

- .1120 **Permanent Pavement Striping Tape** - On complex urban projects involving dual bi-directional turn lanes or urban or rural intersections with painted islands, or where complex striping conditions may exist as a result of a project reconstruction or new construction a striping diagram sheet should be developed. This will provide guidance to the Division of Traffic on safety conditions of concern to the designer. The incorporation of this sheet is left to the discretion of the designer and should be discussed on a project-by-project basis.

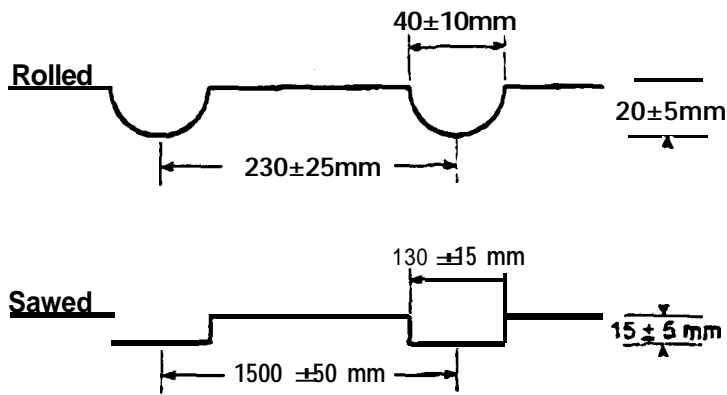
61-06.1200 RUMBLE STRIPS

Rumble strips are a traffic warning device and, when required, shall be constructed as shown in the Standard Drawings. Types 1 and 2 (Standard Drawing No. RPM-140) are raised bituminous rumble strips to be used for warning or unexpected stop conditions. They are not to be used *on* bituminous concrete shoulders or PCC shoulders, except at approaches to narrow bridges where the shoulder width is less than the normal roadway shoulder width. Type 3 rumble strips (Standard Drawing No. RPM-145) are formal or sawed warning devices for use in non-reinforced concrete paved shoulders and medians. Bituminous indented rumble strips will be used on all main line shoulders including both outside shoulders and median shoulders (except for flush medians) on divided highways, and for two-lane roads when called for by the pavement design.

61-06.1300 SIDEWALKS

Sidewalks are considered as integral parts of city streets; however, they are rarely considered necessary in rural areas and have only been included on projects where sidewalks were existing. They are, however, highly desirable in some rural areas because of higher speeds and lack of lighting. On all projects other than fully-controlled access the designer will consider on a project-by-project basis the inclusion of sidewalks on projects in areas where community development such as schools, shopping centers, local businesses and industrial plants create pedestrian concentrations near or along the highway. The preliminary line and grade inspection team will assess the need for sidewalks and make the necessary recommendation to the Director, Division of Highway Design, for approval.

403.03.08 Rumble Strips. When using a surface mixture instead of the Asphalt Mixture for Pavement Wedge or when the Engineer deems it appropriate to pave the driving lanes and the adjacent shoulder monolithically, provide rumble strips. Construct strips on all main line shoulders. When furnishing Asphalt Mixture for Pavement Wedge, ~~Class~~ Class I binder, or a base mixture for shoulders, the Department will not require rumble strips.



Length of strips: 600 mm

Distance from the edge of the mainline pavement to the end of the strip: 300 mm

Time the rolling operation so indentations are at the specified size and depth without causing unacceptable displacement of the asphalt mat. Correct unacceptable rolled-in rumble strips by sawing as detailed above.

If preferred, construct the rumble strips by sawing. If choosing this method, saw, size, and space the grooves as detailed above or as detailed on Standard Drawing No. RPM-145. Paint the disturbed areas of **sawn** rumble strips with a tack coat.

On shoulders less than 1.2 meters, shorten the length and distance of the strips as the **Engineer** directs.

403.03.09 Leveling and Wedging, and Scratch Course.

A) Leveling and Wedging. Conform to the gradation requirements for base, binder, or surface as applicable, and obtain the Engineer's approval for the asphalt binder content. The Engineer may adjust the gradation limits of the asphalt mixture being used for leveling and wedging in order to provide smooth transitions.

Upon completing each course of asphalt mixture and before spreading the next course, check the surface of that course by a stringline for deviations from a uniform grade. Correct any such deviations from the required uniformity by applying additional material, blade spreading, and rolling as directed.

When construction of the previous course is included in the same contract, mill any high joints or other high areas as required in addition to leveling and wedging.

When leveling and wedging is provided for on resurfacing projects, check the existing surface by stringline for deviations from a uniform grade. **Correct** the courses in the same manner with an application of either Class 1 Binder or a surface mixture, or both.

When an asphalt mixture has been included in the proposal for leveling and wedging, perform this work at the locations designated before starting the normal paving operations. Thoroughly clean the areas to receive the corrective work and apply the same **tack coat material** as specified for the courses **being constructed**. Do not apply the material as a scratch course over the entire area of the existing pavement. Do not apply the **material** monolithically with the surface course.

Spread the asphalt mixture for leveling and wedging with a motor patrol grader. When required, provide graders equipped with edgers or an end plate on the blade to aid in producing a uniform edge. Do not level or wedge with a paver without obtaining the Engineer's permission.

After spreading, thoroughly compact the mixture.

B) Scratch Course. When required by the Contract, place an asphalt mixture as a scratch course. Apply the mixture over the entire area of the existing pavement

Entrances to residential and commercial sites should match the existing pavement as to type.

Farm field entrances shall match the pavement design for the traffic **lanes**.

The pavement designs for entrances and approaches shall begin and end at the limits set forth in previous Section 61-06.0300.

61-06.0500 SHOULDERS

A shoulder is the portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles for emergency use and for lateral support of the sub-base, base and surface courses. Shoulders may be earth or paved, varying in width from 0.6 meter to 3.6 meters depending on the functional classification of the roadway (see Chapter 5, Geometric Design Standards), and will be specified on the Design Executive Summary, TC 61-9 (Exhibit 01-03). Cross slopes for shoulders shall be 8.0 percent for earth and 4.0 percent for paved. The face of guardrail shall be **offset** 0.6 meter from the outer edge of the usable shoulder, regardless of width, on all projects, including Interstate and arterial routes. Shoulders shall be widened 0.6 meter beyond the face of the guardrail (a total of either 0.6 meter or 1.2 meters, depending upon usable width and whether the usable width is paved), except ramp shoulders shall not be widened. Refer to Standard Drawing No. RGX-001 for rounding at the shoulder break on superelevated sections.

.0510 Shoulder Paving - AA.SHTO's A Policy on Geometric Design of Highways and Streets established the following definitions for shoulders:

1. Minimum width of shoulder is that **measured** from the edge of the travelled way to the intersection of the shoulder slope and the foreslope.
2. Usable width of shoulder is the actual width of shoulder that can be used when a driver makes an emergency or parking stop.

The **thickness** of shoulder pavement shall be as indicated in the approved pavement design document. For those sections with a 0.6-meter paved shoulder and the remainder an earth shoulder, the structural design of the shoulder shall be the same as the mainline pavement. A 0.6-meter wide rumble strip shall be placed along the paved portion of the shoulder to delineate the driving lane ~~from~~ the paved shoulder. The cross slope shall be **4.0 percent** for **paved** shoulders and 8.0 percent for earth shoulders except for those situations where a 0.6-meter paved shoulder is used. The cross slope for the 0.6-meter paved shoulder shall be the same as the **main lie** pavement.

.0520 Minimum Paving Width Requirements for Shoulders

TRAFFIC		SHOULDER PARAMETERS			
ADT (Current)	DHV (Design)	MINIMUM WIDTH ¹ (Meters)	USABLE WIDTH (Meters)	PAVED (Meters)	EARTH (Meters)
RURAL LOCAL - RURAL COLLECTOR					
0 - 400	--	0.6	--	--	0.6
400 - Up	--	1.2	--	--	1.2
--	100 - 200	1.8	0.6	0.6	1.2
--	200 - 400	2.4	0.6	0.6	1.8
--	400 - Up ²	2.4	2.4	0.6 - 1.8	Up to 1.8
2 - LANE ARTERIALS (Other Than Freeways)³					
0 - 400	--	1.8	1.2	1.2	--
400 - Up	--	2.4	1.8	1.8	--
--	100 - 200	2.4	1.8	1.8	--
--	200 - 400	3.0	2.4	2.4	--
--	400 - Up ²	* 3.6	3.0	3.0	--
4 - LANE ARTERIALS - FREEWAYS - INTERSTATES³					
(Outside Shoulders)		3.6	3.0	3.0	
(Inside Shoulders)		1.8	1.2	1.2	

- Shoulder not widened 0.6 meter when guardrail or barrier is required, except at bridge ends.
1. Shoulder to be widened 0.6 meter when guardrail or barrier is required.
 2. Rural Local and Rural Collector Roads - The minimum and usable shoulder width shall be as shown. The paved width shall be designed to meet the traffic classification and volumes using the facility. For relatively short lengths, the shoulder type of the adjoining road shall be considered.

3. **The** remainder of the shoulder outside of the paved area shall be full depth aggregate as noted in the approved pavement design.

NOTE: Surfacing course to extend under guardrail when wedge curb is required.

For those sections with a 0.6-meter paved shoulder and the remainder an earth shoulder, the structural design of the shoulder shall be the same as the mainline pavement. A 0.6-meter wide rumble strip shall be placed along the paved portion of the shoulder to delineate the driving lane from the paved shoulder. The cross slope shall be 4 percent for paved shoulders and 8 percent for earth shoulders except for those situations where a 0.6-meter paved shoulder is used. The cross slope for the 0.6-meter paved shoulder shall be the same as the mainline pavement with the remaining shoulder 8 percent.

- .0530 **Paved Shoulders At Bridge Ends** - Paved shoulders shall be used at bridge ends for all bridge and approach projects as a means of minimizing erosion at bridge ends. The following note will be included in the pavement design document and should be incorporated into the plans:

“Shoulders shall be paved full width within the guardrail limits or 60 meters. The remainder of the project shall be constructed with shoulders as otherwise shown or matching existing.”

The intent of this note is to specify the use of a paved shoulder for short sections of pavement (usually less than 60 meters) at the ends of bridges for bridge replacement projects where there is potential for erosion of the shoulder approaching the ends of the bridge. The designer is cautioned to exercise judgment in the application of this note. There may be situations where it is not practical to end the paved shoulder at 60 meters because the guardrail extends well beyond 60 meters. There also may be situations where it is not practical to pave the full 60 meters as recommended. In these situations, the designer should exercise judgment and end the paved shoulder at a location where the potential for erosion of the shoulder is minimized and the transition from full width paved shoulders to typical shoulders can be done efficiently. It is the ultimate responsibility of the designer to appropriately apply this note on all applicable projects.

Standard Drawing No. RBB-001 shows a 1:25 pavement taper for transition from the mainline pavement to the shoulder. When the note listed above is used on the pavement design, it is intended that mainline pavement thickness be used within the area designated as pavement taper on Standard Drawing No. RBB-001. The area outside the pavement taper designated as “shoulder” on Standard Drawing No. RBB-001 shall be paved within the guardrail limits or 60 meters. The remainder of the project shall be constructed as otherwise shown or with shoulders matching the existing. The thickness of paving for shoulders in this area typically will be different from that used for mainline pavement and will be indicated as shoulders on the paving-schedule and typical section of the pavement design.

- H) **Texturing.** Immediately after finishing the concrete with the burlap drag, **texture the surface** by forming transverse grooves.

Form the transverse grooves by mechanical equipment using a comb made with steel tines. When allowing hand finishing on areas, the Department will allow the use of manual tools such as rakes with spring steel tines.

Form the grooves in the concrete at an appropriate time during the stiffening of **the** concrete mixture, so that in the hardened concrete, the grooves will be between 2.3 and 3.3 mm in width, between 3.0 and 4.8 mm in depth, and will be spaced at random intervals between 7.5 and 25 mm.

Regardless of the method used to form the grooves, ensure that the grooves are relatively smooth and uniform, and form the grooves without tearing the surface or bringing pieces of the coarse aggregate to the top of the surface.

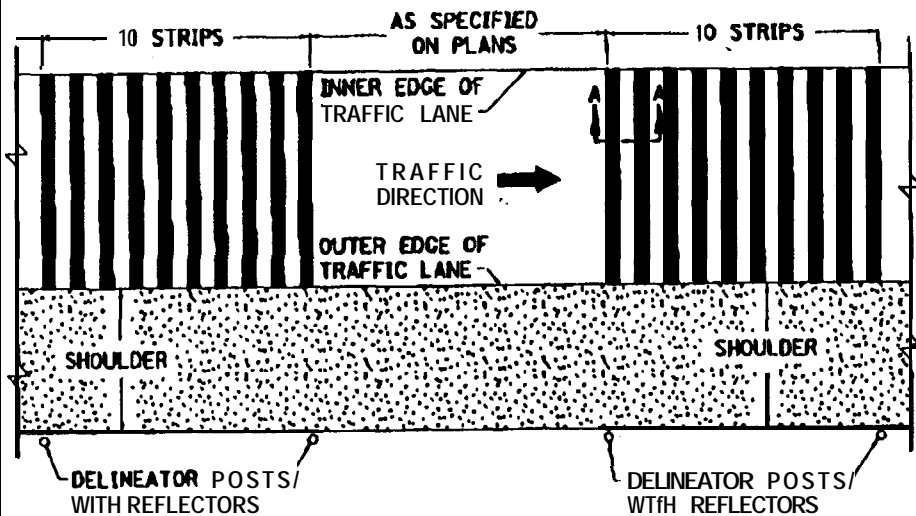
Correct any individual areas of 50 square meters or larger of the hardened grooved concrete that do not conform to the above requirements. Correct by cutting acceptable grooves in the hardened surface with an approved cutting machine or by other methods approved by the Engineer.

The Department will not require texturing on PCC base.

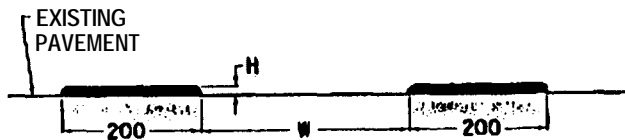
- I) **Station Numbers.** Stencil station numbers into the pavement before it takes its final set. Mark the complete station number every 100 meters. Mark equations in the alignment when they occur, in the pavement in the same manner and at the same locations as specified in the Contract.

Size and place the stencils according to the Standard Drawings.

- J) **Rumble Strips In Shoulders.** After finishing the shoulders, form rumble strips according to the Standard Drawings. When the shoulder is used to maintain traffic during construction, do not form rumble strips until the mainline is opened to traffic. When the mainline is open to traffic saw cut Type 3 rumble strips according to the Standard Drawings. Seal saw cut grooves with epoxy sealer according to Section 5 10.



PLAN VIEW



SECTION A-A

NOTES

1. BID ITEMS: RUMBLE STRIPS TYPE ★
- ★ 1 OR 2
DELINEATOR POSTS
DELINEATORS WHITE
2. THE CONTRACT UNIT PRICE PER METER FOR A TEN (10) STRIP WIDE UNIT SHALL INCLUDE ALL LABOR, FORMING MATERIALS AND INCIDENTALS NECESSARY TO COMPLETE THE WORK.
3. THE CONTRACT UNIT PRICE EACH FOR DELINEATOR POSTS AND DELINEATORS WHITE SHALL INCLUDE THE DELINEATOR POST DELINEATOR UNIT, LABOR AND ALL INCIDENTALS NECESSARY FOR ON6 COMPLETE INSTALLATION.
4. APPROXIMATE QUANTITIES REQUIRED FOR ONE UNIT
TEN (10) STRIPS WIDE X ONE METER LONG.
0.028 MTON FOR 6MM BITUMINOUS CONCRETE MIX
0.047 MTON FOR 10MM BITUMINOUS CONCRETE MIX
0.066 MTON FOR 14MM BITUMINOUS CONCRETE MIX
0.931 LITER OF TACK COAT
5. THE BITUMINOUS MATERIAL SHALL BE EITHER CLASS 1 SURFACE OR SAND ASPHALT SURFACE EXCEPT THAT ALL THE AGGREGATE RETAINED ON THE NO. 4 SIEVE SHALL BE REMOVED PRIOR TO MIXING THE MATERIAL. NO. 11 STONE MAY BE USED IN CLASS I SURFACE FOR COARSE AGGREGATE IN LIEU OF NO. 9 STONE.
6. TWO 2130 MM LONG, TYPE I DELINEATOR POSTS SHALL BE INSTALLED AT EACH LOCATION.
7. TWO 65 MM DIAMETER TYPE III A SILVER WHITE DELINEATOR UNITS SHALL BE INSTALLED AT THE TOP OF EACH DELINEATOR POST WITH A M5 ALUMINUM OR STAINLESS STEEL SLOTTED ROUND HEAD MACHINE SCREW, WASHER AND VANDAL PROOF NUT.
8. THE PAVEMENT SHALL BE CLEANED AND TM STRIPS SHALL BE CONSTRUCTED UNIFORMLY AT RIGHT ANGLES TO THE CENTER LINE OF THE ROADWAY.
9. THE TACK COAT SHALL BE APPLIED FULL STRENGTH WITH A LIBERAL COAT.
10. SIDE FORMS OR OTHER APPROVED METHODS SHALL BE USED TO ACCOMPLISH THE DESIRED 10 UNIT STRIP SYSTEM. A SUFFICIENT AMOUNT OF BITUMINOUS MIXTURE SHALL BE PLACED IN THE FORMS AND COMPACTED WITH A LIGHT ROLLER SO AS TO PROVIDE A COMPACTED THICKNESS OF 6 MM TO 14 MM AS APPLICABLE.
11. THE DELINEATOR UNIT SHALL BE CONSTRUCTED IN SUCH A MANNER THAT TOP OF THE DELINEATOR UNIT IS 1200 MM ABOVE TOP OF PAVEMENT.
12. THE REFLECTIVE SURFACE OF THE DELINEATOR UNIT SHALL FACE TRAFFIC AND POINT TOWARD THE CENTER LINE OF THE ROADWAY APPROXIMATELY 400 METERS AWAY.
13. WHEN APPLIED TO RIGID PAVEMENTS THE ENGINEER MAY REQUIRE THE RUMBLESTRIPS TO BE SKEWED PARALLEL TO OTHER SKEWED TRANSVERSE JOINTS.
14. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.

TYPE	KM/H	H	W
1	0-70	6-10	300
2	OVER 70	10 - 14	600

**KENTUCKY
DEPARTMENT OF HIGHWAY**

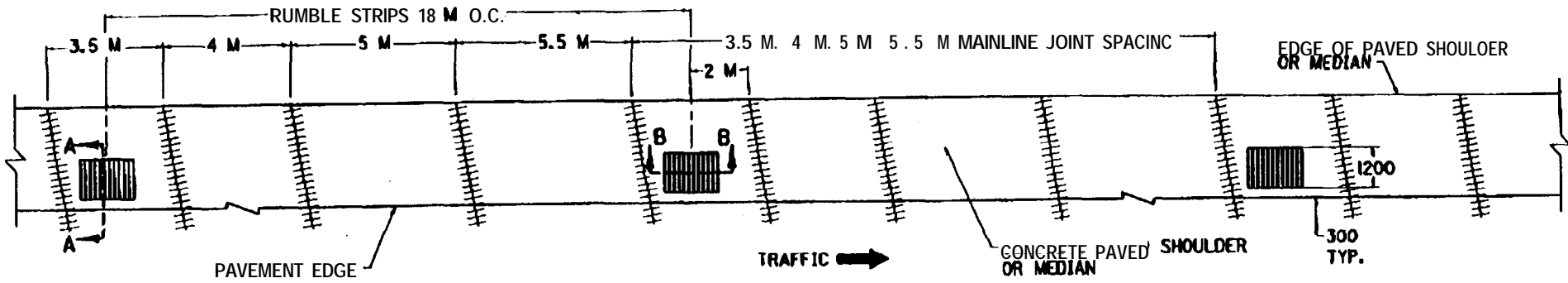
RUMBLE STRIPS

STANDARD DRAWING NO. RPM-140-01

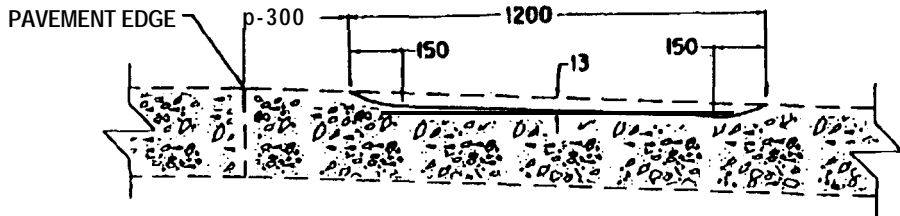
SUBMITTED: *J. B. [Signature]* DATE: 11-23-71

APPROVED: *J. H. [Signature]* DATE: 11-23-71

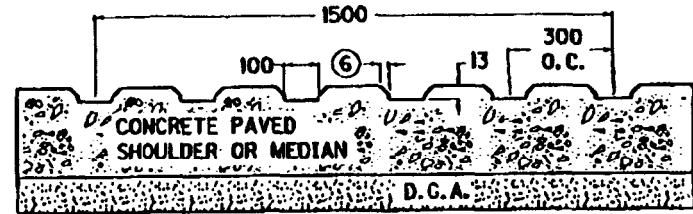
NON-REINFORCED CONCRETE PAVED SHOULDER OR MEDIAN WITH NON-REINFORCED CONCRETE MAINLINE



PLAN VIEW



SECTION A-A



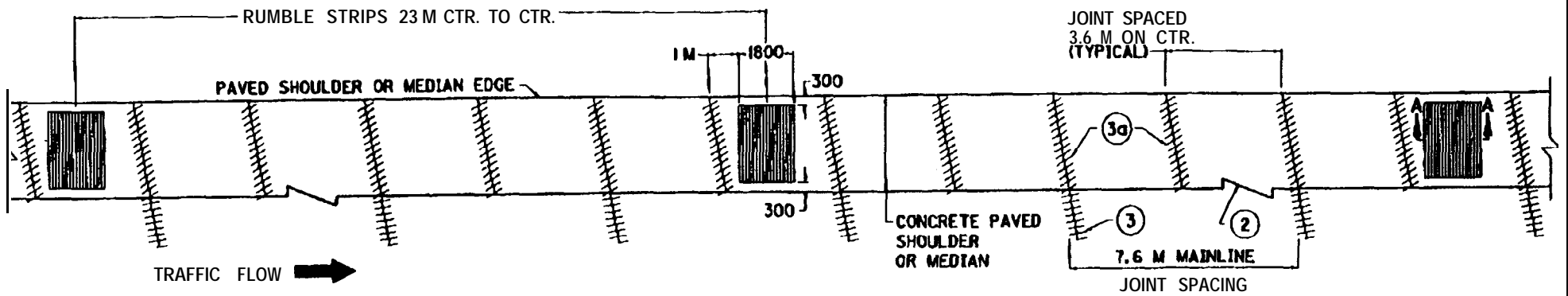
⑥ 6 MM BEVEL

SECTION B-B

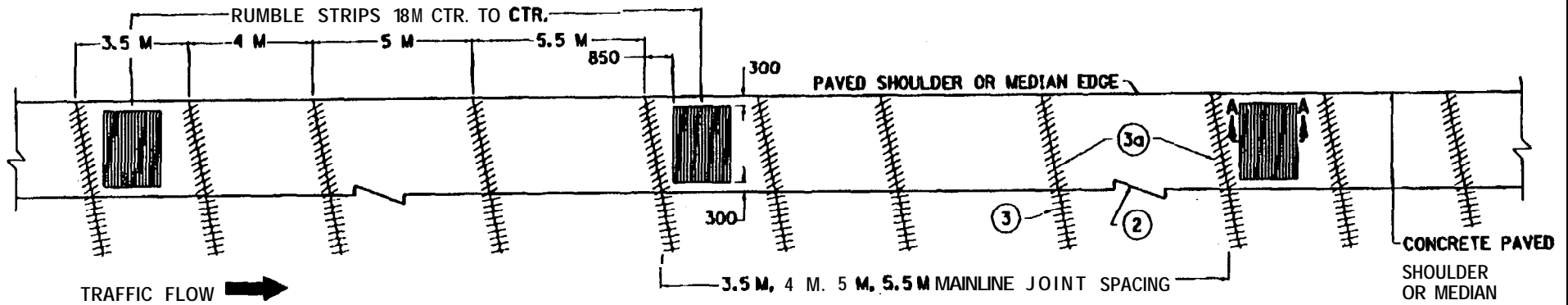
NOTES

1. BID ITEM RUMBLE STRIPS TYPE 3. THE CONTRACT UNIT PRICE PER METER FOR A SIX (6) STRIP UNIT SHALL INCLUDE ALL LABOR, MATERIALS, EPOXY SEALER AND INCIDENTALS NECESSARY TO COMPLETE ONE INSTALLATION.
2. THE GROOVED RUMBLE STRIPS SHALL BE CUT INTO THE CURED CONCRETE SHOULDER AS DETAILED ON THIS DRAWING.
3. THE GROOVE SHALL BE TAPERED OUT, SO AS TO PROVIDE POSITIVE DRAINAGE.
4. THE GROOVES SHALL BE SEALED WITH EPOXY SEALER MEETING THE REQUIREMENTS OF SECTION 731 OF THE STANDARD SPECIFICATIONS.
5. WHEN THE SHOULDER IS USED TO MAINTAIN TRAFFIC DURING CONSTRUCTION, THE RUMBLE STRIPS SHALL NOT BE CUT UNTIL THE MAINLINE IS OPENED TO TRAFFIC.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.

KENTUCKY	
DEPARTMENT OF HIGHWAY	
RUMBLE STRIPS	
TYPE 3	
STANDARD DRAWING NO. RPM-145-01	
DESIGNED BY	02-22-21
APPROVED	02-22-21



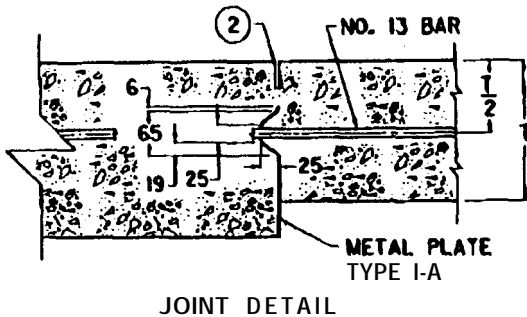
NON-REINFORCED CONCRETE PAVED SHOULDER OR MEDIAN WITH STANDARD REINFORCED CONCRETE MAINLINE



NON-REINFORCED CONCRETE PAVED SHOULDER OR MEDIAN WITH NON-REINFORCED CONCRETE MAINLINE

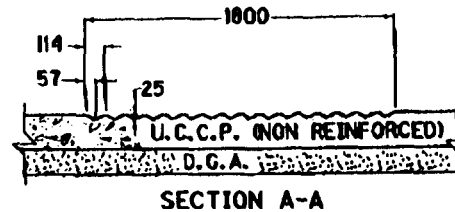
NOTES

1. THE COST OF CONSTRUCTING RUMBLE STRIPS SHALL BE INCLUDED IN THE UNIT BID PRICE FOR NON-REINFORCED CONCRETE PAVEMENT.
2. (2) (3) (3a) SEE CUR. STD. DWC. RPS-010 FOR JOINT SYMBOLS AND DETAILS.
3. AFTER FINAL FINISHING OF THE PAVEMENT. CORRUGATIONS FOR RUMBLE STRIPS SHALL BE FORMED AT THE INTERVALS SHOWN INTO THE PLASTIC CONCRETE.
4. THE CORRUGATIONS SHALL BE ROUNDED RATHER THAN PEAKED, WITH THE TOP FLUSH WITH THE SHOULDER OR MEDIAN SLOPE.
5. THE TROUGH SHALL BE TAILED OUT, SO AS TO PROVIDE POSITIVE DRAINAGE.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.



JOINT DETAIL

METAL PLATE FOR USE WITH CEMENT CONCRETE SHOULDER PAVING CONSTRUCTED IN CONJUNCTION WITH MAINLINE PAVEMENT. IF OTHER ALTERNATES ARE USED, THE TIE-STEEL AND KEYWAY SHALL BE LOCATED IN ACCORDANCE WITH THIS DRAWING.



SECTION A-A

KENTUCKY	
DEPARTMENT OF HIGHWAYS	
NON-REINFORCED	
CONCRETE PAVEMENT	
FOR	
SHOULDERS & MEDIANS	
STANDARD DRAWING NO. RPN-001-03	
SUBMITTED <i>J. B. Anderson</i>	92-20-01
APPROVED <i>J. B. Anderson</i>	92-20-01
BY <i>J. B. Anderson</i>	DATE