

3.7 Geometric Road Design Requirements

A geometric road design must be carried out for all roads that will cross areas with a moderate or high likelihood of landslides. In those areas of potentially unstable terrain, incorporate measures to maintain slope stability into the geometric road design (including where necessary for protecting workers in excavations greater than 6m). These measures rarely allow for the most optimum balance of waste, borrow, and endhaul volumes.

In addition to the above, carry out a geometric road design:

- other than the foregoing situations, on side slopes greater than 50%, to facilitate construction and control materials movements during construction, or to minimize impacts on alienated land and other resources. It is recognized that when encountering short sections (i.e. <100 metres) of stable terrain along a corridor where a geometric road design would not otherwise be required, it may be impractical to mobilize a survey crew just for those short sections. In such situations, information from the field reconnaissance report would be utilized.
- on higher order roads or road sections where alignment constraints are particularly important to achieve, particularly for addressing the safety of road users.

In geometric road design, select specifications for road width, cut and fill slope angles, and horizontal and vertical control angles to match the required road standard. Design a road centreline location (L-Line) based on information from the location survey and reconnaissance report. Calculate earthwork volumes or quantities.

In addition to the design requirements previously mentioned, ensure that a geometric road design provides:

- plans and profiles (see the road standard drawings for recommended content and layout);
- cross-sections with road prism templates;
- mass diagrams with balance lines;
- appropriate expansion and shrinkage factors for the material types;
- a schedule of quantities and units of measure for clearing, grubbing, excavating (other material and rock), and graveling;
- planned movement and placement of materials (balancing of design);
- the location and size of required drainage structures such as culverts and bridges;
- the location and size of retaining walls or specialized roadway structures;
- clearing widths (generally tabular in variable widths);
- construction equipment considered in the design for material movements;
- estimated material costs;
- location survey alignment and designed centreline (L-Line) offsets, and clearing width offsets shown on the site plan;

- slope stake information (note that this information is only a guide and slope/grade stakes should be calculated and placed based on design or re- design cuts and fills at centreline);
- measures required for reducing potential impacts on other resource values;
- site-specific design and construction notes and prescriptions on, for example, the location of endhaul sections, borrow pits, waste and slash disposal areas, and full bench cut areas, and any other information that the designer considers useful to the road builder;
- measures to maintain slope stability if the road will cross areas with a moderate or high likelihood of landslides as determined by a TSFA; and
- information that the designer considers useful to the road builder or owner.

Whenever possible, allow for the use of waste or spoil material in ways that reduce endhauling requirements. For example, some material types may be used for the road subgrade, base course, turnouts, curve widenings, and embankment (fill). If these options are not available, or if the excess material consists of overburden and debris, then identify spoil sites as close to the construction area as possible. Abandoned quarries, gravel pits, and roads are some possibilities for spoil sites. Alternatively, evaluate stable areas in gentle or benched terrain for use as spoil sites.