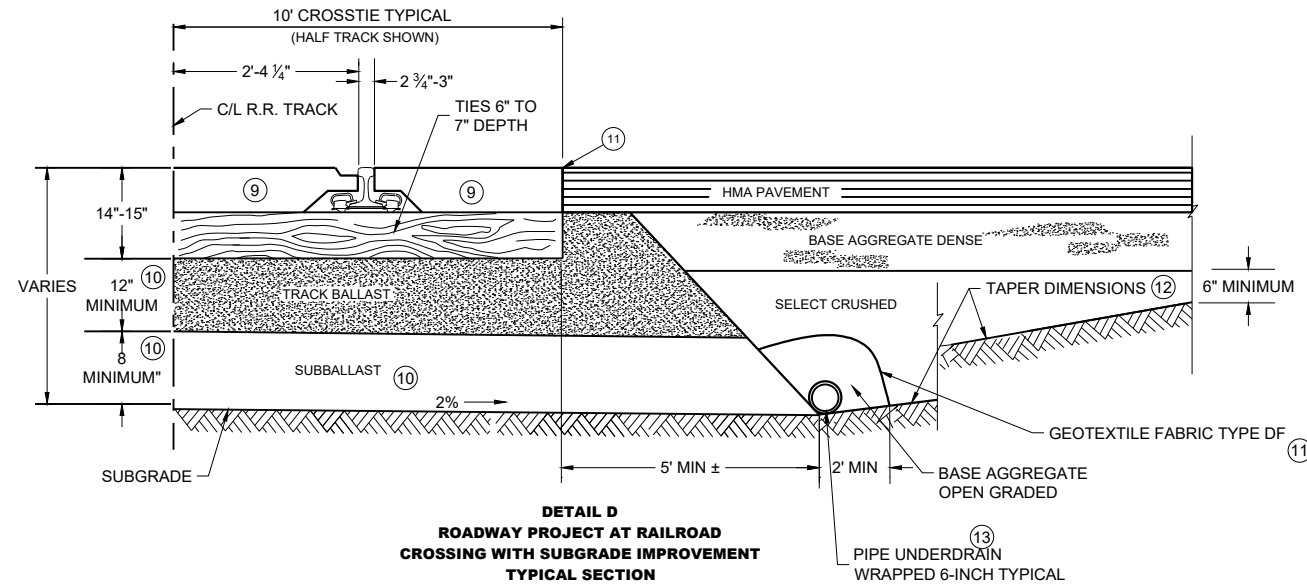
APPROVED  
May 2023 /S/ Kristen Sommers  
DATE STATE RAILROAD ENGINEERING AND SAFETY SUPERVISOR

FHWA

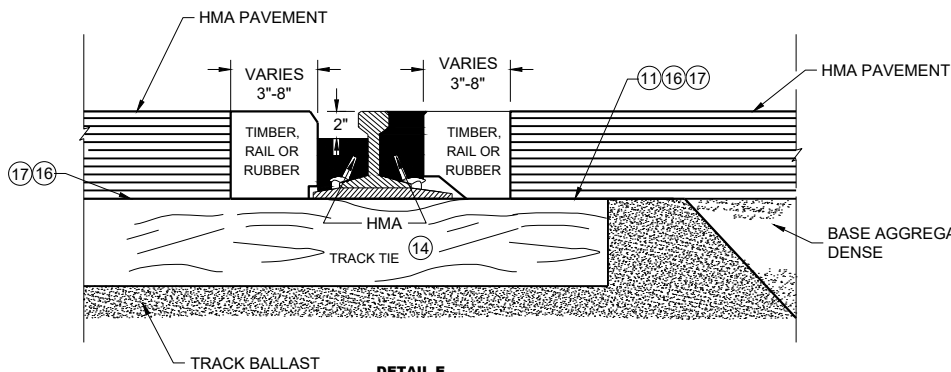
**TYPICAL SECTIONS FOR RAILROAD APPROACH**



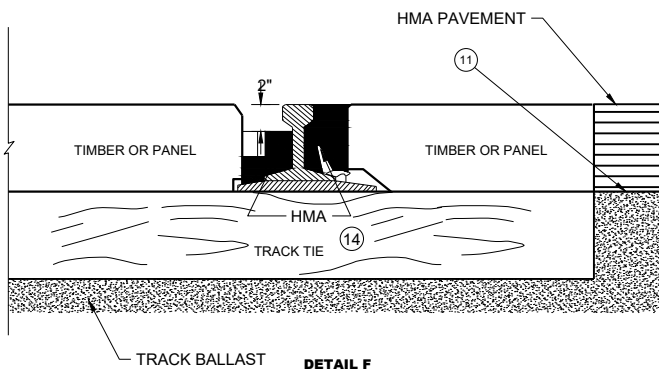
**DETAIL C**  
ROADWAY PROJECT AT RAILROAD  
CROSSING WITHOUT SUBGRADE IMPROVEMENT  
TYPICAL SECTION



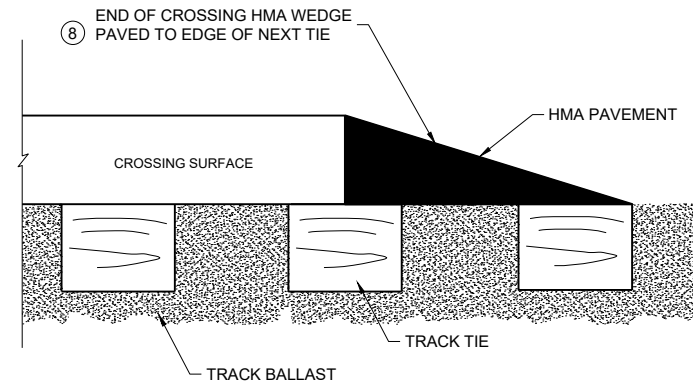
**DETAIL D**  
ROADWAY PROJECT AT RAILROAD  
CROSSING WITH SUBGRADE IMPROVEMENT  
TYPICAL SECTION



**DETAIL E**  
TIMBER, RAIL OR  
RUBBER SECTION  
HMA FLANGEWAY  
AND FIELD FILLERS



**DETAIL F**  
PANEL SECTION  
HMA FLANGEWAY  
AND FIELD FILLERS



**DETAIL G**  
END OF CROSSING HMA WEDGE

**GENERAL NOTES**

- ⑧ IF METAL END PLATES ARE NOT INSTALLED BY THE RAILROAD THEN HMA PAVEMENT WEDGE SHALL BE PLACED AT THE END OF THE LAST PANEL TAPERED TO BACK EDGE OF NEXT TIE AND THOROUGHLY COMPACTED. SEE DETAIL A AND B.
- ⑨ MATCH THE CROSSING TYPE THAT IS INSTALLED UNLESS OTHERWISE DIRECTED BY PROJECT ENGINEER.
- ⑩ TRACK BALLAST AND SUBBALLAST REQUIRED 12" AND 8" MINIMUM DEPTHS RESPECTIVELY. DIMENSION FROM BOTTOM OF TRACK TIE TO HIGH SIDE OF 2% SLOPE. THE 2% SLOPE IS REQUIRED ON RAILROAD SUBBALLAST. SEE PLAN FOR CROWN, MATERIAL THICKNESS, AND SLOPE DIRECTION. SUBBALLAST CAN BE HMA, 1 1/2" BASE AGGREGATE DENSE, SELECT CRUSHED, OR A COMBINATION OF THEM.
- ⑪ GEOTEXTILE FABRIC TYPE SAS PLACED IN ORDER TO PROVIDE STABILIZATION AND SEPARATION ON TOP OF THE TRACK BALLAST WHERE IT IS UNDER HMA PAVEMENT, BASE AGGREGATE DENSE OR SELECT CRUSHED MATERIAL AND THE FIELD SIDE BALLAST CRIBS. GEOTEXTILE FABRIC TYPE DF PLACED IN ORDER TO PROVIDE STABILIZATION AND SEPARATION UNDER AND AROUND THE PIPE UNDERDRAIN. PLACING GEOTEXTILE FABRIC OR GEOGRID UNDER THE SUBBALLAST IS OPTIONAL.
- ⑫ TAPER DIMENSIONS PROVIDED BY PLAN OR BY PROJECT ENGINEER.
- ⑬ IF SHOWN ON THE PLAN, TYPICAL 6-INCH PERFORATED PVC SCHEDULE 80 PIPE UNDERDRAIN TO BE PLACED ALONG THE TOE OF SLOPE, GRADED TO DRAIN AND DAYLIGHT OR INTO STORM SEWER. BASE AGGREGATE OPEN GRADED OVER PIPE UNDERDRAIN AND THEN WRAPPED IN GEOTEXTILE FABRIC TYPE DF SCHEDULE A IN ORDER TO STABILIZE AND SEPARATE FROM SELECT CRUSHED.
- ⑭ HMA FLANGEWAY AND FIELD FILLERS ARE TO BE PLACED AND THOROUGHLY HAND COMPACTED BY THE CONTRACTOR, WHEN NOT PROVIDED BY OTHERS AS PART OF THE CROSSING SURFACE MATERIAL. IF THE CROSSING SURFACE IS NOT BEING REPLACED, THEN REMOVE AND REPLACE THE HMA FLANGEWAY AND FIELD FILLERS AS DIRECTED BY THE RAILROAD OR PROJECT ENGINEER.
- ⑮ GRADE TO MATCH EXISTING OR PROPOSED TYPICAL SECTION OF ROADWAY. SEE PLAN OR PROJECT ENGINEER FOR MORE DETAIL. IF NOT NOTED OTHERWISE IN THE PLAN, BACKFILL ANY REMOVED BASE AND SUBGRADE WITH BASE AGGREGATE DENSE.
- ⑯ IF THE CROSSING IS NOT BEING REPLACED, REMOVE AND REPLACE HMA AS DIRECTED BY RAILROAD AND PROJECT ENGINEER. CARE MUST BE TAKEN TO NOT DAMAGE CROSSING PANELS, TIES, RAIL, PLATES AND SPIKES.
- ⑰ PLACE HMA FULL DEPTH. AGGREGATE IS NOT TO BE PLACED BETWEEN THE RAILROAD TIES AND THE HMA PAVEMENT.

**TYPICAL SECTIONS FOR RAILWAY APPROACH**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED

May 2023  
DATE

/s/ Kristen Sommers  
STATE RAILROAD ENGINEERING  
AND SAFETY SUPERVISOR

FHWA

## Pavement Details for Railroad Approach

**References:**[FDM 17-60](#)[FDM 11-46-15.9](#)**Bid Items associated with this drawing:**

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
305.0110 - 0135	Base Aggregate Dense (inch) .....	TON or CY
312.0110 - 0115	Select Crushed Material (inch).....	TON or CY
415.0060 – 0199	Concrete Pavement (inch).....	SY
415.1080 – 1199	Concrete Pavement HES (inch).....	SY
460.1100 – 1700	HMA Pavement Type (xx).....	TON
601.0300 – 0339	Concrete Curb & Gutter (Inch).....	LF
602.0505	Curb Ramp Detectable Warning Field Yellow.....	SF
602.0510	Curb Ramp Detectable Warning Field White.....	SF
602.0515	Curb Ramp Detectable Warning Field Natural Patina.....	SF
602.0405	Concrete Sidewalk 4".....	SF
602.0410	Concrete Sidewalk 5".....	SF
602.0415	Concrete Sidewalk 6".....	SF
602.0420	Concrete Sidewalk 7".....	SF
612.0106	Pipe Underdrain 6-Inch.....	LF
645.0110 – 0111	Geotextile Fabric Type DF Schedule A .....	SY
645.0140	Geotextile Fabric Type SAS .....	SY

**Standardized Special Provisions associated with this drawing:**

<u>STSP NUMBER</u>	<u>TITLE</u>
<a href="#">Standard spec. 107.17.1</a>	Railroad Coordination
<a href="#">Standard spec. 612</a>	Underdrains

**Other SDDs associated with this drawing:**

<a href="#">SDD 15C9</a>	Signing and Pavement Marking
<a href="#">SDD 8D5 sheet e</a>	Sidewalk/Shared-use Path
<a href="#">SDD 8D1 sheet b</a>	Concrete Curb, Pavement Ties and Curb Ramp
<a href="#">SDD 8D15 sheet b</a>	Underdrain

**Design Notes:**

General – Comply with the Wisconsin Department of Transportation Facilities Development Manual Procedure 17-60-5 Attachment 5.1 and 5.2.

State clearly in Section C (“Work by Railroad”) of the “Relations with Railroad Company” special provision, what work if any will be performed by the railroad company. If track work and/or crossing surface installation is to be performed by the contractor, follow the crossing manufacturer’s recommendations. Due to the need for room for track maintenance and repair and to prevent tight track gauge due to concrete pavement expansion, do not place concrete pavement next to the end of track ties. Include guidance in the plans or special provision where track centers do not provide sufficient room for heavy roller compaction.

## 1. Traffic Staging for Highway:

- a. Typical crossing surface replacement requires the replacement of the crossing surface, rails, ties and ballast. This requires a full closure and detour of the highway unless there is special staging, such as a temporary bypass of the crossing. Special staging arrangements must be agreed upon by the railroad and Rails and Harbors Section.
- b. Staging & Lane Closures – Review the construction project roadway closure, detour, staging

and traffic control for the area near the railroad (RR) crossing with the Regional Railroad Coordinator (RRC). All lane shifts at a RR crossing shall be reviewed with the RRC and may require a special traffic control plan including items such as temporary RR signals, traffic flagging, railroad flagman and/or other signing.

## 2. Paving:

- a. Review of existing and proposed track profile elevation needs to be done before setting the highway profile elevation. Reference FDM 17-60-5.3 and ensure that the proposed highway, including sideroads, profile standards are met. Any deviation from standards shall be reviewed and approved by Rails and Harbors Section. Expansion of the project scope might be necessary to address a sub-standard profile.
- b. Rural Cross Section HMA Approach - A flared paved shoulder is typically tapered at a 3:1 to meet the end of the crossing surface. Show this on the Railroad Plan and Profile sheet(s).
- c. Crown Transition - Call out the roadway crown transition start and end points on the plan. Roadway profiles approaching RR crossings need to be designed along the crown point of the road. Always rotate crown up for crown transitions along the crown point. Calculate the crown transition length as provided in the WisDOT FDM 11-10 Exhibit 5.1 Superelevation Tables.
- d. HMA Approach – Pave railroad crossing approaches with the same pavement mix design as the roadway project or as directed by your Pavement Engineer. Provide a typical section for railroad approaches in the plan.
- e. Due to the greater potential for cracking at an acute angle, concrete pavement terminations should not be skewed unless conditions warrant. Also, concrete saw cuts typically should be perpendicular to the roadway. Consult pavement engineer for more guidance.
- f. For resurfacing projects that include replacement of the crossing surface material, saw cut and remove full depth pavement a minimum of 15 feet from track centerline [measured perpendicularly]. Show in plan.

## 3. Center Median Barrier:

- a. Center median barriers should be installed where railroad gates are present or proposed. Any deviation from this shall be reviewed and approved by Rails and Harbors Section.
- b. Center median barrier shall be at 6-inch full curb height where the railroad gate comes down. Adjustment of gate location may be needed to accommodate this requirement. To maintain the 6-inch vertical, do not pave over the gutter. Replace the curb and gutter to raise the grade, if needed.
- c. The center median barrier end section nearest the crossing should have a 6-foot tapered slope. This distance may be less depending on field conditions to ensure that the curb is 6-inch at the gate.
- d. The center median barrier length should be a desired minimum of 105' measured from the 6" vertical at the gate to 6" vertical at the far end. This distance may be less depending on field conditions.

## 4. Curb & Gutter:

- a. To maintain the 6-inch vertical at the railroad signal, do not pave over the gutter. Replace the curb and gutter to raise the grade, if needed.

## 5. Signal and Gate Placement:

- a. If railroad signals are being installed during the project, include the location of the signals, gates and bungalow on the plan for railroad, utility and environmental coordination as well as construction. The plans will be reviewed as part of the railroad coordination process. Show the signals as "Work by Railroad". Place base aggregate dense (BAD) around signal bases,

generally for a 5-foot radius.

- b. Rural cross section requires shoulder to be typically tapered at a 10:1 (3:1 minimum) to behind the railroad signal. This area is required for the railroad to maintain railroad signals.

6. Sidewalk/Shared-Use Path:

- a. ADA and bicycle standards best practice is to have flared sidewalk/path approaches cross railroad tracks at 90°. Any deviation from this shall be reviewed and approved by Rails and Harbors Section.
- b. At back of sidewalk, shared-use path, or curb, the HMA flare should extend to the end of the crossing surface material. Show on plan.
- c. See SDD 8D5-19e for placement of detectable warning fields.

7. Bicycle Bump Outs:

- a. Include bicycle/roadway flare (bump outs) per the Wisconsin Bicycle Facility Design Handbook. Options like this should be considered if the crossing angle is less than 75°. Bicycle bump outs are required for crossings less than 60°. Any deviation from this shall be reviewed and approved by Rails and Harbors Section.

8. If a railroad subgrade improvement is being proposed by the railroad and Department, then a railroad typical section and plan view need to be included in the plan. The railroad subgrade improvement shall extend a minimum of 20' past the end of the crossing. If the profile of the railroad is proposed to change, then a railroad plan and profile should be included in the plan.

9. Geotextile fabric (type SAS unless otherwise noted) to be placed at the following locations in order to provide stabilization and separation:

- a. On top of the track ballast where it is under base aggregate dense (BAD) or select crushed. BAD never to be placed directly over track ballast.
- b. Up the side of the crossing surface and cover ballast cribs when not covered by the crossing surface panels or HMA pavement.
- c. Geotextile fabric type DF Schedule A Under and around the pipe underdrain.

**Contact Person:**

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