
ROUTT COUNTY ROAD & BRIDGE POLICY AND PROCEDURES

SUBJECT: CONVERSION OF A GRAVEL SURFACE TO A PAVED SURFACE

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Routt County is Committed to Effective Road Management

Routt County is committed to effective management. It is a matter of making sure that taxpayer money is well spent as if it were one's own money. It does not mean paving roads with gold, but it does mean using the best soils available. It does not mean taking short cuts resulting in a shoddy project but it does mean using correct construction techniques and quality control. A commitment to effective management means planning for 10 or even 20 years instead of putting a band-aid on today's problem. It means using good management techniques instead of the "seat of the pants" method. It means taking advantage of available training. It means taking the time to do things right the first time and constructing projects to last.

We are facing increasing traffic volumes and more demands for more maintenance, in a declining revenues environment. We are expected to do more with less. Building roads to last requires an attitude of excellence. Such an attitude is the path toward better decision making, saves money in the long run, and results in a better overall road system.

History of Road Creation and Maintenance

Two thirds of the highway system in the United States and more than 90 percent of all the roads in the world are unsurfaced or lightly surfaced low volume roads. In Routt County more than 850 miles of local roads have gravel or native material surfaces.

Most Local roads were not designed with the same considerations used in the design of state and interstate highways. In Colorado most roads have evolved from primitive trails. Paths of least resistance first created by wild animals were later used by settlers. As needs and traffic increased, these traveled ways became roads which were gradually improved with gravel or crushed rock. Little engineering went into these improvements. Using available materials and "keeping them out of the mud" were the extent of efforts to maintain a road.

As paving occurred, the tendency was to make minor modifications to the foundations of the evolved road and to seal or pave the surface. As a result, many low volume roads in Routt County now have continual maintenance problems because of inadequate sub base support in addition to alignment and drainage problems.

To add to the problem, unimproved roads throughout Routt County are experiencing ever increasing weights and volumes of traffic. Population growth and tourism result in increased traffic volume. Trash trucks, logging trucks and other commercial vehicles are carrying heavier loads than ever before. These higher volumes and greater weights are putting a steadily increasing strain on road maintenance and reconstruction budgets.

GRAVEL OR PAVED: A MATTER OF TRADE-OFFS

The decision to pave is a matter of tradeoffs. Paving helps to seal the surface from moisture intrusion, and thus protects the base and subgrade material. It eliminates dust problems, has high user acceptance because of increased smoothness, and can accommodate many types of vehicles such as semitrailers that do not operate as effectively on unsurfaced roads.

In spite of the benefits of paved roads, well maintained gravel roads are an effective alternative and some local governments are reverting back to gravel roads. Potholes can be repaired more efficiently. Gravel roads generate lower speeds. Another advantage of the unpaved road is its forgiveness of external forces. For example, it is common today for vehicles with gross weights of 80,000 pounds to operate on Routt County's local roads. Such vehicles could damage a

lightly paved road so as to require improved subbase or resealing. The damage to a gravel road would be much easier and less expensive to repair. There is nothing wrong with a good gravel road. Properly maintained, a gravel road can serve general traffic adequately for many years.

THE TERM "PAVED"

What is meant by a "paved" road? For some, a light chip seal coat is considered paving. For others, paving is four or more inches of bituminous asphalt or "hot mix." The primary purpose of a pavement is to protect the base, subbase gravels. As loads get heavier the pavement thickness must be increased.

Generally speaking, bituminous concrete (hot mix asphalt) has no real load-bearing capacity of its own until it reaches a thickness of two inches. In fact, The Asphalt Institute has a firm policy of recommending a minimum pavement thickness of 4 inches full depth asphalt or 3 inches asphaltic concrete with a suitable granular base even for low volume roads. Their research shows that the load to produce a 1/8-inch deformation on the base is only 400 pounds on a 2-inch pavement versus 3,900 pounds on a 4-inch pavement.

A pavement less than two inches thick primarily protects the base materials by shedding water and it provides a smooth riding surface. Such a road is more properly called a surface-treated road. Roads with surface treatments or thin pavements must have excellent drainage designed into them and be diligently maintained throughout their service life.

In this policy we will consider even a light surface treatment as paving. The assumption is that, when the county first applies a chip seal treatment, for example, it has taken a first step toward eventually achieving a load-bearing pavement.

PROCEDURE:

SHOULD WE PAVE A GRAVEL ROAD? *EIGHT POINTS FOR DECISION-MAKING*

When Routt County considers paving a road, it will be with a view toward maximizing road maintenance dollars and providing a smooth riding surface. Paving is expensive, so Routt County must know that it is making the most cost-effective decision.

We will consider eight points in determining when a gravel road should be surfaced. Consideration of all eight points will provide a framework for careful decision making.

1. **Road improvements must be consistent with the County Road Management System and considered as part of the budgeting process**

If the road being considered for paving does not fit into a county-wide road improvement program, it is quite possible that funds will not be used to the full advantage. The goal of a road management system is to improve and / or maintain county roads using good management practices. A particular road is only one of many in the countywide road system. The road management system is a common sense, step by step approach to scheduling and budgeting for road maintenance work. It consists of surveying the mileage and condition of the county's roads, establishing short-term and long-term maintenance goals and prioritizing road projects according to budget constraints. A road management system helps the county develop its road budget and allows the county to use dollars wisely because priorities and needs are clearly defined. Through roadway management, the county can determine the most cost-effective, long-term treatments for their roads, control their road maintenance costs, and spend tax dollars wisely.

The Following Steps will be used when developing and re-evaluating the Road Management System:

- 1) Inventory of Roads- Includes road number and historical name if any, length and width of road per the road model database
- 2) Assess the condition of the roads- Develop a simple and easy survey technique to use each year. Maintain a continuing record of the assessed condition of each road so that changes in condition can be noted easily and quickly on an annual basis with gravel road review, and Pavement Information Management System survey of paved roads.
- 3) Select a road management strategy- Select the most appropriate treatment to maintain each road, bridge, or problem area using an evaluation of past treatment processes.

4) Determine the County's overall present needs- Estimate the cost of each maintenance job using generalized average costs and tally up the total. Establish long range goals and objectives, which in turn will help the county, justify its budget requests.

5) Establish priorities- Determine which roads may be considered for reconstruction and/or paving per the county road maintenance plan.

2. **The Average Daily Traffic (ADT) count on a county road must be sufficient to justify pavement**

The number of vehicles and the weight of the vehicles using it affect the life of a road. Generally speaking, the more vehicles using a road, the faster it will deteriorate. The average daily traffic volumes (ADT) used to justify paving generally will be in a range of 300 – 500 ADT. When traffic volumes reach this range, serious consideration should be given to some kind of surface treatment.

Traffic volumes are one of the points to guide in the decision-making processes. Types of traffic should also be considered. Different types of traffic (and drivers) put different demands on roads.

3. **The improvements must be consistent with county adopted standards**

Written standards of road design, construction and maintenance define the level of excellence. They are goals to aim for. Written standards create a common understanding about what the county is seeking in road design, construction and maintenance.

Design and construction standards should include but not necessarily be limited to right-of-way width, traveled way width, depth of base, drainage improvements, and types of surfacing.

Maintenance standards address the need for planned, periodic maintenance. A good maintenance strategy protects the integrity of the road. It is also an excellent aid when the annual Road and Bridge budget is developed. Considerations should include:

How often shall new gravel be applied to each gravel road?

How many times per year are roads to be graded?

How often and in what locations should magnesium chloride or other road stabilizers be applied?

What is the plan for ditch cleaning?

4. **Consideration of improvements must address safety and design issues**

A paved road tempts drivers to drive faster. As speed increases, the road must be straighter, wider, and as free as possible from obstructions for it to be safe. Paving low volume roads before correcting safety and design inadequacies encourages speeds, which are unsafe, especially when the inadequacies "surprise" the driver. Because of the vast mileage of low volume roads it is difficult to manage vehicle speeds by enforcement.

Roads must be designed to provide safe travel for the expected volume at the design speed. To do this a number of physical features must be considered:

*Sight distance

*Alignment and curves

*Lane width

*Design speed

*Surface friction

*Superelevation

It may be necessary to remove trees or other obstructions such as boulders from the road's edge. Gravel roads must be widened to a minimum of 22 feet before surfacing. Bridges may need widening as well. Considering these and other safety and design factors in the early stages of decision making can help to achieve the most economical road and one that will meet transportation needs. It makes no sense to pave a gravel road, which is poorly designed and is compromised by poor curvature and alignment.

5. **Base and Drainage must be improved if not adequate in their current condition.**

Build up the road base and improve drainage before surfacing. This cardinal rule cannot be stressed enough. If the foundation fails, the pavement fails. If water is not drained away from the road, the pavement fails. Surfacing a road with a poor base or with inadequate drainage is a waste of money. It is far more important to ask, "does this road need strengthening and drainage work?" than it is to ask, "should we pave this gravel road?"

Soil is the foundation of the road and, as such, it is the most important part of the road structure. A basic knowledge of soil characteristics can help avoid failures and unneeded expense. Soils vary throughout Routt County. The most important properties of a soil are size grading, plasticity and optimum moisture content.

There is a substantial difference in the type of gravel used for a gravel road-riding surface versus that used as a base under a pavement. The gravel road surface needs to have more fines plus some plasticity to bind it together make it drain quicker, and create a hard riding surface. Such material is an inferior base for pavement. If pavement is laid over such material, it traps water in the base. The high fines and the plasticity of the material make the base soft. The result is premature pavement failure.

6. **Costs of Road Preparation prior to paving must be fully developed.**

The decision to pave a gravel road is ultimately an economic one. Policy makers want to know when it becomes economical to pave. Road preparation costs are the costs of construction before paving actually takes place.

For example, if the county's standards call for a traveling surface of 22 feet and shoulders of two feet for a paved road, the costs of new material must be calculated. Removing trees, brush or boulders, adding new culverts or other drainage improvements, straightening a dangerous curve, improving slopes and elevations, constructing new guardrails, upgrading signs and making other preparations -- all must be estimated.

7. **Comparing Pavement Costs, Pavement Life and Maintenance Costs must be more cost effective than the ongoing maintenance of the gravel surface**

It is critical that the long term maintenance costs of a paved road and maintenance costs of a gravel road are developed and compared. To make a realistic comparison the years of pavement life (how long the pavement will be of service before it requires treatment or overlay) and the actual cost of paving should be included.

The following maintenance requirements should be considered in developing the long-term maintenance costs:

A) **For paved roads** only, Routt County must:

patch
reseal- chip, slurry, crack seal
stripe

B) **For gravel roads** only, Routt County must:

regravel
grade
stabilize soils or control dust

8. **Public opinion should be considered prior to paving a gravel road**

Adjoining property owners must be notified of the plans for improving and paving a gravel road and invited to a Board of County Commissioners public hearing to describe the improvements and receive comments. The public in general should also be notified about the public hearing through notices, advertisements or articles in the newspaper and /or the radio.

Although public and adjoining landowners opinions will be considered by the Board of County Commissioners, it will not be the sole determining factor in the determining whether or not to convert a gravel road to a surfaced surface.