

When alternate lines are necessary, their stationing shall be a continuation of the stationing of the original line and a stationing equality shall be shown at the tie-in. Each alternate line shall be clearly designated if adopted. When a survey line intersects or is within a reasonable distance of a previous survey, the lines should be tied together at frequent intervals.

When terrain, property developments or other conditions make it desirable to parallel a right-of-way owned by any public utility company, special attention must be given to positioning the line so as to avoid encroachment of the proposed highway right-of-way on that owned by the utility company.

In making surveys from mosaics furnished by the Location and Design Division, any change in topography, or other features which do not show on the mosaic and which might have an adverse effect on the ultimate location, should be brought to the attention of the District Survey Manager. If a decision to change the proposed line is made, this should be fully explained in the Survey Report.

Alignments for all intersecting roads should be run out a sufficient distance from the survey traverse line, depending upon the nature of the possible changes, to ensure the securing of all needed information. Complete survey information - topography, property lines, property owners, DTM's, etc. - should be secured for the full length of the connection. When a large skew angle is encountered, consideration should be given to relocate to a more desirable intersecting angle.

Alignment for grade separation structures of railroads should cross the railroads at right angles whenever possible. When a skew crossing is necessary, the skew should be at even fifteen-degree (**15°**) skew angle increments, unless conditions make other angles necessary. When conditions warrant the use of other angles, the angles should be to the nearest even degree. The skew angle is not to exceed forty-five degrees (**45°**). The distance between the P.C. or P.T. of a curve and the structure should be sufficient to permit using the standard length transition without overlapping the bridge where possible. A centerline tie must be made with the railroad by measuring the angle of intersection. Track alignment on the railroad shall be run for a distance of five hundred feet (**500 ft**) each side of the centerline, down the center of the tracks. When the railroad is on a curve, the track alignment should be run out as a regular traverse, with each chord point used as a point of intersection. These angular measurements must be taken and recorded to the nearest **thirty seconds (30")**.

Alignments for construction centerlines shall be shown on all plan sheets, bridge situations, and/or site plans, closed survey plats or any other surveys. All plus and offsets will be referenced from the construction centerline.

Generally, long easy curves that do not materially lengthen the route are preferred to a continuous tangent alignment. Long curves that fit the topography of the country are preferable to shorter curves and longer tangents. Short, sharp curves and steep grades near the approach to a bridge and sharp curves at the foot of a steep descending grade are particularly hazardous and should be avoided.