Gravel Road Design & Maintenance Planning

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In Partnership With
Kennebec County
Soil & Water Conservation District
Topics

Road Construction Basics

Surveying/Inventorying gravel roads

Management Plans

Q&A
What is a road?

A road is:

- a way to get from Point A to Point B
- clear of vegetation and other obstacles.
- constructed of material that holds up against the forces of weather and traffic.
- shaped to keep water off, and away from the traveled way.
Clear of vegetation and other obstacles.
• Constructed of material that holds up against the forces of weather and traffic.
• Shaped to keep water off, and away from the traveled way.
The Basics of Road Building

- All roads need to withstand the impacts of vehicles and weather.
- This is accomplished by:
  - Using the appropriate materials when constructing the road
  - Shaping the road to efficiently drain water
Parts of a Road (surface)
Parts of a Road (profile)

- Road Surface
- Road Base
- Sub-Base
- Ditch
- Sub-Base
- Provides foundation for road, holds up vehicles
- Gravel contains lots of rock and drains well
- Larger aggregate size than surface gravel – 4” minus
Fabric

- Woven Geotextile
  - 200 weight is best
  - Use on new roads or in wet areas of chronic erosion that don’t dry
Surface

- Provides a smooth, easily gradable driving surface
- Keep water out of road base (roof)
- Directs water into ditches
- Crown – minimum of $\frac{1}{4}''$ per foot
- Super-elevate
Surface Gravel

-1.5 – ¾” minus material with 7-12% fines

-Bluestone gravel
  -crushed bluestone or slate with crusher dust included. Still 7-12% fines
Ditches

- Control the runoff from the road surface
- Drains water out of the road base materials
- Shape of ditch should be a “rounded V”
- Stabilizing ditches
Culverts

- Used to convey water under a road
- Properly sized
- Proper compaction
Surveying Gravel Roads

Taking Inventory
Road Problems

- **Common Problems:**
  - Road Surface Erosion/Potholes
  - Mud
  - Road Shoulder Erosion
  - Ditch Erosion
  - Culvert Inlet/Outlet Erosion

- Most problems are due to poor road shape and/or poor materials
A Guide to Forming Road Associations

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GRAVEL ROAD MAINTENANCE MANUAL
A Guide for Landowners on Camp and Other Gravel Roads

Links:
http://www.maine.gov/dep/land/watershed/materials.html
Score Sheet Evaluating Gravel Roads For Drivability, Stability And Maintenance of Water Quality

Road Name or Fire Lane Number: ______________________

Municipality: ______________________

Book and Page number of deed for road: Book: _____ Page: _____

Road is seasonal _______ Road is year round _______

If year round, is it plowed in the winter? _______

Are winter and/or “mud season” use prohibited by owners or the Road Association? _______

Right of way width if known: _______

Approximate Road Length: _______

Number of culvert crossings: _______

What Lake Watershed is the road located in: ______________________

Is the road in the Shoreland Zone? _______

If yes, be sure to follow Shoreland Zoning and NRPA regulations
(Refer to page 71 of the Gravel Road Maintenance Manual for more information)

Is there an active Road Association for the road? _______

If yes, Contact Person: ______________________

Telephone number: ______________________

Name of Evaluator: ______________________

Date of Evaluation: ______________________

Weather conditions: ______________________
### Section 1. Road Base and Surface Areas

<table>
<thead>
<tr>
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<th>SCORE</th>
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<tbody>
<tr>
<td></td>
<td>Stations</td>
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<tr>
<td>1. Road constructed <strong>above</strong> original ground level to facilitate drainage/structural integrity of road base materials.</td>
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<tr>
<td>2. Gravel road surface is at least 4 to 6 inches, is compacted, and is composed of a firmly packed aggregate. <em>(Refer to page 21 of the Gravel Road Maintenance Manual for road material information)</em></td>
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<td>3. Gravel road surface provides good traction and is not highly erodible and dusty <em>(too many fines)</em>.</td>
<td>0</td>
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<td>4. Level or low slope road surfaces are crowned to shed water at ( \frac{1}{2} ) inch of rise per foot of road width, or contain alternative drainage structures, such as waterbars, or are otherwise designed to direct stormwater as sheet flow off of the road surface <em>(insloped/outsloped)</em>. <em>(Refer to page 30 of the Gravel Road Maintenance Manual for information on road crowning)</em></td>
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<tr>
<td>5. Steep sloped road surfaces are crowned to shed water at ( \frac{3}{4} ) inch of rise per foot of road width, or contain alternative drainage structures or are otherwise designed to direct stormwater as sheet flow off of the road surface or are paved. <em>(Refer to page 30 of the Gravel Road Maintenance Manual for information on road crowning)</em></td>
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<td>6. Stormwater flow from the road surface is directed to stable ditches, a vegetated buffer or stable vegetated areas <em>(that are not wetlands)</em> of at least 50 feet in width between the road and a waterbody.</td>
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Road Inventory

**Culvert**
- Unstable inlet / outlet
- Clogged
- Crushed / Broken

**Ditch**
- Slight Erosion
- Moderate Erosion
- Severe Erosion
- Bank Failure
- Inadequate Ditch

**Road Shoulder Erosion**
- Slight
- Moderate
- Severe

**Surface Erosion**
- Slight
- Moderate
- Severe
Culvert: Unstable inlet/outlet
Culvert: Unstable inlet/outlet
Culvert: Clogged
Ditch: Moderate Erosion
Ditch: Severe Erosion
Ditch: Bank Failure
Road Shoulder: Moderate Erosion
Road Shoulder: Severe Erosion
Road Surface: Mild Erosion
Road Surface: Severe Erosion
8 Steps to Managing Your Gravel Road

1. Inventory road
2. Assess condition using score sheets
3. Determine specific road repairs
4. Determine costs
5. Establish priorities – 2 factors
6. Create inspection schedule & checklist
7. Establish yearly budget
8. Keep a journal
Gravel Road Maintenance Planning
MES Road Plans Include the Following Information

- Evaluation of Existing Road
- Aggregate Sizes and Options
- Dust Control
- Contact Information
- Aerial Maps of Site Locations and Measurements
- Photos/Report of Site Specific Repairs and Ranking
- Construction Details
- Maintenance Recommendations
- Maintenance Log

Additional Management Plan Options

- Road Profile
- Construction Oversight
Site # 1: 140’ section between Dick Harvey driveway & Pole # 23.

Issue: Water not reaching ditches, ground water coming up through road, lack of crown and insufficient ditching.

Fix: Box cut 140’ section and install US 200 woven filter fabric, 1’ of 3” minus base gravel compacted in 6” lifts and 4” of 1” minus surface gravel with 7-12% fines. Road surface should be shaped and compacted to a minimum of ¼” per foot crown.

Install 85’ of ditching on west side of road between poles #21 & #23 & tie into existing ditch to the north. Stabilize ditch with seed and hay.

Priority #: 1
Site # 4: 300’ section from turnout at the bottom of site # 3, around corner to Camp sign.

Issue: Lack of ditching, surface erosion, road material accumulation at bottom of hill.

Fix: Install ditch on east side of road (Approx 230’) where water cannot get to woods and stabilize with 6” angular rock. (ditching this section will be a challenge due to site conditions) Super-elevate road surface (approx 300’) to east & direct water into new ditch that will end in a turnout at the bottom of the hill.

Priority Ranking #: 2
Same site following implementation of recommendations
Site # 9: From Pole 88 to Pole 91 for a distance of 630’

Issue: Road is lower than surrounding grade. Surface erosion is occurring and there is no way to get water off road surface.

Fix: This is the most challenging section of Horse Point Road to address. To significantly improve this section would require a complete rebuild to raise road 1’ above existing grade.

Steps: Install layer of Woven stabilization fabric like US 200, over road surface using specs provided. Add 5” of 4” minus material and compact with a roller. Add remaining 4” to a crown of ½” per foot and roll again. Add 3” of 1” or 1.5” minus surface gravel and crown to ½” per foot and roll a third time.

Priority Ranking #: 3
Same site following implementation of recommendations - Day after Hurricane Irene
Site # 4: From end of Site #3 - 420’ to south.

Issues: Vegetation and debris buildup in left side ditch. Ditch also needs to be reshaped and deepened. 3-6” DBH (diameter breast height) trees encroaching road surface on right. Shoulder berms are present along the sides of road.

Fix: Clean and reshape left side ditch to increase capacity and ensure uninterrupted flows toward culverts. Remove closest trees on right side of road surface growing in shoulder. Shave shoulder berms & cut in several turnouts on right where trees and topography allow. Maintain crown.

Priority #: 4
Searls Mills Road - Site # 3

Site # 3: From Pole # 13 – 275’ to Pole # 14

**Issues:** Lack of ditching and shoulder berms
A wet spring is weeping water through the road surface causing rutting, mud and saturated conditions.
Poor surface gravel with very high fine content and sandy

**Fix:** Continue right side ditch for 271y’ to Pole # 14 and stabilize with seed and hay.
Box cut 75’ saturated area and rebuild road. Install woven geotextile fabric and rebuild base with 1’ of 4” minus base gravel rolled in 6” lifts. (Compacted depth will be approximately 6”)
Install 6” of 1” minus surface gravel (pre-compacted depth) and crown to a minimum or ¼” per foot.

**Priority #:** 1
Gravel road maintenance plans have proven to be the best investment a group can make in their gravel road.

Small investment to have a 10 year plan for properly maintaining a road, spending your money in the right areas and protecting your investment.
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