



Final Report

**Prioritization of Gravel Road Upgrades
Grant County
Phase 2**

**Reid C. Wheeler, Consultant
Wheeler Management Assistance
September 29, 2006**

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Grant County Prioritization of Gravel Road Upgrades – Phase 2

2006

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Background

In 1999, Grant County embarked on a program of upgrading existing gravel roads to paved. This program anticipated directing as much as \$7 to \$8 million of the County Road Fund over the next 6 to 7 years to placing a bituminous surface treatment on the most important gravel roads. Grant County did not have a method to prioritize the extensive amount of gravel roads (1,200+ miles) and desired to develop such a priority programming process to insure gravel roads are identified and scheduled for improvement in a logical, cost effective manner. The Board of County Commissioners also directed the use of a stakeholder advisory group to assist and advise in the development of such a priority programming process.

On December 21, 1999 the Grant County Department of Public Works entered into a contract with Wheeler Management Assistance (WMA) to develop and implement a priority programming method for evaluating and ranking gravel roads (and less) within Grant County such as to provide both a methodology and an immediate rank-ordered list of such roads for upgrading to a paved surface. This process included the establishment, management and use of a Stakeholder Advisor Committee to assist in this process, specifically the development and establishment of appropriate criteria, including weighting. It is important to note that only potential projects proposed by the Stakeholder Advisory Committee members and Public Works were considered; the option to solicit projects from the general citizenry was not done. A total of 93 potential projects were identified and evaluated.

On December 18, 2000 the project was finished, providing the County a rank-ordered list of the 93 projects. As a result, the County has followed the ordered list – project by project – in its annual work program from 2001 through 2007. By 2007, the first 40 of the 93 projects will be constructed. The details of the process and the results are contained in the final report; a copy is available at the Grant County Public Works office.

Because of the completion of the initial six years in 2007, the likelihood that the remainder of the 93 project array are probably lesser valued projects and that the process was not opened up to the public the County decided that it would be prudent to revisit the process if it is to be continued. Overall, the County has been quite satisfied with the program and does wish it to continue at least for the next two to three years depending on the funding availability.

To that end, the County retained the services of the original consultant to perform an update (referred to as Phase 2) to the original study. This will entail a reconstitution of a Stakeholders Advisory Committee to work with the consultant to revisit - and modify as may be appropriate - the original characteristics and the recommended weighting for each characteristic, to open up the solicitation of new projects to the public at large (yet still keeping the remaining, unfunded list of the original projects), and develop a new priority listing for funding beyond 2007.

A contract between the Grant County Department of Public Works and Wheeler Management Assistance to implement this 'Phase 2' was signed on March 29, 2006.

Project History

Actual project work began in April 2006 with the consultant developing and providing Grant County with information regarding the use of advisory committees and some suggestions for selection of members. The consultant also obtained a copy of the most recent road log from the County Road Administration Board to develop the most up to date listing of all gravel roads in the County.

On April 11th, the consultant, Public Works Director and Assistant Director met with the Grant County Board of County Commissioners to discuss the use of a stakeholders advisory committee with special emphasis on member selection, the committee process, and expected outcomes. Subsequently, the Grant County Board of County Commissioners selected a twelve-member Stakeholder Advisory Committee (SAC). Each Board member selected four committee members from within their district. See Appendix B for the list of SAC members. The first meeting was set for June 5th at the Grant County Public Works meeting room. A copy of the 2000 report was sent to each member in advance of the June 5th meeting.

SAC #1 – June 5, 2006

At the first SAC meeting, the following was accomplished¹:

- Introductions of the consultant, Public Works Staff, and the Board of County Commissioners members in attendance
- Welcoming comments by Board of County Commissioners chairman
- Self introductions of the SAC members
- Review of purpose/scope of the project and the role of the SAC
 - ✓ One-time, single-purpose group
 - ✓ Input as to what factors or criteria should be considered for gravel road upgrades, how factors should be scored or evaluated (objective vs. subjective), and how much weight to each factor or how they should be combined.
 - ✓ SAC should represent rural residents and rural issues
 - ✓ SAC members should represent some particular interest in gravel roads, have respect of their local community, understand need for reaching a clear, workable solution.
 - ✓ SAC is not an independent body that will decide which roads get paved – advisory to/with Public Works. Key element is to bring rural community values/issues/concerns to the process.
- Review of project timetable and key events
- Discussion of priority programming principles including use of current data, data reliability, collection of additional data, and discussion of objective versus subjective data.
- Review of entire 2000 report in detail including how the 2000 report results were implemented
- Review of current/historical processes of upgrading gravel roads (grant funding, cost share program)
- Feedback from SAC members as to what they want for next meeting

¹ Eleven of the twelve members were present

- Set next meeting for June 26

During the remainder of June in preparation for the second meeting, the consultant obtained a county road map exhibit for the next SAC meeting showing the entire road system with the existing gravel roads. In preparation for the second meeting, a short paper on the various issues concerning gravel road upgrades was prepared for discussion. The paper discussed:

- What is expected from paving a gravel road?
- Who benefits from paving a gravel road?
- What are the characteristics of an existing gravel road that makes it a good candidate?
- What are the characteristics of an existing gravel road that makes it a poor candidate?
- Further discussion on objective versus subjective and independent versus dependent data elements
- Methods of measuring ‘good candidate’ characteristics which include:
 - High traffic volumes
 - High truck traffic volumes
 - School bus routes
 - Large number of residents adjacent to/served by a gravel road
 - Safety problems
 - Connections between existing paved roads
 - High road maintenance costs
 - Dust susceptible crops
 - Arterial versus non-arterial projects
 - Other, such as those inside urban areas, around unincorporated population centers, and adjacent to smaller incorporated towns.

Also prepared a draft news release regarding citizen suggestions for candidate projects that will be printed in the various local newspapers as well as be reproduced on the Public Works’ web site. The news release will be printed twice (once per week) in each of the county newspapers – all submittals must be in to Public Works by July 14 providing some three weeks notice.

SAC #2 – June 26, 2006

At the second SAC meeting, the following was accomplished²:

- Presented the large scale county map showing the location of all unpaved roads
- Passed out and reviewed/discussed the paper prepared earlier (see above); received opinions/observations/suggestions from each member
 - ✓ Projects will not include any that require major road realignment or grading; program is designed for straightforward upgrades of existing roads with only structural improvements, upgraded drainage and only very minor alignment changes (primarily in width to meet county standards).
 - ✓ Program does address general health and welfare needs that will be alleviated by paving gravel roads

² Nine of the twelve members were present

- ✓ Discussed status of current traffic count data (old, poor) – new counts will be necessary but only could do up to 200 miles yet this year; need to reduce viable candidates to somewhere around that number of miles or less.
- Considered additional gravel road characteristics that could be used including availability of data and how it might be measured.
- Discussion of relative importance/value of each characteristic in light of developing a final array and selection of the final key characteristics to be used including how/where the data will come from.
- Discussed how citizen suggestions for candidate projects will be done (published news releases).
- Set the next SAC meeting for August 21st.

During July and August prior to the third advisory committee meeting finalize the list of candidate projects, provide to Public Works so all new traffic counts can get underway, begin and complete the field inventories of all candidate projects to ascertain adjacent residences and crops, complete discussions and meetings with the various school district transportation supervisors to obtain information on school bus routes and frequency. Copies of the final project listing as well as the suggested final ‘Scoring of Gravel Road Characteristics’ were also sent out in advance to each of the advisory committee members.

SAC #3 – August 21, 2006

At the third SAC meeting the following were accomplished³:

- Overall progress to date was presented.
- An updated version of the final project list was distributed and discussed. This list contained a little over 200 miles of gravel roads – this list includes all of the carry-forwards from the 2000 array plus all new submittals from both Public Works and the citizens at large resulting from the news releases.
- The ‘Scoring of Gravel Road Characteristics’ paper was discussed; additional explanations of the various data elements including availability/quality were done. No further revisions were suggested although the committee did discuss a recommendation by member Rachel Perkins (via e-mail) to remove the school bus route characteristic. The committee did not agree. [The final ‘Scoring of Gravel Road Characteristics’ paper is included in Appendix C.]
- There was discussion regarding the inclusion of the rural community projects (Beverly, Schwana, and Royal Camp) as well as inclusion of those which are in the urban growth boundaries (principally those around Moses Lake). The committee decided to continue to include the rural communities, primarily due to the fact that there are numerous county residences and there is no other possibility of funding road improvements, and to eliminate from further consideration those within urban area boundaries as they will ultimately become part of the adjacent city as envisioned by GMA and the committee envisions the gravel road upgrade program as primarily rural in nature.
- As there was a general agreement as to the list of characteristics, a table was put up on the board and each member was asked to suggest a preliminary relative weight each factor or characteristic should have in determining any one project’s priority. This was done for the seven members in attendance and the suggested weightings received via e-mail from two of the missing members.

³ Seven of the twelve members were present

Subsequently, on August 25th, this incomplete and preliminary table of weightings was sent to all committee members with a request for those who had ‘voted’ to amend their vote if so desired and for those who were absent to cast their ‘vote’ by September 5th. Ultimately, a final table of weightings was created with eleven of the twelve members providing their recommended weighting. [The final relative weightings of each of the characteristics is shown in Appendix D.]

During the remainder of September, the County continued to complete the new traffic count and the consultant completed the entry of all data elements into the prioritization spreadsheet which reflect the required data elements as per the ‘Scoring of Gravel Road Characteristics’ paper.

SAC #4 – September 25, 2006

At the fourth and final meeting the following were accomplished⁴:

- Overall progress and status were reported by the consultant
- Handouts illustrating the final committee characteristic weightings (raw and adjusted), comparison of effects of alternate weightings on the first 25 projects, and the recommended priority listing were distributed and discussed
- Some general discussion of the recommended priority listing and the effects that the various characteristics had on the relative priorities; no further suggestions from the committee members in attendance

Subsequent to the meeting, the consultant completed the final report.

Conclusions

Other than the unforeseen delay in getting the initial advisory committee constituted, the entire project stayed on task and on track. Overall, the experience of using a Stakeholder Advisory Committee chosen by the Board of County Commissioners worked very well. Although not all the members were able to attend all the meetings, they kept well informed (through mailings of meeting notes and meeting handouts to those who missed a meeting) and actively participated in the project.

Public Works was very cooperative throughout the process, providing maps, data, etc. as needed.

The Stakeholder Advisory Committee was able to efficiently and effectively progress through the various steps leading to a comprehensive priority process and resultant priority array.

Perhaps the most important product was not just a priority process and array but the overall process of using an advisory committee to provide community input to get there.

⁴ Four of the twelve members were present

Recommendations

The consultant has the following recommendations to the Department of Public Works and the Board of County Commissioners:

1. Accept the specific gravel road characteristics, the methods to determine each characteristic and the valuation scale of each as described in the Scoring of Gravel Road Characteristics as shown in Appendix C;
2. Accept the Relative Weightings of each characteristic as determined by the Stakeholder Advisory Committee and as shown in Appendix D;
3. Accept the resultant rank-ordered list of the initial project list as shown in Appendix A⁵ to serve as the basis for selecting specific projects to be constructed in 2008 and 2009; if sufficient funds area available, continue through 2010.
4. Maintain the existing Cost Share Program as it provides an alternate means of funding gravel road upgrades for projects that do not rank well or not at all on the priority array.

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⁵ A copy of the complete priority calculation spreadsheet as well as individual project location maps are contained in Appendix E.

*Grant County Gravel Road Upgrade Project – Phase 2***SCORING OF GRAVEL ROAD CHARACTERISTICS**

Each of the selected characteristics of a gravel road has been scored on a 0 to 10 scale. This paper describes how each of the characteristics was evaluated and scored.

1. General Traffic Volume/Commercial Traffic (trucks)

In generally accepted road maintenance practice, gravel roads become good candidates for paving when the average annual daily traffic (AADT) count exceeds 150 to 200. At around that point, the cost to maintain a gravel road in a good driving condition frequently exceeds the long term cost to place and maintain a paved (BST¹) road. High levels of truck traffic are hard on gravel roads especially as speeds increase. Truck volume and classification information is not available for the gravel road system in Grant County. Typically, truck counts are only done in preparation for some grant funding programs or for new road design.

Method to Determine**General traffic volume**

Each of the roads in the final project list was counted in July and August using automatic traffic counters for a minimum period of 3 days. The traffic counters now in use have the capability to determine both car and truck counts. In some cases, each end of a road was counted. In those cases, the highest value was used. These traffic counts are ‘raw’, that is they have not been seasonally adjusted; the seasonal adjustment factors have been reviewed and have virtually no effect. In all cases, the County has attempted to determine the best, most correct traffic count numbers. As has been discussed several times, the absolute accuracy of any one traffic count cannot be precisely determined without performing an actual count for an entire year. This is impractical and the shorter count periods are adjusted where necessary to provide an estimate of the annual count figures. This problem is further compounded by the relatively low counts for the projects on the final project list. Low counts are subject to a much larger variation for any given time period.

Commercial Traffic (trucks)

All roads that are on final project list have been counted using special classification counters that can determine the amount of truck traffic as part of a total traffic count.

¹ *BST stands for Bituminous Surface Treatment in which after a gravel road is properly graded and compacted, liquid asphalt is sprayed on the road and then covered with select small aggregate.*

Scale

As general traffic count and commercial (truck) traffic are combined into one characteristic, the two variables were combined into a single score with a maximum value of 10 points. As the general traffic volume is the more important of the two, 80% or 8 points maximum was assigned to this variable. 20% or 2 points were assigned to commercial traffic.

Assigning a maximum 8 points for general traffic volume, the 8 points are scaled as follows:

- Less than 50 AADT = 0 points
- 50 to 99 AADT = 2 points
- 100 to 149 AADT = 4 points
- 150 to 249 AADT = 6 points
- Over 250 AADT = 8 points

Assigning a maximum 2 points for commercial traffic, the 2 points are scaled as follows:

- Average Daily Truck traffic of less than 10 = 0 points
- Average Daily Truck traffic of 10 to 24 = 1 points
- Average Daily Truck traffic of 25 to 39 = 1.5 points
- Average Daily Truck traffic of 40 or more = 2 points

Scoring

The final number of points assigned to the General Traffic Volume/Commercial Traffic (trucks) characteristic is the sum of the general traffic volume and the commercial traffic score.

2. **Number of Residences Near**

A count of residences (dwelling units) adjacent to a gravel road is an indicator of the relative severity of any dust problems as they affect personal comfort and quality of life. How close or far away a residence adjacent to a gravel road is from the road will also be important to assessing the probable impacts. For this analysis, a distance of 500 feet has been used. To adjust for the difference in project length, the final computation is in residences per mile.

Method to Determine

This data is not readily available and has been gathered by a site-specific field review of the actual residences on or adjacent to each road segment. Each road was inventoried and the number of residences within 500 +/- feet of the road were counted. This is limited to those residences that are or appear to be at least semi-permanent and occupied. Trailers and mobile homes that are blocked up were counted as residences.

Scale and Scoring

Assigning a maximum 10 points for number of residents near, the 10 points are scaled as follows:

- No residences on or adjacent to road = 0 points
- Residence density adjacent is 1 to less than 4 per mile = 3 points
- Residence density adjacent is 4 to 8.9 per mile = 5 points
- Residence density adjacent is 9 to 11.9 per mile = 7 points
- Residence density adjacent is 12 or more per mile = 10 points

If a road is less than one mile in length or there is only one residence on road more than one mile in length, the actual number of residences is used to compute the points (residence density less than 1 is scored as having 1 per mile).

3. **School Bus Routes**

A new characteristic that was not considered in the 2000 study, school bus routes are considered in the 2006 phase 2 study. School buses, like trucks, also create a high wear and tear on gravel roads. Many of the children being transported wait at the edge of the gravel road and are thus subject to being dusted during the dry months. Public Works also indicate that many of the complaints they receive concern school bus traffic on gravel roads being a major contributor to the dust being created.

Method to Determine

This data is not readily available and was solicited from the various school districts with routes within Grant County. Each of the transportation ‘directors’ of the various school districts were contacted and a determination was made regarding each project within each school district as to whether the project was on a school bus route and the total number of times the route was used during a typical school day.

Scale and Scoring

Assigning a maximum 10 points for school bus routes, the 10 points are scaled as follows:

- Not a school bus route = 0 points
- School bus route – 1 to 2 uses per day = 6 points
- School bus route – 3 to 4 uses per day = 8 points
- School bus route – 5 or more uses per day = 10 points

4. “Missing Link”/Network Completion

Missing links are those unpaved pieces of a road system that connect between paved sections for route continuity and provide alternate (and often shorter) connections between paved portions of the road system. Missing links are most often on the major (arterial or classified truck routes) routes.

Network completion refers to a characteristic that takes into account the general existing surfacing of the roads in the immediate vicinity of a gravel road. Locations where there are unpaved connections between existing paved roads are most likely good candidates for paving. Improvements to such locations can improve overall network circulation (more options for traffic routing and more direct point-to-point travel options) on the paved road system. When all of the roads surrounding and connecting to (at both ends) a gravel road are paved, there is some utility in upgrading to paved as road graders do not have to be ‘deadheaded’ to pick up an isolated section. Roads categorized as “network completion” sections are typically fairly short sections with a total length of 2 miles or less and must be connected to other county or state paved roads at both ends.

Dead end roads are not considered as being either a ‘missing link’ or will be scored for network completion.

Method to Determine

Missing Links

Each proposed road was located on a county map of sufficient scale and detail to determine the functional class (arterial or non-arterial) and the FGTS² classification (is on FGTS system or is not) as well as those characteristics for the roads connecting to the proposed gravel road.

Network Completion

Each proposed road was located on a county map of sufficient scale and detail to determine the road surface (paved or not paved) for all roads connecting at each end of a proposed gravel road.

Scale

Assigning a maximum 10 points for “missing links”, the 10 points are scaled as follows:

For all gravel roads that appear to be a missing link, score as follows:

- On the county road arterial system and the county FGTS = 10 points
- On the county road arterial system only = 8 points
- On the county FGTS only = 6 points

² In 1993 and in accordance with State requirements, all counties have evaluated their road systems and designated what is called the Freight and Goods Transportation System (FGTS). This system of roads (which also includes all of the State highways) maps the major truck routes based on annual estimated tonnage being moved. Most of the designated FGTS routes are on paved roads, however there some 64 miles of the gravel and less road system that are designated FGTS routes.

If not on the county road arterial or FGTS system:

- Connection to county arterials and/or state highways at both ends = 5 points
- Connection to county arterial or state highway at one end = 4 points

Assigning a maximum 10 points for network completion, the 10 points are scaled as follows:

For all gravel roads that appear to be part of a network completion, score as follows:

- All other roads within 1 mile of each end are paved = 10 points
- 80% of all other roads within 1 mile of each end are paved = 7 points
- If less than 80% of all roads within 1 mile of each end are paved, but the road does otherwise provide a connection between two paved roads = 5 points

Scoring

Because of the similarity between missing links and network completion, a proposed road section was scored under “network completion” or “missing link”, not both. The higher of the two values was used.

5. Road Maintenance Costs

Those gravel (or less) roads with the highest maintenance costs should rank high on any upgrade priority list. Such high-cost roads may have the average annual maintenance cost reduced through upgrading to paved.

A related issue is that of transporting ‘soft’ fruits. Roads with a high maintenance cost experience more frequent periods of potholing and general road roughness. This requires that the transporting vehicles must go very slow to reduce fruit damage. Roads in areas where such fruit is grown and the transport period coincides with the worst roughness should be good candidates for paving.

Another issue of concern to road maintenance supervisors is reducing the amount of gravel road grading in urban areas (chiefly those adjacent to the city of Moses Lake) and in the small rural unincorporated town-like areas such as Trinidad and Schawana. Parked cars and right-of-way encroachments make periodic grading difficult on both the Public Works department and the local residents.

Method to Determine

It is possible to obtain at least some relative ‘cost to maintain’ rankings by interviewing the road maintenance staff. Such a review of gravel roads has been done by each of the three county road supervisors. Specific gravel road sections that are considered unusually high in gravel road maintenance cost for which the maintenance costs may be lowered by paving have been identified and tabulated. In addition, gravel road segments that have other, unique maintenance problems (for example, steep grades, excessive grader travel to maintain, short miscellaneous pieces within urban areas, and rural unincorporated town-like areas) have been identified.

Scale and Scoring

Assigning a maximum 10 points for high road maintenance cost, the 10 points are scaled as follows:

- Roads designated as high maintenance = 10 points
- ~~Roads designated as spot locations in urban areas = 7 points³~~
- Roads designated as rural unincorporated town-like areas = 4 points

Roads that are designated as being in out-of –the-way locations or as isolated pieces requiring excessive grader travel time will be rated under the “Missing Link”/Network Completion characteristic.

³ Further consideration of spot locations in urban areas or within an urban growth boundary has been deleted as per advisory committee recommendation of August 21, 2006

6. Dust Susceptible Crops

Some field and row crops are more highly susceptible than others to diseases and market value reduction when exposed to road dust. Such locations should be good candidates for paving. According to the WSU Extension service, both fruit trees and grapes are clearly adversely affected by dust. As part of a similar project done for Yakima County in 2004, the consultant was able to find additional supportive research done by the New Zealand Ministry of Agriculture and Forestry in 1999. The relative effect of dust on the commercial value of crops, using the very limited data available, provides the following relative effects by general crop type. For simplicity, the highest effected crop was assigned a value of 1.0.

Table 1 – Crop Dust Sensitivity

Crop	Sensitivity Factor
Peaches	1.0
Cherries	1.0
Blueberries	1.0
Apples	1.0
Pears	1.0
Vegetables	0.7
Hops	0.7
Potatoes	0.7
Apricots	1.0
Grapes, All	1.0
Corn, all	0.7
Asparagus	0.7
Mint, all	0.7
Prunes & Plums	1.0
Hay, Alfalfa	0.2
Hay, Other	0.2
Grain	0.2
Irrigated Pasture	0.1

Method to Determine

Each road on the initial project list was field-inventoried to determine the amount of each crop currently being grown on each side of the road.

Scale and Scoring

Assigning a maximum 10 points for dust susceptible crops, the 10 points are scaled as follows:

1. Determine the total length in miles along each side of the road devoted to each of the agricultural uses as per Table 1.
2. Multiply the miles in step 1 by the associated sensitivity factor.
3. Total the results of step 2.
4. Divide the results of step 3 by twice the total length of the road.
5. Multiply the results of step 5 by 10 to determine the final score.

7. **Safety**

Safety problems are generally determined from accident history records. Many grant programs require that at least a three-year accident history be submitted. There are, however, two problems with placing too much emphasis on accident history in the prioritization of gravel road upgrades:

1. Typically, gravel roads have a very low accident rate. Just one recorded accident can overly skew the priority.
2. In rural areas, most minor accidents are not recorded or filed. We can have locations that have a relatively large number of these low severity accidents but no one would know.

There are also combinations of grade and vertical/horizontal alignment that may create less than desirable driving situations even if there is no recorded accident history. Relatively steep grades on gravel roads are prone to ‘washboarding’ during dry weather. This is a particular problem for vehicles going uphill as the uphill lanes are far more prone to washboarding than the down hill lane. A possible result is that vehicles may use the ‘wrong’ lane when going uphill to avoid the washboard surface. If this combines with minimal sight distance with on-coming traffic (the grade and the vertical/horizontal alignment are not well coordinated), there is a potential for accidents.

Method to Determine

The available accident records available as computer files identified by county road log number and milepost cover the five year period of 2001 through 2005. The county’s computerized County Road Information System was queried to identify all recorded accidents on the initial project list.

As part of the field inventory of each road on the initial project list, a visual observation was made to identify those locations where there are poor combinations of steep grade and vertical/horizontal alignment.

Scale

Assigning a maximum 10 points for safety, the 10 points are scaled as follows:

- 2.00 or more accidents per mile 2001 through 2005 = 10 points
- 1.00 to 1.99 accidents per mile 2001 through 2005 = 7 points
- 0.50 to 0.99 accidents per mile 2001 through 2005 = 4 points
- Zero to 0.49 accidents per mile 2001 through 2005 = 0 points

If there are locations where there are poor combinations of steep grade and vertical/horizontal alignment deficiencies noted on the field inventories, they are scored as follows:

- Two or more locations = 6 points
- One location = 3 points

Scoring

Both the accidents and the poor steep grade and vertical/horizontal alignment locations are scored. The final score is the higher of the two values.

8. **Arterial/Non-Arterial**

Roads that are on the county arterial system serve a higher function to convey traffic than do local access roads. Gravel road arterials should rate higher than gravel road local access roads.

Method to Determine

Each county maintains an up-to-date designation of all arterial roads within its computerized road log.

Scale and Scoring

Assigning a maximum 10 points for arterial/non-arterial, the 10 points are scaled as follows:

- If a rural major collector⁴ (arterial) or urban arterial, score 10 points
- If a rural minor collector(arterial), score 7 points
- If not a collector (arterial), score 0 points

⁴ Road systems are fundamentally broken down into arterial and local access. Rural “collectors” are a subdivision of the arterial definitions.

9. **Land Value (Agricultural)**

Agricultural land value is a measure of the relative property values and generated tax income. The theory is that the higher valued land grows the higher valued crops and thus generates a higher commercial 'value' to the county as a whole. A higher priority for roads that serve and support this higher commercial (and tax) value to the county is implied.

Method to Determine

Each road on the initial project list was field-inventoried to determine the agricultural land use on each side of the road. The amount of mileage of each agricultural land use was multiplied by the assessed value from figures provided by the County Assessor's office. As there are a range of assessed valuation for most agricultural land uses (the exact figure is determined for each parcel by the Assessor's office periodically and is based on more specific information than can be gathered by a field inventory), a figure slightly more than one-half of the way from the lowest to the highest assessed value was used. The per-acre figures (2006 values) used are as follows:

- Dryland grain - \$500
- Orchards - \$11,000
- Irrigated row crops⁵ - \$2,000
- Asparagus - \$2,500
- Uncultivated/unimproved - \$200
- Hay/alfalfa - \$1,300
- Grapes - \$7,000
- Irrigated pasture - \$850

Using the above values and the mileage of each current agricultural use along side a road, a weighted average value was determined ranging from a low of \$200 per acre to a high of \$11,000 per acre. Only agriculture land being served or supported by each of the gravel road sections was considered; land primarily devoted to business, homes, public use, etc. was not included in these calculations.

Scale and Scoring

Each road was scored as follows:

1. Determine the total length in miles along each side of the road devoted to each of the agricultural uses as shown above.
2. Multiply the miles in step 1 by the associated agricultural land value⁶.
3. Total the results of step 2 and divide by twice the total length of the road.
4. Divide the results of step 3 by 11,000.
5. Multiply the results of step 5 by 10 to determine the final score.

⁵ Includes tree nurseries and turf farms

⁶ All values were reduced by \$200 as unimproved and uncultivated land was not inventoried and they have a base land value of \$200 per acre.