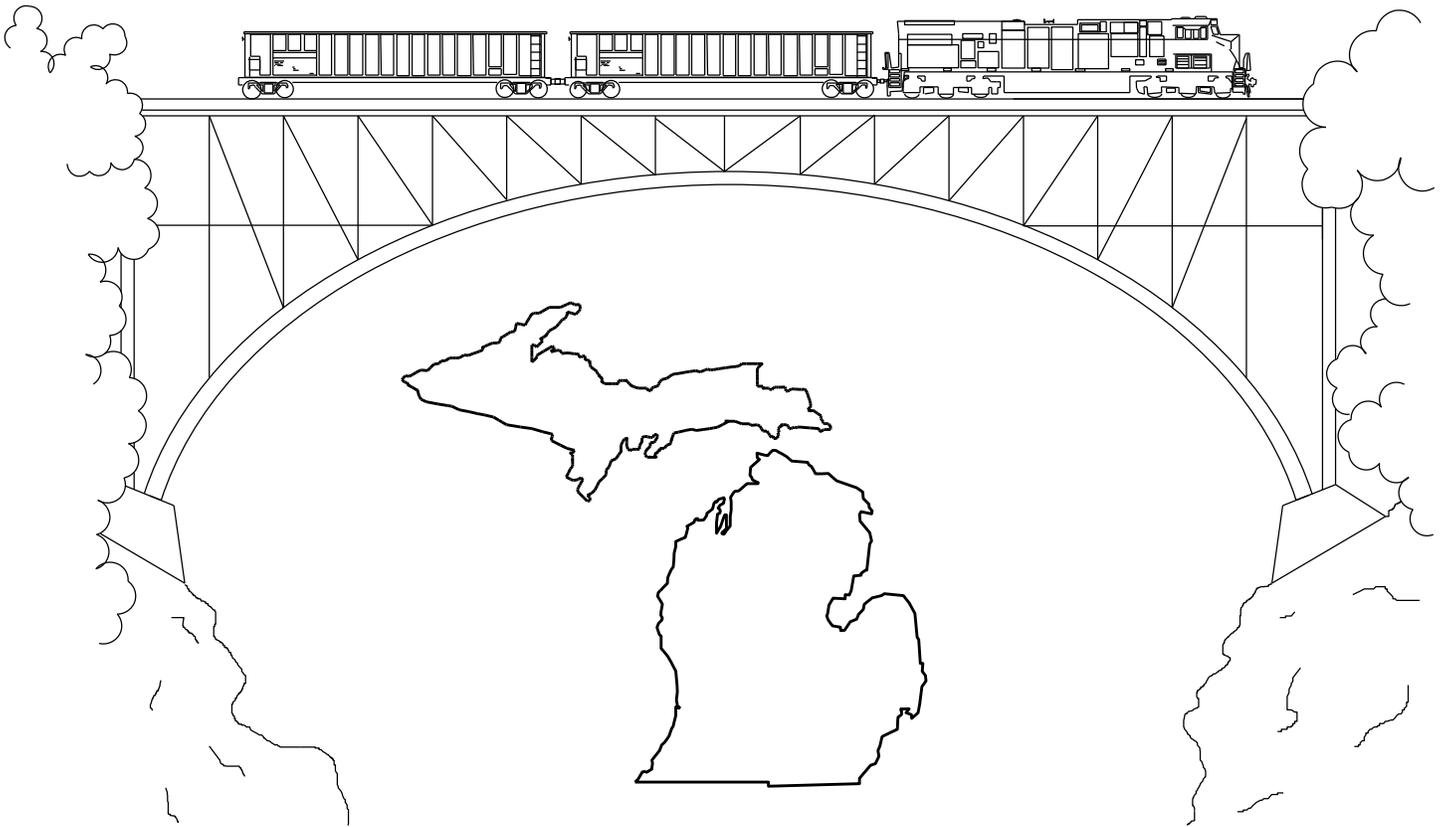




RAILROAD TYPICAL PLANS

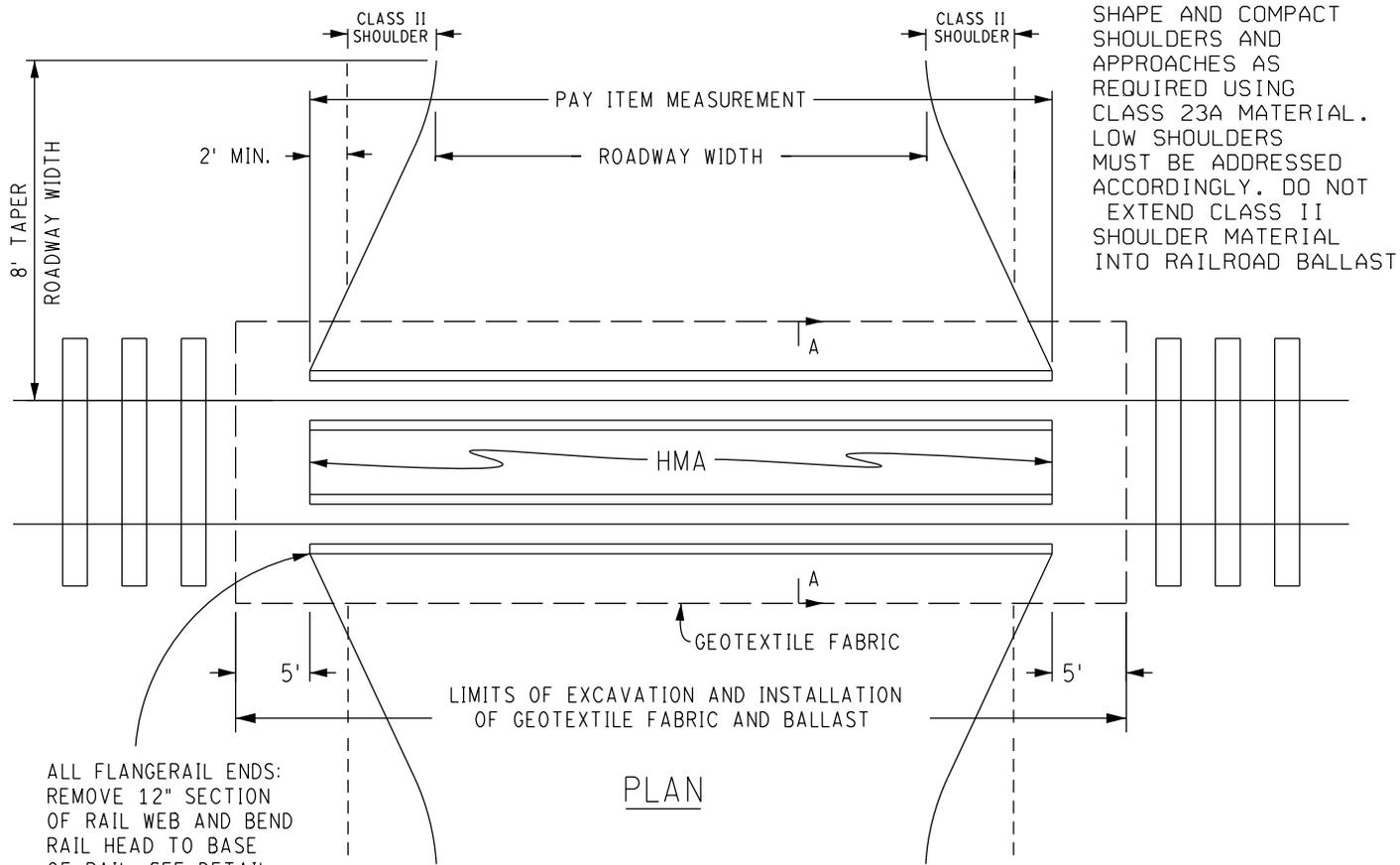
2019





INDEX TO RAILROAD TYPICAL PLANS

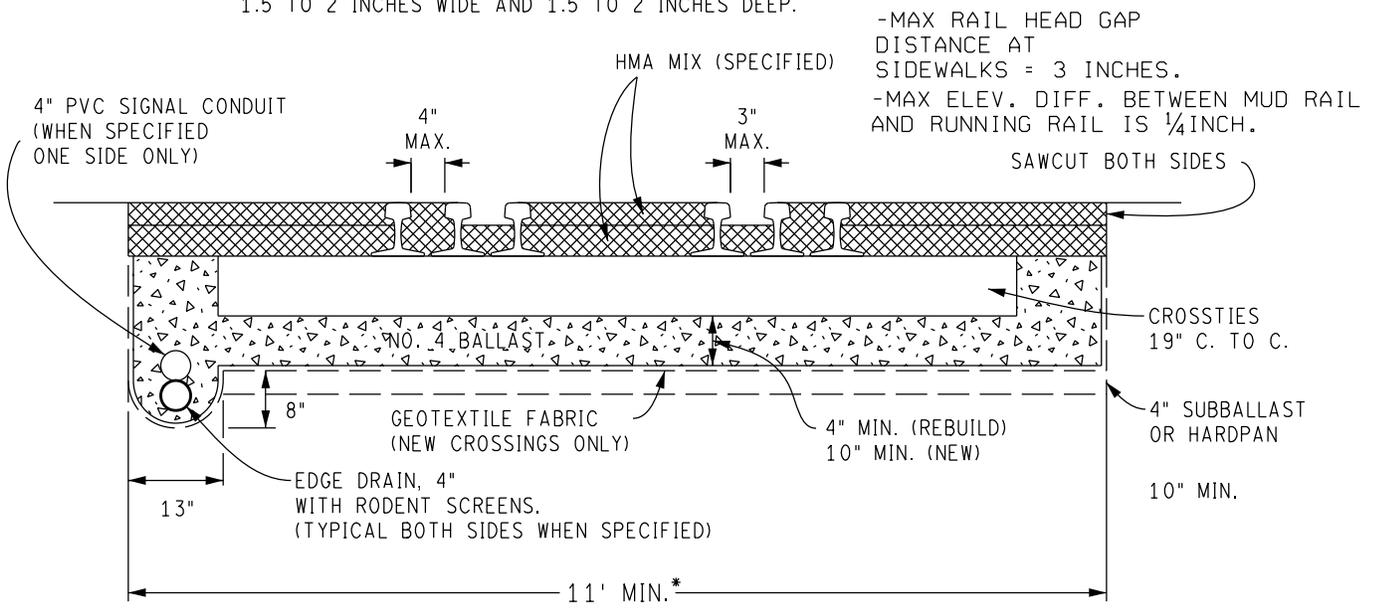
| TYPICAL PLAN NO. | NO. OF SHEETS | TITLE | REVISION DATE |
|------------------------|---------------------|---|------------------|
| RR-10 | 2 | RAIL FLANGEWAY - HMA GRADE CROSSING | 2/4/2019 |
| RR-12 | 1 | TEMPORARY PLANK GRADE CROSSING | 5/12/2015 |
| RR-13 | 1 | TEMPORARY PLANK SIDEWALK CROSSING | 4/19/2016 |
| RR-20 | 2 | LOCAL AGENCY GRADE CROSSING APPROACHES | 2/4/2019 |
| RR-25 | 1 | BALLAST RETAINING WALLS | 2/4/2019 |
| RR-30 | 2 | ROAD CLOSURE TEMPORARY SIGNING | 4/5/2016 |
| RR-40 | 1 | RAIL SPIKING PATTERNS | 4/19/2016 |
| RR-41 | 2 | TYPICAL TRACK AND STRUCTURE SECTION | 2/20/2019 |
| RR-42 | 2 | RAIL ANCHORING | 4/19/2016 |
| RR-50 | 1 | CULVERT INSTALLATION UNDER RAILROAD TRACK | 4/19/2016 |
| RR-62 | 1 | CULVERT (CSP) EXTENSION | 4/19/2016 |
| RR-70 | 1 | CHEMICAL VEGETATION CONTROL | 4/5/2016 |
| RR-90 | 2 | SWITCH ROD INSULATION | 4/19/2016 |
| RR-91 | 1 | GAGE PLATE INSULATION | 4/19/2016 |
| | | | |
| | | | |
| | | | |
| | | | |



SHAPE AND COMPACT SHOULDERS AND APPROACHES AS REQUIRED USING CLASS 23A MATERIAL. LOW SHOULDERS MUST BE ADDRESSED ACCORDINGLY. DO NOT EXTEND CLASS II SHOULDER MATERIAL INTO RAILROAD BALLAST.

ALL FLANGERAIL ENDS: REMOVE 12" SECTION OF RAIL WEB AND BEND RAIL HEAD TO BASE OF RAIL, SEE DETAIL SHEET 2 OF 2.

WHEEL FLANGE VOIDS INSIDE HEADS OF RUNNING RAILS SHALL BE 1.5 TO 2 INCHES WIDE AND 1.5 TO 2 INCHES DEEP.

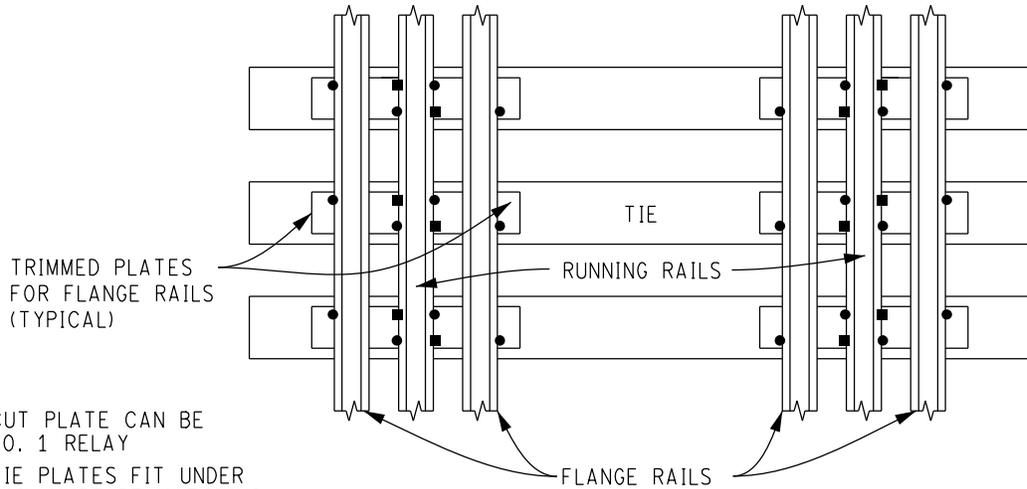


1/4" MAX DEPTH DEVIATION BETWEEN FLANGE AND RUNNING RAILS

SECTION A-A

* 12' MAX. WHEN EDGE DRAINS ARE SPECIFIED

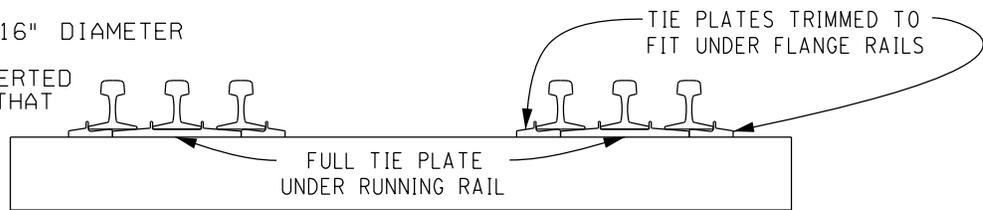
FLANGE RAIL SPIKING PATTERN
(PUBLIC AND PRIVATE CROSSINGS)



CUT PLATE CAN BE NO. 1 RELAY
TIE PLATES FIT UNDER RAIL MUST BE MATCHING

-SCREW LAGS SHALL BE 11/16" DIAMETER

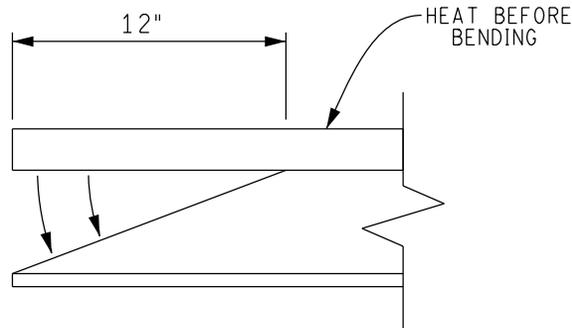
-SCREW LAGS SHALL BE INSERTED INTO A PRE-DRILLED HOLE THAT IS 1/8" SMALLER THAN SCREW LAG



(SPIKES NOT SHOWN IN CROSS SECTION)

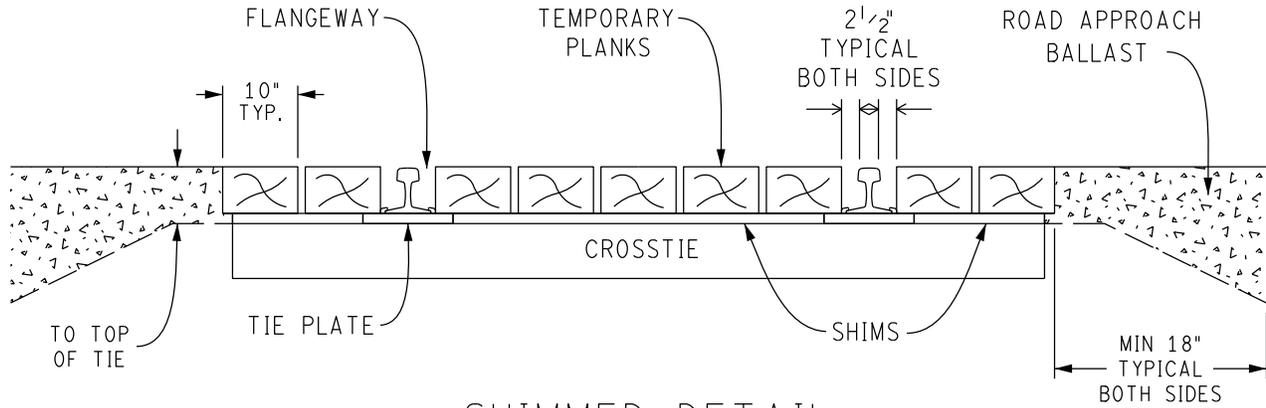
- NOTES: 1) ■ = TRACK SPIKE HOLDING RUNNING RAIL
● = SCREW LAG
- 2) BORE HOLES FOR DRIVE SPIKES SHALL BE 9/16" DIAMETER.
- 3) ALL RAILS TO BE SAME SIZE.
- 4) SCREW LAG RUNNING RAIL EVERY TIE, USING 2 SPIKES PER RAIL.
- 5) PLACE TIE PLATES UNDER FLANGE RAILS ON ONE END OF EACH TIE. TRIM TIES PLATES FOR FLANGE RAILS TO FIT, RETAINING SHOULDER SECTION OF PLATE.

FLANGE RAIL END TREATMENT

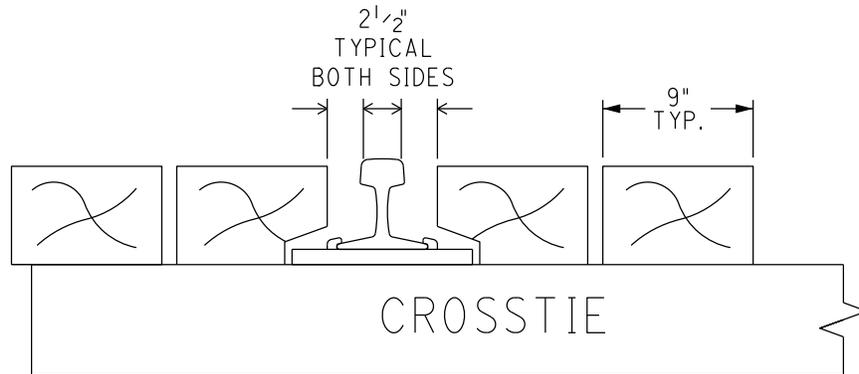


REMOVE 12" SECTION OF RAIL WEB AND BEND RAIL HEAD TO BASE OF RAIL (SEE DETAIL ABOVE).

INSTALL 4 WASHER HEAD TIMBER DRIVE SPIKES MIN. PER 10' PLANK OR 3 WASHER HEAD TIMBER DRIVE SPIKES MIN. PER 8' PLANK. STAGGER WASHER HEAD TIMBER DRIVE SPIKES LONGITUDINALLY ALONG PLANKS. INSTALL OUTSIDE WASHER HEAD TIMBER DRIVE SPIKES 6" FROM ENDS OF PLANKS. DRILL $\frac{1}{2}$ " DIA. HOLE FOR $\frac{5}{8}$ " DIA. WASHER HEAD TIMBER DRIVE SPIKES. COUNTER BORE $2\frac{1}{2}$ " DIA. AND $1\frac{7}{8}$ " DEEP.



SHIMMED DETAIL

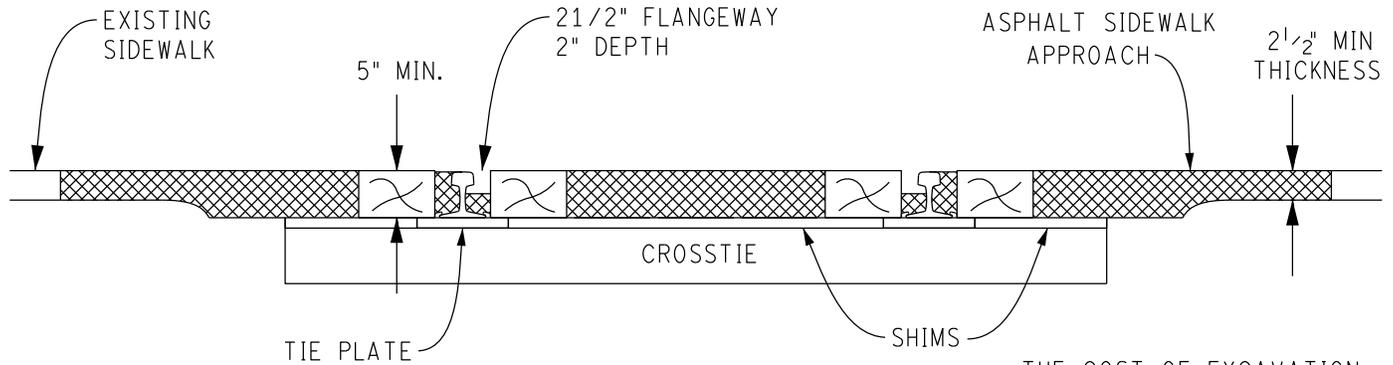


NON-SHIMMED DETAIL

NOTE: TOP OF PLANK ELEVATION SHALL EQUAL TOP OF RAIL ELEVATION, PLUS OR MINUS $\frac{1}{4}$ ".

TEMPORARY PLANK GRADE CROSSING MAY BE CONSTRUCTED WITH EITHER SHIMMED OR NON-SHIMMED DETAIL.

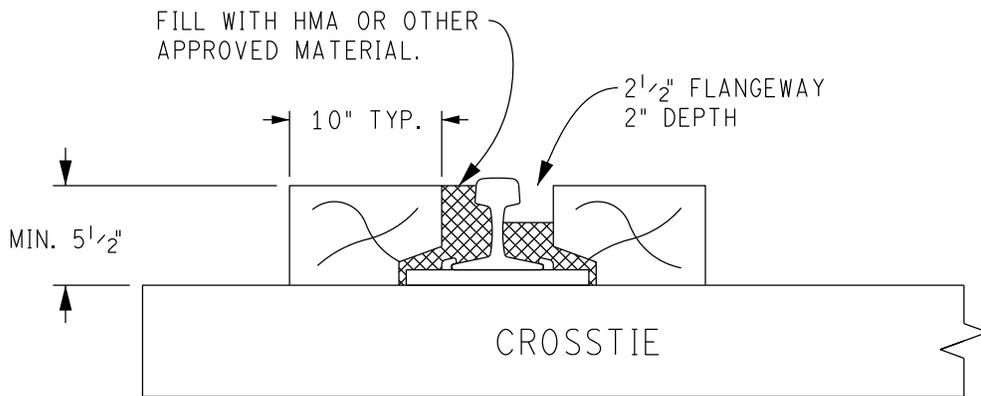
INSTALL 4 WASHER HEAD TIMBER DRIVE SPIKES MIN. PER 10' PLANK OR 3 SPIKES MIN. PER 8' PLANK. STAGGER SPIKES LONGITUDINALLY ALONG PLANKS NOT LESS THAN 3" FROM EDGES. INSTALL OUTSIDE SPIKES NOT LESS THAN 6" FROM ENDS OF PLANKS. DRILL $\frac{1}{2}$ " DIA. HOLE FOR $\frac{5}{8}$ " DIA. SPIKES. COUNTER BORE $2\frac{1}{2}$ " DIA. AND $1\frac{7}{8}$ " DEEP.



SHIMMED DETAIL

THE COST OF EXCAVATION REQUIRED TO ATTAIN $3\frac{1}{2}$ " THICKNESS IS INCLUDED IN THE COST OF THE HMA.

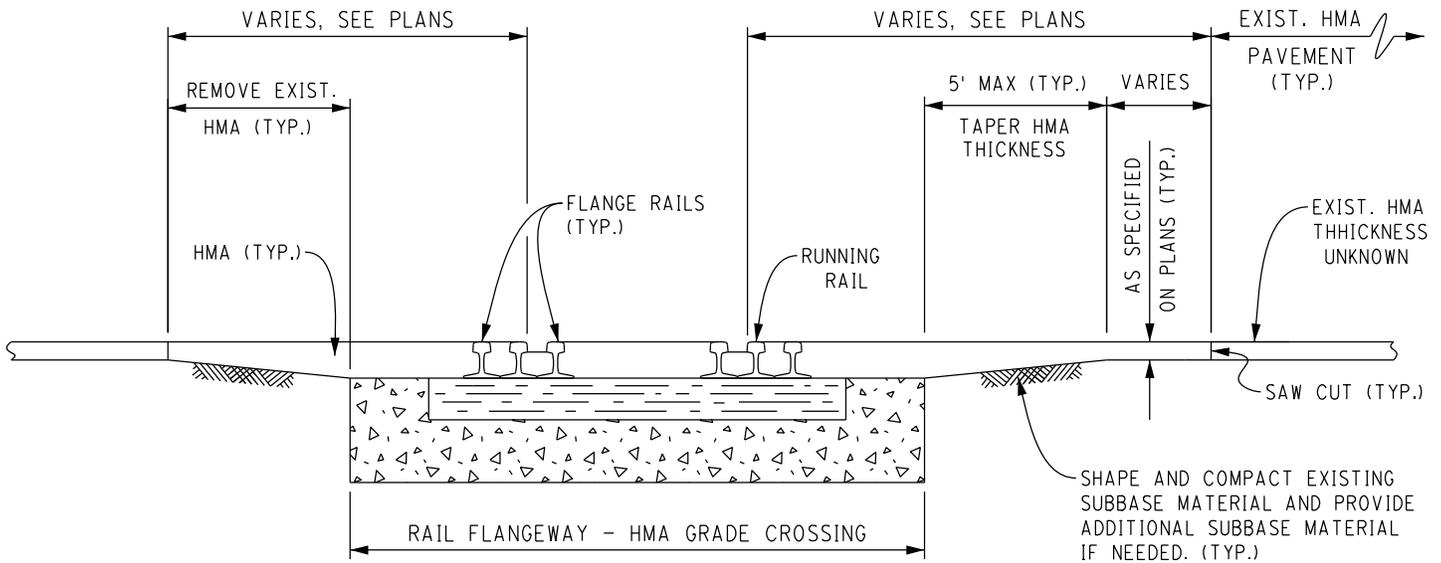
NOTE: WIDTH OF PROPOSED HMA SIDEWALK TO MATCH WIDTH OF EXISTING SIDEWALK. LENGTH OF PROPOSED HMA SIDEWALK WILL BE AS PRESCRIBED IN THE PROJECT PLANS OR AS DIRECTED BY THE F.D.I OR ENGINEER.



NON-SHIMMED DETAIL

NOTE: TOP OF PLANK ELEVATION SHALL EQUAL TOP OF RAIL ELEVATION, PLUS OR MINUS $\frac{1}{4}$ ".

TIMBER PLANK SIDEWALK CROSSING MAY BE CONSTRUCTED WITH EITHER SHIMMED OR NON-SHIMMED DETAIL.

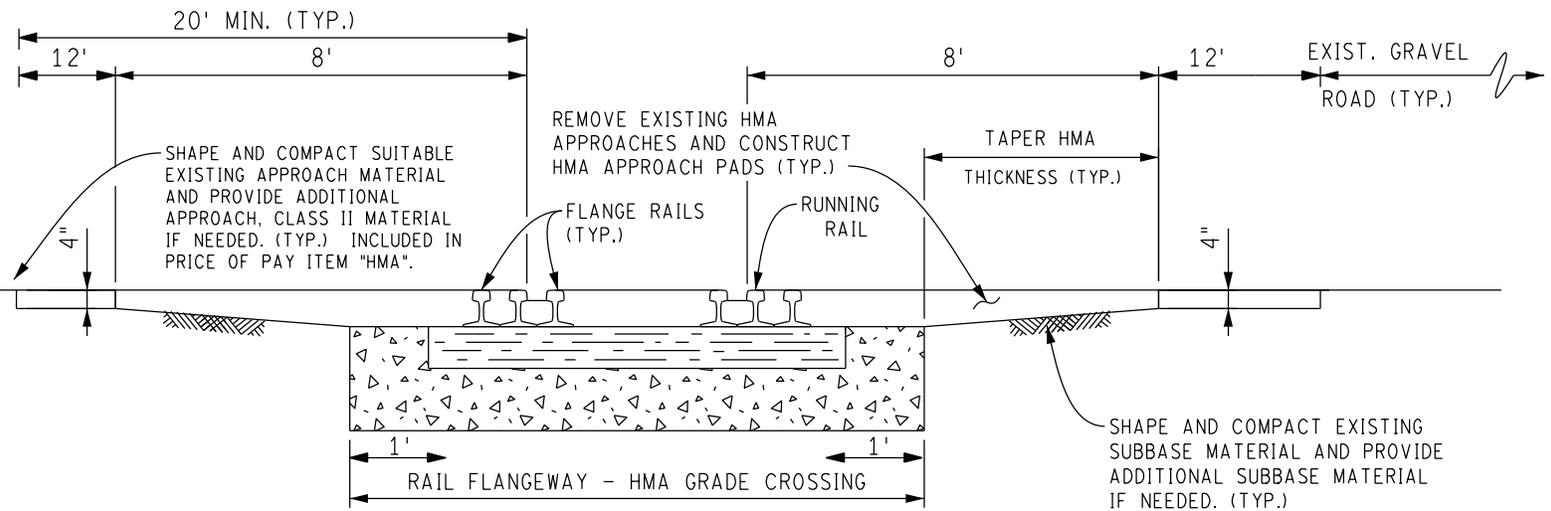


NOTE: THE COST OF SAW CUTTING, REMOVING AND DISPOSING OF EXISTING HMA PAVEMENT OUTSIDE OF THE RENEW OR REBUILD GRADE CROSSING LIMITS, AND THE PREPARATION OF THE SUBBASE FOR THE HMA APPROACHES ARE INCLUDED IN THE PAY ITEM "HMA".

TYPE I

TYPE I IS USED WHEN THE EXISTING ROAD IS HMA PAVEMENT.

FOR MDOT ROUTES, REFERENCE MDOT STD PLAN R-121

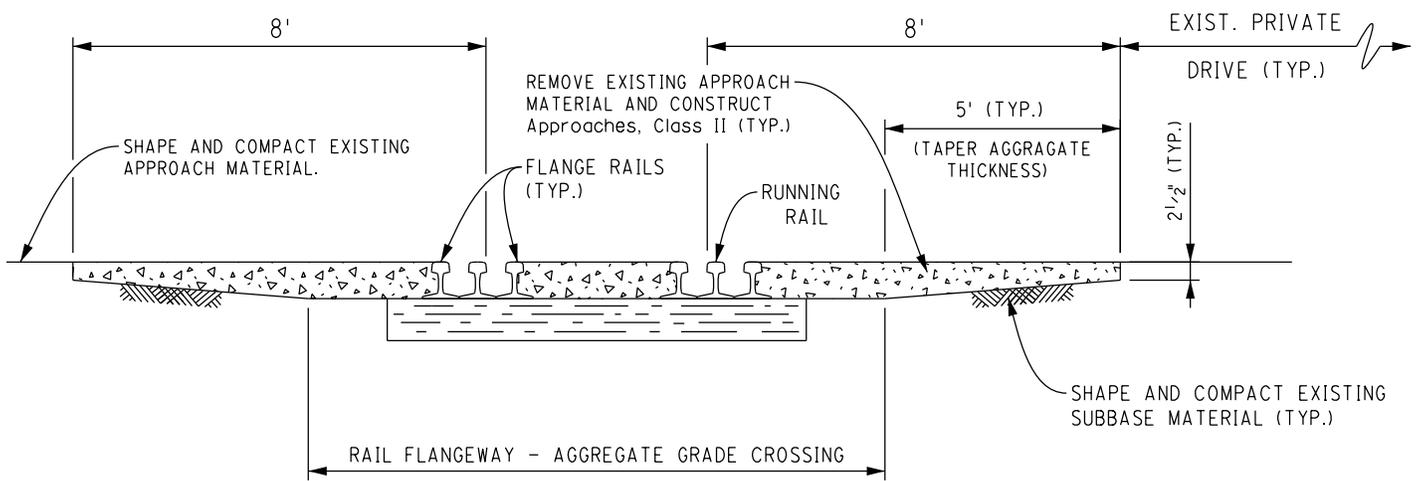


NOTE: THE COST OF REMOVING AND DISPOSING OF EXISTING HMA OR GRAVEL APPROACHES OUTSIDE OF THE RENEW OR REBUILD GRADE CROSSING LIMITS, THE PREPARATION OF SUBBASE FOR THE HMA APPROACHES, AND GRADING OF EXISTING GRAVEL APPROACHES IS INCLUDED IN THE PAY ITEM "HMA".

TYPE II

TYPE II IS USED WHEN THE EXISTING ROAD IS GRAVEL.

ENDS OF HMA PAVING SHALL BE PERPENDICULAR TO ROADWAY LANES.



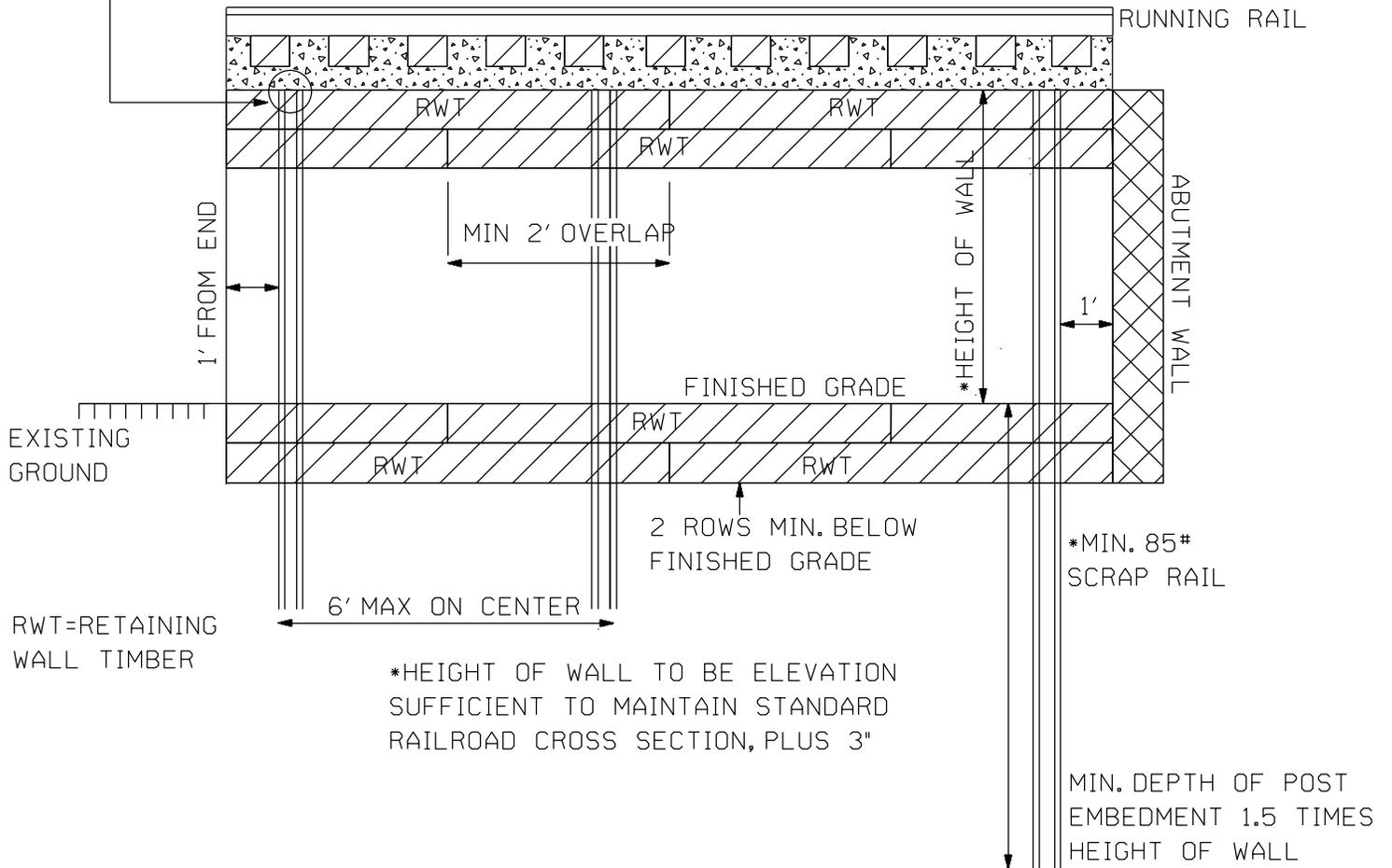
TYPE III

TYPE III IS USED AT
PRIVATE CROSSING.

NOTE: THE COST OF REMOVING AND DISPOSING OF EXISTING APPROACH MATERIAL OUTSIDE OF THE RENEW GRADE CROSSING LIMITS, THE PREPARATION OF SUBBASE FOR THE CLASS II APPROACHES, AND THE GRADING OF EXISTING APPROACH MATERIAL IS INCLUDED IN THE PAY ITEM "Approaches, Class II".

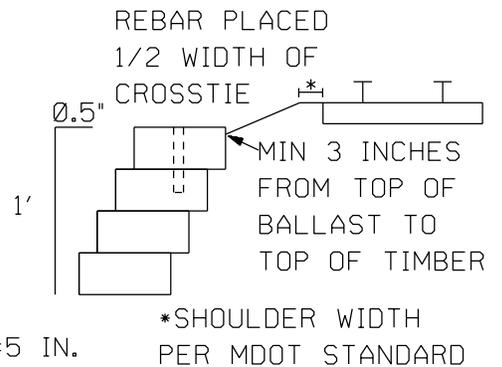
PROFILE VIEW

TOP OF RAIL SHALL BE FLUSH WITH TOP OF RETAINING WALL. TOP EDGE SHALL HAVE SMOOTH SURFACE.

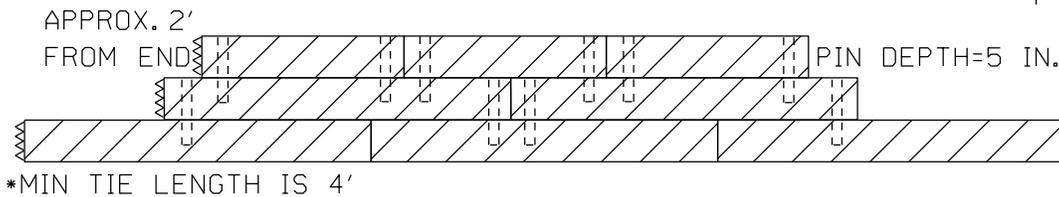


1. ALL DRIFT PINS ARE TO BE COVERED BY EPOXY
2. EACH LAYERED TIMBER SHALL HAVE 2 PINS PLACED INTO LOWER TIMBER
3. MINIMUM TIE THICKNESS IS 6"
4. WALL TO BE CONSIDERED ON 1:12 BATTER

CROSS SECTION



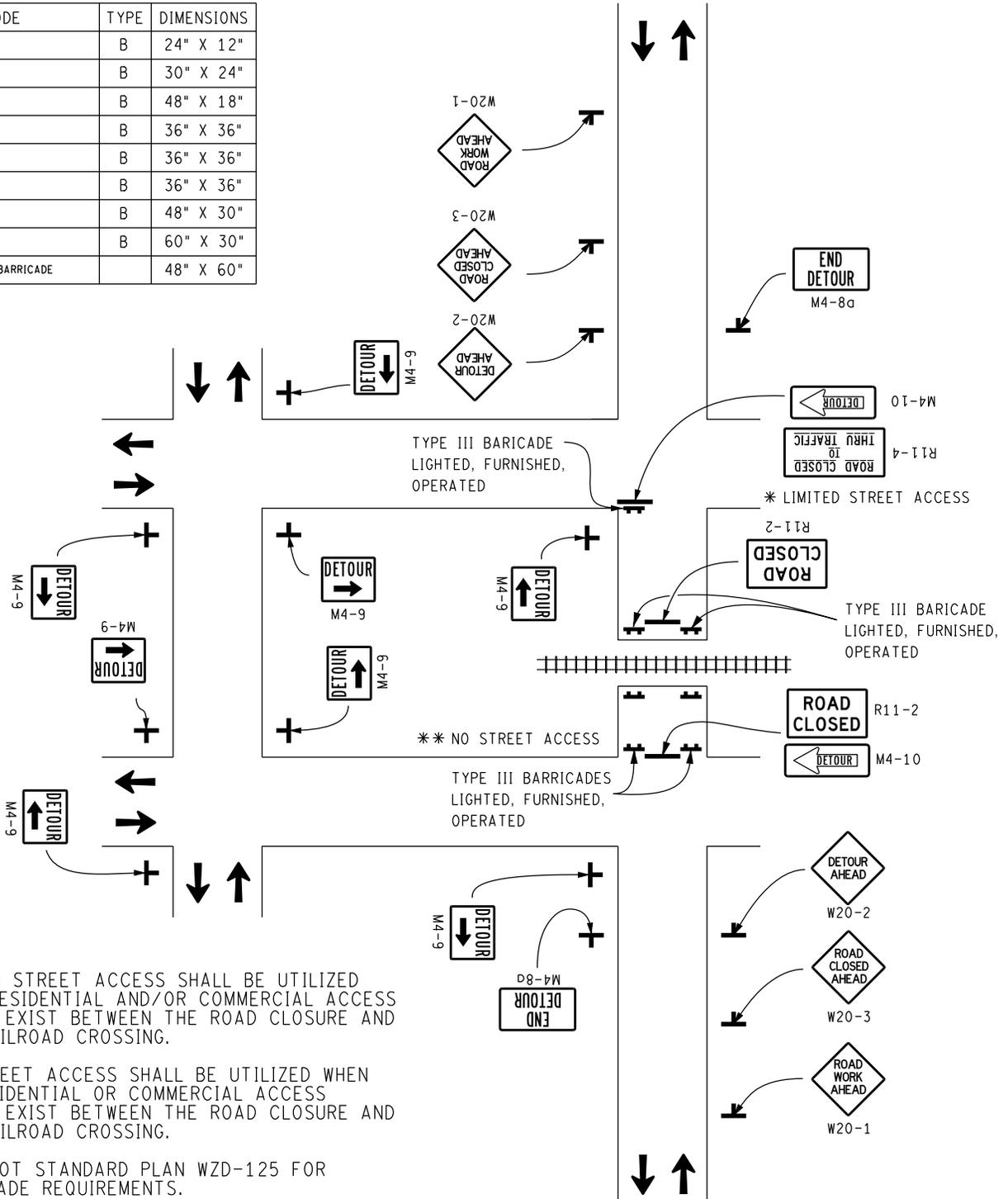
DRIFT PIN DETAIL



TYPICAL SIGNING REQUIREMENTS (MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES)

TEMPORARY SIGNING SPECIFICATIONS

| CODE | TYPE | DIMENSIONS |
|--------------------|------|------------|
| M4-8a | B | 24" X 12" |
| M4-9 | B | 30" X 24" |
| M4-10 | B | 48" X 18" |
| W20-1 | B | 36" X 36" |
| W20-2 | B | 36" X 36" |
| W20-3 | B | 36" X 36" |
| R11-2 | B | 48" X 30" |
| R11-4 | B | 60" X 30" |
| TYPE III BARRICADE | | 48" X 60" |



NOTES:

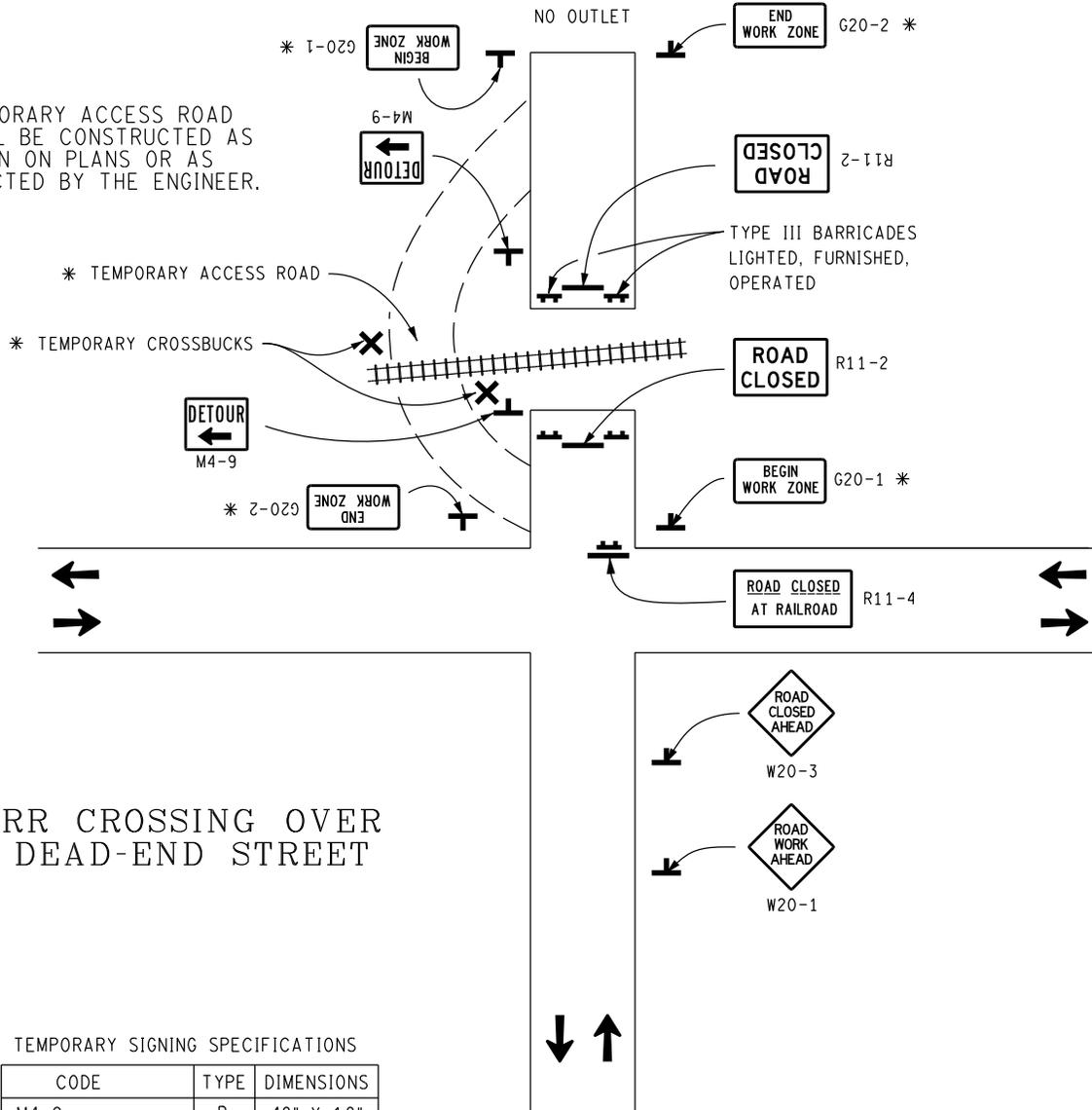
- * LIMITED STREET ACCESS SHALL BE UTILIZED WHEN RESIDENTIAL AND/OR COMMERCIAL ACCESS DRIVES EXIST BETWEEN THE ROAD CLOSURE AND THE RAILROAD CROSSING.
- ** NO STREET ACCESS SHALL BE UTILIZED WHEN NO RESIDENTIAL OR COMMERCIAL ACCESS DRIVES EXIST BETWEEN THE ROAD CLOSURE AND THE RAILROAD CROSSING.

SEE MDOT STANDARD PLAN WZD-125 FOR BARRICADE REQUIREMENTS.

PLACEMENT OF TRAFFIC CONTROL DEVICES AS SHOWN ON PLANS OR AS DIRECTED BY ENGINEER.

TYPICAL SIGNING REQUIREMENTS
(MICHIGAN MANUAL OF UNIFORM
TRAFFIC CONTROL DEVICES)

* TEMPORARY ACCESS ROAD
SHALL BE CONSTRUCTED AS
SHOWN ON PLANS OR AS
DIRECTED BY THE ENGINEER.



RR CROSSING OVER
DEAD-END STREET

TEMPORARY SIGNING SPECIFICATIONS

| CODE | TYPE | DIMENSIONS |
|--------------------|------|------------|
| M4-9 | B | 48" X 18" |
| W20-1 | B | 36" X 36" |
| W20-3 | B | 36" X 36" |
| R11-2 | B | 48" X 30" |
| R11-4 (MOD) | B | 60" X 40" |
| G20-1 (MOD) | B | 36" X 18" |
| G20-2 (MOD) | B | 36" X 18" |
| TYPE III BARRICADE | | 48" X 60" |

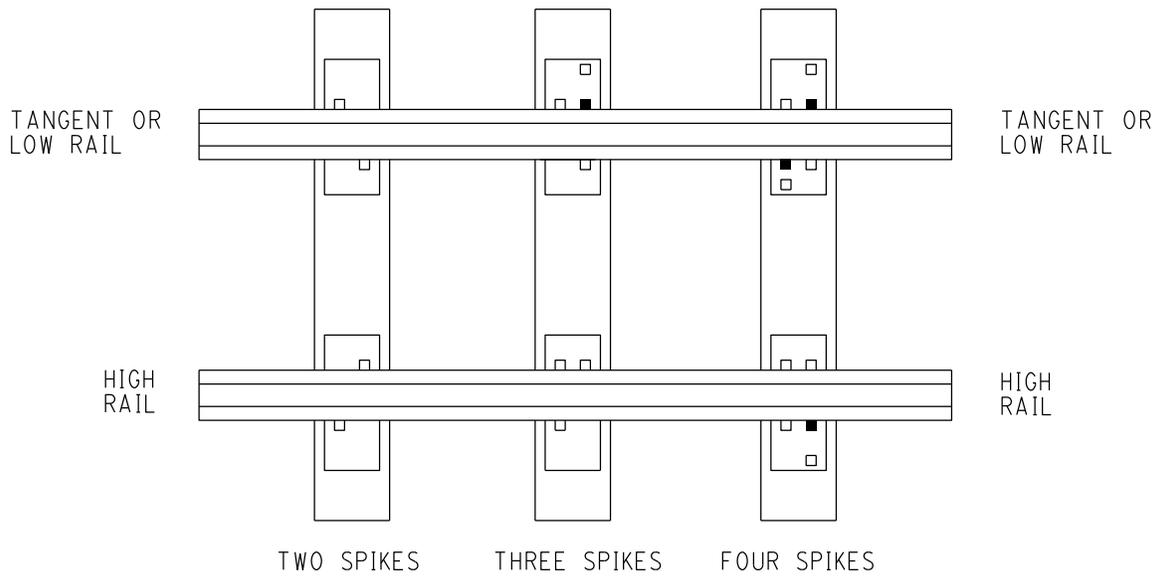
NOTES:

* IF REQUIRED

SEE MDOT STANDARD PLAN WZD-125
FOR BARRICADE REQUIREMENTS

PLACEMENT OF TRAFFIC CONTROL
DEVICES AS SHOWN ON PLANS OR
AS DIRECTED BY ENGINEER.

SPIKING PATTERNS

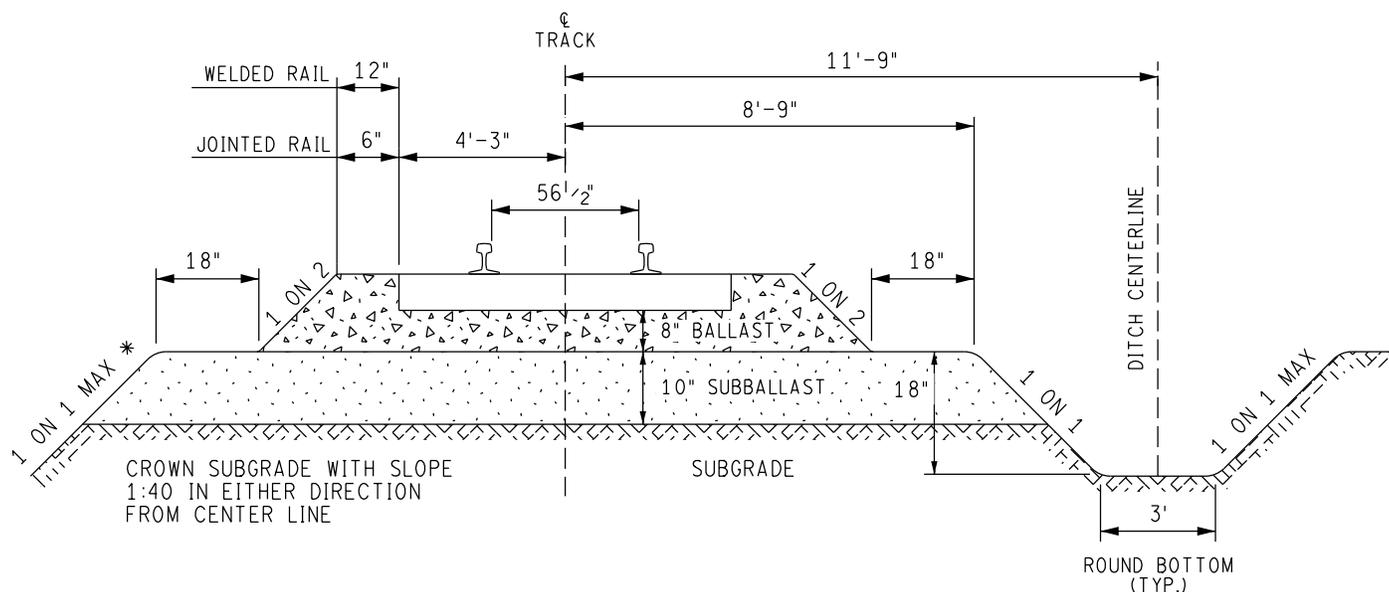


- DRIVEN HOLES
- USE WHEN ANCHOR SPIKE HOLES ARE NOT AVAILABLE

MINIMUM NUMBER OF SPIKES PER TIE PLATE

| ALIGNMENT | | SPEED IN MPH FOR TERRITORY | | | | | | | | |
|--------------------------|---------------|----------------------------|----|----|----|----|----|----|----|-----------|
| | | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 AND UP |
| TANGENT | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 |
| CURVES | | | | | | | | | | |
| GREATER THAN OR EQUAL TO | BUT LESS THAN | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 AND UP |
| 0° | 2° | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 |
| 2° | 5° | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 |
| 5° | 8° | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 |
| 8° | 10° | 2 | 3 | 3 | 4 | 4 | 4 | 4 | | |
| 10° AND OVER | | 2 | 3 | 4 | 4 | 4 | 4 | | | |

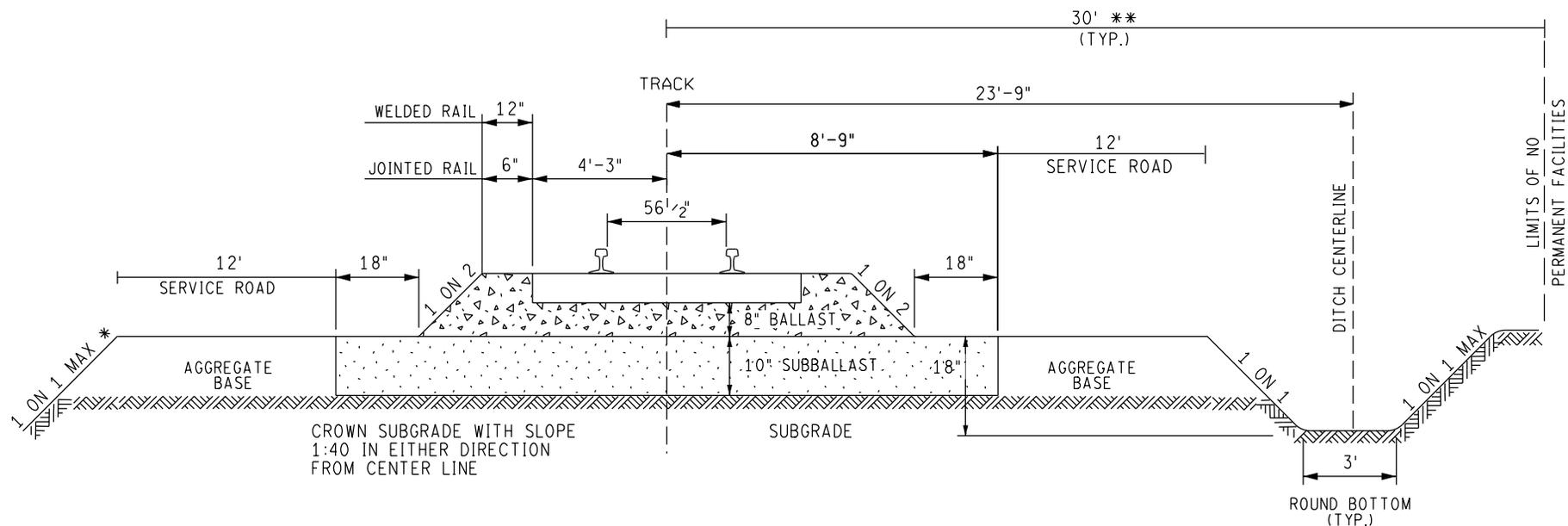
TYPICAL TRACK STRUCTURE SECTION



TANGENT TRACK

* FOR CONSTRUCTION AND REHABILITATION, FRONTSLOPES SHALL BE CONSISTANT WITH EXISTING SLOPES.

TYPICAL TRACK STRUCTURE SECTION



TANGENT TRACK

* FOR CONSTRUCTION AND REHABILITATION, FRONTSLOPES SHALL BE CONSISTANT WITH EXISTING SLOPES.

**NO PERMANENT FACILITIES SHALL BE INSTALLED WITHIN THE RAILROAD RIGHT-OF-WAY WITHIN THIS AREA.

MDOT
OFFICE OF RAIL

MICHIGAN DEPARTMENT OF TRANSPORTATION
RAILROAD TYPICAL PLAN FOR
TYPICAL TRACK STRUCTURE SECTION WITH SERVICE ROAD

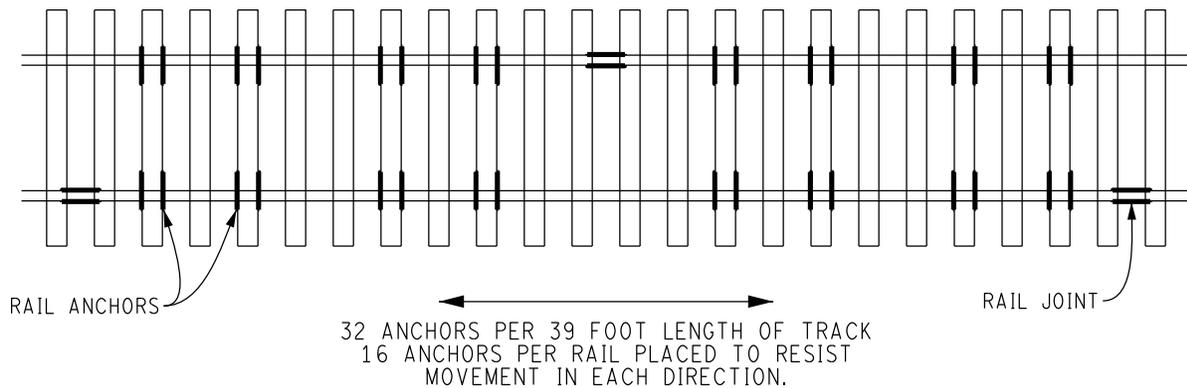
APPROVED BY: JIM D'LAMATER
RAILROAD INFRASTRUCTURE ENGINEER-MANAGER

REVISION DATE
2/20/2019

RR-41 SHEET 2 OF 2

ANCHOR LOCATIONS IN TRACK

RAIL TRAFFIC ABOUT THE SAME IN BOTH DIRECTIONS



NOTES:

TRACK GRADES

- ANCHOR PATTERN MAY BE ADJUSTED FOR GRADES
- NUMBER OF ANCHORS MAY INCREASE FOR GRADES

BRIDGES

- RAIL ON BRIDGES WILL NOT BE ANCHORED IF DIRECT FIXATION OR OPEN DECK. BALLASTED DECKS GET ANCHORED AS PER PATTERN SHOWN ABOVE.
- APPROACHES TO BRIDGES WILL BE BOX ANCHORED EVERY OTHER TIE FOR 200' IN BOTH DIRECTIONS FROM THE BRIDGE.

ROAD CROSSINGS

- RAIL IN CROSSINGS WILL NOT BE ANCHORED
- APPROACHES TO CROSSINGS WILL BE BOX ANCHORED EVERY TIE FOR 50' IN BOTH DIRECTIONS FROM THE CROSSING.

PRIVATE CROSSINGS

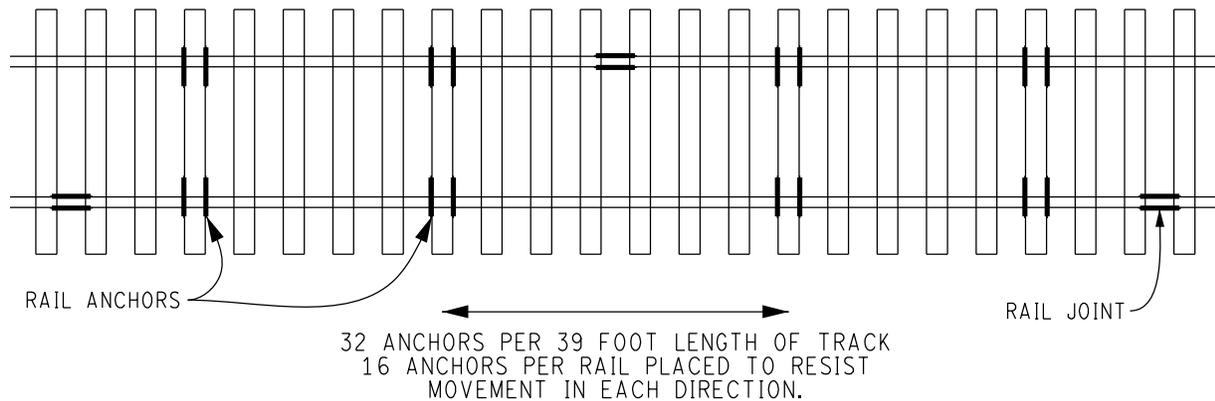
- ANCHOR APPROACHES AND CROSSINGS AS PER TRACK PATTERN SHOWN ABOVE.

TURNOUTS

- APPROACHES TO TURNOUTS WILL BE BOX ANCHORED EVERY OTHER TIE FOR 200' IN BOTH DIRECTIONS FROM THE TURNOUT.
- RAIL WITHIN THE TURNOUT WILL BE BOX ANCHORED EVERY OTHER TIE ON RAIL THAT CAN RECEIVE ANCHORS EXCLUDING THE SWITCH.
- THE ANCHORING WILL CONTINUE THROUGH THE LAST LONG TIE OF THE TURNOUT
- 160 ANCHORS WITHIN #8 TURNOUT
- 184 ANCHORS WITHIN #10 TURNOUT

ANCHOR LOCATIONS IN TRACK

RAIL TRAFFIC ABOUT THE SAME IN BOTH DIRECTIONS



NOTES:

TRACK GRADES

- ANCHOR PATTERN MAY BE ADJUSTED FOR GRADES
- NUMBER OF ANCHORS MAY INCREASE FOR GRADES

BRIDGES

- RAIL ON BRIDGES WILL NOT BE ANCHORED IF DIRECT FIXATION OR OPEN DECK. BALLASTED DECKS GET ANCHORED AS PER PATTERN SHOWN ABOVE.
- APPROACHES TO BRIDGES WILL BE BOX ANCHORED EVERY OTHER TIE FOR 200' IN BOTH DIRECTIONS FROM THE BRIDGE.

ROAD CROSSINGS

- RAIL IN CROSSINGS WILL NOT BE ANCHORED
- APPROACHES TO CROSSINGS WILL BE BOX ANCHORED EVERY TIE FOR 50' IN BOTH DIRECTIONS FROM THE CROSSING.

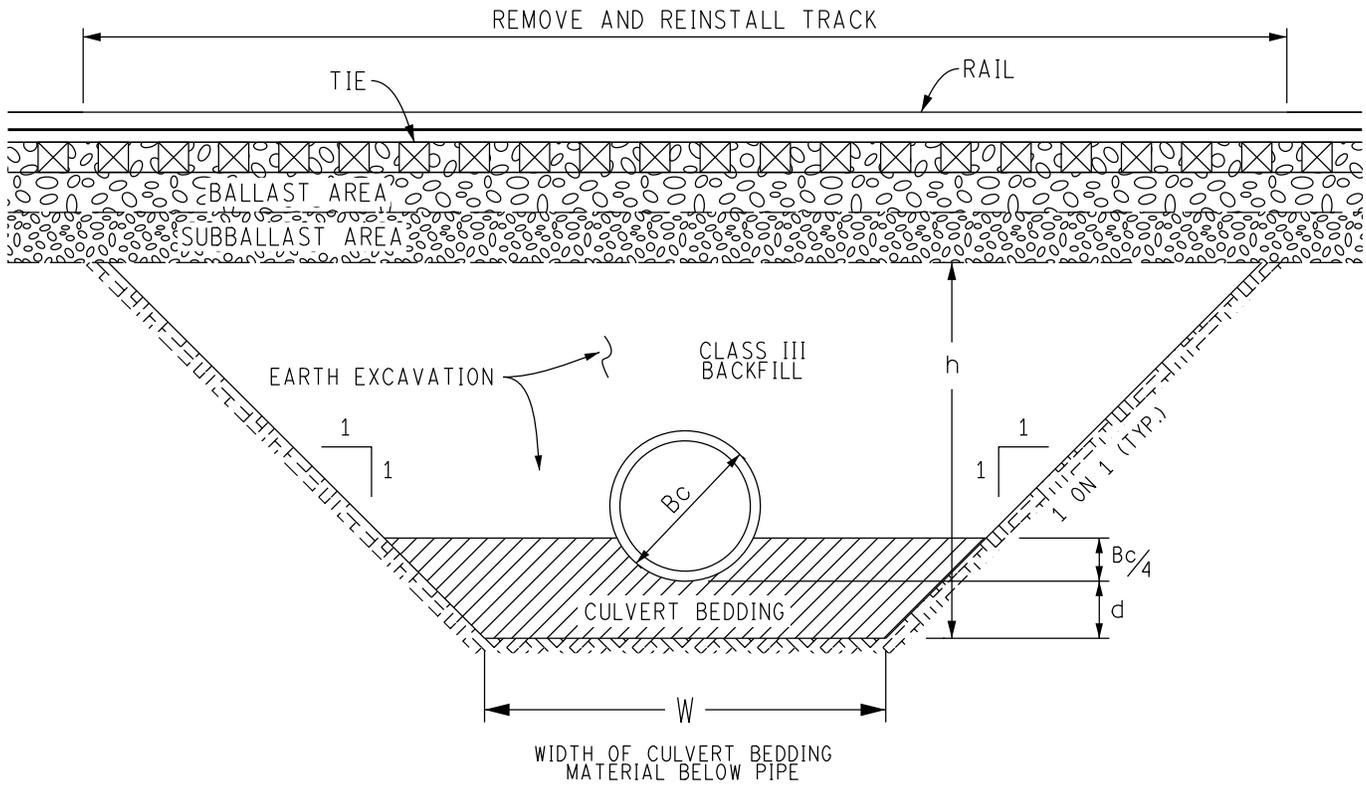
PRIVATE CROSSINGS

- ANCHOR APPROACHES AND CROSSINGS AS PER TRACK PATTERN SHOWN ABOVE.

TURNOUTS

- APPROACHES TO TURNOUTS WILL BE BOX ANCHORED EVERY OTHER TIE FOR 200' IN BOTH DIRECTIONS FROM THE TURNOUT.
- RAIL WITHIN THE TURNOUT WILL BE BOX ANCHORED EVERY OTHER TIE ON RAIL THAT CAN RECEIVE ANCHORS, EXCLUDING THE SWITCH.
- THE ANCHORING WILL CONTINUE THROUGH THE LAST LONG TIE OF THE TURNOUT
- 160 ANCHORS WITHIN #8 TURNOUT
- 184 ANCHORS WITHIN #10 TURNOUT

TRENCH DETAIL



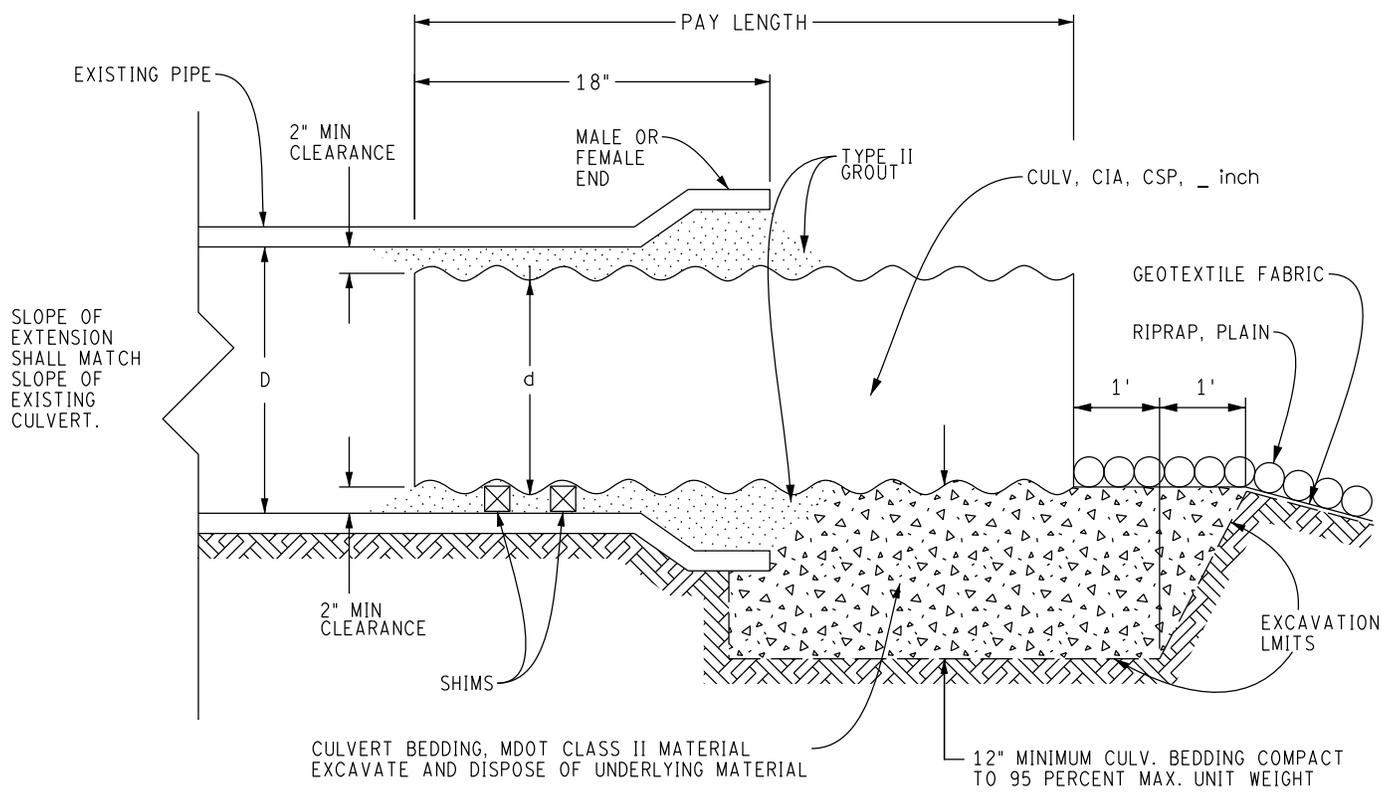
| D | d |
|---------------|-----|
| 27" & SMALLER | 6" |
| 30" TO 60" | 9" |
| 60" & LARGER | 12" |

B_c = OUTSIDE DIAMETER
 W = $B_c + 8"$ OR $1\frac{1}{2} \times B_c$
 (WHICHEVER IS GREATER)
 d = DEPTH OF BEDDING
 MATERIAL BELOW PIPE
 D = INSIDE DIAMETER
 h = DEPTH OF EXCAVATION
 BELOW BALLAST

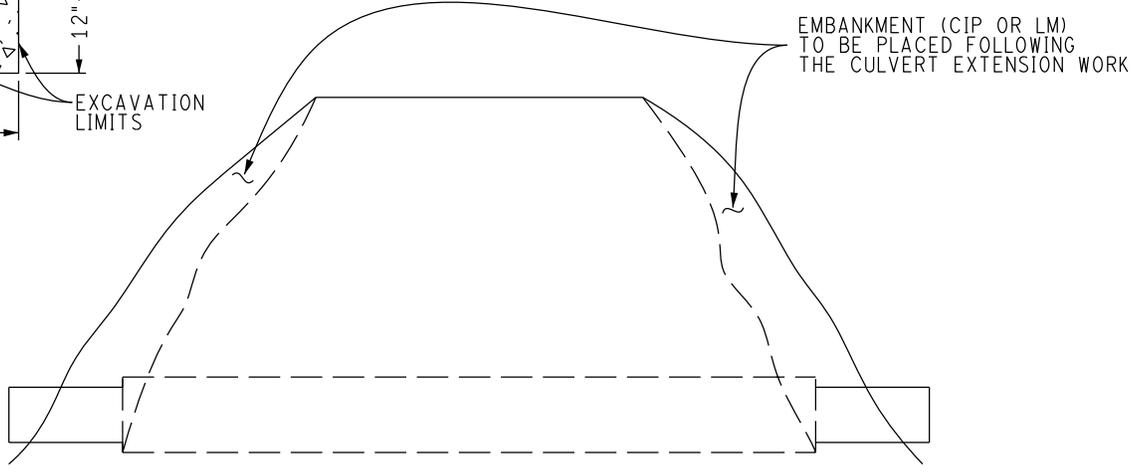
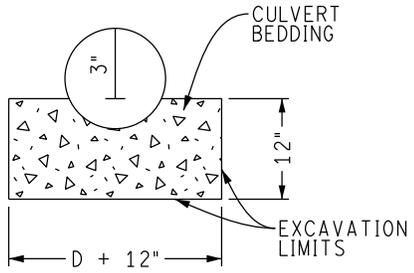
NOTE: PLACE AND COMPACT CULVERT BEDDING TO THE LEVEL OF d PLUS $\frac{1}{4}$ THE OUTSIDE DIAMETER OF THE PIPE CULVERT ($d + B_c/4$) AND THEN EXCAVATE AND SHAPE A TRENCH TO FIT THE PIPE. AFTER PLACING CULVERT, CONTINUE FILLING WITH CLASS III BACKFILL.

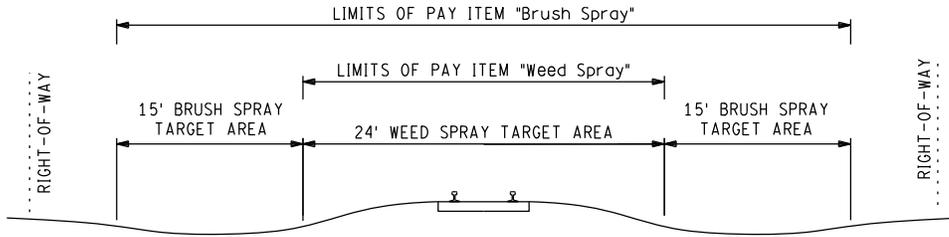
CULVERT BEDDING SHALL BE CLASS III BACKFILL EXCEPT WHEN CLASS II CULVERT BEDDING IS NOTED ON THE PLANS.

CLASS II CULVERT BEDDING AND CLASS III BACKFILL SHALL BE PLACED AND COMPACTED IN 9" MAXIMUM LAYERS, UNLESS OTHERWISE NOTED. COMPACTION SHALL REACH A MINIMUM DENSITY OF 95% OF THE MAXIMUM UNIT WEIGHT OF THE MATERIAL BEING COMPACTED.



D= NOMINAL DIAMETER OF EXISTING PIPE
 d= NOMINAL DIAMETER OF EXTENSION PIPE





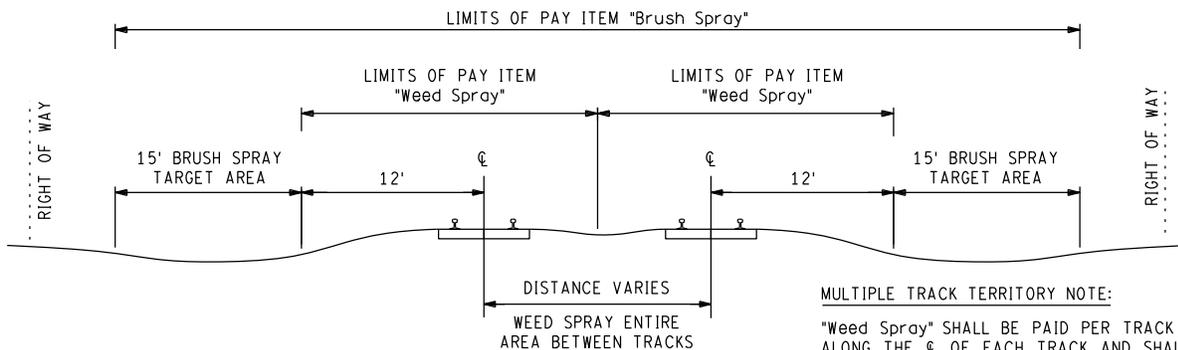
TYPICAL

MAINLINE WEED AND BRUSH SPRAY
SINGLE TRACK

SINGLE TRACK TERRITORY NOTE:

"Weed Spray" SHALL BE PAID ONCE PER TRACK MILE. PAYMENT INCLUDES WEED SPRAY ACTIVITIES ON BOTH SIDES OF TRACK.

"Brush Spray" SHALL BE PAID BY THE ROADBED MILE. PAYMENT INCLUDES BRUSH SPRAY ACTIVITIES ON ALL SIDES OF TRACK.



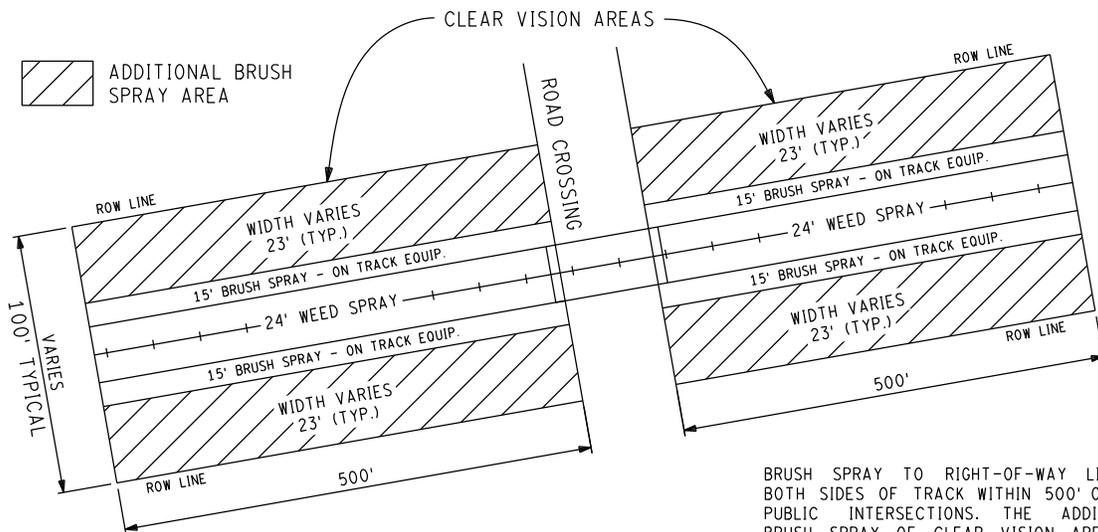
TYPICAL

YARD/SIDING WEED AND BRUSH SPRAY
MULTIPLE TRACK

MULTIPLE TRACK TERRITORY NOTE:

"Weed Spray" SHALL BE PAID PER TRACK MILE ALONG THE € OF EACH TRACK, AND SHALL BE PAID SEPARATELY FOR EACH TRACK IN AREAS WITH MULTIPLE PARALLEL TRACKS. PAYMENT INCLUDES WEED SPRAY ACTIVITIES ON BOTH SIDES OF EACH TRACK.

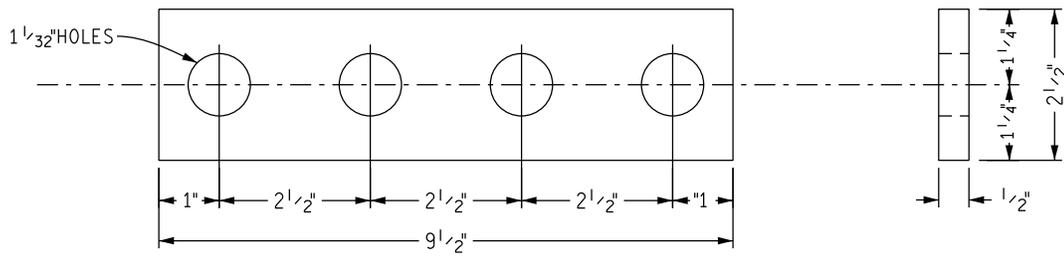
"Brush Spray" SHALL BE PAID BY THE ROADBED MILE. PAYMENT INCLUDES BRUSH SPRAY ACTIVITIES ON ALL SIDES OF ALL TRACKS.



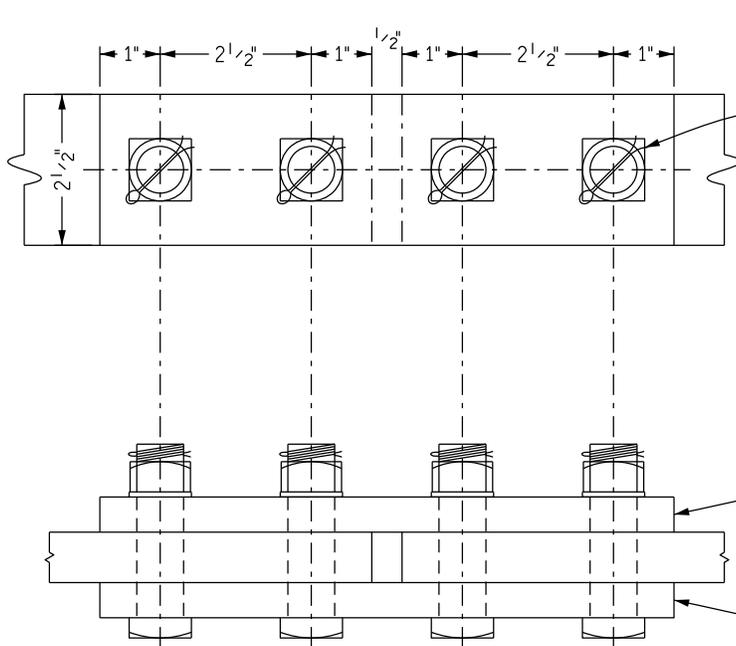
TYPICAL

CLEAR VISION BRUSH SPRAYING
AT INTERSECTIONS

BRUSH SPRAY TO RIGHT-OF-WAY LINE ON BOTH SIDES OF TRACK WITHIN 500' OF ALL PUBLIC INTERSECTIONS. THE ADDITIONAL BRUSH SPRAY OF CLEAR VISION AREAS AT INTERSECTIONS SHALL NOT BE PAID FOR SEPARATELY. ADDITIONAL BRUSH SPRAY OF CLEAR VISION AREAS SHALL BE INCLUDED IN THE PAY ITEM "Brush Spray".



INSULATED SPLICE PLATE, 3M SCOTCHPLY MATERIAL
OR APPROVED EQUAL



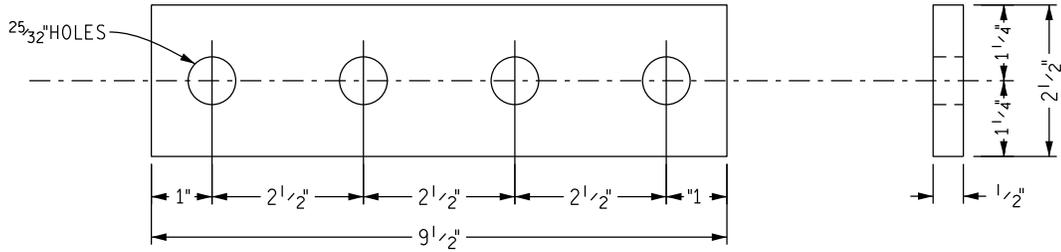
1" DIA. BOLTS 3 1/2" LONG FOR 3/4" SWITCH ROD
1" DIA. BOLTS 3 1/2" LONG FOR 1" SWITCH ROD
1" DIA. BOLTS 3 3/4" LONG FOR 1 1/4" SWITCH ROD
WITH A.S.A. REG. SQ. HEADS, A.S.A.
HEAVY SQ. NUTS, SPRING WASHERS AND
COTTER PINS.

INSULATED SPLICE PLATE

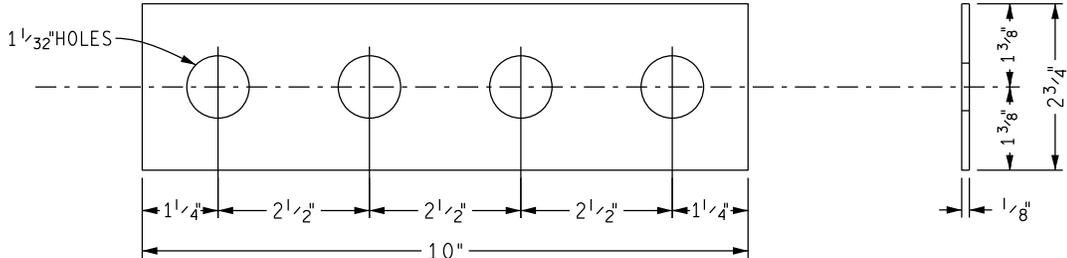
INSULATED SPLICE PLATE

NOTE: DIMENSIONS WILL REQUIRE MODIFICATION
IF EXISTING SWITCH ROD IS NOT AN
A.R.E.M.A. STANDARD DESIGN.

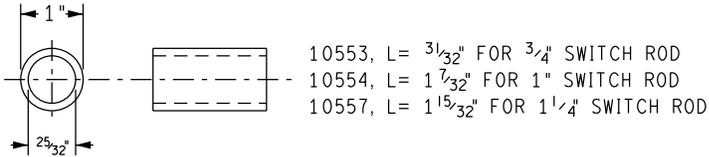
TYPE I
SWITCH ROD INSULATION



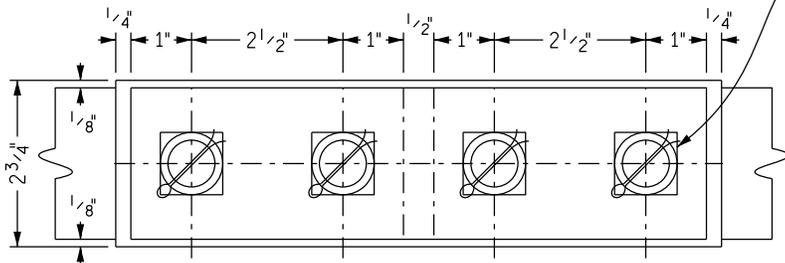
10551 SPLICE PLATE, STEEL



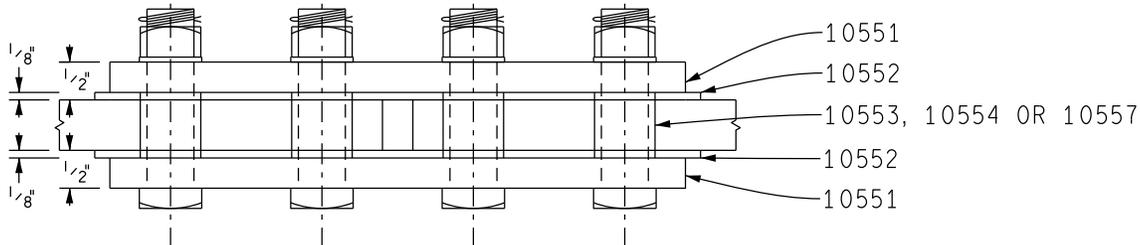
10552 SPLICE PLATE, FIBRE



3/4" DIA. BOLTS 3 1/4" LONG FOR 3/4" SWITCH ROD
 3/4" DIA. BOLTS 3 1/2" LONG FOR 1" SWITCH ROD
 3/4" DIA. BOLTS 3 3/4" LONG FOR 1 1/4" SWITCH ROD
 WITH A.S.A. REG. SQ. HEADS, A.S.A. HEAVY SQ. NUTS, SPRING WASHERS AND COTTER PINS.



TYPE 2
SWITCH ROD INSTALLATION



10555 INSULATION COMPL. FOR 3/4" SWITCH ROD
 10556 INSULATION COMPL. FOR 1" SWITCH ROD
 10558 INSULATION COMPL. FOR 1 1/4" SWITCH ROD

NOTE: DIMENSIONS WILL REQUIRE MODIFICATION IF EXISTING SWITCH ROD IS NOT AN A.R.E.M.A. STANDARD DESIGN.

3M SCOTCHPLY MATERIAL OR APPROVED EQUAL

