A" and "Line B." Profiles and cross-sections should be taken along each line and plans of both submitted to the State office with reasons for selection of the route adopted and an estimate of the cost of each also to be furnished.

Alternative lines should be made on separate sheets.

Levels

Profile levels should be taken at least three hundred feet beyond the beginning and end of the proposed road.

A well-adjusted transit-bubble will be sufficiently accurate for general highway work where a closing error of one-tenth foot per mile will be allowed.

Levels should be run forward and backward along the course of the road in order to close the circuit. Bench marks on some prominent object should be taken at intervals of each one-fourth mile and recorded in the notes.

The profile levels of the centre line and bench marks should be run in one operation and check levels run in the same operation with the cross-sections, but do not attempt to do both at one operation.

It is not necessary to run check levels on resurfacing work.

Cross-sections

Cross-sections should be taken at all one hundred foot stations in regular country and at shorter intervals where the ground undergoes a marked change between stations. Where rock is encountered, sections and soundings to determine the elevation of the rock should be taken at such frequent intervals as the surface requires.

At the station points, readings should be taken on the centre line of the travelled way, the right and left edges of the travelled way or of the roadway, at the top and base of each slope and one reading farther out (not less than thirty feet from the centre line of location) at either side to show the slope of the natural surface.

Readings on the ground should be taken at the nearest one-tenth foot.

In general, it will not be necessary to show more of the topography than these cross-sections will reveal. In cases where the location of the road is open for some question, a short topographic survey might be made in order to show on the plans the circumstances which caused the choice of the location to be made.

Take only a few cross-sections to show condition of road on resurfacing work.

Drainage

Complete provisions must be made for the drainage of every road and the plans must show what arrangements have been made and complete data must be furnished for all drainage structures larger than regular standard culverts. Estimates of the drainage area for all structures must be given in all cases.

For culverts the length, width and average slope per one hundred feet of drainage area should be noted and the direction of flow indicated on plan by an arrow.

Ditches

Whenever the road is at a grade of less than 0.5 per cent., the grading of the drainage ditches must be planned by a separate grade. The design of the ditch must be shown on the cross-sections, and all grades of less than 0.5 per cent. should be avoided if possible.

Underdrains

The engineer should take special care to note or to determine by local inquiry any parts of the road which break up in wet seasons and specify underdrains.

Culverts

Small culverts crossing the centre line of the road should be of sufficient length to prevent any decrease in the crown of the road where it passes over the culvert.

Every bridge and culvert within the course of the design should be described in the specified form whether it is or is not intended for reconstruction.

At every culvert which it is proposed to construct or reconstruct, a cross-section should be taken along the proposed axis, and the section taken far enough out to show elevation of inlet and the lowest possible outlet available, even if this involves the construction of a short ditch.

Profiles must also be taken on the centre line of the road, the elevation of the finished roadway noted, and, if the culvert is to be located on a skew, the angle of the skew must be given. Do not try to build culverts at right angles to the road if same should be built on a skew to fit the stream.

Considerable attention should be paid to the angle at which any drainage structure crosses the road, and if they should be built on a skew, these angles must be noted and the length and type of wings should be noted in every instance. Culverts should not be designed askew if possible to economically change the course of stream.

Plans

The plans will consist of a title page, typical cross-section of improvement, plan and profile, cross-sections, and such structural plans and state structural standards as may be necessary to properly show the proposed construction.

All plans or drawings will be on flat sheet, 22 x 36 ins. outside dimensions; boundary lines are to be so placed as to provide a binding margin 2 ins. wide at the left-hand end, and a margin ½ in. wide on the remaining three edges of all plans. On cross-section sheets, the boundary lines may be omitted but sufficient space should be allowed for the 2-in. binding edge at the left-hand end of the sheets. State Highway Department standard sheets showing structural standards may be made a part of the plans and be attached thereto, provided the size of these standard sheets does not exceed the size required for plans.

The plans are to be based upon the surveys described above, and all notation necessary to make the required details clear is to appear approximately throughout the plans. Any information which the local officials may deem necessary for their own uses may be incorporated in the plans in addition to that herein prescribed, provided it does not interfere with their legibility.

The sheets composing the set of plans shall be bound in the following order: Title page, typical cross-section of improvement, road plans, state standards, special structural plans, and cross-sections.

The plan and profile shall be placed on the same sheet; the plan shall be shown across the top of the sheet and the corresponding profile directly below. When the conditions permit without interference or overlapping, two sections of the plan and profile may be shown on the same sheet.

The plan shall be drafted to a scale of 1 in. equal to 100 ft. or 1 in. equal to 50 ft. in the option of the engineer, and the profile shall be drafted to the same scale horizontally as the plan, and to a scale of 1 in. equal to 10 ft. vertically.