

Road Pavement Catalogue

The city maintains an annual road catalogue showing every street in Darien and when the paving is estimated to take place, typically every 12 to 15 years. To review the road catalogue please contact Regina in the municipal services department at rkokkinis@darienil.gov or 630-353-8105.

The following is information about the city's Road Pavement Catalogue. The annual catalogue lists the City's roadways within their respective subdivision and includes the following:

1. Numerical Location Identifier
2. Location of the road
3. Composition of the Road-Updated through the Annual Coring Process
 - Aggregate Base-Measured in Inches
 - Bituminous Binder-Measured in Inches
 - Bituminous Surface-Measured in Inches
4. Year the Road was constructed
5. Pavement Length
6. Pavement Width
7. Square Yards
8. Most Recent Road Maintenance
 - EG-Edge Grind
 - FM-Fabric Material
 - LB-Bituminous Leveling Binder
 - OL-Bituminous Surface Overlay
9. Condition Rating-Based on Reporting Year
10. Recommended Rehabilitation Current Year-The following items would apply if the Roadway calls out for maintenance.
 - EG-Edge Grind
 - TG-Total Grind Mill
 - FM-Fabric Material
 - LB-Bituminous Leveling Binder
 - OL-Bituminous Surface Overlay
 - Crack Fill

The report below further explains and depicts the City's Roadway Rating System with basis points. The roadways are evaluated on a yearly basis and assigned basis points through a inspection process. The points are entered onto the Asphalt Pavement Rating Form and total condition rating is summarized. The results render a fair rating for upcoming bituminous overlay maintenance programs. The rating system utilizes a numerical assigned value of 0-5 and 0-10, whereas the higher numerical value indicates severe.

Below, please find the terminology used for the rating system:

1. Transverse Cracking-Rating Factor 0-5

Transverse cracks run roughly perpendicular to the roadway centerline. These cracks are be caused by surface shrinkage due to low temperatures, hardening of the asphalt, or cracks in underlying pavement

layers. The cracks extend partially or fully across the roadway. The inspector will consider only those transverse cracks that are a minimum of two feet in length.



Low — The cracks have very little or no spalling along the edges and are less than $\frac{1}{4}$ -inch in width. If the cracks are sealed and the width of the crack prior to sealing is visible, they should be classified as Low Severity. (Good Prospect for Crack Sealing)

RATING VALUE=2

Medium — The cracks have little or no spalling but they are greater than $\frac{1}{4}$ -inch in width. There may be a few randomly spaced low severity connecting cracks near the main crack or at the corners of intersecting cracks. (Good Prospect for Crack Sealing)

RATING VALUE=3

High — Cracks are spalled and there may be several randomly spaced cracks near the main crack or at the corners of intersecting cracks. Pieces are visibly missing along the crack.

RATING VALUE=4 TO 5

2A. Longitudinal Cracking-Rating Factor 0-5

Longitudinal cracks run roughly parallel to the roadway centerline. Longitudinal cracks associated with the beginning of alligator cracking are generally discontinuous, broken, and occur in the wheel path. However, any longitudinal crack that is clearly within the wheel path should be rated.



2b. Nonwheel Path Longitudinal Cracking

Nonwheel path longitudinal cracks run roughly parallel to the roadway centerline. They may be caused by a poorly constructed paving joint, a reflective crack caused by joints and cracks beneath the surface course, including joints and cracks near the edge of the pavement. These types of cracks are not load-associated. Low severity nonwheel path longitudinal cracking looks very similar to low severity alligator cracking; however, low severity alligator cracking always occurs in the wheel path and should be rated as alligator cracking. Please note that pending the longevity of a longitudinal crack it will develop into an alligator crack, and thus could increase the rating of an alligator crack significantly over a year.



Severity:

Low — The cracks have very little or no spalling along the edges and are less than $\frac{1}{4}$ -inch in width. If the cracks are sealed and the width of the crack prior to sealing is visible, they should be classified as Low Severity. (Good Prospect for Crack Sealing)

RATING VALUE=1-2

Medium — The cracks have little or no spalling but they are greater than $\frac{1}{4}$ -inch in width. There may be a few randomly spaced low severity connecting cracks near the main crack or at the corners of intersecting cracks. (Good Prospect for Crack Sealing)

RATING VALUE=3

High — Cracks are spalled and there may be several randomly spaced cracks near the main crack or at the corners of intersecting cracks. Pieces are visibly missing along the crack. At some point, this longitudinal cracking becomes alligator cracking.

RATING VALUE=4-5

3. Alligator Cracking-Rating Factor 0-10

Alligator fatigue cracking is associated with loads and is usually limited to areas of repeated traffic loading. The cracks surface initially as a series of parallel longitudinal cracks within the wheel path that progress with time and masses to a more branched pattern that begins to interconnect. The stage at which several discontinuous longitudinal cracks begin to interconnect is defined as alligator cracking. Eventually the cracks interconnect sufficiently to form many pieces, resembling the pattern of an alligator. On two-lane roads, alligator cracking may form along the centerline rather than in the customary wheel paths. Usually, the patterns of the cracking, or the longitudinal cracks, are parallel to the roadway or direction of vehicle travel. Alligator cracking occasionally occurs in a pattern transverse to the roadway direction because of poor trench compaction, settlement, or frost action. Potholes and other occurrences of destroyed or missing pavement become prevalent as high severity alligator cracking occurs.



Severity:

Low — Branched, longitudinal, discontinuous thin cracks are beginning to interconnect and form the typical alligator pattern with no spalling. (Good Prospect for Crack Sealing)

RATING VALUE=1-3

Medium — Cracking is completely interconnected and has fully developed an alligator pattern. Some spalling may appear at the edges of cracks. The cracks may be greater than 1/4-inch wide, but the pavement pieces are still in place.

RATING VALUE=4-7

High — The pattern of cracking is well developed. Spalling is very apparent at the crack. Individual pieces may be loosened and may rock under traffic. Pieces may be missing. Pumping of fine aggregates up through the cracks may be evident.

RATING VALUE=8-10

4. Shrinkage Cracks-Rating Factor 0-5

Shrinkage/Block cracks divide the pavement surface into nearly rectangular pieces with cracks that intersect at about 90 degrees. This type of distress differs from alligator cracking in that alligator cracks form smaller, irregular shaped pieces with sharp angles. In addition, alligator cracks are caused by repeated traffic loadings and are, therefore, generally located in traffic areas (i.e., the wheel paths). Block cracking is caused principally by shrinkage of the asphalt concrete and daily temperature cycling. It is not load-associated, although load can increase the severity of individual cracks. The occurrence of block cracking usually indicates that the asphalt has hardened significantly through aging. Block cracking normally occurs over a large portion of the pavement area including nontraffic areas. However, various fatigue related defects may occur in the same segment.



Measurement of Block Cracking

Extent: The extent of block cracking requires being the full surveyed segment. If the block cracking does not extend throughout the segment, then the segment is rated using longitudinal and transverse cracking.

Measure: Estimate the typical size of the blocks and select the appropriate standard block size and crack size.

The analysis of the block cracking through a surveyed area may further differ due to traffic patterns or routes. In other words a segment may be a three City of Darien block stretch in which case only one of the three blocks has been determined to have excessive cracking/shrinkage in which event could present the deficiency to be a candidate for crack sealing or a base repair.

Severity: The severity of shrink/block cracking is defined by the average size of the blocks and the average width of the cracks that separate them.

Block Size

Low — 9 × 9 feet or greater
RATING VALUE=1-2

Medium — 5 × 5 feet to 8 × 8 feet blocks
RATING VALUE=3

High — 4 × 4 feet blocks or less
RATING VALUE=4-5

Crack Size

Low — Less than 1/4 inch
RATING VALUE=1-2

Medium — Over 1/4 inch
RATING VALUE=3

High — Spalled
RATING VALUE=4-5

5. Rutting-Rating Factor 0-10

Rutting is a surface depression within the wheel path. Rutting results from a permanent deformation in any of the pavement layers or subgrades, usually caused by consolidation or lateral movement of the materials due to traffic loads. When the upper pavement layers are severely rutted, the pavement along the edges of the rutted area may be raised. Usually, the rutting occurs gradually across the wheel path, reaching a maximum depth in the center of the wheel path. Ruts are most obvious after rainfall when they are full of water. Wear is surface depression in the wheel path resulting from tire abrasion.



Measurement for Rutting

Severity: The average rut depth in the wheel path for the segment.

Recommended ranges for estimated severity.

Low — 1/4-inch to 1/2-inch

RATING VALUE=1-2

Low-Medium — 1/2-inch to 3/4-inch

RATING VALUE=3-6

Medium-High — over 3/4-inch

RATING VALUE=7-10

6. Corrugation-Rating Factor 0-5

This distress category covers a general form of surface distress which is not limited to the wheel path, although they may occur in the wheel path. The distress may occur in isolated areas, such as at intersections, or it may occur over a large part of the roadway surface. Corrugations/waves are regularly occurring transverse undulations in the pavement surface. Corrugations occur as closely spaced ripples, while waves are undulations whose distance from peak to valley is more than 3 feet.



Severity: The severity of corrugation is defined as the maximum vertical deviation from a 10-foot straightedge placed on the pavement parallel to the center line of the roadway.

Low — 1/8-inch to 2 inches per 10 feet.

RATING VALUE=1-2

Medium — 2 inches to 4 inches per 10 feet.

RATING VALUE=3-4

High — Over 4 inches per 10 feet.

RATING VALUE=4-5

7. Raveling-Rating Factor 0-5

Edge raveling occurs when the pavement edge breaks away from roadways without curbs or paved shoulders. However, edge conditions can still occur with paved shoulders. Edge/base patching is the repair of this condition. The “lane less than 10 feet” distress indicates that the edge raveling has progressed to the point where the pavement width from the center line to the outer edge of roadway has been reduced to less than 10 feet or impacts the travel lane.



Measure: Accumulate the lengths along the surveyed lane of each type edge defect as it occurs. Divide the accumulated lengths by the length of the segment. Multiply by 100 to get percent, and round to a whole number.

Please note that as mentioned above, raveling refers primarily to sections of pavement areas that do not utilize a curb and gutter system.

Severity: The severity of Pavement Edge Condition is defined as follows

Low — Edge Raveling
RATING VALUE=1-2

Medium — Edge Patching
RATING VALUE=3-4

High — Edge lane less than 10-12 feet
RATING VALUE=4-5

8. Shoving or Pushing-Rating Factor 0-10

Shoving or pushing is a lateral displacement of pavement material, and usually caused by vehicles consistent braking. Shoving or pushing further may occur in roadways where there is an insufficient road base, such as an aggregate, or binder. These segments will require a base repair, consisting of an excavation depth of a minimal of six to nine inches. A binder bituminous product is then used to stabilize the base and further capped with an inch and a half bituminous surface.



Severity: The severity of Pushing/Shoving is defined as follows

Low — 1/2-inch to 1-inch per 10-12 feet
RATING VALUE=1-3

Low-Medium — 1-inch to 2-inch per 10-12 feet
RATING VALUE=4-6

High — 2-inch and greater per 10-12 feet
RATING VALUE=7-10

9. Pot Holes/Patches-Rating Factor 0-10

A patch is an area of pavement which has been replaced with new material to repair the existing pavement or access a utility. A patch is considered a defect no matter how well it is performing (a patched area or adjacent area usually does not perform as well as an original pavement section). A patch allows weathering to gain access around the weathering, in which if not sealed causes further deterioration of longitudinal cracking, and/or alligating. Generally, some roughness and smoothness is associated with this distress. In general, a patch is less than a typical rehabilitation in size and scope. They are less than full roadway width and/or are less than project length. Patches, or permanent repairs (dig-out repair), are included in this distress category. Utility cut patches are also included as part of the patching values. A patch regardless of its size is rated under the City of Darien current criteria.

While appropriately done repairs are an asset rather than a liability to the life of a segment of pavement, the fact that they were required (other than for utility work) generally indicates some failure in the pavement structure.



Severity: the average of potholes filled and or repair patches (base repairs) completed. These patches exclude utility work.

Recommended ranges for estimated severity

Low — 2 Potholes or 2 Base Repair Patches

RATING VALUE=1-2

Low-Medium — 3-5 Potholes 3-5 Base Repair Patches
RATING VALUE=3-4

Medium-High — 5-7 Potholes 5-7 Base Repair Patches or travel lane base repair up to 50 feet by 12 feet.
RATING VALUE=5-7

High — 8 or greater Potholes 8 or greater Base Repair Patches/or travel lane base repair in excess of 50 feet by 12 feet.
RATING VALUE=8-10

10. Excess Asphalt-Rating Factor 0-10

Flushing and bleeding is indicated by an excess of bituminous material on the pavement surface, which presents a shiny, glass-like reflective surface that may become sticky in hot temperatures. At the lower severity levels, the extents “localized” and “wheel path” may be difficult to differentiate; however, as the severity increases, “wheel path” becomes better defined. Wheel path refers to tire tracking area and may be used to represent the condition of only one wheel track being heavily involved. This distress is measured or observed through the loss of aggregate (raveling), commonly referred to as “chip loss”, and leaves the binder exposed.



Severity:

Low — Minor amounts of the aggregate have been covered by excess asphalt but the condition has not progressed significantly.
RATING VALUE=1-2

Low-Medium — Moderate quantities of the surface aggregate have been covered with excessive asphalt. Small amount of the coarse surface aggregate is exposed, even in those areas showing flushing.
RATING VALUE=3-4

Medium-high — Significant quantities of the surface aggregate have been covered with excessive asphalt. However, much of the coarse surface aggregate is exposed, even in those areas showing flushing.
RATING VALUE=5-7

High — Most of the aggregate is covered by excessive asphalt in the affected area. The area appears wet and is sticky in hot weather.
RATING VALUE=8-10

11. Polished Aggregate--Rating Factor 0-5

Polished aggregate is referred to as the upper portion of the roadway which is worn over time and begins to present a shiny coarse aggregate.

Severity

Although the degree of severity is not a structural factor initially, an opportunity for weathering could result in moisture becoming trapped within the exposed aggregates and further exacerbating the condition to alligating.

Severity:

Low — Minor amounts of the aggregate are beginning to show discoloration with no loss of aggregate.
RATING VALUE=1-2

Medium — Significant quantities of the aggregate are beginning to show discoloration from a black gray to all gray with moderate loss of aggregate surface.

RATING VALUE=3-4

High — Significant quantities of the aggregate are beginning to show discoloration to all gray with moderate-to significant loss of aggregate surface. Loose aggregate is further defined within the curb and gutter system or within road shoulder area of a rural street.

RATING VALUE=4-5

12. Deficient Drainage 0-10

The roadway is inspected for positive drainage. As the roadway tends to wear and tear the roadway is further evaluated to determine that the sheet flow of water is guided to an adjacent curb and gutter system or ditch system. Should a roadway be identified with negative drainage and left unattended, the results will consist of possible base failure, alligating, longitudinal cracking, as well as pothole development.

Severity

Although the degree of severity will vary to the abovementioned potentials, City Staff must maintain a proactive maintenance schedule of curb and gutter maintenance as well as ditch maintenance. Without these key infrastructures components being maintained the reactive approach could cause additional subbase failures, which will eventually trigger a reconstruction program for a roadway, thus costing additional funding. Prior to a scheduled road resurfacing project, Staff will further evaluate through an inspection process to define storm sewer structure and/or open ditch system deficiencies. The deficiencies that are defined would be corrected prior to the abovementioned bituminous overlay. Should a project require extensive work in an amount to be determined excessive, the City administrator would provide further direction for approval if required.

Severity:

Curb and Gutter

Low — Minor amounts of pooling water (covers a nickel coin) in the gutter due to very minor settlement or heaving-measuring three to five feet

RATING VALUE=1-2

Open Ditch

Low- Minor amounts of water accumulated at the shoulder and street edge-usually dissipates within 12 hours after a rain event

RATING VALUE=1-2

Curb and Gutter

Medium to High — Minor amounts of pooling water (up to ¾ inch depth) in the gutter and the pavement is below (up to 1/2 inch depth) the gutter as to where storm water cannot flow to the gutter due to minor to moderate settlement or heaving-measuring five to 12 feet

RATING VALUE=5-7

Open Ditch

Low to Medium-Moderate amounts of pooling water accumulated at the shoulder and street edge-usually dissipates after 24 hours after a rain event- and measuring no more than 12-24 feet-road shouldering maintenance could be required to attain positive drainage

RATING VALUE=5-7

Curb and Gutter

High — High amounts of pooling water(greater then 3/4 inch in depth) in the gutter and the pavement is below the gutter (greater then 3/4 inch in depth) as to where storm water cannot convey flow atop the gutter due to moderate to excessive settlement or heaving-measuring 12 feet or greater. The storm water stagnates for a period of over 24 hours after a storm event or the storm water does not dissipate without manual removal.

RATING VALUE=8-10

Open Ditch

High-High amounts of pooling/standing storm water accumulated at the shoulder and within the open ditch system. The shoulder and ditch areas are in excess of two-inches in depth and a length of 25 feet. The storm water stagnates for a period of over 72 hours after a storm event or the storm water does not dissipate due to further ditch maintenance that is required. The road shoulder and ditch will require a ditch maintenance project along with storm sewer apparatus replacement.

RATING VALUE=8-10

Summary Review

Upon review, the City of Darien has been averaging approximately 5.05 miles of bituminous roadway maintenance over the last several years. The City of Darien has 65 miles of roadway. Based on current statistics, a roadway has an average life of 12 years before it requires overlay maintenance.

The City of Darien has also implemented a Crack Sealing Program, as an additional road maintenance item. The Crack Sealing Program extends the life of the road up to three years. The program is in its third year and the City has completed approximately 12-15 miles of crack filling per year.

In order to maintain continuity, Staff has been addressing each street from limit to limit versus the City block methodology. In other words, a street such as Richmond Ave. would be rated on the abovementioned criteria from Plainfield Road to 67th Street, versus completing an overlay from Plainfield Road to 72nd Street, and then completing the additional link from 72nd Street to 67th Street a year to two later. An additional example of this methodology would be Exner Avenue. Exner Avenue would be evaluated from 75th Street to the southern limits of Darien Club Drive. A further concern regarding the previous method is that a one or two block segment of, for example, Exner Avenue, may not qualify for an overlay, and may be pushed back for an additional two years. Meanwhile, the remainder of Exner would have been completed, and in two years the City is exposing the recently completed street to the heavy truck traffic, thus creating a premature stress level to the recently overlaid roadway.

The one question remains, how is a long block evaluated in comparison to a short block. Staff has defined that a segment would be looked at as one block, regardless of size. Although, please note that size could be a partial factor within the scope of funding mechanisms. The methodology here is that a short block or cul de sac may not be slated for an additional one or two years, but due to the potential proximity of the scheduled streets, unit pricing and being that there is a remainder of additional funding available, Staff would recommend for consideration of adding the short block or cul de sac due to economics or logistics.