KENTUCKY STANDARD DRAWINGS

ROADWAY
- BARRIERS
- DRAINAGE
- FENCES AND GRATES
- GENERAL
- PAVEMENT
- ROADSIDE DEVELOPMENT
- PERMANENT
- TEMPORARY
- SEE OVERLEAF

TRAFFIC
- PERMANENT
- TEMPORARY

BRIDGES

~ DRAWING NUMBER EXPLANATION ~
- DIVISION HEADING (ROADWAY)
- SECTION HEADING (FENCES & GRATES)
- SUB-SECTION (GATES)
- THREE OR FOUR DIGIT NUMBER

RFG - 001
- MISCELLANEOUS
- NO. OF TIMES
- DRAWING REVISED

RGX - 001-01

KENTUCKY DEPARTMENT OF HIGHWAYS
LAYOUT CHART FOR KENTUCKY STANDARD DRAWINGS
2003
NORMAL GUARDRAIL CONSTRUCTION

ITEM | STD. DWG. NO. (CURRENT EDITION)
--- | ---
1. STEEL W BEAM GUARDRAIL (SINGLE FACE) | RBR-001
2. BRIDGE END CONNECTORS | RBC-SERIES
3. END TREATMENT TYPE 1, 2A, 3 OR 4A | RBR-SERIES

DRAINAGE ITEMS (WHEN REQUIRED)

4. BRIDGE END DRAINAGE AREA | RDB-SERIES
5. CURB BOX INLET TYPE B | RPM-SERIES
6. ISL. INTERGAL CURB OR ISL. CURB AND GUTTER | RPM-SERIES

NOTES

A. NO ANGLES PERMITTED IN NORMAL GUARDRAIL ALIGNMENT.
B. THIS ILLUSTRATION IS FOR TWO-WAY TRAFFIC FLOW. FOR ONE-WAY TRAFFIC FLOW, MAKE THE FOLLOWING ALTERATIONS:
   A. NO PAVEMENT TAPER REQUIRED
   B. ALIGN FACE OF GUARDRAIL WITH STRUCTURE GUTTERLINE

END TREATMENT TYPE 1, 2A, 3 OR 4A
A. ALL FILLS; ALSO SOLID ROCK CUTS WITH ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL, USE END TREATMENT TYPE 1.
B. SOLID ROCK CUTS WITHOUT ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL, USE END TREATMENT TYPE 2A.
C. EARTH CUTS AND SOFT ROCK CUTS, USE END TREATMENT TYPE 3.
D. ALL FILLS; ALSO SOLID ROCK CUTS WITH ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL, USE END TREATMENT TYPE 4A.

WHEN THIS DIMENSION IS 6'-0" OR GREATER USE CONCRETE PAVEMENT (8" JOINTED PLAIN CONCRETE PAVEMENT WHEN MAINLINE DESIGN IS FLEXIBLE, SAME THICKNESS AS MAINLINE WHEN RIGID DESIGN). WHEN THIS DIMENSION IS LESS THAN 6'-0" USE ISLAND CURB AND GUTTER AND SAME PAVEMENT AS SHOWN ON MAINLINE DESIGN, (SEE DETAIL A).
1. NO ANGLES PERMITTED IN NORMAL GUARDRAIL ALIGNMENT.
2. TO TERMINATE GUARDRAIL INSTALLATION:
   A. ALL FILLS; ALSO SOLID ROCK CUTS WITH ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL, USE END TREATMENT TYPE 1.
   B. SOLID ROCK CUTS WITHOUT ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL, USE END TREATMENT TYPE 2A.
   C. EARTH CUTS AND SOFT ROCK CUTS, USE END TREATMENT TYPE 3.
   D. ALL FILLS; ALSO SOLID ROCK CUTS WITH ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL, USE END TREATMENT TYPE 4A.
3. USE ROADWAY OR BORROW EXCAVATION, OR EMBANKMENT IN PLACE.
4. WHEN THIS DIMENSION IS 6' OR GREATER USE CONCRETE PAVEMENT (6" JOINTED PLAIN CONCRETE PAVEMENT WHEN MAINLINE DESIGN IS FLEXIBLE, SAME THICKNESS AS MAINLINE WHEN RIGID DESIGN).
5. WHEN THIS DIMENSION IS LESS THAN 6' USE ISLAND CURB AND GUTTER AND SAME PAVEMENT AS SHOWN ON MAINLINE DESIGN. (SEE DETAIL A).
6. FLATTEN SLOPES AND ELIMINATE INLET WHEN MEDIAN SLOPES AWAY FROM BRIDGE.
7. LOCATE AS CLOSE TO GUARDRAIL AS SLOPE WILL PERMIT.
8. VARIABLE LENGTH. SEE APPLICABLE "BRIDGE END CONNECTOR" DRAWING (RBC SERIES).
9. SEE STD. DWG. RBB-003, CURRENT EDITION, FOR MEDIAN GUARDRAIL POST ALIGNMENT.
10. SHOWN FOR FILL CONDITION. REDUCE LENGTH SHOULD FIELD CONDITIONS WARRANT.
11. ROUND SLOPES IN ACCORDANCE WITH CURRENT STD. DWG. RGX-001.

NOTES

- RBC SERIES: USE WITH CURRENT STD. DWG. RBB-003
- RBR SERIES: STANDARD DRAWING NO RBB-002-08
- RBB SERIES: STANDARD DRAWING NO RBB-003-08
- RDE SERIES: STANDARD DRAWING NO RDE-003-08
- RDB SERIES: STANDARD DRAWING NO RDB-003-08
- RPM SERIES: STANDARD DRAWING NO RPM-003-08
- RGX SERIES: STANDARD DRAWING NO RGX-003-08

SECTION A-A

NOTES

- MEDIAN WIDTH
- SAME ELEVATION AS EDGE OF SHLDR.
- INSIDE SHLDR.
- 4" AS SLOPES 12:1 DESIRABLE, 6:1 MINIMUM
- 6" AS SLOPES 12:1 OR FLATTER REQUIRED

DETAIL A
### Calculations for Median Guardrail Location (Depressed Medians)

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<th>36’</th>
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**Distance in Above Chart** refers to points along extended line at various distances in feet from a point on face of guardrail at location of centerline of post number P₁. Offset refers to distance in feet at 90 degrees from points along extended line to face of guardrail at corresponding listed post number.

**Line extended from this point on gutterline of bridge paralleling edge of pavement.**
OFFSET DIMENSIONS SHOWN ARE FOR 12 FOOT SHOULDERS, WITH W EQUAL TO 7.5 FEET.

3. CALCULATIONS FROM 0 FEET TO 100 FEET ARE BASED ON THE FOLLOWING FORMULA:
   \[ \text{OFFSET} = \left( \frac{x}{L/2} \right) \times \frac{W}{2} \]
   FROM 100 FEET TO 200 FEET THE PROCEDURE IS AS FOLLOWS, FOR EXAMPLE AT P28:
   7.5 FEET MINUS 0.23 FEET = 7.27 FEET, ETC.

4. THE ENGINEER SHALL USE THE OFFSET FORMULA AND CALCULATE OFFSETS NEEDED FOR FIELD
   CONDITIONS DIFFERENT THAN THAT SHOWN IN THE CHART.
1. GENERAL
   a. See Cur. Std. Dws. in the RBB, RBI, RBR, and RPM-Series for other related guardrail details and bridge plans for bridge wing detail.
   b. See Cur. Std. Dwgs. RDB-Series for curb box inlet type B.
   c. Guardrail connector to bridge end type A is required on both bridge ends of an undivided highway and only on the approach bridge ends of a divided highway. Guardrail connector to bridge end type A-1 is required on the exit end of a divided highway.

2. MATERIAL REQUIREMENTS
   All hardware shall be galvanized. (AASHTO M-232)
   - ¾" STEEL PLATE "A" (AASHTO M-270)
   - ½" HEX HEAD BOLTS OR STEEL THREADED RODS (LENGTH AS SHOWN)
   - ¼" HEAVY HEX NUTS (¼" THICK) (AASHTO M-291)
   - ¼" FLAT WASHERS (¾" THICK) (AASHTO M-293)
   - ½" BEVELED WASHERS (½" MEAN THICKNESS) (AASHTO M-293)
   BOTH THE BOLT AND THREADED ROD SHALL HAVE A MINIMUM OF 50,000 LBS. TENSILE STRENGTH AT THEIR NARROWEST POINT.

3. CONSTRUCTION METHODS
   a. Back-up plates are not required within 2 ply guardrail section.
   b. Eliminate extra offset blocks when curb box inlet type B is not required.
   c. Eliminate extra posts, offset blocks, rub rail, one ply of rail elements and other incidentals which are in addition to normal installation of steel beam guardrail used in construction of double strength rail when guardrail connector to bridge end type A-1 is required.

4. METHOD OF MEASUREMENT AND BASIS OF PAYMENT
   a. Guardrail connector to bridge end type A shall be paid for at the contract unit price each, and includes: Terminal sect. No. 2; for rectangular plate washer requirements at splice see cur. std. dwg. RBR-010.
   b. Guardrail connector to bridge end type A-1 shall be paid for at the contract unit price each, and includes: Terminal sect. No. 2; all other incidentals necessary to complete the installation as detailed.
   c. Steel "W" beam guardrail (single face) and island curb are separate bid items which are always required, curb box inlet type B is a separate bid item that will be used when required for bridge end drainage.
   d. The plastic pipe and cost of forming shall be included in the unit price bid for bridge superstructure concrete.

5. ISLAND CURB, TRANSITION FROM ISLAND CURB SHAPE TO SHAPE ON BRIDGE WING WITHIN 7'-3" LENGTH OF CURB VARIABLE. (22'-3" WHEN L=5'-0") (17'-3" WHEN L=10'-0") (12'-3" WHEN L=15'-0") (7'-3" WHEN L=20'-0"), ON APPROACH END CONSTRUCT 25'-0" OF ISLAND CURB EEN WHEN CURB BOX INLET TYPE B IS NOT REQUIRED.

6. 6'-4" WHEN L=5'-0"
   11'-4" WHEN L=10'-0"
   16'-4" WHEN L=15'-0"
   21'-4" WHEN L=20'-0"

7. ⅝" X 3½" BUTTON HEAD BOLT, HEX HEAD NUT

8. CURB NOT REQUIRED ON TRAILING END UNLESS NEEDED FOR DRAINAGE.

L EQUALS THROAT LENGTH OF BOX.

SHEET 1 OF 3
KENTUCKY DEPARTMENT OF HIGHWAYS
GUARDRAIL CONNECTOR TO BRIDGE END TYPE A AND A-1

DIRECTOR DIVISION OF DESIGN
STATE HIGHWAY ENGINEER
DATE
SUBMITTED
APPROVED
STANDARD DRAWING NO.
RBB-SERIES
SEE CUR. STD. DWGS. IN THE , , , AND , FOR OTHER RELATED
RBC-001-09
RBR-SERIES
SEE CUR. STD. DWGS. IN THE , , , AND , FOR OTHER RELATED
RBM-SERIES
SEE CUR. STD. DWGS. IN THE , , , AND , FOR OTHER RELATED
RBR-010
REQUIRMENTS AT SPLICE SEE CUR. STD. DWG.
1. RUB RAIL IS DETAILED AS ONE CONTINUOUS PIECE. A SPLICE IS PERMITTED PROVIDING IT IS DONE AT A GUARDRAIL POST. SEE "RUB RAIL SPLICE" DETAIL.

2. MATERIAL REQUIREMENTS

   - ALL HARDWARE SHALL BE GALVANIZED. (AASHTO M-232)
   - 5/8" STEEL PLATE "B" (AASHTO M-270)
   - 3/4" STEEL PLATE "RUB RAIL SPLICE PLATE" (AASHTO M-270)
   - 5/8" BUTTON HEAD BOLTS (AASHTO M-180)
   - 5/8" HEAVY HEX NUTS (5/8" THICK) (AASHTO M-291)
   - 5/8" FLAT WASHERS (5/8" THICK) (AASHTO M-293)

   C6 X 8.2 RUB RAIL (AASHTO M160 AND M270)
   GRADE 36, GALVANIZED ACCORDING TO AASHTO MIII AFTER PUNCHING AND CUTTING ARE COMPLETE.

3. THIS SLOT FOR BOLTING RAIL AND SPLICE PLATE TO GUARDRAIL POST WITH A 5/8" X 3/2" BUTTON HEAD BOLT AND HEX HEAD NUT.

4. THESE SLOTS FOR BOLTING RAIL TO SPLICE PLATE WITH A 5/8" X 1/2" BUTTON HEAD BOLT AND HEX HEAD NUT.

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**ELEVATION VIEW**

**PLAN VIEW**

**C6 X 8.2 RUB RAIL**

**RUB RAIL SPLICE (TYP.)**

**RUB RAIL SPLICE PLATE**

**SECTION A-A**

**NOTES**

- Plate "B" is attached to the concrete parapet.
- 7/4" and 1'-2" dimensions are marked.
- 5/8" button head bolts (W + 4") for attachment.
- 3/4" x 2" slot for 5/8" button head bolts (W + 3/2").

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**SHEET 2 OF 3**

**GUARDRAIL CONNECTOR TO BRIDGE END**

**TYPE A AND A-1 COMPONENTS**

**STANDARD DRAWING NO. RBC-002-01**

**DATE**

- 11-21-07

---
~ W6 X 9.0 STEEL GUARDRAIL POST ~
(USED WITH C6 X 8.2 RUB RAIL)

~ W8 X 21 STEEL GUARDRAIL POST ~
(FOR USE WITH W8 X 21 STEEL POST ONLY)
NOTE:
GUARDRAIL CONNECTOR TO BRIDGE END TYPE "D" SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE EACH, AND SHALL INCLUDE TERMINAL SECTION NO. 2, EXTRA GUARDRAIL POST AND OFFSET BLOCKS, EXTRA GUARDRAIL, BRIDGE SIDEWALK RAMP (INCLUDING CLASS "A" CONCRETE, STEEL REINF. AND STRUCTURE EXCAVATION) ALL COMPLETELY INSTALLED. ISLAND INTEGRAL CURB (LIN. FT.) - DENSE GRADED AGGREGATE BASE (TON) - CLASS "A" CONCRETE (CU. YD.) FOR GUTTER PAVING 2 IN PLACE - AND CURB BOX INLET TYPE B (EACH) - ARE ADDITIONAL BID ITEMS WHEN APPLICABLE AND NEEDED FOR BRIDGE END DRAINAGE.

THIS DRAWING DEPICTS GUARDRAIL CONNECTED TO A POST AT THE END OF THE BRIDGE. WHEN A BRIDGE WING EXTENDS BEYOND THE END OF THE BRIDGE, THE GUARDRAIL SHALL BE MOVED BACK AND CONNECTED IN A CORRESPONDING MANNER.

THE GUARDRAIL CONNECTOR TO BRIDGE END TYPE "D" SHALL BE APPLIED ON EACH END OF THE BRIDGE, WHERE A SIDEWALK EITHER EXISTS OR IS PROPOSED, ON THE STRUCTURE AND NOT ON THE ROADWAY. THIS IS ONLY APPLICABLE TO RURAL STRUCTURES THAT HAVE TWO DIRECTIONAL TRAFFIC WITH SIDEWALK.

APPROXIMATE QUANTITIES

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<tr>
<th>&quot;W&quot;</th>
<th>SIDEWALK RAMP</th>
<th>GUTTER PAVING</th>
<th>STEEL REINFORCEMENT</th>
<th>ISLAND INTEGRAL CURB</th>
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<td>3'-6&quot;</td>
<td>2.7</td>
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<tr>
<td>4'-0&quot;</td>
<td>3.1</td>
<td></td>
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</table>

2 APPROX. QUANTITY PER LIN. FT. Z DIMENSION.
1. GUARDRAIL CONNECTOR TO CONCRETE MEDIAN BARRIER END SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE EACH AND INCLUDES TERMINAL SECTION NO. 2, ADDITIONAL POSTS, ADDITIONAL OFFSET BLOCKS, ADDITIONAL RAIL ELEMENTS, HARDWARE, ETC., AND OTHER INCIDENTALS AS SHOWN BETWEEN POINTS A — — B NECESSARY TO COMPLETE THE INSTALLATION AS DETAILED.

2. THE STEEL "W" BEAM GUARDRAIL (DOUBLE FACE) IS A SEPARATE BID ITEM AND SHALL BEGIN PAYMENT AT POINT A — — B.

3. THE 4-BOLT INSERT ASSEMBLY INSTALLATION SHALL BE INCIDENTAL TO THE COST OF THE BRIDGE SUPERSTRUCTURE CONCRETE OR CONCRETE MEDIAN BARRIER END AS APPLICABLE.

4. 4-BOLT ASSEMBLIES:
   (a) THE 3/8" x 2" CAP SCREWS WITH STANDARD STEEL WASHERS SHALL BE GALVANIZED AND CONFORM TO ASTM A-325.
   (b) NO. W-8 GAUGE WIRE, COLD DRAWN CONFORMING TO ASTM A-82.
   (c) STEEL INSERTS SHALL CONFORM TO ASTM A-108 GRADES C1008 AND C1010 OR B113.

5. SEE CUR. STD. DWGS. IN THE RBI, RBE, AND RBR-SERIES AS APPLICABLE.

6. BACK UP PLATES ARE NOT REQUIRED WITHIN THE 2 PLY GUARDRAIL SECTION.

7. SEE BRIDGE PLANS FOR CONSTRUCTION DETAILS WHEN APPLICABLE.

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KENTUCKY DEPARTMENT OF HIGHWAYS
GUARDRAIL CONNECTOR TO CONCRETE MEDIAN BARRIER END

DIRECTOR DIVISION OF DESIGN

STANDARD DRAWING NO RBC-100-03

12-1-99
1. ALL HARDWARE, POSTS, OFFSET BLOCKS, ADDITIONAL GUARDRAIL, W-BEAM TO CRASH CUSHION CONNECTOR, LABOR AND INCIDENTALS WITHIN THE TRANSITION LENGTH, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE FOR "CRASH CUSHION TYPE VI".

2. ADD SUFFIX OF 1 TO BID ITEM WHICH DENOTES A BACK-UP SYSTEM OTHER THAN CONCRETE, AS DETAILED ON PLANS AND APPROVED SHOP DRAWING.

2. OBJECT MARKER TYPE 1, (SEE CURRENT MUTCD MANUAL FOR DETAILS) CENTER HORIZ. AND VERT.
1. The contract unit price shall be crash cushion type VII, class B or C, as required.
   - Class B: Test Level 2 (TL2) or Test Level 3 (TL3), as required.
   - Class C: Either M, Medium, or W, Wide, or S, Special Wide units.
2. The concrete pad shall be required only when the unit is constructed on non-rigid pavement and shall be measured and paid for per cubic yard of Class "A" concrete, which shall include all necessary excavation and reinforcing steel. The pad shall be cured and finished as either sidewalk or pavement. Rear footings and rear back-up wall, except on structures, shall be required at all installations, which shall be measured and paid for as Class "A" concrete and shall include all necessary excavation and reinforcing steel.
3. The cross slope on the pad or pavement shall not exceed 5 percent.
4. When installed on a structure, details for anchorage shall be developed and shown elsewhere on the plans.
5. Special width units are available from the manufacturers. When special wide units are required details of the unit shall be developed and shown elsewhere on the plans.
6. See shop drawings from manufacturer for back up details.
7. Concrete pad and below grade anchor shall be placed monolithically.
8. Crash cushion type VII is a patented (one source) product manufactured by Energy Absorption Systems, Inc. of Chicago, Ill., Trinity Industries, Inc. of Dallas, Tex., or SCI Products, Inc. of St. Charles, Ill.
9. End shoe may be eliminated with one way traffic.
10. The crash cushion type VII may also be utilized for temporary use and construction zones (Class BT or Class CT).
11. A crash cushion type VII class B is to be used in areas where crash history is not known to be severe.
12. A crash cushion type VII class C is considered a severe use crash cushion.
13. When selecting between the crash cushion class B or C, consider the following factors:
   - Whether the hazard to be shielded is located in a high or low risk impact area;
   - Initial, maintenance, and restoration cost; and
   - Ease or difficulty of restoration of the system after impact. The importance of this factor will be related to the traffic and hazard levels at a site. More traffic and higher hazards will make speedy repair or replacement a higher priority. A suggested ADT range is given in the table below for guidance. This guidance should not supersede the application of sound engineering principles by experienced design professionals.

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<th>CLASS</th>
<th>SPEED (MPH)</th>
<th>ATTENUATOR MODEL</th>
<th>PRODUCT NAME</th>
<th>LENGTH (FT)</th>
<th>APPROX. CU. YD. CONC. FOR PAD</th>
<th>APPROX. CU. YD. CONC. FOR NOSE ASSEMBLY</th>
<th>APPROX. CU. YD. CONC. FOR END SHOE</th>
<th>SUGGESTED ADT RANGE (P.C.P.L.)**</th>
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<td>C</td>
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<td>SCI100GM</td>
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* Average daily traffic
** Passenger cars per lane

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**Notes**

1. The contract unit price shall be crash cushion type VII, class B or C, as required.
2. The concrete pad shall be required only when the unit is constructed on non-rigid pavement and shall be measured and paid for per cubic yard of class "A" concrete, which shall include all necessary excavation and reinforcing steel. The pad shall be cured and finished as either sidewalk or pavement. Rear footings and rear back-up wall, except on structures, shall be required at all installations, which shall be measured and paid for as class "A" concrete and shall include all necessary excavation and reinforcing steel.
3. The cross slope on the pad or pavement shall not exceed 5 percent.
4. When installed on a structure, details for anchorage shall be developed and shown elsewhere on the plans.
5. Special width units are available from the manufacturers. When special wide units are required details of the unit shall be developed and shown elsewhere on the plans.
6. See shop drawings from manufacturer for back up details.
7. Concrete pad and below grade anchor shall be placed monolithically.
8. Crash cushion type VII is a patented (one source) product manufactured by Energy Absorption Systems, Inc. of Chicago, Ill., Trinity Industries, Inc. of Dallas, Tex., or SCI Products, Inc. of St. Charles, Ill.
9. End shoe may be eliminated with one way traffic.
10. The crash cushion type VII may also be utilized for temporary use and construction zones (Class BT or Class CT).
11. A crash cushion type VII class B is to be used in areas where crash history is not known to be severe.
12. A crash cushion type VII class C is considered a severe use crash cushion.
13. When selecting between the crash cushion class B or C, consider the following factors:
   - Whether the hazard to be shielded is located in a high or low risk impact area;
   - Initial, maintenance, and restoration cost; and
   - Ease or difficulty of restoration of the system after impact. The importance of this factor will be related to the traffic and hazard levels at a site. More traffic and higher hazards will make speedy repair or replacement a higher priority. A suggested ADT range is given in the table below for guidance. This guidance should not supersede the application of sound engineering principles by experienced design professionals.
1. Crash Cushion Type VI, Class B or C, as required

2. The concrete pad, pad excavation and steel reinforcement, installed in place shall be included in the unit price bid for Crash Cushion Type VI. Use Class AA concrete to construct concrete pad (see concrete pad section for steel requirements). The pad shall be cured and finished as either sidewalk or pavement. The cross slope of the pad or pavement shall not exceed 5%. The pad will not be required when the unit is constructed on rigid pavement.

3. Crash Cushion Type VI may be used at the end of; concrete median barrier, bridge piers and steel "W" beam guardrail (double face).

4. When Crash Cushion Type VI connects to; concrete median barrier or bridge pier the contract unit price shall include; Crash Cushion Type VI, all hardware, additional rail elements, post, concrete pad and all other incidentals necessary to complete the installation.

5. This drawing depicts connection of Crash Cushion Type VI to concrete median barrier. For this application see current std. dwg. RBE-065 "Concrete Median Barrier End".

6. When Crash Cushion Type VI connects to double face guardrail see current std. dwg. RBC-110 "Connection Details of Crash Cushion Type VI to Double Face Guardrail".

7. Permissible alternates for Crash Cushion Type VI are patented items; Quadguard manufactured by Energy Absorption Systems, Inc. of Chicago, IL. Trinity Industries, Inc. of Dallas, TX. Or Sci Products, Inc. of St. Charles, IL.

8. The manufacturer shall furnish two (2) sets of shop plans to the contractor with each installation.

9. The Crash Cushion Type VI may also be utilized for temporary use and construction zones (class BT or class CT).

10. A Crash Cushion Type VI Class B is to be used in areas where crash history is not known to be severe.

11. A Crash Cushion Type VI Class C is considered a severe use crash cushion.

12. When selecting between the Crash Cushion Class B or Class C, consider the following factors:

- Whether the hazard to be shielded is located in a high- or low-risk impact area;
- Initial, maintenance, and restoration cost; and
- Ease or difficulty of restoration of the system after impact.

The importance of this factor will be related to the traffic and hazard levels at a site. More traffic and higher hazards will make speedy repair or replacement a higher priority. A suggested ADT range is given in the table below for guidance. This guidance should not supersede the application of sound engineering principles by experienced design professionals.

<table>
<thead>
<tr>
<th>Class</th>
<th>Speed (MPH)</th>
<th>Attenuator Model</th>
<th>Product Name</th>
<th>Length</th>
<th>Approx. CU. YD. Conc. For Pad</th>
<th>Suggested ADT Range (P.C.P.L.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>45 &amp; LESS</td>
<td>TL2</td>
<td>SHORTRACC</td>
<td>14'-0&quot;</td>
<td>1.12</td>
<td>Up to 12,000</td>
</tr>
<tr>
<td></td>
<td>OVER 45</td>
<td>TL3</td>
<td>3-BAY QUADGUARD</td>
<td>12'-0&quot;</td>
<td>0.87</td>
<td>8,000 and OVER</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TRACC</td>
<td>21'-0&quot;</td>
<td>1.63</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6-BAY QUADGUARD</td>
<td>21'-0&quot;</td>
<td>1.53</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>OVER 45</td>
<td>TL3</td>
<td>SCIOOGM</td>
<td>23'-0&quot;</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OVER</td>
<td></td>
<td>QUADGUARD ELITE</td>
<td>26'-7&quot;</td>
<td>1.98</td>
<td></td>
</tr>
</tbody>
</table>

W = 2'-0" (INSIDE BAY WIDTH)

~ LEGEND ~

1. Nose Assembly
2. Back-up
3. 6" Concrete Pad
4. Object Marker Type I (see CUR. MUTCD Manual for details) Center horiz. and vert.

~ NOTES ~

Use with Cur. std. dwgs. RBE-065 or RBC-110 as applicable.

Kentucky Department of Highways
Crash Cushion
Type VI (One & Two Direction)

Standard Drawing No. RBE-060-13

R-21-07
R-21-07
NOTES

1. BID ITEMS AND UNIT TO BID:
   a. STEEL REINFORCEMENT-POUNDS (MIN. GRADE 40).
   b. CLASS "A" CONC.-CUBIC YARDS (INCLUDES ALL MATERIALS, TOOLS, FORMS, LABOR, EXCAVATION, AND INCIDENTALS NECESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH THIS DRAWING).

2. 1/2" PREMOLDED EXPANSION JOINT MATERIAL REQUIRED.

3. STEEL REINFORCING BARS SHALL BE EVENLY SPACED AS SHOWN.

4. CONCRETE QUANTITIES FOR CONDITION NO. 1, 2, AND 3 ARE BASED ON A BRIDGE PIER WIDTH OF 3'-0".

5. USE DETAIL "A" FOR ENERGY ABSORPTION SYSTEM'S QUADGUARD CRASH CUSHION ALTERNATE. ALL OTHER CONNECTIONS REQUIRE A SQUARE NOSE.

6. Y=2'-0" FOR CRASH CUSHION TYPE VI, AND Y=1'-6" FOR GUARDRAIL CONNECTOR TO CONCRETE MEDIAN BARRIER END.

7. WHEN THE CONCRETE MEDIAN BARRIER END IS PLACED AT A PIER WIDER THAN 3'-0" THE BARRIER END TRANSITION SHALL BE CONSTRUCTED ON A 12:1 TAPER AND ADDITIONAL CONCRETE AND STEEL QUANTITIES SHALL BE CALCULATED.

---

USE DETAIL "A" FOR ENERGY ABSORPTION SYSTEM'S QUADGUARD CRASH CUSHION ALTERNATE. ALL OTHER CONNECTIONS REQUIRE A SQUARE NOSE.

Y=2'-0" FOR CRASH CUSHION TYPE VI, AND Y=1'-6" FOR GUARDRAIL CONNECTOR TO CONCRETE MEDIAN BARRIER END.

WHEN THE CONCRETE MEDIAN BARRIER END IS PLACED AT A PIER WIDER THAN 3'-0" THE BARRIER END TRANSITION SHALL BE CONSTRUCTED ON A 12:1 TAPER AND ADDITIONAL CONCRETE AND STEEL QUANTITIES SHALL BE CALCULATED.

---

<table>
<thead>
<tr>
<th>NO. 5 STEEL REINFORCEMENT BARS</th>
<th>CUBIC YARD OF CLASS &quot;A&quot; CONC.</th>
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<tbody>
<tr>
<td>CONDITION NO.</td>
<td>BAR a</td>
</tr>
<tr>
<td>1</td>
<td>6&quot;</td>
</tr>
<tr>
<td>2</td>
<td>9&quot;</td>
</tr>
<tr>
<td>3</td>
<td>9&quot;</td>
</tr>
<tr>
<td>4</td>
<td>12&quot;</td>
</tr>
</tbody>
</table>

---

USE WITH CUR. STD. DWG. RBE-060 OR RBC-100 AS APPLICABLE.
1. BID ITEMS AND UNIT TO BID:
   a. CONCRETE MEDIAN BARRIER END
   b. STEEL REINFORCEMENT - POUNDS (MIN. GRADE 40)
   c. CLASS "A" CONCRETE - CUBIC YARDS (INCLUDES ALL MATERIALS, TOOLS, FORMS, LABOR, EXCAVATION, AND INCIDENTALS NECESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH THIS DRAWING.

2. ½" PREMOLDED EXPANSION JOINT MATERIAL REQUIRED.

3. STEEL REINFORCING BARS SHALL BE EVENLY SPACED AS SHOWN.

4. 4-BOLT INSERT ASSEMBLIES ARE REQUIRED. (SEE CURRENT STD. DWG. RBC-100 FOR INSERT DETAIL)

5. CONCRETE QUANTITIES AT BRIDGE PIERS ARE BASED ON A BRIDGE PIER WIDTH OF 3'-0".

6. WHEN THE CONCRETE MEDIAN BARRIER END IS PLACED AT A PIER WIDER THAN 3'-0" THE BARRIER END TRANSITION SHALL BE CONSTRUCTED ON A 12:1 MIN. TAPER AND ADDITIONAL CONCRETE AND STEEL QUANTITIES SHALL BE CALCULATED.

QUANTITIES FOR ONE CONCRETE MEDIAN BARRIER END

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>NO. 5 STEEL REINF. BARS</th>
<th>POUNDS OF STEEL</th>
<th>CU. YDS. CONC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>9&quot; WALL</td>
<td></td>
<td>5 14'-4&quot;</td>
<td>7.5</td>
</tr>
<tr>
<td>12&quot; WALL</td>
<td></td>
<td>15 2'-3&quot;</td>
<td>19.6</td>
</tr>
<tr>
<td>14&quot; WALL</td>
<td></td>
<td>196</td>
<td>4.73</td>
</tr>
</tbody>
</table>

DETAIL "A"

- CONCRETE MEDIAN BARRIER END FOR CRASH CUSHION TYPE IX
- USE WITH CUR. STD. DWG. RBE-200

DEPARTMENT OF HIGHWAYS

KENTUCKY

STANDARD DRAWING NO. RBE-070-04

11-21-07

RBE-200

RBC-100

RBE-070-04
**NOTES**

1. CRASH CUSHION TYPE VI, CLASS B, C, D, as required
   - EITHER TEST LEVEL 2 (TL2) OR TEST LEVEL 3 (TL3), AS REQUIRED.
   - SEE "CONNECTION DETAILS OF CRASH CUSHION TYPE VI TO DOUBLE FACE GUARDRAIL".

2. CRASH CUSHION TYPE VI-BT OR CT IS DEPICTED ATTACHED TO A CONCRETE BARRIER (TEMPORARY).

3. WHEN CRASH CUSHION TYPE VI-BT OR CT IS ATTACHED TO STEEL "W" BEAM GUARDRAIL (DOUBLE FACE), ALL APPLICABLE DETAILS SHOWN ON CUR. STD. DWG. RBC-110, "CONNECTION DETAIL OF CRASH CUSHION TYPE VI TO DOUBLE FACE GUARDRAIL" SHALL BE REQUIRED.

4. WHEN CRASH CUSHION TYPE VI-BT OR CT IS ATTACHED TO STEEL "W" BEAM GUARDRAIL (DOUBLE FACE), THE TRANSITION PANEL SHALL BE ELIMINATED.


6. FOR ONE-WAY APPROACH TRAFFIC THE UNIT SHALL BE CENTERED ON THE END OF THE BARRIER.

7. THE COMPLETE INSTALLATION SHALL MEET ALL APPLICABLE REQUIREMENTS OF ENERGY ABSORPTIONS INC., TRINITY INDUSTRIES INC., OR SCI PRODUCTS INC. (SEE APPROVED SHOP DRAWINGS).

8. ANCHORAGE DEVICES TO SECURE CRASH CUSHION TO THE EXISTING SURFACE SHALL BE SHOWN ON APPROVED SHOP DRAWINGS.

9. WHEN REQUIRED, THE CONCRETE PAD, PAD EXCAVATION AND STEEL REINFORCEMENT, INSTALLED IN PLACE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CRASH CUSHION TYPE VI. USE CLASS AA CONCRETE TO CONSTRUCT CONCRETE PAD (SEE CONCRETE PAD SECTION FOR STEEL REQUIREMENTS).

10. THE PAD WILL NOT BE REQUIRED WHEN UNIT IS CONSTRUCTED ON RIGID PAVEMENT.

11. THE PAD WILL NOT BE REQUIRED WHEN THE UNIT IS CONSTRUCTED ON EXISTING PAVEMENT OR BRIDGES AND THE COST OF ANCHORING SHALL BE INCLUDED IN THE UNIT PRICE OF THE CRASH CUSHION.

12. PERMISSIBLE ALTERNATES FOR CRASH CUSHION TYPE VI-BT OR CT ARE PATENTED (ONE SOURCE) ITEMS: ENERGY ABSORPTION SYSTEMS, INC. OF CHICAGO, IL., TRINITY INDUSTRIES, INC. OF DALLAS, TX. OR SCI PRODUCTS, INC. OF ST. CHARLES, IL.

### Legend

- **1.** NOSE ASSEMBLY
- **2.** CONSTRUCTION ZONE BACKUP
- **3.** OBJECT MARKER TYPE 1. (SEE CUR. MUTCD MANUAL FOR DETAILS) CENTER HORIZ. AND VERT.

### Attenuator Speed Requirements

<table>
<thead>
<tr>
<th>CLASS</th>
<th>SPEED (MPH)</th>
<th>ATTENUATOR</th>
<th>PRODUCT NAME</th>
<th>LENGTH</th>
<th>APPROX. CU. YD. CONC. FOR PAD</th>
<th>SUGGESTED ADT* RANGE (P.C.P.L.) **</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>45 &amp; LESS</td>
<td>TL2</td>
<td>SHORTRACC</td>
<td>14’-0”</td>
<td>1.12</td>
<td>UP TO 12,000</td>
</tr>
<tr>
<td></td>
<td>OVER 45</td>
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<td></td>
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<td>SCI100GM</td>
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<td>8,000 AND OVER</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>QUADGUARD ELITE</td>
<td>26’-7”</td>
<td>1.98</td>
<td></td>
</tr>
</tbody>
</table>

* AVERAGE DAILY TRAFFIC
** PASSENGER CARS PER LANE
EXTRA POSTS & OFFSET BLOCKS FOR ADDED STRENGTH.

TWO SECTIONS OF W-BEAM GUARDRAIL ONE SET INSIDE THE OTHER (STAR BOTH)

6" TO CENTER OF FIRST HOLE

6" I.D. x 9" LONG STEEL SPACER TUBE
SCH. 40 GALVANIZED PIPE (ATTACHED TO GUARDRAIL ONLY)

PLAN VIEW

TRAFFIC

TOP OF RAIL

WOOD BLOCK

FINISHED GRADE LINE

WOOD POST

2'-3"

SOIL PLATE

6" x 8" TUBE

SECTION A-A

WOOD POST (2)

WOOD OFFSET BLOCKS

W-BEAM GUARDRAIL

3'-1/2"

4 SPACES AT 1'-6¼"

3 SPACES AT 3-1/2"

P8

P7

(5)

A

A

CRASH CUSHION TYPE IX

LENGTH OF NEED

APPROX. 56'-3"

NORMAL MEDIAN BARRIER WALL CONSTRUCTION

TERMINAL SECTION NO. 2 (TYP)

4 SPACES

AT 1'-6¼"

3 SPACES

AT 3-1/2"

P8

P7

P6

P5

P4

P3

P2

P1

P8

EXTRA POSTS & OFFSET BLOCKS FOR ADDED STRENGTH.

2

TRAFFIC

TRAFFIC

~NOTES~

1. CRASH CUSHION TYPE IX SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE EACH, AND INCLUDES TERMINAL SECTIONS NO. 2, POST, RAIL ELEMENTS, OBJECT MARKER TYPE 1, AND ALL OTHER INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION AS DETAILED.

2. POSTS AND OFFSET BLOCKS MAY BE WOOD OR STEEL POST AND WOOD OFFSET BLOCKS.

3. OBJECT MARKER TYPE 1, (SEE CURRENT MUTCD MANUAL FOR DETAILS) CENTER HORIZ. AND VERT.

4. SEE CUR. STD. DWG. RBE-070 FOR DETAILS OF CRASH CUSHION BARRIER END.

5. POST P1 THROUGH P7 ARE SPACED 6'-3" ON CENTER.

6. GUARDRAIL NOT REQUIRED TO BE ATTACHED TO POST AT THESE LOCATIONS.

7. CRASH CUSHION TYPE IX IS A PATENTED (ONE SOURCE) PRODUCT MANUFACTURED BY TRINITY INDUSTRIES, INC. OF DALLAS TX. OR ROAD SYSTEMS, INC. OF BIG SPRING, TX.

8. BACK-UP PLATES REQUIRED AT THESE POSTS.

9. THE MANUFACTURER SHALL FURNISH TWO (2) SETS OF SHOP PLANS TO THE CONTRACTOR WITH EACH INSTALLATION.

10. FOR NON-PAVEMENT APPLICATIONS SEE ROADWAY PLANS FOR GRADING DETAILS.
~ NOTES ~

1. CRASH CUSHION TYPE IX-A SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE EACH, AND INCLUDES POSTS, RAIL ELEMENTS, OBJECT MARKER TYPE 1 AND ALL OTHER INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION AS DETAILED.
2. OBJECT MARKER TYPE 1 (SEE CURRENT MUTCD MANUAL FOR DETAILS) CENTER HORIZ. AND VERT.
3. CRASH CUSHION TYPE IX-A IS A PATENTED (ONE SOURCE) PRODUCT MANUFACTURED BY TRINITY INDUSTRIES, INC. OF DALLAS, TX. OR ROAD SYSTEMS, INC. OF BIG SPRING, TX.
4. AT POST P7 AND P8 THE POSTS AND OFFSET BLOCKS MAY BE WOOD OR STEEL POST AND WOOD OFFSET BLOCKS.
5. POST P1 THROUGH P8 ARE SPACED 6'-3'' ON CENTER.
6. BACK-UP PLATES REQUIRED AT POST P7.
7. THE MANUFACTURER SHALL FURNISH TWO (2) SETS OF SHOP PLANS TO THE CONTRACTOR WITH EACH INSTALLATION.
8. FOR NON-PAVEMENT APPLICATIONS SEE ROADWAY PLANS FOR GRADING DETAILS.
~ NOTES ~

1. FOR END TREATMENT TYPE 4A USE CUR. STD. DWG. RBR-035 FOR OFFSETS.

2. THE MINIMUM LENGTH OF GUARDRAIL, INCLUDING THE END TREATMENT, PRECEDING A FIXED OBJECT IS 200 FEET: (LENGTH MAY BE REDUCED SHOULD FIELD CONDITIONS WARRANT).

END TREATMENT (TYPES 1, 2A, 3, 4A, OR 7 AS REQUIRED)

NORMAL GUARDRAIL INSTALLATION

TYPICAL DOUBLE FACE GUARDRAIL INSTALLATION

MAIN ROAD

TERMINAL SECTION NO. 1

GUARDRAIL USED AS A BARRICADE
GENERAL APPLICATION OF END TREATMENTS

(a.) ALL FILLS; ALSO SOLID ROCK CUTS WITH ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL, USE END TREATMENT TYPE 1.

(b.) SOLID ROCK CUTS WITHOUT ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL, USE END TREATMENT TYPE 2A.

(c.) EARTH CUTS AND SOFT ROCK CUTS, USE END TREATMENT TYPE 3.

(d.) ALL FILLS; ALSO SOLID ROCK CUTS WITH ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL, USE END TREATMENT TYPE 4A.

NORMAL GUARDRAIL INSTALLATION. FOR FIXED OBJECTS, SPECIFY "X" IN 12'-6" INCREMENTS.

FIXED OBJECTS SUCH AS (PIERS, NEAR OR AT GRADE CULVERTS, POST, OR POLE LOCATED IN THE SAFETY ZONE AND NOT HAVING BREAKAWAY FEATURE. SEE APPROPRIATE CURRENT STANDARD DRAWING FOR PROPER OFFSET "W"). THE MINIMUM LENGTH OF GUARDRAIL, INCLUDING THE END TREATMENT, PRECEDING A FIXED OBJECT IS 200 FEET (LENGTH MAY BE REDUCED SHOULD FIELD CONDITIONS WARRANT).
~ DETAIL OF GUARDRAIL FOR FILL TO SOLID ROCK CUT SECTION ~

BID ITEMS AND UNIT TO BID:

A. GUARDRAIL END TREATMENT TYPE 2A - EACH
B. ROADWAY OR BORROW EXCAVATION, OR EMBANKMENT IN PLACE - CU. YD.
C. DRAINAGE STRUCTURE BID SEPARATELY.

GUARDRAIL END TREATMENT TYPE 2A

1. SOLID ROCK CUTS WITHOUT AN ADEQUATE RECOVERY ZONE.
2. INTENDED USE: FOR END TREATMENTS AGAINST SOLID ROCK CUTS ONLY. END TREATMENT SHALL NOT ABUT LOOSE ROCK.
   FOR INSTALLATION WHERE SOLID ROCK IS NOT ENCOUNTERED SEE CURRENT STANDARD DRAWING RBR-030.

NOTES:

1. SEE GRADING DETAILS FOR DRAINAGE STRUCTURE (WHEN REQUIRED)
2. GRADE MATERIAL
3. END TREATMENT TYPE 2A

SECTION B-B (SOLID ROCK CUT) MATERIAL DETAIL OF END TREATMENT TYPE 2A

SECTION D-D (GUARDRAIL END TREATMENT TYPE 2A)

<table>
<thead>
<tr>
<th>DESIGN SPEED</th>
<th>70+ MPH</th>
<th>60 MPH</th>
<th>50 MPH OR LESS</th>
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<tbody>
<tr>
<td>FLARE RATES</td>
<td>15:1</td>
<td>13:1</td>
<td>11:1</td>
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</table>

- USE WITH CUR. STD. DWGS.
- RBI-001, RBI-002, RDB-005

KENTUCKY DEPARTMENT OF HIGHWAYS

TYPICAL INSTALLATION FOR GUARDRAIL END TREATMENT TYPE 2A

STANDARD DRAWING NO. RBI-003-07

USE WITH CUR. STD. DWGS.
1. BID ITEMS AND UNIT TO BID:
A. GUARDRAIL END TREATMENT TYPE 1 - EACH
B. MATERIAL USED TO CONSTRUCT WIDENING SHALL BE
   BID AS ROADWAY OR BORROW EXCAVATION OR
   EMBANKMENT-IN-PLACE AT THE CONTRACT UNIT PRICE
   PER CUBIC YARD.

2. THE MINIMUM LENGTH OF GUARDRAIL, INCLUDING THE
   END TREATMENT, PRECEDING A FIXED OBJECT IS 200 FEET
   (LENGTH MAY BE REDUCED SHOULD FIELD CONDITIONS
   WARRANT).

3. GUARDRAIL EXTRUDER EDGE CLOSEST TO TRAFFIC SHALL BE PLACED
   ON NORMAL GUARDRAIL LINE.

4. END TREATMENT TYPE 1 MAY BE ATTACHED TO CURVED GUARDRAIL PROVIDED CURVE
   IS 9° OR LESS. END TREATMENT TYPE 1 SHALL BE INSTALLED ON A STRAIGHT LINE
   TAPER WITHIN THE PAY LIMITS.

5. INTENDED USE: FILLS WITH ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL.
LOCATION OF GUARDRAIL WITH VARIABLE WIDTH MEDIAN

~ NOTES ~

1. THE MIN. LENGTH OF GUARDRAIL, INCLUDING THE END TREATMENT, PRECEDING A FIXED OBJECT IS 200 FEET (LENGTH MAY BE REDUCED SHOULD FIELD CONDITIONS WARRANT).

2. 4'-0" OR MORE FROM NORMAL GUARDRAIL ALIGNMENT. HOWEVER, IF COLUMNS, PIERS, ABUTMENTS, ETC. ARE LOCATED IN THE CLEAR ZONE DISTANCE OR 30'-0" WHICHEVER IS GREATER FROM THE EDGE OF A THROUGH TRAVEL LANE, GUARDRAIL SHALL NOT BE REQUIRED.

3. TO TERMINATE GUARDRAIL INSTALLATION:
   A. ALL FILLS, ALSO SOLID ROCK CUTS WITH ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL; USE END TREATMENT TYPE 1.
   B. SOLID ROCK CUTS WITHOUT ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL; USE END TREATMENT TYPE 2A.
   C. EARTH CUTS AND SOFT ROCK CUTS; USE END TREATMENT TYPE 3.
   D. ALL FILLS, ALSO SOLID ROCK CUTS WITH ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL; USE END TREATMENT TYPE 4A.

4. SEE CURRENT STD. DWG. RBI-007 OR CURRENT STD. DWG. RBI-009 AS APPLICABLE.

5. WHEN CONC. MEDIAN BARRIER WALL IS REQUIRED SEE CUR. STD. DWG. RBM-D15 FOR APPLICABLE DETAILS.
GUARDRAIL INSTALLATION AT KENTUCKY DEPARTMENT OF HIGHWAYS

END TREATMENT TYPE 2A

~ NOTES ~

1. TO TERMINATE GUARDRAIL INSTALLATION:
   A. ALL FILLS, ALSO SOLID ROCK CUTS WITH ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL; USE END TREATMENT TYPE 1.
   B. SOLID ROCK CUTS WITHOUT ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL; USE END TREATMENT TYPE 2A.
   C. EARTH CUTS AND SOFT ROCK CUTS; USE END TREATMENT TYPE 3.
   D. ALL FILLS, ALSO SOLID ROCK CUTS WITH ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL; USE END TREATMENT TYPE 4A.
   2. SEE CURRENT STD. DWG. RBI-009 FOR APPLICABLE CRASH CUSHION.

3. IF GAPS OF 200 FEET OR LESS SHOULD OCCUR BETWEEN SECTIONS OF GUARDRAIL, THE GUARDRAIL SHALL BE EXTENDED THROUGH SUCH GAPS TO PROVIDE A CONTINUOUS SECTION.

4. GUARDRAIL INSTALLATION IS NOT NECESSARY FOR SIGNS MOUNTED ON:
   A. CHANNEL POST IN TYPE "B" OR "C" BASES.
   B. TYPE "B" BREAKAWAY BEAMS.
   C. SIGNS MOUNTED IN CAST ALUMINUM SHOES. (SEE SIGN PLAN).

5. THE MIN. LENGTH OF GUARDRAIL, INCLUDING THE END TREATMENT, PRECEDING A FIXED OBJECT IS 200 FEET (LENGTH MAY BE REDUCED SHOULD FIELD CONDITIONS WARRANT).

6. WHEN CONCRETE BARRIER WALL IS REQUIRED SEE CUR. STD. DWG. RBM-015 FOR APPLICABLE DETAILS.

TYPICAL GUARDRAIL INSTALLATIONS FOR OVERHEAD SIGN SUPPORT - TRUSS (RAISED MEDIAN)

TYPICAL GUARDRAIL INSTALLATIONS FOR OVERHEAD SIGN SUPPORT - TRUSS (DEPRESSED MEDIAN)

TYPICAL GUARDRAIL INSTALLATIONS FOR "A" CANTILEVER SIGN SUPPORT OR "B" OVERHEAD SIGN SUPPORT

KENTUCKY DEPARTMENT OF HIGHWAYS

GUARDRAIL INSTALLATION AT SIGN SUPPORTS

STANDARD DRAWING NO. RBI-006-06

~ NOTES ~

1. TO TERMINATE GUARDRAIL INSTALLATION:
   A. ALL FILLS, ALSO SOLID ROCK CUTS WITH ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL; USE END TREATMENT TYPE 1.
   B. SOLID ROCK CUTS WITHOUT ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL; USE END TREATMENT TYPE 2A.
   C. EARTH CUTS AND SOFT ROCK CUTS; USE END TREATMENT TYPE 3.
   D. ALL FILLS, ALSO SOLID ROCK CUTS WITH ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL; USE END TREATMENT TYPE 4A.
   2. SEE CURRENT STD. DWG. RBI-009 FOR APPLICABLE CRASH CUSHION.

3. IF GAPS OF 200 FEET OR LESS SHOULD OCCUR BETWEEN SECTIONS OF GUARDRAIL, THE GUARDRAIL SHALL BE EXTENDED THROUGH SUCH GAPS TO PROVIDE A CONTINUOUS SECTION.

4. GUARDRAIL INSTALLATION IS NOT NECESSARY FOR SIGNS MOUNTED ON:
   A. CHANNEL POST IN TYPE "B" OR "C" BASES.
   B. TYPE "B" BREAKAWAY BEAMS.
   C. SIGNS MOUNTED IN CAST ALUMINUM SHOES. (SEE SIGN PLAN).

5. THE MIN. LENGTH OF GUARDRAIL, INCLUDING THE END TREATMENT, PRECEDING A FIXED OBJECT IS 200 FEET (LENGTH MAY BE REDUCED SHOULD FIELD CONDITIONS WARRANT).

6. WHEN CONCRETE BARRIER WALL IS REQUIRED SEE CUR. STD. DWG. RBM-015 FOR APPLICABLE DETAILS.
7. MATERIAL 6" OF NO. 57 COARSE AGGREGATE (LOOSE DEPTH).
A RAISED MEDIAN IS DEPICTED; HOWEVER, THE SAME WARRANTS WOULD GOVERN FOR A FLUSH MEDIAN.

A CRASH CUSHION TYPE VI IS DEPICTED; HOWEVER, CRASH CUSHION TYPE IX SHALL BE PERMITTED SHOULD WARRANTS PERMIT.

MATERIALS

CONCRETE MEDIAN BARRIER END FOR CRASH CUSHION TYPE VI OR CRASH CUSHION TYPE IX AS APPLICABLE.

CONCRETE PAD FOR CRASH CUSHION TYPE VI.

CRASH CUSHION TYPE VI (SEE CUR. STD. DWG. RBE-060), OR CRASH CUSHION TYPE IX (SEE CUR. STD. DWG. RBE-200) AS APPLICABLE.

PAVED MEDIAN (SEE PLANS FOR MATERIAL).
~ NOTES ~

The bid item shall be: Concrete Median Barrier Type \( \odot \odot \)

\( \odot \) 9, 12, or 14 depending on \( W \)
\( \odot \) A, B, C, D, or E depending on pavement type.

For walls in transition and separate segment walls see current std. dwg. RBM-015 for appropriate bid items.

The contract unit price per linear foot for concrete median barrier including the base in Types A and C shall be full compensation for all materials, equipment, labor and incidentals necessary to complete the work.

1. When a construction joint is used, dowel bars will be required as shown with Type 9B, 12B, or 14B barrier.

2. Longitudinal construction joint without tie bars is required and shall be placed at the location shown or may be installed at the corresponding point on the opposite side of the barrier, at the option of the contractor. It shall be required on the low side of a super-elevated section.

3. No. 8 dowel bars spaced 4'-0" O.C. and staggered 2'-0".

4. Construction joint permitted when fixed forms or slip forms are used.

5. Polyethylene (6 mils thick) bond breaker.

6. Pavement shall be drilled and bars grouted.

7. Bars shall be either drilled and grouted or driven.

8. 3" raceway (typical) see elsewhere in the plans for location and payment for raceway when required.

Approximate quantities per linear foot

<table>
<thead>
<tr>
<th>Type</th>
<th>Conc.- Cu.Yd.</th>
<th>Steel - Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>9&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>A</td>
<td>0.18</td>
<td>0.20</td>
</tr>
<tr>
<td>B</td>
<td>0.13</td>
<td>0.15</td>
</tr>
<tr>
<td>C</td>
<td>0.18</td>
<td>0.20</td>
</tr>
<tr>
<td>D</td>
<td>0.14</td>
<td>0.16</td>
</tr>
<tr>
<td>E</td>
<td>0.14</td>
<td>0.16</td>
</tr>
</tbody>
</table>

\( \hat{\text{A}} \) When required

Concrete quantities shown include 8" base thickness for Type A, but do not include quantities necessary for asphalt overlay thickness shown for Type D and E.
CONCRETE MEDIAN BARRIER PRECAST (PERMANENT)

KENTUCKY DEPARTMENT OF HIGHWAYS

CONCRETE MEDIAN BARRIER TYPE

BID ITEM AND UNIT TO BID:
A. CONCRETE MEDIAN BARRIER TYPE

+ 9 OR 12 OR 14 DEPENDING ON W.
+ A OR C DEPENDING ON PAVEMENT TYPE (SEE CUR. STD. DWG. RBM-001 FOR TYPE).

B. WITH FLEXIBLE PAVEMENT THE CONTRACT UNIT PRICE PER LINEAR FOOT SHALL INCLUDE
THE BASE, ALL CONCRETE, LABOR, REINFORCING STEEL AND ALL OTHER INCIDENTALS NECESSARY
TO COMPLETE THE PERMANENT INSTALLATION.

C. WITH RIGID PAVEMENT THE CONTRACT UNIT PRICE PER LINEAR FOOT SHALL INCLUDE,
THE BASE, ALL CONCRETE, LABOR, REINFORCING STEEL AND ALL OTHER INCIDENTALS
NECESSARY TO COMPLETE THE PERMANENT INSTALLATION.

FOR ILLUSTRATION PURPOSES, THE PAVEMENT DETAIL ABOVE DEPICTS THE INSTALLATION OF A
CONCRETE MEDIAN BARRIER (PRECAST) WITH NEW RIGID PAVEMENT ON ONE SIDE AND NEW FLEXIBLE
PAVEMENT ON THE OPPOSITE SIDE (SEE PLANS FOR APPLICABLE PAVEMENT DESIGN).

1. SHORTER SECTIONS MAY BE PERMITTED IF APPROVED IN WRITING BY THE ENGINEER.
2. 2" DIAM. LIFTING HOLE - 2 REQUIRED EACH SECTION, FORMED WITH 2" P.V.C. PIPE OR EQUAL.
3. SEE ELSEWHERE IN THE PLANS FOR BASE REQUIREMENTS.
4. 9" WIDE TOP WITH 2'-3" WIDE BASE, OR 12" WIDE TOP WITH 2'-6" WIDE BASE OR 14" WIDE TOP
2'-8" WIDE BASE. (TAPER NOT INCLUDED IN BASE WIDTH).
5. OTHER METHODS OF ANCHORAGE WILL BE ACCEPTABLE IF APPROVED IN WRITING BY THE ENGINEER.
6. PAVEMENT THICKNESS MINUS 3".
7. THE RACEWAY SHALL BE TIED TO EACH OF THE "A" AND "B" BARS TO PREVENT SAG.
8. PLACE ALL STEEL REINFORCEMENT A CLEAR DISTANCE OF 2" MIN. FROM OUTSIDE FACE OF WALL, EXCEPT WHERE SHOWN OTHERWISE.
9. SHOP DRAWINGS SHALL BE APPROVED PRIOR TO MANUFACTURE.
10. WHEN THE "X" DIMENSION EQUALS 10" THE BAR SHALL BE TURNED DOWN 6" ("Z" DIMENSION) AND AN ADDITIONAL LONGITUDINAL BAR SHALL
BE ADDED AT THE BOTTOM OF THE TURN DOWN ("Z" DIMENSION) AND TO THE "Y" PORTION OF THE BAR. FOR EACH 6" INCREMENT OF THE
"X" DIMENSION ABOVE 10", AN ADDITIONAL LONGITUDINAL BAR SHALL BE ADDED IN THE "Z" AND "Y" PORTION OF THE BAR.
11. THE "Z" DIMENSION SHALL INCREASE INCH FOR INCH WHEN THE "X" DIMENSION EXCEEDS 10".
12. LIFTING BARS SHALL BE REQUIRED TO PREVENT SPALLING OF CONCRETE AROUND HOLES.
13. WHEN THE PRECAST WALL IS USED IN PERMANENT CONSTRUCTION THE LIFTING HOLES SHALL BE FILLED WITH GROUT.
BID ITEM AND UNIT TO BID:
A. CONCRETE MEDIAN BARRIER TYPE 9 OR 12 OR 14 DEPENDING ON W.  D OR E DEPENDING ON PAVEMENT TYPE.

1. SHORTER SECTIONS MAY BE PERMITTED IF APPROVED IN WRITING BY THE ENGINEER.
2. 2" DIA. LIFTING HOLE - 2 REQUIRED EACH SECTION. FORMED WITH 2" P.V.C. PIPE OR EQUAL.
3. SEE ELSEWHERE IN THE PLANS FOR BASE REQUIREMENTS.
4. 9" WIDE TOP WITH 2'-3" WIDE BASE OR 12" WIDE TOP WITH 2'-6" BASE. 14" WIDE TOP WITH 2'-8" WIDE BASE. (TAPER NOT INCLUDED IN BASE WIDTH).
5. THE RACEWAY SHALL BE TIED TO EACH OF THE A AND B BARS TO PREVENT SAG.
6. PLACE ALL STEEL REINFORCEMENT A CLEAR DISTANCE OF 2" MIN. FROM OUTSIDE FACE OF WALL, EXCEPT WHERE SHOWN OTHERWISE.
7. SHIP DRAWINGS SHALL BE APPROVED PRIOR TO MANUFACTURE.
8. WHEN THE "X" DIMENSION EQUALS 10" THE BAR SHALL BE TURNED DOWN 6" ("Z" DIMENSION) AND AN ADDITIONAL LONGITUDINAL BAR SHALL BE ADDED AT THE BOTTOM OF THE TURN DOWN ("Z" DIMENSION) AND TO THE "Y" PORTION OF THE BAR. FOR EACH 6" INCREMENT OF THE "X" DIMENSION ABOVE 10" AN ADDITIONAL LONGITUDINAL BAR SHALL BE ADDED IN THE "Z" AND "Y" PORTION OF THE BAR.
9. THE "Z" DIMENSION SHALL INCREASE INCH FOR INCH WHEN THE "X" DIMENSION EXCEEDS 10".
10. LIFTING BARS SHALL BE REQUIRED TO PREVENT SPALLING OF CONCRETE AROUND HOLES.
11. WHEN THE PRECAST WALL IS USED IN PERMANENT CONSTRUCTION THE LIFTING HOLES SHALL BE FILLED WITH GROUT.

RIGHT ELEVATION VIEW
APPROX. REINF./30' SECTION
289 LBS.
APPROX. CU. YD. CONC./LIN. FT.
9" WIDE TOP = 0.14
12" WIDE TOP = 0.16
14" WIDE TOP = 0.17
APPROX. WEIGHT/30' SECTION
BASED ON 150 LBS./CU. FT.
9" WIDE TOP = 8.1 TONS
12" WIDE TOP = 9.7 TONS
14" WIDE TOP = 10.6 TONS

STEEL PLACEMENT FOR ASYMMETRICAL WALL SECTION

EXISTING PAVEMENT -

5' 3" RACEWAY -

2'-8"

1'-7"

1'-3"

10"

10" R

1/4 TAPER PERMITTED

USE WITH CUR. STD. DWG. RBM-001

KENTUCKY DEPARTMENT OF HIGHWAYS
CONCRETE MEDIAN BARRIER PRECAST (PERMANENT)

STANDARD DRAWING NO RBM-006-09
DATE
APPROVED
DIRECTOR DIVISION OF DESIGN
APPROVED
SUBMITTED
DATE
STATE HIGHWAY ENGINEER
KENTUCKY DEPARTMENT OF HIGHWAYS

~ NOTES ~

BID ITEM AND UNIT TO BID:
A. CONCRETE MEDIAN BARRIER TYPE 9 OR 12 OR 14 DEPENDING ON W.  D OR E DEPENDING ON PAVEMENT TYPE.

1. SHORTER SECTIONS MAY BE PERMITTED IF APPROVED IN WRITING BY THE ENGINEER.
2. 2" DIA. LIFTING HOLE - 2 REQUIRED EACH SECTION. FORMED WITH 2" P.V.C. PIPE OR EQUAL.
3. SEE ELSEWHERE IN THE PLANS FOR BASE REQUIREMENTS.
4. 9" WIDE TOP WITH 2'-3" WIDE BASE OR 12" WIDE TOP WITH 2'-6" BASE. 14" WIDE TOP WITH 2'-8" WIDE BASE. (TAPER NOT INCLUDED IN BASE WIDTH).
5. THE RACEWAY SHALL BE TIED TO EACH OF THE A AND B BARS TO PREVENT SAG.
6. PLACE ALL STEEL REINFORCEMENT A CLEAR DISTANCE OF 2" MIN. FROM OUTSIDE FACE OF WALL, EXCEPT WHERE SHOWN OTHERWISE.
7. SHIP DRAWINGS SHALL BE APPROVED PRIOR TO MANUFACTURE.
8. WHEN THE "X" DIMENSION EQUALS 10" THE BAR SHALL BE TURNED DOWN 6" ("Z" DIMENSION) AND AN ADDITIONAL LONGITUDINAL BAR SHALL BE ADDED AT THE BOTTOM OF THE TURN DOWN ("Z" DIMENSION) AND TO THE "Y" PORTION OF THE BAR. FOR EACH 6" INCREMENT OF THE "X" DIMENSION ABOVE 10" AN ADDITIONAL LONGITUDINAL BAR SHALL BE ADDED IN THE "Z" AND "Y" PORTION OF THE BAR.
9. THE "Z" DIMENSION SHALL INCREASE INCH FOR INCH WHEN THE "X" DIMENSION EXCEEDS 10".
10. LIFTING BARS SHALL BE REQUIRED TO PREVENT SPALLING OF CONCRETE AROUND HOLES.
11. WHEN THE PRECAST WALL IS USED IN PERMANENT CONSTRUCTION THE LIFTING HOLES SHALL BE FILLED WITH GROUT.
**NOTES**

Transition condition No. 1, 2 and 3 along with symmetrical and asymmetrical barrier sections are depicted on this drawing for illustration purposes only at structures and fixed objects. (See plans for additional details)

All pavement, fill material, pipe drainage (exclusive of weep hole pipe) placed between segments of the barrier shall be shown separately or included with other like pay items on the project.

For application details to new or existing pavement see drawing entitled "Concrete Median Barrier, Fixed Form or Slip Form (Permanent)."

The method of measurement for concrete median barrier for each type will be in linear feet measured along the top centerline of the barrier.

The separate or solid barrier shall be shown in the Bid Item as follows: "Concrete Median Barrier" ⊕ ⊗ ⊕

⊕ A, B, C, D or E depending on "W"

⊗ 1 = Solid segment—denotes barrier wall with:
   - Transition from "W" width to max. width of 4'.
   - Constant width wall greater than "W" but not greater than 4' wide. (Ex.: wall between bridge piers).

⊗ 2 = Separate segment

⊗ 3 = See elsewhere in plans for size, location and payment for raceway when required.

⊗ 4 = Pipe for weep holes spaced on 20' centers and staggered 10' with each wall.

---

**SECTION A-A**

**ASYMMETRICAL WALL SECTION**

**VARIABLE WIDTH**

**VARIABLE WIDTH**

**VARIABLE WIDTH**

---

**SECTION B-B**

**NORMAL SECTION**

**SECTION C-C**

**SECTION D-D**

**SECTION E-E**

**SECTION F-F**

---

**KENTUCKY DEPARTMENT OF HIGHWAYS**

**CONCRETE MEDIAN BARRIER**

**SYMMETRICAL & ASYMMETRICAL**

**SEPARATE & TRANSITION**

**DETAILS**

**STANDARD DRAWING NO. RBM-015-05**

**DATE 12-2-02**

**APPROVED**

**DIRECTOR DIVISION OF DESIGN**

**STATE HIGHWAY ENGINEER**
NOTES

1. Delineators shall be measured and paid for at the contract unit price each, and shall include all materials and labor necessary for one complete installation.

2. Code | Pay Item | Pay Unit
1984 | Delineator for Barrier-White | Each
1985 | Delineator for Barrier-Yellow | Each

3. The delineators shall be yellow in color when the barrier is placed in the median and/or on the left side of the driving lane. The delineators shall be white in color when the barrier is placed on the right side of the driving lane.

4. Types of delineators permitted shall be from the approved materials list. The delineator's shapes shown are for illustration purposes.

5. The delineator unit shall have the reflective surface installed facing traffic.

6. Clean the area to receive the reflector with a steel wire brush to remove all loose concrete and/or dirt.

7. Delineators shall be attached to concrete median barrier with an epoxy adhesive or other approved materials.

8. The delineator type A shall not be placed on top of barrier wall.

9. These delineators may be "type A" or "type B model one".

<table>
<thead>
<tr>
<th>Delineator Spacings on Horizontal Curves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of Curve</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>( \leq 2^\circ )</td>
</tr>
<tr>
<td>( &gt; 2^\circ \leq 4^\circ )</td>
</tr>
<tr>
<td>( &gt; 4^\circ )</td>
</tr>
<tr>
<td>Spacing on tangents = 100' intervals</td>
</tr>
</tbody>
</table>

Normal (solid) wall section
Asymmetrical (solid) wall section
(Separate segment) wall section

Variable width

Rev 0 12-1-99

KENTUCKY DEPARTMENT OF HIGHWAYS

Delineators for concrete barriers

RBM-020-08

12-1-99
NOTES

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

MODULAR GLARE SCREEN △ - ○ SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE BID PER LINEAR FOOT AND SHALL INCLUDE ALL LABOR, MATERIALS AND OTHER INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION.

△ 18", 24", OR 30"
○ (W) = WHITE OR (G) = GREEN

CONSTRUCTION METHODS

INSTALLATION SHALL BE COMPLETED IN ACCORDANCE WITH THE MANUFACTURES RECOMMENDATIONS (A COPY OF WHICH SHALL BE FURNISHED TO THE ENGINEER).

MODULAR UNITS ARE FURNISHED IN LENGTHS OF 10' (8 BLADES) OR 12' (10 BLADES). THE DISTANCE BETWEEN EACH UNIT SHALL BE 1" WHEN INSTALLED.

1) 3" X 6" STRIP OF REFLECTIVE MATERIAL CENTERED VERTICAL AND OFFSET HORIZONTAL TOWARD THE DRIVING LANE EDGE. PLACE ONE 3" X 6" STRIP EVERY 10'-0" ON CENTER.

MODULAR UNITS ARE PAID FOR AT THE CONTRACT UNIT PRICE BID PER LINEAR FOOT AND SHALL INCLUDE ALL LABOR, MATERIALS AND OTHER INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION.

CONSTRUCTION METHODS

INSTALLATION SHALL BE COMPLETED IN ACCORDANCE WITH THE MANUFACTURES RECOMMENDATIONS (A COPY OF WHICH SHALL BE FURNISHED TO THE ENGINEER).

MODULAR UNITS ARE FURNISHED IN LENGTHS OF 10' (8 BLADES) OR 12' (10 BLADES). THE DISTANCE BETWEEN EACH UNIT SHALL BE 1" WHEN INSTALLED.

1) 3" X 6" STRIP OF REFLECTIVE MATERIAL CENTERED VERTICAL AND OFFSET HORIZONTAL TOWARD THE DRIVING LANE EDGE. PLACE ONE 3" X 6" STRIP EVERY 10'-0" ON CENTER.

SECTION A-A

PICTORIAL VIEW

SEE DETAIL "A"
SEE DETAIL "B"
NOTES

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

MODULAR GLARE SCREEN ∆ - ○ SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE BID PER LINEAR FOOT AND SHALL INCLUDE ALL LABOR, MATERIALS AND OTHER INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION.

∆ 24", 36", OR 48" (HEIGHT)
○ (G) = GREEN

CONSTRUCTION METHODS

INSTALLATION SHALL BE COMPLETED IN ACCORDANCE WITH THE MANUFACTURES RECOMMENDATIONS (A COPY OF WHICH SHALL BE FURNISHED TO THE ENGINEER).

1. 3" WIDE STRIP OF REFLECTIVE MATERIAL AROUND BLADE EVERY 10'-0" ON CENTER.

2. MODULAR UNITS ARE FURNISHED IN LENGTHS OF 9'-8". THE DISTANCE BETWEEN EACH UNIT SHALL BE 4" WHEN INSTALLED.
**KENTUCKY DEPARTMENT OF HIGHWAYS**

**CONCRETE MEDIAN BARRIER**

**TYPE A BARRIER**

NEW RIGID PAVEMENT

- TOP OF PAVEMENT 10' + 10'' R
- PERMITTED 3'' EXPANSION JOINT DETAIL

**TYPE B BARRIER**

NEW RIGID PAVEMENT

- TOP OF PAVEMENT 10' + 10'' R
- PERMITTED 3'' EXPANSION JOINT DETAIL

**TYPE C BARRIER**

NEW FLEXIBLE PAVEMENT

- TOP OF PAVEMENT 10' + 10'' R
- PERMITTED 3'' EXPANSION JOINT DETAIL

**NOTES**

- THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR "CONCRETE MEDIAN BARRIER TYPE 50" SHALL BE FULL COMPENSATION FOR ALL MATERIALS, EQUIPMENT, LABOR AND INCIDENTALS NECESSARY TO COMPLETE THE WORK.

**12 OR 14 DEPENDING ON W.**

- A, B OR C DEPENDING ON PAVEMENT TYPE.

1. LONGITUDINAL CONSTRUCTION JOINT WITHOUT TIE BARS IS REQUIRED AND SHALL BE PLACED AT THE LOCATION SHOWN OR MAY BE INSTALLED AT THE CORRESPONDING POINT ON THE OPPOSITE SIDE OF THE BARRIER, AT THE OPTION OF THE CONTRACTOR. IT SHALL BE REQUIRED ON THE LOW SIDE OF A SUPERELEVATED SECTION.

2. NO. 8 DOWEL BARS SPACED 4'-0" O.C. AND STAGGERED 2'-0".

3. WALL TRANSITION (ELEVATION VIEW) SEE ELSEWHERE IN THE PLANS FOR LOCATION AND PAYMENT FOR RACEWAY WHEN REQUIRED.

4. WALL MAY BE FORMED AS DEPICTED BY PHANTOM LINES.

5. WHEN A CONSTRUCTION JOINT IS USED, DOWEL BARS WILL BE REQUIRED AS SHOWN WITH TYPE B BARRIERS.

6. CONSTRUCTION JOINT PERMITTED WHEN FIXED FORMS OR SLIP FORMS ARE USED.

7. A 14" WALL IS REQUIRED ONLY WHEN THE ROADWAY WILL BE LIGHTED FROM THE MEDIAN.

8. THE WALL TRANSITION DETAILED IS FOR A FIXED-FORM OR SLIP-FORM WALL. SEE CURRENT STANDARD DRAWING RBM-053 FOR CONNECTION DETAILS, STEEL PLACEMENT, AND STEEL QUANTITIES ShOWN INCLUDE 8" BASE THICKNESS FOR TYPE A AND TYPE C.

**APPROX. QUANTITIES PER LINEAR FOOT**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>12&quot; WALL</th>
<th>14&quot; WALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.27</td>
<td>0.30</td>
</tr>
<tr>
<td>B</td>
<td>0.21</td>
<td>0.23</td>
</tr>
<tr>
<td>C</td>
<td>0.27</td>
<td>0.30</td>
</tr>
</tbody>
</table>

△ WHEN REQUIRED

CONCRETE QUANTITIES SHOWN INCLUDE 8" BASE THICKNESS FOR TYPE A AND TYPE C.

**USE WITH CUR. STD. DWG. RBM-053**

**KENTUCKY DEPARTMENT OF HIGHWAYS**

**CONCRETE MEDIAN BARRIER FIXED-FORM OR SLIP-FORM (PERMANENT) (50' TALL WALL)**

**STANDARD DRAWING NO. RBM-050**

**DATE** 12-2-02

**STATE HIGHWAY ENGINEER**

**DIRECTOR DIVISION OF DESIGN**

**SUBMITTED**

**APPROVED**

**50" TALL WALL**

**RBM-053**

**CURRENT STANDARD DRAWING FOR CONNECTION DETAILS, STEEL PLACEMENT, AND STEEL QUANTITIES SHOWN INCLUDE 8" BASE THICKNESS FOR TYPE A AND TYPE C.**
NOTE

BID ITEM AND UNIT TO BID:

A. CONCRETE MEDIAN BARRIER TYPE
   - A or C depending on pavement type. See current standard drawing for pavement type.
   - 12 or 14 depending on w.

B. With flexible pavement the contract unit price per linear foot shall include the base, all concrete, labor, reinforcing steel and all other incidentals necessary to complete the permanent installation.

C. With rigid pavement the contract unit price per linear foot shall include the base, all concrete, labor, reinforcing steel and all other incidentals necessary to complete the permanent installation.

1. 2" dia. Lifting hole - 2 required each section. Formed with 2" P.V.C. pipe or equal.

2. The raceway shall be tied to each of the A and B bars to prevent sag.

3. 12" W with 2'-6" wide base or 14" W with 2'-8" base (taper not included in base width).

4. Place all steel reinforcement a clear distance of 2" min. from outside face of wall, except where shown otherwise.

5. Shop drawings shall be approved prior to manufacture.

6. When the "X" dimension equals 10" the bar shall be turned down 6" ("Z" dimension) and an additional longitudinal bar shall be added at the bottom of the turn down ("Z" dimension) and to the "Y" portion of the bar. For each 6" increment of the "X" dimension above 10" an additional longitudinal bar shall be added in the "Z" and "Y" portion of the bar.

7. The "Z" dimension shall increase inch for inch when the "X" dimension exceeds 10".

8. Lifting bars shall be required to prevent spalling of concrete around holes.

9. The lifting holes shall be filled with grout when complete.

10. Wall may be formed as depicted by phantom lines.

11. Pavement thickness minus 3".

12. See elsewhere in plans for location and payment for raceway when required.

13. See current standard drawing RBM-050 for wall transition when applicable.

NOTE

CONCRETE MEDIAN BARRIER TYPE
   - A or C depending on pavement type. See current standard drawing for pavement type.
   - 12 or 14 depending on w.

B. With flexible pavement the contract unit price per linear foot shall include the base, all concrete, labor, reinforcing steel and all other incidentals necessary to complete the permanent installation.

C. With rigid pavement the contract unit price per linear foot shall include the base, all concrete, labor, reinforcing steel and all other incidentals necessary to complete the permanent installation.

1. 2" dia. Lifting hole - 2 required each section. Formed with 2" P.V.C. pipe or equal.

2. The raceway shall be tied to each of the A and B bars to prevent sag.

3. 12" W with 2'-6" wide base or 14" W with 2'-8" base (taper not included in base width).

4. Place all steel reinforcement a clear distance of 2" min. from outside face of wall, except where shown otherwise.

5. Shop drawings shall be approved prior to manufacture.

6. When the "X" dimension equals 10" the bar shall be turned down 6" ("Z" dimension) and an additional longitudinal bar shall be added at the bottom of the turn down ("Z" dimension) and to the "Y" portion of the bar. For each 6" increment of the "X" dimension above 10" an additional longitudinal bar shall be added in the "Z" and "Y" portion of the bar.

7. The "Z" dimension shall increase inch for inch when the "X" dimension exceeds 10".

8. Lifting bars shall be required to prevent spalling of concrete around holes.

9. The lifting holes shall be filled with grout when complete.

10. Wall may be formed as depicted by phantom lines.

11. Pavement thickness minus 3".

12. See elsewhere in plans for location and payment for raceway when required.

13. See current standard drawing RBM-050 for wall transition when applicable.
NOTES

TRANSITION CONDITION NO. 1, 2 AND 3 ALONG WITH SYMMETRICAL AND ASYMMETRICAL BARRIER SECTIONS ARE DEPICTED ON THIS DRAWING FOR ILLUSTRATION PURPOSES ONLY AT STRUCTURES AND FIXED OBJECTS. (SEE PLANS FOR ADDITIONAL DETAILS)

ALL PAVEMENT, FILL MATERIAL, PIPE DRAINAGE (EXCLUSIVE OF WEEP HOLE PIPE) PLACED BETWEEN SEGMENTS OF THE BARRIER SHALL BE SHOWN SEPARATELY OR INCLUDED WITH OTHER LIKE PAY ITEMS ON THE PROJECT.

FOR APPLICATION DETAILS SEE DRAWING ENTITLED "CONCRETE MEDIAN BARRIER, FIXED FORM OR SLIP FORM (PERMANENT) (50" TALL WALL)".

THE METHOD OF MEASUREMENT FOR CONCRETE MEDIAN BARRIER FOR EACH TYPE WILL BE IN LINEAR FEET MEASURED ALONG THE TOP CENTERLINE OF THE BARRIER.

THE SEPARATE OR SOLID BARRIER SHALL BE SHOWN IN THE BID ITEM AS FOLLOWS: "CONCRETE MEDIAN BARRIER TYPE ☐ ☐ ☐ (50"

☐ A, B OR C DEPENDING ON "W"

☐ 12, OR 14 DEPENDING ON "W"

☐ 1= SOLID SEGMENT- DENOTES BARRIER WALL WITH

a. TRANSITION FROM “W” WIDTH TO MAX. WIDTH OF 4’,
b. CONSTANT WIDTH WALL GREATER THAN “W” WIDE BUT NOT GREATER THAN 4’ WIDE. (EX.: WALL BETWEEN BRDG. PIERS).

2 = SEPARATE SEGMENT

3 SEE ELSEWHERE IN PLANS FOR SIZE, LOCATION AND PAYMENT FOR RACEWAY WHEN REQUIRED.

4 4” PIPE FOR WEEP HOLES SPACED ON 20’ CENTERS AND STAGGERED 10’ WITH EACH WALL.

5 VARIABLE WIDTH

SECTION A-A  SECTION B-B  NORMAL SECTION C-C  SECTION D-D  SECTION E-E  SECTION F-F

ASYMMETRICAL WALL SECTION

KENTUCKY DEPARTMENT OF HIGHWAYS
CONCRETE MEDIAN BARRIER SYMMETRICAL & ASYMMETRICAL SEPARATE & TRANSITION DETAILS (50'' TALL WALL)

STANDARD DRAWING NO. RBM-060

DATE
12-2-02

APPROVED

SUBMITTED

DIRECTOR DIVISION OF DESIGN
STATE HIGHWAY ENGINEER
PLANNED DRAWING NO. RBM-115-08 - PLAN OF CONNECTION DETAIL

- 1/3 D
- 1/3 D
- TOP CONNECTOR: 2 1/2"
- BOTTOM CONNECTOR: 3" (TYP)
- CONNECTOR PIN: 5/16" THD.
- LENGTH (MIN.)
- ELEVATION OF CONNECTION DETAIL

~ NOTES ~

BID ITEM AND UNIT TO BID:
CONC. BARRIER WALL TYPE 9T - LIN. FT.

1. 2" DIA. LIFTING HOLE - 2 REQUIRED EACH SECTION.
   FORMED WITH 2" P.V.C. PIPE OR EQUAL.
2. TAPER NOT INCLUDED IN BASE WIDTH.
3. SHOP DRAWINGS SHALL BE APPROVED PRIOR TO MANUFACTURE.
4. BASED ON 150 LBS./CU. FT.
5. PLACE ALL STEEL REINFORCEMENT A CLEAR DISTANCE OF 2" MIN.
   FROM OUTSIDE FACE OF WALL, EXCEPT WHERE SHOWN OTHERWISE.
6. LIFTING BARS SHALL BE REQUIRED TO PREVENT SPALLING OF CONCRETE AROUND HOLES.
7. PREVIOUS WALL MANUFACTURED ACCORDING TO STANDARD DRAWING RBM-115-07 MAY STILL BE USED.
   ANY NEW BARRIER WALL TYPE 9T MANUFACTURED SHALL COMPLY TO THIS SEPIA DRAWING.

APPROXIMATE QUANTITIES

<table>
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<tr>
<th>REINF.</th>
<th>CONC.</th>
<th>WEIGHT</th>
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<tbody>
<tr>
<td>LBS.</td>
<td>CU. YD./FT.</td>
<td>TONS</td>
</tr>
<tr>
<td>195</td>
<td>0.12</td>
<td>5.0</td>
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FOR TEMPORARY USE ONLY

KENTUCKY DEPARTMENT OF HIGHWAYS

CONCRETE BARRIER WALL TYPE 9T (TEMPORARY)

STATE HIGHWAY ENGINEER
DATE SUBMITTED
DATE APPROVED
DIRECTOR DIVISION OF DESIGN

PREVIOUS WALL MANUFACTURED ACCORDING TO STANDARD DRAWING RBM-115-07 MAY STILL BE USED.

ANY NEW BARRIER WALL TYPE 9T MANUFACTURED SHALL COMPLY TO THIS SEPIA DRAWING.
THE CONTRACT UNIT PRICE EACH FOR THE CURB TO BARRIER WALL TRANSITION SHALL INCLUDE CONCRETE, FORMS, STEEL REINFORCEMENT, EXPANSION JOINT MATERIAL, AND ALL INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION.

FOR ILLUSTRATION PURPOSES THE DETAILS DEPICT THE CURB TO BARRIER WALL TRANSITION CONNECTING TO A STANDARD CURB, HOWEVER THE CURB TO BARRIER WALL TRANSITION MAY BE CONSTRUCTED TO MATCH ANY ADJOINING CURB.

THE AMOUNT OF CLASS "A" CONCRETE REQUIRED FOR A TRANSITION SECTION WITH A 10½" WIDE TOP IS APPROXIMATELY 2.61 CU. YDS.

WHEN THE CURB TO BARRIER WALL TRANSITION ABUTS RIGID PAVEMENT A LONGITUDINAL SAWED CONSTRUCTION JOINT SHALL BE INSTALLED IN ACCORDANCE WITH CURRENT STD. DWG. RPS-010.

1. SEE STRUCTURE PLANS FOR JOINT DETAIL.
2. SEE STRUCTURE PLANS FOR DIMENSIONS.
3. CURB TO BARRIER WALL TRANSITION MAY BE USED ON APPLICABLE STRUCTURES, WHEN THE OPERATING SPEED IS 45 MPH OR LESS.

<table>
<thead>
<tr>
<th>BAR</th>
<th>QTY.</th>
<th>SIZE</th>
<th>LENGTH</th>
<th>TOTAL LBS. OF STEEL</th>
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<tr>
<td>A</td>
<td>2</td>
<td>5</td>
<td>2'-2&quot;</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>5</td>
<td>6'-6&quot;</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>5</td>
<td>2'-9&quot;</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>9</td>
<td>8</td>
<td>1'-0&quot;</td>
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BILL OF REINFORCEMENT
NOTES

THE CONTRACT UNIT PRICE BID SHALL BE:
GUARDRAIL-STEEL W BEAM-SINGLE FACE - LIN. FT.
GUARDRAIL-STEEL W BEAM-DOUBLE FACE - LIN. FT.

DIMENSIONAL TOLERANCES NOT SHOWN OR IMPLIED ARE
INTENDED TO BE THOSE CONSISTENT WITH THE PROPER
FUNCTIONING OF THE PART, INCLUDING ITS APPEARANCE
AND ACCEPTED MANUFACTURING PRACTICES.

THE RAIL ELEMENT SHALL COMPLY WITH AASHTO M-180
-CLASS A, TYPE II.

ALL LAPS SHALL BE PLACED IN THE DIRECTION OF TRAFFIC
FLOW.

1. TOLERANCE +1/4", -1/4"
2. B - 5/16" x 1/4" LONG BUTTON HEAD BOLTS AND HEX HEAD
   RECESS NUTS REQUIRED FOR EACH RAIL SPLICE.
3. LENGTH EQUALS POST AND BLOCK WIDTH PLUS: 2" FOR BOLT OR 2 1/4" FOR THREADED ROD.
4. GALVANIZED STEEL 10D COMMON COATED NAIL (DRIVE
   NAIL AT THE TOP OR BOTTOM CENTER OF BLOCK AND
   POST AFTER BOLT IS INSTALLED).
5. 5/8" x 3 STEEL THREADED ROD AND TWO (2) HEX
   HEAD NUTS OR 5/8" x 3 BUTTON OR HEX HEAD BOLT
   AND HEX HEAD NUT.
6. 5/8" x 8" BUTTON HEAD BOLT, HEX HEAD RECESS NUT
   AND ONE 3/8" ROUND WASHER (TYP.). BOLT SHALL HAVE
   A MINIMUM THREAD LENGTH OF 2".

BEELD REQUIRED FOR DOUBLE RAIL.

SECTION B-B
USE WITH CUR. STD. DWG. RBR-005

KENTUCKY
DEPARTMENT OF HIGHWAYS

STEEL BEAM
GUARDRAIL
("W" BEAM )

SECTION A-A
DOUBLE FACE RAIL WITH
STEEL POST ( W6x9 )
(TIMBER OFFSET BLOCK )

SECTION A-A
DOUBLE FACE RAIL WITH
ROUND TIMBER POST

SECTION A-A
DOUBLE FACE RAIL WITH
TIMBER POST

ELEVATION VIEW

PLAN VIEW
(DOUBLE FACE RAIL OR SINGLE FACE RAIL)

SECTION C-C
(RAIL CORRUGATED SHEET STEEL BEAM)
**RAIL ANCHOR ASSEMBLY**

1. **RAIL BOLT SIMILAR EXCEPT LENGTH.**
2. **CABLE ASSEMBLY TYPE 3 - GUARDRAIL END TREATMENT TYPE 2A**
3. **THE THRIE BEAM TO "W" BEAM CONNECTOR SHALL COMPLY WITH AASHTO M-180 CLASS A, TYPE 2 EXCEPT WHERE IN CONFLICT WITH THIS DETAIL.**

**CABLE ASSEMBLY TYPE 3**

- **RAIL BOLT SIMILAR EXCEPT LENGTH.**
- **5/8" BUTTON HEAD BOLT AND RECESSED NUT**
- **ROUND WASHER AND RECTANGULAR PLATE WASHER**

**SEE CUR. STD. DWG. RBR-100 FOR DIMENSIONS**

**SEE CUR. STD. DWG. RBR-001 FOR DIMENSIONS**

**THRIE BEAM TO "W" BEAM CONNECTOR 3**

**RAIL ANCHOR ASSEMBLY**

**NOTES**

1. **RAIL BOLT SIMILAR EXCEPT LENGTH.**
2. **CABLE ASSEMBLY TYPE 3 - GUARDRAIL END TREATMENT TYPE 2A**
3. **THE THRIE BEAM TO "W" BEAM CONNECTOR SHALL COMPLY WITH AASHTO M-180 CLASS A, TYPE 2 EXCEPT WHERE IN CONFLICT WITH THIS DETAIL.**
NOTES

TERMINAL SECTIONS SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE BID EACH COMPLETE AND INSTALLED, EXCEPT WHEN INCIDENTAL TO OTHER BID ITEMS.

TERMINAL SECTIONS SHALL COMPLY WITH AASHTO M-180 AS FOLLOWS:

a. TERMINAL SECTIONS NO. 1, 3 - CLASS A OR B, TYPE 2
b. TERMINAL SECTION NO. 2 - CLASS B, TYPE 2

1. WHEN SLOTTED HOLES ARE EXPOSED (8) EIGHT RECTANGULAR FLAT WASHERS SHALL BE REQUIRED - 2" SPLICE BOLTS ARE TO BE USED IF NEEDED.
OFFSET BLOCK TYPE 4
(TIMBER)
(FOR USE WITH STEEL POST ONLY)

4 HOLES 1" DIA.

1/4" (TYP)  1" (TYP)  1 3/8" (TYP)  8"

HEX NUT  FLAT WASHER  ANCHOR PLATE

PLAN VIEW

SIDE VIEW

ANCHOR PLATE

REAR ELEVATION

SIDE VIEW

PLAN VIEW

FRONT VIEW

SECTION A-A

SIDE VIEW

~ W6 X 9.0 STEEL POST ① ~

~ NOTES ~

① W6 x 8.5 IS AN ACCEPTABLE ALTERNATE.
GUARDRAIL POSTS

RBR-016-04

GUARDRAIL POSTS

PLAN VIEW

6"x8" TIMBER POST

FRONT ELEVATION

6'0"

¾" DIA.
2 HOLES

7"

1'-2"

¾" DIA.
2 HOLES

THIS HOLE PERMITTED
(INTENDED FOR RUB RAIL
WHICH IS NOT USED.)

USE WITH CUR. STD. DWG. RBR-015.

7" ROUND TIMBER POST
(SINGLE FACE RAIL)

8" ROUND TIMBER POST
(DOUBLE FACE RAIL)

FRONT ELEVATION

OFFSET BLOCK TYPE 3
(6" X 8" TIMBER)

( FOR USE WITH RECTANGULAR
AND ROUND POSTS)
GUARDRAIL END TREATMENT TYPE 1 SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE EACH, AND INCLUDES POSTS, RAIL ELEMENTS, GUARDRAIL EXTRUDER AND ALL OTHER INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION AS DETAILED.

1. GUARDRAIL END TREATMENT TYPE 1 SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE EACH, AND INCLUDES POSTS, RAIL ELEMENTS, GUARDRAIL EXTRUDER AND ALL OTHER INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION AS DETAILED.

2. PERMISSIBLE ALTERNATES FOR GUARDRAIL END TREATMENT TYPE 1 ARE PATENTED ITEMS: ET PLUS MANUFACTURED BY TRINITY INDUSTRIES OF GIRARD, OHIO OR SKT-350 MANUFACTURED BY ROAD SYSTEMS INC. OF BIG SPRINGS, TEXAS.

3. THE MANUFACTURER SHALL FURNISH TWO (2) SETS OF SHOP PLANS TO THE CONTRACTOR WITH EACH INSTALLATION.

4. THE COMPLETED INSTALLATION SHALL MEET ALL APPLICABLE REQUIREMENTS OF THE MANUFACTURER (SEE SHOP DRAWINGS).

5. POSTS P1 THROUGH P9 ARE SPACED 6'3" ON CENTER.

6. INTENDED USE: AREAS WITH ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL.

7. OBJECT MARKER TYPE 3 (SEE CURRENT MUTCD MANUAL FOR DETAILS)
NOTES

1. GUARDRAIL END TREATMENT TYPE 2A SHALL BE TO THE PAY LIMITS AS DETAILED AND THE CONTRACT UNIT PRICE BID EACH SHALL INCLUDE TERMINAL SECTION NO. 1, CLASS A CONCRETE, RAIL ANCHOR ASSEMBLY, CABLE ASSEMBLY TYPE 3, ANCHOR ROD AND POST ASSEMBLY, AND ALL The INCIDENTALS NECESSARY FOR A COMPLETE INSTALLATION AS DETAILED.

2. IN THE EVENT SOLID ROCK IS ENCOUNTERED IN THE ANCHOR, THE POST (SEE DETAIL "A") MAY BE SHORTENED, PROVIDED IT EXTENDS INTO THE SOLID ROCK A MINIMUM OF 3 FEET.

3. FORM THE TOP 4" OF THE CONCRETE ANCHOR AND CROWN 1/2" TO DRAIN. A CONSTRUCTION JOINT WILL NOT BE PERMITTED IN THE ANCHOR.

KENTUCKY DEPARTMENT OF HIGHWAYS

GUARDRAIL END TREATMENT TYPE 2A

DETAIL "A"

1 1/8" DRILL

PL. 3"x1/4"x10"

W6x9.0x4'-6"

-1 1/4" x 3'-3" GALV. ROD WITH FULL PENETRATION WELD OR DROP FORGED EYE FOR 3/4" WIRE ROPE

PL. 3"x1/2"x10"

1 1/8" DRILL

- W6x9.0x4'-6"

- 1/4" x 3'-3" GALV. ROD WITH FULL PENETRATION WELD OR DROP FORGED EYE FOR 3/4" WIRE ROPE

ANCHOR ROD AND POST ASSEMBLY

ELEVATION VIEW

TERMINAL SECTION NO. 1

PAY LIMIT

1'-0"

5'-0"

3'

1'-3"

6'-3"

1'-0"

1/4"

57°

W6x9.0x4'-6"

PL. 3"x1/4"x10"

1/4"

1/8" DRILL

-1 1/4" x 3'-3" GALV. ROD

-CABLE ASSEMBLY TYPE 3

ANCHOR ROD AND POST ASSEMBLY

PLAN VIEW

TRAFFIC

USE WITH CURRENT STANDARD DRAWINGS: RBR-005, RBR-010, RBI-001, RBI-002, RBI-003

KENTUCKY DEPARTMENT OF HIGHWAYS

GUARDRAIL END TREATMENT TYPE 2A

STANDARD DRAWING NO. RBR-025-03

DRAWINGS: , , , ,

DATE: 12-1-99
1. The contract unit price for guardrail end treatment type 3 shall include the concrete block, terminal section no. 2, four bolt insert assembly and all incidentals necessary to complete the work.

2. Bid items and unit to bid:
   A. Guardrail end treatment type 3 - each
   B. Roadway or borrow excavation, or embankment in place - cu. yd.
   C. Drainage structure bid separately.

3. Offset blocks may be eliminated on any post that is completely below grade.

4. See cur. std. dwg. RBC-100 for 4-bolt insert assembly details.
PLAN VIEW

CHANNEL LINING CLASS II
END ANCHOR
FILL

- 6" X 8" CRT WOOD POSTS W/ 2 OFFSET BLOCKS

CUT

3 OMITTED OR POSTS MAX. 37'-6''
100' - TWO PLY NESTED GUARDRAIL
37'-6''
37'-6''

10:1

35'-0''

EDGE OF DRIVING LANE
SHOULDER BREAK

WOOD POST
- 2 - TYPE 3 OFFSET BLOCKS

6'' X 8'' CRT WOOD POST W/ 2 OFFSET BLOCKS
6'' X 8'' CRT WOOD POST

SECTION A-A

NOTES

1. SEE CURRENT STANDARD DRAWING RDB-150 AND RDB-160 FOR METAL END SECTIONS.
2. A MINIMUM DISTANCE OF 5'-0'' BEHIND THE RAIL SHALL BE CLEAR OF ANY FIXED OBJECT HAZARDS.
3. 1- ½" DIA. BOLT WITH TWO ROUND WASHERS.
4. BID ITEMS AND UNIT TO BID:
   A. CHANNEL LINING CLASS II - TON
   B. END ANCHOR - CU. YD.
   C. PIPE - L.F.
   SEE CURRENT STANDARD DRAWING RBR-030 FOR OTHER BID ITEMS.
1. BID ITEMS AND UNIT TO BID:
   A. GUARDRAIL END TREATMENT TYPE 4A - EACH
   B. MATERIAL USED TO CONSTRUCT WIDENING SHALL BE
      BID AS ROADWAY OR BORROW EXCAVATION OR
      EMBANKMENT-IN-PLACE AT THE CONTRACT UNIT PRICE
      PER CUBIC YARD.

2. INTENDED USE: AREAS WITH ADEQUATE VEHICLE RECOVERY ZONE BEHIND GUARDRAIL.

3. POST P7 SHALL BE A CRT BREAKAWAY WOOD POST.

4. GUARDRAIL END TREATMENT TYPE 4A IS A PATENTED (ONE SOURCE) PRODUCT MANUFACTURED
   BY TRINITY INDUSTRIES, INC. OF DALLAS, TX. OR ROAD SYSTEMS, INC. OF BIG SPRING, TX.

5. THE MANUFACTURER SHALL FURNISH TWO (2) SETS OF SHOP PLANS TO THE CONTRACTOR WITH
   EACH INSTALLATION.

6. SYSTEM OFFSET OF 4'-0" SHALL BE MEASURED FROM FACE OF OFFSET BLOCK AT
   NORMAL GUARDRAIL SECTION TO FACE OF POST AT P1

7. OBJECT MARKER TYPE 3 (SEE CURRENT MUTCD MANUAL FOR DETAILS).
NORMAL GUARDRAIL CONSTRUCTION

PAY LIMITS FOR GUARDRAIL END TREATMENT TYPE 7

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

GUARDRAIL END TREATMENT TYPE 7 SHALL BE TO THE PAY LIMITS AS DETAILED AND THE CONTRACT UNIT PRICE EACH SHALL INCLUDE TERMINAL SECTION NO. 2, STEEL "W" BEAM GUARDRAIL (SINGLE FACE), GUARDRAIL POSTS MI, CONCRETE ANCHOR BLOCK, EXCAVATION, LABOR, HARDWARE AND INCIDENTALS NECESSARY FOR THE INSTALLATION.

CONSTRUCTION REQUIREMENTS

SPlice BOLTS AT TERMINAL SECTION NO. 2 SHALL BE LOOSELY TIGHTENED AND CENTERED TO ALLOW MAXIMUM MOVEMENT DUE TO EXPANSION. ONE (1) ⁹⁄₈" ROUND WASHER AND ONE (1) RECTANGULAR PLATE WASHER REQUIRED FOR EACH SPLICE BOLT, AT TERMINAL SECTION NO. 2.

1. THE CONCRETE ANCHOR BLOCK MAY BE PRECAST OR CAST-IN-PLACE. WHEN THE CONCRETE ANCHOR BLOCK IS CAST-IN-PLACE FORMING OF THE SIDES SHALL BE REQUIRED.

2. ON ALL NEW ROADWAYS THE OFFSET DISTANCE SHALL BE 4'-0". ON ALL EXISTING ROADWAYS THE OFFSET DISTANCE MAY VARY FROM ZERO FEET MINIMUM TO A DESIRABLE 4'-0" MAXIMUM.

MATERIAL REQUIREMENTS

SEE CURRENT STD. DWG. RBR-001, RBR-005, RBR-010, AND RBR-015 FOR APPLICABLE DETAILS AND SPECIFICATIONS.

APPROX. QUANTITY FOR ANCHOR BLOCK: 0.83 CU. YD. CLASS "A" CONCRETE FOR TYPE 7 INSTALLATION.

3. THIS GUARDRAIL END TREATMENT SHALL ONLY BE USED ON LOW SPEED (45 MPH OR LESS) AND LOW VOLUME (LESS THAN 6,000 ADT) RURAL ROADS WITHOUT ADEQUATE ROOM FOR OTHER APPROVED END TREATMENTS.
STEEL BEAM GUARDRAIL
(THRIE BEAM)

OFFSET BLOCK
- POST

PLAN VIEW

6'-3'' (TYP)
POST SPACING

POST BOLT SLOTS
\( \frac{3}{4}'' \times 2\frac{1}{2}'' \times 6'-3'' \) O.C.

SPLICE BOLT SLOTS
\( \frac{3}{8}'' \times 1\frac{1}{8}'' \)

ELEVATION VIEW

POST BOLT SLOTS
\( \frac{3}{4}'' \times 2\frac{1}{2}'' \times 6'-3'' \) O.C.

SLOTS
\( \frac{3}{4}'' \times 2\frac{1}{2}'' \)

NOTES

BID ITEM AND UNIT TO BID-
STEEL THRIE BEAM GUARDRAIL (SINGLE FACE) - LIN. FT.
STEEL THRIE BEAM GUARDRAIL (DOUBLE FACE) - LIN. FT.

DIMENSIONAL TOLERANCES NOT SHOWN OR IMPLIED ARE INTENDED TO BE THOSE
CONSISTENT WITH THE PROPER FUNCTIONING OF THE PART, INCLUDING ITS
APPEARANCE AND ACCEPTED MANUFACTURING PRACTICES.

THE SAME TYPE OF RAIL ELEMENT, POST, FASTENINGS AND ACCESSORIES SHALL
BE USED THROUGHOUT THE WORK.

CONNECT OFFSET BLOCK TO STEEL POST WITH TWO DIAGONALLY LOCATED BLOTS.

1. 2\( \frac{3}{8}'' \times 1\frac{1}{4}'' \) BUTTON HEAD BOLTS AND HEX HEAD RECESS NUTS.
2. TOLERANCE \( +1\frac{1}{4}'', -\frac{1}{8}'' \)

AASHTO M-180 SHALL APPLY EXCEPT WHERE IN CONFLICT WITH THIS DRAWING.

REQUIRED FOR DOUBLE RAIL NOT REQUIRED FOR SINGLE RAIL.