Hart County 5 Year Road Plan

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Update to the 2001 5 Year Roads Plan
December 31, 2006

Executive Summary:

Road maintenance is an ongoing program must be planned correctly so that the roads infrastructure improves over time. Without a long range plan the County does not have a direction to ensure roads get better.

Road infrastructure conditions change over time therefore the roads plan is set up for 5 year intervals. I developed the first ever Hart County roads plan in 2001. This is an update to that roads plan and does not contain the volume of information in the original plan. Please refer to the original plan for more detailed information.

In the past five years we have resurfaced 87 miles of our paved roads (24% of our 368 paved road miles). In addition we have first time paved 25% of our dirt road miles in five years reducing our dirt road miles from 109 miles to 82 miles of dirt road. In 2007 we will also complete the resurfacing of 101 miles of tar and gravel road.

With the rise in petroleum prices the price of asphalt more than doubled last year. At the same time, the changes in the SPLOST funding law has resulted in less revenues available for road projects this 5 year planning period in comparison with the past 5 years. This has placed some challenges in developing a strategy for the next 5 years. In response, I am recommending that we institute some alternative plans for the next five years.

The next five years of roads maintenance will be funded by the current SPLOST III. There is approximately $4,000,000 estimated allocated to roads. Any surplus funds will also be allocated to roads. However to maintain our roads at the current condition and/or to improve the condition of our roads inventory we will need more than that amount of money.

Five years ago, I also created the first roads database. This roads database track improvements to roads including resurfacing. However the paving data is only available for the past 5-7 years. An asphalt paved road should be evaluated for resurfacing every 10 years therefore any road that has been recorded as resurfaced in the past 5-7 years has not been revisited and is listed in the "excellent condition" column.

Over the next five years, sealing of asphalt roads with tar and gravel will be an even more important tool than it has in the past 5 years. As part of our long range roads maintenance program, several years ago we began a program of "strip sealing" sections of asphalt paved roads in order to prevent them from very costly patching in the future.

The prior five year plan created distinct pavement condition categories based on the cracking observed during inspection. The worst condition of "poor" and "very poor" were taken care of in the last five years.

For this five year update I have re-inspected any road that was not resurfaced in the past 10 years. For this next five years, I have developed the road categories of condition based on the resources available. In order to continue positive progress with our roads infrastructure, we must carefully spend our road money.

THE "PLAN":

Hart County has an estimated $100,000,000 in road assets including 224 bridge structures, 367 miles of asphalt paved roads, 109 miles of tar and gravel paved roads, and 82 miles of gravel (dirt) roads. This plan addresses the management of our road assets including our paved roads, tar and gravel roads, dirt roads, and bridge and pipe structures.

The value of our road assets was declining due to a lack of a long range plan, neglected maintenance (including resurfacing), and lack of sufficient resources. With the implementation of a long range roads plan we have reduced the volume of work that needs to be completed however the price of road work has increased dramatically.

Over this planning period an estimated $5,000,000 is needed for resurfacing of paved roads in the worst condition of "fair". Because the amount needed to bring our roads to proper condition exceeds available funding, this 5 year plan suggests continuation of the prior plan of sealing sections of these roads with tar and gravel using the road department labor. By stabilizing the asphalt paved roads the cost to patch and pave these roads at a later date will not increase over the five year planning period.

The County has also 109 miles of tar and gravel surfaced roads that were in various stages of degradation. All these roads were past their design surface life so the prior 5 year roads plan recommended resealing all 109 miles of tar and gravel roads over the five year planning period. This work is scheduled to be completed in 2007. At that point all 109 miles of tar and gravel road will have received a new surface and no further resurfacing of these roads is scheduled for this planning period.

Bridge and pipe work in the prior planning period involved stabilizing the structures, improving safety features and replacement of the worst structures. This planning period will continue those same goals.

In 2001 Hart County had 109 miles of dirt road. We have added a few dirt roads to our inventory but three years ago we instituted a brand new program of first time paving of dirt roads using tar and gravel. We now have 82 miles of dirt road (25% less dirt road miles than five years ago) primarily due to the cost effective new program of tar and gravel paving of our dirt roads.

ASPHALT PAVED ROADS

Road Inventory:
The prior planning period identified a need to adopt a comprehensive official roads inventory. Extensive research was performed in 2001 and 2002 to determine what roads should be included in the Hart County roads system. On November 26, 2002 the Hart County Board of Commissioners adopted an ordinance that set the official County roads inventory. All additions and deletions to this inventory can only take place through an official resolution by the Board of Commissioners.

Ranking System:
Hart County's pavement management program used a similar rating system as the GA DOT system. This system is comprehensive and by utilizing this system Hart County can select roads that will rank higher on the GA DOT system for those roads that the County desires to submit for the various State assistance programs.

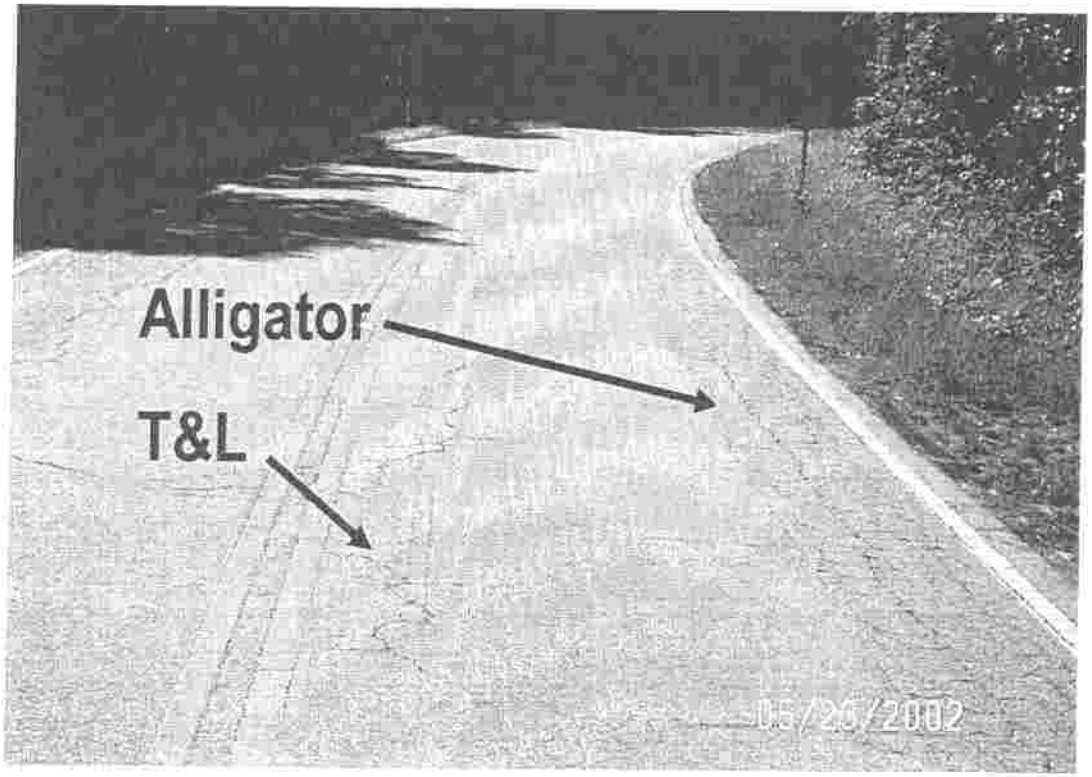
This system has basically four parts ranking the condition of the pavement, use of the road (traffic volume), number of structures per mile, and a minor score for the road based on the road's importance to the road system. This plan ranked each paved road based on these factors and also included a 5th factor for the pavement condition.

This 5th factor determined the amount of two types of cracks that are primarily observed on aged pavements. The first is called transverse and longitudinal cracking (T&L cracking) which are longer widely spaced cracks both parallel and perpendicular in the road pavement. This type of cracking is normally early evidence of future further pavement degradation. See **Illustration #1** for examples of T&L and alligator cracking.

If these cracks are sealed then water can not enter the subsurface below. If water is allowed to enter the subsurface below, the supporting structure of the pavement (base & sub base) weakens causing further cracking.

This further cracking as well as other conditions such as bad base/sub base and truck traffic leads to the second type of cracking which is referred to as alligator cracking.

Illustration #1: Types of Pavement Cracking



These issues are further discussed in the pavement maintenance section of this report. This 5th factor was utilized to divide Hart County paved roads into 5 categories (excellent, good, fair, poor, very poor).

Roads were divided into six classes depending on the type of road, traffic, truck traffic. This is important in determining factors such as paint stripping, reconstructing of base, prioritization etc. Classes listed as A,B or C depending on the volume of traffic with an A class road having higher traffic.

A number was also assigned to the ABC classification to define the amount of heavy truck traffic anticipated. Roads that will have heavy truck traffic will be assigned a 1. These roads may need additional base materials when reconstructed.

Please refer to the original roads plan for a more detailed discussion on road degradation and maintenance program.

Excellent Condition Paved Roads:
Paved roads that did not have any significant cracking were ranked as "excellent" condition roads. Five years ago, fifty five percent (55%) of Hart County paved roads were ranked in this condition. Today that number has grown to 64%, a trend that should continue if we continue to maintain our roads according to the long range plan. This list of these roads is attached as **appendix A**. Also see chart entitled "Paved Road Conditions".

During the planning period some of these roads will degrade to a lower quality rating and should be reassessed in 2012 at the end of this planning period. However the roads listed in this category are not expected to need resurfacing during this planning period.

Good Condition Paved Roads:
Paved roads where the pavement had less than 10% age cracking (T&L) and less than 5% alligator/fatigue cracking were ranked as "good" condition roads. Roads that had limited alligator cracking were allowed to have a higher percentage of T&L cracking due to the fact that the T&L cracking was apparently not leading to significant alligator cracking. The lack of alligator cracking in these cases indicates that traffic and base conditions are better than normal and thus deserve a higher condition ranking.

Twenty two percent (22%) of Hart County paved roads were ranked in this condition which is slightly lower than the prior planning period. This is another positive indicator that our roads management program is achieving results. If this number had increased then it would indicate that our paved roads were getting in worse condition. A list of these roads is attached as **appendix A**.

This is the ideal time to resurface a paved road. At this point the cost for resurfacing is the lowest due to the lower amount of patching required. During the planning period some of these roads will degrade to a lower quality rating and should be reassessed in 2012 at the end of this planning period or earlier if conditions lead to worsening pavement. The roads listed in this category may need to be resurfaced during this planning period however due to the limited funding available the roads in the next worst category should be a higher priority for resurfacing.

Sealing these roads will be a continued practice from the original roads plan so that no further deterioration to the next level of "fair" condition will occur during the planning period. Sealing of bad patches of alligator cracking will be with the patch machine that can patch small sections of alligator cracking and/or with strip sealing for larger sections (although strip sealing is not anticipated to be significant in the "good" category roads).

Fair Condition Paved Roads:
Paved roads that had 10-50% T&L cracking and 5-10% alligator cracking were ranked as "fair" condition roads.

Ten percent (10%) (39 miles) of Hart County paved roads were ranked in this condition which is lower than the prior planning period where 18% or 64 miles were in this category. This is still another very positive indicator that our roads management program is achieving results. If this number had increased then it would indicate that our paved roads were getting in worse condition. A list of these roads is attached as **appendix A**.

These roads must be resurfaced during this planning period at an estimated cost of $5,000,000. At this point the road has developed significant overall age cracking and a fair amount of road fatigue (alligator) cracking.

These roads will be strip sealed in the coming year or two to attempt to ensure that the road condition does not worsen. When roads reach this condition they have surpassed the ideal time to be resurfaced. At this point the cost for resurfacing is significantly higher than roads in "good" condition. If these roads had been resurfaced just a few years earlier when they were in "good" condition, the costs for this work would be significantly less than the current cost of $125,000 per mile.

However these roads must be stabilized and should be resurfaced during this planning period or the condition and cost of the road resurfacing will substantially escalate.

Poor Condition Paved Roads:
Paved roads that had over 50% T&L cracking combined with 10-20% fatigue/alligator cracking were ranked as "poor" condition roads. During the last planning period, 2.4% or 8.8 miles of Hart County paved roads were ranked in this condition however these roads have all been repaired in the past few years. There are no roads in this condition for this planning period. This is further very positive evidence that our roads management program is achieving results. Costs for recondition roads in this condition is significantly higher than roads in "fair" condition. Roads should not be allowed to get in this condition.

Very Poor Condition Paved Roads:
Paved roads that had more than 20% fatigue/alligator cracking combined with near complete age cracking were ranked as "very poor" condition roads. During the last planning period, about 7 miles of Hart County paved roads were ranked in this condition however these roads have all been repaired in the past few years. There are no roads in this condition for this planning period. This is further very positive evidence that our roads management program is achieving results. When roads reach this condition level it is more cost effective to rebuild the road. The cost for rebuilding the road was almost twice the cost of resurfacing a road therefore it is very important to not let our roads ever get in this condition again.

During the last year Cedar Pond Road, a formerly private road, was accepted into the Hart County roads system by the Hart County Board of Commissioners. This road has a creek crossing that is failing and is currently in the process of being evaluated for replacement. The 0.250 mile section of this section of road is in very poor condition.

When the bridge work is completed this section of road will be repaired. Roads should not be allowed to degrade to this condition.

OTHER FACTORS

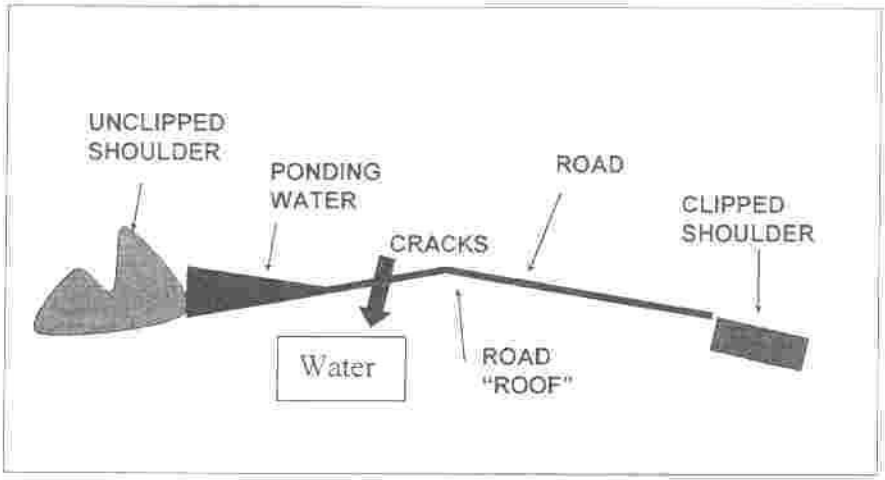
Maintenance of Paved Roads:

Illustration #4 is a diagram showing that a pavement on a paved road is similar to a roof on a house where both must shed water to protect the structure below. If water is allowed to get below the pavement it weakens the structure below the road causing the pavement to fail.

Roads develop cracks from natural and manmade forces as the pavement ages. These cracks allow water to enter below the pavement causing additional fatigue/alligator cracking. When fatigue cracking occurs, this area must be removed and replaced prior to resurfacing.

The goal is to minimize the amount of water getting below the pavement. This is done by both sealing cracks when they occur and by ensuring that road surfaces drain properly and do not allow water to stand on the road.

Illustration #4: Clipping Shoulders



Sealing every crack on our County roads would be very labor intensive. The five year plan addresses a mass sealing of a majority of the cracks in the first year. It is important that we seal all fatigue cracking on an annual basis to minimize the spread of this fatigue cracking.

The other important factor is to keep water from standing on our roads. As vegetation grows on the edge of the pavement, it increasingly prohibits water from leaving the road surface. To correct this problem the shoulders and ditches must be scraped on a routine basis. This also makes our roads safer by not allowing water to puddle on our roads creating unsafe driving conditions.

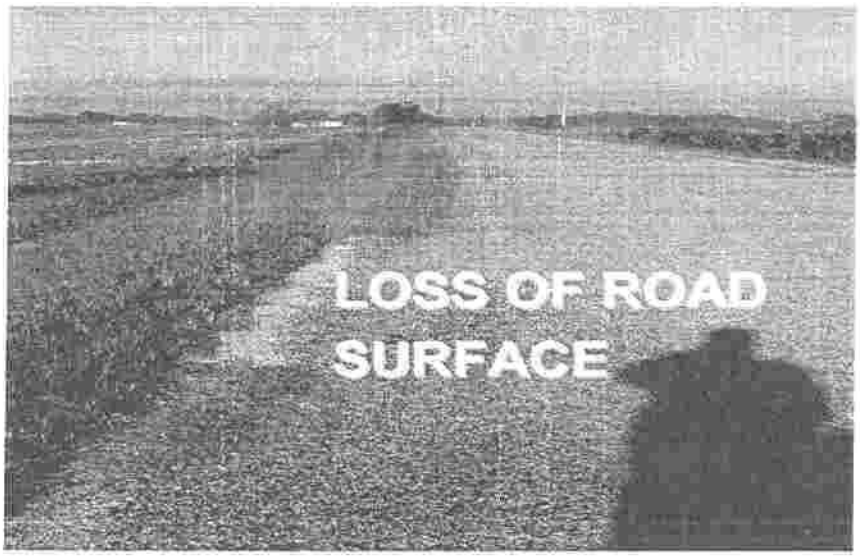
Illustration #5 & #6 shows a road before and after the shoulders have been clipped. The Before picture has grass on the pavement, and clumps of grass and dirt that do not allow water to leave the road. In the after picture (#6) the dirt, grass both on and adjacent to the road have been removed allowing water to leave the road. Alligator cracking is also evident in the after picture from where water had stood on top of the pavement and the pavement had failed as a result of this.

Illustration #5: Before Shoulders Clipped

Illustration #6: After Shoulders Clipped

Illustration #7 shows a more evident picture of the loss of road surface to encroaching shoulder vegetation. This vegetation must be killed and cut back to the edge of pavement. When vegetation is allowed to grow on pavement the roots will break up the pavement below. In addition the vegetation will hold water further degrading the pavement.

Illustration #7: Loss of Road Surface from Vegetation



We have been implementing a cycle for our paved roads whereby we clear the shoulders, ditches and pipes on a regular basis.

Some of our roads also need paint stripping. It is estimated that paint stripping will last 5 years and must be redone every five years. At a minimum (depending on the class of road, i.e. amount of traffic) some roads should be striped while others (low traffic) could remain unstriped. Additionally a minimum those roads that are to receive stripping should have the center yellow stripes painted. Some roads may warrant addition side stripping (white). An annual allocation should be budgeted each year for stripping.

Maintenance of Gravel Roads:

Hart County currently has approximately 82 remaining miles of dirt road (gravel surfaced roads). These roads develop potholes, washboards, loss of stone and other conditions which make travel difficult. These roads should be maintained by scraping and placing new stone on a periodic basis. In 2005 we started the first full time maintenance program for our dirt roads where we have one motor grader that does nothing but maintain our dirt roads on a full time basis. This program has proven to be highly successful and will be continued.

First Time Paving, Pave Roads vs. Gravel Roads:

Three years ago the county adopted a first time dirt road paving program using tar and gravel. This program does not widen the road but does place a stone base under the road.

shapes the road to drain properly and reestablishes the ditches. This program has also been highly successful and is recommended to be continued. Through this program we have first time paved 7-10 miles per year at a fraction of the cost of prior methods and reduced our dirt road miles by almost 25% in just three years.

PART 2: BRIDGES AND PIPES OVER LIVE CREEK CROSSINGS

This section of the roads plan addresses the County's bridge structures. Bridge structures identified in this plan only include pipes, bridges and culverts that have water flowing in them during dry weather. The original roads plan included developing a comprehensive list of these structures along with recommended actions for the planning period. This update will recommend a continuation of those practices.

It is important to note that the GADOT does a biannual inspection of some of our larger bridge structures. We have taken action on replacing or repairing several of the deficiencies noted on these reports however some of these structures will require very costly replacement and will probably be recommended to be abandoned during this planning period should the condition of the structure deteriorate to the point that it must be closed or replaced.

Problems identified in the original plan:

By far the biggest problem affecting the structures needing work was voids that were created under the road surface due to erosion below the structure. The majority of these have been corrected during the last planning period however sometimes these problems are not readily detectable. If additional void erosion occurs it will be corrected immediately due to the fact that this situation could lead to a bridge failure.

The second problem affecting bridge structures that need work was an obstruction and/or a problem with the stream channel. Most of these were corrected during the last planning period however obstruction removal (especially beaver dams) is an ongoing maintenance issue that will continue to be addressed.

The third major problem is where the road surface has settled at the bridge structure. Settling of the road surface could be indicative of void erosion but in most cases is the result of poor installation of the fill materials when the structure was original constructed. These situations must be corrected in order to reduce the vehicle loading on the structure, create safer driving conditions, and to create a better road surface for the public.

Another category of bridge structure problems are not as specific as the previous problems described. Several of our bridge structures have extensive damage that will require extensive repair or replacement. Some of these have already been replaced however in some instances the cost of repair or replacement is too costly and the recommended solution may be to close the structure permanently if a convenient alternative route is available.

Two bridges should be closed and taken out of service when the DOT indicates that they are unsafe for travel. On Highway 29 towards Royston, the State realigned the road in two sections to eliminate three old bridges. These roads and bridges were acquired by the County. To replace these bridges will cost in excess of $1,000,000. In both instances there is another way to travel on these roads if we take these bridges out of service.

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Safety Issues:

Safety issues were identified in the last planning period. Most of these issues were dangerous bridge structure crossings that lack sufficient shoulder. The immediate plan (short term action) was to place signs on these structures to warn the driver that a hazard exists in this area and this was accomplished during the last planning period.

Some crossing needed the installation of guardrail. Some guardrail was installed in the last planning period however addition guardrail is needed during this planning period.