

Bui l di ng a Successful Road

By Doug MacGuire, Project Assistant

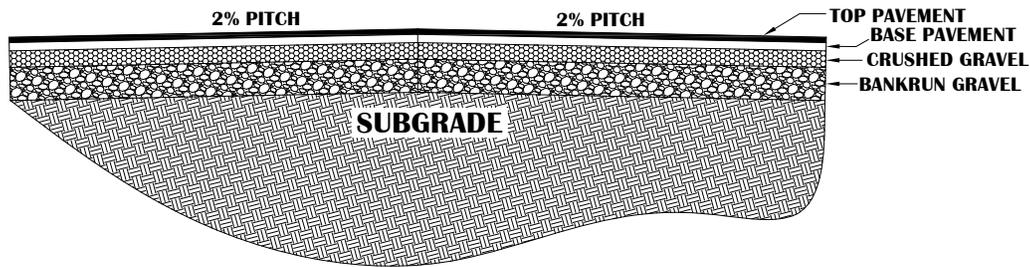


Figure 1: Road Cross Section

Municipalities must be prepared to play an active role in the layout, design, and inspection of the new roads proposed and built by developers. It is in the municipality's best interest to accept well-built roads as future maintenance will be the municipality's responsibility. Consider the following suggestions when creating minimum local road construction standards.

Road Components

A well built paved road consists of two gravel layers and two pavement layers (see figure 1). NHDOT recommends 11 foot travel lanes (22 feet pavement width) for a road with an average daily traffic of 750-1500 cars. Many communities have found that the pavement section described below provides a roadway that will require minimal maintenance for many years.

1. BankRun Gravel – 12 inches (NHDOT Spec. 304.2)
2. Crushed Gravel – 6 inches (NHDOT Spec. 304.3)
3. Base Course Pavement – 2.5-3 inches
4. Top Course Pavement – 1.5-2 inches

Subgrade

Construction begins at subgrade (the foundation of the road). Stake the road to the correct elevations. Typical spacing of centerline stakes is every 50 feet. Each stake contains the following information (see figure 2):

- Station number corresponding to the design plan. It represents a distance, (e.g. 3+50=350ft from project start).

- Elevation at subgrade,
- Plus 12" bankrun,
- Plus 6" crushed,
- Plus 2.5" base course, and
- 1.5" top course.

Place two offset stakes for every centerline stake, one on each side of the road 3-4 feet off the proposed edge of pavement. Subgrade elevations must match the engineering plan.

In excavated areas, watch for groundwater entering the excavation. Consider adding underdrain when groundwater is present.

Road Crown

Road crown should begin at subgrade and be carried through both gravel layers. A typical road crown is 2%. Less than 2% will prevent water from sheeting away, making the road prone to frost heaving. After placing bankrun and crushed gravel, fine grade to perfect the road crown.

Compaction

Use a geotechnical company to perform the compaction testing on each gravel layer and on subgrade sections where more than a foot of fill is required. Test at least every 100 feet. The recommended compaction is 95%.

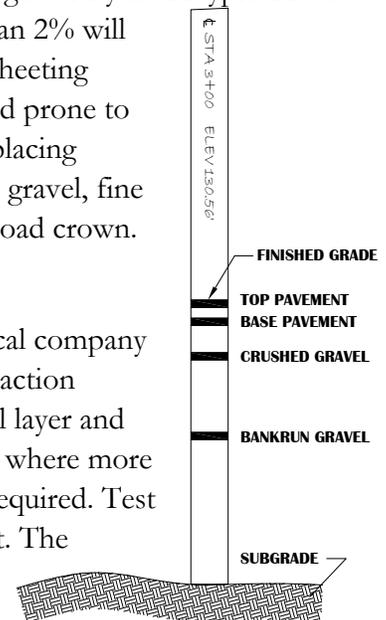


Figure 2: Typical Grade Stake

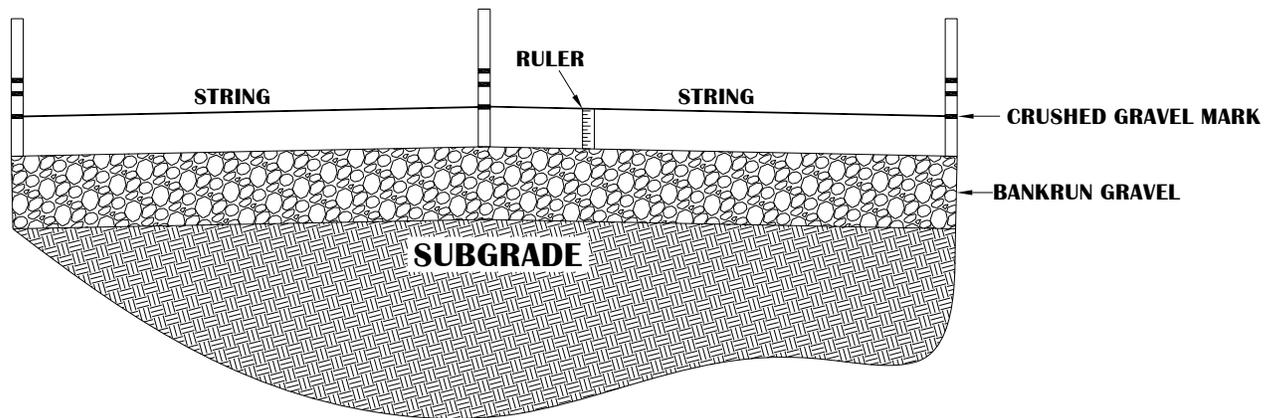


Figure 3: Checking Bank Run Gravel

Check multiple areas at each station

To achieve compaction, use a large vibratory roller. A large single roller may not fully compact around stakes. As construction vehicles travel over the subgrade watch for signs of instability. If the subgrade material appears soft or spongy, the materials may be saturated or unstable. Aerate saturated areas. Excavate and replace unstable materials.

Stringing Gravel Layers

A string line and ruler provide a reasonably accurate method to ensure uniform placement of gravels. Figure 3 shows an example of utilizing this method to check a placed bank run gravel layer.

The following steps explain how to check for any low or high areas across the span of road.

1. Span a station of the road with a string.
2. Wrap the string around all three stakes (centerline and 2 offsets) at the mark above the one being checked.
3. Measure down from the string, to the layer below. (The measurement should be equal to the next layer.)
4. Check several spots across the span. (Typical tolerance is within one inch.)
5. Repeat procedure at several stations.

Before Paving

Check the crown using a four foot level. The paver will follow existing ground assuming no error by the paver operation.

Before paving, survey centerline elevations because a stake may have shifted resulting in a rise or drop in grade.

Paving

Do not pave in the winter or when the ground is frozen. The air temperature must be 45°F and rising. Do not allow paving during steady rain as rain will saturate the gravels.

The temperature of pavement off the truck must be between 260°F and 350°F. Verify pavement thickness and that the paver follows the 2% grade.

Once paved, back up edges of pavement with gravel to protect the pavement edge from cracking and to allow cars to smoothly pull off the road.

Remember, verifying proper building procedure through inspection is essential to make sure the road is built correctly. A road built correctly will last and require minimum maintenance saving a town time and money.



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