

Example 1 – T-Intersection (Painted Island)

This example demonstrates the jointing design process for a T-intersection of a rural two lane highway and a paved side road. The intersection has returns on each side (see Figure 1) and the pavement thickness is 10 inches. The design year truck volume on the side road is 250 vpd.

Step 1: Place Joints with Predetermined Locations

Longitudinal Joints

Because the location of longitudinal joints for both the mainline and the side road are predetermined by the lane pavement width, these joints should be placed first. Within the intersection, the road that is paved first determines which joints are longitudinal and which are transverse. In this example, assume that the mainline is paved first. Since the mainline is a rural two lane highway, the longitudinal joints are spaced at the lane pavement width of 12 feet.

To determine an appropriate longitudinal joint to use, refer to Standard Road Plan [PV-101](#) or Table 2 in Section [7A-2](#). Normally, the type of joint used depends on the pavement thickness. Since the pavement thickness is greater than 8 inches in this case, either a KT-2 or an L-2 joint is appropriate.

Initial Transverse Joints

The longitudinal joints running down the centerline and edges of the side road define the locations of the first transverse joints for the mainline (see Figure 1). The only other joints with predetermined locations are the transverse joints that are placed where the end-of-taper sections terminate. End-of-taper sections are 2 foot wide sections placed at the ends of an intersection return (see Figure 1). They are used to prevent the return from narrowing to a point as it intersects with the pavement.

Note: Concrete less than 2 feet in width is weak and cracks readily.

As Figure 1 shows, normal practice is to place a transverse joint in the mainline or side road pavement where the end-of-taper section terminates. Standard Road Plan [PV-101](#) and Table 1 in Section [7A-2](#) indicate that a CD joint should be used on the mainline since the pavement thickness is greater than 8 inches. On the side road, CD joints are also used since the design year truck volume is greater than 200 vpd (C joints could be used on the side road if the design year truck volume was less than 200 vpd).

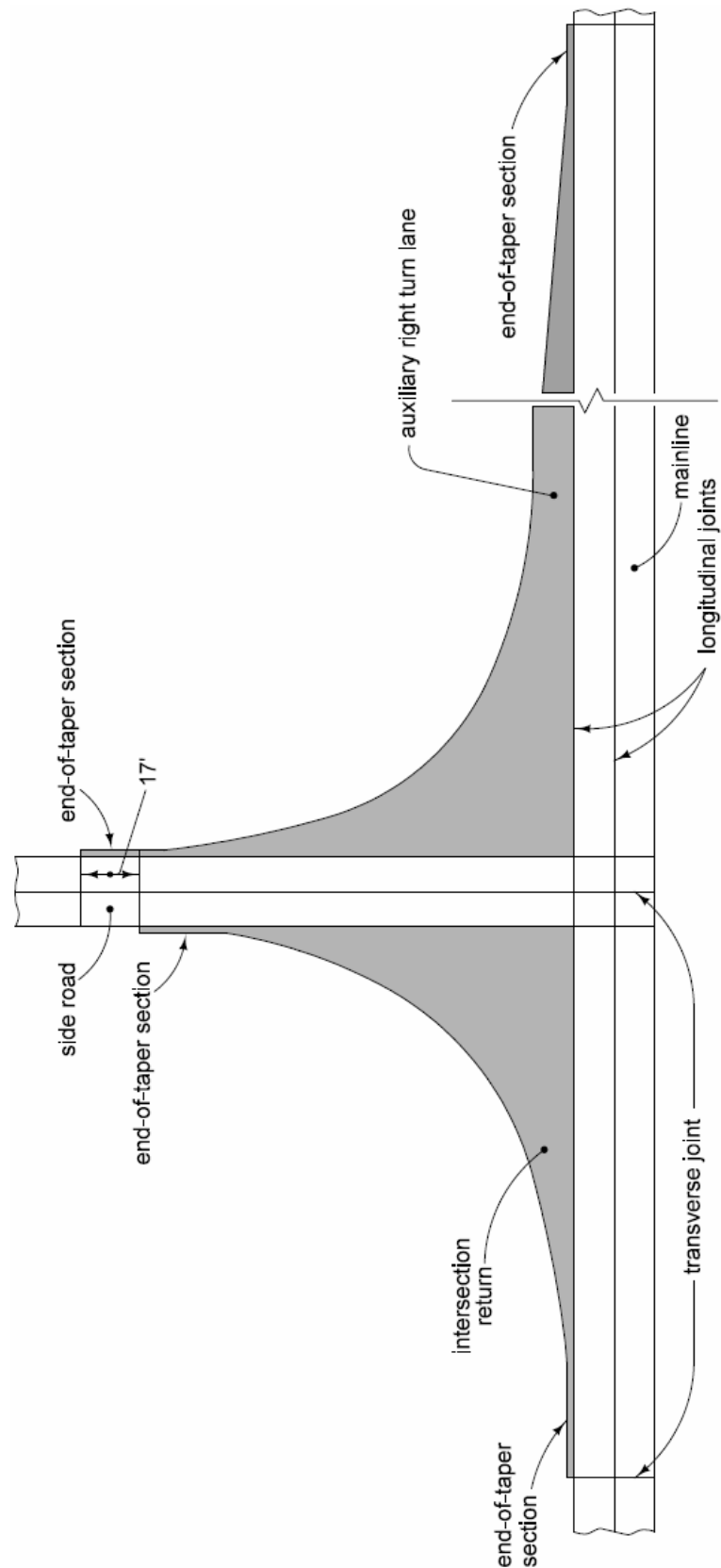


Figure 1: Placement of predetermined joints.

Step 2: Place Remaining Joints

The remaining joints (generally transverse joints) are placed in appropriate locations. As noted in Step 1, the appropriate transverse joint for both the mainline and the side road is the CD joint. The maximum spacing for CD joints is 17 feet and the minimum spacing is 12 feet. Therefore, the remaining areas that need transverse joints should have CD joints spaced within this range.

Mainline and Side Road

The placement of the remaining transverse joints on the mainline and side road is largely determined by the location of joints already placed in Steps 1 and 2 (see Figure 1). The remaining joints are spaced between 12 and 17 feet between these already-placed joints. However, the designer must also consider how these joints will be extended into the returns (described below).

Intersection Returns

After the transverse joints have been placed in the mainline and the side road, they are extended into the intersection returns to be used as transverse joints for those areas as well. As with other transverse joints, those in intersection returns must intersect with the free edge of the pavement. However, the acute angle between the joint and the pavement edge (and between the joint and other joints) must be greater than or equal to 70 degrees. Details A, and B in Figure 2 illustrate how to intersect joints with the free edge of the pavement (and with other joints) under various conditions.

- Detail A shows a transverse joint that intersects with the free edge of the pavement unaltered. This is acceptable because all angles between the transverse joint and the longitudinal joints and between the transverse joint and the free edge of the pavement are greater than 70 degrees.
- Detail B uses a dashed line to show the original position of a transverse joint whose angle with the free edge of the pavement is less than 70 degrees. This joint should be skewed to make it perpendicular to the free edge of the pavement, as shown by the solid line. However, skewing the joint to make it perpendicular to the free edge of the pavement causes the angle between the transverse joint and the longitudinal mainline joint to be less than 70 degrees. To resolve this situation, the transverse joint is extended a minimum of 2 feet beyond the mainline longitudinal joint, and then it is skewed to make it perpendicular to the free edge of the pavement.

After all joints are placed, the layout should be checked to ensure that all joint spacings and angles are acceptable. If they are not, the spacing of the mainline or side road joints may need to be changed, one or more joints may need to be added, or joints within the returns may need to be modified.

Figure 2 shows all the transverse joints appropriately placed.

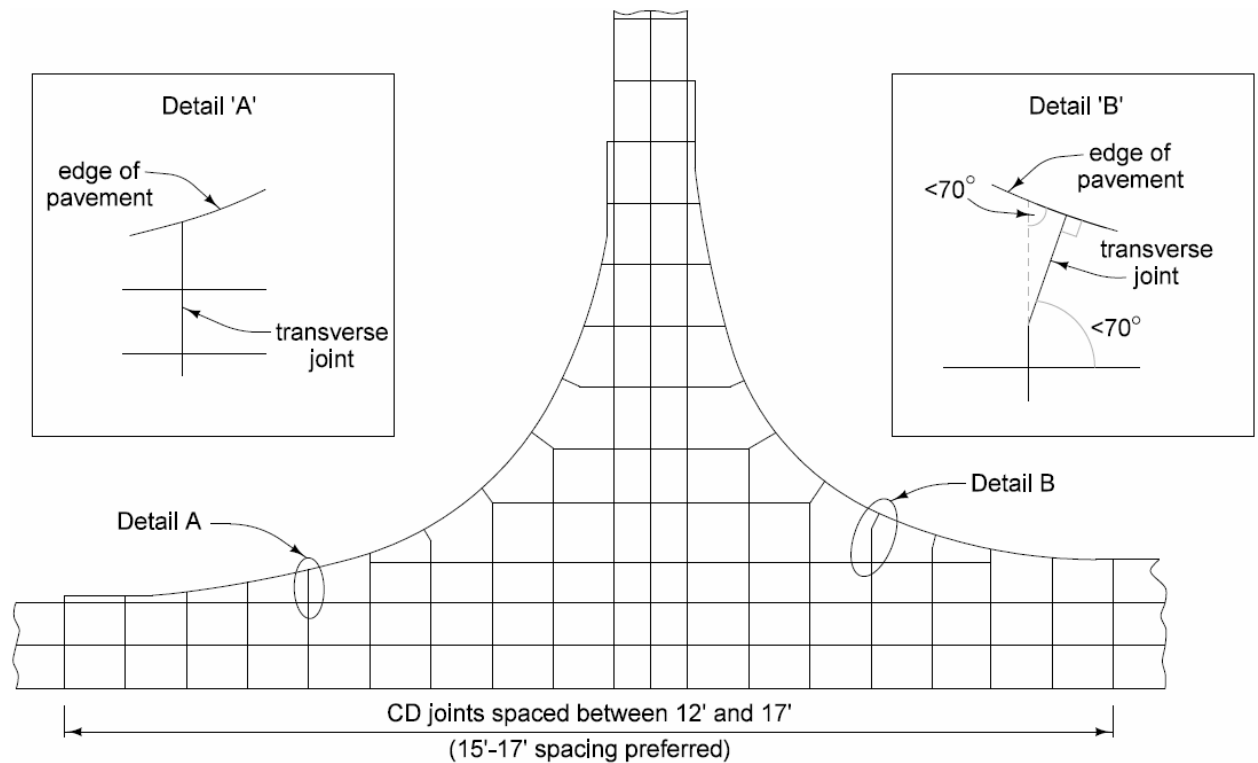
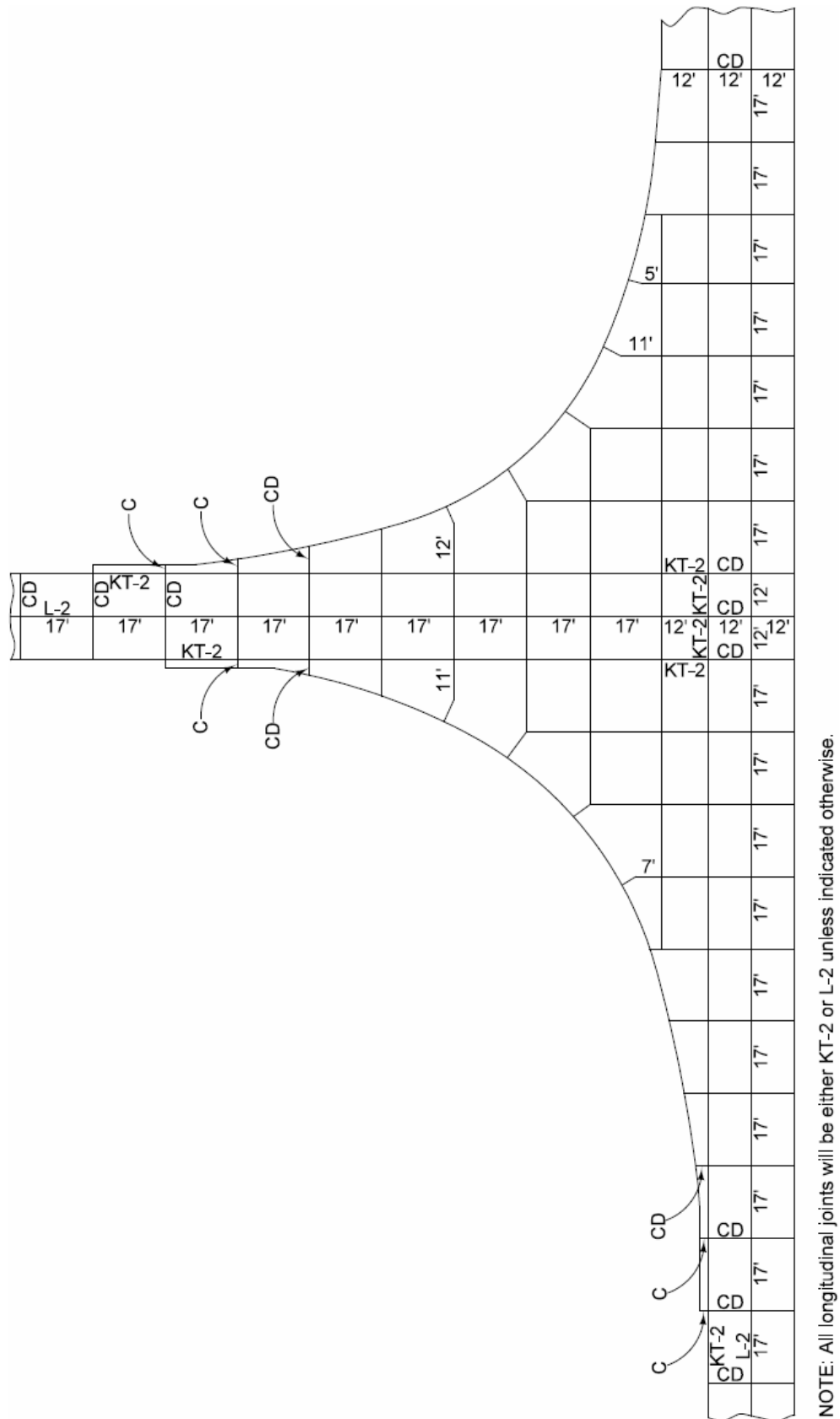


Figure 2: Placement of remaining joints.

Step 3: Label Joints

The completed jointing layout of the T-intersection is shown in Figure 3. As stated on Standard Road Plan [PV-101](#), the L-2 and KT-2 joints may be used interchangeably, at the contractor's discretion, depending on the paving sequence. Therefore, the designer may identify the longitudinal joints as either L-2 or KT-2 on the jointing layout. The transverse joints in the end-of-taper sections are C joints because they are only 2 feet long – not long enough to use a doweled transverse joint like the CD. The joints on the right side of the traffic island are also C joints as specified on Standard Road Plan [PV-20](#).

**Figure 3:** Final jointing layout.

Not every joint on the jointing layout needs to be identified. A few key joints on the diagram should be identified, and whenever a series of joints changes to a different type of joint, the joint at the location of the change should be identified. Also, any joint that may be a source of confusion should be identified.

Joint lengths are also shown on the jointing layout, normally rounded to the nearest foot. Similar to labeling joint types, not every length needs to be indicated. However, any length that cannot be inferred from the diagram should be labeled. For example, the distance the mainline or side road transverse joints extend into the intersection returns before being skewed perpendicular to the free edge of the pavement should be dimensioned (see Figure 3).