U20069: Pavement Analysis Study 2020 University of Illinois at Urbana-Champaign

Final Report

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AUGUST 2020

applied pavement TECHNOLOGY

EXECUTIVE SUMMARY

The University of Illinois' (University) road network provides vital infrastructure that allows the safe, efficient movement of people, goods, and services throughout the Champaign-Urbana campus. The asset value of the University's 17.7 centerline mile road network is estimated at over $49 million based on reconstruction costs. In response to managing this high-value asset, the University has developed a formalized pavement management system (PMS) and has periodically updated the PMS to reflect changing conditions and needs. In 2020, the Facilities & Services (F&S) group of the University hired Applied Pavement Technology, Inc. (APTech) to update its PMS, which was originally implemented in 2009. APTech also conducted the previous PMS update in 2016. Appendix A provides a more extensive introduction to pavement management concepts, definitions, and components.

The University's road network consists of 150 pavement sections (generally block-to-block) that are managed independently for decisions regarding maintenance and rehabilitation (M&R). Figure 1 shows the distribution of the 2.8 million ft^2 network by surface type. More pavements are concrete surfaced than the other types. The smallest family of pavements is the brick-surfaced roadways.

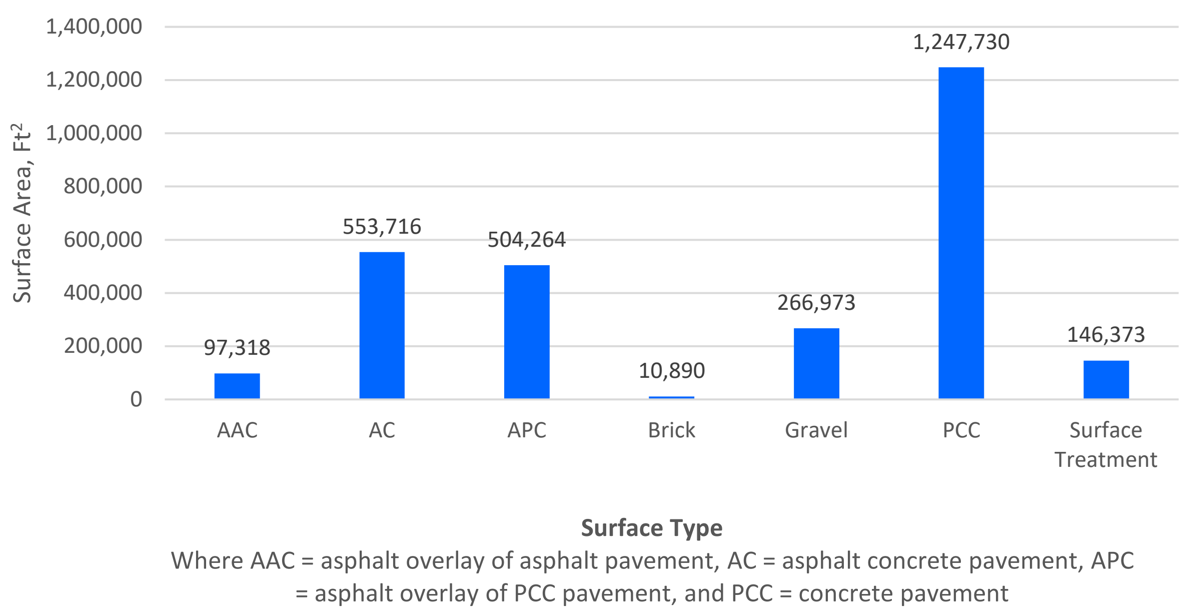

Figure 1. Pavement inventory by surface type.

The methodology used for the systematic assessment of pavement conditions is described in ASTM D6433, *Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys*. In May 2020, APTech conducted visual pavement condition surveys to identify the type, severity, and extent of the visible pavement distresses. The results were used to calculate the Pavement Condition Index (PCI) value for each pavement section with a paved surface (140 sections, excluding brick and gravel).

The PCI scale ranges from a value of 0 (representing a pavement in a completely failed condition) to a value of 100 (representing a pavement with no visible distress). In general terms, pavements with a PCI above 60 will benefit from maintenance actions, such as crack sealing and patching. Pavements with a PCI between 30 and 60 are more likely candidates for major rehabilitation activities (such as hot mix asphalt overlay). Often, when the PCI is less than 30, reconstruction is the most viable alternative due to presence of the substantial damage to the pavement structure. Figure 2 illustrates the distress inputs and PCI condition ranges.

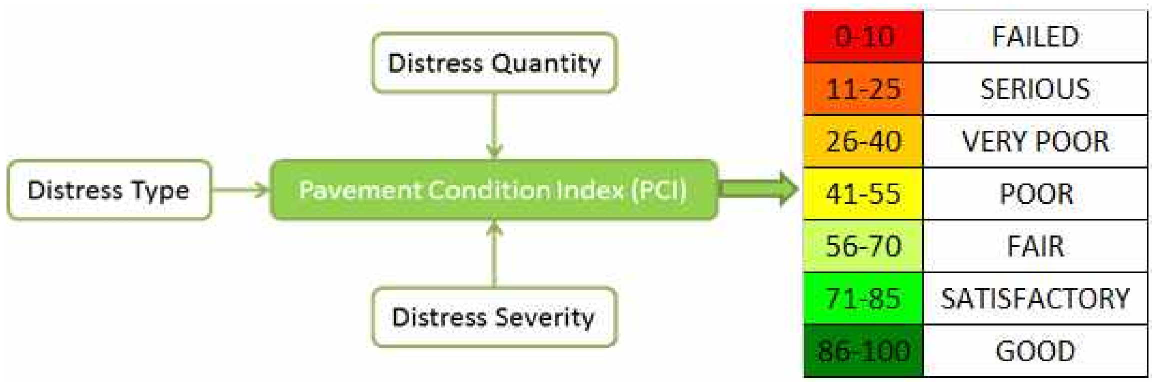

Figure 2. PCI condition ranges.

Overall, the 2020 area-weighted PCI of the University-maintained roadways is 65. Condition results from the previous PMS projects for the University can be compared to the results of this study to track how the pavement network is performing between PCI inspections. The overall area-weighted PCI was 59 in 2009, and 65 in 2016 and 2020 (excluding brick and gravel). It is interesting to note that the overall PCI remained unchanged from 2016 to 2020, despite annual spending of about $1.5 Million. Figure 3 compares the pavement area associated with each condition category from the 2009, 2016, and 2020 inspections. The percent of pavement above a PCI of 70 has increased to 50 percent (it was 37 percent in 2009), while the percent of pavement with a PCI below 40 has remained near 25 percent for all inspection years. Since the percent of pavement in the mid-range of the PCI scale (40 to 70) has decreased from 39 percent to 25 percent since 2009, it appears most of the major work that has occurred since 2009 has focused on improving pavements in this condition range.

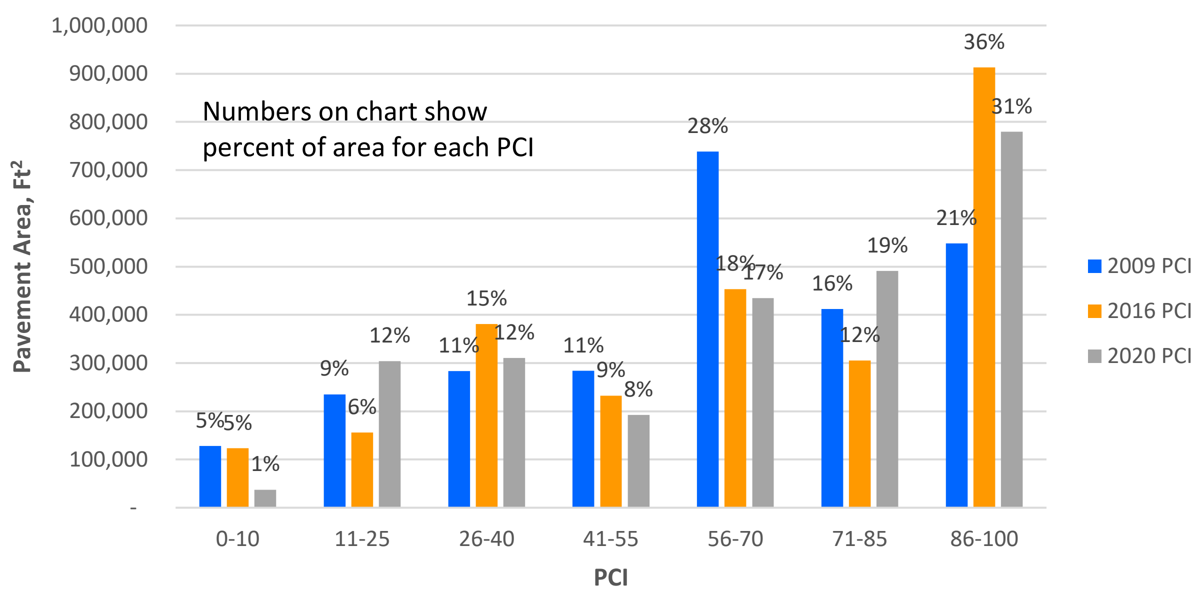

Figure 3. Pavement area by condition from 2009 to 2020.

Since 2013, 34 percent of the paved network (excluding brick and gravel-surfaced roads) has been reconstructed or received asphalt overlays. The percent of the network receiving major work by year has ranged from 1 percent (2019) to 14 percent (2014) for a 7-year average of 5 percent. Since 2013, nearly half of the area receiving major work has had asphalt overlays (47 percent), while PCC reconstruction projects account for the remaining amount (53 percent). Based on information provided by F&S, expenditures for major paving projects averaged $2.5 million between 2013 and 2016. Since 2016, average expenditures have dropped to $1.5 million per year. The impact of this reduced annual budget is fewer reconstruction and overlay projects and an overall network condition (65) that has remained the same since 2016.

APTech investigated the impact that various budget scenarios would have on the overall condition of the pavement network, with each scenario run for 5 years (2021 to 2025). The first budget scenario considered no funding for M&R. Under this assumption the pavement network is expected to deteriorate from a 2020 area-weighted PCI of 65 to a PCI of 54 by 2025. At a PCI of 54, the University can expect the rate of deterioration to increase, resulting in a corresponding increase in the financial burden to maintain the roadway network.

A constrained annual budget of $1.5 million per year for major M&R (defined as a treatment which raises a section's PCI to 100) was analyzed and it showed that the full budget would be used each year and the network PCI would increase to 85 by 2025. The resulting major M&R work plan indicates an average of 10 percent of the network could be repaired each year using a variety of rehabilitation techniques across a mixture of section sizes and condition levels. Although the annual budget of $1.5 million is comparable to the average budget for the University since 2016, the results indicate this budget amount could be allocated across more of the network to improve network conditions, starting with many of the smaller sections that are at or above the critical PCI of 55 (trigger level of major M&R). When available, historical budgets have typically been used to reconstruct a small number of sections for a given year. Using a variety of repair techniques across a broader spectrum of pavement conditions will reduce the need to focus all of the budget on sections in need of reconstruction.

A third analysis was run but with the budget at $1.5 million per year for the first three years, $750,000 the fourth year, and $250,000 for the fifth year. The variable budget attempts to capture the historical fluctuations in funding at potential future funding levels. If this work plan were to be implemented, the area-weighted PCI is projected by PAVER to be 77 by 2025. This analysis indicates a funding level of $1.5 million over three more years (2021 to 2023) will address the majority of the remaining needs across the network. By 2025 nearly 77 percent of the network would be in satisfactory or good condition, with PCIs above 70, compared to 50 percent of the network in 2020. This large shift would allow a more sustainable approach to the management of this network where less expensive preventive measures are used on the pavements already in satisfactory or good condition, with fewer pavement sections needing major rehabilitation after 2023. Figure 4 shows the impact on the condition of the network for each of the three scenarios.

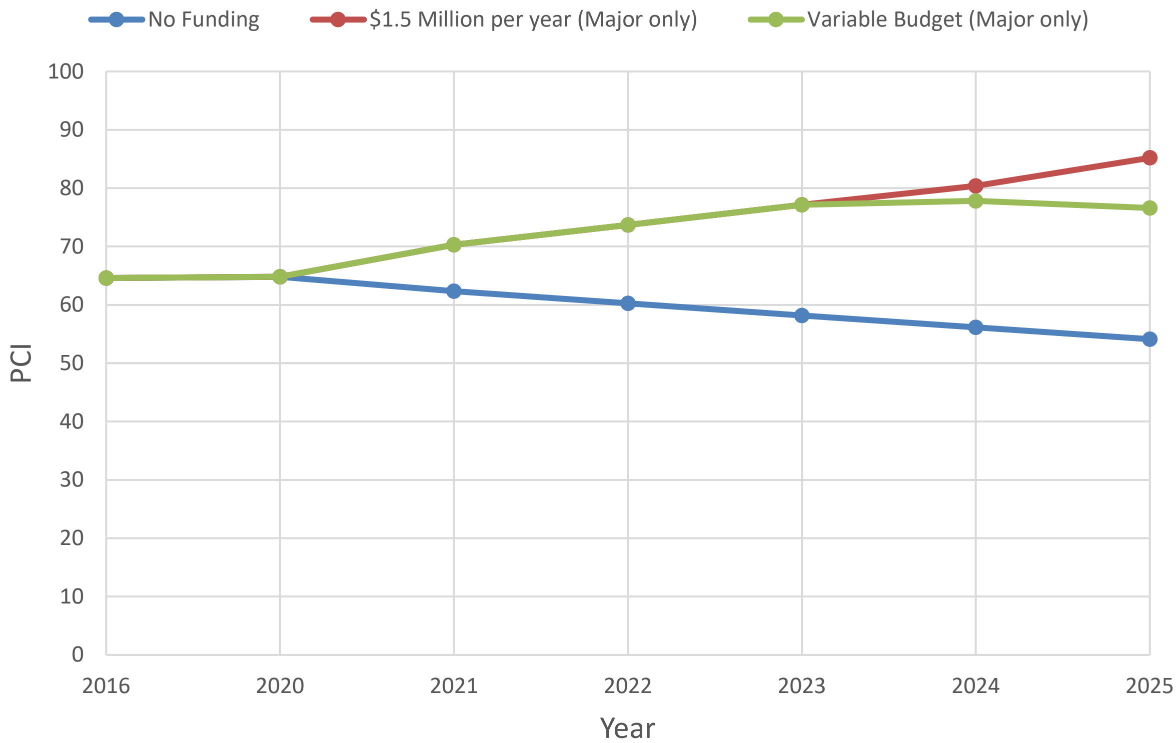

Figure 3. Change in network condition for the considered scenarios.

Two different maintenance plans were developed that apply specific treatments to distresses identified during the 2020 PCI inspections. The preventive maintenance policy targets streets that are already in good overall condition with the objective of slowing deterioration rates and keeping the pavement in good condition longer. The stopgap policy identifies the streets where safety issues could be addressed with maintenance treatments to keep the pavement in serviceable condition until major M&R can be performed. Results indicate that approximately $800,000 could be spent on preventive maintenance activities with 72 percent of this total going towards PCC patching. If only stopgap maintenance activities are performed, then about $500,000 could be spent addressing safety related distresses until major M&R takes place.

In summary, at an annual funding level of about $1.5 Million the University has maintained the network condition at an area-weighted average of about 65 since 2016. If that funding level were to continue the PMS predicts that the network would dramatically improve over the next 5 years using a variety of repair techniques across a wider range of condition levels. A significant reduction in funding shows a significant drop in condition over time. Experience has shown that the lower the condition, the higher the required budget to maintain condition. The University has invested a lot of money in recent years to improve conditions, and should preserve those improvements with funding dedicated to roadway maintenance and preservation rather than allowing the roads to deteriorate at an accelerated pace and require future reconstruction.

This report also emphasizes the need for special considerations in the vicinity of bus stop locations. A number of localized failures were observed, some in newly reconstructed pavements, that appear directly associated with bus operations. Special attention needs to be given to these areas so that expensive repair work is not prematurely destroyed.

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PROJECT BACKGROUND

The University of Illinois (University) campus is located in portions of both Urbana and Champaign. Although some of the roads that are within the limits of campus are maintained by the municipalities of Urbana or Champaign, the remaining road network is the responsibility of the University. The University's road network provides vital infrastructure that allows the safe, efficient movement of people, goods, and services throughout the campus. The asset value of the University's road network is estimated at over $49 million based on reconstruction costs. To facilitate managing this high-value asset, in 2009 the University developed a formalized pavement management system (PMS) and has periodically updated the PMS to reflect changing conditions and needs.

In 2016, and again in 2020 the University hired Applied Pavement Technology (APTech) to update their PMS. Specific steps in this process included the following:

- Updating the inventory of all University-managed roadways. The inventory includes identification (and mapping) and an assessment of the condition of all paved roads (e.g., length of cracking, area of patching). Gravel and brick-surfaced roads were inventoried, but no condition assessments were performed.
- Determining the pavement maintenance and rehabilitation (M&R) treatment needs based on the projected pavement condition.
- Identifying the annual budget needs for pavement maintenance and rehabilitation.
- Prioritizing pavement M&R projects.

Scope of Work

The scope of work consisted of the following tasks:

- **Task 1 – Project Initiation and Kickoff Meeting**: The kick-off meeting was held in April 2020. The primary objective of this task was to discuss project details, scope, and work schedule with the University staff. APTech also used this opportunity to obtain key information about the University's pavement network and to become more familiar with the University's roadway system and goals for the use of a pavement management system.
- **Task 2 – Update Work History**: Using the information provided by the University, APTech updated the University's PAVER database with roadwork performed since the 2016 PMS update.
- **Task 3 – Condition Assessment**: In May 2020 APTech conducted pavement condition surveys in accordance with ASTM Standard D6433 to identify the type, severity, and extent of the visible pavement distresses. The results were used to calculate the Pavement Condition Index (PCI) value for each pavement section with a paved surface. The distress data was input into the PAVER database.
- **Task 4 – Customize Database**: APTech customized the PAVER database for the University by updating performance models, maintenance policies, unit costs, and a network prioritization matrix. A quality assurance check was also performed as a part of this task to verify the consistency of reference information.

- **Task 5 – Maintenance and Rehabilitation Program Development**: APTech investigated the impact of various budget scenarios and developed an M&R plan for the University.
- **Task 6 – Final Report**: A draft report was prepared that discusses the project process, provides results of the condition surveys and network condition, summarizes the maintenance and preservation scenarios developed, and presents budget requirements. After review and comment from the University, APTech prepared a final report.

The project deliverables include the pavement management database, a network definition map, a pavement condition map, and this report.

In an effort to assist in the understanding of the information provided in this report, Appendix A provides a brief introduction to pavement management. The appendix covers the history of pavement management, provides definitions of common pavement management-related terms, and discusses the different components of a modern-day PMS in more detail.

PAVEMENT INVENTORY AND EVALUATION RESULTS

System Inventory and Network Definition

The University pavement network was updated using information obtained from the 2016 PMS implementation, records made available from F&S, a geographic information system (GIS) shape file, and discussions with University officials. If detailed information on construction history for a section was not available, APTech estimated construction or rehabilitation dates based on the current condition of the pavement observed during the pavement inspections. The construction history entries can be easily updated in the PAVER database as new or additional information becomes available.

Previous updates of the University's pavement management system established a network definition following the procedures outlined in American Society for Testing and Materials (ASTM) D6433, *Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys*. This process created an organizational hierarchy of the pavement network consisting of branches, sections, and sample units. A branch consists of the entire length of a road. A section is a subdivision of a branch containing pavement with the same design, construction history, traffic, and condition. Finally, sections are divided into sample units which are small areas (2,500 ft^2 for asphalt or 20 slabs for concrete) used for inspection purposes. Within selected sample units, distress types and severities are identified and quantified to estimate repair needs and to calculate PCIs.

Approximately 17.7 centerline-miles (over 2.8 million ft^2) of roads, comprised of 150 pavement sections, are currently defined in the University's pavement management database. The pavement sections are divided into seven surface types:

- Asphalt Overlay of Asphalt Pavement (AAC).
- Asphalt Concrete Pavement (AC).
- Asphalt Overlay of PCC Pavement (APC).
- Brick.
- Gravel.
- Concrete Pavement (PCC).
- Surface Treatment (typically oil and chip).

Figure 1 shows the distribution of area by surface type. Although brick and gravel sections were not inspected and are not included in the various analyses conducted for this project, these roads are inventoried in the PAVER database.

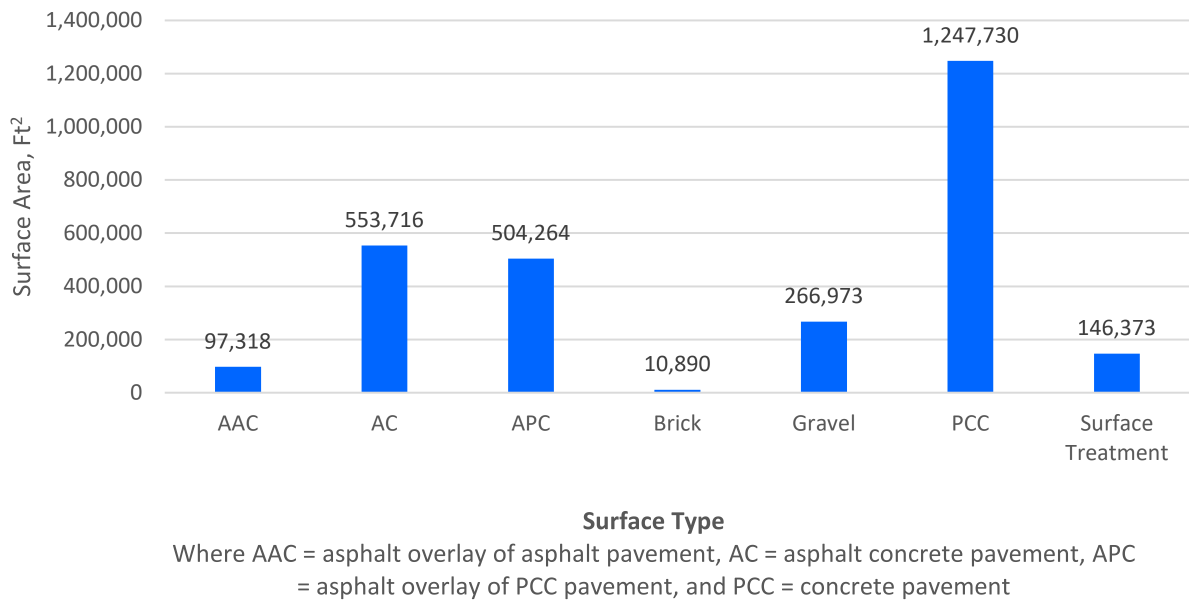

Figure 1. Pavement inventory by surface type.

Pavement Condition Assessment Procedure

One of the most important components of a pavement management system is the methodology for the systematic assessment of pavement conditions. Pavement condition data are used to identify current M&R needs, predict future needs, and project the impact of alternative M&R strategies on overall network conditions. Because of its importance to the pavement management system, the approach used to evaluate pavement condition must provide the level of detail required for the data analysis needs, and also be repeatable among inspectors.

The PCI procedure described in ASTM D6433, *Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys*, was used to assess pavement condition during the pavement evaluations conducted in May 2020. A PCI was determined for each of the 140 sections with a paved surface. The PCI provides a numerical indication of the overall pavement condition. The PCI procedure is one of the standard approaches used by the pavement management industry to visually assess pavement condition. It was developed to provide a consistent, objective, and repeatable tool to represent the overall pavement condition. This methodology involves traveling the pavement length, identifying the type and severity of existing distress, and measuring the quantity (generally length, area, or number of slabs affected) of distress. It is not cost-effective, or rarely even necessary, to inspect every sample unit in a section to make network-level planning decisions. The sampling rate presented in table 1 was used to determine a representative condition and to estimate distress quantities present in each roadway section.

Table 1. Sampling rate for roads.

Total Number of Samples	Number of Samples to Inspect
1-4	1
5-15	2
16-30	3
31 and above	4

Figure 2 illustrates PCI condition ranges. The PCI scale ranges from a value of 0 (representing a pavement in a completely failed condition) to a value of 100 (representing a pavement with no visible distress). Typically, pavements with a PCI above 60 that are not exhibiting significant amounts of load-related distress (e.g., alligator cracking in the wheel-path) will benefit from maintenance actions, such as crack sealing and patching. Crack sealing and patching are cost-effective ways to extend pavement life when the pavement surface is still in good condition, but become less cost-effective as the PCI drops below 60. Pavements with a PCI between 30 and 60 are more likely candidates for major rehabilitation activities (such as hot-mix asphalt overlay). When the PCI is less than 30 often reconstruction is the most viable alternative due to presence of the substantial damage to the pavement structure.

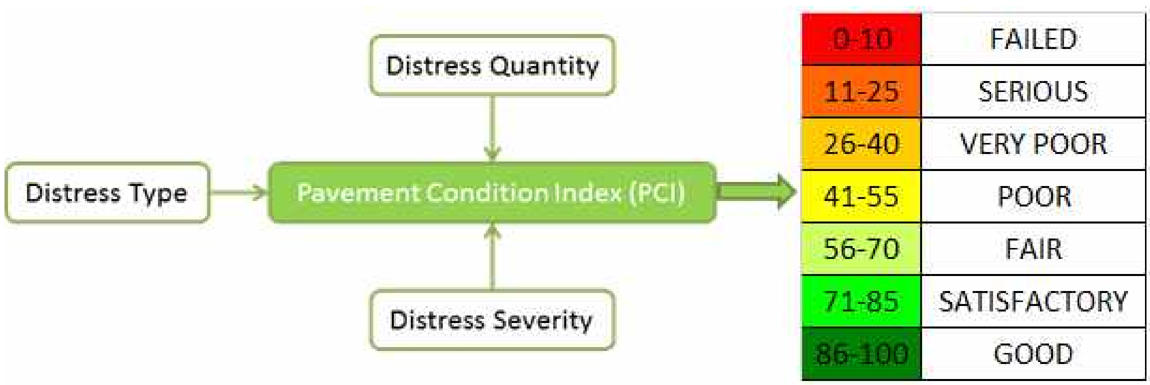

Figure 2. PCI condition ranges.

Although PCI ratings can be used as a general guideline for identifying the repair type, examining the individual distresses measured during the inspection is often more useful in assessing the cause(s) of deterioration. By knowing the cause(s) of the pavement deterioration, appropriate repair and rehabilitation alternatives can be identified.

The three categories of distress types are load-related distresses (such as alligator cracking, rutting, or corner breaks), climate-related distresses (such as block cracking or joint seal damage), and other distresses (which include distresses that are not directly related to load or climate, such as lane/shoulder drop-off). Load-related distresses are defined as being caused by vehicular traffic and may provide an indication of structural deficiency. Climate-related distresses often signify the presence of aged and/or environment-susceptible materials. Asphalt and PCC pavement distresses are summarized in table 2.

Table 2. Pavement distresses by category (as categorized in PAVER).

Load-Related	Climate-Related	Other
Asphalt Pavement		
• Fatigue (Alligator) Cracking • Edge Cracking • Potholes • Rutting	• Block Cracking • Joint Reflection Cracking • Longitudinal and Transverse (L&T) Cracking • Raveling • Weathering	• Bleeding • Bumps and Sags • Corrugation • Depression • Lane/Shoulder Drop-off • Patching • Polished Aggregate • Railroad Crossing • Shoving • Slippage Cracking • Swelling
PCC Pavement		
• Corner Break • Divided Slab • Linear Cracking • Punchout	• Blow Up • Durability Cracking • Joint Seal Damage • Shrinkage Cracking • Corner Spalling • Joint Spalling	• Faulting • Lane/Shoulder Drop Off • Large Patch • Small Patch • Polished Aggregate • Popout • Pumping • Railroad Crossing • Scaling

2020 Pavement Condition Inspection Results

Overall, the area-weighted PCI of the University-maintained roadways in 2020 is 65, which is the same as the PCI of the network during the 2016 inspection. Figure 3 shows the area-weighted PCI by surface type, which ranges from a PCI of 83 for PCC pavements to a 42 for asphalt concrete (AC) pavements. Figure 4 shows the pavement area associated with each condition category. During the condition inspection, the APTech survey crew also documented distresses observed on the pavement surface through digital photographs, both to record typical conditions and to highlight areas of concern. Pictures of typical distresses observed for each section are included in Appendix B.

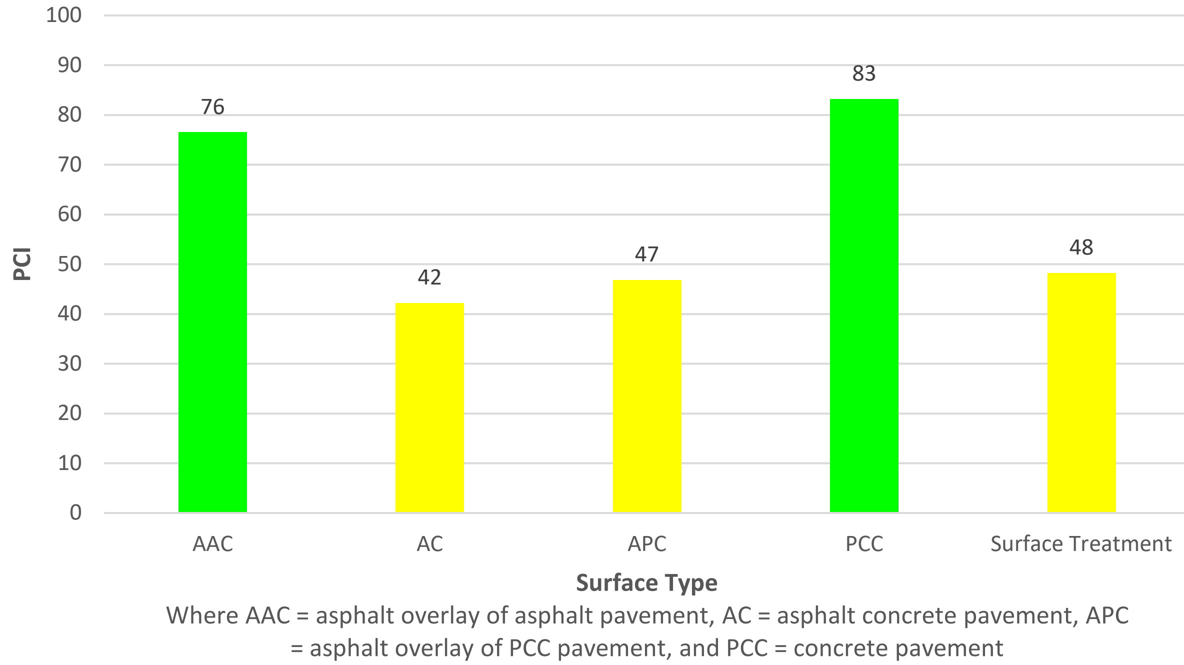

Figure 3. Area-weighted condition by surface type.

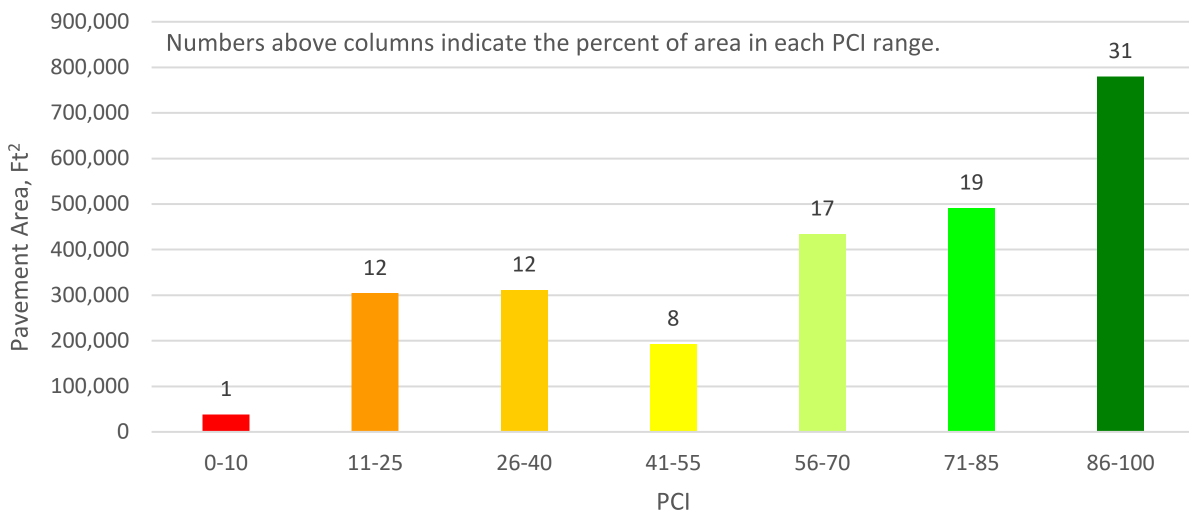

Figure 4. Pavement area by condition.

While the area-weighted PCI of the University roadway network is 65, the conditions vary drastically. The results of the pavement condition inspection indicated that 33 percent of the pavement area (844,242 ft^2) have PCIs below 56; however, more than 50 percent of the area (1,270,803 ft^2) is in satisfactory or good condition, with PCIs above 70.

The summary of 2020 PCI results and extrapolated distresses for each pavement section is provided in Appendix C. The 2020 PCI results are presented on a map of the University's road network in Appendix D (figure D-1). Figure 5 is an example pavement condition map. Labels represent roadway branch and section names, with PCI values shown parenthetically.

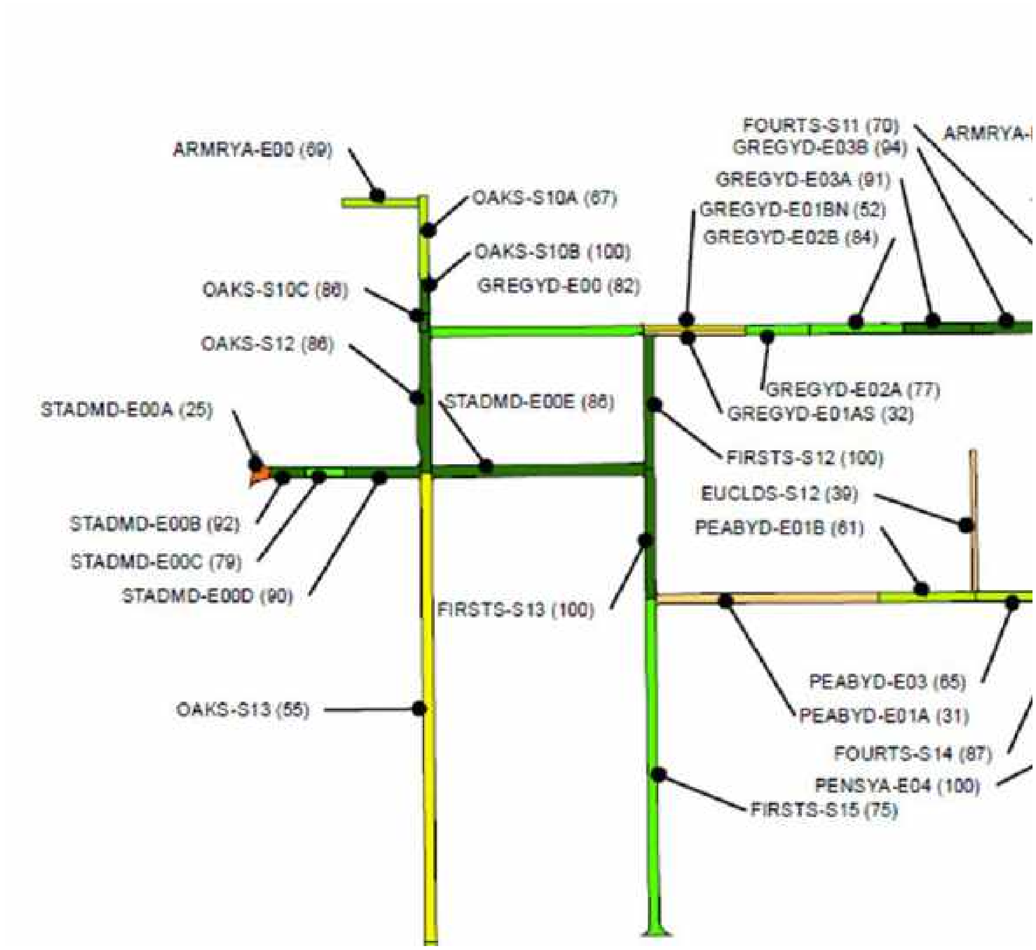

Figure 5. Sample pavement condition map (vicinity of Stadium Drive and Oak Street)

Historical Inspection Results

Condition results from the previous PMS updates (2009 and 2016) for the University can be compared to the results of this study to track how the pavement network is performing over time. Comparing the change in PCI by surface type, AAC, AC, and APC have decreased in condition since the 2016 inspections, while the ST pavements have improved in PCI. Figure 6 shows the area-weighted PCI by surface type for the 2009, 2016, and 2020 PCI inspections. Note the 2009 PMS study did not distinguish between AAC and AC surface types so no direct comparison of AAC is possible.

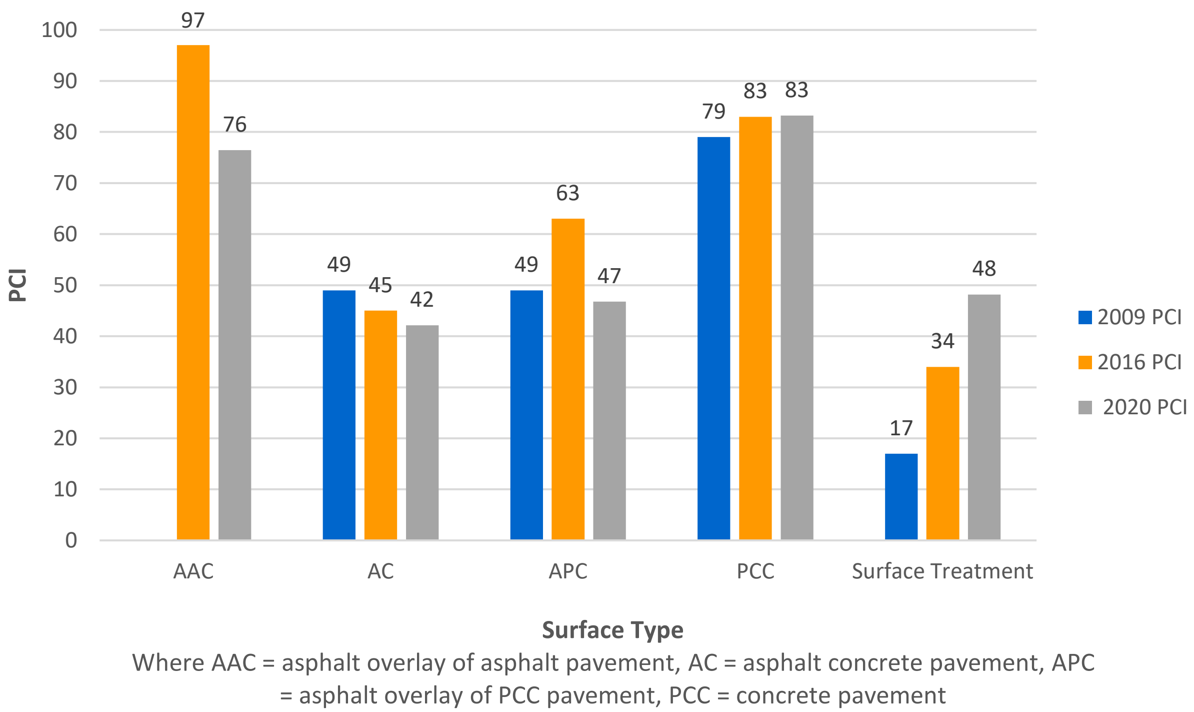

Figure 6. Area-weighted condition by surface type from 2009 to 2020.

Since 2013, 34 percent of the paved network (excluding gravel) has had major work performed, such as reconstruction or asphalt overlays. The percent of the network receiving major work by year has ranged from 1 percent (2019) to 14 percent (2014) for a 7-year average of 5 percent. Of the sections receiving major work since 2013, nearly half of the area has been asphalt overlays (47 percent), while PCC reconstruction projects account for the remaining amount (53 percent). Based on information provided by F&S, expenditures for major paving projects averaged $2.5 million between 2013 and 2016. Since 2016, expenditures have dropped to an average of $1.5 million per year. The impact of this reduced annual budget is fewer reconstruction and overlay projects and an overall network condition (65) that has remained the same since 2016.

Table 3. Sections with major work completed since 2016.

Branch ID	Section ID	From	To	LCD[1]	Surface	Area (Ft^2)
FIRSTS	S12	Gregory Avenue	Stadium Drive	2016	PCC	17,206
FIRSTS	S13	Stadium Drive	Peabody Drive	2016	PCC	16,322
FOURTS	S16	Kirby Avenue	St. Mary's Road	2016	PCC	56,430
HAZELWDD	UW04	George Huff Drive	Dead End	2017	AC	14,240
ORCHDST	US17A	Florida Avenue	Orchard Place	2017	PCC	17,603
ORCHDST	US17B	Orchard Place	George Huff Drive	2017	PCC	72,884
GRIFFITHD	S22A	Gerty Drive	615' N. Of Bailey Drive	2018	PCC	2,927
OAKS	S18B	Hazelwood Dr	SB Lane 400' North	2018	AAC	6,191
PENSYA	E04	Fourth Street	Sixth Street	2018	PCC	35,639
PENSYA	E06	Sixth Street	410' East	2018	PCC	16,903
KIRKD	S20A	Gerty Drive	Cul-De-Sac	2019	PCC	6,376
ARMRYA	E06	Sixth Street	Wright Street	2019	PCC	12,151
GOODWINA	US13	Peabody Drive	Pennsylvania Avenue	2019	AAC	9,830

[1]LCD = last construction date (year)

Appendix E presents the PCIs for the 2016 and 2020 inspections for each section as well as the predicted PCI for each year through 2025 assuming no major work occurs. The PCI deterioration rate (drop in PCI per year) was determined based on the change in PCI since 2016, divided by four (years between inspections). On average the deterioration rate is 2.4 PCI points per year which is within the typical deterioration range for pavements in this region of the country. Deterioration rates by surface type were also determined:

- AC/AAC = 3.5 points per year
- APC = 3.6 points per year
- PCC = 1.0 point per year
- Surface treatment (oil and chip) = 3.3 points per year.

With the exception of the PCC sections, deterioration rates greater than 3.0 PCI points per year are deteriorating at a higher rate and might reach condition levels that warrant major work sooner than expected. For the 42 sections with deterioration rates greater than 3.0 points per year, only four sections are PCC (Fourth St, section S15B, Gregory Dr, section UW12C, Stadium Dr, section E00C, and St Mary Rd, section E00B). Also, 67 percent of the sections experiencing higher deterioration rates are designated bus routes. Appendix E presents the deterioration rate for each section that has not had major M&R since 2016; sections with a deterioration rate greater than 3.0 PCI points per year are shaded red. Appendix D provides a map that identifies the sections with deterioration rates greater than 3.0 PCI points per year since 2016. Although looking at deterioration rates between PCI inspections is useful for identifying individual sections that are deteriorating faster than expected, pavement performance models (discussed later in the report) were developed to model the overall performance trends for each surface type.

Figure 7 shows the pavement area associated with each condition category for 2009, 2016, and 2020. It is interesting to note that the percent of pavement above a PCI of 70 has increased to 50 percent (from 37 percent in 2009), while the percent of pavement with a PCI below 40 has remained near 25 percent for all inspection years. Since the percent of pavement in the mid-range of the PCI scale (40 to 70) has decreased from 39 percent to 25 percent since 2009, it appears most of the major work that has occurred since 2009 has focused on improving pavements in this condition range.

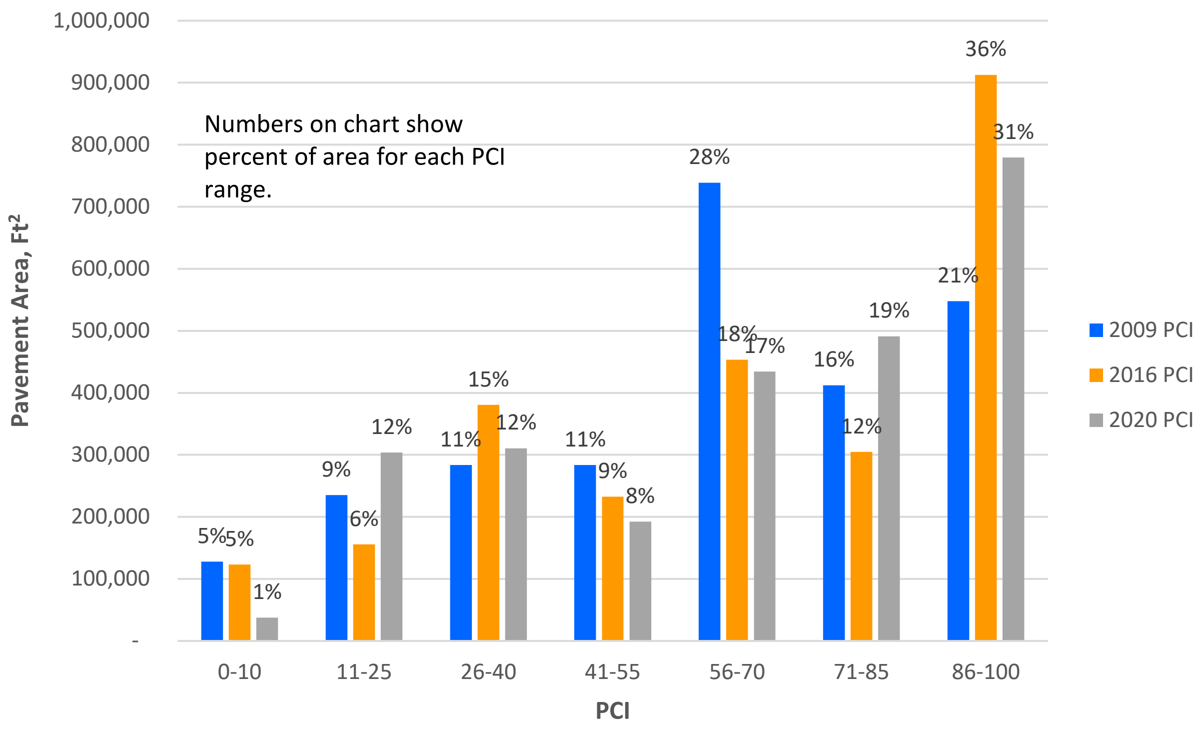

Figure 7. Pavement area by condition from 2009 to 2020.

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PAVER CUSTOMIZATION

Background

PAVER is a pavement management software tool developed by the US Army Corps of Engineers and distributed by the American Public Works Association (APWA). It stores pavement inventory information, calculates pavement conditions using visual assessment data, develops models to predict future pavement performance, stores past performance data, and develops basic M&R plans. The software was customized to reflect the specific conditions and needs for maintaining the pavements for the University. Customizing PAVER is essential to ensure the analysis results are meaningful and applicable to the specific agency needs. APTech defined the PAVER inputs using past pavement management experience and assistance from the F&S staff.

PAVER permits the user to define many database fields to meet specific requirements. This customization occurs at three levels: the network level (e.g., all University-maintained roads), the branch level (e.g., entire street length), and the section level (e.g., portions of each street with the same surface and condition). The University pavement system is represented by a single network, where each road is a unique branch. Sections are used to further divide each branch into smaller areas with common attributes (such as pavement type and general condition). Sample units are also identified within each section, as required by the inspection process.

The customization of the University pavement management system can be broken down into the following areas:

- Database-related customization.
- Performance modeling.
- M&R alternatives.

Each of these areas is addressed under separate headings in this chapter.

Database-Related Customization

Network-Level Customization

At the network level, the network identifier and name can be customized, and user-definable fields can be developed. The University database has been customized at the network level as shown in figure 8 and as follows:

- There is one network in the database consisting of all University roads. The network identifier is UOFI, and the network name is University of Illinois U-C.
- User-defined fields of information were not utilized at the network level. Three fields (NSort1, NSort2, and NSort3) remain available for use, and an unlimited number of additional user-defined fields can also be created in the future. These fields can be used to store other inventory information about the network, which is not generally necessary if only one network is present. For example, if the University were split into networks of different districts, a user-defined field could be created to store the name of the person in charge of each district.

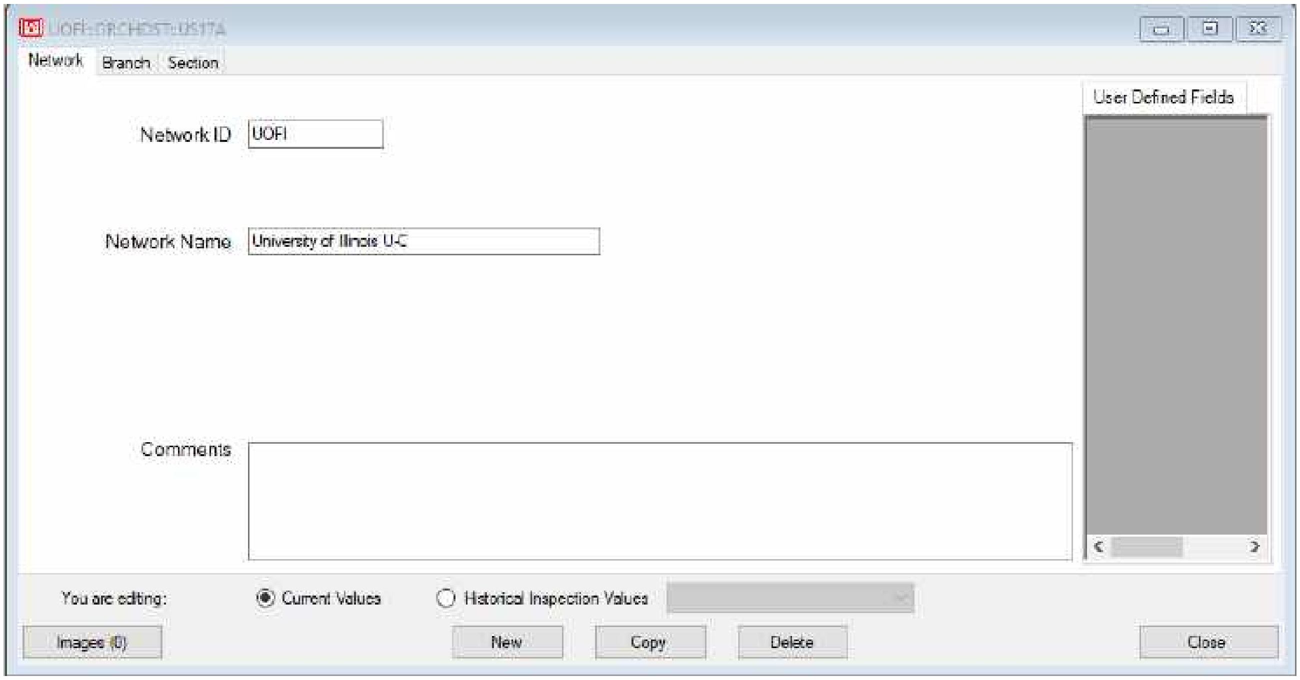

Figure 8. Network-level customized database fields.

Branch-Level Customization

Branches are subdivisions within a network. A branch is a single entity that serves a distinct function. In PAVER, the user is able to customize the facility identifier, the facility name, and the branch use; user-definable fields can also be developed. The University PAVER system includes abbreviated branch IDs that correspond to road names as shown in table 4, with further customization at the branch level as shown in figure 9 and as follows:

- The branch ID is limited to a total of ten characters. Due to this limitation, the branch ID is usually a shortened form of the branch name.
- The use of the pavement is defined as Roadway. This feature could be used to differentiate University-maintained alleys or parking lots, if added to the database in the future.
- User-defined fields of information were not utilized at the branch level. Three fields (BSort1, BSort2, and BSort3) remain available for future use, and an unlimited number of additional user-defined fields can also be created. For example, if the road has an alternate name, a user-defined field could be created to store it. Similarly, if the road has an assigned route number, it could be stored in a user-defined field.

Table 4. University branch IDs and associated road names.

Branch ID	Road Name
ARMRYA[1]	Armory Avenue
BAILEYD	Bailey Drive
CLARKST	Clark Street
COLAGCT	College Court
DORNRDR[1]	Dorner Drive
EUCLDS	Euclid Street
FIRSTS[1]	First Street
FOURTS[1]	Fourth Street
GERTYD	Gerty Drive
GHUFFDR	George Huff Drive
GOODWINA	Goodwin Avenue
GREGYD[1]	Gregory Drive
GRGRYST	Gregory Street
GRIFFITHD	Griffith Drive
HAZELWDD	Hazelwood Drive
KIRKD	Kirk Drive
LNCLNAV[1]	Lincoln Avenue
LORADOTD	Lorado Taft Drive
MAINS	Main Street
MRYLNDDR	Maryland Drive
OAKS[1]	Oak Street
ORCHDST	Orchard Street
PEABYD	Peabody Drive
PENSYA[1]	Pennsylvania Ave
SIXTHS[1]	Sixth Street
STADMD[1]	Stadium Drive
STMARR[1]	Saint Mary's Road
STOUGS	Stoughton Street
VRGNADR	Virginia Drive
WRIGHS	Wright Street

[1] Portions of these roads have been identified by the University as “Core Roads” which are higher priority in relation to the remainder of the road network. Appendix D provides a map identifying which pavement sections of these branches are considered core roads.

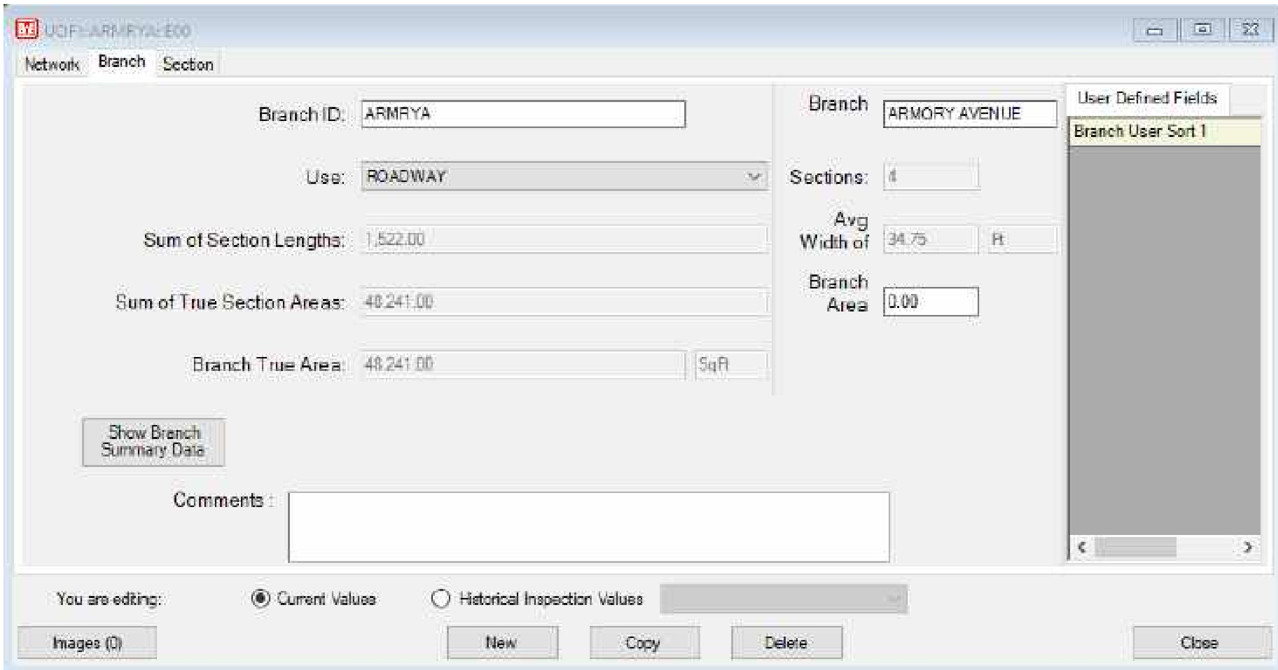

Figure 9. Branch-level customized database fields.

Section-Level Customization

A section is a subdivision of a branch used to define pavements with common attributes, such as cross section, construction date, traffic level, and general condition. In PAVER the user is able to customize the section identifier, from/to descriptors, use, pavement type, rank, category, street type, and zone. In addition, there are three user-definable fields (SSort1, SSort2, and SSort3) available for use. The University system has been customized at the section level as shown in figure 10 and as follows:

- The section identifiers within a branch are numbered according to a naming convention that the Cities of Champaign and Urbana use. Each block of a road is identified in relation to main roads that divide east from west, and north from south for both cities. For example, section E05 of Armory Avenue is the fifth block east of Neil Street which divides east from west in Champaign. The section identifiers that start with a “U” are located in Urbana and are maintained by the University.
- The from/to fields provide a reference of location, using intersections as references when possible.
- Length, width, and true area indicate the dimensions and size of the section. The true area is used to determine extrapolated distress quantities, costs, and quantities for rehabilitation needs and is used when reporting area-weighted PCI results. The sections were developed based on similar surface appearance and pavement condition.
- Ranks of A, C, and N are defined for Arterial, Collector, and Neighborhood (Local roads), respectively. In this case the sections defined as arterials in the PAVER database are actually “core roads,” which collectively represent the most critical sections in the University’s pavement network. These definitions were determined by roadway functional classification as defined in the University District Traffic Circulation Study report that F&S staff provided.

- PAVER requires a pavement type, which is referred to as "surface type" by the software, to be provided. The pavement types used in the University database are AC (asphalt concrete), AAC (asphalt overlaid with asphalt), APC (PCC overlaid with asphalt), Brick, Gravel, PCC (portland cement concrete), and ST (surface treated-chip seal).
- Last construction date identifies the most recent year of surface construction, such as original construction, overlay, or reconstruction.
- Category field identifies if this section receives scheduled bus traffic according to the MTD schedule (Y for yes, N for no).
- The Zone field is used to identify sections that are maintained by F&S or the Housing Department of the University. This will primarily be used to sort M&R recommendations to the appropriate group.
- Lane/Spaces field is used to identify the number of traffic lanes for each section.
- User-defined fields at the moment contain the same information as the Zone field. It is anticipated that the User-defined field will be removed from the final version of the PAVER database since the information is also housed in the Zone field which allows more filtering/sorting options.

Figure 10. Section-level customized database fields.

Performance Modeling

Performance models play an essential role in developing pavement M&R programs. The performance models are used within a pavement management system to predict pavement performance over time, helping to determine the appropriate time to apply maintenance or rehabilitation to maximize the benefits from the expenditure. In addition, by projecting the rate at which the pavement condition will change over time, a meaningful life cycle cost analysis can be performed to compare the costs of different rehabilitation alternatives.

A PCI assessment provides the condition of the pavement at the time of the inspection. However, for developing future M&R plans, it is also valuable to be able to predict the future PCI of the pavement sections. This can be done in PAVER through the development and application of performance models. By using the actual pavement condition data from all inspections and the known age at the time of inspection, it is possible to develop database-specific performance models for groups of pavements. First, the pavement network is divided into groups of pavements called “families,” which are comprised of sections that are expected to perform in a similar manner over time. For example, AC-surfaced roadway pavements that receive heavy traffic might be grouped into one family, whereas AC-surfaced pavements that are primarily used for residential traffic might comprise another family.

Figure 11 graphically illustrates the application of performance model prediction. In this example, a pavement family model was developed using past pavement condition data (shown as black points) and statistically fitted through the data to develop the performance model (shown as the blue curve). For a given pavement section, if the pavement is performing better (or worse) than the rest of the pavement family (for example, see PCI value at 10 years), the model is “shifted” horizontally within PAVER to represent the improved pavement condition (shown as the orange modified family model). In this example, the model shift results in an extension of predicted future pavement condition from the original pavement family model.

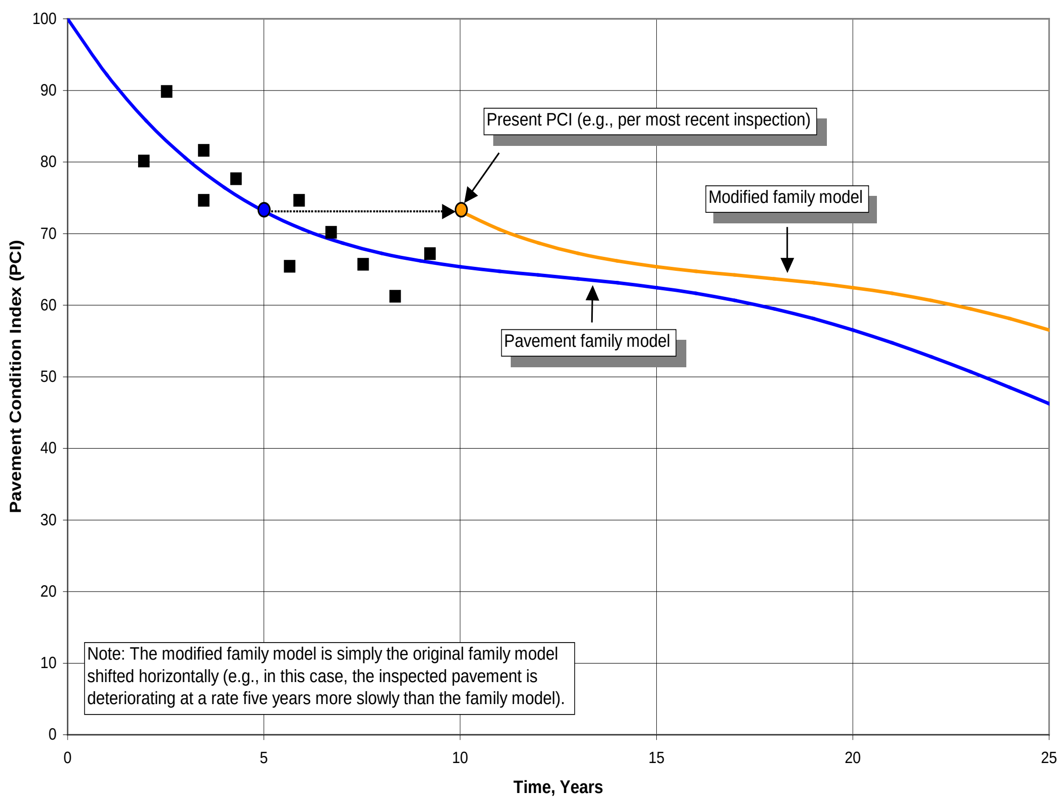

Figure 11. Example of pavement performance model application.

Pavement characteristics such as pavement use, pavement type, surface type, and traffic level can be investigated to determine their impact on pavement performance. Due to the relatively small number of pavement sections included in the University network, pavements were divided into three families: PCC, asphalt (HMA—includes AC, AAC, and APC), and surface treatment (oil and chip), then subdivided by sections with and without designated bus routes. Only the PCC family resulted in separate performance models when bus routes were accounted for. The performance curves developed for each of these pavements are shown in figures 12 through 15.

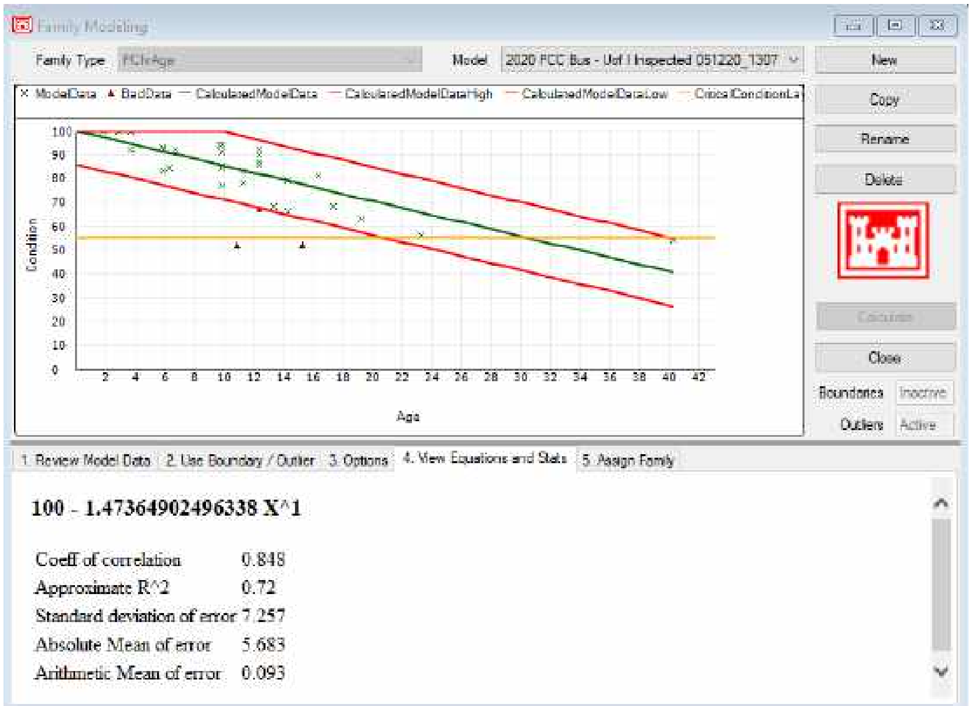

Figure 12. PCC pavement with bus route performance model.

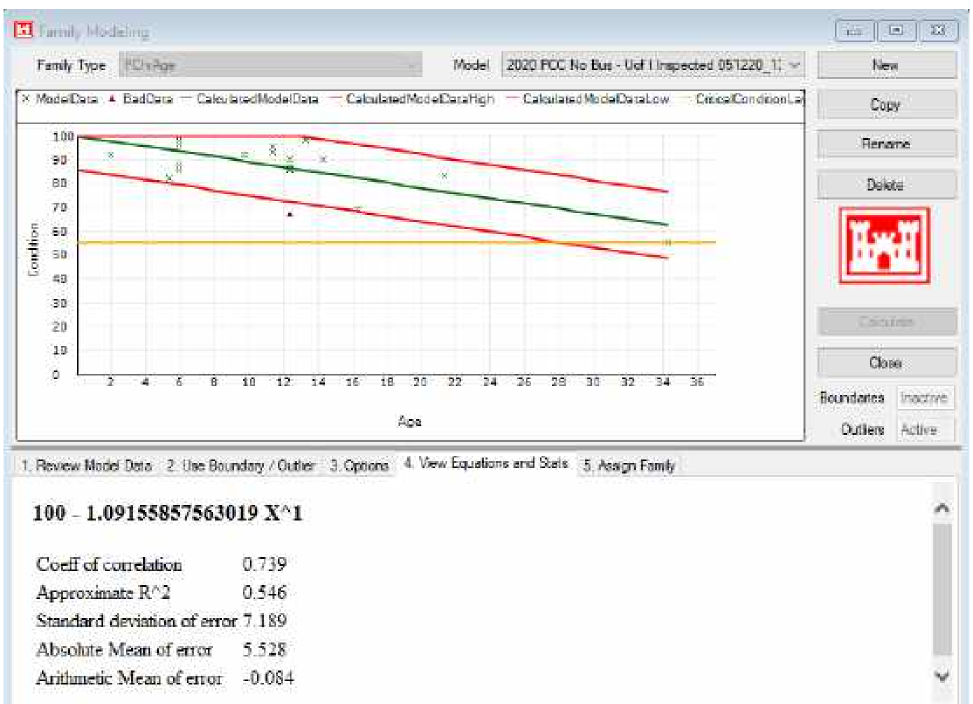

Figure 13. PCC pavement without bus route performance model.

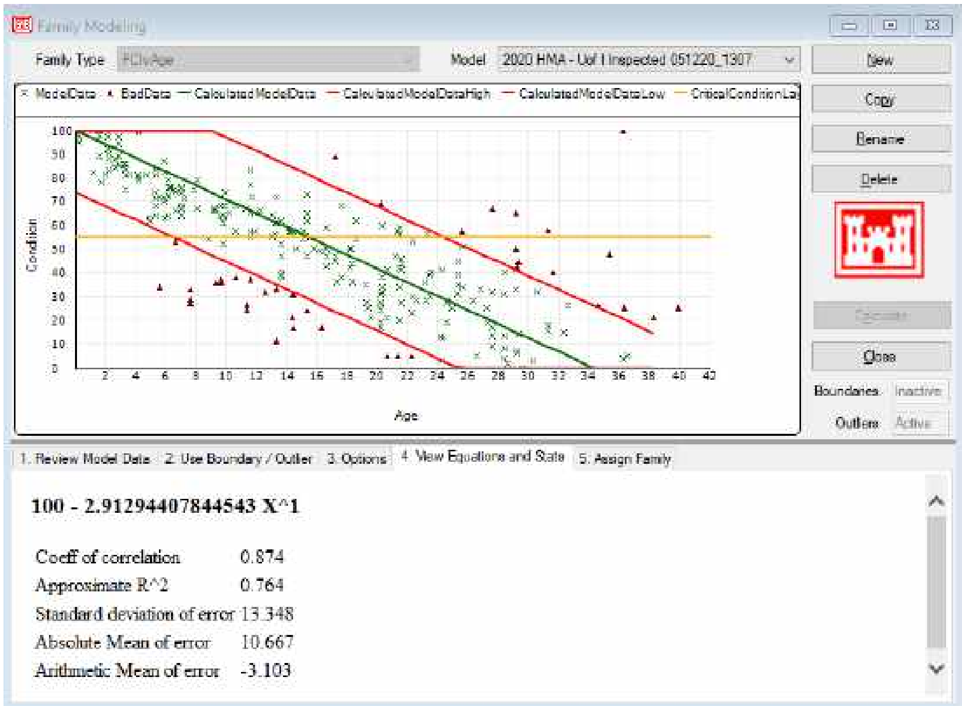

Figure 14. Asphalt (HMA) pavement performance model.

Figure 15. Surface Treatment (oil and chip) pavement performance model.

The models are described by the following equations:

PCC (with bus route):	*PCI = 100 – (1.47*Age)*
PCC (without bus route):	*PCI = 100 – (1.09*Age)*
Asphalt (HMA):	*PCI = 100 – (2.91*Age)*
Surface Treatment (oil and chip):	*PCI = 100 – (2.66*Age)*

Maintenance and Rehabilitation Alternatives

Maintenance Policies

Pavement maintenance includes routine maintenance actions that are applied to address a specific distress, such as crack sealing linear cracks, or patching a pothole. A slight increase in PCI is typically realized by the application of maintenance treatments, but the age of the pavement would still be based on the year of last major work (either original construction or overlay). In general, pavement maintenance is divided into two approaches depending on the overall condition of the pavement being considered for maintenance: preventive and stopgap. Characteristics of each maintenance approach are provided below, along with the following definitions:

- Preventive maintenance: maintenance activities performed with the primary objective of slowing the rate of pavement deterioration on a pavement that is generally in good condition.
- Stopgap maintenance: maintenance activities performed to keep the pavement operational and in a safe condition.

The goal of preventive maintenance is to preserve the pavement system by slowing the rate of deterioration through proactive treatments. Since preventive maintenance treatments are usually very low in cost, their use is a cost-effective strategy for preserving network conditions. Preventive maintenance policies are established to define the type of maintenance action needed to correct each distress type observed during the pavement evaluation.

Stopgap maintenance is recommended when rehabilitation activities are warranted but funding is insufficient to perform the needed level of work. The goal of these policies is to keep the pavement operational through the repair of distress type and severity level combinations that could create hazardous situations through the potential for tire damage, hydroplaning, or other safety concerns.

The critical PCI is the pavement condition level that is used to distinguish between preventive and stopgap approaches, and it represents the condition level below which major rehabilitation work should be triggered. Preventive maintenance actions are recommended above the critical PCI level. Below the critical PCI, stopgap maintenance could be applied but ideally the pavement is being considered for major M&R in the near future. Major M&R is typically defined as follows:

- Major M&R: a global activity such as an overlay or reconstruction that would return the pavement to basically "new" condition and would result in a PCI of 100 (no distress) if implemented.

Currently all University roads are set to a critical PCI of 55, which is the same PCI that the City of Champaign uses. Table 5 shows the critical PCIs chosen for University roads. A map is provided in appendix D which identifies which roads are identified as core roads by the University.

Table 5. Critical PCIs for University roads.

Critical PCI	Road Type
55	Core roads
55	Secondary roads
55	Local roads

Tables 6 and 7 present localized preventive and stopgap maintenance policies that were used in PAVER for asphalt and PCC pavements, respectively. The localized preventive and stopgap maintenance policies primarily consist of crack sealing and partial and full-depth patching to address isolated areas of distresses to slow down the rate of deterioration of the pavement section. Items identified in tables 5 and 6 as “monitor” are not recommended for a specific maintenance action at this time, but should be checked periodically for further deterioration. The distresses that were identified during the 2020 PCI inspections are highlighted in tables 6 and 7. The maintenance activities recommended for the University will be discussed in later sections of this report.

Table 6. Localized preventive and stopgap maintenance policies for asphalt pavements.

Distress Type	Severity Level	Preventive Maintenance Action	Stopgap Maintenance Action
Alligator Cracking	Low	Monitor	Monitor
	Medium	Patching – AC Full Depth	Monitor
	High	Patching – AC Full Depth	Patching – AC Full Depth
Bleeding	Low	Monitor	Monitor
	Medium	Spread Sand	Monitor
	High	Milling – 1/2" inch (localized)	Milling – 1/2" inch (localized)
Block Cracking	Low	Monitor	Monitor
	Medium	Crack Sealing – AC	Monitor
	High	Crack Sealing – AC	Monitor
Bumps and Sags	Low	Monitor	Monitor
	Medium	Patching – AC Partial Depth	Monitor
	High	Patching – AC Partial Depth	Patching – AC Partial Depth
Corrugation	Low	Monitor	Monitor
	Medium	Milling – 1/2" inch (localized)	Monitor
	High	Patching – AC Full Depth	Patching – AC Partial Depth
Depression	Low	Monitor	Monitor
	Medium	Patching – AC Partial Depth	Monitor
	High	Patching – AC Full Depth	Patching – AC Partial Depth
Edge Cracking	Low	Monitor	Monitor
	Medium	Crack Sealing – AC	Monitor
	High	Patching – AC Full Depth	Patching – AC Full Depth
Joint Reflection Cracking	Low	Monitor	Monitor
	Medium	Crack Sealing – AC	Monitor
	High	Crack Sealing – AC	Crack Sealing – AC
Lane/Shoulder Drop-off	Low	Monitor	Monitor
	Medium	Patching – AC Leveling	Monitor
	High	Patching – AC Leveling	Patching – AC Leveling
Longitudinal and Transverse Cracking	Low	Monitor	Monitor
	Medium	Crack Sealing – AC	Monitor
	High	Crack Sealing – AC	Crack Sealing – AC
Patching	Low	Monitor	Monitor
	Medium	Monitor	Monitor
	High	Patching – AC Full Depth	Patching – AC Full Depth
Polished Aggregate	N/A	Milling – 1/2" inch (localized)	Milling – 1/2" inch (localized)
Potholes	Low	Patching – AC Full Depth	Patching – AC Full Depth
	Medium	Patching – AC Full Depth	Patching – AC Full Depth
	High	Patching – AC Full Depth	Patching – AC Full Depth
Rutting	Low	Monitor	Monitor
	Medium	Patching – AC Full Depth	Monitor
	High	Patching – AC Full Depth	Patching – AC Full Depth
Shoving	Low	Monitor	Monitor
	Medium	Milling – 1/2" inch (localized)	Monitor
	High	Patching – AC Full Depth	Patching – AC Full Depth
Slippage Cracking	Low	Monitor	Monitor
	Medium	Patching – AC Partial Depth	Patching – AC Partial Depth
	High	Patching – AC Partial Depth	Patching – AC Partial Depth
Swelling	Low	Monitor	Monitor
	Medium	Patching – AC Full Depth	Monitor
	High	Patching – AC Full Depth	Milling – 1/2" inch (localized)
Raveling	Medium	Monitor	Monitor
	High	Patching – AC Partial Depth	Patching – AC Partial Depth
Weathering	All	Monitor	Monitor

Table 7. Localized preventive and stopgap policies for PCC pavements.

Distress Type	Severity Level	Preventive Maintenance Action	Stopgap Maintenance Action
Blow-Up	Low	Patching – PCC Partial Depth	Patching – PCC Partial Depth
	Medium	Patching – PCC Full Depth	Patching – PCC Full Depth
	High	Patching – PCC Full Depth	Patching – PCC Full Depth
Corner Break	Low	Monitor	Monitor
	Medium	Patching – PCC Full Depth	Monitor
	High	Patching – PCC Full Depth	Patching – PCC Full Depth
Divided/Shattered Slab	Low	Monitor	Monitor
	Medium	Slab Replacement – PCC	Monitor
	High	Slab Replacement – PCC	Slab Replacement – PCC
Durability Cracking	Low	Monitor	Monitor
	Medium	Patching – PCC Partial Depth	Monitor
	High	Patching – PCC Full Depth	Patching – PCC Partial Depth
Faulting/Settlement	Low	Monitor	Monitor
	Medium	Grinding (Localized)	Monitor
	High	Grinding (Localized)	Grinding (Localized)
Joint Seal Damage	Low	Monitor	Monitor
	Medium	Monitor	Monitor
	High	Joint Seal (Localized)	Monitor
Lane/Shoulder Drop off	Low	Monitor	Monitor
	Medium	Patching – AC Leveling	Monitor
	High	Patching – AC Leveling	Patching – AC Leveling
Linear Crack	Low	Monitor	Monitor
	Medium	Crack Sealing – PCC	Monitor
	High	Patching – PCC Full Depth	Patching – PCC Full Depth
Patch (Large)	Low	Monitor	Monitor
	Medium	Monitor	Monitor
	High	Patching – PCC Full Depth	Patching – PCC Full Depth
Patch (Small)	Low	Monitor	Monitor
	Medium	Monitor	Monitor
	High	Patching – PCC Full Depth	Patching – PCC Full Depth
Polished Aggregate	N/A	Grinding (Slab)	Grinding (Slab)
Popouts	N/A	Monitor	Monitor
Pumping	N/A	Monitor	Monitor
Punchout	Low	Monitor	Monitor
	Medium	Patching – PCC Full Depth	Monitor
	High	Patching – PCC Full Depth	Patching – PCC Full Depth
Scaling	Low	Monitor	Monitor
	Medium	Monitor	Monitor
	High	Slab Replacement – PCC	Monitor
Shrinkage Cracks	N/A	Monitor	Monitor
Spalls (Joint and Corner)	Low	Monitor	Monitor
	Medium	Patching – PCC Partial Depth	Monitor
	High	Patching – PCC Partial Depth	Patching – PCC Partial Depth

Unit Costs

APTech used the cost data for maintenance activities in table 8 to estimate the cost of maintenance needs. The cost data is based on information APTech has collected working with other local agencies.

Table 8. Unit costs for localized maintenance activities.

Maintenance Item	Cost	Work Unit
Crack Sealing - AC	$1.09	ft
Crack Sealing - PCC	$1.09	ft
Joint Seal (Localized)	$1.09	ft
Grinding (Localized)	$0.56	ft
Spread Sand	$0.25	ft^2
Patching - AC Full Depth	$11.00	ft^2
Patching - AC Partial Depth	$7.00	ft^2
Patching - AC Leveling	$7.00	ft^2
Patching - PCC Full Depth	$21.00	ft^2
Patching - PCC Partial Depth	$40.00	ft^2
Slab Replacement - PCC	$18.00	ft^2

Using the unit cost and maintenance policies shown above, a cost by PCI table was developed for preventive, stopgap, and rehabilitation activities. These costs were used during the preliminary budget scenario analysis and comparison. The preliminary budget scenario analysis allows a simple comparison of different budgets and condition targets.

In general, the costs for rehabilitating pavements with a PCI below 40 represent the cost of reconstruction. For PCIs between 40 and 70, the costs generally represent the cost of patching or the cost of an asphalt overlay with varying amounts of pre-overlay repairs. Finally, costs for pavements with PCIs above 70 are for preventive maintenance and repairs. Table 8 shows the cost by PCI ranges of preventive and stopgap maintenance for asphalt and PCC roads. PAVER will use the cost by PCI in table 9 after the first simulation year to estimate the costs for applying preventive and stopgap maintenance for a section. The costs for maintenance for the first simulation year are based on the distresses and extrapolated quantities identified during the 2016 PCI inspections. Table 9 shows the cost by PCI ranges for rehabilitation activities for asphalt and PCC which are defined by classification of the road and are based on City of Champaign unit costs. PAVER will use the costs by PCI data in table 10 for each year of the simulation to estimate the costs of applying rehabilitation (major M&R) activities.

Table 9. Cost by PCI range for preventive and stopgap maintenance.

PCI	PCC		Asphalt	
	Preventive	**Stopgap**	**Preventive**	**Stopgap**
0	$2.00/ft^2$	$9.39/ft^2$	$8.00/ft^2$	$1.70/ft^2$
10	$2.00/ft^2$	$4.45/ft^2$	$8.00/ft^2$	$0.80/ft^2$
20	$2.00/ft^2$	$1.97/ft^2$	$4.25/ft^2$	$0.20/ft^2$
30	$2.00/ft^2$	$0.77/ft^2$	$2.50/ft^2$	$0.07/ft^2$
40	$2.00/ft^2$	$0.49/ft^2$	$1.25/ft^2$	$0.02/ft^2$
50	$2.00/ft^2$	$0.28/ft^2$	$0.50/ft^2$	$0.00/ft^2$
60	$2.00/ft^2$	$0.11/ft^2$	$0.06/ft^2$	$0.00/ft^2$
70	$0.85/ft^2$	$0.06/ft^2$	$0.02/ft^2$	$0.00/ft^2$
80	$0.50/ft^2$	$0.02/ft^2$	$0.02/ft^2$	$0.00/ft^2$
90	$0.05/ft^2$	$0.00/ft^2$	$0.01/ft^2$	$0.00/ft^2$
100	$0.00/ft^2$	$0.00/ft^2$	$0.00/ft^2$	$0.00/ft^2$

Table 10. Cost by PCI range for rehabilitation activities.

PCI	Arterial/Collector[1]		Local[1]	
	PCC	**Asphalt**	**PCC**	**Asphalt**
0	$24.00/ft^2$	$9.00/ft^2$	$16.80/ft^2$	$6.30/ft^2$
10	$24.00/ft^2$	$9.00/ft^2$	$16.80/ft^2$	$6.30/ft^2$
20	$24.00/ft^2$	$9.00/ft^2$	$16.80/ft^2$	$6.30/ft^2$
30	$24.00/ft^2$	$9.00/ft^2$	$16.80/ft^2$	$6.30/ft^2$
40	$24.00/ft^2$	$9.00/ft^2$	$16.80/ft^2$	$6.30/ft^2$
50	$3.60/ft^2$	$3.75/ft^2$	$3.60/ft^2$	$2.35/ft^2$
60	$3.60/ft^2$	$3.75/ft^2$	$3.60/ft^2$	$2.35/ft^2$
70	$0.00/ft^2$	$0.00/ft^2$	$0.00/ft^2$	$0.00/ft^2$
80	$0.00/ft^2$	$0.00/ft^2$	$0.00/ft^2$	$0.00/ft^2$
90	$0.00/ft^2$	$0.00/ft^2$	$0.00/ft^2$	$0.00/ft^2$
100	$0.00/ft^2$	$0.00/ft^2$	$0.00/ft^2$	$0.00/ft^2$

[1] Street classification as defined by City of Champaign standards.

Prioritization Guidelines

Prioritization is a technique used to determine which M&R activities should be performed when there is insufficient funding to perform all necessary work. A prioritization scheme should be developed such that when funding is limited, more important pavements receive their recommended work first and less important pavements have their recommended work postponed either until needed funds become available or conditions deteriorate such that the priority increases.

Priorities should consider all factors relevant in determining the relative importance of various pavements. Typically, agency policy is a key factor in determining priorities. For example, some agencies may determine that certain roadways are more important than others because of traffic patterns or other priorities.

The priorities used for the University network are based on the functional classification of the road as defined in the University District Traffic Circulation Study report and are as follows:

- High priority – Core roads. Includes roads which serve as the main distributing arteries for traffic originating outside of campus and which provide access to, through, and between the various functional areas.
- Medium priority – Collector roads. Includes roads which supplement the core roads by providing access to, between, and within the various functional areas.
- Low priority – Local roads. Includes all roads not classified as core or collector roads.

When a constrained budget (not enough budget to fund every need) analysis is performed, PAVER prioritizes projects in the following order:

- First Priority: Stopgap maintenance.
- Second Priority: Preventive maintenance.
- Third Priority: Major M&R above critical PCI with structural defects.
- Fourth Priority: Major M&R below critical PCI.

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MAINTENANCE AND REHABILITATION PROGRAM

Analyses were run using PAVER to determine the impact that several different funding scenarios would have on the overall condition of the pavement network. A "no funding" scenario was run to determine the impact if no major rehabilitation activities were scheduled for the next 5 years. Other scenarios analyzed how to allocate a constrained or limited budget (needs are greater than amount of funding available) over a 5-year period that focuses the overall budget towards major M&R treatments (returns PCI to 100). In addition to these plans, APTech has also developed a 1-year plan for pavement maintenance activities. The details of these plans and the impact of no rehabilitation on the University pavement network are discussed in this section.

No Major Rehabilitation

If no funding is available for preventive and rehabilitation activities, the area-weighted average network PCI will drop from 65 (2020) to 54 (2025) at the end of the analysis period. Appendix E shows the projected PCIs of each pavement section if no major rehabilitation work is performed in the next 5 years (2021 to 2025). The forecasted PCIs are determined using the prediction models developed for the University pavement network (discussed in the previous chapter). In addition, Appendix E shows the inspected PCIs for each section from the previous inspection (2016) and 2020, making it easy to track how sections have deteriorated between PCI inspections. The deterioration rate (drop in PCI points per year) for sections that have not had major work performed since 2016 is included in this table.

$1.5 Million per Year M&R Program

This M&R program attempts to balance network needs, addressing streets that are candidates for major improvements while also maintaining the condition of the other roads. The plan recommends major M&R for several streets each year, but the budget is constrained so some of the larger sections that are eligible for major repairs are not funded due to lack of funds.

Table 11 summarizes the 5-year M&R plan that was developed based on an annual funding level of $1.5 million per year allocated for major M&R treatments, typically overlays or reconstruction depending on the PCI level. The analysis indicates that the full budget is spent each year of the analysis with a dramatic increase in condition by the end of the 5 years. If the recommended work plan is successfully implemented, PAVER predicts the area-weighted network average PCI will be 85 by 2025. The resulting major M&R work plan indicates an average of 10 percent of the network could be repaired each year using a variety of rehabilitation techniques across a mixture of section sizes and condition levels. Although the annual budget of $1.5 million is comparable to the average budget for the University since 2016, the results indicate this budget amount could be allocated across more of the network to improve network conditions, starting with many of the smaller sections that are at or above the critical PCI of 55 (trigger level of major M&R). When available, historical budgets have typically been used to reconstruct a small number of sections for a given year. The provided work plan spreads the level of repair across a broader spectrum of pavement conditions instead of focusing all of the budget on sections in need of reconstruction. Note the sections identified in table 11 have not been grouped into logical projects that account for construction phasing, traffic considerations, etc. Sections that have been identified as one of the core roads are highlighted in table 11.

Variable per Year M&R Program

A third analysis was run with a budget of $1.5 million per year for the first 3 years, $750,000 for the fourth year, and $250,000 for the fifth year. The variable budget attempts to capture the historical fluctuations in funding at potential future funding levels. If this work plan were to be successfully implemented, the area-weighted PCI would be 77 by 2025 indicating that this budget improves the overall network condition before a slight deterioration during the fifth year of the analysis. Given that the funding levels for major capital repair projects have averaged around $1.5 million per year since 2016, this analysis indicates a funding level of $1.5 million over three more years (2021 to 2023) will address the majority of the remaining needs across the network. By 2025 nearly 77 percent of the network would be in satisfactory or good condition, with PCIs above 70, compared to 50 percent of the network in 2020. This large shift would allow a more sustainable approach to the management of this network where less expensive preventive measures are used on the pavements already in satisfactory or good condition, with fewer pavement sections needing major rehabilitation after 2023. Figure 16 shows the impact on the condition of the network for each of the three scenarios.

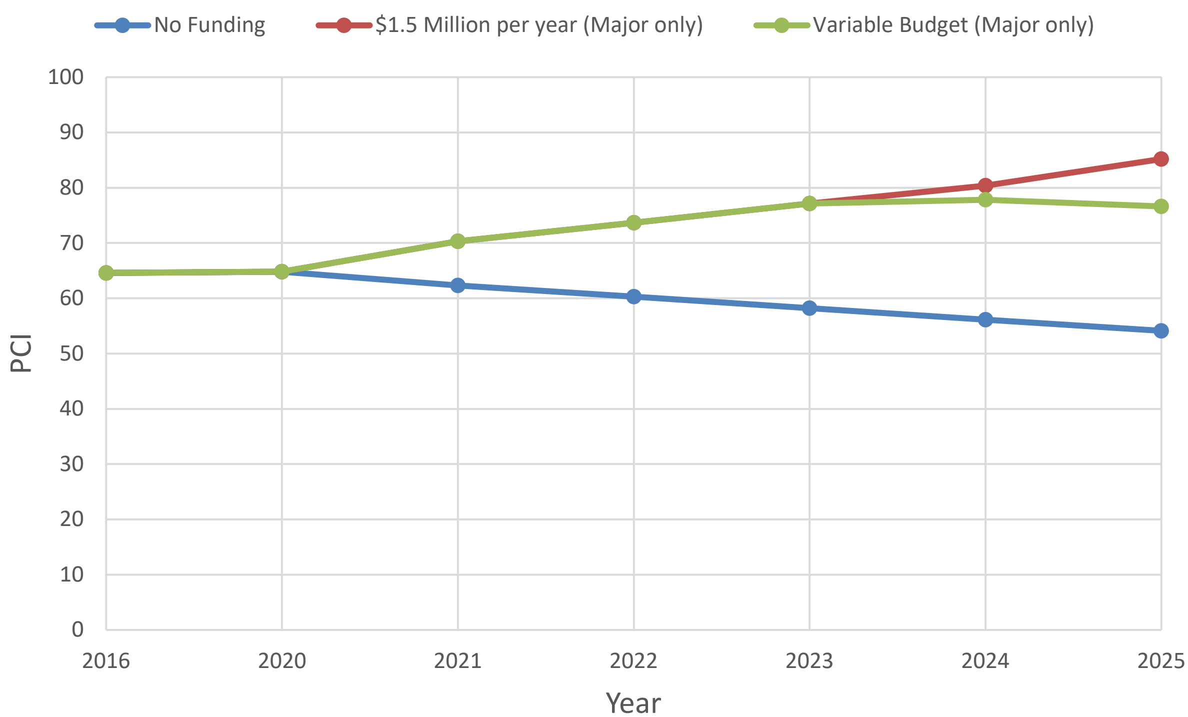

Figure 16. Change in network condition for the considered scenarios.

Maintenance Work Plan

A separate list of pavement sections that are good candidates for pavement maintenance and preservation was also compiled and is shown in table 12. It should be noted that the sections identified in table 12 show maintenance quantities based on the distresses recorded during the 2020 PCI inspections, and therefore become less accurate for future years. A total of approximately $800,000 would be needed to address all maintenance items listed in table 12, with approximately 72% of this amount going towards PCC patching.

In addition to the work items listed in tables 11 and 12, it is also recommended that the University perform stopgap maintenance to address safety issues that were identified due to the presence of high-severity distresses (with the exception of weathering and raveling), and potholes of any severity. These are maintenance needs identified during the 2020 inspections. Table 13 shows the list of pavements recommended for stopgap and safety repairs. The stopgap and safety repair activities are estimated to cost about $500,000.

Table 11. Candidates for Major M&R ($1.5 million/year).

Year	Branch ID	Section ID	Area (Ft^2)	PCI Before	Cost
2021	ARMRYA	E00	7,475	68	$6,292
	DORNRDR	US11BE	6,952	54	$26,849
	DORNRDR	US13E	5,257	38	$48,735
	DORNRDR	US13W	5,383	30	$49,903
	FOURTS	S11	20,487	67	$26,901
	FOURTS	S12	42,040	68	$38,967
	GHUFFDR	UW03	13,420	65	$17,544
	GHUFFDR	UW04BN	6,587	61	$14,990
	GOODWINA	US12	8,647	69	$2,931
	GOODWINA	US19	49,021	59	$118,678
	GREGYD	E01BN	5,968	50	$22,129
	GREGYD	UW10	8,260	45	$56,024
	GREGYD	UW11	20,280	33	$188,005
	HAZELWDD	E00A	8,051	59	$19,491
	HAZELWDD	E00B	6,105	60	$14,780
	HAZELWDD	UW05	13,714	68	$7,968
	LNCLNAV	US19	59,609	54	$221,030
	OAKS	S10A	9,657	66	$15,290
	OAKS	S13	69,188	54	$256,549
	OAKS	S20A	24,690	70	$2,391
	OAKS	S20B	6,191	59	$14,988
	PEABYD	E01B	12,156	58	$29,429
	PEABYD	E03	9,748	62	$19,824
	SIXTHS	S11	18,364	29	$170,243
	STMARR	E00B	13,162	50	$48,805
	STMARR	UW09A	9,133	64	$22,574
	STMARR	UW09C	9,520	61	$34,561
2022	DORNRDR	US11AW	11,129	24	$106,266
	DORNRDR	US11BW	7,959	9	$75,997
	FIRSTS	S15	43,947	69	$22,901
	GREGYD	E01AS	6,121	26	$58,447
	GREGYD	UW12A	17,945	54	$71,384
	PENSYA	UW11B	12,233	20	$116,808
	SIXTHS	S13	24,321	28	$232,231
	SIXTHS	S14	15,411	26	$147,153

Table 11. Candidates for Major M&R ($1.5 million/year) (continued).

Year	Branch ID	Section ID	Area (Ft^2)	PCI Before	Cost
2022	STADMD	E00A	4,126	19	$39,397
	STMARR	E01	62,095	30	$592,919
	STMARR	UW12	27,515	69	$14,338
	VRGNADR	US14BW	3,215	52	$8,017
2023	LNCLNAV	US17B	21,263	12	$209,122
	PENSYA	UW09B	16,447	8	$161,757
	PENSYA	UW12A	38,344	3	$377,114
	PENSYA	UW12B	13,169	7	$129,518
	STMARR	E00C	22,316	5	$219,479
	STMARR	E00D	36,464	10	$358,625
	VRGNADR	US14A	6,014	44	$31,589
2024	COLAGCT	UW09BN	8,559	32	$60,687
	COLAGCT	UW09BS	16,917	44	$90,923
	EUCLDS	S12	9,556	27	$67,756
	GERTYD	E00B	34,863	48	$252,097
	GOODWINA	US08	22,477	24	$227,694
	GRIFFITHD	S20	15,782	46	$70,161
	HAZELWDD	UW12A	15,561	44	$83,013
	LORADOTD	UW12	11,695	35	$82,923
	MAINS	UW11AN	5,028	19	$35,651
	MAINS	UW11AS	4,698	33	$33,311
	MAINS	UW11B	5,902	26	$41,848
	PEABYD	E06B	8,946	33	$63,431
	PENSYA	UW09A	15,592	0	$157,948
	PENSYA	UW11A	10,351	0	$104,856
	STMARR	E00A	10,278	0	$104,117
2025	BAILEYD	E00	16,349	3	$119,399
	COLAGCT	UW09AS	5,334	0	$38,955
	COLAGCT	UW09CS	3,790	11	$27,679
	COLAGCT	UW09DN	7,553	9	$55,161
	GRGRYST	US05	9,536	10	$69,643
	HAZELWDD	E00C	26,023	20	$190,050
	KIRKD	S20B	9,175	10	$67,006
	OAKS	S18A	36,150	9	$264,009
	PEABYD	E01A	28,443	16	$207,723
	PEABYD	E06A	6,256	0	$45,688
	STMARR	E04B	10,519	53	$45,724
	STOUGS	UW11	10,213	6	$74,587
	STOUGS	UW13	8,943	13	$65,312
	WRIGHS	S18	25,168	16	$183,805

Note: Highlighted rows indicate sections that are part of the core roads.

Table 12. Candidate pavement sections for maintenance and preservation activities.

Branch ID	Section ID	Description	Severity	Distress Qty	Distress Unit	Work Description	Work Qty	Work Unit	Unit Cost	Work Cost
ARMRYA	E00	DIVIDED SLAB	Medium	1	Slabs	Slab Replacement - PCC	375	Ft^2	$18.00	$6,750
ARMRYA	E00	DURABIL. CR	Medium	3	Slabs	Patching - PCC Partial Depth	154	Ft^2	$40.00	$6,152
ARMRYA	E00	JT SEAL DMG	High	25	Slabs	Joint Seal (Localized)	1,073	Ft	$1.09	$1,170
ARMRYA	E00	LINEAR CR	Medium	4	Slabs	Crack Sealing - PCC	66	Ft	$1.09	$72
ARMRYA	E04	CORNER SPALL	Medium	20	Slabs	Patching - PCC Partial Depth	55	Ft^2	$40.00	$2,185
ARMRYA	E04	CORNER SPALL	High	3	Slabs	Patching - PCC Partial Depth	8	Ft^2	$40.00	$312
ARMRYA	E04	JOINT SPALL	Medium	6	Slabs	Patching - PCC Partial Depth	16	Ft^2	$40.00	$624
ARMRYA	E04	JT SEAL DMG	High	116	Slabs	Joint Seal (Localized)	2,117	Ft	$1.09	$2,308
ARMRYA	E05	CORNER SPALL	Medium	23	Slabs	Patching - PCC Partial Depth	62	Ft^2	$40.00	$2,476
ARMRYA	E05	JOINT SPALL	Medium	7	Slabs	Patching - PCC Partial Depth	17	Ft^2	$40.00	$707
ARMRYA	E05	JOINT SPALL	High	3	Slabs	Patching - PCC Partial Depth	71	Ft^2	$40.00	$2,829
ARMRYA	E05	JT SEAL DMG	High	69	Slabs	Joint Seal (Localized)	1,199	Ft	$1.09	$1,307
ARMRYA	E05	LINEAR CR	Medium	3	Slabs	Crack Sealing - PCC	37	Ft	$1.09	$40
CLARKST	UW12	JT SEAL DMG	High	96	Slabs	Joint Seal (Localized)	1,306	Ft	$1.09	$1,424
COLAGCT	UW09AN	JT SEAL DMG	High	33	Slabs	Joint Seal (Localized)	590	Ft	$1.09	$643
COLAGCT	UW09CN	JOINT SPALL	Medium	6	Slabs	Patching - PCC Partial Depth	15	Ft^2	$40.00	$597
COLAGCT	UW09CN	JT SEAL DMG	High	37	Slabs	Joint Seal (Localized)	656	Ft	$1.09	$715
COLAGCT	UW09CN	LINEAR CR	Medium	4	Slabs	Crack Sealing - PCC	44	Ft	$1.09	$48
DORNRDR	US11BE	JT REF. CR	Medium	368	Ft	Crack Sealing - AC	368	Ft	$1.09	$401
FIRSTS	S15	ALLIGATOR CR	Medium	176	Ft^2	Patching - AC Deep	234	Ft^2	$11.00	$2,565
FIRSTS	S15	JT REF. CR	Medium	568	Ft	Crack Sealing - AC	568	Ft	$1.09	$620
FOURTS	S11	ALLIGATOR CR	Medium	164	Ft^2	Patching - AC Deep	220	Ft^2	$11.00	$2,414
FOURTS	S12	ALLIGATOR CR	Medium	2,550	Ft^2	Patching - AC Deep	2,758	Ft^2	$11.00	$30,335
GERTYD	E00D	LINEAR CR	Medium	3	Slabs	Crack Sealing - PCC	36	Ft	$1.09	$39
GHUFFDR	UW03	ALLIGATOR CR	High	134	Ft^2	Patching - AC Deep	185	Ft^2	$11.00	$2,033
GHUFFDR	UW03	DEPRESSION	High	67	Ft^2	Patching - AC Deep	104	Ft^2	$11.00	$1,145
GHUFFDR	UW04BN	ALLIGATOR CR	Medium	15	Ft^2	Patching - AC Deep	34	Ft^2	$11.00	$380
GOODWINA	US12	ALLIGATOR CR	Medium	69	Ft^2	Patching - AC Deep	107	Ft^2	$11.00	$1,173

Table 12. Candidate pavement sections for maintenance and preservation activities (continued).

Branch ID	Section ID	Description	Severity	Distress Qty	Distress Unit	Work Description	Work Qty	Work Unit	Unit Cost	Work Cost
GOODWINA	US19	ALLIGATOR CR	Medium	1,961	Ft^2	Patching - AC Deep	2,143	Ft^2	$11.00	$23,574
GOODWINA	US19	POTHOLE	Low	7	Count	Patching - AC Deep	19	Ft^2	$11.00	$216
GOODWINA	US19	RAVELING	High	621	Ft^2	Patching - AC Shallow	621	Ft^2	$7.00	$4,347
GREGYD	E00	JOINT SPALL	Medium	3	Slabs	Patching - PCC Partial Depth	8	Ft^2	$40.00	$293
GREGYD	E00	LINEAR CR	Medium	3	Slabs	Crack Sealing - PCC	42	Ft	$1.09	$46
GREGYD	E03B	CORNER SPALL	Medium	4	Slabs	Patching - PCC Partial Depth	12	Ft^2	$40.00	$472
GREGYD	E04	CORNER BREAK	Medium	4	Slabs	Patching - PCC Full Depth	144	Ft^2	$21.00	$3,035
GREGYD	E04	CORNER SPALL	Medium	4	Slabs	Patching - PCC Partial Depth	12	Ft^2	$40.00	$482
GREGYD	E04	JOINT SPALL	Medium	4	Slabs	Patching - PCC Partial Depth	12	Ft^2	$40.00	$482
GREGYD	E04	LINEAR CR	Medium	13	Slabs	Crack Sealing - PCC	175	Ft	$1.09	$190
GREGYD	UW12A	JT REF. CR	Medium	1,364	Ft	Crack Sealing - AC	1,364	Ft	$1.09	$1,487
GREGYD	UW12A	RAVELING	High	449	Ft^2	Patching - AC Shallow	449	Ft^2	$7.00	$3,140
GREGYD	UW12B	CORNER SPALL	Medium	2	Slabs	Patching - PCC Partial Depth	4	Ft^2	$40.00	$188
GREGYD	UW12B	DIVIDED SLAB	Medium	2	Slabs	Slab Replacement - PCC	394	Ft^2	$18.00	$7,088
GREGYD	UW12B	JOINT SPALL	Medium	5	Slabs	Patching - PCC Partial Depth	14	Ft^2	$40.00	$565
GREGYD	UW12B	JOINT SPALL	High	2	Slabs	Patching - PCC Partial Depth	38	Ft^2	$40.00	$1,507
GREGYD	UW12B	JT SEAL DMG	High	35	Slabs	Joint Seal (Localized)	785	Ft	$1.09	$855
GREGYD	UW12B	LARGE PATCH	High	2	Slabs	Patching - PCC Full Depth	129	Ft^2	$21.00	$2,713
GREGYD	UW12B	LINEAR CR	Medium	5	Slabs	Crack Sealing - PCC	79	Ft	$1.09	$86
GREGYD	UW12C	CORNER SPALL	Medium	3	Slabs	Patching - PCC Partial Depth	6	Ft^2	$40.00	$277
GREGYD	UW12C	FAULTING	Medium	8	Slabs	Grinding (Localized)	62	Ft	$0.56	$35
GREGYD	UW12C	FAULTING	High	10	Slabs	Grinding (Localized)	82	Ft	$0.56	$46
GREGYD	UW12C	JOINT SPALL	Medium	10	Slabs	Patching - PCC Partial Depth	28	Ft^2	$40.00	$1,109
GREGYD	UW12C	JT SEAL DMG	High	103	Slabs	Joint Seal (Localized)	1,996	Ft	$1.09	$2,175
GREGYD	UW12C	LINEAR CR	Medium	3	Slabs	Crack Sealing - PCC	30	Ft	$1.09	$32
GREGYD	UW12D	CORNER SPALL	Medium	7	Slabs	Patching - PCC Partial Depth	18	Ft^2	$40.00	$735
GREGYD	UW12D	CORNER SPALL	High	2	Slabs	Patching - PCC Partial Depth	6	Ft^2	$40.00	$245
GREGYD	UW12D	DIVIDED SLAB	Medium	2	Slabs	Slab Replacement - PCC	512	Ft^2	$18.00	$9,214

Table 12. Candidate pavement sections for maintenance and preservation activities (continued).

Branch ID	Section ID	Description	Severity	Distress Qty	Distress Unit	Work Description	Work Qty	Work Unit	Unit Cost	Work Cost
GREGYD	UW12D	DURABIL. CR	Medium	5	Slabs	Patching - PCC Partial Depth	280	Ft^2	$40.00	$11,196
GREGYD	UW12D	FAULTING	Medium	7	Slabs	Grinding (Localized)	102	Ft	$0.56	$57
GREGYD	UW12D	JOINT SPALL	Medium	14	Slabs	Patching - PCC Partial Depth	37	Ft^2	$40.00	$1,469
GREGYD	UW12D	JOINT SPALL	High	5	Slabs	Patching - PCC Partial Depth	98	Ft^2	$40.00	$3,918
GREGYD	UW12D	JT SEAL DMG	High	91	Slabs	Joint Seal (Localized)	2,082	Ft	$1.09	$2,269
GREGYD	UW12D	LINEAR CR	Medium	7	Slabs	Crack Sealing - PCC	102	Ft	$1.09	$112
GREGYD	UW12D	LINEAR CR	High	2	Slabs	Patching - PCC Full Depth	512	Ft^2	$21.00	$10,749
GRIFFITHD	S20	ALLIGATOR CR	Medium	474	Ft^2	Patching - AC Deep	565	Ft^2	$11.00	$6,215
GRIFFITHD	S20	ALLIGATOR CR	High	79	Ft^2	Patching - AC Deep	118	Ft^2	$11.00	$1,305
GRIFFITHD	S20	EDGE CR	Medium	256	Ft	Crack Sealing - AC	257	Ft	$1.09	$280
GRIFFITHD	S22A	JT SEAL DMG	High	214	Slabs	Joint Seal (Localized)	3,120	Ft	$1.09	$3,400
GRIFFITHD	S22B	CORNER SPALL	Medium	5	Slabs	Patching - PCC Partial Depth	13	Ft^2	$40.00	$517
GRIFFITHD	S22B	JOINT SPALL	Medium	2	Slabs	Patching - PCC Partial Depth	6	Ft^2	$40.00	$258
GRIFFITHD	S22B	JT SEAL DMG	High	48	Slabs	Joint Seal (Localized)	697	Ft	$1.09	$760
GRIFFITHD	S22C	CORNER SPALL	Medium	2	Slabs	Patching - PCC Partial Depth	4	Ft^2	$40.00	$190
GRIFFITHD	S22C	JOINT SPALL	Medium	2	Slabs	Patching - PCC Partial Depth	4	Ft^2	$40.00	$190
GRIFFITHD	S22C	JT SEAL DMG	High	106	Slabs	Joint Seal (Localized)	1,687	Ft	$1.09	$1,839
HAZELWDD	E00A	ALLIGATOR CR	Medium	201	Ft^2	Patching - AC Deep	263	Ft^2	$11.00	$2,886
HAZELWDD	E00A	L & T CR	Medium	84	Ft	Crack Sealing - AC	84	Ft	$1.09	$91
HAZELWDD	E01B	CORNER SPALL	Medium	8	Slabs	Patching - PCC Partial Depth	23	Ft^2	$40.00	$899
HAZELWDD	E01B	LINEAR CR	Medium	8	Slabs	Crack Sealing - PCC	104	Ft	$1.09	$114
HAZELWDD	UW09	DURABIL. CR	Medium	22	Slabs	Patching - PCC Partial Depth	887	Ft^2	$40.00	$35,495
HAZELWDD	UW09	JT SEAL DMG	High	251	Slabs	Joint Seal (Localized)	6,300	Ft	$1.09	$6,867
HAZELWDD	UW09	LINEAR CR	Medium	9	Slabs	Crack Sealing - PCC	130	Ft	$1.09	$142
LNCLNAV	US17A	DURABIL. CR	Medium	24	Slabs	Patching - PCC Partial Depth	1,181	Ft^2	$40.00	$47,244
LNCLNAV	US17A	JT SEAL DMG	High	160	Slabs	Joint Seal (Localized)	4,578	Ft	$1.09	$4,990
LNCLNAV	US17A	LINEAR CR	Medium	28	Slabs	Crack Sealing - PCC	476	Ft	$1.09	$519
LNCLNAV	US19	DURABIL. CR	Medium	34	Slabs	Patching - PCC Partial Depth	1,668	Ft^2	$40.00	$66,732

Table 12. Candidate pavement sections for maintenance and preservation activities (continued).

Branch ID	Section ID	Description	Severity	Distress Qty	Distress Unit	Work Description	Work Qty	Work Unit	Unit Cost	Work Cost
LNCLNAV	US19	DURABIL. CR	High	11	Slabs	Patching - PCC Full Depth	2,983	Ft^2	$21.00	$62,647
LNCLNAV	US19	JOINT SPALL	Medium	8	Slabs	Patching - PCC Partial Depth	20	Ft^2	$40.00	$811
LNCLNAV	US19	JT SEAL DMG	High	226	Slabs	Joint Seal (Localized)	6,444	Ft	$1.09	$7,024
LNCLNAV	US19	LINEAR CR	Medium	57	Slabs	Crack Sealing - PCC	961	Ft	$1.09	$1,047
LNCLNAV	US19	LINEAR CR	High	8	Slabs	Patching - PCC Full Depth	1,989	Ft^2	$21.00	$41,765
LNCLNAV	US23	CORNER SPALL	Medium	6	Slabs	Patching - PCC Partial Depth	17	Ft^2	$40.00	$687
LNCLNAV	US23	LINEAR CR	Medium	6	Slabs	Crack Sealing - PCC	86	Ft	$1.09	$94
OAKS	S10A	DIVIDED SLAB	Medium	4	Slabs	Slab Replacement - PCC	963	Ft^2	$18.00	$17,338
OAKS	S10A	JOINT SPALL	Medium	4	Slabs	Patching - PCC Partial Depth	12	Ft^2	$40.00	$463
OAKS	S10A	LINEAR CR	Medium	9	Slabs	Crack Sealing - PCC	129	Ft	$1.09	$141
OAKS	S10C	CORNER SPALL	Medium	8	Slabs	Patching - PCC Partial Depth	22	Ft^2	$40.00	$861
OAKS	S10C	JOINT SPALL	Medium	2	Slabs	Patching - PCC Partial Depth	5	Ft^2	$40.00	$215
OAKS	S10C	JT SEAL DMG	High	32	Slabs	Joint Seal (Localized)	459	Ft	$1.09	$500
OAKS	S12	CORNER BREAK	Medium	5	Slabs	Patching - PCC Full Depth	177	Ft^2	$21.00	$3,697
OAKS	S12	CORNER SPALL	Medium	11	Slabs	Patching - PCC Partial Depth	29	Ft^2	$40.00	$1,174
OAKS	S12	JOINT SPALL	Medium	33	Slabs	Patching - PCC Partial Depth	88	Ft^2	$40.00	$3,521
OAKS	S12	JT SEAL DMG	High	229	Slabs	Joint Seal (Localized)	3,506	Ft	$1.09	$3,821
OAKS	S16	DURABIL. CR	Medium	131	Slabs	Patching - PCC Partial Depth	5,100	Ft^2	$40.00	$203,994
OAKS	S16	DURABIL. CR	High	15	Slabs	Patching - PCC Full Depth	1,316	Ft^2	$21.00	$27,651
OAKS	S16	JOINT SPALL	Medium	54	Slabs	Patching - PCC Partial Depth	145	Ft^2	$40.00	$5,802
OAKS	S16	JT SEAL DMG	High	616	Slabs	Joint Seal (Localized)	9,048	Ft	$1.09	$9,862
OAKS	S16	LARGE PATCH	High	8	Slabs	Patching - PCC Full Depth	360	Ft^2	$21.00	$7,560
OAKS	S16	LINEAR CR	Medium	15	Slabs	Crack Sealing - PCC	142	Ft	$1.09	$155
OAKS	S20A	ALLIGATOR CR	Medium	99	Ft^2	Patching - AC Deep	143	Ft^2	$11.00	$1,570
OAKS	S20B	ALLIGATOR CR	Medium	945	Ft^2	Patching - AC Deep	1,073	Ft^2	$11.00	$11,801
OAKS	S20B	EDGE CR	Medium	95	Ft	Crack Sealing - AC	94	Ft	$1.09	$103
OAKS	S20B	L & T CR	Medium	680	Ft	Crack Sealing - AC	680	Ft	$1.09	$742
PEABYD	E01B	ALLIGATOR CR	Medium	304	Ft^2	Patching - AC Deep	378	Ft^2	$11.00	$4,159

Table 12. Candidate pavement sections for maintenance and preservation activities (continued).

Branch ID	Section ID	Description	Severity	Distress Qty	Distress Unit	Work Description	Work Qty	Work Unit	Unit Cost	Work Cost
PEABYD	E01B	JT REF. CR	Medium	438	Ft	Crack Sealing - AC	439	Ft	$1.09	$478
PEABYD	E03	ALLIGATOR CR	Medium	139	Ft^2	Patching - AC Deep	191	Ft^2	$11.00	$2,098
PEABYD	E03	JT REF. CR	Medium	122	Ft	Crack Sealing - AC	122	Ft	$1.09	$133
PEABYD	E04A	JT SEAL DMG	High	245	Slabs	Joint Seal (Localized)	3,213	Ft	$1.09	$3,502
PEABYD	E04B	CORNER SPALL	Medium	12	Slabs	Patching - PCC Partial Depth	32	Ft^2	$40.00	$1,292
PEABYD	E04B	JT SEAL DMG	High	160	Slabs	Joint Seal (Localized)	2,254	Ft	$1.09	$2,457
PEABYD	UW11	JOINT SPALL	Medium	9	Slabs	Patching - PCC Partial Depth	26	Ft^2	$40.00	$1,017
PEABYD	UW11	JT SEAL DMG	High	189	Slabs	Joint Seal (Localized)	3,683	Ft	$1.09	$4,015
PEABYD	UW11	LINEAR CR	Medium	5	Slabs	Crack Sealing - PCC	55	Ft	$1.09	$61
SIXTHS	S10	LINEAR CR	Medium	3	Slabs	Crack Sealing - PCC	38	Ft	$1.09	$41
STADMD	E00C	CORNER BREAK	Medium	4	Slabs	Patching - PCC Full Depth	129	Ft^2	$21.00	$2,713
STADMD	E00C	JOINT SPALL	Medium	4	Slabs	Patching - PCC Partial Depth	11	Ft^2	$40.00	$431
STADMD	E00C	JT SEAL DMG	High	40	Slabs	Joint Seal (Localized)	817	Ft	$1.09	$890
STADMD	E00D	CORNER SPALL	Medium	4	Slabs	Patching - PCC Partial Depth	10	Ft^2	$40.00	$398
STADMD	E00D	JT SEAL DMG	High	148	Slabs	Joint Seal (Localized)	2,343	Ft	$1.09	$2,553
STADMD	E00E	CORNER SPALL	Medium	5	Slabs	Patching - PCC Partial Depth	14	Ft^2	$40.00	$562
STADMD	E00E	JOINT SPALL	Medium	26	Slabs	Patching - PCC Partial Depth	70	Ft^2	$40.00	$2,808
STADMD	E00E	JOINT SPALL	High	5	Slabs	Patching - PCC Partial Depth	112	Ft^2	$40.00	$4,492
STADMD	E00E	JT SEAL DMG	High	313	Slabs	Joint Seal (Localized)	5,619	Ft	$1.09	$6,125
STMARR	E04A	EDGE CR	Medium	199	Ft	Crack Sealing - AC	199	Ft	$1.09	$217
STMARR	E04B	L & T CR	Medium	383	Ft	Crack Sealing - AC	383	Ft	$1.09	$418
STMARR	UW12	EDGE CR	Medium	362	Ft	Crack Sealing - AC	362	Ft	$1.09	$395
VRGNADR	US14BE	DIVIDED SLAB	Medium	3	Slabs	Slab Replacement - PCC	161	Ft^2	$18.00	$2,907
VRGNADR	US14BE	JOINT SPALL	Medium	8	Slabs	Patching - PCC Partial Depth	20	Ft^2	$40.00	$815
VRGNADR	US14BE	JT SEAL DMG	High	53	Slabs	Joint Seal (Localized)	1,409	Ft	$1.09	$1,536
VRGNADR	US14BW	JT REF. CR	Medium	502	Ft	Crack Sealing - AC	502	Ft	$1.09	$548

Table 13. Pavement sections recommended for stopgap and safety repairs.

Branch ID	Section ID	Description	Severity	Distress Qty	Distress Unit	Work Description	Work Qty	Work Unit	Unit Cost	Work Cost
BAILEYD	E00	POTHOLE	Medium	4	Count	Patching - AC Deep	26	Ft^2	$11.00	$284
BAILEYD	E00	RAVELING	High	817	Ft^2	Patching - AC Shallow	817	Ft^2	$7.00	$5,722
COLAGCT	UW09AS	ALLIGATOR CR	High	533	Ft^2	Patching - AC Deep	631	Ft^2	$11.00	$6,934
COLAGCT	UW09AS	RAVELING	High	533	Ft^2	Patching - AC Shallow	534	Ft^2	$7.00	$3,734
COLAGCT	UW09BN	ALLIGATOR CR	High	12	Ft^2	Patching - AC Deep	29	Ft^2	$11.00	$324
COLAGCT	UW09CS	ALLIGATOR CR	High	190	Ft^2	Patching - AC Deep	249	Ft^2	$11.00	$2,738
COLAGCT	UW09CS	RAVELING	High	190	Ft^2	Patching - AC Shallow	189	Ft^2	$7.00	$1,327
DORNRDR	US11AW	JT REF. CR	High	9	Ft	Crack Sealing - AC	9	Ft	$1.09	$10
DORNRDR	US11AW	RAVELING	High	618	Ft^2	Patching - AC Shallow	618	Ft^2	$7.00	$4,328
GERTYD	E00B	DURABIL. CR	High	5	Slabs	Patching - PCC Full Depth	1,738	Ft^2	$21.00	$36,514
GERTYD	E00B	JOINT SPALL	High	8	Slabs	Patching - PCC Partial Depth	172	Ft^2	$40.00	$6,910
GOODWINA	US08	JT REF. CR	High	31	Ft	Crack Sealing - AC	32	Ft	$1.09	$34
GOODWINA	US17	ALLIGATOR CR	High	594	Ft^2	Patching - AC Deep	696	Ft^2	$11.00	$7,656
GOODWINA	US17	EDGE CR	High	330	Ft	Patching - AC Deep	541	Ft^2	$11.00	$5,953
GOODWINA	US17	POTHOLE	Medium	7	Count	Patching - AC Deep	40	Ft^2	$11.00	$436
GOODWINA	US17	POTHOLE	High	33	Count	Patching - AC Deep	297	Ft^2	$11.00	$3,266
GREGYD	E01AS	JT REF. CR	High	44	Ft	Crack Sealing - AC	44	Ft	$1.09	$48
GREGYD	UW11	L & T CR	High	81	Ft	Crack Sealing - AC	81	Ft	$1.09	$88
GRIFFITHD	S18	ALLIGATOR CR	High	1,222	Ft^2	Patching - AC Deep	1,367	Ft^2	$11.00	$15,034
GRIFFITHD	S18	DEPRESSION	High	1,833	Ft^2	Patching - AC Deep	2,010	Ft^2	$11.00	$22,103
GRIFFITHD	S18	EDGE CR	High	550	Ft	Patching - AC Deep	902	Ft^2	$11.00	$9,923
GRIFFITHD	S18	POTHOLE	Medium	6	Count	Patching - AC Deep	37	Ft^2	$11.00	$403
GRIFFITHD	S18	RUTTING	High	92	Ft^2	Patching - AC Deep	91	Ft^2	$11.00	$1,008
HAZELWDD	E00C	POTHOLE	Medium	4	Count	Patching - AC Deep	26	Ft^2	$11.00	$286
HAZELWDD	UW12A	POTHOLE	Low	6	Count	Patching - AC Shallow	18	Ft^2	$7.00	$126
KIRKD	S20B	POTHOLE	Medium	2	Count	Patching - AC Deep	12	Ft^2	$11.00	$132
LNCLNAV	US17B	JT REF. CR	High	1,063	Ft	Crack Sealing - AC	1,063	Ft	$1.09	$1,159
LNCLNAV	US17B	RAVELING	High	2,126	Ft^2	Patching - AC Shallow	2,126	Ft^2	$7.00	$14,884
MAINS	UW11AN	RAVELING	High	296	Ft^2	Patching - AC Shallow	296	Ft^2	$7.00	$2,070
MAINS	UW11AS	RAVELING	High	470	Ft^2	Patching - AC Shallow	469	Ft^2	$7.00	$3,289
MAINS	UW11B	RAVELING	High	590	Ft^2	Patching - AC Shallow	590	Ft^2	$7.00	$4,131
OAKS	S13	DURABIL. CR	High	25	Slabs	Patching - PCC Full Depth	3,462	Ft^2	$21.00	$72,685
OAKS	S18A	ALLIGATOR CR	High	50	Ft^2	Patching - AC Deep	83	Ft^2	$11.00	$910

Table 13. Pavement sections recommended for stopgap and safety repairs (continued).

Branch ID	Section ID	Description	Severity	Distress Qty	Distress Unit	Work Description	Work Qty	Work Unit	Unit Cost	Work Cost
OAKS	S18A	RAVELING	High	1,807	Ft^2	Patching - AC Shallow	1,807	Ft^2	$7.00	$12,653
PEABYD	E01A	JT REF. CR	High	178	Ft	Crack Sealing - AC	178	Ft	$1.09	$194
PEABYD	E01A	POTHOLE	Medium	10	Count	Patching - AC Deep	61	Ft^2	$11.00	$670
PEABYD	E01A	POTHOLE	High	5	Count	Patching - AC Deep	45	Ft^2	$11.00	$503
PEABYD	E06A	ALLIGATOR CR	High	12	Ft^2	Patching - AC Deep	31	Ft^2	$11.00	$338
PEABYD	E06A	RAVELING	High	3,128	Ft^2	Patching - AC Shallow	3,128	Ft^2	$7.00	$21,896
PEABYD	E06A	RUTTING	High	188	Ft^2	Patching - AC Deep	187	Ft^2	$11.00	$2,064
PEABYD	E06B	DEPRESSION	High	36	Ft^2	Patching - AC Deep	64	Ft^2	$11.00	$702
PEABYD	E06B	RAVELING	High	358	Ft^2	Patching - AC Shallow	357	Ft^2	$7.00	$2,505
PENSYA	UW09A	POTHOLE	Low	22	Count	Patching - AC Shallow	67	Ft^2	$7.00	$468
PENSYA	UW09A	POTHOLE	Medium	22	Count	Patching - AC Deep	133	Ft^2	$11.00	$1,470
PENSYA	UW09A	POTHOLE	High	8	Count	Patching - AC Deep	75	Ft^2	$11.00	$827
PENSYA	UW09A	RAVELING	High	3,898	Ft^2	Patching - AC Shallow	3,898	Ft^2	$7.00	$27,286
PENSYA	UW09A	SWELL	High	97	Ft^2	Cold Milling-Localized	141	Ft^2	$0.56	$79
PENSYA	UW09B	ALLIGATOR CR	High	230	Ft^2	Patching - AC Deep	295	Ft^2	$11.00	$3,249
PENSYA	UW09B	RAVELING	High	1,234	Ft^2	Patching - AC Shallow	1,234	Ft^2	$7.00	$8,635
PENSYA	UW11A	POTHOLE	Medium	7	Count	Patching - AC Deep	44	Ft^2	$11.00	$488
PENSYA	UW11A	RUTTING	High	74	Ft^2	Patching - AC Deep	74	Ft^2	$11.00	$813
PENSYA	UW11B	POTHOLE	Low	7	Count	Patching - AC Shallow	19	Ft^2	$7.00	$138
PENSYA	UW11B	POTHOLE	Medium	7	Count	Patching - AC Deep	40	Ft^2	$11.00	$433
PENSYA	UW11B	RAVELING	High	1,223	Ft^2	Patching - AC Shallow	1,223	Ft^2	$7.00	$8,563
PENSYA	UW12A	ALLIGATOR CR	High	562	Ft^2	Patching - AC Deep	662	Ft^2	$11.00	$7,280
PENSYA	UW12A	RAVELING	High	6,135	Ft^2	Patching - AC Shallow	6,135	Ft^2	$7.00	$42,945
PENSYA	UW12B	POTHOLE	Low	5	Count	Patching - AC Shallow	16	Ft^2	$7.00	$111
PENSYA	UW12B	RAVELING	High	658	Ft^2	Patching - AC Shallow	659	Ft^2	$7.00	$4,609
SIXTHS	S11	L & T CR	High	73	Ft	Crack Sealing - AC	73	Ft	$1.09	$80
SIXTHS	S11	RAVELING	High	918	Ft^2	Patching - AC Shallow	918	Ft^2	$7.00	$6,427
SIXTHS	S13	RAVELING	High	608	Ft^2	Patching - AC Shallow	608	Ft^2	$7.00	$4,256
SIXTHS	S13	SWELL	High	24	Ft^2	Cold Milling-Localized	48	Ft^2	$0.56	$27
SIXTHS	S14	JT REF. CR	High	231	Ft	Crack Sealing - AC	231	Ft	$1.09	$252
SIXTHS	S14	RAVELING	High	771	Ft^2	Patching - AC Shallow	771	Ft^2	$7.00	$5,394
STADMD	E00A	RAVELING	High	413	Ft^2	Patching - AC Shallow	412	Ft^2	$7.00	$2,888
STMARR	E00A	RAVELING	High	2,569	Ft^2	Patching - AC Shallow	2,569	Ft^2	$7.00	$17,987

Table 13. Pavement sections recommended for stopgap and safety repairs (continued).

Branch ID	Section ID	Description	Severity	Distress Qty	Distress Unit	Work Description	Work Qty	Work Unit	Unit Cost	Work Cost
STMARR	E00A	RUTTING	High	62	Ft^2	Patching - AC Deep	61	Ft^2	$11.00	$678
STMARR	E00B	CORNER SPALL	High	3	Slabs	Patching - PCC Partial Depth	9	Ft^2	$40.00	$336
STMARR	E00B	DURABIL. CR	High	22	Slabs	Patching - PCC Full Depth	2,297	Ft^2	$21.00	$48,234
STMARR	E00B	JOINT SPALL	High	3	Slabs	Patching - PCC Partial Depth	67	Ft^2	$40.00	$2,691
STMARR	E00B	LARGE PATCH	High	6	Slabs	Patching - PCC Full Depth	323	Ft^2	$21.00	$6,782
STMARR	E00C	JT REF. CR	High	659	Ft	Crack Sealing - AC	659	Ft	$1.09	$719
STMARR	E00C	POTHOLE	High	5	Count	Patching - AC Deep	45	Ft^2	$11.00	$502
STMARR	E00D	JT REF. CR	High	414	Ft	Crack Sealing - AC	414	Ft	$1.09	$452
STMARR	E00D	PATCH/UT CUT	High	249	Ft^2	Patching - AC Deep	316	Ft^2	$11.00	$3,477
STMARR	E00D	POTHOLE	Medium	33	Count	Patching - AC Deep	199	Ft^2	$11.00	$2,188
STMARR	E00D	POTHOLE	High	17	Count	Patching - AC Deep	150	Ft^2	$11.00	$1,641
STMARR	E01	JT REF. CR	High	1,882	Ft	Crack Sealing - AC	1,882	Ft	$1.09	$2,051
STMARR	E01	RAVELING	High	941	Ft^2	Patching - AC Shallow	941	Ft^2	$7.00	$6,586
STOUGS	UW13	ALLIGATOR CR	High	16	Ft^2	Patching - AC Deep	37	Ft^2	$11.00	$401
STOUGS	UW13	L & T CR	High	244	Ft	Crack Sealing - AC	244	Ft	$1.09	$266
WRIGHS	S18	POTHOLE	Medium	7	Count	Patching - AC Deep	42	Ft^2	$11.00	$461

SUMMARY

The University of Illinois hired Applied Pavement Technology to update its PAVER pavement management system, document the overall condition of the pavement network, and develop a 5-year maintenance and rehabilitation plan. This update included conducting a needs assessment, determining the impact of treatment application on pavement life, providing recommendations for distribution of the annual pavement maintenance budget, and helping prioritize pavement M&R needs for future years.

In May 2020, APTech inspected approximately 17.7 centerline-miles of roadway pavement maintained by the University. The 2020 area-weighted PCI of the inspected pavements at the University is 65, based on 140 pavement sections inspected. The following summarizes the findings from analyzing the PCI data and M&R planning scenarios:

- If no funding is provided for pavement maintenance and rehabilitation, the pavement system is expected to deteriorate from a 2020 area-weighted PCI of 65 to a PCI of 54 by 2025. At a PCI of 54, the University can expect the rate of deterioration to increase, resulting in a corresponding increase in the financial burden to maintaining the roadway network.
- Since 2013, nearly 33 percent of the network (excluding gravel) has had major rehabilitation (overlay of reconstruction) performed.
- Since the previous update (2016), the network PCI has remained at 65 with an average funding level for major rehabilitation projects of $1.5 million per year since 2016.
- The percent of pavement with a PCI above 70 has increased to 50 percent (from 37 percent in 2009), while the percent of pavement with a PCI below 40 has remained near 25 percent for all inspection years. Since the percent of pavement in the mid-range of the PCI scale (40 to 70) has decreased from 39 percent to 25 percent since 2009, it appears most of the major work that has occurred since 2009 has focused on improving pavements in this condition range.
- A constrained annual budget of $1.5 million per year for major M&R (which raises a section’s PCI to 100) was analyzed to determine that the full budget would be used each year and the network PCI would increase to 85 by 2025. Although the annual budget of $1.5 million is comparable to the average budget for the University since 2016, the results indicate this budget amount could be allocated across more of the network to improve network conditions, starting with many of the smaller sections that are at or above the critical PCI of 55 (trigger level of major M&R). Using a variety of repair techniques across a broader spectrum of pavement conditions will reduce the need to focus all of the budget on sections in need of reconstruction.
- A variable budget of $1.5 million per year for the first three years, $750,000 for the fourth year, and $250,000 per year for the fifth year indicates that the network PCI would increase to 77 by 2025. In relation to an average spending level of $1.5 million per year since 2016, this analysis indicates consistent funding of $1.5 million for the next 3 years will allow a greater focus on preserving the network, with fewer pavement sections needing major rehabilitation after 2023.
- Two different maintenance plans were developed that apply specific treatments to distresses identified during the 2020 PCI inspections. The preventive maintenance policy

addresses streets that are already in good overall condition with the objective of slowing deterioration rates and keeping the pavement in good condition longer. The stopgap policy identifies the streets where safety issues could be addressed with maintenance treatments to keep the pavement in serviceable condition until major M&R can be performed. Results indicate that approximately $800,000 could be spent on preventive maintenance activities with 72 percent of this total going towards PCC patching. If only stopgap maintenance activities are performed, then about $500,000 could be spent addressing safety-related distresses until major M&R takes place.

- Special considerations should be implemented in the vicinity of bus stop locations. A number of localized failures were observed, some in newly reconstructed pavements, that appear directly associated with bus operations. Special attention needs to be given to these areas so that expensive repair work is not prematurely destroyed.

APPENDIX A – INTRODUCTION TO PAVEMENT MANAGEMENT

INTRODUCTION TO PAVEMENT MANAGEMENT

Agencies with a road network such as the University of Illinois (University) have long been responsible for maintaining their pavement infrastructure. Careful management of the pavements has become increasingly important as competition for scarce resources and expectations for agency accountability have increased. Faced with this daunting task, agencies often find themselves asking many different questions similar to the following:

- What pavements should we address first?
- On what pavements is our money best spent?
- What annual budget do we need to keep our pavement network at its current condition over the next few years?
- How are our pavements really performing over time?
- Are we better off spending our money on pavements in very poor condition, or letting those bad pavements deteriorate while we concentrate on keeping good roads in good condition?

To answer these questions, and many more, pavement management practitioners developed the first pavement management systems (PMS) in the 1970s. In simple terms, a PMS is a systematic process that: 1) assesses the current pavement condition, 2) predicts future pavement condition, 3) determines maintenance and rehabilitation needs, and 4) prioritizes these needs to make the best use of anticipated funding levels (i.e., maximizing benefit while minimizing costs). The remainder of this section introduces some of the history of pavement management, provides definitions for common pavement management-related terms, and discusses the different components of a modern-day PMS in more detail.

Historical Perspective of Pavement Management

The concept of pavement management has evolved significantly since its inception in the 1970s. As standardized condition survey techniques came into place, more information regarding the cause of pavement deterioration became available. This information was then used to readily assess available repair alternatives and select the best repair strategy. This approach greatly improved the effectiveness of selected rehabilitation treatments since they were now being chosen both to correct existing deficiencies and to prevent their recurrence.

As computerized pavement management systems became available, an even more sophisticated level of analysis became possible. With today’s systems, the results of the pavement condition surveys are used to assess current pavement conditions, and to identify pavement deterioration trends. This capability provides an agency with the ability to forecast future pavement conditions. As a result, agencies are able to assess the long-term impacts of decisions made today on future network conditions and identify the optimal time for repair so that funding can be scheduled in advance of the forecasted need.

The importance of identifying not only the best repair alternative but also the optimal time of repair has been documented in U.S. Army Corps of Engineers, Construction Engineering Laboratory (USACERL) Technical Report M-90/05 and is summarized in figure 1 (Shahin and Walther 1990). This figure shows that over the first 75 percent of the pavement life, approximately 40 percent of the pavement condition deterioration takes place. After this point, the pavement deteriorates much faster, with the next 40 percent drop in pavement condition occurring over the next 12 percent of the pavement life. The financial impact of delaying repairs until the second drop in pavement condition can mean repair expenses four to five times higher than repairs triggered over the first 75 percent of the pavement life.

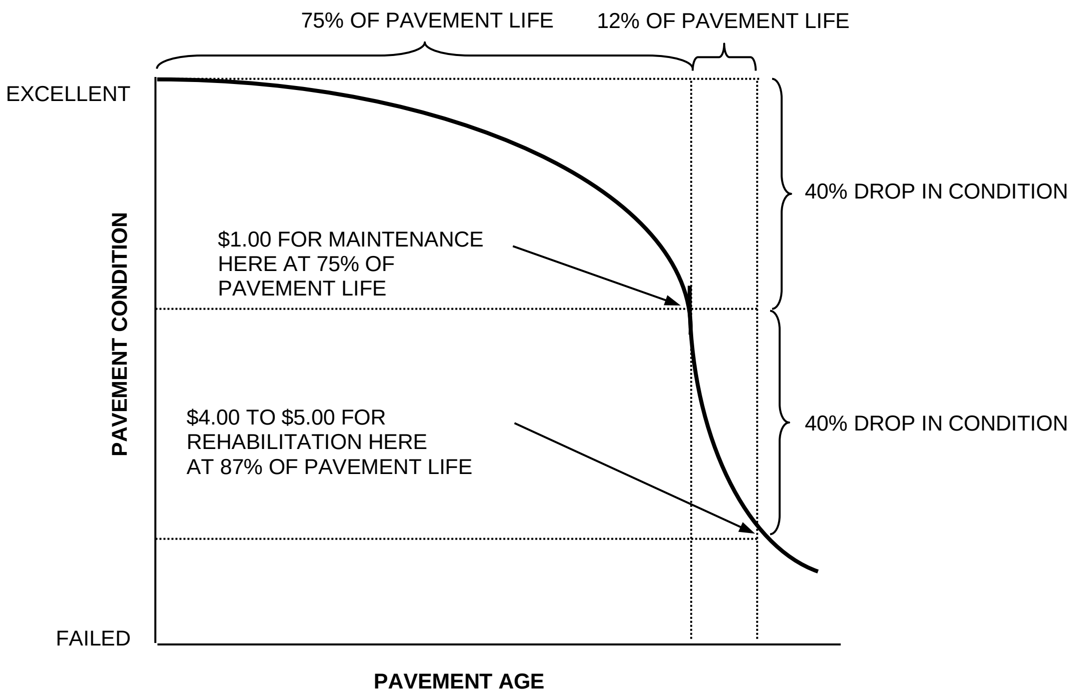

Figure E-1. Typical pavement condition life cycle (Shahin and Walther 1990)[1].

Definition of Terms

This section provides definitions of some of the more general terms used in this report.

- **Backlog –** Amount of unfunded maintenance and rehabilitation (M&R).
- **Branch –** A part of the network that is a distinct entity and has a unique function. Each road and parking lot in the pavement network is considered a separate branch. Note that a branch does not have to have consistent characteristics throughout its area, such as surface type or age.
- **Condition analysis –** Determination of current pavement condition in terms of amount of deterioration present, cause of deterioration, and deterioration rate.
- **Deterioration rate –** Drop in pavement condition in terms of points per year.
- **Effect on pavement life –** The effect that a treatment has on the remaining life of a section. For example, complete reconstruction yields an essentially new pavement with all of its life (as defined by the performance model assigned to the section) remaining.
- **Family –** Group of pavement sections that deteriorate in a similar manner.

[1] Shahin, M.Y. and J.A. Walther. 1990. Pavement Maintenance Management for Roads and Streets Using the MicroPAVER System. Technical Report M-90/05. Army Corps of Engineers Construction Engineering Laboratory (USACERL), Champaign, IL.

- **Hot-Mix Asphalt (HMA) –** asphalt mix prepared at an asphalt plant that requires compaction after placement.
- **Impact analysis –** A comparison of different M&R plans to determine the impact that different decisions will have on the pavement network.
- **M&R –** This is an abbreviation for "maintenance and rehabilitation," but generally refers to any pavement work activities, such as localized maintenance, rehabilitation, and reconstruction.
- **Major M&R –** a global activity that returns the PCI to 100 if implemented, examples include overlay and reconstruction treatments.
- **PAVER –** A pavement management system developed by the U.S. Army Corps of Engineers. It consists of a Microsoft® Access database for storing inventory and condition information and some analysis tools.
- **Needs analysis –** The determination of M&R requirements, associated costs, and scheduling subject to constraints (e.g., funding levels or desired network condition) for a specified period of time (often 1 to 5 years).
- **Network –** A broad grouping of pavements within a specified physical area, sometimes managed separately (such as districts within a city or subdivisions within a town).
- **Pavement condition index (PCI) –** A numerical indicator between 0 and 100 that reflects the surface condition of a pavement. PCI inspections are performed in accordance with ASTM D-6433, *Standard Test Method for Roads and Parking Lots Pavement Condition Index Surveys*[2], and correspond with PAVER pavement management software.
- **Pavement maintenance –** Routine maintenance actions, both preventive and reactive, applied to preserve the pavement structure.
- **Pavement rehabilitation –** Work undertaken to restore the serviceability and extend the life of an existing pavement. This includes overlays and other work necessary to return an existing pavement to a condition of structural or functional adequacy.
- **Performance –** Change in pavement condition over time.
- **Performance model –** Mathematical description of the expected values that pavement attributes will take during a specified analysis period.
- **Preventive maintenance –** Maintenance activities performed with the primary objective of slowing the rate of pavement deterioration.
- **Prioritization –** Technique used to determine which M&R activities should be performed when there is insufficient funding to perform all required M&R.
- **Regression analysis –** Statistical tool that is used to relate two or more variables in a mathematical equation.
- **Sample unit –** A subdivision of a pavement section for PCI inspection purposes.
- **Section –** A part of a branch that has consistent characteristics throughout its area. The PMS analyzes pavement information at the section level; therefore, a section is

[2] American Society for Testing and Materials (ASTM). 2007. *Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys.* ASTM D6433-07. American Society for Testing and Materials, West Conshohocken, PA.

considered the management unit. This means that pavement condition is analyzed at the section level and that pavement M&R recommendations are made at the section level.

- **Stopgap Maintenance** – Maintenance activities performed to keep the pavement operational in a safe condition.
- **Treatment trigger** – A set of conditions that must exist in order for a treatment to be considered. For example, in order for a thin asphalt concrete (AC) overlay to be considered a viable treatment for a pavement section, the following criteria need to be met: 1) the section PCI must be between 40 and 70, and 2) the section must have an asphalt surface.

General PMS Components

A PMS is comprised of six basic components, as shown in figure 2. To illustrate the general concepts of the PMS approach, each of these different components are discussed in more detail below.

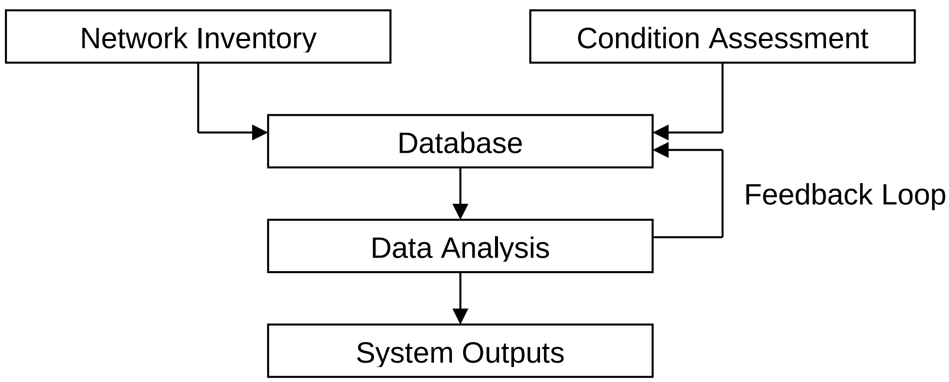

Figure E-2. Basic components of a PMS.

Network Inventory

Network inventory is used to define the physical characteristics of the pavements being managed. Typically, the collected inventory information includes location information, pavement characteristics (such as length, width, and type), construction and maintenance histories, and traffic data. The network inventory is the foundation for the PMS.

The first decision that an agency should make with respect to network inventory is which pavement areas to include in the PMS. While it is probable that major pavement areas—such as driving lanes, parking lanes and lots, and intersections—will be included in the database, the actual selection of the pavement facilities to be included in the PMS is up to the agency.

Once a decision has been made about which pavements to include in the database, information about these pavements must be collected. It is important to keep three guidelines in mind when determining the extent of historical information to include in the inventory. First, the data should be accessible so that large quantities of time are not invested in a records search. Second, the collected information should serve a purpose. Third, the information must be chosen to ensure that the PMS is capable of meeting the analysis needs of the agency.

Although there is flexibility in the amount of information that must be collected and the manner that is it stored in a PMS database, there are some types of information that are mandatory. The following list outlines the types of information that must be collected in order for the system to operate correctly:

- *Pavement location* – Physical locations of the pavements need to be identified.
- *Pavement dimensions* – Length, width, and/or area of the pavement sections.
- *Surface type* – Describes the pavement surface/structure; for the University of Illinois, the following surface types are identified:
  - AC: Asphalt concrete pavement.
  - AAC: AC pavement that has received one or more asphalt overlays.
  - APC: PCC surface that has received one or more asphalt overlays.
  - PCC: Portland cement concrete pavement.
  - BR: Brick surface.
  - GR: Gravel road.
  - ST: Surface Treatment (primarily oil and chip surfaces).
- *Last construction date* – Date of original construction or last major rehabilitation, such as reconstruction or an overlay.

Examples of other information that are beneficial to record in a PMS database are included in the following list (note that this list is not comprehensive):

- *Pavement cross-section* – Information on the thicknesses and material types of each pavement layer.
- *Traffic* – Types and levels of traffic.
- *Maintenance history* – Date, type, and cost of maintenance activities performed on the pavements.
- *Testing data* – Coring, boring, deflection, roughness data, and so on.
- *Drainage facilities* – Type and location of drainage facilities.
- *Shoulders or curbs* – Type and location of shoulders or curbs.

In addition to there being mandatory types of information included in a PMS, there are also organizational requirements for building a database, as follows:

- Each network must have one or more branches.
- Each branch must have one or more sections.
- Each branch must have a defined use (i.e. roadway or parking lot).
- Each section must be contained within a single branch.
- Each section must have a last construction date, area, and surface type.

Since pavement maintenance and rehabilitation recommendations, pavement deterioration rates, and cost estimates are determined at the section level, a section's characteristics should be as consistent as possible in terms of pavement design and construction, traffic, and condition. There should also be a systematic method for assigning branch and section names and identifiers.

Condition Assessment

Pavement management decisions depend on some method of pavement evaluation. The method selected to evaluate pavement condition is extremely important because it is the basis of all M&R recommendations. For that reason, it is critical to select an objective and repeatable procedure so that PMS recommendations are reliable.

Pavement managers must evaluate their needs when determining not only the type of condition data to collect, but also how often to collect the data. For example, an agency experiencing rapid deterioration rates may elect to survey its pavements more frequently than the average organization, or to survey high-priority pavements on a more frequent basis than low-priority areas. Each agency must carefully evaluate its own circumstances to ensure that the data collection aspects of their PMS match both its needs and financial means. The PCI method is one of the most commonly used methods to evaluate pavement conditions and this method has been used to assess the condition of the University's roadways.

Database

Once the network inventory and pavement condition data have been collected, a database can be established to store and use the information. Although a manual filing system may be possible for a small network, the efficiency and cost-effectiveness of storing data on a computer makes an automated database the most practical alternative, especially when a comprehensive PMS is desired. PAVER, which is distributed by the American Public Works Association (APWA), was used as the University's PMS software program.

Data Analysis

Data analysis can occur at the network or project level. At the network level, potential rehabilitation needs of the entire network are evaluated and prioritized for planning and scheduling budget needs over a multi-year period. The objective of network-level analysis is to evaluate rehabilitation needs for a future time period and prioritize project lists so that the agency makes the best use of the limited funds available for M&R. After the planning and programming decisions have been made during the network-level analysis, the information in the database can be used to supplement a project-level analysis. At the project-level, each individual project is investigated in detail to determine the appropriate rehabilitation treatment.

System Outputs

There are a number of different methods for presenting the results of the analyses, including tables, reports, graphs and maps. Because of the volume of information obtained from a PMS, graphical reports are generally more effective than comprehensive project reports for people who need to quickly evaluate large amounts of data.

Many agencies have found value in linking their PMS to maps to display information through color-coded maps. As with the graphical display, this capability has greatly enhanced the usefulness of the PMS to agencies that need to convey a lot of information in a short period of time. Map links are perhaps most useful in displaying the funded projects in each year of the analysis and for displaying pavement condition results.

Feedback Loop

An often-overlooked component of a PMS is the development of a feedback loop. The feedback loop establishes a process by which actual performance and cost data are input back into the models used in the pavement management analysis. For example, the PMS may use models that estimate the life of an asphalt overlay at 12 years. Actual performance data may show that the life of the agency's overlays is closer to 8 to 10 years. This type of information should be used to update the pavement management models so that the system recommendations remain reliable and become improved with time.

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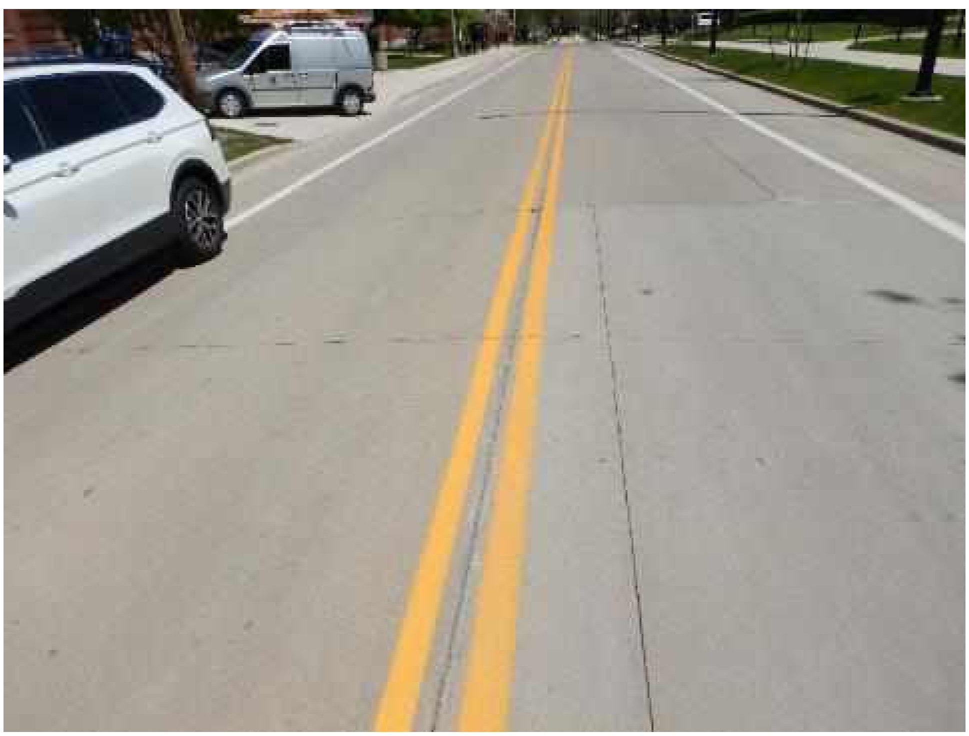
APPENDIX B – PHOTOGRAPHS

ARMRYA-E00-LTD Cracking-(Sample Unit No. 01)

ARMRYA-E00-Overview-(Sample Unit No. 01)

ARMRYA-E04-Corner Spalling-(Sample Unit No. 01)



ARMRYA-E04-Overview-(Sample Unit No. 01)

ARMRYA-E05-Corner Spalling-(Sample Unit No. 01)

ARMRYA-E05-Faulting-(Sample Unit No. 01)

ARMRYA-E05-Joint Spalling-(Sample Unit No. 01)

ARMRYA-E05-Overview-(Sample Unit No. 01)

ARMRYA-E06-Overview-(Sample Unit No. 01)

BAILEYD-E00-Alligator Cracking-(Sample Unit No. 01)

BAILEYD-E00-Alligator Cracking-(Sample Unit No. 02)

BAILEYD-E00-Overview-(Sample Unit No. 01)

BAILEYD-E00-Overview-(Sample Unit No. 02)

BAILEYD-E00-Patching-(Sample Unit No. 02)

BAILEYD-E00-Rutting-(Sample Unit No. 01)

CLARKST-UW11-Overview-(Sample Unit No. 01)

CLARKST-UW12-Joint Seal Damage-(Sample Unit No. 01)

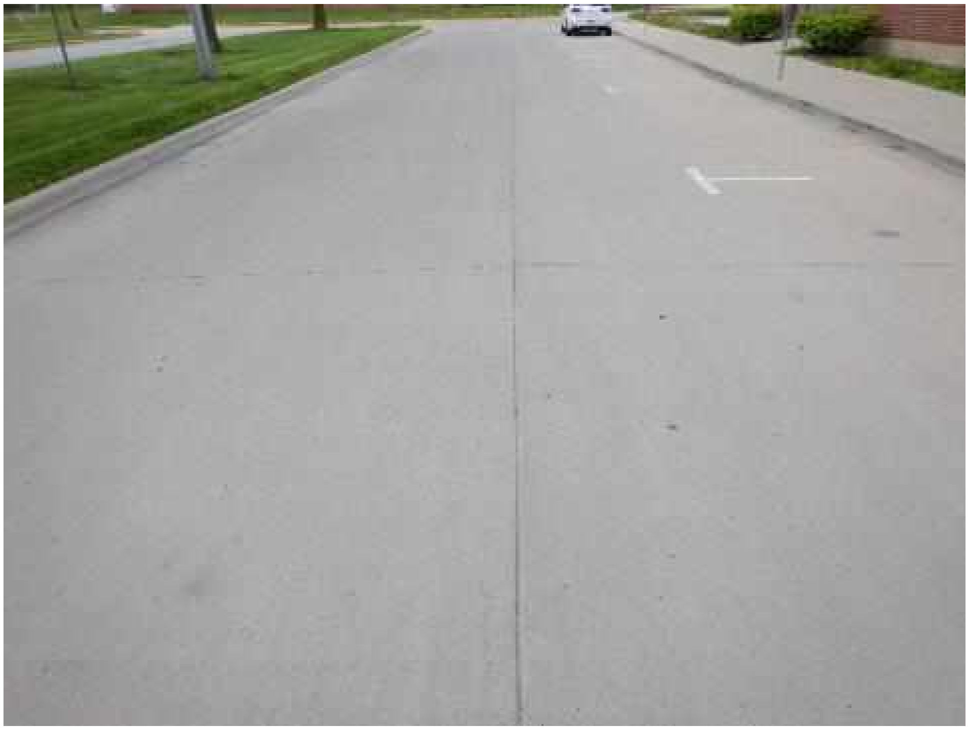
CLARKST-UW12-LTD Cracking-(Sample Unit No. 01)

CLARKST-UW12-Overview-(Sample Unit No. 01)

CLARKST-UW12-Shrinkage Cracking-(Sample Unit No. 01)

COLAGCT-UW09AN-Alligator Cracking-(Sample Unit No. 01)

COLAGCT-UW09AN-Joint Seal Damage-(Sample Unit No. 01)



COLAGCT-UW09AN-Overview-(Sample Unit No. 01) (1)

COLAGCT-UW09AN-Overview-(Sample Unit No. 01) (2)

COLAGCT-UW09BN-Alligator Cracking-(Sample Unit No. 01)

COLAGCT-UW09BN-L&T Cracking-(Sample Unit No. 01)

COLAGCT-UW09BN-Overview-(Sample Unit No. 01)

COLAGCT-UW09BN-Weathering-(Sample Unit No. 01)

COLAGCT-UW09BS-Block Cracking-(Sample Unit No. 01)

COLAGCT-UW09BS-Overview-(Sample Unit No. 01)

COLAGCT-UW09BS-Weathering-(Sample Unit No. 01)

COLAGCT-UW09CN-LTD Cracking-(Sample Unit No. 01)

COLAGCT-UW09CN-Overview-(Sample Unit No. 01)

COLAGCT-UW09CS-Alligator Cracking-(Sample Unit No. 01)

COLAGCT-UW09CS-Overview-(Sample Unit No. 01)

COLAGCT-UW09CS-Raveling-(Sample Unit No. 01)

COLAGCT-UW09DN-Alligator Cracking-(Sample Unit No. 01)

COLAGCT-UW09DN-L&T Cracking-(Sample Unit No. 01)

COLAGCT-UW09DN-Overview-(Sample Unit No. 01)

COLAGCT-UW09DN-Weathering-(Sample Unit No. 01)

DORNRDR-US11AE-L&T Cracking-(Sample Unit No. 01)

DORNRDR-US11AE-Overview-(Sample Unit No. 01)

DORNRDR-US11AW-Alligator Cracking-(Sample Unit No. 01)

DORNRDR-US11AW-Joint Reflection Cracking-(Sample Unit No. 01)

DORNRDR-US11AW-Overview-(Sample Unit No. 01)

DORNRDR-US11AW-Patching-(Sample Unit No. 01)

DORNRDR-US11AW-Pothole-(Sample Unit No. 01)

DORNRDR-US11BE-Joint Reflection Cracking-(Sample Unit No. 01)

DORNRDR-US11BE-L&T Cracking-(Sample Unit No. 01)

DORNRDR-US11BE-Overview-(Sample Unit No. 01)

DORNRDR-US11BE-Weathering-(Sample Unit No. 01)

DORNRDR-US11BW-Joint Reflection Cracking-(Sample Unit No. 01)

DORNRDR-US11BW-Overview-(Sample Unit No. 01)

DORNRDR-US11BW-Patching-(Sample Unit No. 01)

DORNRDR-US13E-Alligator Cracking-(Sample Unit No. 01)

DORNRDR-US13E-Block Cracking-(Sample Unit No. 01)

DORNRDR-US13E-Overview-(Sample Unit No. 01)

DORNRDR-US13E-Weathering-(Sample Unit No. 01)

DORNRDR-US13W-Alligator Cracking-(Sample Unit No. 01)

DORNRDR-US13W-L&T Cracking-(Sample Unit No. 01)

DORNRDR-US13W-Overview-(Sample Unit No. 01)

DORNRDR-US13W-Weathering-(Sample Unit No. 01)

EUCLDS-S12-Alligator Cracking-(Sample Unit No. 02)

EUCLDS-S12-L&T Cracking-(Sample Unit No. 01)

EUCLDS-S12-Overview-(Sample Unit No. 01)

EUCLDS-S12-Patching-(Sample Unit No. 01)

EUCLDS-S12-Rutting-(Sample Unit No. 072)

FIRSTS-S12-Overview

FIRSTS-S13-Overview-(Sample Unit No. 01)

FIRSTS-S15-Joint Reflection Cracking-(Sample Unit No. 01)

FIRSTS-S15-L&T Cracking-(Sample Unit No. 01)

FIRSTS-S15-Overview-(Sample Unit No. 01)

FIRSTS15-Alligator-Cracking-(Sample Unit No.01)

FOURTS-S11-Alligator Cracking-(Sample Unit No. 01)

FOURTS-S11-Joint Reflection Cracking-(Sample Unit No. 01)

FOURTS-S11-L&T Cracking-(Sample Unit No. 01)

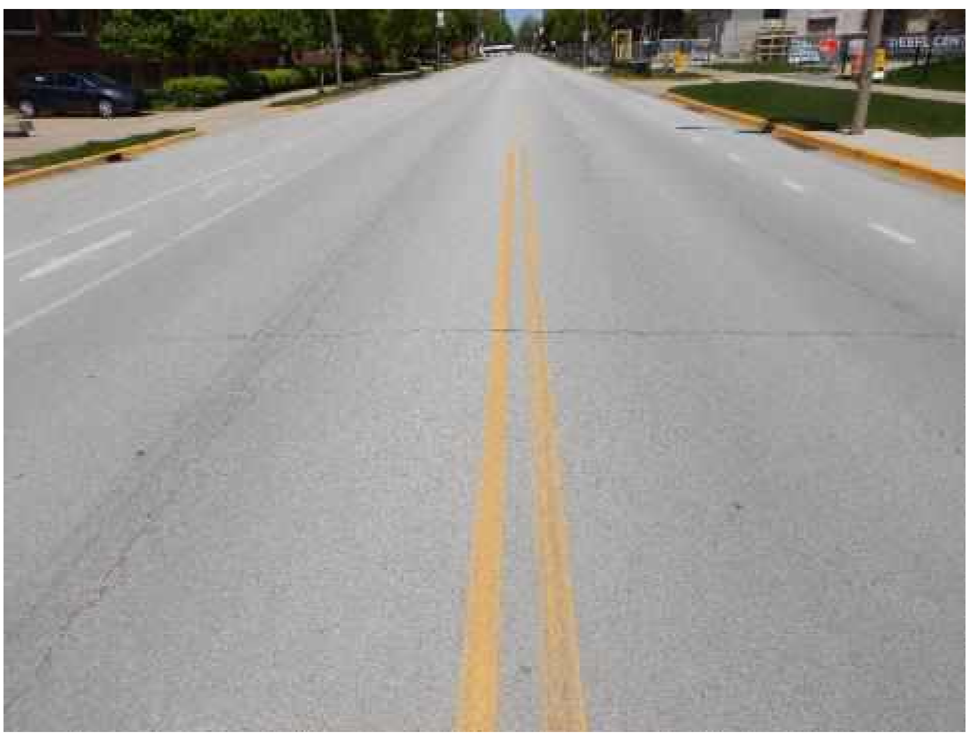
FOURTS-S11-Overview-(Sample Unit No. 01)

FOURTS-S11-Patching-(Sample Unit No. 02)

FOURTS-S12-Alligator Cracking-(Sample Unit No. 003)

FOURTS-S12-Joint Reflection Cracking-(Sample Unit No. 01)

FOURTS-S12-L&T Cracking-(Sample Unit No. 01)



FOURTS-S12-Overview-(Sample Unit No. 01)

FOURTS-S14-L&T Cracking-(Sample Unit No. 01)

FOURTS-S14-Overview-(Sample Unit No. 01)

FOURTS-S15A-L&T Cracking-(Sample Unit No. 01)

FOURTS-S15A-Overview-(Sample Unit No. 01)

FOURTS-S15B-LTD Cracking-(Sample Unit No. 01)

FOURTS-S15B-Overview-(Sample Unit No. 01)

FOURTS-S16-LTD Cracking-(Sample Unit No. 01)

FOURTS-S16-Overview-(Sample Unit No. 01)

FOURTS-S24A-Overview-(Sample Unit No. 01)

FOURTS-S24B-Overview-(Sample Unit No. 01)

GERTYD-E00B-Durability Cracking-(Sample Unit No. 01)

GERTYD-E00B-Joint Seal Damage

GERTYD-E00B-Joint Spalling-(Sample Unit No. 01)

GERTYD-E00B-LTD Cracking

GERTYD-E00B-Large Patching-(Sample Unit No. 01)

GERTYD-E00B-Overview-(Sample Unit No. 01)

GERTYD-E00B-Popouts-(Sample Unit No. 01)

GERTYD-E00C-LTD Cracking-(Sample Unit No. 01)

GERTYD-E00C-Overview-(Sample Unit No. 01)

GERTYD-E00D-LTD Cracking-(Sample Unit No. 01)

GERTYD-E00D-Overview-(Sample Unit No. 01)

GERTYD-UW09-Overview-(Sample Unit No. 01)

GHUFFDR-UW03-Alligator Cracking-(Sample Unit No. 01)

GHUFFDR-UW03-L&T Cracking-(Sample Unit No. 01)

GHUFFDR-UW03-Overview-(Sample Unit No. 01)

GHUFFDR-UW03-Weathering-(Sample Unit No. 01)

GHUFFDR-UW04AN-L&T Cracking-(Sample Unit No. 01)

GHUFFDR-UW04AN-Overview-(Sample Unit No. 01)

GHUFFDR-UW04AN-Weathering-(Sample Unit No. 01)

GHUFFDR-UW04BN-Alligator Cracking-(Sample Unit No. 01)

GHUFFDR-UW04BN-L&T Cracking-(Sample Unit No. 01)

GHUFFDR-UW04BN-Overview-(Sample Unit No. 01)

GHUFFDR-UW04BN-Weathering-(Sample Unit No. 01)

GHUFFDR-UW04S-L&T Cracking-(Sample Unit No. 01)

GHUFFDR-UW04S-Overview-(Sample Unit No. 01)

GHUFFDR-UW04S-Weathering-(Sample Unit No. 01)

GOODWINA-US08-Alligator Cracking-(Sample Unit No. 01)

GOODWINA-US08-Joint Reflection Cracking-(Sample Unit No. 01)

GOODWINA-US08-Overview-(Sample Unit No. 01)

GOODWINA-US12-Alligator Cracking-(Sample Unit No. 01)

GOODWINA-US12-Overview-(Sample Unit No. 01) (2)

GOODWINA-US12-Overview-(Sample Unit No. 01)

GOODWINA-US12-Weathering-(Sample Unit No. 01)

GOODWINA-US17-Edge Cracking-(Sample Unit No. 01)

GOODWINA-US17-Overview-(Sample Unit No. 01)

GOODWINA-US17-Overview-(Sample Unit No. 02)

GOODWINA-US17-Patching-(Sample Unit No. 01)

GOODWINA-US17-Pothole-(Sample Unit No. 01)

GOODWINA-US17-Raveling-(Sample Unit No. 01)

GOODWINA-US19-Alligator Cracking-(Sample Unit No. 01)

GOODWINA-US19-Overview-(Sample Unit No. 01)

GOODWINA-US19-Pothole-(Sample Unit No. 01)

GOODWINA-US19-Raveling-(Sample Unit No. 02)

GOODWINA-US20-Overview-(Sample Unit No. 01)

GOODWINA-US23-Overview-(Sample Unit No. 01)

GREGYD-E00-LTD Cracking-(Sample Unit No. 01)

GREGYD-E00-Overview-(Sample Unit No. 01)

GREGYD-E00-Shattered Slab-(Sample Unit No. 01)

GREGYD-E01AS-Joint Reflection Cracking-(Sample Unit No. 01)

GREGYD-E01AS-Overview-(Sample Unit No. 01)

GREGYD-E01AS-Weathering-(Sample Unit No. 01)

GREGYD-E01BN-LTD Cracking-(Sample Unit No. 01)

GREGYD-E01BN-Overview-(Sample Unit No. 01)

GREGYD-E02A-LTD Cracking-(Sample Unit No. 01) (2)

GREGYD-E02A-LTD Cracking-(Sample Unit No. 01)

GREGYD-E02A-Overview-(Sample Unit No. 01)

GREGYD-E02A-Shattered Slab-(Sample Unit No. 01)

GREGYD-E02B-Corner Spalling-(Sample Unit No. 01)

GREGYD-E02B-LTD Cracking-(Sample Unit No. 01)

GREGYD-E03A-LTD Cracking-(Sample Unit No. 01)

GREGYD-E03A-Overview-(Sample Unit No. 01)

GREGYD-E03B-Corner Spalling-(Sample Unit No. 01)

GREGYD-E03B-LTD Cracking-(Sample Unit No. 01)

GREGYD-E03B-Overview-(Sample Unit No. 01)

GREGYD-E04-Corner Break-(Sample Unit No. 01)

GREGYD-E04-Corner Spalling-(Sample Unit No. 01)

GREGYD-E04-LTD Cracking-(Sample Unit No. 01)

GREGYD-E04-Overview-(Sample Unit No. 01)

GREGYD-UW10-Alligator Cracking-(Sample Unit No. 01)

GREGYD-UW10-Overview-(Sample Unit No. 01)

GREGYD-UW11-Alligator Cracking-(Sample Unit No. 01)

GREGYD-UW11-Block Cracking-(Sample Unit No. 01)

GREGYD-UW11-Overview-(Sample Unit No. 01)

GREGYD-UW12A-Joint Reflection Cracking-(Sample Unit No. 01)

GREGYD-UW12A-Overview-(Sample Unit No. 01)

GREGYD-UW12B-Corner Spalling-(Sample Unit No. 01)

GREGYD-UW12B-LTD Cracking-(Sample Unit No. 01)

GREGYD-UW12B-Large Patching-(Sample Unit No. 01)

GREGYD-UW12B-Overview-(Sample Unit No. 01)

GREGYD-UW12B-Shattered Slab-(Sample Unit No. 01)

GREGYD-UW12C-Corner Spalling-(Sample Unit No. 01)

GREGYD-UW12C-Faulting-(Sample Unit No. 01)

GREGYD-UW12C-LTD Cracking-(Sample Unit No. 01)

GREGYD-UW12C-Large Patching-(Sample Unit No. 01)

GREGYD-UW12C-Overview-(Sample Unit No. 01)

GREGYD-UW12D-Corner Break-(Sample Unit No. 01)

GREGYD-UW12D-Corner Spalling-(Sample Unit No. 01)

GREGYD-UW12D-Joint Spalling-(Sample Unit No. 01)

GREGYD-UW12D-LTD Cracking-(Sample Unit No. 01)

GREGYD-UW12D-Large Patching-(Sample Unit No. 01)

GREGYD-UW12D-Overview-(Sample Unit No. 01)

GREGYD-UW12D-Scaling-(Sample Unit No. 02)

GRGRYST-US05-Alligator Cracking-(Sample Unit No. 01)

GRGRYST-US05-Block Cracking-(Sample Unit No. 01)

GRGRYST-US05-Overview-(Sample Unit No. 01)

GRGRYST-US05-Patching-(Sample Unit No. 01)

GRIFFITHD-S18-Alligator Cracking-(Sample Unit No. 01)

GRIFFITHD-S18-Depression-(Sample Unit No. 02)

GRIFFITHD-S18-Edge Cracking-(Sample Unit No. 01)

GRIFFITHD-S18-Overview-(Sample Unit No. 01)

GRIFFITHD-S18-Overview-(Sample Unit No. 02)

GRIFFITHD-S20-Alligator Cracking-(Sample Unit No. 01)

GRIFFITHD-S20-Edge Cracking-(Sample Unit No. 01)

GRIFFITHD-S20-Overview-(Sample Unit No. 01)

GRIFFITHD-S22A-Joint Seal Damage-(Sample Unit No. 01)

GRIFFITHD-S22A-Overview-(Sample Unit No. 01)

GRIFFITHD-S22B-Corner Spalling-(Sample Unit No. 01)

GRIFFITHD-S22B-Joint Seal Damage-(Sample Unit No. 01)

GRIFFITHD-S22B-Overview-(Sample Unit No. 01)

GRIFFITHD-S22C-Joint Seal Damage-(Sample Unit No. 01)

GRIFFITHD-S22C-Overview-(Sample Unit No. 01)

HAZELWDD-E00A-Alligator Cracking-(Sample Unit No. 01)

HAZELWDD-E00A-L&T Cracking-(Sample Unit No. 01)

HAZELWDD-E00A-Overview-(Sample Unit No. 01)

HAZELWDD-E00B-Alligator Cracking-(Sample Unit No. 01)

HAZELWDD-E00B-L&T Cracking-(Sample Unit No. 01)

HAZELWDD-E00B-Overview-(Sample Unit No. 01)

HAZELWDD-E00B-Weathering-(Sample Unit No. 01)

HAZELWDD-E00C-Alligator Cracking-(Sample Unit No. 01)

HAZELWDD-E00C-Alligator Cracking-(Sample Unit No. 02)

HAZELWDD-E00C-L&T Cracking-(Sample Unit No. 01)

HAZELWDD-E00C-L&T Cracking-(Sample Unit No. 02)

HAZELWDD-E00C-Overview-(Sample Unit No. 01)

HAZELWDD-E00C-Overview-(Sample Unit No. 02)

HAZELWDD-E00C-Patching-(Sample Unit No. 02)

HAZELWDD-E00C-Pothole-(Sample Unit No. 02)

HAZELWDD-E00C-Weathering-(Sample Unit No. 01)

HAZELWDD-E01A-LTD Cracking-(Sample Unit No. 01)

HAZELWDD-E01A-Overview-(Sample Unit No. 01)

HAZELWDD-E01B-Corner Spalling-(Sample Unit No. 01)

HAZELWDD-E01B-LTD Cracking-(Sample Unit No. 01)

HAZELWDD-E01B-LTD Cracking-(Sample Unit No. 02)

HAZELWDD-E01B-Overview-(Sample Unit No. 01)

HAZELWDD-E01B-Shattered Slab-(Sample Unit No. 02)

HAZELWDD-E01C-LTD Cracking-(Sample Unit No. 01)

HAZELWDD-E01C-Overview-(Sample Unit No. 01)

HAZELWDD-E04-Overview-(Sample Unit No. 01)

HAZELWDD-UW04-L&T Cracking-(Sample Unit No. 01)

HAZELWDD-UW04-Overview-(Sample Unit No. 01)

HAZELWDD-UW04-Weathering-(Sample Unit No. 01)

HAZELWDD-UW05-Alligator Cracking-(Sample Unit No. 01)

HAZELWDD-UW05-Overview-(Sample Unit No. 01)

HAZELWDD-UW05-Weathering-(Sample Unit No. 01)

HAZELWDD-UW09-Durability Cracking-(Sample Unit No - 03)

HAZELWDD-UW09-Joint Seal Damage-(Sample Unit No. 01)

HAZELWDD-UW09-Overview-(Sample Unit No. 01)

HAZELWDD-UW09-Scaling-(Sample Unit No. 01)

HAZELWDD-UW12A-Overview-(Sample Unit No. 01)

HAZELWDD-UW12A-Raveling-(Sample Unit No. 01)

HAZELWDD-UW12A-Weathering-(Sample Unit No. 01)

HAZELWDD-UW12B-Overview-(Sample Unit No. 01)

KIRKD-S20A-Overview-(Sample Unit No. 01)

KIRKD-S20A-Overview-(Sample Unit No. 02)

KIRKD-S20B-Alligator Cracking-(Sample Unit No. 01)

KIRKD-S20B-Block Cracking-(Sample Unit No. 01)

KIRKD-S20B-Depression-(Sample Unit No. 01)

KIRKD-S20B-Overview-(Sample Unit No. 01)

KIRKD-S20B-Pothole-(Sample Unit No. 01)

KIRKD-S20B-Raveling-(Sample Unit No. 01)

LNCLNAV-US17A-Durability Cracking-(Sample Unit No. 01)

LNCLNAV-US17A-Large Patching-(Sample Unit No. 01)

LNCLNAV-US17A-Overview-(Sample Unit No. 01)

LNCLNAV-US17B-Alligator Cracking-(Sample Unit No. 01)

LNCLNAV-US17B-Alligator Cracking-(Sample Unit No. 02)

LNCLNAV-US17B-Block Cracking-(Sample Unit No. 01)

LNCLNAV-US17B-Block Cracking-(Sample Unit No. 02)

LNCLNAV-US17B-Joint Reflection Cracking-(Sample Unit No - 72)

LNCLNAV-US17B-Joint Reflection Cracking-(Sample Unit No. 01)

LNCLNAV-US17B-Overview-(Sample Unit No. 01)

LNCLNAV-US17B-Overview-(Sample Unit No. 02)

LNCLNAV-US17B-Raveling-(Sample Unit No. 01)

LNCLNAV-US19-Durability Cracking-(Sample Unit No. 01)

LNCLNAV-US19-Joint Spalling-(Sample Unit No. 01)

LNCLNAV-US19-LTD Cracking-(Sample Unit No. 01)

LNCLNAV-US19-Large Patching-(Sample Unit No. 01)

LNCLNAV-US19-Overview-(Sample Unit No. 01)

LNCLNAV-US21-Corner Break-(Sample Unit No - 04)

LNCLNAV-US21-Overview-(Sample Unit No. 01)

LNCLNAV-US23-Corner Spalling-(Sample Unit No. 01)

LNCLNAV-US23-Joint Spalling-(Sample Unit No. 01)

LNCLNAV-US23-LTD Cracking-(Sample Unit No. 01)

LNCLNAV-US23-Overview-(Sample Unit No. 01)

LNCLNAV-US26-Overview-(Sample Unit No. 01)

LORADOTD-UW12-Alligator Cracking-(Sample Unit No. 01)

LORADOTD-UW12-L&T Cracking-(Sample Unit No. 01)

LORADOTD-UW12-Overview-(Sample Unit No. 01)

MAINS-UW11AN-Alligator Cracking-(Sample Unit No. 01)

MAINS-UW11AN-Block Cracking-(Sample Unit No. 01)

MAINS-UW11AN-Overview-(Sample Unit No. 01)

MAINS-UW11AS-Joint Reflection Cracking-(Sample Unit No. 01)

MAINS-UW11AS-Overview-(Sample Unit No. 01)

MAINS-UW11AS-Weathering-(Sample Unit No. 01)

MAINS-UW11B-Joint Reflection Cracking-(Sample Unit No. 01)

MAINS-UW11B-L&T Cracking-(Sample Unit No. 01)

MAINS-UW11B-Overview-(Sample Unit No. 01)

MAINS-UW11B-Raveling-(Sample Unit No. 01)

MRYLNDDR-US14-LTD Cracking-(Sample Unit No. 01)

MRYLNDDR-US14-Overview-(Sample Unit No. 01)

MRYLNDDR-US15-LTD Cracking-(Sample Unit No. 01)

MRYLNDDR-US15-Overview-(Sample Unit No. 01)

OAKS-S10A-Joint Spalling-(Sample Unit No. 01)

OAKS-S10A-LTD Cracking-(Sample Unit No. 01)

OAKS-S10A-Large Patching-(Sample Unit No. 01)

OAKS-S10A-Overview-(Sample Unit No. 01)

OAKS-S10B-Overview-(Sample Unit No. 01)

OAKS-S10C-Joint Seal Damage-(Sample Unit No. 01)

OAKS-S10C-Joint Spalling-(Sample Unit No. 01)

OAKS-S10C-Overview-(Sample Unit No. 01)

OAKS-S12-Corner Spalling-(Sample Unit No. 01)

OAKS-S12-Joint Spalling-(Sample Unit No. 01)

OAKS-S12-LTD Cracking-(Sample Unit No. 01)

OAKS-S12-Overview-(Sample Unit No. 01)

OAKS-S13-Durability Cracking-(Sample Unit No. 01)

OAKS-S13-Durability Cracking-(Sample Unit No. 02)

OAKS-S13-LTD Cracking-(Sample Unit No. 01)

OAKS-S13-Large Patching-(Sample Unit No. 01)

OAKS-S13-Overview-(Sample Unit No. 01)

OAKS-S16-Durability Cracking-(Sample Unit No. 01)

OAKS-S16-Durability Cracking-(Sample Unit No. 02)

OAKS-S16-Joint Seal Damage-(Sample Unit No. 01)

OAKS-S16-Joint Spalling-(Sample Unit No. 01)

OAKS-S16-Large Patching-(Sample Unit No. 004)

OAKS-S16-Overview-(Sample Unit No. 01)

OAKS-S18A-Alligator Cracking-(Sample Unit No. 01)

OAKS-S18A-Alligator Cracking-(Sample Unit No. 02)

OAKS-S18A-Block Cracking-(Sample Unit No. 01)

OAKS-S18A-Block Cracking-(Sample Unit No. 02)

OAKS-S18A-Overview-(Sample Unit No. 01)

OAKS-S18A-Overview-(Sample Unit No. 02)

OAKS-S18A-Patching-(Sample Unit No. 02)

OAKS-S18A-Weathering-(Sample No. 01)

OAKS-S18B-L&T Cracking-(Sample Unit No. 05)

OAKS-S18B-Overview-(Sample Unit No. 05)

OAKS-S18B-Weathering-(Sample Unit No. 05)

OAKS-S20A-Alligator Cracking-(Sample Unit No. 01)

OAKS-S20A-L&T Cracking-(Sample Unit No. 01)

OAKS-S20A-Overview-(Sample Unit No. 01)

OAKS-S20B-Alligator Cracking-(Sample Unit No. 01)

OAKS-S20B-L&T Cracking-(Sample Unit No. 01)

OAKS-S20B-Overview-(Sample Unit No. 01)

OAKS-S20B-Weathering-(Sample Unit No. 01)

ORCHDST-US17A-Overview-(Sample Unit No. 01)

ORCHDST-US17B-Overview-(Sample Unit No. 01)

PEABYD-E01A-Joint Reflection Cracking-(Sample Unit No. 01)

PEABYD-E01A-Overview-(Sample Unit No. 01)

PEABYD-E01A-Patching-(Sample Unit No. 02)

PEABYD-E01A-Pothole-(Sample Unit No. 01)

PEABYD-E01B-Joint Reflection Cracking-(Sample Unit No. 01)

PEABYD-E01B-Overview-(Sample Unit No. 01)

PEABYD-E01B-Weathering-(Sample Unit No. 01)

PEABYD-E03-Alligator Cracking-(Sample Unit No. 01)

PEABYD-E03-Joint Reflection Cracking-(Sample Unit No. 01)

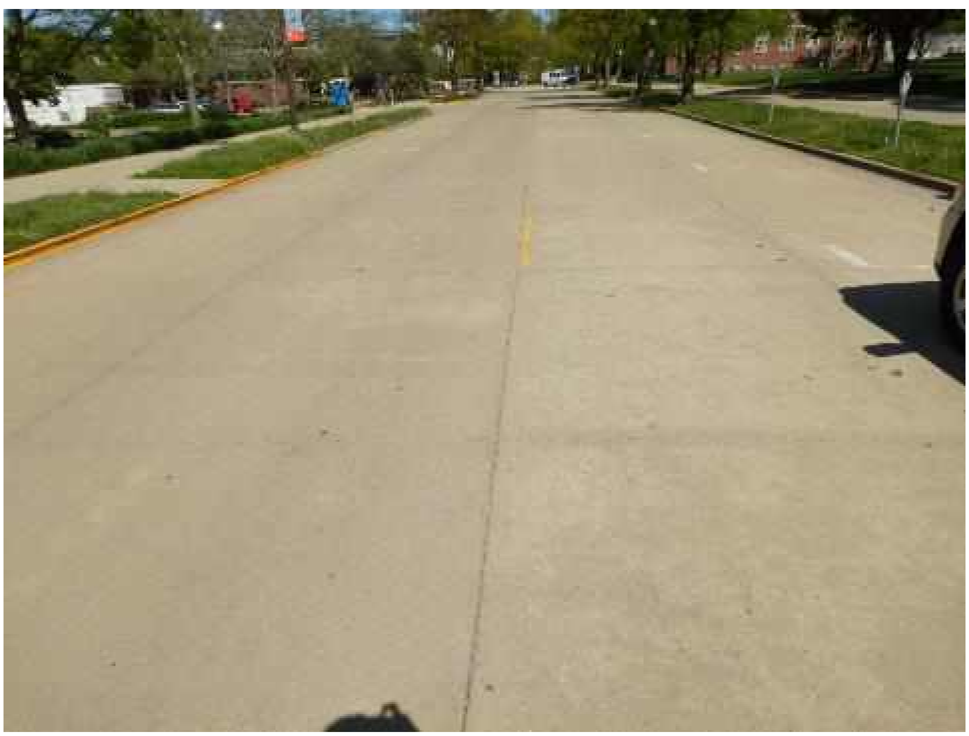
PEABYD-E03-Overview-(Sample Unit No. 01)

PEABYD-E04A-Joint Seal Damage-(Sample Unit No. 01)

PEABYD-E04A-Overview-(Sample Unit No. 01)

PEABYD-E04B-Corner Spalling-(Sample Unit No. 01)

PEABYD-E04B-Joint Seal Damage-(Sample Unit No. 01)



PEABYD-E04B-Overview-(Sample Unit No. 01)

PEABYD-E06A-Alligator Cracking-(Sample Unit No. 01)

PEABYD-E06A-Overview-(Sample Unit No. 01)

PEABYD-E06A-Patching-(Sample Unit No. 01)

PEABYD-E06A-Raveling-(Sample Unit No. 01)

PEABYD-E06B-Alligator Cracking-(Sample Unit No. 01)

PEABYD-E06B-Depression-(Sample Unit No. 01)

PEABYD-E06B-Overview-(Sample Unit No. 01)

PEABYD-E06B-Weathering-(Sample Unit No. 01)

PEABYD-UW11-Joint Seal Damage-(Sample Unit No. 01)

PEABYD-UW11-Large Patching-(Sample Unit No. 01)

PEABYD-UW11-Overview-(Sample Unit No. 01)

PENSYA-E04-Overview-(Sample Unit No. 01)

PENSYA-E06-Overview-(Sample Unit No. 01)

PENSYA-UW09A-Alligator Cracking-(Sample Unit No. 01)

PENSYA-UW09A-Block Cracking-(Sample Unit No. 01)

PENSYA-UW09A-Overview-(Sample Unit No. 01)

PENSYA-UW09A-Pothole-(Sample Unit No. 01)

PENSYA-UW09A-Swelling-(Sample Unit No. 01)

PENSYA-UW09A-Weathering-(Sample Unit No. 01)

PENSYA-UW09B-Alligator Cracking-(Sample Unit No. 01)

PENSYA-UW09B-Block Cracking-(Sample Unit No. 01)

PENSYA-UW09B-Overview-(Sample Unit No. 01)

PENSYA-UW09B-Raveling-(Sample Unit No. 01)

PENSYA-UW11A-Alligator Cracking-(Sample Unit No. 01)

PENSYA-UW11A-Block Cracking-(Sample Unit No. 01)

PENSYA-UW11A-Overview-(Sample Unit No. 01)

PENSYA-UW11A-Patching-(Sample Unit No. 01)

PENSYA-UW11A-Pothole-(Sample Unit No. 01)

PENSYA-UW11A-Rutting-(Sample Unit No. 01)

PENSYA-UW11A-Weathering-(Sample Unit No. 01)

PENSYA-UW11B-Alligator Cracking-(Sample Unit No. 01)

PENSYA-UW11B-Block Cracking-(Sample Unit No. 01)

PENSYA-UW11B-Overview-(Sample Unit No. 01)

PENSYA-UW11B-Pothole-(Sample Unit No. 02)

PENSYA-UW11B-Weathering-(Sample Unit No. 01)

PENSYA-UW12A-Alligator Cracking-(Sample Unit No. 01)

PENSYA-UW12A-Overview-(Sample Unit No. 01)

PENSYA-UW12B-Alligator Cracking-(Sample Unit No. 01)

PENSYA-UW12B-Block Cracking-(Sample Unit No. 01)

PENSYA-UW12B-L&T Cracking-(Sample Unit No. 01)

PENSYA-UW12B-Overview-(Sample Unit No. 01)

PENSYA-UW12B-Patching-(Sample Unit No. 02)

SIXTHS-S10-LTD Cracking-(Sample Unit No. 01)

SIXTHS-S10-Overview-(Sample Unit No. 01)

SIXTHS-S10-Scaling-(Sample Unit No. 01)

SIXTHS-S11-Alligator Cracking-(Sample Unit No. 01)

SIXTHS-S11-L&T Cracking-(Sample Unit No. 01)

SIXTHS-S11-Overview-(Sample Unit No. 01)

SIXTHS-S13-Alligator Cracking-(Sample Unit No. 01)

SIXTHS-S13-Joint Reflection Cracking-(Sample Unit No. 01)

SIXTHS-S13-Overview-(Sample Unit No. 01)

SIXTHS-S14-Block Cracking-(Sample Unit No. 01)

SIXTHS-S14-Joint Reflection Cracking-(Sample Unit No. 01)

SIXTHS-S14-Overview-(Sample Unit No. 01)

STADMD-E00A-Alligator Cracking-(Sample Unit No. 01)

STADMD-E00A-Overview-(Sample Unit No. 01)

STADMD-E00A-Patching-(Sample Unit No. 01)

STADMD-E00A-Raveling-(Sample Unit No. 01)

STADMD-E00B-LTD Cracking-(Sample Unit No. 01)

STADMD-E00B-Overview-(Sample Unit No. 01)

STADMD-E00C-Joint Seal Damage-(Sample Unit No. 01)

STADMD-E00C-Joint Spalling-(Sample Unit No. 071)

STADMD-E00C-Overview-(Sample Unit No. 01)

STADMD-E00D-Joint Seal Damage-(Sample Unit No. 02)

STADMD-E00D-Joint Spall-(Sample Unit No. 01)

STADMD-E00D-Joint Spalling-(Sample Unit No. 01)

STADMD-E00D-Joint Spalling-(Sample Unit No. 02)

STADMD-E00D-Overview-(Sample Unit No. 01)

STADMD-E00D-Overview-(Sample Unit No. 02)

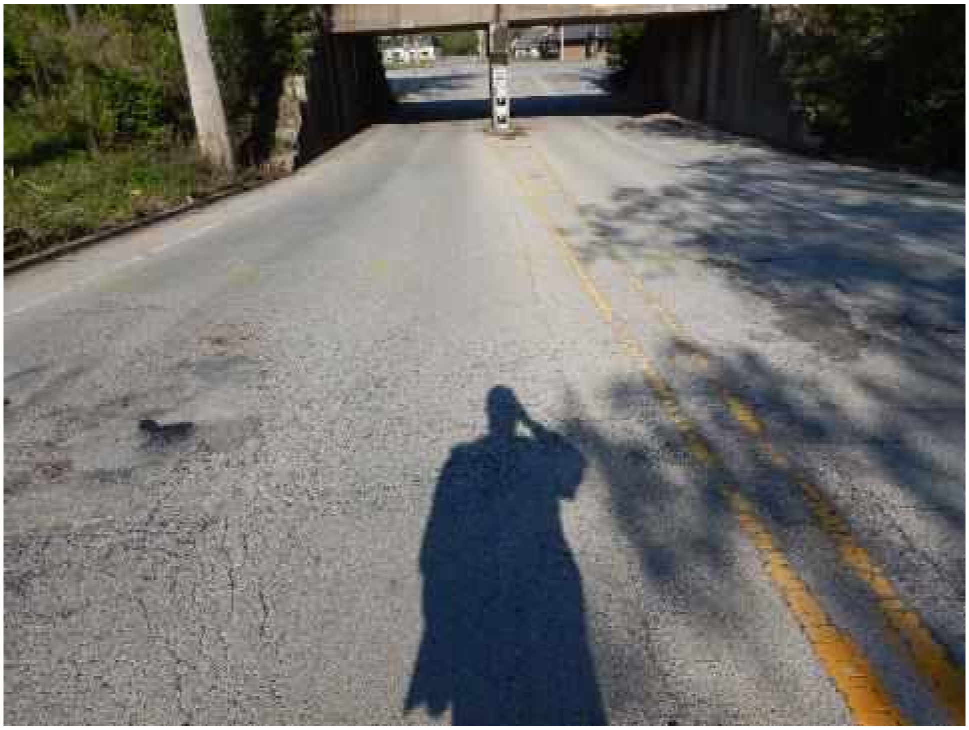
STADMD-E00D-Small Patching-(Sample Unit No. 02)

STADMD-E00E-Joint Seal Damage-(Sample Unit No. 01)

STADMD-E00E-Joint Spalling-(Sample Unit No. 01)

STADMD-E00E-Overview-(Sample Unit No. 01)

STMARR-E00A-Alligator Cracking-(Sample Unit No. 01)



STMARR-E00A-Overview-(Sample Unit No. 01)

STMARR-E00A-Patching-(Sample Unit No. 01)

STMARR-E00A-Rutting-(Sample Unit No. 01)

STMARR-E00B-Corner Break-(Sample Unit No. 01)

STMARR-E00B-Durability Cracking-(Sample Unit No. 01)

STMARR-E00B-Joint Seal Damage-(Sample Unit No. 01)

STMARR-E00B-Large Patching-(Sample Unit No. 01)

STMARR-E00B-Overview-(Sample Unit No. 01)

STMARR-E00B-Popouts-(Sample Unit No. 01)

STMARR-E00B-Small Patching-(Sample Unit No. 01)

STMARR-E00C-Block Cracking-(Sample Unit No. 01)

STMARR-E00C-Joint Reflection Cracking-(Sample Unit No. 01)

STMARR-E00C-Overview-(Sample Unit No. 01)

STMARR-E00C-Pothole-(Sample Unit No. 01)

STMARR-E00D-Alligator Cracking-(Sample Unit No. 01)

STMARR-E00D-Block Cracking-(Sample Unit No. 01)

STMARR-E00D-Joint Reflection Cracking-(Sample Unit No. 01)

STMARR-E00D-Overview-(Sample Unit No. 01)

STMARR-E00D-Pothole-(Sample Unit No. 02) (1)

STMARR-E00D-Pothole-(Sample Unit No. 02) (2)

STMARR-E01-Block Cracking-(Sample Unit No. 01)

STMARR-E01-Joint Reflection Cracking-(Sample Unit No - 71)

STMARR-E01-Overview-(Sample Unit No. 01)

STMARR-E01-Weathering-(Sample Unit No. 01)

STMARR-E04A-Edge Cracking-(Sample Unit No. 01)

STMARR-E04A-L&T Cracking-(Sample Unit No. 01)

STMARR-E04A-Overview-(Sample Unit No. 01)

STMARR-E04B-L&T Cracking-(Sample Unit No. 01)

STMARR-E04B-Overview-(Sample Unit No. 01)

STMARR-E04B-Weathering-(Sample Unit No. 01)

STMARR-UW09A-Alligator Cracking-(Sample Unit No. 01)

STMARR-UW09A-L&T Cracking-(Sample Unit No. 01)

STMARR-UW09A-Overview-(Sample Unit No. 01)

STMARR-UW09B-L&T Cracking-(Sample Unit No. 01)

STMARR-UW09B-Overview-(Sample Unit No. 01)

STMARR-UW09B-Weathering-(Sample Unit No. 01)

STMARR-UW09C-Alligator Cracking-(Sample Unit No. 01)

STMARR-UW09C-L&T Cracking-(Sample Unit No. 01)

STMARR-UW09C-Overview-(Sample Unit No. 01)

STMARR-UW09C-Patching-(Sample Unit No. 01)

STMARR-UW12-Alligator Cracking-(Sample Unit No. 01)

STMARR-UW12-Edge Cracking-(Sample Unit No. 01)

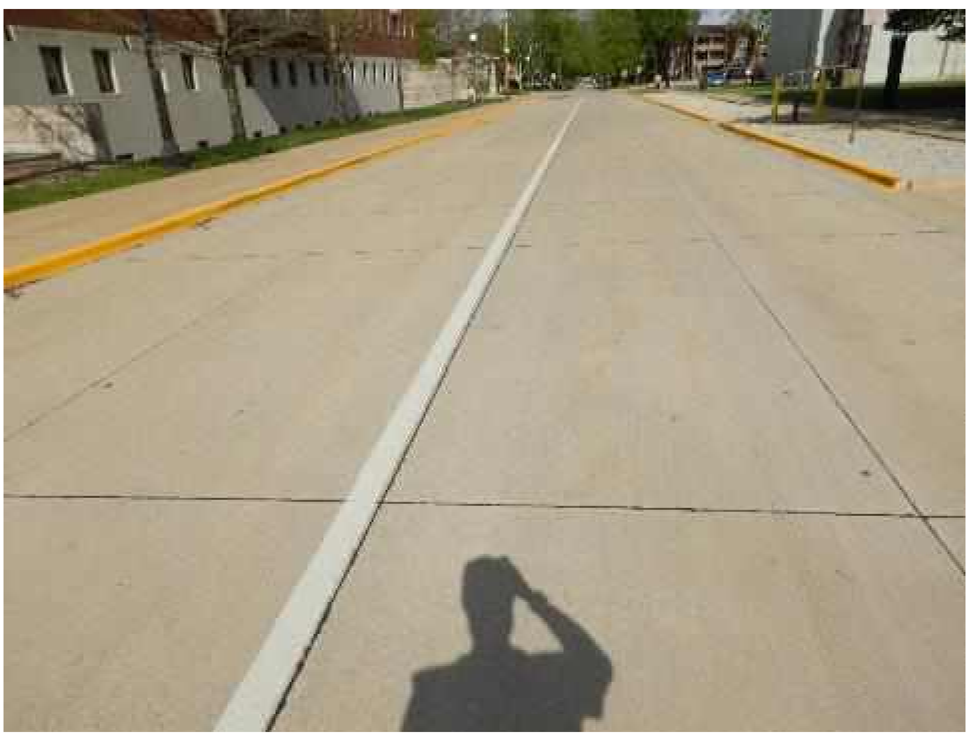
STMARR-UW12-L&T Cracking-(Sample Unit No. 01)

STMARR-UW12-Overview-(Sample Unit No. 01)

STOUGS-UW11-Alligator Cracking-(Sample Unit No. 01)

STOUGS-UW11-Overview-(Sample Unit No. 01)

STOUGS-UW12-Joint Seal Damage-(Sample Unit No. 01)



STOUGS-UW12-Overview-(Sample Unit No. 01)

STOUGS-UW13-Alligator Cracking-(Sample Unit No. 02)

STOUGS-UW13-Block Cracking-(Sample Unit No. 02)

STOUGS-UW13-L&T Cracking-(Sample Unit No. 02)

STOUGS-UW13-Overview-(Sample Unit No. 02)

VRGNADR-US14A-Joint Reflection Cracking-(Sample Unit No. 01)

VRGNADR-US14A-L&T Cracking-(Sample Unit No. 01)

VRGNADR-US14A-Overview-(Sample Unit No. 01)

VRGNADR-US14A-Weathering-(Sample Unit No. 01)

VRGNADR-US14BE-Joint Spalling-(Sample Unit No. 01)

VRGNADR-US14BE-Overview-(Sample Unit No. 01)

VRGNADR-US14BE-Shattered Slab-(Sample Unit No. 01)

VRGNADR-US14BW-Joint Reflection Cracking-(Sample Unit No. 01)

VRGNADR-US14BW-L&T Cracking-(Sample Unit No. 01)

VRGNADR-US14BW-Overview-(Sample Unit No. 01)

VRGNADR-US14BW-Weathering-(Sample Unit No. 01)

WRIGHS-S17-Overview-(Sample Unit No. 01)

WRIGHS-S18-Alligator Cracking-(Sample Unit No. 01)

WRIGHS-S18-Overview-(Sample Unit No. 01)

WRIGHS-S18-Weathering-(Sample Unit No. 01)

WRIGHS-S20-Overview-(Sample Unit No. 01)

WRIGHS-S20-Weathering-(Sample Unit No. 01)

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APPENDIX C – 2020 PCI AND EXTRAPOLATED DISTRESS

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
ARMRYA	E00	PCC	7,475	69	Corner Break, Slabs	1			
ARMRYA	E00	PCC	7,475	69	Divided Slab, Slabs		1		
ARMRYA	E00	PCC	7,475	69	Durability Cracking, Slabs	4	3		
ARMRYA	E00	PCC	7,475	69	Joint Seal Damage, Slabs			25	
ARMRYA	E00	PCC	7,475	69	Joint Spalling, Slabs	1			
ARMRYA	E00	PCC	7,475	69	Large Patch/Utility Cut, Slabs		4		
ARMRYA	E00	PCC	7,475	69	Linear Cracking, Slabs	3	4		
ARMRYA	E04	PCC	13,078	83	Corner Spalling, Slabs	3	20	3	
ARMRYA	E04	PCC	13,078	83	Faulting, Slabs	15			
ARMRYA	E04	PCC	13,078	83	Joint Seal Damage, Slabs			116	
ARMRYA	E04	PCC	13,078	83	Joint Spalling, Slabs	6	6		
ARMRYA	E05	PCC	15,537	78	Corner Spalling, Slabs		23		
ARMRYA	E05	PCC	15,537	78	Faulting, Slabs	46			
ARMRYA	E05	PCC	15,537	78	Joint Seal Damage, Slabs			69	
ARMRYA	E05	PCC	15,537	78	Joint Spalling, Slabs	13	7	3	
ARMRYA	E05	PCC	15,537	78	Linear Cracking, Slabs		3		
ARMRYA	E06	PCC	12,151	100					
BAILEYD	E00	AC	16,349	18	Alligator Cracking, Sqft		7,357		
BAILEYD	E00	AC	16,349	18	Block Cracking, Sqft	8,175			
BAILEYD	E00	AC	16,349	18	Patch/Utility Cut, Sqft	817			
BAILEYD	E00	AC	16,349	18	Pothole, Count		4		
BAILEYD	E00	AC	16,349	18	Raveling, Sqft			817	
BAILEYD	E00	AC	16,349	18	Rutting, Sqft		430		
BAILEYD	E00	AC	16,349	18	Weathering, Sqft		14,714		
CLARKST	UW12	PCC	9,588	90	Corner Break, Slabs	2			
CLARKST	UW12	PCC	9,588	90	Joint Seal Damage, Slabs			96	
CLARKST	UW12	PCC	9,588	90	Linear Cracking, Slabs	2			

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
CLARKST	UW12	PCC	9,588	90	Shrinkage Cracking, Slabs				2
COLAGCT	UW09AN	PCC	5,349	92	Joint Seal Damage, Slabs			33	
COLAGCT	UW09AS	AC	5,334	3	Alligator Cracking, Sqft		4,801	533	
COLAGCT	UW09AS	AC	5,334	3	Raveling, Sqft			533	
COLAGCT	UW09AS	AC	5,334	3	Rutting, Sqft	727	121		
COLAGCT	UW09AS	AC	5,334	3	Weathering, Sqft		4,801		
COLAGCT	UW09BN	AC	8,559	44	Alligator Cracking, Sqft		389	12	
COLAGCT	UW09BN	AC	8,559	44	Longitudinal/Transverse Cracking, Ft	253	895		
COLAGCT	UW09BN	AC	8,559	44	Weathering, Sqft		8,559		
COLAGCT	UW09BS	AC	16,917	56	Block Cracking, Sqft	7,344			
COLAGCT	UW09BS	AC	16,917	56	Patch/Utility Cut, Sqft	5,075	846		
COLAGCT	UW09BS	AC	16,917	56	Weathering, Sqft		10,996		
COLAGCT	UW09CN	PCC	5,016	85	Corner Spalling, Slabs	4			
COLAGCT	UW09CN	PCC	5,016	85	Joint Seal Damage, Slabs			37	
COLAGCT	UW09CN	PCC	5,016	85	Joint Spalling, Slabs		6		
COLAGCT	UW09CN	PCC	5,016	85	Linear Cracking, Slabs		4		
COLAGCT	UW09CS	AC	3,790	26	Alligator Cracking, Sqft		379	190	
COLAGCT	UW09CS	AC	3,790	26	Block Cracking, Sqft	1,895			
COLAGCT	UW09CS	AC	3,790	26	Raveling, Sqft			190	
COLAGCT	UW09CS	AC	3,790	26	Weathering, Sqft		3,411		
COLAGCT	UW09DN	AC	7,553	24	Alligator Cracking, Sqft	2,266	2,266		
COLAGCT	UW09DN	AC	7,553	24	Block Cracking, Sqft	4,532			
COLAGCT	UW09DN	AC	7,553	24	Longitudinal/Transverse Cracking, Ft	566			
COLAGCT	UW09DN	AC	7,553	24	Weathering, Sqft		7,553		
DORNRDR	US11AE	APC	10,351	76	Longitudinal/Transverse Cracking, Ft	1,102			
DORNRDR	US11AE	APC	10,351	76	Weathering, Sqft		10,351		
DORNRDR	US11AW	APC	11,129	30	Alligator Cracking, Sqft	278	556		

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
DORNRDR	US11AW	APC	11,129	30	Joint Reflection Cracking, Ft		1,793	9	
DORNRDR	US11AW	APC	11,129	30	Patch/Utility Cut, Sqft	618			
DORNRDR	US11AW	APC	11,129	30	Raveling, Sqft			618	
DORNRDR	US11AW	APC	11,129	30	Weathering, Sqft		9,892		
DORNRDR	US11BE	APC	6,952	57	Joint Reflection Cracking, Ft	368	368		
DORNRDR	US11BE	APC	6,952	57	Longitudinal/Transverse Cracking, Ft	299			
DORNRDR	US11BE	APC	6,952	57	Patch/Utility Cut, Sqft	1,636			
DORNRDR	US11BE	APC	6,952	57	Weathering, Sqft		5,316		
DORNRDR	US11BW	AC	7,959	15	Alligator Cracking, Sqft	265	2,653		
DORNRDR	US11BW	AC	7,959	15	Block Cracking, Sqft		3,980		
DORNRDR	US11BW	AC	7,959	15	Joint Reflection Cracking, Ft		619		
DORNRDR	US11BW	AC	7,959	15	Patch/Utility Cut, Sqft	2,653			
DORNRDR	US11BW	AC	7,959	15	Weathering, Sqft		7,959		
DORNRDR	US13E	AC	5,257	41	Alligator Cracking, Sqft	263	263		
DORNRDR	US13E	AC	5,257	41	Block Cracking, Sqft	1,051			
DORNRDR	US13E	AC	5,257	41	Depression, Sqft		66		
DORNRDR	US13E	AC	5,257	41	Edge Cracking, Ft		329		
DORNRDR	US13E	AC	5,257	41	Weathering, Sqft		5,257		
DORNRDR	US13W	APC	5,383	33	Alligator Cracking, Sqft	269	269		
DORNRDR	US13W	APC	5,383	33	Depression, Sqft		18		
DORNRDR	US13W	APC	5,383	33	Joint Reflection Cracking, Ft		778		
DORNRDR	US13W	APC	5,383	33	Longitudinal/Transverse Cracking, Ft	359			
DORNRDR	US13W	APC	5,383	33	Weathering, Sqft		5,383		
EUCLDS	S12	AC	9,556	39	Alligator Cracking, Sqft		1,143		
EUCLDS	S12	AC	9,556	39	Longitudinal/Transverse Cracking, Ft	693			
EUCLDS	S12	AC	9,556	39	Patch/Utility Cut, Sqft	187			
EUCLDS	S12	AC	9,556	39	Rutting, Sqft	131	768		

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
EUCLDS	S12	AC	9,556	39	Weathering, Sqft		9,369		
FIRSTS	S12	PCC	17,206	100					
FIRSTS	S13	PCC	16,322	100					
FIRSTS	S15	APC	43,947	75	Alligator Cracking, Sqft	117	176		
FIRSTS	S15	APC	43,947	75	Joint Reflection Cracking, Ft	2,842	568		
FIRSTS	S15	APC	43,947	75	Longitudinal/Transverse Cracking, Ft	1,764			
FIRSTS	S15	APC	43,947	75	Weathering, Sqft	29,298	14,649		
FOURTS	S11	AAC	20,487	70	Alligator Cracking, Sqft	123	164		
FOURTS	S11	AAC	20,487	70	Joint Reflection Cracking, Ft	1,209			
FOURTS	S11	AAC	20,487	70	Longitudinal/Transverse Cracking, Ft	1,598			
FOURTS	S11	AAC	20,487	70	Patch/Utility Cut, Sqft	819			
FOURTS	S11	AAC	20,487	70	Weathering, Sqft	19,668			
FOURTS	S12	APC	42,040	71	Alligator Cracking, Sqft		2,550		
FOURTS	S12	APC	42,040	71	Joint Reflection Cracking, Ft	1,917			
FOURTS	S12	APC	42,040	71	Longitudinal/Transverse Cracking, Ft	2,354			
FOURTS	S12	APC	42,040	71	Weathering, Sqft	28,027			
FOURTS	S14	APC	15,147	87	Joint Reflection Cracking, Ft	373			
FOURTS	S14	APC	15,147	87	Longitudinal/Transverse Cracking, Ft	651			
FOURTS	S14	APC	15,147	87	Weathering, Sqft	15,147			
FOURTS	S15A	APC	37,121	82	Joint Reflection Cracking, Ft	2,101			
FOURTS	S15A	APC	37,121	82	Longitudinal/Transverse Cracking, Ft	2,598			
FOURTS	S15A	APC	37,121	82	Weathering, Sqft	37,121			
FOURTS	S15B	PCC	3,975	83	Linear Cracking, Slabs	9			
FOURTS	S16	PCC	56,430	92	Linear Cracking, Slabs	51			
GERTYD	E00B	PCC	34,863	54	Durability Cracking, Slabs	11	27	5	
GERTYD	E00B	PCC	34,863	54	Joint Seal Damage, Slabs			107	
GERTYD	E00B	PCC	34,863	54	Joint Spalling, Slabs		8	8	

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
GERTYD	E00B	PCC	34,863	54	Large Patch/Utility Cut, Slabs	8	8		
GERTYD	E00B	PCC	34,863	54	Linear Cracking, Slabs	16	16		
GERTYD	E00B	PCC	34,863	54	Popouts, Slabs				107
GERTYD	E00B	PCC	34,863	54	Small Patch, Slabs	5			
GERTYD	E00C	PCC	34,007	98	Linear Cracking, Slabs	5			
GERTYD	E00D	PCC	19,765	88	Linear Cracking, Slabs	24	3		
GHUFFDR	UW03	AAC	13,420	68	Alligator Cracking, Sqft			134	
GHUFFDR	UW03	AAC	13,420	68	Depression, Sqft			67	
GHUFFDR	UW03	AAC	13,420	68	Edge Cracking, Ft	134			
GHUFFDR	UW03	AAC	13,420	68	Longitudinal/Transverse Cracking, Ft	201			
GHUFFDR	UW03	AAC	13,420	68	Weathering, Sqft		13,420		
GHUFFDR	UW04AN	AAC	15,998	81	Longitudinal/Transverse Cracking, Ft	876			
GHUFFDR	UW04AN	AAC	15,998	81	Weathering, Sqft		15,998		
GHUFFDR	UW04BN	AAC	6,587	64	Alligator Cracking, Sqft	180	15		
GHUFFDR	UW04BN	AAC	6,587	64	Edge Cracking, Ft	60			
GHUFFDR	UW04BN	AAC	6,587	64	Longitudinal/Transverse Cracking, Ft	611			
GHUFFDR	UW04BN	AAC	6,587	64	Swell, Sqft	12			
GHUFFDR	UW04BN	AAC	6,587	64	Weathering, Sqft		6,587		
GHUFFDR	UW04S	AAC	11,091	83	Longitudinal/Transverse Cracking, Ft	200			
GHUFFDR	UW04S	AAC	11,091	83	Weathering, Sqft		11,091		
GOODWINA	US08	APC	22,477	36	Alligator Cracking, Sqft	202	2,517		
GOODWINA	US08	APC	22,477	36	Joint Reflection Cracking, Ft		3,102	31	
GOODWINA	US08	APC	22,477	36	Rutting, Sqft	450			
GOODWINA	US08	APC	22,477	36	Weathering, Sqft		22,477		
GOODWINA	US12	AC	8,647	72	Alligator Cracking, Sqft	52	69		
GOODWINA	US12	AC	8,647	72	Longitudinal/Transverse Cracking, Ft	297			
GOODWINA	US12	AC	8,647	72	Weathering, Sqft		8,647		

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
GOODWINA	US13	AAC	9,830	100					
GOODWINA	US17	ST	23,755	15	Alligator Cracking, Sqft		2,705	594	
GOODWINA	US17	ST	23,755	15	Block Cracking, Sqft		1,188		
GOODWINA	US17	ST	23,755	15	Edge Cracking, Ft		990	330	
GOODWINA	US17	ST	23,755	15	Patch/Utility Cut, Sqft	1,188	660		
GOODWINA	US17	ST	23,755	15	Pothole, Count		7	33	
GOODWINA	US19	AC	49,021	62	Alligator Cracking, Sqft		1,961		
GOODWINA	US19	AC	49,021	62	Block Cracking, Sqft	1,634			
GOODWINA	US19	AC	49,021	62	Longitudinal/Transverse Cracking, Ft	1,261			
GOODWINA	US19	AC	49,021	62	Pothole, Count	7			
GOODWINA	US19	AC	49,021	62	Raveling, Sqft			621	
GOODWINA	US19	AC	49,021	62	Weathering, Sqft		16,112		
GREGYD	E00	PCC	26,195	82	Divided Slab, Slabs	11			
GREGYD	E00	PCC	26,195	82	Joint Spalling, Slabs		3		
GREGYD	E00	PCC	26,195	82	Linear Cracking, Slabs	16	3		
GREGYD	E01AS	APC	6,121	32	Alligator Cracking, Sqft	272	204		
GREGYD	E01AS	APC	6,121	32	Joint Reflection Cracking, Ft	119	408	44	
GREGYD	E01AS	APC	6,121	32	Longitudinal/Transverse Cracking, Ft	1,707			
GREGYD	E01AS	APC	6,121	32	Weathering, Sqft		6,121		
GREGYD	E01BN	PCC	5,968	52	Divided Slab, Slabs		13		
GREGYD	E01BN	PCC	5,968	52	Joint Seal Damage, Slabs	44			
GREGYD	E01BN	PCC	5,968	52	Linear Cracking, Slabs		13		
GREGYD	E02A	PCC	7,808	77	Divided Slab, Slabs	3			
GREGYD	E02A	PCC	7,808	77	Joint Seal Damage, Slabs	58			
GREGYD	E02A	PCC	7,808	77	Linear Cracking, Slabs	28			
GREGYD	E02B	PCC	11,254	84	Corner Spalling, Slabs	4			
GREGYD	E02B	PCC	11,254	84	Durability Cracking, Slabs	12			

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
GREGYD	E02B	PCC	11,254	84	Joint Seal Damage, Slabs	83			
GREGYD	E02B	PCC	11,254	84	Linear Cracking, Slabs	20			
GREGYD	E03A	PCC	8,720	91	Joint Seal Damage, Slabs	99			
GREGYD	E03A	PCC	8,720	91	Joint Spalling, Slabs	5			
GREGYD	E03A	PCC	8,720	91	Linear Cracking, Slabs	9			
GREGYD	E03B	PCC	9,925	94	Corner Spalling, Slabs		4		
GREGYD	E03B	PCC	9,925	94	Linear Cracking, Slabs	9			
GREGYD	E04	PCC	29,488	84	Corner Break, Slabs		4		
GREGYD	E04	PCC	29,488	84	Corner Spalling, Slabs		4		
GREGYD	E04	PCC	29,488	84	Joint Spalling, Slabs	4	4		
GREGYD	E04	PCC	29,488	84	Linear Cracking, Slabs	31	13		
GREGYD	UW10	AC	8,260	48	Alligator Cracking, Sqft	413	413		
GREGYD	UW10	AC	8,260	48	Longitudinal/Transverse Cracking, Ft	813			
GREGYD	UW10	AC	8,260	48	Weathering, Sqft		4,130		
GREGYD	UW11	AC	20,280	36	Alligator Cracking, Sqft	507	2,535		
GREGYD	UW11	AC	20,280	36	Block Cracking, Sqft	1,014	6,084		
GREGYD	UW11	AC	20,280	36	Depression, Sqft	183			
GREGYD	UW11	AC	20,280	36	Longitudinal/Transverse Cracking, Ft	1,115	243	81	
GREGYD	UW11	AC	20,280	36	Weathering, Sqft		20,280		
GREGYD	UW12A	APC	17,945	60	Joint Reflection Cracking, Ft	1,077	1,364		
GREGYD	UW12A	APC	17,945	60	Longitudinal/Transverse Cracking, Ft	614			
GREGYD	UW12A	APC	17,945	60	Raveling, Sqft			449	
GREGYD	UW12A	APC	17,945	60	Weathering, Sqft		17,496		
GREGYD	UW12B	PCC	7,966	66	Corner Spalling, Slabs		2		
GREGYD	UW12B	PCC	7,966	66	Divided Slab, Slabs		2		
GREGYD	UW12B	PCC	7,966	66	Joint Seal Damage, Slabs			35	
GREGYD	UW12B	PCC	7,966	66	Joint Spalling, Slabs	2	5	2	

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
GREGYD	UW12B	PCC	7,966	66	Large Patch/Utility Cut, Slabs			2	
GREGYD	UW12B	PCC	7,966	66	Linear Cracking, Slabs	11	5		
GREGYD	UW12C	PCC	12,400	67	Corner Spalling, Slabs		3		
GREGYD	UW12C	PCC	12,400	67	Faulting, Slabs	28	8	10	
GREGYD	UW12C	PCC	12,400	67	Joint Seal Damage, Slabs			103	
GREGYD	UW12C	PCC	12,400	67	Joint Spalling, Slabs		10		
GREGYD	UW12C	PCC	12,400	67	Large Patch/Utility Cut, Slabs		10		
GREGYD	UW12C	PCC	12,400	67	Linear Cracking, Slabs	5	3		
GREGYD	UW12D	PCC	20,501	68	Corner Spalling, Slabs		7	2	
GREGYD	UW12D	PCC	20,501	68	Divided Slab, Slabs		2		
GREGYD	UW12D	PCC	20,501	68	Durability Cracking, Slabs		5		
GREGYD	UW12D	PCC	20,501	68	Faulting, Slabs		7		
GREGYD	UW12D	PCC	20,501	68	Joint Seal Damage, Slabs			91	
GREGYD	UW12D	PCC	20,501	68	Joint Spalling, Slabs		14	5	
GREGYD	UW12D	PCC	20,501	68	Large Patch/Utility Cut, Slabs	9	5		
GREGYD	UW12D	PCC	20,501	68	Linear Cracking, Slabs	5	7	2	
GREGYD	UW12D	PCC	20,501	68	Scaling/Crazing, Slabs		9		
GREGYD	UW12D	PCC	20,501	68	Small Patch, Slabs		5		
GRGRYST	US05	AC	9,536	25	Alligator Cracking, Sqft		4,768		
GRGRYST	US05	AC	9,536	25	Block Cracking, Sqft		4,768		
GRGRYST	US05	AC	9,536	25	Patch/Utility Cut, Sqft	1,467			
GRGRYST	US05	AC	9,536	25	Weathering, Sqft		8,069		
GRIFFITHD	S18	ST	20,774	16	Alligator Cracking, Sqft	306	2,200	1,222	
GRIFFITHD	S18	ST	20,774	16	Bleeding, Sqft		10,082		
GRIFFITHD	S18	ST	20,774	16	Depression, Sqft		244	1,833	
GRIFFITHD	S18	ST	20,774	16	Edge Cracking, Ft	244	428	550	
GRIFFITHD	S18	ST	20,774	16	Longitudinal/Transverse Cracking, Ft	183			

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
GRIFFITHD	S18	ST	20,774	16	Pothole, Count		6		
GRIFFITHD	S18	ST	20,774	16	Rutting, Sqft		306	92	
GRIFFITHD	S18	ST	20,774	16	Weathering, Sqft		18,697		
GRIFFITHD	S20	ST	15,782	57	Alligator Cracking, Sqft		473	79	
GRIFFITHD	S20	ST	15,782	57	Edge Cracking, Ft	276	256		
GRIFFITHD	S22A	PCC	2,927	92	Joint Seal Damage, Slabs			214	
GRIFFITHD	S22B	PCC	4,850	87	Corner Spalling, Slabs		5		
GRIFFITHD	S22B	PCC	4,850	87	Joint Seal Damage, Slabs			48	
GRIFFITHD	S22B	PCC	4,850	87	Joint Spalling, Slabs	2	2		
GRIFFITHD	S22C	PCC	10,586	90	Corner Spalling, Slabs		2		
GRIFFITHD	S22C	PCC	10,586	90	Joint Seal Damage, Slabs			106	
GRIFFITHD	S22C	PCC	10,586	90	Joint Spalling, Slabs		2		
GRIFFITHD	S22C	PCC	10,586	90	Large Patch/Utility Cut, Slabs	4			
HAZELWDD	E00A	AC	8,051	62	Alligator Cracking, Sqft		201		
HAZELWDD	E00A	AC	8,051	62	Longitudinal/Transverse Cracking, Ft	604	84		
HAZELWDD	E00A	AC	8,051	62	Weathering, Sqft	7,648	403		
HAZELWDD	E00B	AC	6,105	63	Alligator Cracking, Sqft	611			
HAZELWDD	E00B	AC	6,105	63	Longitudinal/Transverse Cracking, Ft	560			
HAZELWDD	E00B	AC	6,105	63	Weathering, Sqft	6,105			
HAZELWDD	E00C	AC	26,023	35	Alligator Cracking, Sqft	1,735	3,036		
HAZELWDD	E00C	AC	26,023	35	Longitudinal/Transverse Cracking, Ft	1,054	932		
HAZELWDD	E00C	AC	26,023	35	Patch/Utility Cut, Sqft	694			
HAZELWDD	E00C	AC	26,023	35	Pothole, Count		4		
HAZELWDD	E00C	AC	26,023	35	Raveling, Sqft		2,602		
HAZELWDD	E00C	AC	26,023	35	Weathering, Sqft		22,727		
HAZELWDD	E01A	PCC	22,871	96	Linear Cracking, Slabs	11			
HAZELWDD	E01B	PCC	26,023	88	Corner Spalling, Slabs		8		

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
HAZELWDD	E01B	PCC	26,023	88	Divided Slab, Slabs	4			
HAZELWDD	E01B	PCC	26,023	88	Linear Cracking, Slabs	25	8		
HAZELWDD	E01C	PCC	13,218	86	Corner Break, Slabs	4			
HAZELWDD	E01C	PCC	13,218	86	Linear Cracking, Slabs	18			
HAZELWDD	UW04	AC	14,240	94	Longitudinal/Transverse Cracking, Ft	43			
HAZELWDD	UW04	AC	14,240	94	Weathering, Sqft	14,240			
HAZELWDD	UW05	AAC	13,714	71	Alligator Cracking, Sqft	535			
HAZELWDD	UW05	AAC	13,714	71	Longitudinal/Transverse Cracking, Ft	189			
HAZELWDD	UW05	AAC	13,714	71	Weathering, Sqft		13,714		
HAZELWDD	UW09	PCC	50,178	83	Durability Cracking, Slabs	26	22		
HAZELWDD	UW09	PCC	50,178	83	Joint Seal Damage, Slabs			251	
HAZELWDD	UW09	PCC	50,178	83	Linear Cracking, Slabs	4	9		
HAZELWDD	UW09	PCC	50,178	83	Scaling/Crazing, Slabs	43			
HAZELWDD	UW12A	ST	15,561	55	Pothole, Count	6			
HAZELWDD	UW12A	ST	15,561	55	Raveling, Sqft		15,561		
KIRKD	S20A	PCC	6,376	100					
KIRKD	S20B	AC	9,175	25	Alligator Cracking, Sqft		1,230		
KIRKD	S20B	AC	9,175	25	Block Cracking, Sqft		3,171		
KIRKD	S20B	AC	9,175	25	Depression, Sqft	75	50		
KIRKD	S20B	AC	9,175	25	Pothole, Count		2		
KIRKD	S20B	AC	9,175	25	Raveling, Sqft		250		
KIRKD	S20B	AC	9,175	25	Weathering, Sqft		4,651		
LNCLNAV	US17A	PCC	42,317	63	Durability Cracking, Slabs	12	24		
LNCLNAV	US17A	PCC	42,317	63	Joint Seal Damage, Slabs			160	
LNCLNAV	US17A	PCC	42,317	63	Large Patch/Utility Cut, Slabs	60	4		
LNCLNAV	US17A	PCC	42,317	63	Linear Cracking, Slabs	20	28		
LNCLNAV	US17A	PCC	42,317	63	Scaling/Crazing, Slabs		32		

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
LNCLNAV	US17B	APC	21,263	21	Alligator Cracking, Sqft		1,063		
LNCLNAV	US17B	APC	21,263	21	Block Cracking, Sqft	13,821	6,379		
LNCLNAV	US17B	APC	21,263	21	Joint Reflection Cracking, Ft			1,063	
LNCLNAV	US17B	APC	21,263	21	Raveling, Sqft			2,126	
LNCLNAV	US17B	APC	21,263	21	Weathering, Sqft		19,137		
LNCLNAV	US19	PCC	59,609	56	Durability Cracking, Slabs	4	34	11	
LNCLNAV	US19	PCC	59,609	56	Joint Seal Damage, Slabs			226	
LNCLNAV	US19	PCC	59,609	56	Joint Spalling, Slabs		8		
LNCLNAV	US19	PCC	59,609	56	Large Patch/Utility Cut, Slabs	41	8		
LNCLNAV	US19	PCC	59,609	56	Linear Cracking, Slabs	26	57	8	
LNCLNAV	US19	PCC	59,609	56	Popouts, Slabs				23
LNCLNAV	US19	PCC	59,609	56	Scaling/Crazing, Slabs		38		
LNCLNAV	US19	PCC	59,609	56	Small Patch, Slabs		11		
LNCLNAV	US21	PCC	64,756	95	Corner Break, Slabs	7			
LNCLNAV	US21	PCC	64,756	95	Corner Spalling, Slabs	20			
LNCLNAV	US21	PCC	64,756	95	Joint Seal Damage, Slabs	392			
LNCLNAV	US21	PCC	64,756	95	Joint Spalling, Slabs	20			
LNCLNAV	US23	PCC	68,872	93	Corner Spalling, Slabs	45	6		
LNCLNAV	US23	PCC	68,872	93	Joint Spalling, Slabs	32			
LNCLNAV	US23	PCC	68,872	93	Linear Cracking, Slabs	19	6		
LORADOTD	UW12	AC	11,695	47	Alligator Cracking, Sqft	585	501		
LORADOTD	UW12	AC	11,695	47	Longitudinal/Transverse Cracking, Ft	485	251		
LORADOTD	UW12	AC	11,695	47	Weathering, Sqft		11,695		
MAINS	UW11AN	APC	5,028	31	Alligator Cracking, Sqft		503		
MAINS	UW11AN	APC	5,028	31	Block Cracking, Sqft	4,525			
MAINS	UW11AN	APC	5,028	31	Raveling, Sqft			296	
MAINS	UW11AN	APC	5,028	31	Weathering, Sqft		4,732		

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
MAINS	UW11AS	APC	4,698	45	Joint Reflection Cracking, Ft		390		
MAINS	UW11AS	APC	4,698	45	Raveling, Sqft			470	
MAINS	UW11AS	APC	4,698	45	Weathering, Sqft		4,228		
MAINS	UW11B	APC	5,902	38	Joint Reflection Cracking, Ft		1,086		
MAINS	UW11B	APC	5,902	38	Longitudinal/Transverse Cracking, Ft	260			
MAINS	UW11B	APC	5,902	38	Raveling, Sqft			590	
MAINS	UW11B	APC	5,902	38	Weathering, Sqft		5,312		
MRYLNDDR	US14	PCC	12,395	94	Linear Cracking, Slabs	7			
MRYLNDDR	US15	PCC	11,534	92	Linear Cracking, Slabs	9			
OAKS	S10A	PCC	9,657	67	Divided Slab, Slabs		4		
OAKS	S10A	PCC	9,657	67	Joint Spalling, Slabs		4		
OAKS	S10A	PCC	9,657	67	Large Patch/Utility Cut, Slabs		4		
OAKS	S10A	PCC	9,657	67	Linear Cracking, Slabs	6	9		
OAKS	S10B	PCC	4,286	100					
OAKS	S10C	PCC	2,314	86	Corner Spalling, Slabs		8		
OAKS	S10C	PCC	2,314	86	Joint Seal Damage, Slabs			32	
OAKS	S10C	PCC	2,314	86	Joint Spalling, Slabs		2		
OAKS	S12	PCC	21,666	86	Corner Break, Slabs		5		
OAKS	S12	PCC	21,666	86	Corner Spalling, Slabs	5	11		
OAKS	S12	PCC	21,666	86	Joint Seal Damage, Slabs			229	
OAKS	S12	PCC	21,666	86	Joint Spalling, Slabs	5	33		
OAKS	S12	PCC	21,666	86	Linear Cracking, Slabs	5			
OAKS	S13	PCC	69,188	55	Durability Cracking, Slabs	51	246	25	
OAKS	S13	PCC	69,188	55	Joint Seal Damage, Slabs			509	
OAKS	S13	PCC	69,188	55	Large Patch/Utility Cut, Slabs	212	25		
OAKS	S13	PCC	69,188	55	Linear Cracking, Slabs	119			
OAKS	S13	PCC	69,188	55	Small Patch, Slabs		8		

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
OAKS	S16	PCC	52,682	68	Durability Cracking, Slabs	146	131	15	
OAKS	S16	PCC	52,682	68	Joint Seal Damage, Slabs			616	
OAKS	S16	PCC	52,682	68	Joint Spalling, Slabs		54		
OAKS	S16	PCC	52,682	68	Large Patch/Utility Cut, Slabs	8	8	8	
OAKS	S16	PCC	52,682	68	Linear Cracking, Slabs	15	15		
OAKS	S18A	AC	36,150	24	Alligator Cracking, Sqft	1,808	3,615	50	
OAKS	S18A	AC	36,150	24	Block Cracking, Sqft	8,435	16,870		
OAKS	S18A	AC	36,150	24	Patch/Utility Cut, Sqft	1,205			
OAKS	S18A	AC	36,150	24	Raveling, Sqft			1,808	
OAKS	S18A	AC	36,150	24	Weathering, Sqft		34,343		
OAKS	S18B	AAC	6,191	81	Longitudinal/Transverse Cracking, Ft	622			
OAKS	S18B	AAC	6,191	81	Weathering, Sqft	6,191			
OAKS	S20A	AC	24,690	73	Alligator Cracking, Sqft	267	99		
OAKS	S20A	AC	24,690	73	Longitudinal/Transverse Cracking, Ft	884			
OAKS	S20A	AC	24,690	73	Weathering, Sqft		24,690		
OAKS	S20B	AC	6,191	62	Alligator Cracking, Sqft		945		
OAKS	S20B	AC	6,191	62	Edge Cracking, Ft	47	95		
OAKS	S20B	AC	6,191	62	Longitudinal/Transverse Cracking, Ft	165	680		
OAKS	S20B	AC	6,191	62	Weathering, Sqft		23,628		
ORCHDST	US17A	PCC	17,603	100					
ORCHDST	US17B	PCC	72,884	100					
PEABYD	E01A	APC	28,443	31	Alligator Cracking, Sqft		305		
PEABYD	E01A	APC	28,443	31	Joint Reflection Cracking, Ft	1,371	2,438	178	
PEABYD	E01A	APC	28,443	31	Patch/Utility Cut, Sqft	4,063			
PEABYD	E01A	APC	28,443	31	Pothole, Count		10	5	
PEABYD	E01A	APC	28,443	31	Raveling, Sqft		10,158		
PEABYD	E01A	APC	28,443	31	Weathering, Sqft		14,222		

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
PEABYD	E01B	APC	12,156	61	Alligator Cracking, Sqft		304		
PEABYD	E01B	APC	12,156	61	Joint Reflection Cracking, Ft	1,020	438		
PEABYD	E01B	APC	12,156	61	Longitudinal/Transverse Cracking, Ft	141			
PEABYD	E01B	APC	12,156	61	Weathering, Sqft		12,156		
PEABYD	E03	APC	9,748	65	Alligator Cracking, Sqft	35	139		
PEABYD	E03	APC	9,748	65	Joint Reflection Cracking, Ft	749	122		
PEABYD	E03	APC	9,748	65	Weathering, Sqft		9,748		
PEABYD	E04A	PCC	17,661	92	Joint Seal Damage, Slabs			245	
PEABYD	E04B	PCC	12,184	87	Corner Spalling, Slabs		12		
PEABYD	E04B	PCC	12,184	87	Faulting, Slabs	32			
PEABYD	E04B	PCC	12,184	87	Joint Seal Damage, Slabs			160	
PEABYD	E06A	AC	6,256	3	Alligator Cracking, Sqft		3,128	13	
PEABYD	E06A	AC	6,256	3	Patch/Utility Cut, Sqft		125		
PEABYD	E06A	AC	6,256	3	Raveling, Sqft		1,877	3,128	
PEABYD	E06A	AC	6,256	3	Rutting, Sqft			188	
PEABYD	E06B	AC	8,946	45	Alligator Cracking, Sqft		429		
PEABYD	E06B	AC	8,946	45	Depression, Sqft			36	
PEABYD	E06B	AC	8,946	45	Raveling, Sqft			358	
PEABYD	E06B	AC	8,946	45	Weathering, Sqft		8,588		
PEABYD	UW11	PCC	24,142	86	Joint Seal Damage, Slabs			189	
PEABYD	UW11	PCC	24,142	86	Joint Spalling, Slabs	5	9		
PEABYD	UW11	PCC	24,142	86	Large Patch/Utility Cut, Slabs		5		
PEABYD	UW11	PCC	24,142	86	Linear Cracking, Slabs	14	5		
PEABYD	UW11	PCC	24,142	86	Small Patch, Slabs	5			
PENSYA	E04	PCC	35,639	100					
PENSYA	E06	PCC	16,903	100					
PENSYA	UW09A	AC	15,592	4	Alligator Cracking, Sqft	780	5,457		

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
PENSYA	UW09A	AC	15,592	4	Block Cracking, Sqft	9,355			
PENSYA	UW09A	AC	15,592	4	Pothole, Count	22	22	8	
PENSYA	UW09A	AC	15,592	4	Raveling, Sqft			3,898	
PENSYA	UW09A	AC	15,592	4	Swell, Sqft			97	
PENSYA	UW09A	AC	15,592	4	Weathering, Sqft		9,355	2,339	
PENSYA	UW09B	AC	16,447	17	Alligator Cracking, Sqft	1,645	1,645	230	
PENSYA	UW09B	AC	16,447	17	Block Cracking, Sqft	11,513			
PENSYA	UW09B	AC	16,447	17	Raveling, Sqft			1,234	
PENSYA	UW09B	AC	16,447	17	Weathering, Sqft		15,213		
PENSYA	UW11A	AC	10,351	11	Alligator Cracking, Sqft	1,035	1,035		
PENSYA	UW11A	AC	10,351	11	Block Cracking, Sqft		5,176		
PENSYA	UW11A	AC	10,351	11	Patch/Utility Cut, Sqft		2,070		
PENSYA	UW11A	AC	10,351	11	Pothole, Count		7		
PENSYA	UW11A	AC	10,351	11	Rutting, Sqft	370		74	
PENSYA	UW11B	AC	12,233	26	Alligator Cracking, Sqft	306	306		
PENSYA	UW11B	AC	12,233	26	Block Cracking, Sqft	5,505			
PENSYA	UW11B	AC	12,233	26	Longitudinal/Transverse Cracking, Ft		393		
PENSYA	UW11B	AC	12,233	26	Pothole, Count	7	7		
PENSYA	UW11B	AC	12,233	26	Raveling, Sqft		4,893	1,223	
PENSYA	UW11B	AC	12,233	26	Weathering, Sqft		6,117		
PENSYA	UW12A	AC	38,344	12	Alligator Cracking, Sqft	639	4,601	562	
PENSYA	UW12A	AC	38,344	12	Block Cracking, Sqft	6,071	12,206		
PENSYA	UW12A	AC	38,344	12	Patch/Utility Cut, Sqft	1,023			
PENSYA	UW12A	AC	38,344	12	Raveling, Sqft			6,135	
PENSYA	UW12A	AC	38,344	12	Rutting, Sqft	5,389			
PENSYA	UW12A	AC	38,344	12	Weathering, Sqft		25,563		
PENSYA	UW12B	AC	13,169	16	Alligator Cracking, Sqft	1,975	5,268		

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
PENSYA	UW12B	AC	13,169	16	Block Cracking, Sqft	1,646			
PENSYA	UW12B	AC	13,169	16	Longitudinal/Transverse Cracking, Ft		527		
PENSYA	UW12B	AC	13,169	16	Patch/Utility Cut, Sqft	395			
PENSYA	UW12B	AC	13,169	16	Pothole, Count	5			
PENSYA	UW12B	AC	13,169	16	Raveling, Sqft			658	
PENSYA	UW12B	AC	13,169	16	Rutting, Sqft		316		
PENSYA	UW12B	AC	13,169	16	Weathering, Sqft		12,115		
SIXTHS	S10	PCC	19,729	93	Linear Cracking, Slabs	3	3		
SIXTHS	S10	PCC	19,729	93	Scaling/Crazing, Slabs	11	3		
SIXTHS	S11	APC	18,364	32	Alligator Cracking, Sqft	459	1,836		
SIXTHS	S11	APC	18,364	32	Block Cracking, Sqft	6,427	8,264		
SIXTHS	S11	APC	18,364	32	Longitudinal/Transverse Cracking, Ft			73	
SIXTHS	S11	APC	18,364	32	Raveling, Sqft			918	
SIXTHS	S11	APC	18,364	32	Weathering, Sqft		17,446		
SIXTHS	S13	APC	24,321	34	Alligator Cracking, Sqft		851		
SIXTHS	S13	APC	24,321	34	Joint Reflection Cracking, Ft	2,213	1,440		
SIXTHS	S13	APC	24,321	34	Longitudinal/Transverse Cracking, Ft	287			
SIXTHS	S13	APC	24,321	34	Raveling, Sqft			608	
SIXTHS	S13	APC	24,321	34	Swell, Sqft		486	24	
SIXTHS	S13	APC	24,321	34	Weathering, Sqft		23,713		
SIXTHS	S14	APC	15,411	32	Alligator Cracking, Sqft		432		
SIXTHS	S14	APC	15,411	32	Block Cracking, Sqft	7,706			
SIXTHS	S14	APC	15,411	32	Joint Reflection Cracking, Ft		1,264	231	
SIXTHS	S14	APC	15,411	32	Raveling, Sqft			771	
SIXTHS	S14	APC	15,411	32	Weathering, Sqft		14,640		
STADMD	E00A	AC	4,126	25	Alligator Cracking, Sqft	206	413		
STADMD	E00A	AC	4,126	25	Block Cracking, Sqft	3,301			

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
STADMD	E00A	AC	4,126	25	Patch/Utility Cut, Sqft	206			
STADMD	E00A	AC	4,126	25	Raveling, Sqft			413	
STADMD	E00A	AC	4,126	25	Weathering, Sqft		3,507		
STADMD	E00B	PCC	5,213	92	Joint Seal Damage, Slabs	35			
STADMD	E00B	PCC	5,213	92	Linear Cracking, Slabs	4			
STADMD	E00C	PCC	5,744	79	Corner Break, Slabs		4		
STADMD	E00C	PCC	5,744	79	Joint Seal Damage, Slabs			40	
STADMD	E00C	PCC	5,744	79	Joint Spalling, Slabs	2	4		
STADMD	E00C	PCC	5,744	79	Shrinkage Cracking, Slabs				4
STADMD	E00D	PCC	11,265	90	Corner Spalling, Slabs		4		
STADMD	E00D	PCC	11,265	90	Joint Seal Damage, Slabs			148	
STADMD	E00D	PCC	11,265	90	Joint Spalling, Slabs	15			
STADMD	E00D	PCC	11,265	90	Shrinkage Cracking, Slabs				15
STADMD	E00D	PCC	11,265	90	Small Patch, Slabs	4			
STADMD	E00E	PCC	31,339	86	Corner Spalling, Slabs		5		
STADMD	E00E	PCC	31,339	86	Joint Seal Damage, Slabs			313	
STADMD	E00E	PCC	31,339	86	Joint Spalling, Slabs	21	26	5	
STADMD	E00E	PCC	31,339	86	Linear Cracking, Slabs	16			
STMARR	E00A	AC	10,278	5	Alligator Cracking, Sqft		8,222		
STMARR	E00A	AC	10,278	5	Block Cracking, Sqft		2,056		
STMARR	E00A	AC	10,278	5	Patch/Utility Cut, Sqft		514		
STMARR	E00A	AC	10,278	5	Raveling, Sqft		7,709	2,570	
STMARR	E00A	AC	10,278	5	Rutting, Sqft			62	
STMARR	E00B	PCC	13,162	52	Corner Break, Slabs		3		
STMARR	E00B	PCC	13,162	52	Corner Spalling, Slabs			3	
STMARR	E00B	PCC	13,162	52	Durability Cracking, Slabs		6	22	
STMARR	E00B	PCC	13,162	52	Joint Seal Damage, Slabs			125	

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
STMARR	E00B	PCC	13,162	52	Joint Spalling, Slabs		3	3	
STMARR	E00B	PCC	13,162	52	Large Patch/Utility Cut, Slabs	3	3	6	
STMARR	E00B	PCC	13,162	52	Linear Cracking, Slabs		16		
STMARR	E00B	PCC	13,162	52	Popouts, Slabs				44
STMARR	E00B	PCC	13,162	52	Small Patch, Slabs	3	6		
STMARR	E00C	APC	22,316	14	Alligator Cracking, Sqft		4,463		
STMARR	E00C	APC	22,316	14	Block Cracking, Sqft	17,853			
STMARR	E00C	APC	22,316	14	Joint Reflection Cracking, Ft		2,992	659	
STMARR	E00C	APC	22,316	14	Pothole, Count			5	
STMARR	E00C	APC	22,316	14	Weathering, Sqft		22,316		
STMARR	E00D	APC	36,464	19	Alligator Cracking, Sqft		2,652		
STMARR	E00D	APC	36,464	19	Block Cracking, Sqft	32,155			
STMARR	E00D	APC	36,464	19	Joint Reflection Cracking, Ft		1,160	414	
STMARR	E00D	APC	36,464	19	Patch/Utility Cut, Sqft	1,409		249	
STMARR	E00D	APC	36,464	19	Pothole, Count		33	17	
STMARR	E00D	APC	36,464	19	Weathering, Sqft		36,464		
STMARR	E01	APC	62,095	36	Alligator Cracking, Sqft	470	753		
STMARR	E01	APC	62,095	36	Block Cracking, Sqft		9,973		
STMARR	E01	APC	62,095	36	Joint Reflection Cracking, Ft	2,023	3,481	1,882	
STMARR	E01	APC	62,095	36	Longitudinal/Transverse Cracking, Ft	1,929			
STMARR	E01	APC	62,095	36	Patch/Utility Cut, Sqft	565			
STMARR	E01	APC	62,095	36	Raveling, Sqft			941	
STMARR	E01	APC	62,095	36	Weathering, Sqft		60,402		
STMARR	E04A	AC	25,164	74	Edge Cracking, Ft	430	199		
STMARR	E04A	AC	25,164	74	Longitudinal/Transverse Cracking, Ft	2,715			
STMARR	E04A	AC	25,164	74	Weathering, Sqft		25,164		
STMARR	E04B	AC	10,519	68	Longitudinal/Transverse Cracking, Ft	1,033	383		

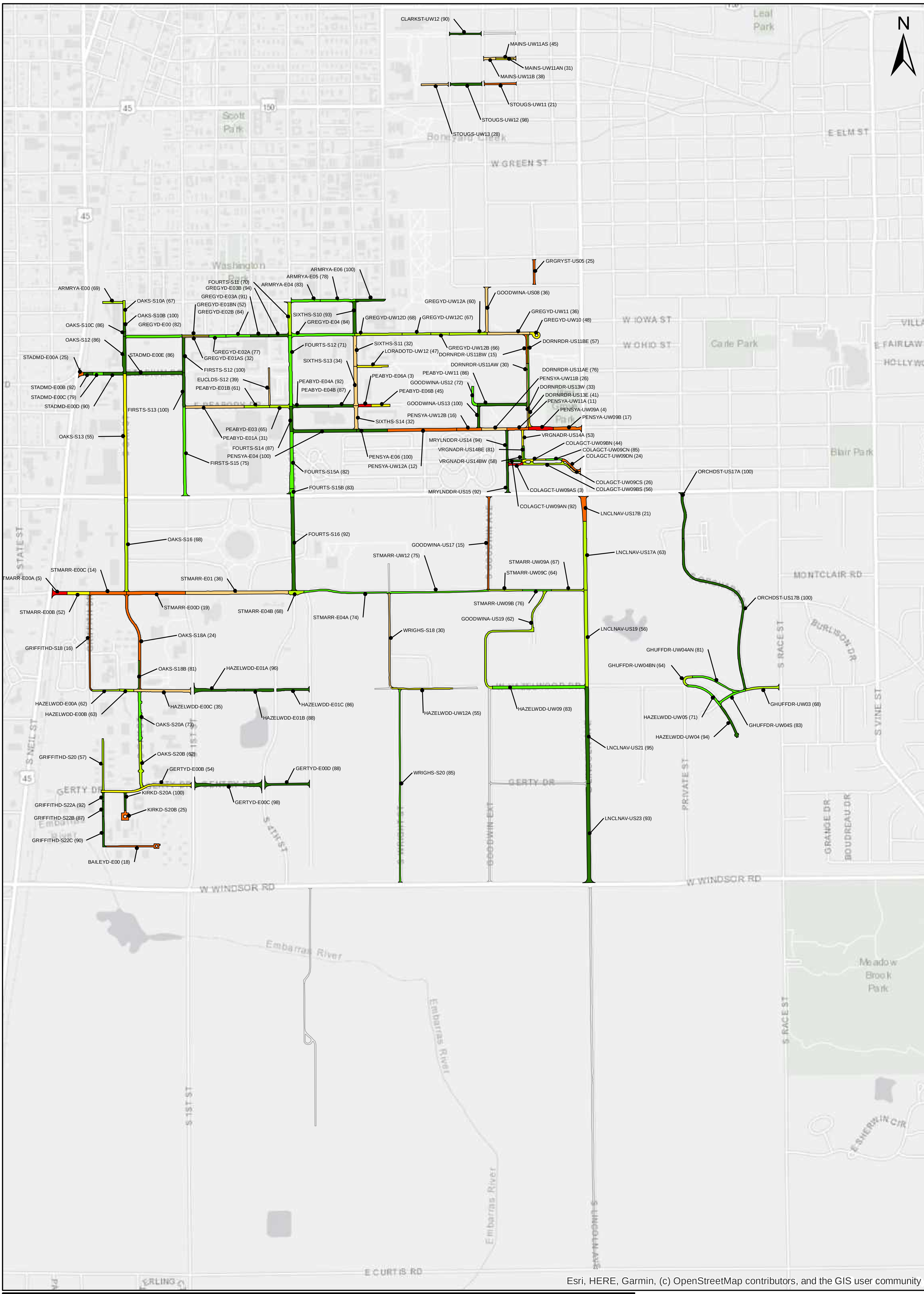
Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
STMARR	E04B	AC	10,519	68	Weathering, Sqft		10,519		
STMARR	UW09A	AC	9,133	67	Alligator Cracking, Sqft	411			
STMARR	UW09A	AC	9,133	67	Longitudinal/Transverse Cracking, Ft	616			
STMARR	UW09A	AC	9,133	67	Weathering, Sqft		9,133		
STMARR	UW09B	AC	7,842	76	Longitudinal/Transverse Cracking, Ft	843			
STMARR	UW09B	AC	7,842	76	Weathering, Sqft		7,842		
STMARR	UW09C	AC	9,520	64	Alligator Cracking, Sqft	476			
STMARR	UW09C	AC	9,520	64	Longitudinal/Transverse Cracking, Ft	785			
STMARR	UW09C	AC	9,520	64	Patch/Utility Cut, Sqft	381			
STMARR	UW09C	AC	9,520	64	Weathering, Sqft		9,139		
STMARR	UW12	AC	27,515	75	Alligator Cracking, Sqft	362			
STMARR	UW12	AC	27,515	75	Edge Cracking, Ft	1,231	362		
STMARR	UW12	AC	27,515	75	Longitudinal/Transverse Cracking, Ft	1,738			
STMARR	UW12	AC	27,515	75	Weathering, Sqft		13,758		
STOUGS	UW11	APC	10,213	21	Alligator Cracking, Sqft		9,192		
STOUGS	UW11	APC	10,213	21	Block Cracking, Sqft	1,021			
STOUGS	UW11	APC	10,213	21	Weathering, Sqft		10,213		
STOUGS	UW12	PCC	13,576	98	Joint Seal Damage, Slabs	126			
STOUGS	UW13	AC	8,943	28	Alligator Cracking, Sqft		447	16	
STOUGS	UW13	AC	8,943	28	Block Cracking, Sqft		8,049		
STOUGS	UW13	AC	8,943	28	Longitudinal/Transverse Cracking, Ft			244	
STOUGS	UW13	AC	8,943	28	Weathering, Sqft		8,943		
VRGNADR	US14A	APC	6,014	53	Joint Reflection Cracking, Ft		702		
VRGNADR	US14A	APC	6,014	53	Longitudinal/Transverse Cracking, Ft	413	251		
VRGNADR	US14A	APC	6,014	53	Weathering, Sqft		6,014		
VRGNADR	US14BE	PCC	3,394	81	Corner Spalling, Slabs	3			
VRGNADR	US14BE	PCC	3,394	81	Divided Slab, Slabs		3		

Table C1. 2020 PCI and Extrapolated Distresses.

Branch ID	Section ID	Surface	Section Area, SqFt	2020 PCI	Distress Description	Low	Medium	High	No Severity
VRGNADR	US14BE	PCC	3,394	81	Joint Seal Damage, Slabs			53	
VRGNADR	US14BE	PCC	3,394	81	Joint Spalling, Slabs	8	8		
VRGNADR	US14BW	APC	3,215	58	Joint Reflection Cracking, Ft		502		
VRGNADR	US14BW	APC	3,215	58	Longitudinal/Transverse Cracking, Ft	72			
VRGNADR	US14BW	APC	3,215	58	Weathering, Sqft		3,215		
WRIGHS	S18	ST	25,168	30	Alligator Cracking, Sqft		11,046		
WRIGHS	S18	ST	25,168	30	Longitudinal/Transverse Cracking, Ft	350			
WRIGHS	S18	ST	25,168	30	Pothole, Count		7		
WRIGHS	S18	ST	25,168	30	Weathering, Sqft		25,168		
WRIGHS	S20	ST	45,333	85	Weathering, Sqft		45,333		

APPENDIX D – PCI MAPS



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LOCATION: University of Illinois Urbana-Champaign, Illinois		
PAGE TITLE: 2020 Network PCI Map		

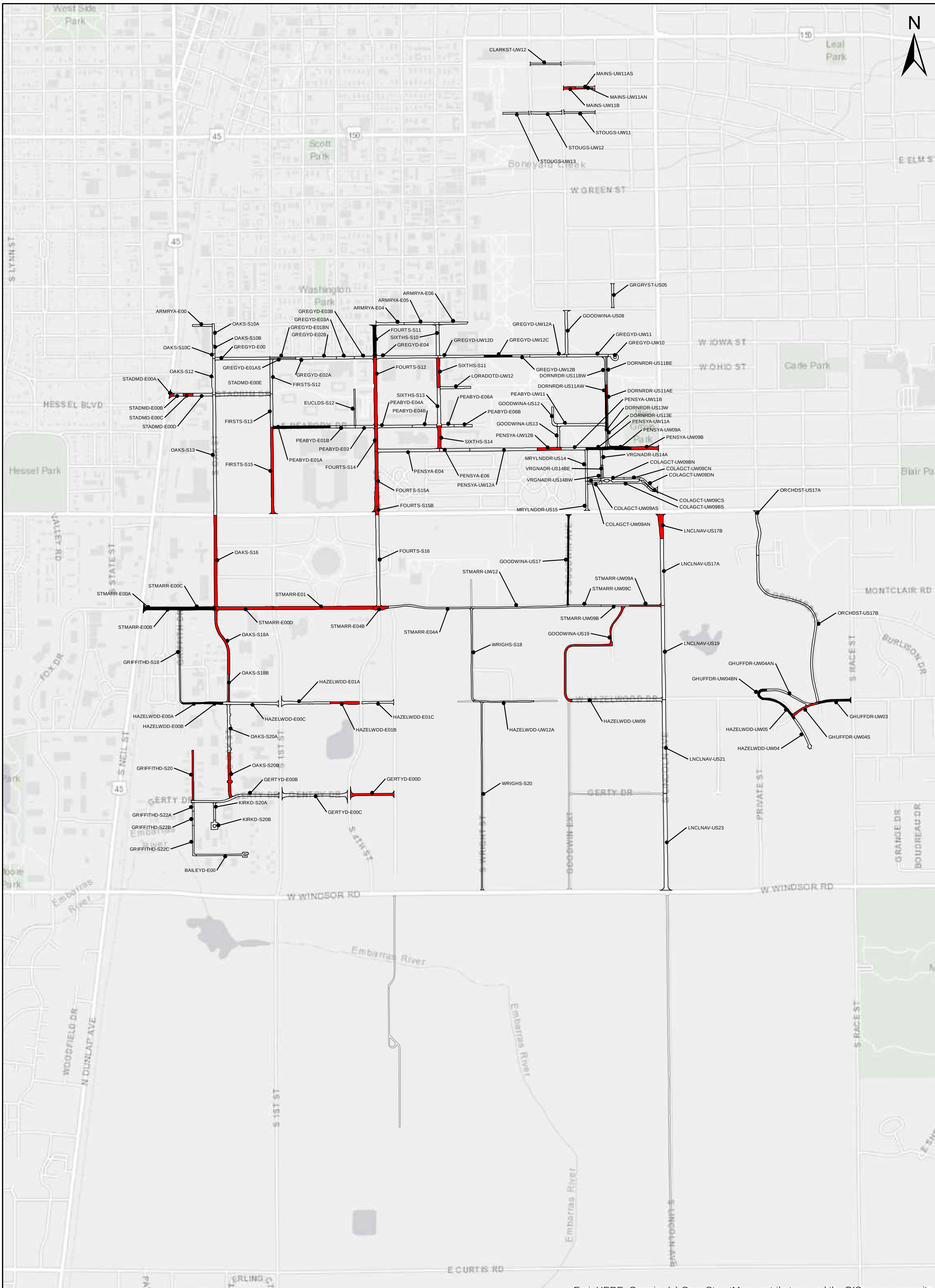
PROJECT DATE:	CREATION DATE:	PROJECT MANAGER:	JOB NUMBER:
MAY. 2020	MAY. 2020	MG	2020-001-RM01
DRAWING SCALE: NTS	LAST MODIFIED DATE: JUNE. 2020	REVISED BY: NFC	DRAWN BY: NFC
FILENAME: University Of Illinois		LAYOUT NAME/NUMBER: PCI	FIGURE: C-1

OAKS-S10A (77)
- BRANCH IDENTIFIER
- SECTION INDENTIFIER
- PCI/CONDITION

SECTION BREAK LINE

Pavement Condition Index
PCI

- 86-100
- 71-85
- 56-70
- 41-55
- 26-40
- 11-25
- 0-10
- Brick and Gravel



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PAGE TITLE:
2020 High Deterioration Map

PROJECT DATE: MAY. 2020	CREATION DATE: MAY. 2020	PROJECT MANAGER: MG	JOB NUMBER: 2020-001-RM01
DRAWING SCALE: NTS	LAST MODIFIED DATE: JUNE. 2020	REVISED BY: NFC	DRAWN BY: NFC
FILENAME: University Of Illinois		LAYOUT NAME/NUMBER: DET	FIGURE: D-1

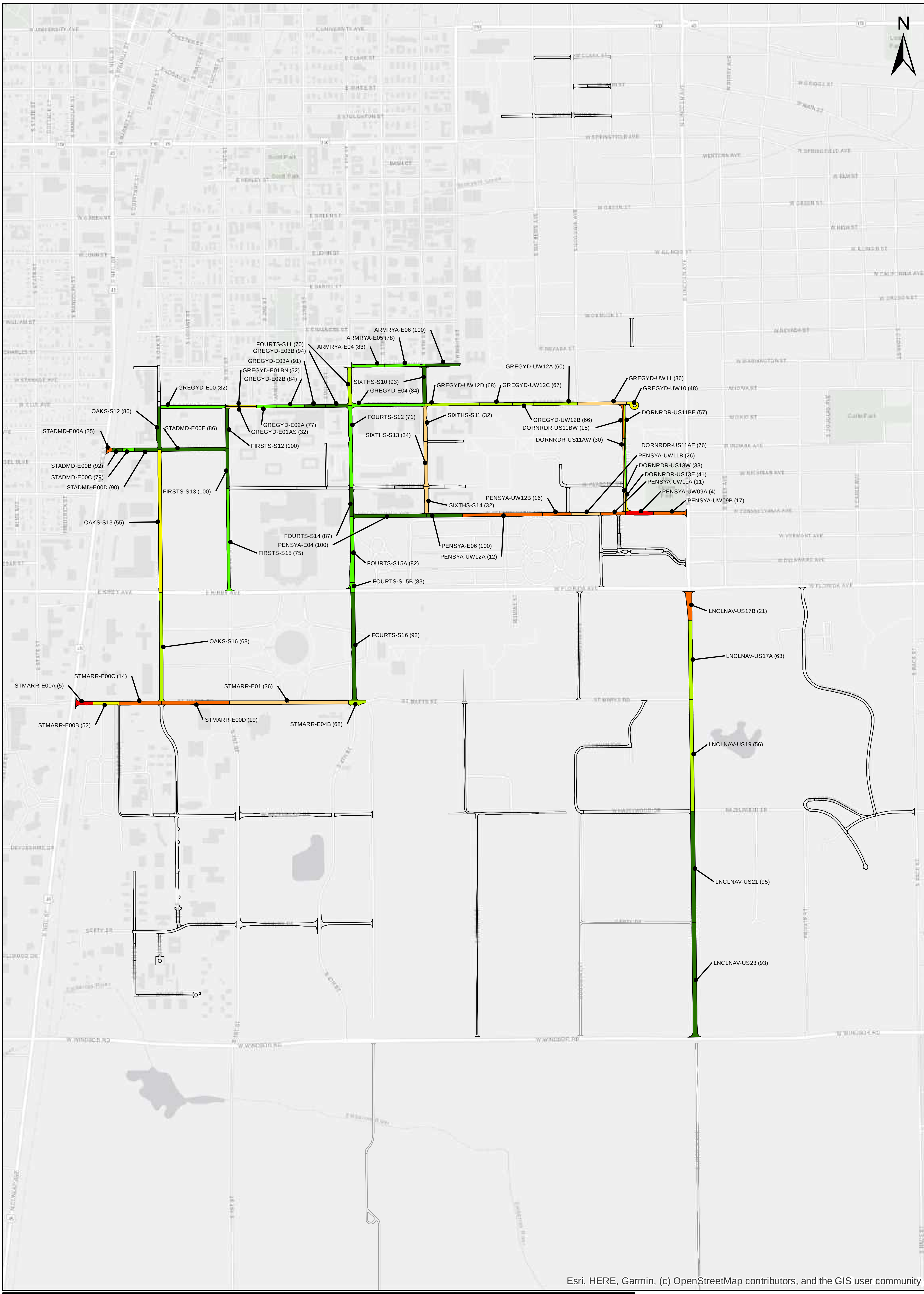
BRANCH IDENTIFIER
SECTION INDENTIFIER
OAKS-S10A

SECTION BREAK LINE

Deterioration Rate

Drop in PCI/year

- > -6.0
- -3.0 to -6.0
- < -3.0
- Brick and Gravel



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AGENCY: University of Illinois - Facility & Services			
LOCATION: University of Illinois Urbana-Champaign, Illinois			
PAGE TITLE: 2020 Core Roads PCI Map			
PROJECT DATE: MAY. 2020	CREATION DATE: MAY. 2020	PROJECT MANAGER: MG	JOB NUMBER: 2020-001-RM01
DRAWING SCALE: NTS	LAST MODIFIED DATE: JUNE. 2020	REVISED BY: NFC	DRAWN BY: NFC
FILENAME: University Of Illinois	LAYOUT NAME/NUMBER: PCI	FIGURE: C-1	

OAKS-S10A (77)
BRANCH IDENTIFIER
SECTION INDENTIFIER
PCI/CONDITION

SECTION BREAK LINE

Pavement Condition Index
PCI

- 86-100
- 71-85
- 56-70
- 41-55
- 26-40
- 11-25
- 0-10
- Brick and Gravel
- Collector and Locals

APPENDIX E – HISTORICAL AND PREDICTED PCI

The table in appendix E provides PCI values for each section defined in the Univeristy's road network (excluding gravel and brick sections). The PCI values for 2016 (previous inspection) and 2020 are based on conditions measured during the respective pavement inspections. The PCI deterioration rate (drop in PCI points/year) is reported based on the drop in PCI between inspections, divided by seven (number of years between inspections). Sections with a deterioration rate greater than 3 PCI points per year are shaded red to identify sections that have deteriorated faster than normal. The reported PCIs for 2021 to 2025 are predicted PCI values assuming no major M&R occurs within this time period. The PCI values for all of years reported in this table are shaded according to the following PCI scale:

0-10	FAILED
11-25	SERIOUS
26-40	VERY POOR
41-55	POOR
56-70	FAIR
71-85	SATISFACTORY
86-100	GOOD

Table E1. Historical and Predicted PCI.

Branch ID	Section ID	Surface	LCD[1]	Area (Ft²)	Bus Rt (Yes/No)	Inspected PCI		Drop in PCI/year since 2016	Predicted PCI (assuming no major M&R)				
						2016	2020		2021	2022	2023	2024	2025
ARMRYA	E00	PCC	2003	7,475	N	77	69	-2.0	68	67	66	64	63
ARMRYA	E04	PCC	2008	13,078	Y	85	83	-0.5	81	80	78	77	75
ARMRYA	E05	PCC	2008	15,537	Y	80	78	-0.5	76	75	73	72	70
ARMRYA	E06	PCC	2019	12,151	Y	(rehab since 2016)	100	N/A	98	97	95	94	92
BAILEYD	E00	AC	1988	16,349	N	13	18	+	15	12	9	6	3
CLARKST	UW12	PCC	2005	9,588	N	90	90	0.0	89	88	87	85	84
COLAGCT	UW09AN	PCC	2013	5,349	Y	94	92	-0.5	90	89	87	86	84
COLAGCT	UW09AS	AC	1995	5,334	Y	5	3	-0.5	0	0	0	0	0
COLAGCT	UW09BN	AC	2001	8,559	Y	50	44	-1.5	41	38	35	32	29
COLAGCT	UW09BS	AC	1996	16,917	Y	32	56	+	53	50	47	44	41
COLAGCT	UW09CN	PCC	2010	5,016	Y	86	85	-0.3	83	82	80	79	77
COLAGCT	UW09CS	AC	2008	3,790	Y	33	26	-1.8	23	20	17	14	11
COLAGCT	UW09DN	AC	2008	7,553	Y	29	24	-1.3	21	18	15	12	9
DORNRDR	US11AE	APC	2013	10,351	Y	88	76	-3.0	73	70	67	64	61
DORNRDR	US11AW	APC	1998	11,129	Y	54	30	-6.0	27	24	21	18	15
DORNRDR	US11BE	APC	1998	6,952	Y	68	57	-2.8	54	51	48	45	42
DORNRDR	US11BW	AC	1987	7,959	Y	2	15	+	12	9	6	3	0
DORNRDR	US13E	AC	1995	5,257	Y	41	41	0.0	38	35	32	29	26
DORNRDR	US13W	APC	2006	5,383	Y	36	33	-0.8	30	27	24	21	18
EUCLDS	S12	AC	1994	9,556	N	46	39	-1.8	36	33	30	27	24
FIRSTS	S12	PCC	2016	17,206	Y	100	100	0.0	98	97	95	94	92
FIRSTS	S13	PCC	2016	16,322	Y	100	100	0.0	98	97	95	94	92
FIRSTS	S15	APC	2013	43,947	Y	97	75	-5.5	72	69	66	63	60
FOURTS	S11	AAC	2014	20,487	Y	97	70	-6.8	67	64	61	58	55
FOURTS	S12	APC	2014	42,040	Y	92	71	-5.3	68	65	62	59	56
FOURTS	S14	APC	2014	15,147	Y	99	87	-3.0	84	81	78	75	72
FOURTS	S15A	APC	2014	37,121	Y	99	82	-4.3	79	76	73	70	67
FOURTS	S15B	PCC	2014	3,975	Y	96	83	-3.3	81	80	78	77	75
FOURTS	S16	PCC	2016	56,430	Y	100	92	-2.0	90	89	87	86	84
GERTYD	E00B	PCC	1980	34,863	Y	56	54	-0.5	52	51	49	48	46
GERTYD	E00C	PCC	2014	34,007	N	100	98	-0.5	97	96	95	93	92
GERTYD	E00D	PCC	2014	19,765	N	100	88	-3.0	87	86	85	83	82
GHUFFDR	UW03	AAC	2014	13,420	Y	100	68	-8.0	65	62	59	56	53
GHUFFDR	UW04AN	AAC	2014	15,998	N	89	81	-2.0	78	75	72	69	66
GHUFFDR	UW04BN	AAC	2014	6,587	N	89	64	-6.3	61	58	55	52	49
GHUFFDR	UW04S	AAC	2014	11,091	N	96	83	-3.3	80	77	74	71	68
GOODWINA	US08	APC	2010	22,477	Y	34	36	+	33	30	27	24	21
GOODWINA	US12	AC	2006	8,647	N	68	72	+	69	66	63	60	57
GOODWINA	US13	AAC	2019	9,830	N	(rehab since 2016)	100	N/A	97	94	91	88	85
GOODWINA	US17	ST	2002	23,755	N	55	15	-10.0	12	9	7	4	1

Table E1. Historical and Predicted PCI.

Branch ID	Section ID	Surface	LCD[1]	Area (Ft²)	Bus Rt (Yes/No)	Inspected PCI		Drop in PCI/year since 2016	Predicted PCI (assuming no major M&R)				
						2016	2020		2021	2022	2023	2024	2025
GOODWINA	US19	AC	2015	49,021	N	82	62	-5.0	59	56	53	50	47
GREGYD	E00	PCC	2014	26,195	N	86	82	-1.0	81	80	79	77	76
GREGYD	E01AS	APC	1989	6,121	Y	33	32	-0.3	29	26	23	20	17
GREGYD	E01BN	PCC	2009	5,968	Y	59	52	-1.8	50	49	47	46	44
GREGYD	E02A	PCC	2010	7,808	Y	77	77	0.0	75	74	72	71	69
GREGYD	E02B	PCC	2010	11,254	Y	84	84	0.0	82	81	79	78	76
GREGYD	E03A	PCC	2010	8,720	Y	92	91	-0.3	89	88	86	85	83
GREGYD	E03B	PCC	2010	9,925	Y	98	94	-1.0	92	91	89	88	86
GREGYD	E04	PCC	2013	29,488	Y	88	84	-1.0	82	81	79	78	76
GREGYD	UW10	AC	1984	8,260	Y	40	48	+	45	42	39	36	33
GREGYD	UW11	AC	2002	20,280	Y	39	36	-0.8	33	30	27	24	21
GREGYD	UW12A	APC	1999	17,945	Y	47	60	+	57	54	51	48	45
GREGYD	UW12B	PCC	2005	7,966	Y	72	66	-1.5	64	63	61	60	58
GREGYD	UW12C	PCC	2007	12,400	Y	91	67	-6.0	65	64	62	61	59
GREGYD	UW12D	PCC	2002	20,501	Y	68	68	0.0	66	65	63	62	60
GRGRYST	US05	AC	1983	9,536	N	26	25	-0.3	22	19	16	13	10
GRIFFITHD	S18	ST	1984	20,774	N	17	16	-0.3	13	10	8	5	2
GRIFFITHD	S20	ST	1998	15,782	N	69	57	-3.0	54	51	49	46	43
GRIFFITHD	S22A	PCC	2018	2,927	N	(rehab since 2016)	92	N/A	91	90	89	87	86
GRIFFITHD	S22B	PCC	2007	4,850	N	92	87	-1.3	86	85	84	82	81
GRIFFITHD	S22C	PCC	2007	10,586	N	90	90	0.0	89	88	87	85	84
HAZELWDD	E00A	AC	2015	8,051	N	100	62	-9.5	59	56	53	50	47
HAZELWDD	E00B	AC	2015	6,105	N	100	63	-9.3	60	57	54	51	48
HAZELWDD	E00C	AC	1994	26,023	N	41	35	-1.5	32	29	26	23	20
HAZELWDD	E01A	PCC	2014	22,871	N	100	96	-1.0	95	94	93	91	90
HAZELWDD	E01B	PCC	2014	26,023	N	100	88	-3.0	87	86	85	83	82
HAZELWDD	E01C	PCC	2014	13,218	N	90	86	-1.0	85	84	83	81	80
HAZELWDD	UW04	AAC	2017	14,240	N	(rehab since 2016)	94	N/A	91	88	85	82	79
HAZELWDD	UW05	AAC	2014	13,714	N	98	71	-6.8	68	65	62	59	56
HAZELWDD	UW09	PCC	1998	50,178	N	83	83	0.0	82	81	80	78	77
HAZELWDD	UW12A	ST	1999	15,561	N	32	55	+	52	49	47	44	41
KIRKD	S20A	PCC	2019	6,376	Y	(rehab since 2016)	100	N/A	98	97	95	94	92
KIRKD	S20B	AC	1980	9,175	Y	(defined new section)	25	N/A	22	19	16	13	10
LNCLNAV	US17A	PCC	2000	42,317	Y	64	63	-0.3	61	60	58	57	55
LNCLNAV	US17B	APC	2005	21,263	Y	38	21	-4.3	18	15	12	9	6
LNCLNAV	US19	PCC	1996	59,609	Y	56	56	0.0	54	53	51	50	48
LNCLNAV	US21	PCC	2008	64,756	N	95	95	0.0	94	93	92	90	89
LNCLNAV	US23	PCC	2008	68,872	N	94	93	-0.3	92	91	90	88	87
LORADOTD	UW12	AC	2004	11,695	N	55	47	-2.0	44	41	38	35	32

Table E1. Historical and Predicted PCI.

Branch ID	Section ID	Surface	LCD[1]	Area (Ft²)	Bus Rt (Yes/No)	Inspected PCI		Drop in PCI/year since 2016	Predicted PCI (assuming no major M&R)				
						2016	2020		2021	2022	2023	2024	2025
MAINS	UW11AN	APC	1991	5,028	N	19	31	+	28	25	22	19	16
MAINS	UW11AS	APC	1990	4,698	N	57	45	-3.0	42	39	36	33	30
MAINS	UW11B	APC	1999	5,902	N	59	38	-5.3	35	32	29	26	23
MRYLNDDR	US14	PCC	2010	12,395	Y	92	94	+	92	91	89	88	86
MRYLNDDR	US15	PCC	2010	11,534	N	92	92	0.0	91	90	89	87	86
OAKS	S10A	PCC	2007	9,657	N	68	67	-0.3	66	65	64	62	61
OAKS	S10B	PCC	2014	4,286	N	100	100	0.0	99	98	97	95	94
OAKS	S10C	PCC	2007	2,314	N	86	86	0.0	85	84	83	81	80
OAKS	S12	PCC	2007	21,666	N	87	86	-0.3	85	84	83	81	80
OAKS	S13	PCC	1985	69,188	N	57	55	-0.5	54	53	52	50	49
OAKS	S16	PCC	2006	52,682	Y	80	68	-3.0	66	65	63	62	60
OAKS	S18	AC	2004	36,150	Y	37	24	-3.3	21	18	15	12	9
OAKS	S18	AC	2004	6,191	Y	(defined new section)	81	N/A	78	75	72	69	66
OAKS	S20A	AC	2004	24,690	Y	83	73	-2.5	70	67	64	61	58
OAKS	S20B	AC	2004	6,191	Y	77	62	-3.8	59	56	53	50	47
ORCHDST	US17A	PCC	2017	17,603	Y	(rehab since 2016)	100	N/A	98	97	95	94	92
ORCHDST	US17B	PCC	2017	72,884	Y	(rehab since 2016)	100	N/A	98	97	95	94	92
PEABYD	E01A	APC	2005	28,443	Y	57	31	-6.5	28	25	22	19	16
PEABYD	E01B	APC	2006	12,156	Y	64	61	-0.8	58	55	52	49	46
PEABYD	E03	APC	2004	9,748	Y	65	65	0.0	62	59	56	53	50
PEABYD	E04A	PCC	2007	17,661	Y	92	92	0.0	90	89	87	86	84
PEABYD	E04B	PCC	2007	12,184	Y	87	87	0.0	85	84	82	81	79
PEABYD	E06A	AC	1989	6,256	Y	5	3	-0.5	0	0	0	0	0
PEABYD	E06B	AC	1994	8,946	Y	44	45	+	42	39	36	33	30
PEABYD	UW11	PCC	2007	24,142	N	89	86	-0.8	85	84	83	81	80
PENSYA	E04	PCC	2018	35,639	Y	(rehab since 2016)	100	N/A	98	97	95	94	92
PENSYA	E06	PCC	2018	16,903	Y	(rehab since 2016)	100	N/A	98	97	95	94	92
PENSYA	UW09A	AC	1991	15,592	Y	28	4	-6.0	1	0	0	0	0
PENSYA	UW09B	AC	2003	16,447	Y	32	17	-3.8	14	11	8	5	2
PENSYA	UW11A	AC	2006	10,351	Y	37	11	-6.5	8	5	2	0	0
PENSYA	UW11B	AC	2008	12,233	Y	27	26	-0.3	23	20	17	14	11
PENSYA	UW12A	AC	1995	38,344	Y	21	12	-2.3	9	6	3	0	0
PENSYA	UW12B	AC	1988	13,169	Y	32	16	-4.0	13	10	7	4	1
SIXTHS	S10	PCC	2014	19,729	Y	98	93	-1.3	91	90	88	87	85
SIXTHS	S11	APC	1999	18,364	Y	50	32	-4.5	29	26	23	20	17
SIXTHS	S13	APC	1999	24,321	Y	43	34	-2.3	31	28	25	22	19
SIXTHS	S14	APC	1999	15,411	Y	50	32	-4.5	29	26	23	20	17
STADMD	E00A	AC	1995	4,126	Y	47	25	-5.5	22	19	16	13	10

Table E1. Historical and Predicted PCI.

Branch ID	Section ID	Surface	LCD[1]	Area (Ft²)	Bus Rt (Yes/No)	Inspected PCI		Drop in PCI/year since 2016	Predicted PCI (assuming no major M&R)				
						2016	2020		2021	2022	2023	2024	2025
STADMD	E00B	PCC	2014	5,213	Y	98	92	-1.5	90	89	87	86	84
STADMD	E00C	PCC	2005	5,744	Y	92	79	-3.3	77	76	74	73	71
STADMD	E00D	PCC	2007	11,265	Y	91	90	-0.3	88	87	85	84	82
STADMD	E00E	PCC	2007	31,339	Y	90	86	-1.0	84	83	81	80	78
STMARR	E00A	AC	1998	10,278	Y	38	5	-8.3	2	0	0	0	0
STMARR	E00B	PCC	2004	13,162	Y	77	52	-6.3	50	49	47	46	44
STMARR	E00C	APC	1990	22,316	Y	51	14	-9.3	11	8	5	2	0
STMARR	E00D	APC	1992	36,464	Y	40	19	-5.3	16	13	10	7	4
STMARR	E01	APC	2001	62,095	Y	57	36	-5.3	33	30	27	24	21
STMARR	E04A	AC	2013	25,164	N	84	74	-2.5	71	68	65	62	59
STMARR	E04B	AC	2013	10,519	N	83	68	-3.8	65	62	59	56	53
STMARR	UW09A	AC	2013	9,133	N	81	67	-3.5	64	61	58	55	52
STMARR	UW09B	AC	2013	7,842	N	84	76	-2.0	73	70	67	64	61
STMARR	UW09C	AC	2013	9,520	N	75	64	-2.8	61	58	55	52	49
STMARR	UW12	AC	2013	27,515	N	86	75	-2.8	72	69	66	63	60
STOUGS	UW11	APC	1981	10,213	N	26	21	-1.3	18	15	12	9	6
STOUGS	UW12	PCC	2006	13,576	N	98	98	0.0	97	96	95	93	92
STOUGS	UW13	AC	1993	8,943	N	28	28	0.0	25	22	19	16	13
VRGNADR	US14A	APC	1997	6,014	Y	62	53	-2.3	50	47	44	41	38
VRGNADR	US14BE	PCC	2003	3,394	Y	90	81	-2.3	79	78	76	75	73
VRGNADR	US14BW	APC	1988	3,215	Y	67	58	-2.3	55	52	49	46	43
WRIGHS	S18	ST	1989	25,168	N	30	30	0.0	27	24	22	19	16
WRIGHS	S20	ST	1991	45,333	N	23	85	+	82	79	77	74	71

(1) LCD = last construction date (either original construction or asphalt overlay),

(+) PCI has increased between the inspections in 2009 and 2016. Maintenance activities, changes in section limits, difference in inspected sample unit locations, or different interpretations of distress conditions usually explain most increases in PCI between inspections.