ROAD IMPROVEMENT MANUAL

TOWNSHIP OF ANTIS

2012
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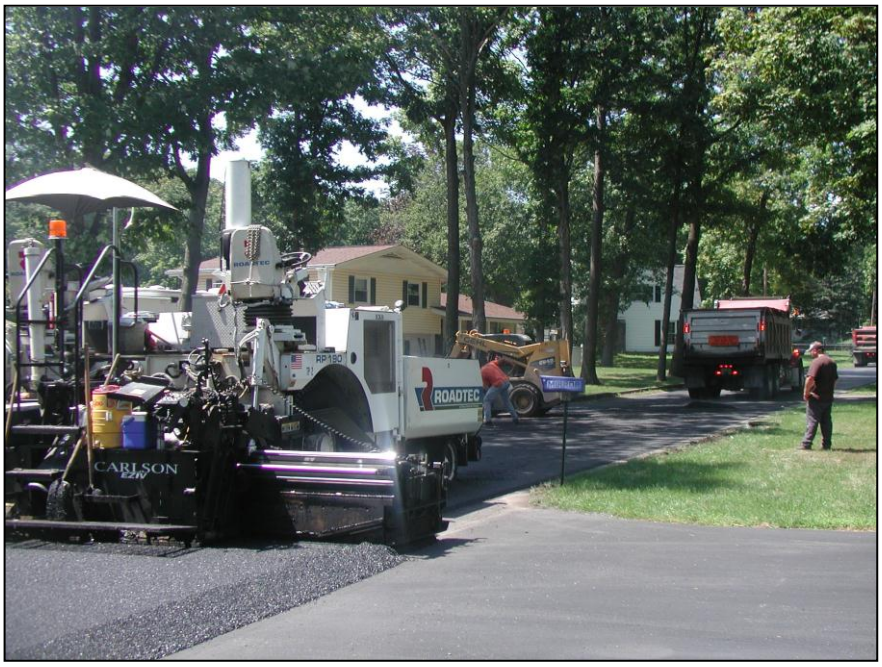

DEPARTMENT OF PUBLIC WORKS

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Purpose

This manual is a tool to inventory the physical road network, record and determine pavement conditions, and develop a method for prioritizing pavement restoration. This methodology enables us to apply appropriate surface treatments to maintain acceptable roadway conditions at a reasonable operational cost. Additionally, prioritizing street paving lends itself to advance planning and coordination with other utility projects to avoid disturbing newly paved streets.

Inspection Cycle

The Pavement Management process is an ongoing perpetual cycle of Inspection, Analysis, and Application of Surface Treatment. Due to the nature of the road building materials, construction standards, and other variables, roads degrade at varying rates. Maintaining and updated pavement condition database documents pavement performance and trends over time; allowing Antis Township to make a better, more informed decisions regarding where and when surface treatment should be applied.

Although a complete network inspection each year is not practical, a percentage of the roads should be inspected on annual basis. The following is a recommended inspection schedule.

Funtional Classification	Inspect per year %
Primary Road	100
Local Road	50
Dead-end Road	25

The logic behind this schedule is to inspect higher volume roads more frequently since those roads degrade at a faster rate than the less used lower volume roads. Since these main roads are also longer, wider, and typically more expensive to repair, having the up to date conditions and performance history enables you to apply the appropriate surface treatment, at the right time, avoiding a more expensive pavement restoration or reconstruction.

Also maintain the current conditions allows Antis Township to demonstrate to the public using current and up-to-date data, the logic and methodology of why certain streets are paved while others are not; showing the residents their tax dollars addressing pavement issues in an efficient manner.

Physical Attributes

Physical Attributes are collected in order to inventory the street, its specific location, and document other needed information. The following is gathered and inputted into the database.

Identification Number

Every street has a unique identification (ID) number which is assigned by GeoPlan.

Condition

The overall street condition is evaluated and entered into this field. Five (5) choices can be selected (Excellent, Good, Fair, and Failure) and is more of a qualitative observation. Although, specific pavement defects are recorded and are ultimately used to develop a pavement condition index, the Condition field allows us a second check on the accuracy of the overall rating system.

Beginning/End Point

The beginning and end point are where the segment of a street begins and ends. It is important to begin or end street segments at intersections or other recognizable geographical features that can be identified both in the field or office.

Class (Functional Classification)

Primary streets: are main streets that carry a heavy volume of traffic on a regular basis; through or high-volume travel corridors that connect the major generators of traffic.

Local streets: are side streets that provide direct service to residential areas and carry a low to moderate volume of traffic.

Dead End or Cul-De-Sac: roads that do not connect to other roads provide service to individual homes.

Width

Width of pavement is recorded with each separate segment. Street length, although an important as width, is derived from street centerline from the shape file and documented in the *StreetInfo* database.

Pavement Defects

Pavement Defects provide the bases for determining the Pavement Condition Index (PCI) as well as providing data that allows us to select the appropriate surface treatment depending on the type and severity in individual defects.

Seven types of defects/distresses that are evaluated and recorded are:

- Raveling
- Corrugations/Rutting
- Alligator Cracking
- Transverse Cracking
- Longitudinal Cracking
- Patching (such as a prior repair)
- Potholes

These defects and distresses are rated by Degree of Distress and Area Affected.

Degree if Distress

- *Slight:* minor distresses, hairline cracks.
- *Moderate:* mod-level distresses, light cracks.
- *Severe:* substantial distresses, large cracks.

Area Affected

The percent of area is how much of the area has been affected by particular defects and distresses. There are three percentage ranges. (Qualitative)

- 1-15%: small area of the street is affected.
- 16-30%: mid-range, approximately up to 1/3 of road is affected with distresses.
- 31%-: high percentage, 1/3 and over of road is affected with distresses.

Additionally, localized defects and any inconsistencies with GIS map can be recorded as well.

Raveling

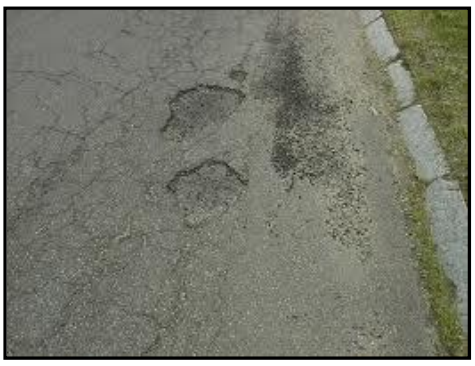
Description: Spalding of the pavement surface causing the asphalt wearing course to separate from the binder course. Raveling can occur in isolated area or across the entire surface, although the wheel tracks are typically the worst areas.

Possible Causes:

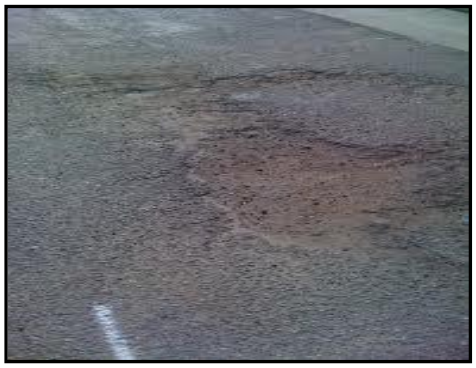
- Poor quality of materials and/or construction.
- Inadequate drainage.
- Freeze-thaw cycling.
- Poor utility patching.
- Excessive wear from heavy vehicles.
- Base Failure.

Severity:

Slight	Less that 8" in widthe and less than 1.5" depth.
Moderate	From 8" to 15" in width and 1.5" to 2.5" in depth.
Severe	More than 15" in widthe and greater than 2,5" in depth.



Slight



Moderate

Severe

Corrugations/Rutting

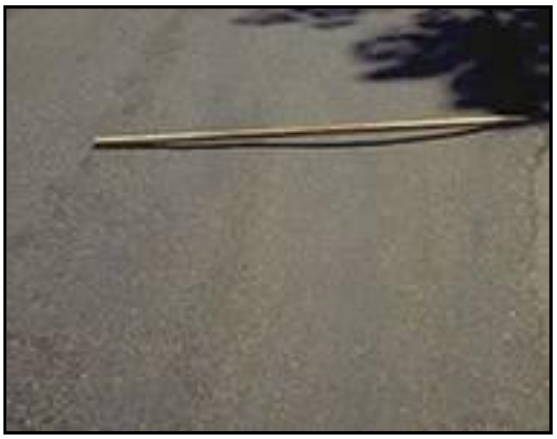
Description: Longitudinal depressions parallel to the direction of travel, typical forming in the wheel tracks.

Possible Causes:

- Poorly constructed roadway.
- Substandard or failing sub-bases
- Inadequate lateral support, failing or steep road shoulder.
- Poor material mix.
- Excessive stopping and starting at signage.

Severity:

Slight	Depth of the rut less than 0.5".
Moderate	Depth of the rut from 0.5" to 1".
Severe	Depth of the rut is greater than 1"



Slight to Moderate

Moderate to Severe

Alligator Cracking

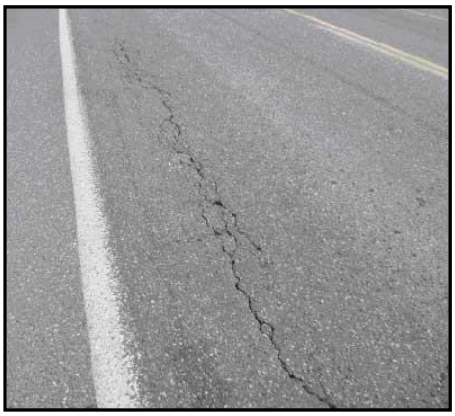
Description: Blocks of interconnecting cracks resembling the skin of an alligator. The cracks are typically full depth, through the entire asphalt layer. Alligator cracks are an indicator of roadway base failure, which may require full depth reconstruction.

Possible Causes:

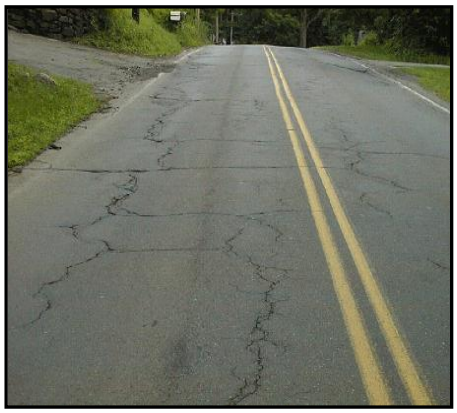
- Insufficient bearing support and repeated traffic loading.
- Poor base drainage.

Severity:

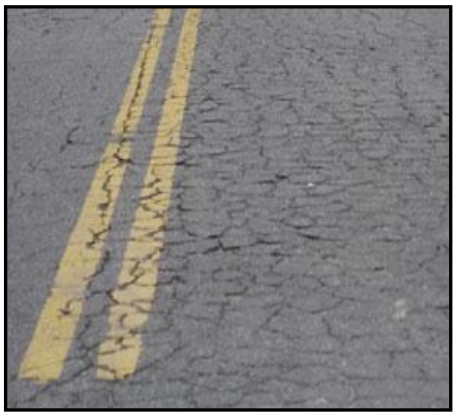
Slight	Fine, longitudinal hairline cracks running parrallel to each other with no or only a few interconnecting cracks; the cracks are not spalled.
Moderate	Further development of light cracks into a pattern or network. of cracks that may be lightliy spalled;distortions of 1/4' to 1/2".
Severe	Cracks are spalled and pieces are well defined. Some blocks may be loose or missing. Distortions of 1/2" or more.



Slight



Moderate



Severe

Transverse Cracking

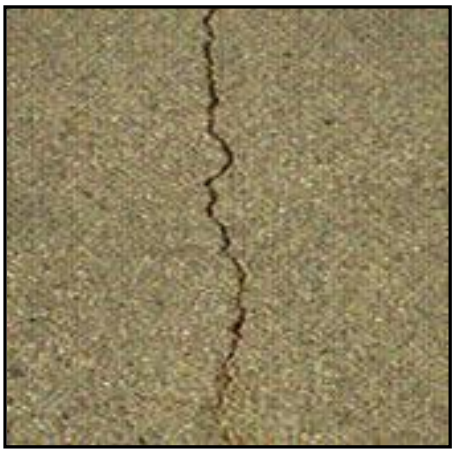
Description: Cracks which usually appear across the road perpendicular to the centerline. They typically affect the wearing asphalt course and are usually not traffic load-related.

Possible Causes:

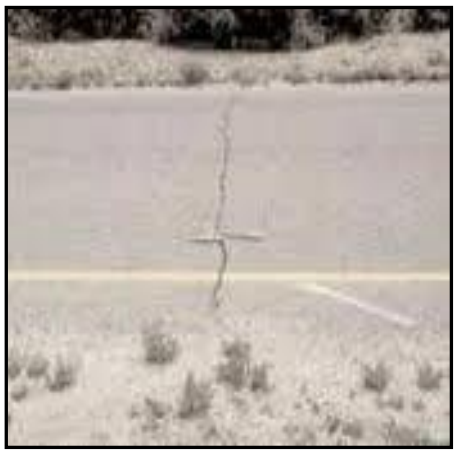
- Poor construction joints.
- Pavement Shrinkage due to asphalt hardening or freeze/thaw cycles.
- Reflective cracking (cracks below the wearing course)

Severity:

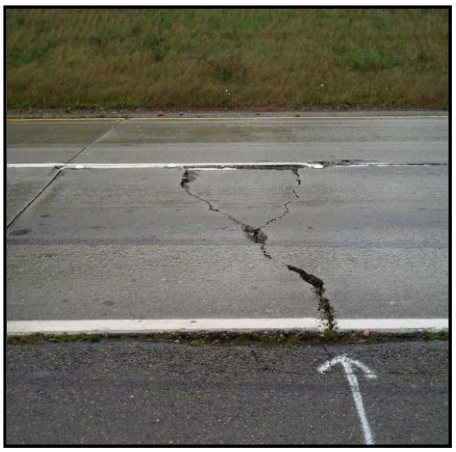
Slight	Hairline cracks less than 1/8" in width.
Moderate	Cracks 1/8" to 1/2" in width.
Severe	Cracks greater than 1/2" in width.



Slight



Moderate



Severe

Longitudinal Cracking

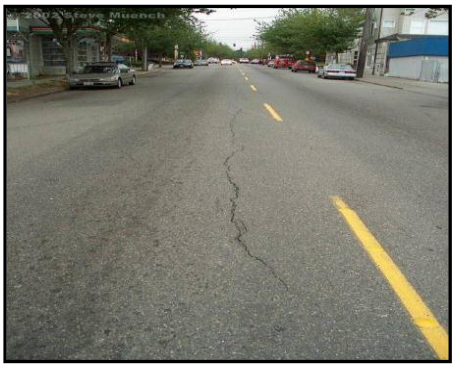
Description: Cracks which follow along the road parallel to the centerline.

Possible Causes:

- Poor construction joints-by applicator.
- Pavement Shrinkage due to asphalt hardening or freeze/thaw cycles.
- Reflective cracking (cracks below the wearing course)

Severity:

Slight	Hairline cracks less than 1/8" in width.
Moderate	Cracks 1/8" to 1/2" in width.
Severe	Cracks greater than 1/2" in width.



Slight

Moderate

Severe

Patching

Description: A surface patch is where the top layer of roadway material has been replaced. Poor patching may be uneven, heavily rutted, contain different cracks based on quality of patch, etc.

Possible Causes:

- Base failure.
- Utility work.
- Poorly constructed paving, thin layer of patching.
- Not sealed along seams, water intrusion defects patch.

Severity:

Slight	Good patch, no ruts or cracks.
Moderate	Moderate cracking.
Severe	Significant cracking or other distresses within the patched area.

Slight

Moderate

Severe

Pot Holes

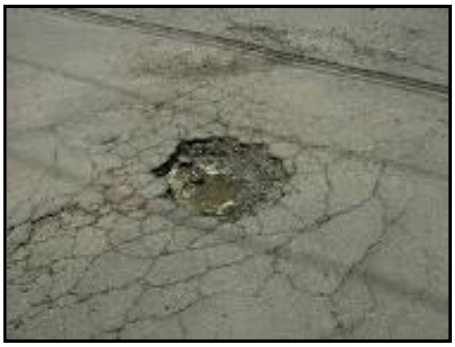
Description: Holes in the asphalt surface which may be isolated or caused by a combination of other progressively failing pavement defects. (raveling, alligator cracking, patching).

Possible Causes:

- Poor quality of materials and/or construction.
- Inadequate drainage.
- Freeze-thaw cycling.
- Poor utility patching.

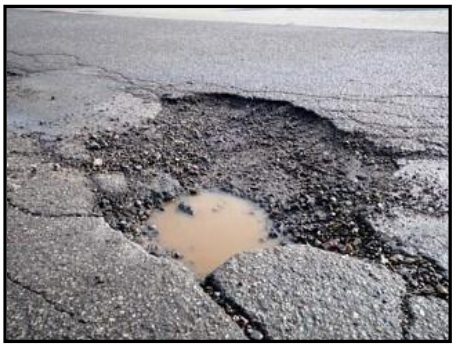
Severity:

Slight	Less that 8" in width and less than 2.5" depth.
Moderate	From 8" to 15" in width and 2.5" to 4" in depth.
Severe	More than 15" in widthe and greater than 4" in depth.



Slight

Moderate



Severe

Reports

Reports provide the means of organizing and presenting the data in a format that can be easily read and analyzed. Primarily the Pavement Management System is designed to identify a suitable surface treatment and assign a construction cost based on the length and width of the paved street.

The Inventory Data Form is to be completed and photographs taken by the Public Works Department prior to consideration for contracted paving. Example

INVENTORY DATA FORM

Street Name: Antis Road **Section No.** All Segments **Inspection Date:** 6-1-2012
Funtional Classification: Primary Road **By:** Steve Shiffler
From:Lower Riggles Gap **To:**Grandview Road **Street Id#** T-485
Width-18ft **Total Length-**4,292 **GeoPlan Segment-**561 & 566
Total Score: **0**

Type of Distress	Degree of Distress	Percentage of Area/Actual Count				Comment
		Number of Raveling			Total	Steve this is actual count not percentage based.
Raveling	Slight				0	
0	Moderate				0	
Score	Severe				0	
	Total	0	0	0	0	
		Number of Corrugations			Total	Steve this is actual count not percentage based.
Corrugations/Rutting	Slight				0	
0	Moderate				0	
Score	Severe				0	
	Total	0	0	0	0	
		1-15%	16-30%	31%-	Total	Steve this is percentage based.
Alligator Cracking	Slight				0	
0	Moderate				0	
Score	Severe				0	
	Total	0	0	0	0	
		Number of T-Cracking			Total	Steve this is actual count not percentage based.
Tranverse Cracking	Slight				0	
0	Moderate				0	
Score	Severe				0	
	Total	0	0	0	0	
		Number of L-Cracking			Total	Steve this is actual count not percentage based.
Longitudinal Cracking	Slight				0	
0	Moderate				0	
Score	Severe				0	
	Total	0	0	0	0	
		Number of Patches			Total	Steve this is actual count not percentage based.
Patching	Slight				0	
0	Moderate				0	
Score	Severe				0	
	Total	0	0	0	0	
		Number of Potholes			Total	Steve this is actual count not percentage based.
Pot Holes	Slight				0	
0	Moderate				0	
Score	Severe				0	
	Total	0	0	0	0	

Road Functionality

Primary Roads	Local Roads	Local Roads	Dead End Streets
Antis Road	Allen Street	Maple Avenue (Bell)	Beechwood Drive
Asbury Road	Alpine Road	Maple Lane (Tipton)	Bland Street
Becker Road	Blair Street	Martin Street	Brush Mountain Road
Bellmeade Drive	Cambells Lane	Mercury Street	Craig Street
Hunter Road	Campbell Road	Mt. View Road	Cedar Lane
Kerbaugh Road	Cherry Avenue	N. 10th Street	Danbeck Road
McFarland Road	Chestnut Street	N. 11th Street	Deerfield Lane
Moser Road	Clearfield Street	N. 1st Street	Dillen Avenue
N. 2nd Street	Deborah Street	N. 3rd Street	Dysart Road
Riggles Gap Road	E. 4th Street	N. 4th Street	E. 8th Street
River Road	E. 5th Street	N. 5th Street	E. Main Street
Rossman Road	E. 6th Street	N. 7th Street	Emory Street
Sandbank Road	E. 7th Street	N. 9th Street	Eric Street
Smith Road	E. 9th Street	N. Hawthorne Drive	Findley Avenue
Stetter Road	E. Antis Street	Old Rt. 220 (Cut-off)	Franklin Circle
Watts Road	Ferndale Drive	Park Ave.	Glenby Drive
	W. 1st Ave.	Park Forest Lane	Harris Road
	Forest Street	Parkside Drive	Hollen Road
	Forge Road	Parkway Drive	Igou Road
	Forrest Street	Pine Street (Tipton)	Jospen Court
	Forshey Lane	Pine Street (Bellwood)	Kelsey Drive
	Forshey Street	Pinecroft Avenue	Kristel Lane
	Frederick Street	Reed Street	Lear Road
	Graham Drive	Rossi Drive	Lee Drive
	Hallaran Dr.	S. Tockahoe Street	Meade Drive
	Hegarty Road	S. Hawthorne Drive	Old Skelp Road
	Holliday Parkway	Sarah Drive	N. 12th Street
	Howard Street	Sassafras Street	N. 13th Street
	Kingdom Street	Spruce Street	N. 15th Street
	Kings Highway	Sunrise Court	N. 16th Street
	Laurel Drive	Taylor Street (Tipton)	N. 6th Street
	Laurel Street	Tipton Manor Road	Oak Lane
	Locke Street	Tuckahoe Street	Oswald Road
	Locust Street	W. 10th Street	Pamela Street
	Logan Street	W. Antis Street	Ritts Road
	Lynn Drive (Tipton)	Walnut Street (East)	Stroemann Drive
	Lynne Drive (Bel Air)	Walnut Street	Swartz Road
		Waterline Drive	Taylor Road
		W. Locke Street	W. 10th Street
		W. Logan Street	W. 11th Street
			W. 12th Street
			W. 13th Street
			W. 9th Street

Antis Map