MISSOURI
HIGHWAYS and TRANSPORTATION COMMISSION

JEFFERSON CITY, MISSOURI

SUPPLEMENTAL PLANS TO JULY 2023 MISSOURI STANDARD PLANS FOR HIGHWAY CONSTRUCTION

EFFECTIVE April 1, 2024
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REVISED OR ADDED SINCE JULY 2023

- 203.45D
- 502.05S
- 504.09L

* EFFECTIVE: 04/01/2024

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* REvised or added since July 2023

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**MULTIPLE FACTORS FOR "L"**

1.0 LANE ROTATED (12 LANE ROADWAY) = 1.00
1.0 LANE ROTATED (13 LANE ROADWAY) = 1.25
2.0 LANE ROTATED (14 LANE ROADWAY) = 1.50
2.0 LANE ROTATED (15 LANE ROADWAY) = 1.75
3.0 LANE ROTATED (16 LANE ROADWAY) = 2.00
3.0 LANE ROTATED (17 LANE ROADWAY) = 2.25

**MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION**

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**TABLE NOTE:** THE EFFECT OF SPIRAL CURVE TRANSITION ON LATERAL ACCELERATION IS LIKELY TO BE NEGLIGIBLE FOR LARGE RADIUS.

**GENERAL NOTES:**

A PRACTICAL CONTROL FOR THE LENGTH OF SPIRAL "L" IS CONSIDERED TO BE THE SUPERELEVATION RUNOFF "L." SEE STANDARD PLANS 203.22 SHEET 1 OF 2.

"W" THE WIDENING FOR SURFACING AT INSIDE SHOULDER; SEE STANDARD PLANS 203.22 SHEET 2 OF 2.

WIDENING TRANSITION VARIES IN DIRECT PROPORTION TO DISTANCE.

SPIRAL CURVES ARE USED ON ALL ROADS THAT HAVE DESIGN TRAFFIC GREATER THAN 500 VEHICLES PER DAY, AND HAVE A RADIUS LESS THAN THE VALUES LISTED IN THE "MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION" TABLE.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

115 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

**SUPERELEVATION SPIRALS AND WIDENING UNDIVIDED HIGHWAYS**

**DATE APPRORVED:** 03/18/1989
**DATE PREPARED:** 11/16/2004

203.20G SHEET NO. 1 OF 4
TABLE NOTE: THE EFFECT OF SPIRAL CURVE TRANSITION ON LATERAL ACCELERATION IS LIKELY TO BE NEGLIGIBLE FOR LARGER RADIUS.

GENERAL NOTES:

1. A PRACTICAL LIMIT FOR THE LENGTH OF SPIRAL "L" IS CONSIDERED TO BE THE SUPERELEVATION RADIUS "LE". SEE STANDARD PLANS 203.22 SHEET 1 OF 2.
3. WIDENING TRANSITION VARIES IN DIRECT PROPORTION TO DISTANCE.
4. SPIRAL CURVES ARE USED ON ALL ROADWAYS THAT HAVE DESIGN TRAFFIC GREATER THAN 400 VEHICLES PER DAY, AND HAVE A RADIUS LESS THAN THE VALUES LISTED IN THE WIDENING RADIUS FOR USE OF A SPIRAL CURVE TRANSITION TABLE.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
1105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

SUPERELEVATION, SPIRALS AND WIDENING DIVIDED HIGHWAYS

DATA INPUTTED: 07/10/2013
DATA PREPARED: 11/16/2013

203.21K SHEET NO. 1 OF 3
### Minimum Radii for Design Super-elevation Rates, Design Speeds, and \( \rho_{\text{min}} = 4\% \)

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<th>%</th>
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### Table Notes:
- "NC" denotes normal curve slope.
- "AD" denotes adverse curve slope.
- Super-elevate at normal curve slope.
- "G" denotes the super-elevation in percent (%).
- "L" the length of super-elevated runout and routine transition in feet for a 2-lane roadway.

**THE L1 COLUMN IS FOR 1-LANE ROUTE**
**THE L2 COLUMN IS FOR 2-LANE ROUTES**

When using one of the tables for a given interpolation, it is not necessary as the super-elevation rate should be determined from the radius equal to, or slightly smaller than, the radius provided in the table. The result is a super-elevation rate that is reduced up to the nearest 0.2 or 0.4 percent.

**EXAMPLE:** A 50-mph curve with a maximum super-elevation rate of 8 percent, and 2 radii of 1,150 ft. Sample use the radius of 1,120 ft to obtain a super-elevation rate of 5.4 percent.
38" TWO-TUBE RAIL TRANSITION (EXTENDED CURB) (1)

GENERAL NOTES:

MGS GUARDRAIL SHALL BE TANGENTIAL WITH BRIDGE APPROACH TRANSITION FOR 12'-6" BEYOND THE TWO NESTED W-BEAM STIFFNESS TRANSITION AND 25'-0" BEYOND THRIE BEAM TRANSITION SECTION.

AT THE CONTRACTORS OPTION, A SINGLE 18'-3" PIECE OF THRIE BEAM MAY BE SUBSTITUTED FOR ONE OF THE 12'-6" PANELS AND THE 6'-3" SECTION AS SHOWN.

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SEC 1045 OF THE STANDARD SPECIFICATIONS.

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

USE 5/8" BUTTON-HEAD OVAL SHOULDER BOLTS WITH HEX NUTS AT ALL SLOTS (THICKNESS OF HEX NUTS = 3/8"

MIN.).

THE CONNECTION PLATE AND ANGLE SHALL BE FABRICATED FROM ASTM A799 GRADE 50 STEEL AND GALVANIZED.

ALL LAP SPLICES, INCLUDING END SHOES, SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

THE COST OF FABRICATING, FABRICATING AND INSTALLING BRIDGE APPROACH TRANSITION (EXTENDED CURB), COMPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

THE CONTRACTOR MAY, AT THEIR OPTION, FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A799 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH REQUIREMENTS OF AASHTO M 111.

(1) WHERE CURB EXTENDS UPSTREAM OF POST NO. 11 FOR DRAINAGE PURPOSES, A STIFFNESS TRANSITION CONSISTING OF AN EXTRA 12'-6" BEAM OF 12 GAUGE W-BEAM MUST BE NESTED PRIOR TO THE TRANSITION SECTION (UPSTREAM OF POST NO. 11). THE CURB SHALL BE EXTENDED TO THE END OF THE 12'-6" 12 GAUGE W-BEAM STIFFNESS TRANSITION SEE STD. PLAN 609.40 FOR DETAILS. WHEN CURBS DO NOT EXTEND UPSTREAM OF POST NO. 11, PAY FOR A TWO-TUBE RAIL TRANSITION (REGULAR CURB/NO CURB). FOR DETAILS OF TWO-TUBE RAIL TRANSITION (REGULAR CURB/NO CURB), SEE SHEET 2 OF 3.

(2) THE ADDITIONAL REQUIRED MGS GUARDRAIL IS INCLUDED IN THE TOTAL LENGTH OF NEED AND SHALL BE PAID FOR AS A GUARDRAIL PAY ITEM.
38" TWO-TUBE RAIL TRANSITION (WITH REGULAR LENGTH CURB OR NO CURB) (1)

GENERAL NOTES:
SEE SHEET 1 FOR ADDITIONAL NOTES NOT INCLUDED ON THIS SHEET.

THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE APPROACH TRANSITION (REGULAR/NO CURB), COMPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

(1) WHERE CURB EXTENDS UPSTREAM OF POST NO. 1.5 FOR DRAINAGE PURPOSES, A STIFFNESS TRANSITION CONSISTING OF AN EXTRA 12'-6" BEAM OF 12 GAUGE W-BEAM MUST BE NESTED PRIOR TO THE TRANSITION SECTION UPSTREAM OF POST NO. 1.5. THE CURB SHALL BE EXTENDED TO THE END OF THE 12'-6" 12 GAUGE W-BEAM STIFFNESS TRANSITION SEE STD. PLAN 609.40 FOR DETAILS. IF CURB EXTENDS BEYOND POST NO. 1.5, PAY FOR A TWO-TUBE RAIL TRANSITION (EXTENDED CURB). FOR DETAILS OF TWO-TUBE RAIL TRANSITION (EXTENDED CURB), SEE SHEET 1 OF 3.
END POST ASSEMBLY
LINE POST
CORNER OR PULL POST ASSEMBLY

STEEL POST

ROADWAY DITCHES OR SMALL SHALLOW CHANNELS
(SPAN WITH NORMAL LINE POST SPACING)

POORLY DEFINED CHANNELS (SMALL DRAINAGE AREAS)

TYPICAL WATER CROSSING GATE

WELL DEFINED CHANNELS (LARGE DRAINAGE AREAS)

TYPICAL FENCING AT CHANNEL CROSSING

WOVEN WIRE FENCE
ATTENUATOR LAYOUT:
ALL SAND FILLED ATTENUATORS SHOULD MEET MANUFACTURER’S RECOMMENDATIONS FOR THE ARRAY AND SAND WEIGHT.

18" X 18" TYPE 3 OBJECT MARKER WITH YELLOW SHEETING
TRAFFIC PASSING TO BOTH LEFT AND RIGHT

18" X 18" TYPE 3 OBJECT MARKER WITH YELLOW SHEETING
LOCATION OF OBJECT MARKER

18" X 18" TYPE 3 OBJECT MARKER WITH YELLOW SHEETING
TRAFFIC PASSING TO LEFT
FLIP FOR TRAFFIC TO RIGHT

TYPE 3 OBJECT MARKER PLACEMENT
FOR PERMANENT INSTALLATIONS

18" X 18" TYPE 1 OBJECT MARKER WITH FLUORESCENT ORANGE SHEETING

TYPE 1 OBJECT MARKER PLACEMENT
FOR TEMPORARY INSTALLATIONS

GENERAL NOTES:
OBJECT MARKER SHALL BE PLACED ON THE LEE SIDE FACING TRAFFIC.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-800-ASK-MODOT (1-888-275-6636)

SAND FILLED IMPACT ATTENUATORS

DATA PREPARED: 11/03/2024
USE OF SPLICE IS OPTIONAL.

SPLICE OVERLAP SHALL BE POSITIONED ENTIRELY BETWEEN GROUND LINE AND 18" ABOVE GROUND LINE.

ONLY ONE SPLICE WILL BE ALLOWED PER POST.

U-CHANNEL POST DETAIL

POST SPACING

WOOD POST DETAIL

PERFORATED SQUARE STEEL TUBE POST DETAIL

GENERAL NOTES:

ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 3 FEET.

SIGN INSTALLATION DETAILS SHOWN SHALL APPLY TO ALL POSTS IN A MULTI-POST INSTALLATION.

THE ENGINEER DESIGNS & FLUORESCENT PAINT SHALL BE APPLIED HEAVILY TO BOTH SIDES OF U-CHANNEL POST Tube FOR A LENGTH OF AT LEAST 6 INCHES BELOW THE TOP OF THE TUBE.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

TEMPORARY TRAFFIC CONTROL DEVICES
POST INSTALLATION DETAILS

DATE REVISION: 2/22/2023
DATE PREPARED: 2/14/2023
PAGE: 2 OF 9
DIRECTION INDICATOR BARRICADE

VERTICAL DIMENSIONS DO NOT INCLUDE PROJECTIONS DESIGNED FOR EASE OF MANEUVERING.

DIRECTION INDICATOR BARRICADES SHALL NOT BE USED IN SHIFTING TAPERS UNLESS SHOWN ON THE PLANS.

THE PANELS SHALL BE SECURELY ATTACHED TO A SUPPORT THAT IS PORTABLE, CAPABLE OF PROVIDING UPRIGHT AND ENTIRELY FREE STANDING.

ADVANCE WARNING RAIL SYSTEM

MAXIMUM WEIGHT OF SIGN SHALL NOT EXCEED 25 LBS.

THE SIGN AND RAIL SYSTEM MAY BE MOUNTED AS TWO SEPARATE GRAVITY-RETAINED DEVICES. THE SIGN SYSTEM SHALL BE LOCATED DIRECTLY IN FRONT OF THE RAIL SYSTEM IN THE LANE OF TRAFFIC SEPARATING THE TWO ELEMENTS.

WHERE MARKING IS NOT PROVIDED ON THE BACKSIDE, STEPS OF 9' WIDE TYPE IV ORANGE SHEETING MAY BE APPLIED TO THE ENDS OF EACH RAIL TO HELP DELIMIT THE DEVICE.

WHITE AND ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC. 1042.2.7.4.

GENERAL NOTES:

WHITE, ORANGE, AND FLUORESCENT ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC. 1042.2.7.4.

BALLAST FOR TRAFFIC CONTROL DEVICES SHALL CONFORM TO MOOD’S RECOMMENDATIONS FOR FIELD CONDITIONS WHEN APPLICABLE.

SEQUENTIAL FLASHING WARNING LIGHTS SHALL BE IN ACCORDANCE WITH SEC. 1042.5.6.

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE DIRECTION INDICATOR BARRICADES IN LIEU OF TRANS-CHANNELIZERS IN MILLING TAPERS.

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE DIRECTION INDICATOR BARRICADES IN LIEU OF TRANS-CHANNELIZERS IN MILLING TAPERS.

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE VERTICAL PANELS IN LIEU OF TRANS-CHANNELIZERS IN MILLING TAPERS DURING DAYTIME OPERATIONS ON MAJOR ROUTES.

CHANNELIZERS

STRIPES OR TRIM-LINE CHANNELIZERS SHALL BE 6' TO 8'. STRIPES OR DRUM-LIKE CHANNELIZERS SHALL BE 4' TO 6'. WHITE AND FLUORESCENT ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC. 1042.2.7.4.

CADES SHALL MAINTAIN THEIR SHAPE UPON EXPOSURE TO NORMAL WEATHER CONDITIONS.

CADES SHALL BE USED DURING NIGHT TIME HOURS ONLY.

VERTICAL PANELS SHALL BE SECURELY ATTACHED TO A SUPPORT THAT IS PORTABLE, CAPABLE OF PROVIDING UPRIGHT AND ENTIRELY FREE STANDING.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

TEMPORARY TRAFFIC CONTROL DEVICES CHANNELIZERS AND DIRECTION INDICATOR BARRICADE
<table>
<thead>
<tr>
<th>Description</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example 1</td>
<td>This is an example of a table entry.</td>
</tr>
<tr>
<td>Example 2</td>
<td>Another example of a table entry.</td>
</tr>
</tbody>
</table>

**General Notes:**
- All signs shall be in English. Flares shall not be used at night.
- Additional flares will be used as needed.

---

**Legend:**
- FLARES: Reflective, red, with red flare. These signs are designed for high visibility.
- WARNING SIGNS: Yellow, with black lettering. These signs are for high-speed roads.

---

**Table Example:**

<table>
<thead>
<tr>
<th>Location</th>
<th>Type</th>
<th>Size</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example 3</td>
<td>FLARES</td>
<td>Large</td>
<td>Red</td>
</tr>
<tr>
<td>Example 4</td>
<td>WARNING</td>
<td>Medium</td>
<td>Yellow</td>
</tr>
</tbody>
</table>

---

**Additional Notes:**
- All signs must be clearly visible and placed in a strategic location.
- For night use, additional flares must be placed accordingly.
<table>
<thead>
<tr>
<th>SIGN</th>
<th>SIZE</th>
<th>AREA (SQ. FT.)</th>
<th>SWEETING (IN.)</th>
<th>COLOR</th>
<th>DESIGNATION</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>W-01</td>
<td>48.0x48</td>
<td>16.00</td>
<td>45H/0 OR 11</td>
<td>BL FL</td>
<td>SHF 2 FLIGHT/ENTER</td>
<td>LEFT LANE CLOSED</td>
</tr>
<tr>
<td>W-02</td>
<td>48.0x48</td>
<td>16.00</td>
<td>45H/0 OR 11</td>
<td>BR FL</td>
<td>SHF 2 FLIGHT/ENTER</td>
<td>LEFT LANE CLOSED</td>
</tr>
<tr>
<td>W-03</td>
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<td>16.00</td>
<td>45H/0 OR 11</td>
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<td>SHF 2 FLIGHT/ENTER</td>
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</tr>
<tr>
<td>W-04</td>
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<td>SHF 2 FLIGHT/ENTER</td>
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</tr>
<tr>
<td>W-05</td>
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<td>16.00</td>
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<td>SHF 2 FLIGHT/ENTER</td>
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<tr>
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<td>SHF 2 FLIGHT/ENTER</td>
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<td>16.00</td>
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<td>SHF 2 FLIGHT/ENTER</td>
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<td>16.00</td>
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<td>SHF 2 FLIGHT/ENTER</td>
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</tr>
</tbody>
</table>

**General Notes:**
- Signs shall be in accordance with the latest edition of "Standard Highway Signs" by the U.S. Department of Transportation - FHWA.
- Signs shall be manufactured as one sign.

_111_ Use of a supplemental plate for line 1 is acceptable.

_151_ Flooded and applicable regulatory signs may be manufactured as one sign.
## Region 1

<table>
<thead>
<tr>
<th>Cool Season Grasses</th>
<th>Warm Season Grasses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Seed Mixtures</strong></td>
<td><strong>Seed Mixtures</strong></td>
</tr>
<tr>
<td><strong>Species</strong></td>
<td><strong>Species</strong></td>
</tr>
<tr>
<td><strong>Fertilizer</strong></td>
<td><strong>Fertilizer</strong></td>
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<tr>
<td><strong>Admixtures</strong></td>
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## Region 2

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<tr>
<td><strong>Admixtures</strong></td>
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## Region 3

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<td><strong>Seed Mixtures</strong></td>
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## Region 4

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</thead>
<tbody>
<tr>
<td><strong>Seed Mixtures</strong></td>
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<tr>
<td><strong>Species</strong></td>
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<tr>
<td><strong>Fertilizer</strong></td>
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</tr>
<tr>
<td><strong>Admixtures</strong></td>
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</tr>
</tbody>
</table>

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**Notes:**
- Seed mixtures shown shall be used for each region.
- Admixtures may be added at the contractor's discretion for no direct pay.
- Fertilizer = Pounds of N/Acre, Pounds of P/Acre, Pounds of K/Acre
- PLSS = Pounds of Live Seed/Acre
- LBS/AC = Pounds of Seed/Acre

**MoDOT:**
- **Missouri Highways and Transportation Commission**
- **155 West Capitol," Jefferson City, MO 65102**
- **1-800-ASK-MODOT (1-800-275-6636)**

**Seeding**

**Date Prepared:** 11/16/2014

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