Burlington, IL

Pavement Management Analysis Report

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Village of Burlington, IL
Attn.: John Whitehouse, Engineer and Zoning Enforcement
175 Water Street
Burlington, IL 60109
In Association with:
Chicago Metropolitan Agency for Planning

IMS Infrastructure Management Services
8380 South Kyrene Road, Tempe, AZ 85284 Phone:
(480) 839-4347, Fax: (480) 839-4348
www.imsanalysis.com

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Abbreviation or Acronym	Definition
$k	Dollars in thousands ($,000)
$M	Dollars in millions
%SP	Percent Spreadability - component of deflection analysis
AC	Asphalt Concrete - asphalt streets, flexible pavements, also know n as ACP
ACP	Asphalt Concrete Pavement - asphalt streets, flexible pavements, also know n as AC
ART	Arterial roadw ay functional classification
ASTM	American Society of Testing Methods
Avg	Average
BCI	Base Curvature Index - component of deflection analysis
Brk	Break
CAL	Coarse Aggregate Loss
CDV	Corrected Deduct Value - part of the ASTM D6433 PCI calculation
COL	Collector roadw ay functional classification
Crk	Crack
DeflCON	Deflection Condition - structural load analysis based on traffic loading and deflection
DMD	Dynamic Maximum Deflection - temperature corrected deflection
Dvdd Slab	Divided Slab
DynaCON	Dynamic Condition - structural layer analysis
ft or FT	Foot
ft2 or FT2	Square foot
FunCL	Functional Classification
FWD	Falling w eight deflectometer
GCI	Gravel Condition Index
GFP	Good - Fair - Poor
GIS	Geographic Information System
GISID	GIS segment identification number
H&V	Horizontal and Vertical
IRI	International Roughness Index
Jt	Joint
L&T	Longitudinal and Transverse
LAD	Load associated distress
LOC	Local roadw ay functional classification - same as RES
LOG	Lip of Gutter
m	Metre or meter
M	Moderate
m2	square metre or square meter
MART	Major arterial roadw ay functional classification
Max	Maximum
MaxDV	Maximum Deduct Value
MCOL	Major collector roadw ay functional classification
mi or Mi	Mile
Min	Minimum
MnART	Minor arterial roadw ay functional classification
MnCOL	Minor collector roadw ay functional classification
MOD	Moderate
NLAD	Non-load associated distress
OCI	Overall condition index, also know n as PCI
Olay	Overlay
PART	Primary arterial roadw ay functional classification
Pavetype	Pavement Type
PCC	Portland Cement Concrete - concrete streets
PCI	Pavement Condition Index - generic term for OCI
R&R	Remove and replace
RART	Rural arterial roadw ay functional classification
PWF	Priority Weighting Factor
Recon	Reconstruction
Rehab	Rehabilitation
RES	Local roadw ay functional classification - same as LOC
RI or RCI	Roughness Index
S	Strong
SART	Secondary arterial roadw ay functional classification
SCI	Surface Curvature Index - componenent of deflection analysis
SDI	Surface Distress Index
SI	Structural Index
STA	Station or chainage
Surf Trtmt	Surface Treatment
TDV	Total Deduct Value
W	Weak

1.0 EXECUTIVE SUMMARY & RECOMMENDATIONS

PROJECT SUMMARY

In 2019 IMS Infrastructure Management Services, LLC (IMS) was contracted by the Chicago Metropolitan Agency for Planning (CMAP) to conduct a pavement condition assessment and funding analysis for the Village of Burlington, IL on approximately 9.4 centerline miles of Village maintained asphalt roadways.

IMS mobilized a Laser Road Surface Tester (RST) to conduct an objective assessment using industry standard pavement distress protocols found in ASTM D6433. At that time, the Village's network area weighted average Pavement Condition Index and IRI was found to be a 23 and 470 inches/mile respectively.

BUDGET SCENARIOS

See section 5 for more information

The current annual budget for Burlington is $35k per year dedicated to pavement rehabilitation. This will drop the average PCI to an 18 over 5 years. Several other budget scenarios were generated with a minimum suggested budget of $400K per year which is the tipping point to prevent further backlog growth.

EXECUTIVE SUMMARY CONCLUSION

The Burlington network has an average PCI of 23 and a backlog of approximately $8.0M at the time of survey (backlog being the value of deferred work below the critical PCI), with most of the network landing in the Serious PCI range. With the Village's existing budget, the network conditions will continue to deteriorate to a PCI of 18 and backlog will continue to grow over time towards a total of $10M. It is worth noting that the majority of Village streets are already considered part of the backlog.

2.0 PRINCIPLES OF PAVEMENT MANAGEMENT

2.1 PAVEMENT PRESERVATION

Preservation of existing roads and street systems has become a major activity for all levels of government. Because municipalities must consistently optimize the spending of their budgets, funds that have been designated for pavement must be used as effectively as possible. The best method to obtain the maximum value of available funds is through the use of a pavement management system.

Pavement management is the process of planning, budgeting, designing, evaluating, and rehabilitating a pavement network to provide maximum benefit with available funds.

A pavement management system is a set of tools or methods that assist decision makers in finding optimal strategies for providing and maintaining pavements in a serviceable condition over a given time period. The intent is to identify the optimum level of long-term funding to sustain the network at a predetermined level of service while incorporating local conditions and constraints.

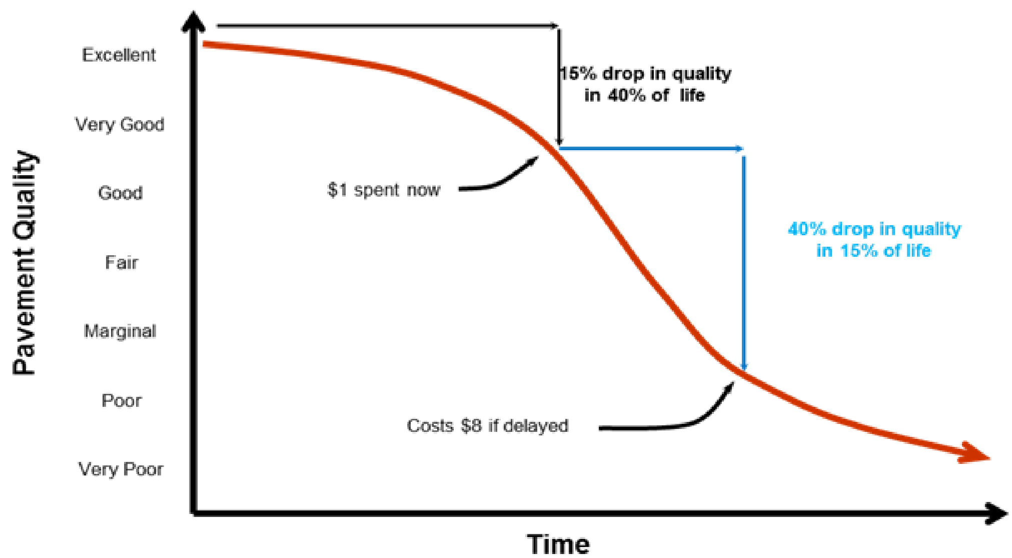


Figure 1 – Pavement Deterioration and Life Cycle Costs

As shown as **Figure 1**, the streets that are repaired while in good condition will cost less over their lifetime than those left to deteriorate to a poor condition. Without an adequate routine pavement maintenance program, streets require more frequent reconstruction, thereby increasing the overall maintenance costs.

The key to a successful pavement management program is to develop a reasonably accurate performance model of the roadway, and then identify the optimal timing and rehabilitation strategy. The resultant benefit of this exercise is realized by the long term cost savings and increase in pavement quality over time. As illustrated in **Figure 1,** pavements typically deteriorate rapidly once they hit a specific threshold. A $1 investment after 40% lifespan is much more effective than deferring maintenance until heavier overlays or possibly reconstruction are required just a few years later.

Once implemented, an effective pavement information management system can assist agencies in developing long-term rehabilitation programs and budgets. The key is to develop policies and practices that delay the inevitable total reconstruction for as long as practical yet still remain within the target zone for cost effective rehabilitation. That is, as each roadway approaches the steepest part of its deterioration curve, apply a remedy that extends the pavement life, at a minimum cost, thereby avoiding costly heavy overlays and reconstruction. **Figure 2** illustrates the concept of extending pavement life through the application of timely rehabilitations.

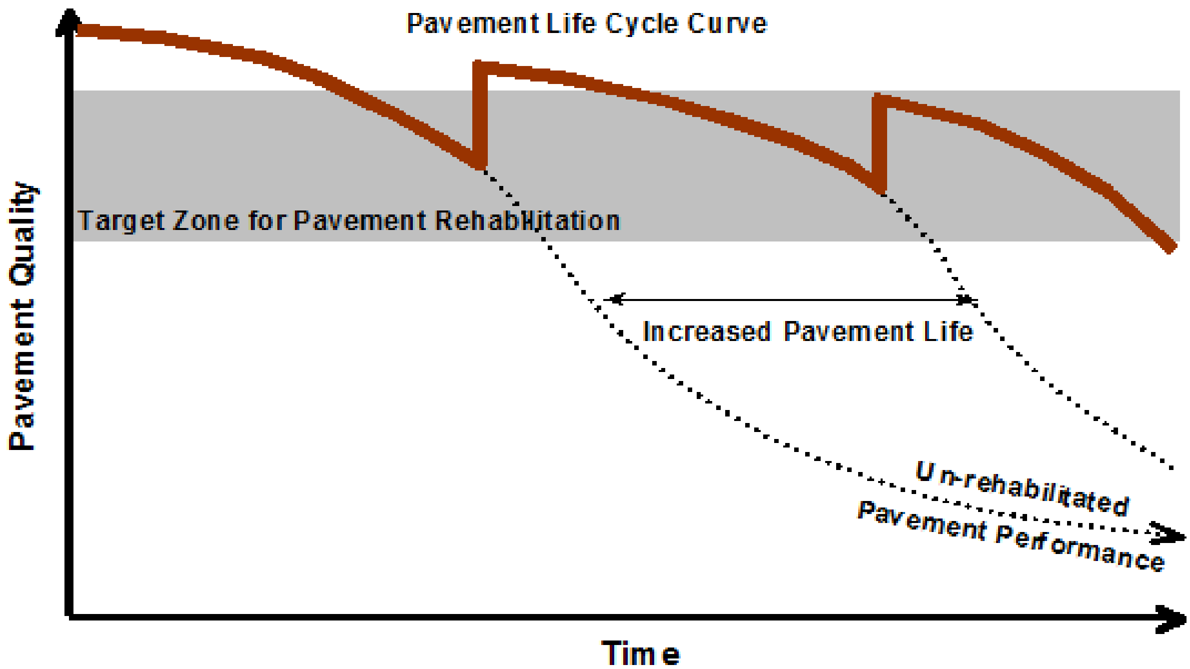


Figure 2 – Pavement Life Cycle Curve

Ideally, the lower limit of the target zone shown in **Figure 2** would have a minimum PCI value in the 60 to 70 range to keep as many streets as possible requiring a thin overlay or less. The upper limit would tend to fall close to the higher end of the Satisfactory category – that is a pavement condition score approaching 85. Other functions of a pavement management system include assessing the effectiveness of maintenance activities, new technologies, and storing historical data and images.

2.2 ECONOMIC IMPACTS OF MAINTENANCE & REHABILITATION

The role of the street network as a factor in the Village's well-being cannot be overstated. In the simplest of terms, roadways form the economic backbone of a community. They provide the means for goods to be exchanged, commerce to flourish, and commercial enterprises to generate revenue. As such, they are an investment to be maintained.

The overall condition of an agency's infrastructure and transportation network is a key indicator of economic prosperity. Roadway networks, in general, are one of the most important and dynamic sectors in the global economy. They have a strong influence on not only the economic well-being of a community, but a strong impact on quality of life.

As a crucial link between producers and their markets, quality road networks ensure straightforward access to goods and drive global and local economies. Roads also act as a key element to social cohesion by acting as a median for integration of bordering regions. This social integration promotes a decreased gap in income along with diversity and a greater sense of community that can play a large role in decreasing rates of poverty.

Conversely, deterioration of roads can have adverse effects on a community and may bring about important and unanticipated welfare effects that the governments should be aware of when cutting transportation budgets. Poor road conditions increase fuel and tire consumption while shortening intervals between vehicle repair and maintenance. In turn, these roads result in delayed or more expensive deliveries for businesses and consumers. Economic effects of poor road networks, such as time consuming and costly rehabilitation, can be reduced if a proactive maintenance approach is successfully implemented. To accomplish this, a pavement assessment and analysis should be completed every few years in an effort update the budget models and rehabilitation plans. As shown below, the IMS Laser Road Surface Tester (featured in **Figure 3**) was mobilized to Burlington to conduct an objective survey.

Figure 3 – Laser Road Surface Tester (RST)

3.0 THE PAVEMENT MANAGEMENT PROCESS

Pavement management at its core is the modeling of future performance based on historical data. The basis for this relies on gathering information about the extent of the network, its defining characteristics, and the current condition to create groups of similar streets.

3.1 NETWORK IDENTIFICATION AND FUNCTIONAL CLASS REVIEW

A review of the current GIS centerline for the Village of Burlington was completed to ensure that not only would all pavement owned by the Village be included in the survey and analysis, but that no pavements owned by other agencies and misidentified as Village owned would be included and alter the findings of this report.

As part of the scope of this assignment, the functional classification designations currently used by the Village were adopted for their use in the pavement analysis after a discussion about current traffic patterns. The Village currently consists of two classes, Collectors and Locals, but may want to reassess the designations as the population grows or traffic patterns in the area change.

Although there is no uniform standard for classifying pavement into functional classes, The Federal Highway Administration (FHWA), American Public Works Association (APWA) and Institute of Transportation Engineers (ITE) offer some broad guidelines on how to assign classifications that were considered in this study.

1. **Minor Arterial (A)** – Continuous and discontinuous cross Village and inter-district corridors that are 2 to 4 lanes across and generally have a centerline stripe or a designated bus route. The ADT generally falls in the 10,000 to 20,000 vehicle per day range. They are typically spaced on the ½ or ¼ mile section line and on occasion, may have a short non-landscaped median.
2. **Collector (B)** – Continuous and discontinuous cross Village and inter-district corridors that are 2 to 4 lanes across and generally have a centerline stripe or a designated bus route. The ADT generally falls in the 500 to 5,000 vehicle per day range. They are typically spaced on the ½ or ¼ mile section line and on occasion, may have a short non-landscaped median. Major collectors are also assigned to streets segments leading to, or adjacent to, a major traffic generator site such as a regional shopping complex. Collectors form the entrance to communities and may have a decorative landscaped median of short duration.
3. **Local (C)** – These are the majority of the street segments consisting of all residential roads not defined above or as industrial/commercial.

In the Paver system the term "Rank" is used as the designation for classes. While these terms can be changed within the system the current defaults have been left in place. These designations are in parenthesis above. A breakdown of the Functional classes for Burlington can be seen on the following pages.

Village of Burlington, IL

Network Summary by Functional Class

	Pavetype	Network	Minor Arterial	Collector	Local
Segment (Block) Count	All Streets	51	9	6	36
Network Length (ft):	All Streets	49,505	3,153	2,750	43,602
Network Length (mi):	All Streets	9.4	0.6	0.5	8.3
Average Width (ft):	All Streets	21.3	35.0	31.7	19.7
Network Area (yd2):	All Streets	117,155	12,252	9,697	95,206
Pavement Condition Index	All Streets	23	74	20	17

Current Network Summary by Functional Class and Condition Rating (Miles)

Condition Rating	Max PCI	Network	Minor Arterial	Collector	Local
Failed (0 to 10)	10	2.8	0.0	0.0	2.8
Serious (10 to 25)	25	4.8	0.0	0.5	4.3
Very Poor (25 to 40)	40	1.0	0.0	0.0	1.0
Poor (40 to 55)	55	0.1	0.0	0.0	0.1
Fair (55 to 70)	70	0.2	0.2	0.0	0.0
Satisfactory (70 to 85)	85	0.4	0.4	0.0	0.0
Good (85 to 100)	100	0.0	0.0	0.0	0.0
Totals (Miles)		**9.4**	**0.6**	**0.5**	**8.3**

Table 1 – Network Summary

3.2 FIELD SURVEY METHODOLOGY

Following a set of predefined assessment protocols matching ASTM D6433, a specialized piece of survey equipment – referred to as a Laser Road Surface Tester – is used to collect observations on the condition of the pavement surface, as well as collect high definition digital imagery and spatial coordinate information. The Laser RST surveys each local street from end to end in a single pass, while all other roadway classifications are completed in two passes.

PCI – The Laser RST collects surface distress observations based on the extent and severity of distresses encountered along the length of the roadway following ASTM D6433 protocols for asphalt and concrete pavements. The surface distress condition (cracking, potholes, raveling, and the like) is considered by the traveling public to be the most important aspect in assessing the overall pavement condition.

Presented on a 0 to 100 scale, the Pavement Condition Index (PCI) is an aggregation of the observed pavement defects. Not all distresses are weighted equally. Certain load associated distresses (caused by traffic loading), such as rutting or alligator cracking on asphalt streets, or divided slab on concrete streets, have a much higher impact on the pavement condition index than non-load associated distresses such as raveling or patching. Even at low extents and moderate severity (less than 10% of the total area), load associated distresses can drop the PCI considerably. ASTM D6433 also has algorithms within it to correct for multiple or overlapping distresses within a segment.

- Alligator Cracking – Alligator cracking is quantified by the severity of the failure and number of square feet. Even at low extents, this can have a large impact on the condition score as this distress represents a failure of the underlying base materials.
- Wheel Path Rutting – Starting at a minimum depth of ¼ inch, wheel path ruts are quantified by their depth and the number of square feet encountered. Like alligator cracking, low densities of rutting can have a large impact on the final condition score.
- Longitudinal, Transverse, Block (Map), and Edge Cracks – These are quantified by their length and width. Longitudinal cracks that intertwine are classified as alligator cracking.
- Patching – Patching is quantified by the extent and quality of patches. Patching encompasses any localized replacement of the pavement surface regardless of the reason.
- Depressions – All uneven pavement surfaces, such as bumps, sags, swells, heaves, and corrugations, are grouped with depressions and are quantified by the severity and extent of the affected area. This is due to the difficulty in classifying uneven pavements during automated collection.
- Raveling – Raveling is the loss of aggregate material on the pavement surface and is measured by the severity and amount of square feet affected.
- Bleeding – Bleeding is the presence of an asphalt film on the roadway surface caused by excessive asphalt in the mix or insufficient voids in the matrix. The result is a pavement surface with low skid resistance and is measured by severity and extent.
- Similar distresses were collected for concrete streets including divided slab, corner breaks, joint spalling, faulting, polished aggregate, and scaling.

3.3 FAMILY MODELS

The Paver software relies on the concept of “Families” for most of its modeling. A family is simply a set of pavements that share a group of characteristics. This can be a surface type, a functional class, traffic patterns, location within the village, unit rates, construction techniques, or any other factor that would cause a pavement to deteriorate similarly or share costs.

For the Village of Burlington these families are mainly split by surface type and functional class due the lack of historical data and the uniformity of the Village. This results in three main splits, asphalt collectors, asphalt locals, and concrete streets. As the Village is able to gather more data in the future it is recommended that these family assignments be reviewed.

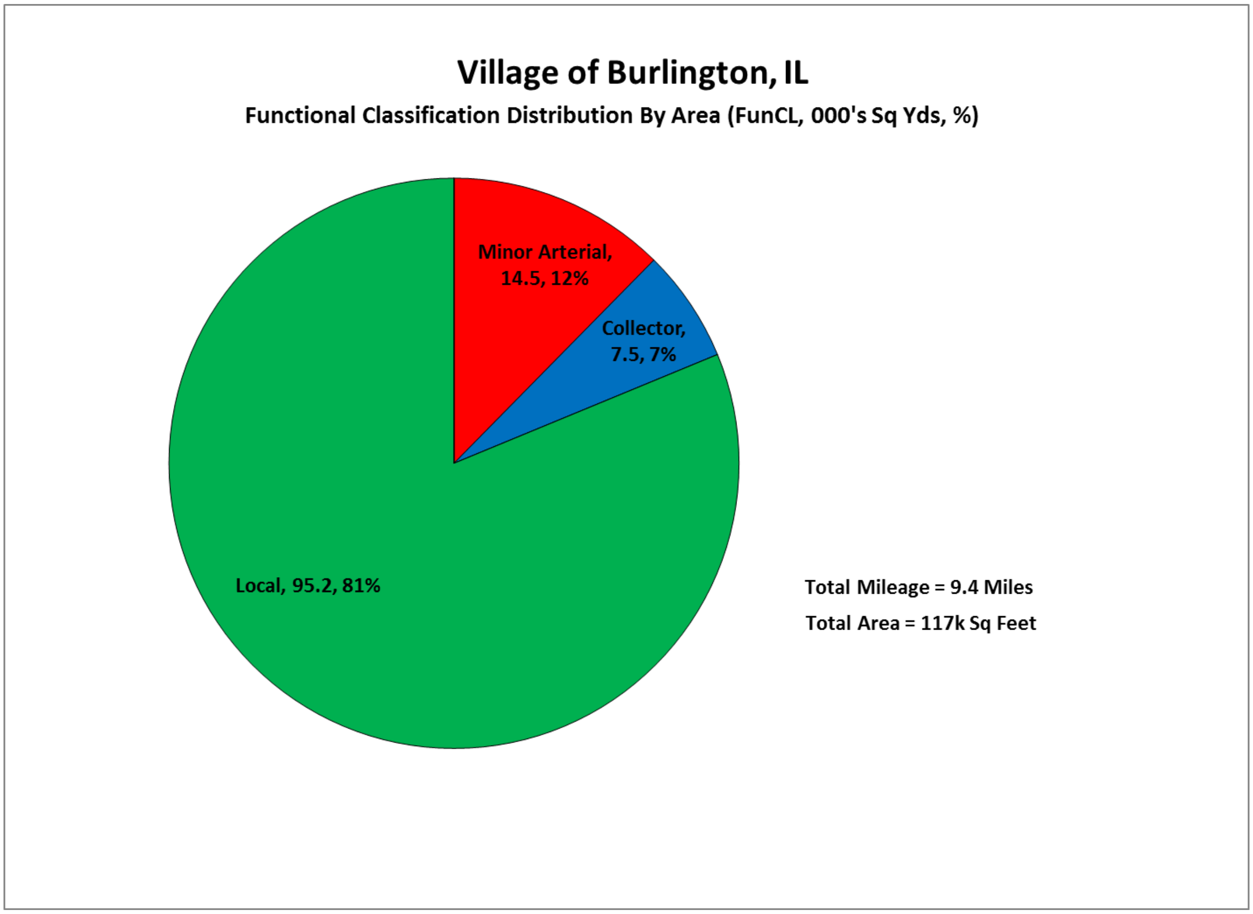


Figure 4 – Functional Classes

4.0 BURLINGTON SURVEY PAVEMENT CONDITION

4.1 UNDERSTANDING THE PAVEMENT CONDITION INDEX

The following compares the Pavement Condition Index (PCI) to commonly used descriptive terms. Divisions between the terms are not fixed, but are meant to reflect common perceptions of condition.

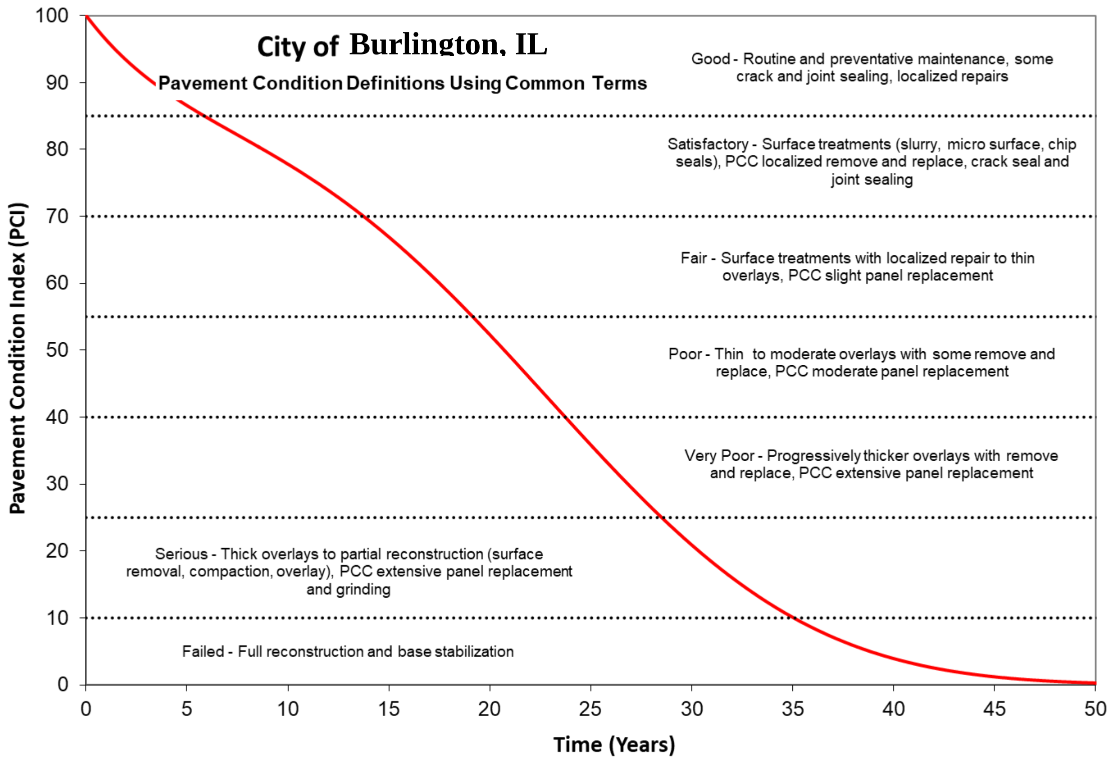


Figure 5 – Understanding the Pavement Condition Index (PCI) Score

The following table details a general description for each of these condition levels with respect to remaining life and typical rehabilitation actions:

PCI Range	Description	Relative Remaining Life	Definition
85 – 100	Good	15 to 25 Years	Like new condition – little to no maintenance required when new; routine maintenance such as crack and joint sealing.
70 – 85	Satisfactory	12 to 20 Years	Routine maintenance such as patching and crack sealing with surface treatments such as seal coats or slurries.
55 – 70	Fair	10 to 15 Years	Heavier surface treatments, chip seals and thin overlays. Localized panel replacements for concrete.
40 – 55	Poor	7 to 12 Years	Heavy surface-based inlays or overlays with localized repairs. Moderate to extensive panel replacements.
25 – 40	Very Poor	5 to 10 Years	Sections will require very thick overlays, surface replacement, base reconstruction, and possible subgrade stabilization.
10 – 25	Serious	0 to 5 Years	High percentage of full reconstruction.
0 – 10	Failed	Failed	Full reconstruction.

4.2 BURLINGTON NETWORK CONDITION IMAGERY

The images presented below provide a sampling of the Burlington streets that fall into the various condition categories with a discussion of potential rehabilitation strategies.

Failed (PCI = 0 to 10) – Complete Reconstruction

Center Street from West End to South Street (GISID 1041, PCI = 9) – Rated as Failed, this street displays spreading base failure as evidenced by the severe alligator cracking and patching. It is also worth noting that the patching along the left hand side of the street has severely deteriorated as evident by the amount loose material on the pavement surface. A mill and overlay on this street would not be suitable as the base has failed and would not meet an extended service life of at least 15 years. This street requires a full reconstruction and should be carefully monitored.

Deferral of reconstruction of streets rated as Failed will not cause a substantial decrease in pavement quality as the streets have passed the opportunity for overlay-based strategies. Due to the high cost of reconstruction, Failed streets are often deferred until full funding is available in favor of completing more streets that can be rehabilitated at lower costs, resulting in a greater net benefit to the Village. This strategy however must be sensitive to citizen complaints forcing the street to be selected earlier. In addition, this type of street can pose a safety hazard for motorists, since severe potholes and distortions may develop. It is important to consistently monitor these streets and check for potholes or other structural deficiencies until the street is eventually rebuilt.

Serious (PCI = 10 to 25) – Partial Reconstruction

South Street from Deutsch Road to Rolling Oaks Drive (GISID 1014, PCI = 22) – Rated as Serious, this segment still has some remaining life before it becomes a critical reconstruction need. On this street, the base is showing signs of failure in areas exhibiting alligator/fatigue cracking. If left untreated, within a short period of time, a full reconstruction would be required.

On arterial roadways, Serious streets often require partial to full reconstruction – that is removal of the pavement surface and base down to the subgrade and rebuilding from there. On local roadways, they require removal of the pavement surface through grinding or excavation, base repairs, restoration of the curb line and drainage, and then placement of a new surface.

In general, the service life of Serious streets is such that if deferred for too long, it would require a more costly reconstruction. Streets rated as Serious are typically selected first for rehabilitation as they provide the greatest cost/benefit to the Village – that is the greatest increase in life per rehabilitation dollar spent.

Very Poor (PCI = 25 to 40) – Thick Overlays & Partial Reconstructs

Waughon Road from Plank Road to Meadow View (GISID 1020, PCI = 32) – Very Poor streets have distresses that tend to be localized and moderate in nature – that is they do not extend the full length of the segment and can be readily dug out and repaired. This street segment highlights this characteristic as the failed area does not quite extend the full length or width of the roadway and is still serviceable.

However, it also highlights the relationship between base and pavement quality. Placing an overlay on this street without repairing the base would not achieve a full 15 year life as the failure would continue to occur over time. Structural patching of the failed areas along localized rehabs would permit a full width grind and inlay on this street segment and return it to full service.

If left untreated, Very Poor streets with high amounts of load associated distresses would deteriorate to become partial reconstruction candidates. Very Poor streets that are failing due to materials issues or non-load associated failures may become suitable candidates for thick overlays if deferred, without a significant cost increase.

Poor (PCI = 40 to 55) – Thick to Moderate Overlays

Main Street from Railroad Street to South Village Limit (GISID 1008, PCI = 49) – Rated in the poor category, these streets require thicker overlays. Several distresses are present, but tend to be more localized, moderate in severity, and less load related (longitudinal and transverse cracking and raveling). *Asphalt streets rated as poor tend to receive a higher priority as they are just below the common point for critical PCI. These streets tending to accelerate in deterioration more quickly and will become a greater burden to the budget if left untreated.*

Fair (PCI = 55 to 70) – Moderate to Thin Overlays

East Old Plank Road from Main Street to Center Street (GISID 1001, PCI = 58) – Rated as Fair with the primary cause of deterioration the transverse and longitudinal cracking. It also displays small amounts of load associated distresses that can easily be removed to restore the visual appearance of the roadway. The existing cracks should be sealed and the pavement surface restored, with a heavier surface treatment such as microsurfacing or double slurry to fully waterproof the pavement and cover the crack sealant. The occasional dig out and replacement may be required to correct localized deficiencies. Alternatively, depending on the extent of the distressed areas, base strength and drainage, a thin overlay may be applied.

Asphalt streets rated as Fair are ideal candidates for thinner surface-based rehabilitations and local repairs. Depending on the amount of localized failures, a thin edge mill and overlay, or possibly a surface treatment, would be a suitable rehabilitation strategy for streets rated as Fair. Streets that fall in the high 60 - low 70 PCI range provide the greatest opportunity for extending pavement life at the lowest possible cost, thus applying the principles of the perpetual life cycle approach to pavement maintenance. The adjacent photo is a great example of a street segment (not a Burlington Road) that displayed low load associated distresses and thus, high structural characteristics, and once the distressed areas were replaced, a slurry seal was applied. The patching accounted for less than 5 to 10% of the total area and resulted in a good looking, watertight final surface at a much lower cost than an overlay with less disruption to the neighborhood and curb line. The patches were paver laid and roller compacted.

Satisfactory (PCI = 70 to 85) – Surface Treatments and Localized Rehabilitation

Main Street from East Old Plank Road to Center Street (GISID 1006, PCI = 80) – Rated as Satisfactory, this road displays minor amounts of transverse cracking and patching. The surface is non-weathered, and the base is still strong. This street is an example of a candidate for preventative maintenance and light weight surface treatments to extend the life of a roadway.

Asphalt streets rated as Satisfactory generally need lightweight surface-based treatments such as surface seals, slurries, chip seals or microsurfacing. Routine maintenance such as crack sealing and localized repairs often precede surface treatments. The concept is to keep the cracks as waterproof as possible through crack sealing and the application of a surface treatment. By keeping water out of the base layers, the pavement life is extended without the need for thicker rehabilitations such as overlays or reconstruction. Surface treatments also tend to increase surface friction and visual appearance of the pavement surface but do not add structure or increase smoothness.

Surface treatments may include:

- *Double or single application of slurry seals (slurries are a sand and asphalt cement mix).*
- *Microsurfacing – asphalt cement and up to 3/8 sand aggregate.*
- *Chip seals and cape seals (Chip seal followed by a slurry).*

Additional cost benefits of early intervention include:

- *Less use of non-renewable resources through thinner rehabilitation strategies.*
- *Less intrusive rehabilitation and easier to maintain access during construction.*
- *Easier to maintain existing drainage patterns.*

Good (PCI = 85 to 100) (Not a Burlington Street)

(Not a Burlington street) PCI = 97) – Rated as Excellent, displaying little to no surface distresses. The ride is smooth and the surface is non-weathered and the base is strong. In a couple of years, this street segment would be an ideal candidate for routine maintenance activities such as crack sealant rehabilitation.

In terms of pavement management efficiency, a program based on worst-first, that is starting at the lowest rated street and working up towards the highest, does not achieve optimal expenditure of money. Generally, under this scenario, agencies can not sufficiently fund pavement rehabilitation and lose ground despite injecting large amounts of capital into the network.

The preferred basis of rehabilitation candidate selection is to examine the cost of deferral of a street, against increased life expectancy.

4.3 BURLINGTON NETWORK CONDITION DISTRIBUTION

Figure 6 presented below shows the distribution of pavement condition for the roadway network in Burlington. The average PCI for the network is 23.

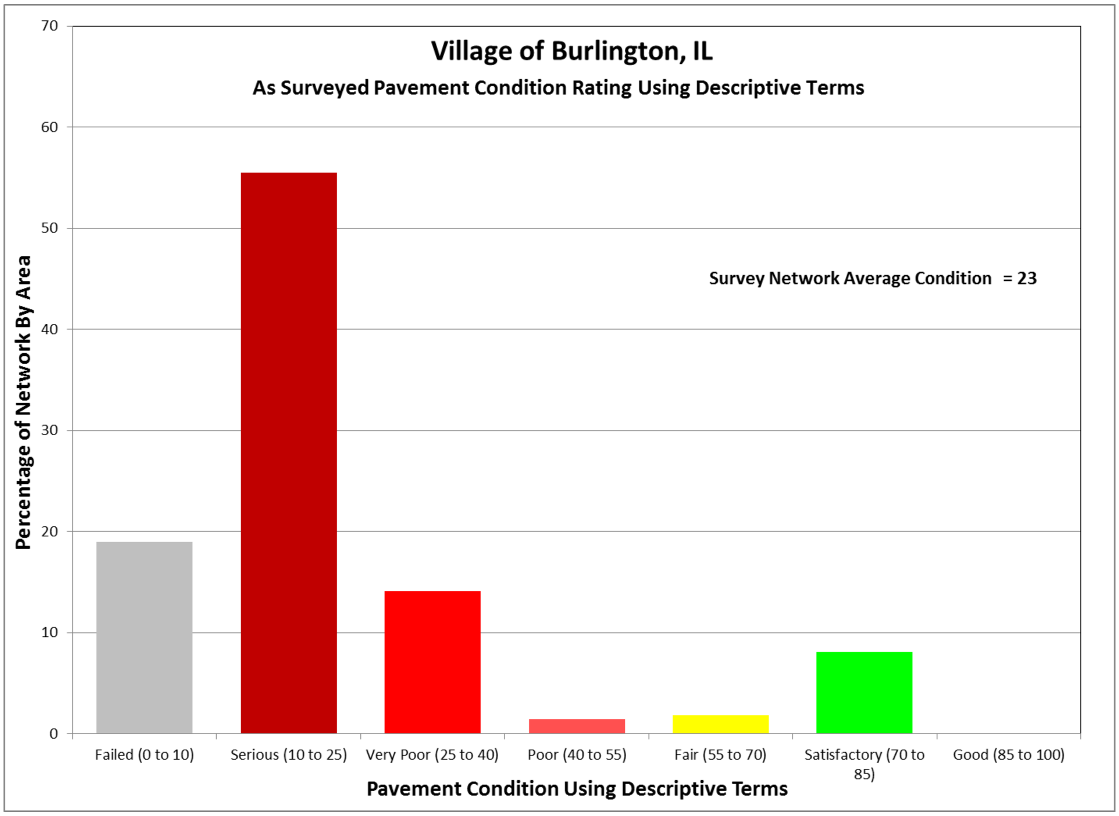


Figure 6 – Network PCI (Good, Fair, Poor)

- No streets within the Village could be classified as Good. However, streets that may fall into the category in the future are prime candidates for preventive maintenance activities such as crack sealing.
- Eight percent (8%) of the network falls into the Satisfactory classification. These are roads that benefit most from preventative maintenance techniques such as microsurfacing, slurry seals and localized panel repairs.
- Two percent (2%) of the streets are rated as Fair and are candidates for lighter surface-based rehabilitations such as thin overlays or slight panel replacements.
- Sixteen percent (16%) of network can be considered Poor to Very Poor condition representing candidates for progressively thicker overlay-based rehabilitation or panel replacements. If left untreated, they will decline rapidly into reconstruction candidates.
- The remaining Seventy-four percent (74%) of the network is rated as Serious to Failed, meaning these roadways have failed or are past their optimal due point for overlay or surface-based rehabilitation and may require progressively heavier or thicker forms of rehabilitation or total reconstruction.

4.4 CONDITION BY FUNCTIONAL CLASSIFICATION

Figure 7 highlights the pavement condition distribution for the Minor Arterial, Collector and Local streets. Keep in mind that Minor Arterial and Collector roadways, the streets that have the majority of traffic use and link various parts of the Village together, may be considered the thoroughfares of the Village and during the budget development process, should receive the highest priority when selecting rehabilitation candidates.

- The **Minor Arterial network** has an average PCI of **74**
- The **Collector network** has an average PCI of **20**
- The **Local network** has an average PCI of **17**

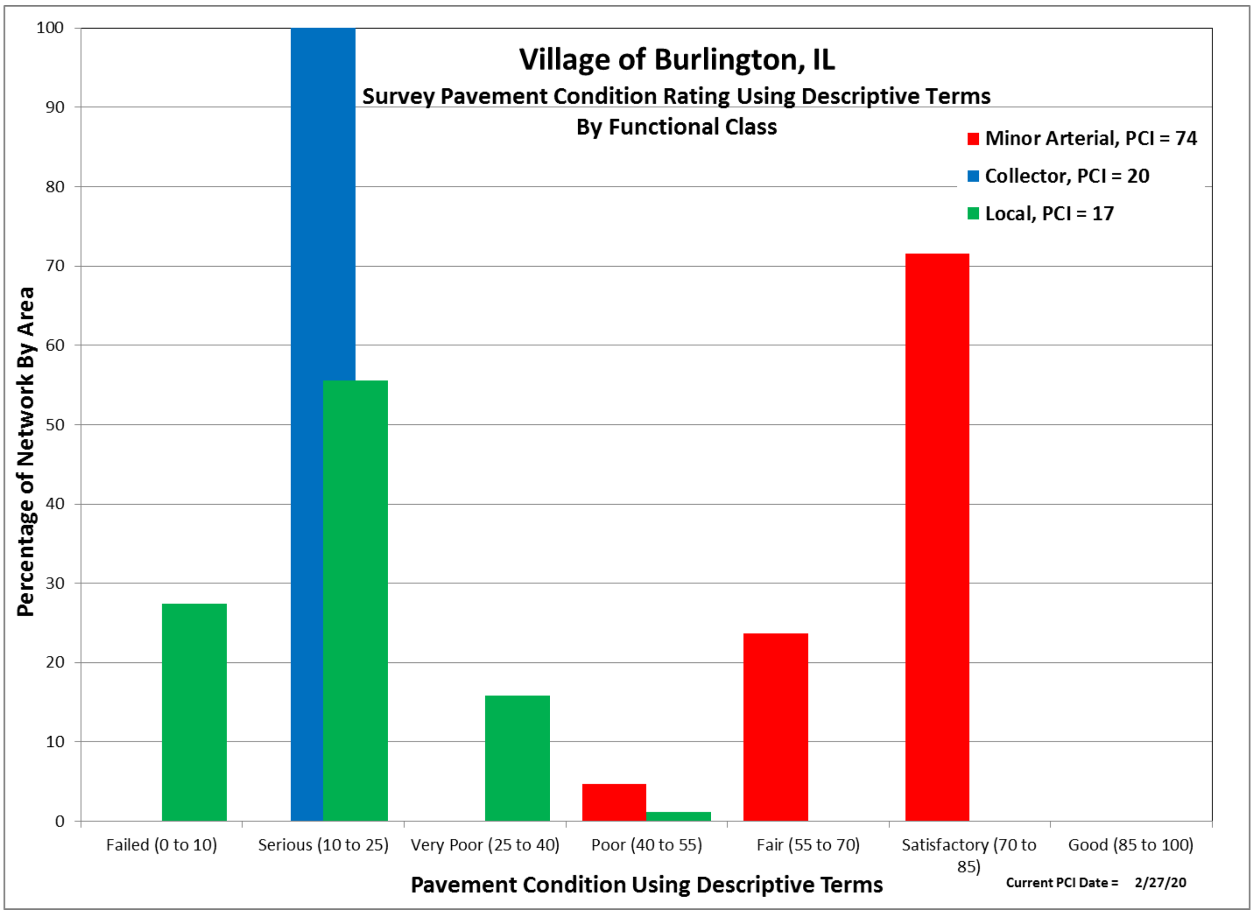


Figure 7 – Condition Rating by Functional Classification

5.0 REHABILITATION PLAN AND BUDGET DEVELOPMENT

5.1 KEY ANALYSIS SET POINTS AND PAVEMENT PERFORMANCE CURVES

The Paver program requires user inputs in order to complete its condition forecasting and prioritization. A series of operating parameters were developed in order to create an efficient program that is tailored to the Village's needs.

Some of the highlights include:

- Pavement performance curves that are used to predict future pavement condition. Paver allows for historical data to be used to build deterioration models that reflect actual pavement condition over time. This gives an agency the ability to group streets into families that share similar characteristics which play a part in deterioration. Examples include functional class, pavement type, AADT, soil properties, heavy vehicle traffic, test pavement, construction method. For the current project, there was no historical data available to build these curves. As a substitute, IMS created curves based on data from decades of surface surveys which the Village can use until sufficient data is available to build custom curves. **Figure 8** below illustrates these curves.
- A threshold for Critical PCI. Paver allows the user to pick a point where rehabilitation is most necessary. Generally this point coincides with either a greater cost of rehabilitation or an increase in the PCI deterioration slope. Since no historical data was available to build curves and some unit prices are estimated the critical PCI has been set at the Paver default of 55.
- Priority ranking analysis in Paver uses prioritization for rehabilitation candidate selection based on a segments Use and Rank. In the program "Use" defines the role the pavement plays (Roadway, Parking Lot, Driveway), while "Rank" defines its functional class. Since this project only focused on roadways the prioritization will be entirely based on Rank. Commonly higher traffic the functional classes receive a higher priority. This ensures that streets that service the most residents undergo rehabilitation first to provide as much benefit per person as possible. For the Village of Burlington, this places Arterial and Collector segments at a higher priority than Local streets.

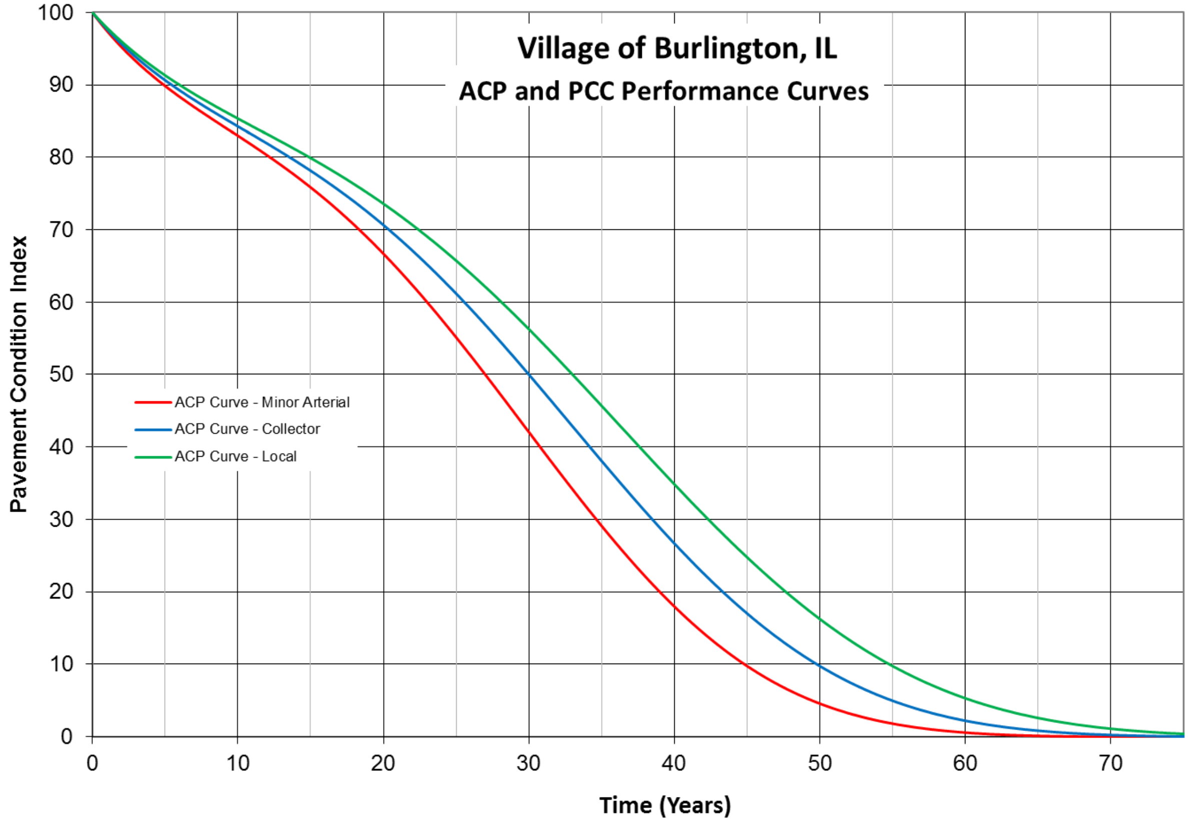


Figure 8 – Performance Curves

Rehabilitation Strategies and Unit Rates

One of the goals of this project was to build a system that allowed the Village to rehabilitate pavements at all points in its life cycle. The main purpose being to extend the useful life of a pavement for minimal cost as discussed in section 2.1. In order to do this an agency must adopt strategies that address pavement distress at its earliest point in order to preserve the pavement. The most common way to do this is to seal the pavement or repair load associated distressed.

In working with the Village it was determined that the current set of rehabilitation strategies were reactive to already deteriorated pavements with a focus on heavy overlays and reconstructs. The current Paver system incorporates localized and global strategies such as crack sealing, patching, slurry seals, and microsurfacing to that list at the request of CMAP.

The rehab strategies and unit rates used in the pavement analysis can be found on the following page.

Village of Burlington, IL

Major and Global M&R
Rehabilitation Strategies and Unit Rates

Pavetype	Rehab Code	Rehab Activity	Unit Rate ($/sqyd)
Asphalt	ST-SS	Slurry Seal / Seal Coat	0.35
Asphalt	ST-MS	MicroSurface	0.40
Asphalt	GL-AT	Thin Overlay	2.00
Asphalt	OL-AS	Overlay	3.22
Asphalt	SR-AC	Surface Reconstrution - AC	6.67
Asphalt	CR-AC	Complete Reconstruction - AC	10.33

Table 2 – Major and Global M&R Rehabilitation Strategies and Rates

The table above breaks out unit costs by work type for Major and Global M&R activities. These costs are the basis of cost by condition tables within the Paver program. Similarly, the table below summaries the costs for Localized Preventive work. The Village uses the same unit rates for all functional classes.

Village of Burlington, IL

Localized Preventive M&R
Rehabilitation Strategies and Unit Rates

Pavetype	Rehab Code	Rehab Activity	Unit Rate ($/ft or sqft)
Asphalt	CS-AC	Crack Sealing - AC	0.25
Asphalt	GR-PP	Grinding (Localized)	3.00
Asphalt	PA-AD	Patching - AC Deep	8.00
Asphalt	PA-AS	Patching - AC Shallow	4.00

Table 3 – Localized Preventive M&R Rehabilitation Strategies and Rates

Village of Burlington, IL

Localized Preventive M&R
Distress Maintenance Policies

Distress	Severity	Description	Code	Work Type	Work Unit
1	Low	ALLIGATOR CR	PA-AS	Patching - AC Shallow	SqFt
1	Medium	ALLIGATOR CR	PA-AD	Patching - AC Deep	SqFt
1	High	ALLIGATOR CR	PA-AD	Patching - AC Deep	SqFt
3	Low	BLOCK CR	CS-AC	Crack Sealing - AC	Ft
3	Medium	BLOCK CR	CS-AC	Crack Sealing - AC	Ft
3	High	BLOCK CR	CS-AC	Crack Sealing - AC	Ft
4	Medium	BUMPS/SAGS	PA-AS	Patching - AC Shallow	SqFt
4	High	BUMPS/SAGS	PA-AD	Patching - AC Deep	SqFt
5	Medium	CORRUGATION	PA-AS	Patching - AC Shallow	SqFt
5	High	CORRUGATION	PA-AD	Patching - AC Deep	SqFt
6	Medium	DEPRESSION	PA-AD	Patching - AC Deep	SqFt
6	High	DEPRESSION	PA-AD	Patching - AC Deep	SqFt
7	Low	EDGE CR	CS-AC	Crack Sealing - AC	Ft
7	Medium	EDGE CR	CS-AC	Crack Sealing - AC	Ft
7	High	EDGE CR	PA-AS	Patching - AC Shallow	SqFt
8	Medium	JT REF. CR	CS-AC	Crack Sealing - AC	Ft
8	High	JT REF. CR	PA-AS	Patching - AC Shallow	SqFt
10	Low	L & T CR	CS-AC	Crack Sealing - AC	Ft
10	Medium	L & T CR	CS-AC	Crack Sealing - AC	Ft
10	High	L & T CR	PA-AS	Patching - AC Shallow	SqFt
11	High	PATCH/UT CUT	PA-AD	Patching - AC Deep	SqFt
13	Low	POTHOLE	PA-AD	Patching - AC Deep	SqFt
13	Medium	POTHOLE	PA-AD	Patching - AC Deep	SqFt
13	High	POTHOLE	PA-AD	Patching - AC Deep	SqFt
15	Medium	RUTTING	PA-AS	Patching - AC Shallow	SqFt
15	High	RUTTING	PA-AD	Patching - AC Deep	SqFt
16	Medium	SHOVING	GR-PP	Grinding (Localized)	Ft
16	High	SHOVING	GR-PP	Grinding (Localized)	Ft
17	Medium	SLIPPAGE CR	PA-AS	Patching - AC Shallow	SqFt
17	High	SLIPPAGE CR	PA-AS	Patching - AC Shallow	SqFt

Table 4 – Localized Preventative M&R Distress Maintenance Policies

5.2 NETWORK BUDGET ANALYSIS MODELS

A series of budget scenarios were run using the work planning tool within Paver. This tool uses the previously defined inputs to determine the most economical application of funds and suggest a list of rehabilitation candidates. Most of these scenarios were generated to determine funding outcomes at various levels for a 5 year period using only Major M&R, an inflation rate of 3%, and a start date of June 1st, 2020.

The analysis results are summarized below:

- **Do Nothing** – This option identifies the effect of spending no capital for 5 years. After 5 years, this scenario results in a network average PCI drop from a 23 to a 17 and a dramatic increase in backlog to $10.1M.
- **Current Budget** – this represents the Village's current annual budget of $35k dedicated to pavement preservation and rehabilitation. This level of funding will result in a network average PCI score of 18 and a backlog increase to $10M.
- **Target PCI = 60** – This is simply the funds required to reach an area weighted network average PCI of 60. A goal of 60 was chosen because it is generally considered the minimum acceptable PCI and would be an improvement in the overall condition of the network. Pavers attempt to meet this benchmark results in a PCI of 61.4 The annual budget required to do so is approximately $984k annually and results in a backlog of $4.6M.
- **Backlog Elimination** – This is the funding level required to rehabilitate all streets below the critical PCI. For the Village this amount came to approximately $1.8M annually and represents the point where all streets are at a condition where low cost rehabilitation is effective. This scenario has a post rehab PCI of 95.
- **Maintain Current PCI** – The funding level required to maintain the Village's current area weighted PCI of 23 is $124k annually. This results in a backlog of $9.6M.
- **Preventive Candidates** – A budget scenario was created to determine which roads were suitable for preventive work (Crack seals, Slurry, Patching, etc.) based on distresses collected during the survey. Paver identified 5 segments that required preventive work and estimated the cost at $13,511. A map of segments to consider and an itemized list of rehabs can be seen in Appendix D while a summary of work is provided below:

Village of Burlington, IL

Localized Preventive M&R

Work Quantities and Costs

Policy	Work Description	Work Quantity	Work Units	Work Cost
AC - Prev	Patching - AC Shallow	3,033.51	SqFt	$12,134.01
AC - Prev	Crack Sealing - AC	5,509.54	Ft	$1,377.37
			Σ	$13,511.38

Table 5 – Localized Preventative Work Quantities and Costs

Figure 9 presents the analysis results on an annual basis. This shows that if the budget falls below $124k/year (Steady State Budget), over time the overall condition of the roads will deteriorate as backlog continues to grow.

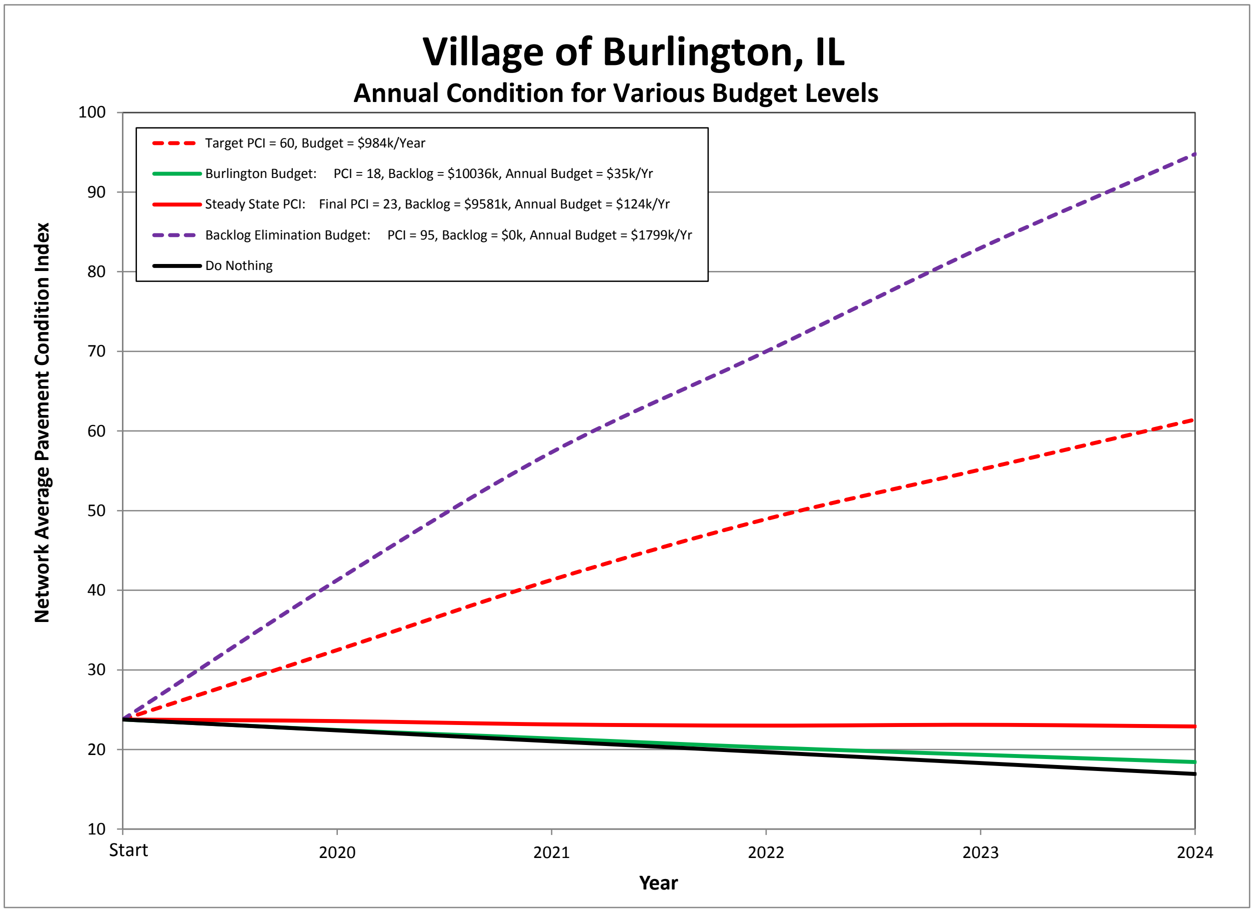


Figure 9 – 5 Year Annual PCI

Figures 10 and **11** on the following page summarize the outcomes of various 5 year funding levels as they relate to overall PCI and Backlog costs. The two charts illustrate that while lower levels of funding are capable of obtaining PCI levels that appear acceptable, the level of backlog that the Village will still have to overcome remains high. The current backlog of segments below critical PCI for the Village of Burlington is approximately $8M and at current funding levels is expected to continue growing. Using the charts below a yearly budget of approximately $400k/year would be required to maintain the backlog at its current value while funding above that level would work to decrease backlog.

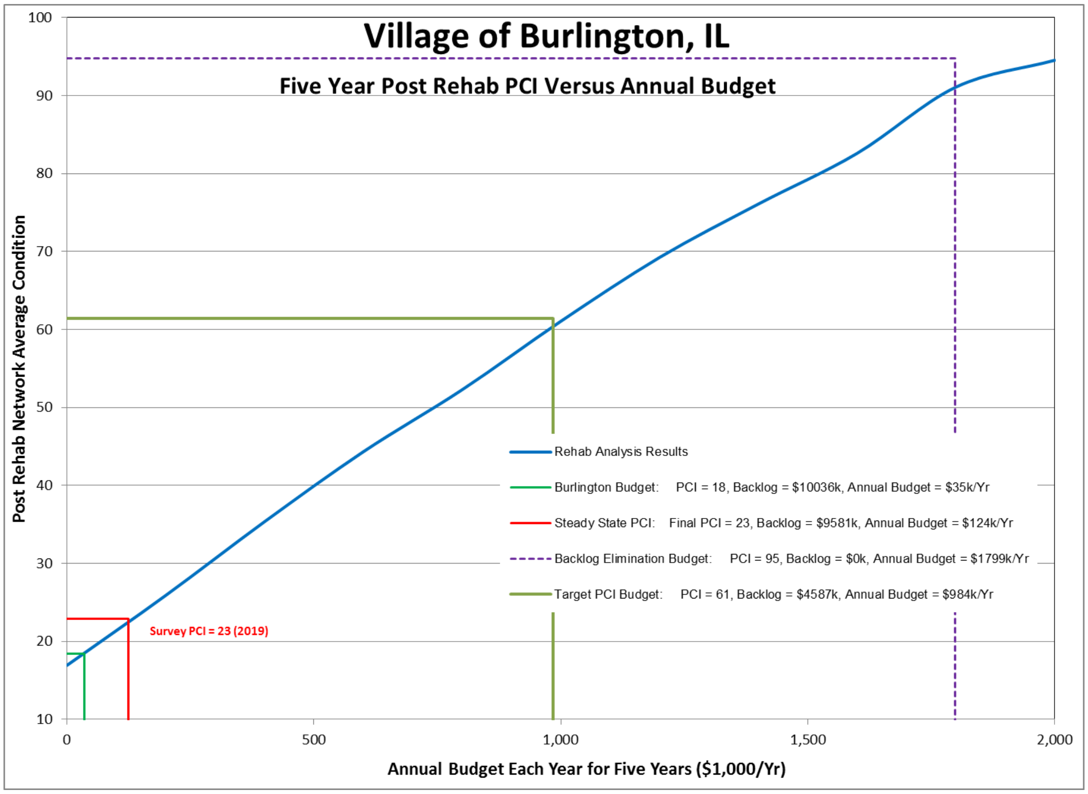


Figure 10 – 5 Year Post Rehab Network PCI Analysis Results

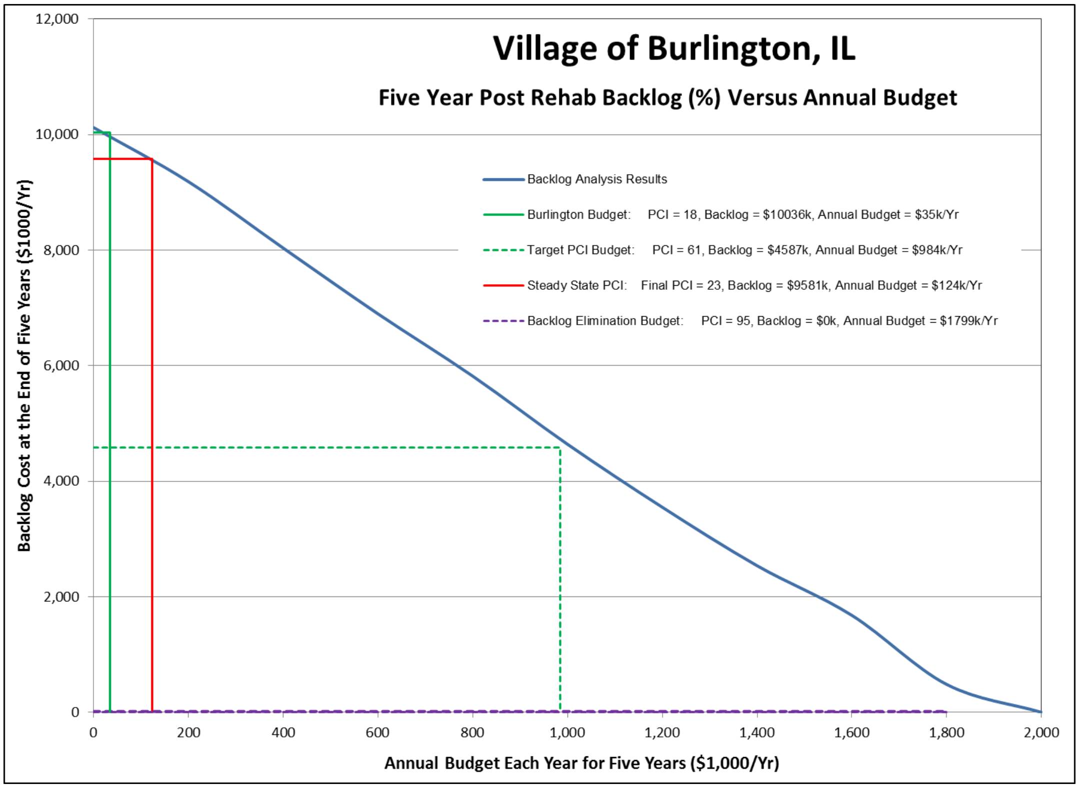


Figure 11 – 5 Year Post Rehab Network PCI Analysis Results

5.3 POST REHABILITATION CONDITION

The following figure (**Figure 12**) compares the current network condition distribution (red) against the 5-year post rehabilitation distribution would be at with a budget of $35k/year (blue). As can be seen in the plot, the current Burlington budget will allow the overall network's PCI average to decrease.

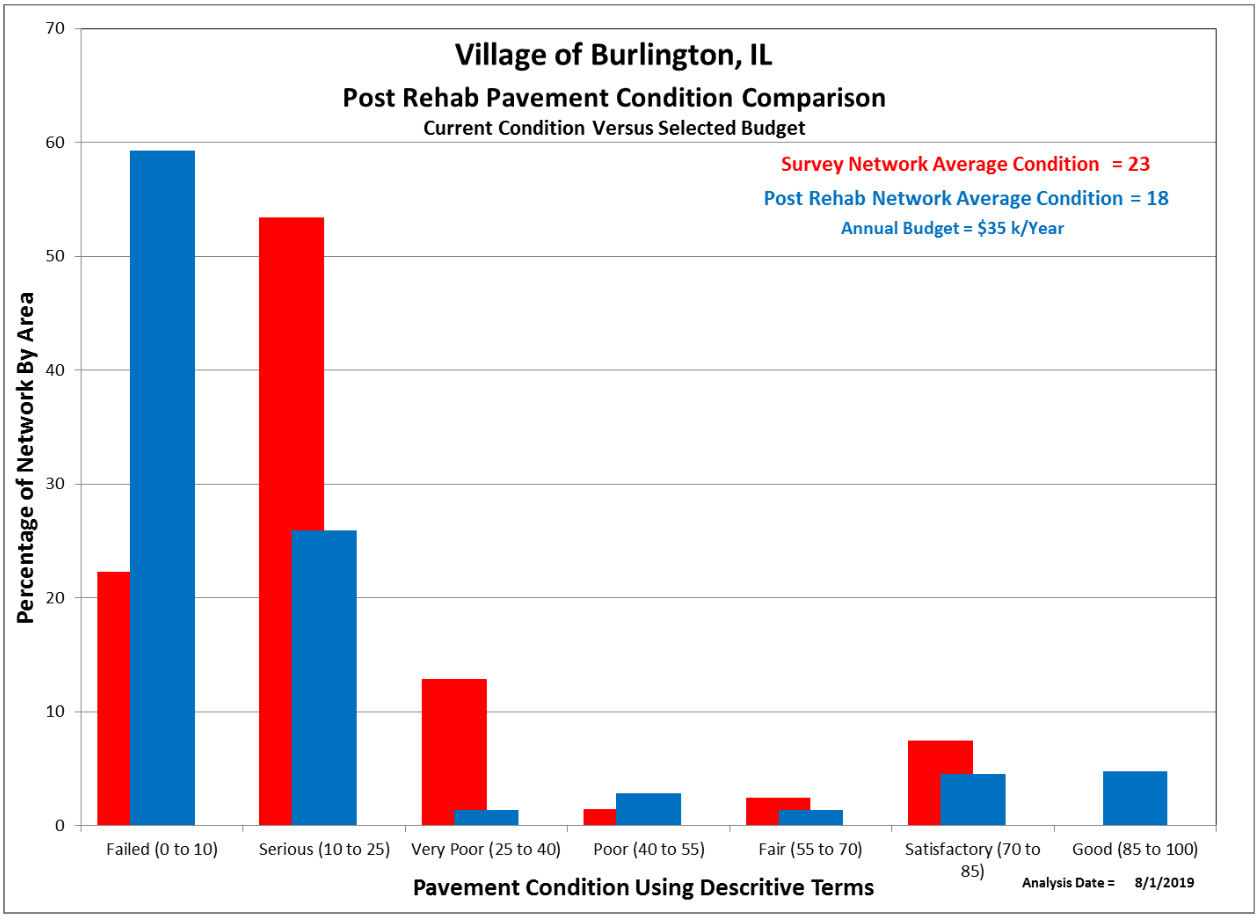


Figure 12 – Five-Year Post Rehabilitation Condition Distribution

Table 6 on the following page displays the segments selected for rehab with their associated costs. Summaries for the remaining scenarios are available in **Table 7**.

Village of Burlington, IL
Major M&R
Current $35k/yr Budget Selections

Year	Network ID	Branch ID	Section ID	PCI Before	Cost
2020	1	1040	20	67.63	$13,736.60
2020	1	1110	60	46.02	$16,789.18
2021	1	1040	30	67.72	$32,887.60
2022	1	1110	10	78.13	$31,469.28
2023	1	1210	10	23.95	$32,363.02
2024	1	1210	60	19.54	$27,440.14

Table 6 – Current $35k/yr Budget Selections

Village of Burlington, IL
Budget Summary
Scenario Costs and Resulting PCI

Scenario	Annual Budget	Unfunded	Funded	Total	Predicted PCI
Backlog Control	$1,799,000	$16,268,182	$8,992,859	$25,261,042	95
Target PCI 60	$984,000	$29,819,503	$4,918,226	$34,737,730	61
Maintain PCI	$124,000	$44,185,275	$618,435	$44,803,710	23
Current Budget	$35,000	$45,713,121	$154,686	$45,867,806	18
Do Nothing	$0	$56,139,017	$0	$56,139,017	17

Table 7 – Budget Scenario Summary

5.4 NETWORK RECOMMENDATIONS AND COMMENTS

The following recommendations are presented to Burlington as an output from the pavement analysis, and must be read in conjunction with the attached reports.

1. Burlington should adopt a policy statement to increase PCI and work to lower their Backlog. This would require an annual budget in excess of $400k (dedicated to pavement rehabilitation and preservation).
2. The full suite of proposed rehabilitation strategies and unit rates should be reviewed annually as these can have considerable effects on the final program.
3. The Village does not currently preform Localized Preventive and Global M&R. The findings of this analysis are based on estimated rates and are only valid for those rates. It is recommended that the Village determine real costs for these work types and reassess these findings.
4. No allowance has been made for network growth. As the Village expands or increases the amount of paved roads, increased budgets will be required.
5. The Village should resurvey their streets every few years to update the condition data and rehabilitation program.

Appendix A

Street Inventory and Condition Summary

Village of Burlington, IL
Street Inventory and Condition Summarry - Sorted by Street Name

IMS Easy Street Analysis

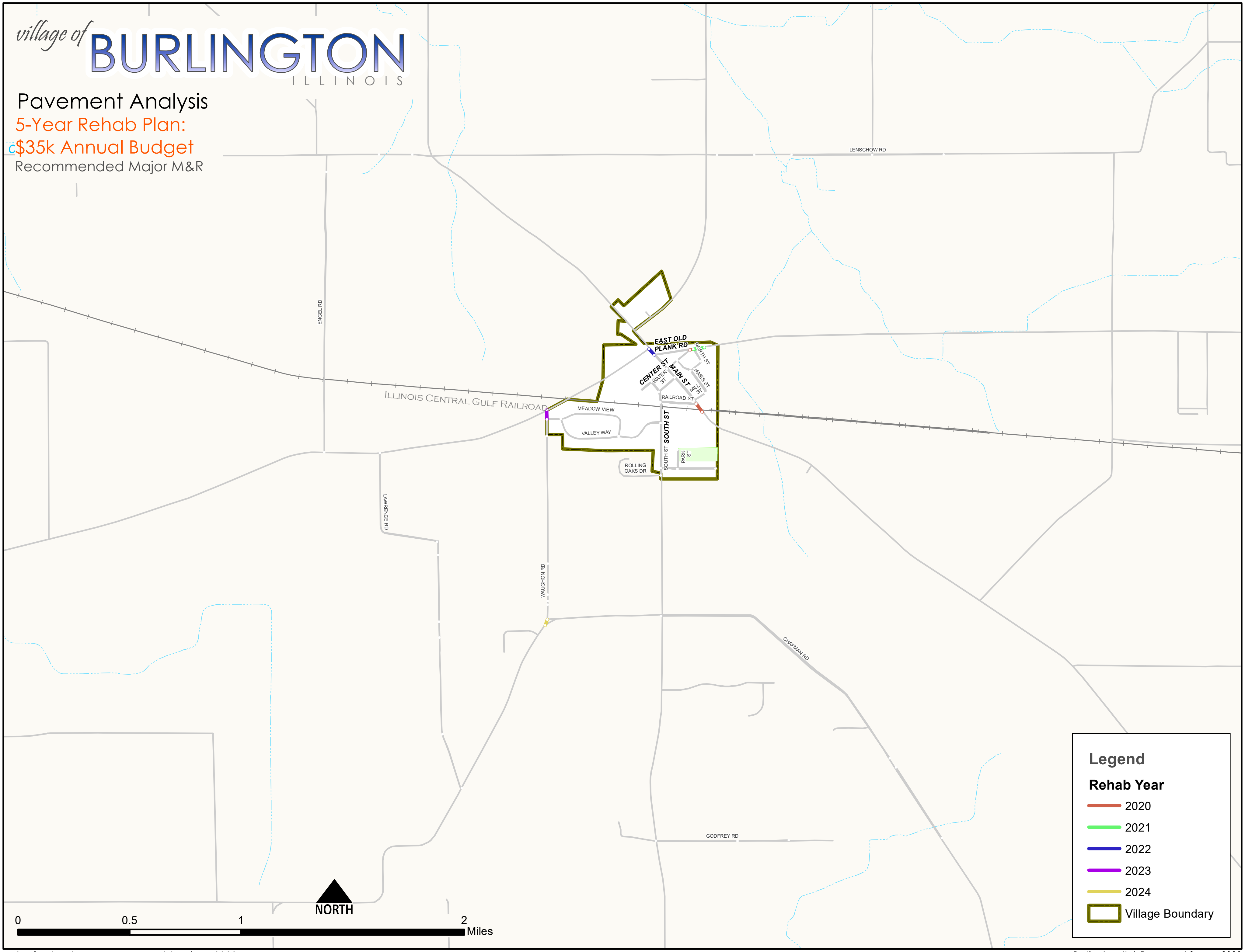
GISID	Street Number	Block Number	Street Prefix	On Street	From Street	To Street	Functional Class	Pavement Ttype	Pavement Width (ft)	Pavement Length (ft)	Survey Pavement Condition Index (PCI)
1041	1010	10	101010	CENTER ST	WEST END	SOUTH ST	Local	AC	21	344	**9**
1010	1010	20	101020	CENTER ST	SOUTH ST	MAIN ST	Collector	AC	42	471	**24**
1044	1010	30	101030	CENTER ST	MAIN ST	JAMES ST	Local	AC	35	318	**33**
1043	1010	40	101040	CENTER ST	JAMES ST	EAST OLD PLANK RD	Local	AC	21	392	**27**
1026	1020	10	102010	CHAPMAN RD	PEPLOW RD	VILLAGE LIMIT	Local	AC	21	6872	**14**
1025	1020	20	102020	CHAPMAN RD	VILLAGE LIMIT	SOUTH VILLAGE LIMIT	Local	AC	21	1993	**14**
1036	1030	10	103010	DEUTSCH RD	SOUTH ST	PARK ST	Local	AC	25	405	**51**
1037	1030	20	103020	DEUTSCH RD	PARK ST	EAST END	Local	AC	20	899	**31**
1001	1040	10	104010	EAST OLD PLANK RD	MAIN ST	CENTER ST	Minor Arterial	AC	23	854	**58**
1002	1040	20	104020	EAST OLD PLANK RD	CENTER ST	NORTH ST	Minor Arterial	AC	54	79	**70**
1003	1040	30	104030	EAST OLD PLANK RD	NORTH ST	EAST END	Minor Arterial	AC	37	268	**72**
1042	1050	10	105010	ENGEL RD	NORTH VILLAGE LIMIT	PLANK RD	Local	AC	18	6641	**17**
1047	1060	10	106010	GODFREY RD	1929E PEPLOW RD	EAST VILLAGE LIMIT	Local	AC	13	1216	**8**
1048	1060	20	106020	GODFREY RD	PEPLOW RD	1929E PEPLOW RD	Local	AC	13	1929	**8**
1031	1070	10	107010	JAMES CT	JAMES ST	NORTH ST	Local	AC	20	333	**9**
1032	1080	10	108010	JAMES ST	CENTER ST	JAMES ST	Local	AC	26	403	**28**
1033	1080	20	108020	JAMES ST	JAMES ST	MILL ST	Local	AC	22	645	**39**
1028	1090	10	109010	LAWRENCE RD	PLANK RD	VILLAGE LIMIT	Local	AC	13	3193	**3**
1029	1090	20	109020	LAWRENCE RD	VILLAGE LIMIT	1575S VILLAGE LIMIT	Local	AC	13	1575	**8**
1045	1090	30	109030	LAWRENCE RD	1575S VILLAGE LIMIT	VILLAGE LIMIT	Local	AC	13	373	**21**
1030	1090	40	109040	LAWRENCE RD	NORTH VILLAGE LIMIT	MC GOUGH RD	Local	AC	15	1367	**8**
1052	1100	10	110010	LENSCHOW RD	VILLAGE LIMIT	VILLAGE LIMIT	Local	AC	18	790	**17**
1049	1100	20	110020	LENSCHOW RD	WEST VILLAGE LIMIT	VILLAGE LIMIT	Local	AC	24	877	**10**
1050	1100	30	110030	LENSCHOW RD	VILLAGE LIMIT	GETZELMAN RD	Local	AC	17	1906	**4**
1051	1100	40	110040	LENSCHOW RD	GETZELMAN RD	EAST VILLAGE LIMIT	Local	AC	18	1693	**8**
1004	1110	10	111010	MAIN ST	PLANK RD	EAST OLD PLANK RD	Minor Arterial	AC	49	188	**83**
1006	1110	20	111020	MAIN ST	EAST OLD PLANK RD	CENTER ST	Minor Arterial	AC	42	442	**80**
1005	1110	30	111030	MAIN ST	CENTER ST	WATER ST	Minor Arterial	AC	43	277	**78**
1009	1110	40	111040	MAIN ST	WATER ST	MILL ST	Minor Arterial	AC	41	715	**81**
1007	1110	50	111050	MAIN ST	MILL ST	RAILROAD ST	Minor Arterial	AC	24	93	**71**
1008	1110	60	111060	MAIN ST	RAILROAD ST	S VILLAGE LIMIT	Minor Arterial	AC	22	237	**49**
1016	1120	10	112010	MEADOW VIEW	WAUGHON RD	VALLEY WAY	Local	AC	27	335	**35**
1017	1120	20	112020	MEADOW VIEW	VALLEY WAY	VALLEY WAY	Local	AC	27	1848	**27**
1038	1130	10	113010	MILL ST	MAIN ST	JAMES ST	Local	AC	20	323	**28**
1039	1140	10	114010	NORTH ST	EAST OLD PLANK RD	JAMES CT	Local	AC	27	333	**11**
1035	1150	10	115010	PARK ST	NORTH END	DEUTSCH RD	Local	AC	30	460	**10**
1040	1160	10	116010	RAILROAD ST	SOUTH ST	MAIN ST	Local	AC	25	852	**13**
1011	1180	10	118010	SOUTH ST	CENTER ST	WATER ST	Collector	AC	40	294	**20**
1015	1180	20	118020	SOUTH ST	WATER ST	RAILROAD ST	Collector	AC	25	246	**17**
1013	1180	30	118030	SOUTH ST	RAILROAD ST	VALLEY WAY	Collector	AC	34	504	**19**

Village of Burlington, IL
Street Inventory and Condition Summarry - Sorted by Street Name

GISID	Street Number	Block Number	Street Prefix	On Street	From Street	To Street	Functional Class	Pavement Ttype	Pavement Width (ft)	Pavement Length (ft)	Survey Pavement Condition Index (PCI)
1012	1180	40	118040	SOUTH ST	VALLEY WAY	DEUTSCH RD	Collector	AC	26	1068	**17**
1014	1180	50	118050	SOUTH ST	DEUTSCH RD	ROLLING OAKS DR	Collector	AC	28	167	**22**
1018	1190	10	119010	VALLEY WAY	MEADOW VIEW	MEADOW VIEW	Local	AC	27	1627	**22**
1019	1190	20	119020	VALLEY WAY	MEADOW VIEW	SOUTH ST	Local	AC	28	1134	**23**
1034	1200	10	120010	WATER ST	MAIN ST	SOUTH ST	Local	AC	30	508	**20**
1020	1210	10	121010	WAUGHON RD	PLANK RD	MEADOW VIEW	Local	AC	20	222	**32**
1021	1210	20	121020	WAUGHON RD	MEADOW VIEW	VILLAGE LIMIT	Local	AC	20	405	**20**
1022	1210	30	121030	WAUGHON RD	VILLAGE LIMIT	736S VILLAGE LIMIT	Local	AC	18	737	**25**
1046	1210	40	121040	WAUGHON RD	736S VILLAGE LIMIT	VILLAGE LIMIT	Local	AC	18	151	**24**
1023	1210	50	121050	WAUGHON RD	VILLAGE LIMIT	MC GOUGH RD	Local	AC	18	348	**14**
1024	1210	60	121060	WAUGHON RD	MC GOUGH RD	MC GOUGH RD	Local	AC	23	155	**29**

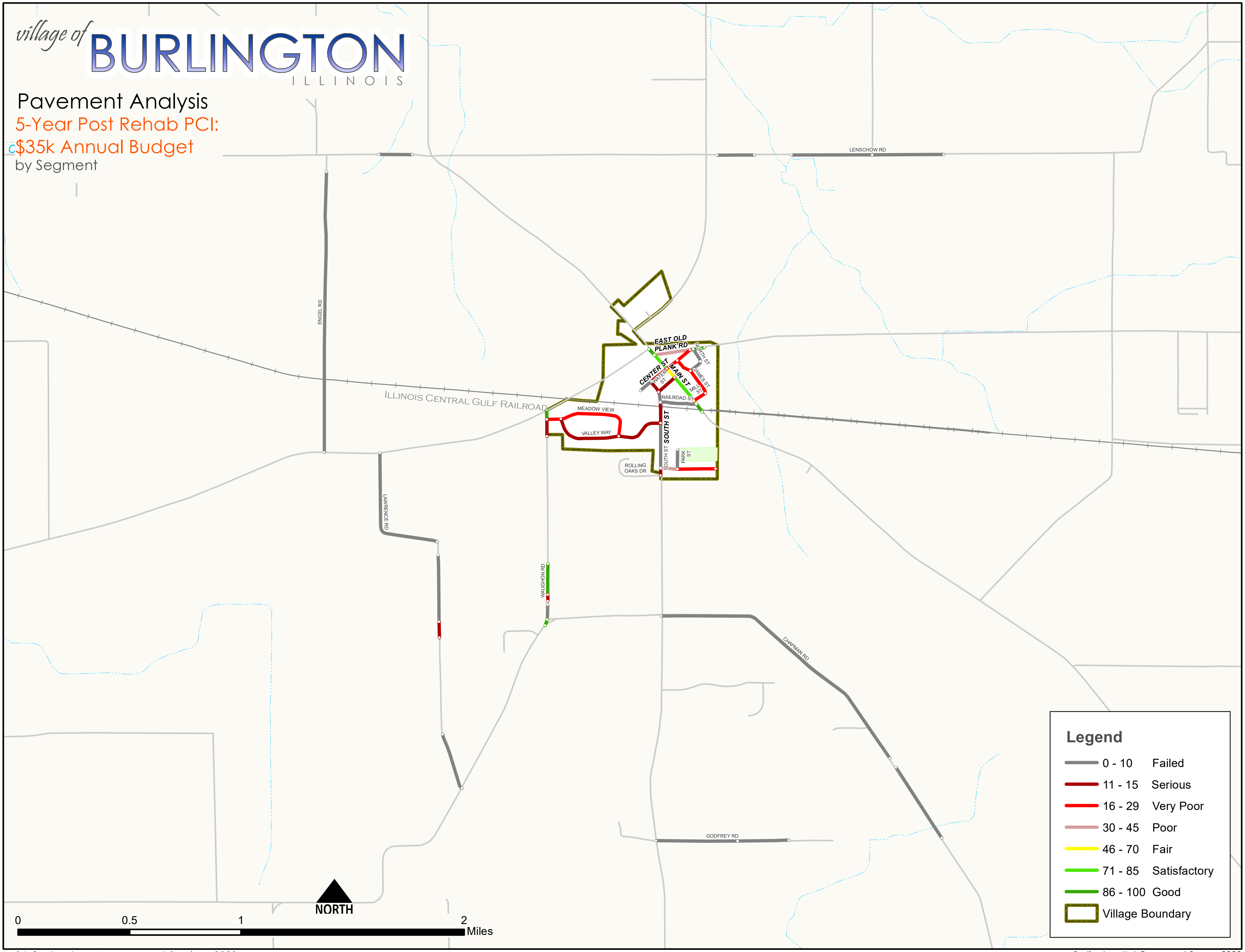
Appendix B

$35k/Year Rehabilitation Plans by Segment


village of BURLINGTON
ILLINOIS
Pavement Analysis
5-Year Rehab Plan:
$35k Annual Budget
Recommended Major M&R
LENSCHOW RD
ENGEL RD
ILLINOIS CENTRAL GULF RAILROAD
EAST OLD PLANK RD
NORTH ST
CENTER ST
MAIN ST
WATER ST
JAMES ST
MILL ST
RAILROAD ST
MEADOW VIEW
VALLEY WAY
SOUTH ST
PARK ST
ROLLING OAKS DR
LAWRENCE RD
WAUGHON RD
CHAPMAN RD
GODFREY RD
NORTH
0
0.5
1
2
Miles
Legend
Rehab Year
2020
2021
2022
2023
2024
Village Boundary

Appendix C

$35k/Year Rehabilitation Plans by Year

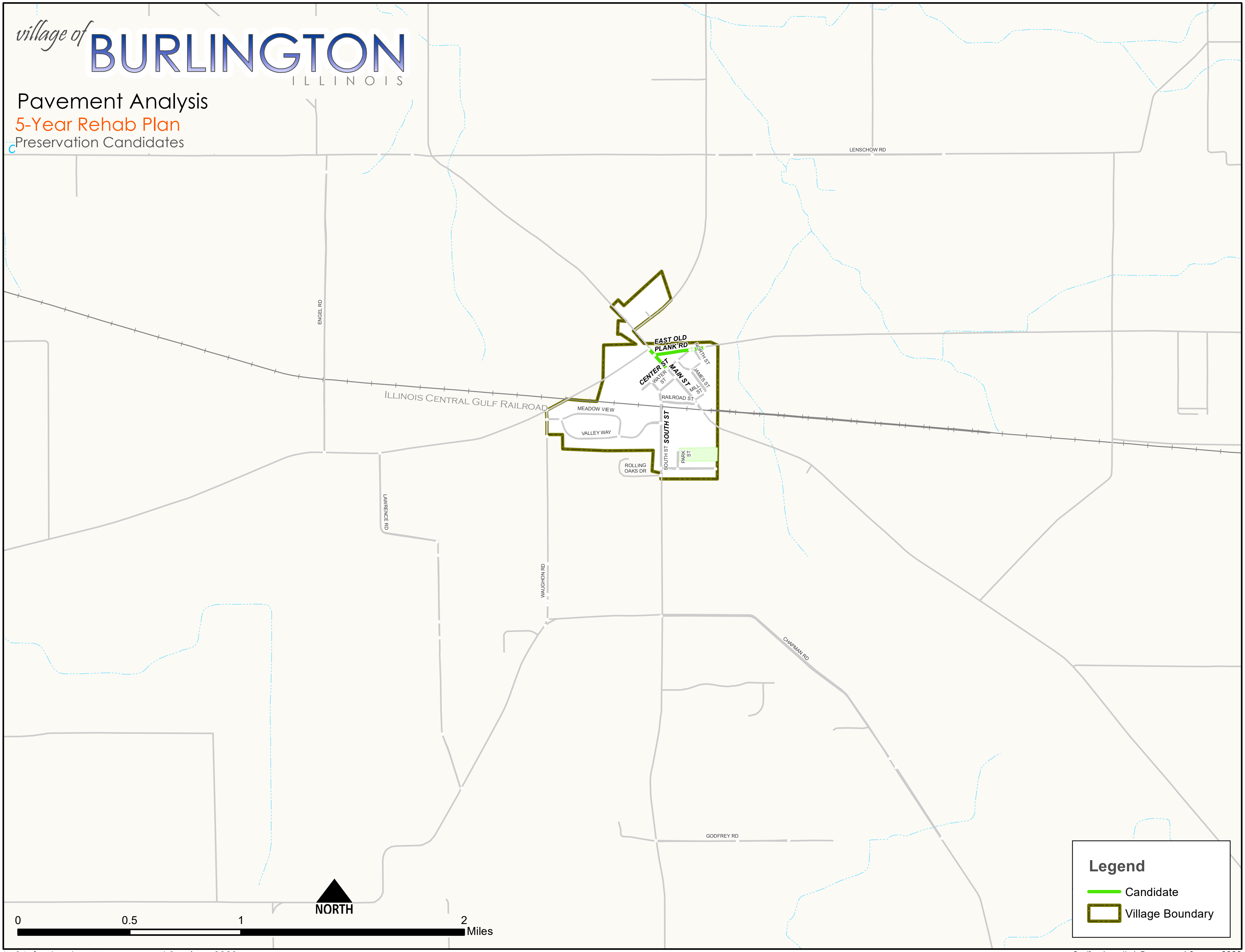

village of
BURLINGTON
ILLINOIS
Pavement Analysis
5-Year Post Rehab PCI:
$35k Annual Budget
by Segment
LENSCHOW RD
ENGEL RD
ILLINOIS CENTRAL GULF RAILROAD
EAST OLD PLANK RD
NORTH ST
CENTER ST
MAIN ST
WATER ST
JAMES ST
MILL ST
RAILROAD ST
MEADOW VIEW
VALLEY WAY
SOUTH ST
PARK ST
ROLLING OAKS DR
LAWRENCE RD
WAUGHON RD
CHAPMAN RD
GODFREY RD
NORTH
0
0.5
1
2
Miles
Legend
0 - 10 Failed
11 - 15 Serious
16 - 29 Very Poor
30 - 45 Poor
46 - 70 Fair
71 - 85 Satisfactory
86 - 100 Good
Village Boundary

Appendix D

Preventive Maintenance Candidates

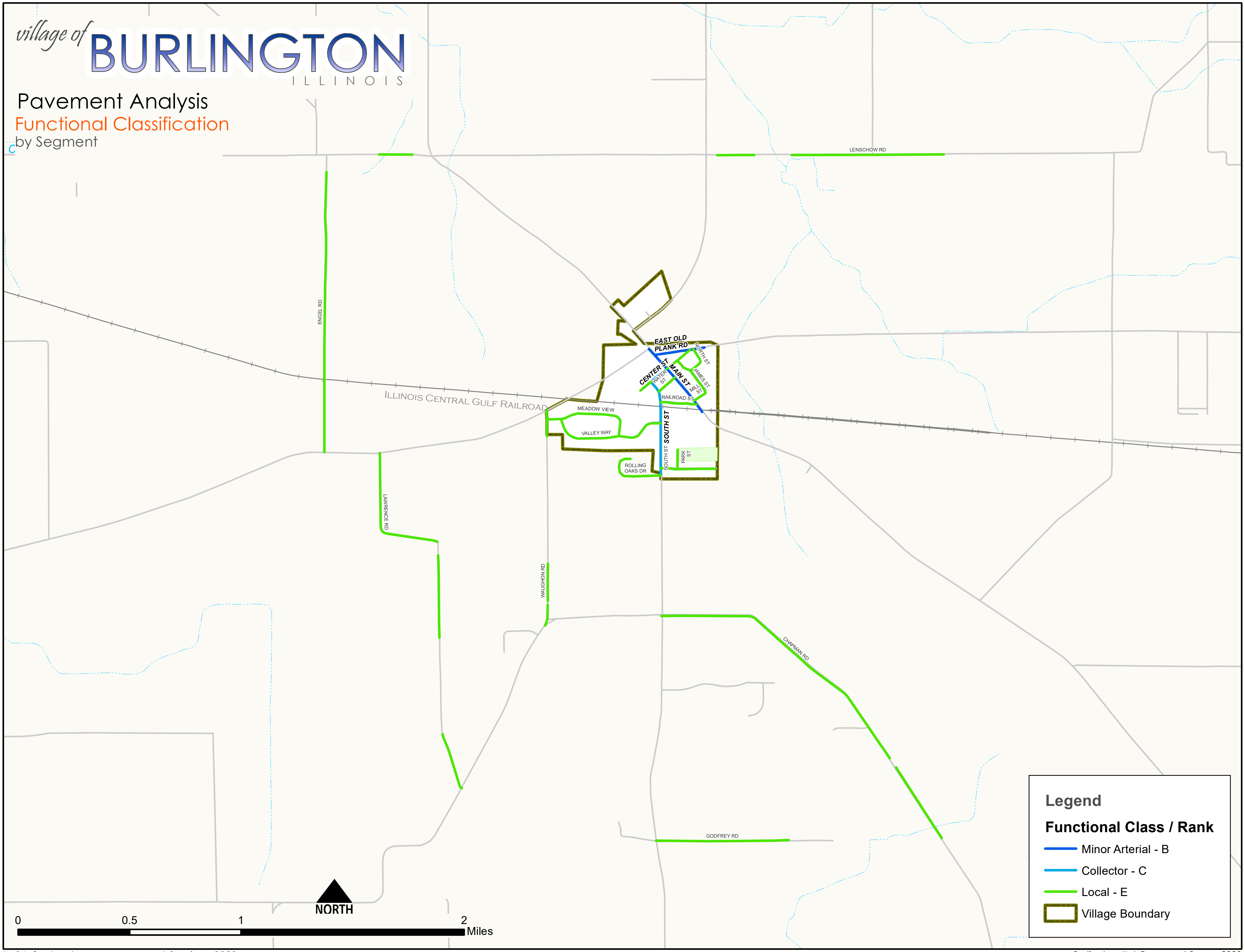
Village of Burlington, IL
Localized Preventive M&R
Segment and Work Candidates

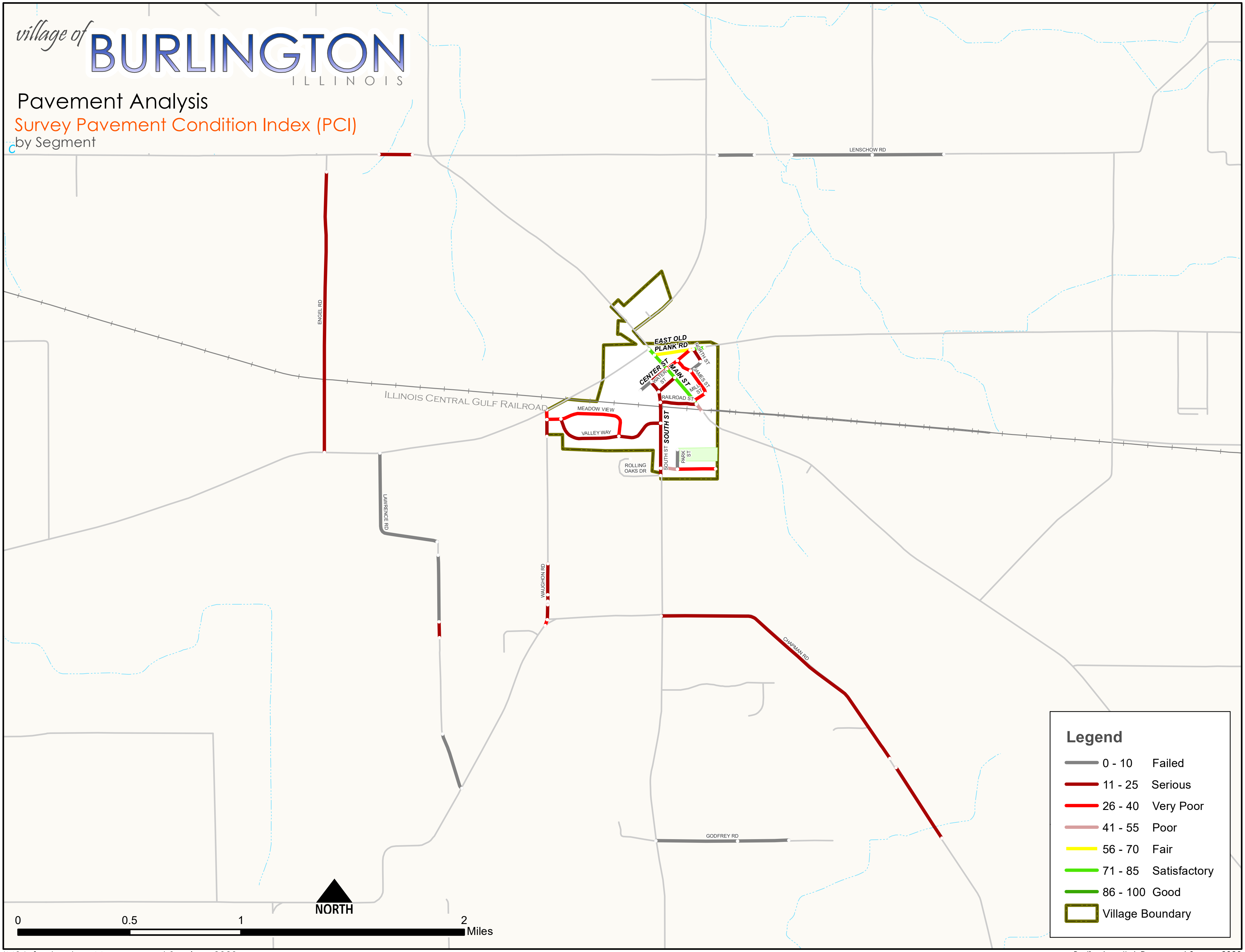
NetworkID	BranchID	SectionID	Policy	Distress Code	Description	Severity	Distress Qty	Distress Unit	Percent Distress	Work Description	Work Qty	Work Unit	Unit Cost	Work Cost
1	1040	10	AC - Prev	1	ALLIGATOR CR	Low	1922.11	SqFt	9.79	Patching - AC Shallow	2102.19	SqFt	$4.00	8410.22
1	1040	10	AC - Prev	10	L & T CR	Medium	725.03	Ft	3.69	Crack Sealing - AC	725.07	Ft	$0.25	181.26
1	1040	10	AC - Prev	10	L & T CR	Low	1636.09	Ft	8.33	Crack Sealing - AC	1636.15	Ft	$0.25	409.02
1	1040	20	AC - Prev	10	L & T CR	Medium	43.9	Ft	1.03	Crack Sealing - AC	43.96	Ft	$0.25	10.97
1	1040	20	AC - Prev	10	L & T CR	Low	318.47	Ft	7.47	Crack Sealing - AC	318.57	Ft	$0.25	79.61
1	1040	20	AC - Prev	1	ALLIGATOR CR	Low	211.51	SqFt	4.96	Patching - AC Shallow	274.48	SqFt	$4.00	1096.39
1	1040	30	AC - Prev	1	ALLIGATOR CR	Low	299.02	SqFt	3.02	Patching - AC Shallow	372.43	SqFt	$4.00	1490.52
1	1040	30	AC - Prev	10	L & T CR	Low	767.09	Ft	7.74	Crack Sealing - AC	767.06	Ft	$0.25	191.77
1	1040	30	AC - Prev	10	L & T CR	Medium	115.03	Ft	1.16	Crack Sealing - AC	115.16	Ft	$0.25	28.75
1	1110	10	AC - Prev	10	L & T CR	Low	499.25	Ft	5.42	Crack Sealing - AC	499.34	Ft	$0.25	124.81
1	1110	10	AC - Prev	10	L & T CR	Medium	32.68	Ft	0.35	Crack Sealing - AC	32.81	Ft	$0.25	8.17
1	1110	10	AC - Prev	1	ALLIGATOR CR	Low	81.7	SqFt	0.89	Patching - AC Shallow	121.63	SqFt	$4.00	488.2
1	1110	20	AC - Prev	10	L & T CR	Low	1074.05	Ft	5.79	Crack Sealing - AC	1074.15	Ft	$0.25	268.51
1	1110	20	AC - Prev	1	ALLIGATOR CR	Low	114.96	SqFt	0.62	Patching - AC Shallow	162.54	SqFt	$4.00	648.68
1	1110	20	AC - Prev	10	L & T CR	Medium	298.03	Ft	1.61	Crack Sealing - AC	297.9	Ft	$0.25	74.5

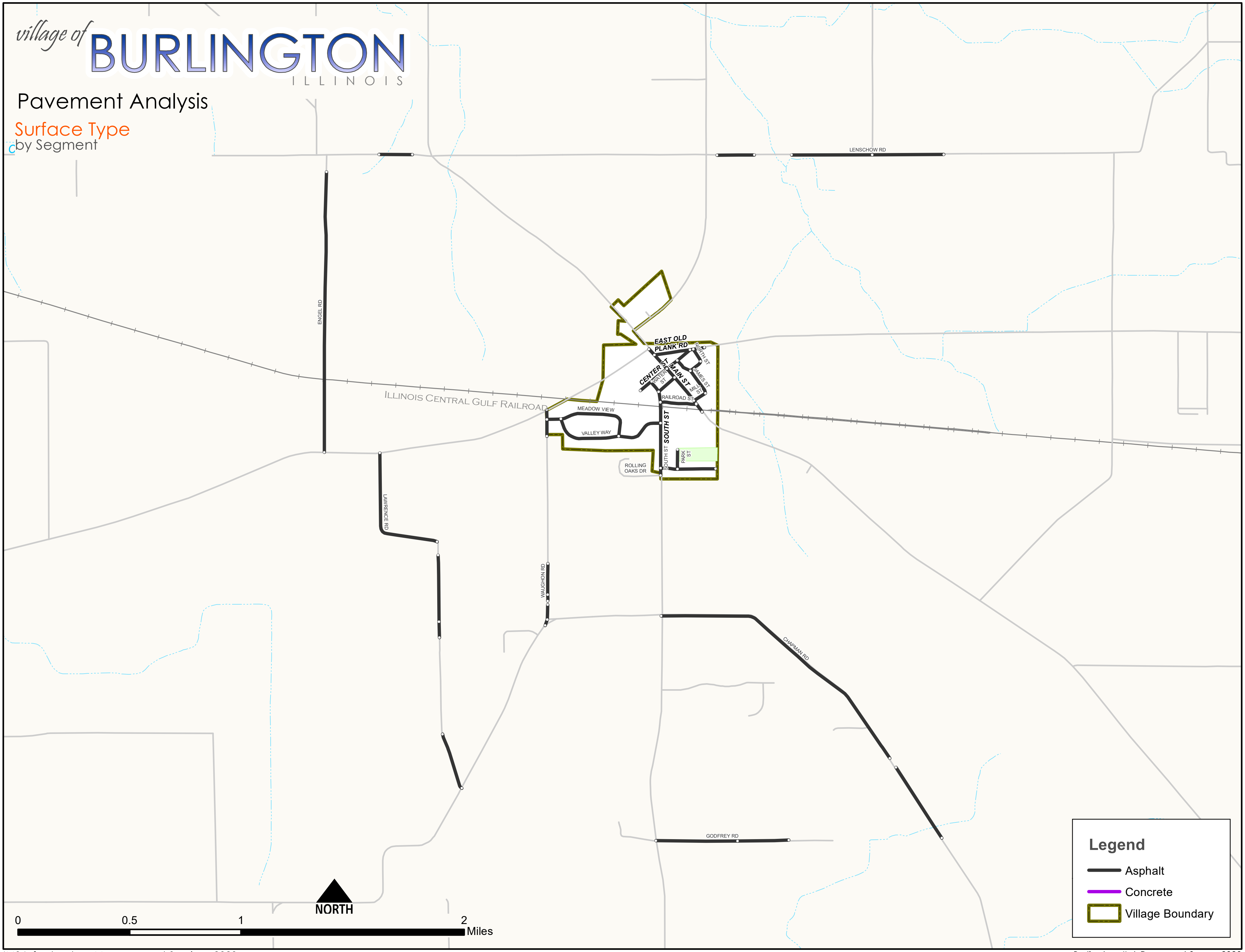

village of BURLINGTON
ILLINOIS
Pavement Analysis
5-Year Rehab Plan
Preservation Candidates
LENSCHOW RD
ENGEL RD
ILLINOIS CENTRAL GULF RAILROAD
EAST OLD PLANK RD
NORTH ST
CENTER ST
WATER ST
MAIN ST
JAMES ST
MILL ST
RAILROAD ST
MEADOW VIEW
VALLEY WAY
SOUTH ST
SOUTH ST
PARK ST
ROLLING OAKS DR
LAWRENCE RD
WAUGHON RD
CHAPMAN RD
GODFREY RD
NORTH
0
0.5
1
2
Miles
Legend
Candidate
Village Boundary

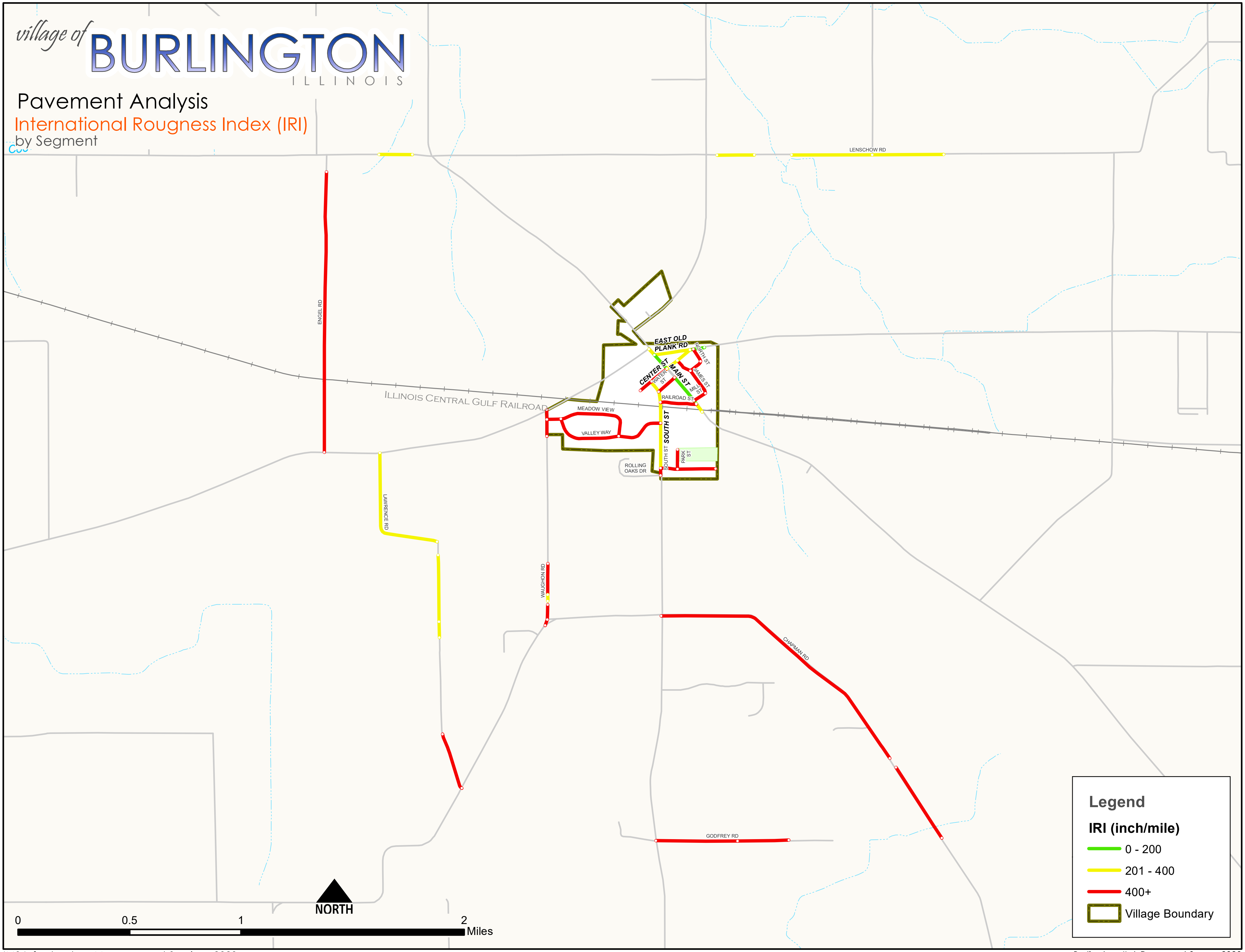
Appendix E

Burlington Condition and Analysis Maps


village of BURLINGTON ILLINOIS
Pavement Analysis
Functional Classification
by Segment
LENSCHOW RD
ENGEL RD
LAWRENCE RD
WAUGHON RD
CHAPMAN RD
GODFREY RD
ILLINOIS CENTRAL GULF RAILROAD
EAST OLD PLANK RD
CENTER ST
MAIN ST
WATER ST
NORTH ST
JAMES ST
MILL ST
RAILROAD ST
MEADOW VIEW
VALLEY WAY
SOUTH ST
ROLLING OAKS DR
PARK ST
NORTH
0 0.5 1 2 Miles
Legend
Functional Class / Rank
Minor Arterial - B
Collector - C
Local - E
Village Boundary


village of BURLINGTON
ILLINOIS
Pavement Analysis
Survey Pavement Condition Index (PCI)
by Segment
LENSCHOW RD
ENGEL RD
ILLINOIS CENTRAL GULF RAILROAD
EAST OLD PLANK RD
NORTH ST
CENTER ST
MAIN ST
WATER ST
JAMES ST
MILL ST
RAILROAD ST
MEADOW VIEW
VALLEY WAY
SOUTH ST
SOUTH ST
PARK ST
ROLLING OAKS DR
LAWRENCE RD
WAUGHON RD
CHAPMAN RD
GODFREY RD
NORTH
0
0.5
1
2
Miles
Legend
0 - 10 Failed
11 - 25 Serious
26 - 40 Very Poor
41 - 55 Poor
56 - 70 Fair
71 - 85 Satisfactory
86 - 100 Good
Village Boundary


village of BURLINGTON ILLINOIS
Pavement Analysis
Surface Type
by Segment
LENSCHOW RD
ENGEL RD
ILLINOIS CENTRAL GULF RAILROAD
EAST OLD PLANK RD
NORTH ST
CENTER ST
WATER ST
MAIN ST
JAMES ST
MILL ST
RAILROAD ST
MEADOW VIEW
VALLEY WAY
SOUTH ST
PARK ST
ROLLING OAKS DR
LAWRENCE RD
WAUGHON RD
CHAPMAN RD
GODFREY RD
NORTH
0
0.5
1
2
Miles
Legend
Asphalt
Concrete
Village Boundary


village of BURLINGTON ILLINOIS
Pavement Analysis
International Rougness Index (IRI)
by Segment
LENSCHOW RD
ENGEL RD
ILLINOIS CENTRAL GULF RAILROAD
EAST OLD PLANK RD
CENTER ST
MAIN ST
WATER ST
NORTH ST
JAMES ST
MILL ST
RAILROAD ST
MEADOW VIEW
VALLEY WAY
SOUTH ST
PARK ST
ROLLING OAKS DR
LAWRENCE RD
WAUGHON RD
CHAPMAN RD
GODFREY RD
NORTH
0
0.5
1
2
Miles
Legend
IRI (inch/mile)
0 - 200
201 - 400
400+
Village Boundary