Relationships.
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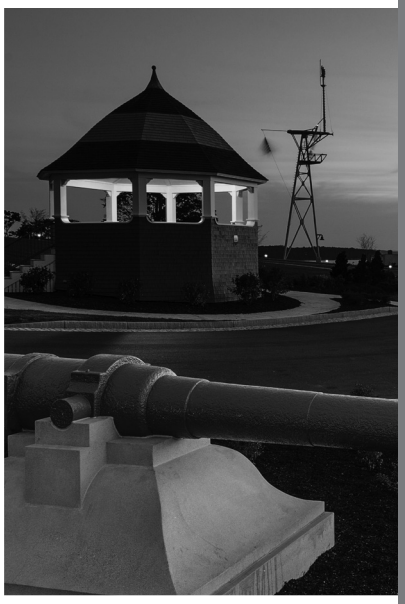

Pavement Condition Study for Gray, Maine

PREPARED FOR:
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February 2022

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Town of Gray
Pavement Condition Study for 2021
Gray, Maine

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Executive Summary

Roadways

The Town of Gray retained Gorrill Palmer (GP) to complete a pavement condition study and report to guide future maintenance and rehabilitation of pavement. Gorrill Palmer evaluated 74.7 miles of roads, including 59.5 miles of local/urban compact roads and 15.2 miles of state roads during July 2021 to obtain Pavement Condition Index (PCI) values. The 2021 PCI for the entire road network in the Town is 79.20 (local/urban compact and state roads combined), which equates to a "Satisfactory" condition. The 2021 PCI for local/urban compact roads only is 80.17, which equates to a "Satisfactory" condition. The 2021 PCI for state roads is 75.68, which also equates to a "Satisfactory" condition. Overall, the Town appears to be doing a good job in maintaining their paved infrastructure. Figure 1 below shows the miles of road sections in each condition for combined state and local/urban compact roads. Approximately 92.7% of all road miles (state and local/urban compact) are in "Fair" or better condition. The percentages above each bar represent the percentage of road miles in those conditions.

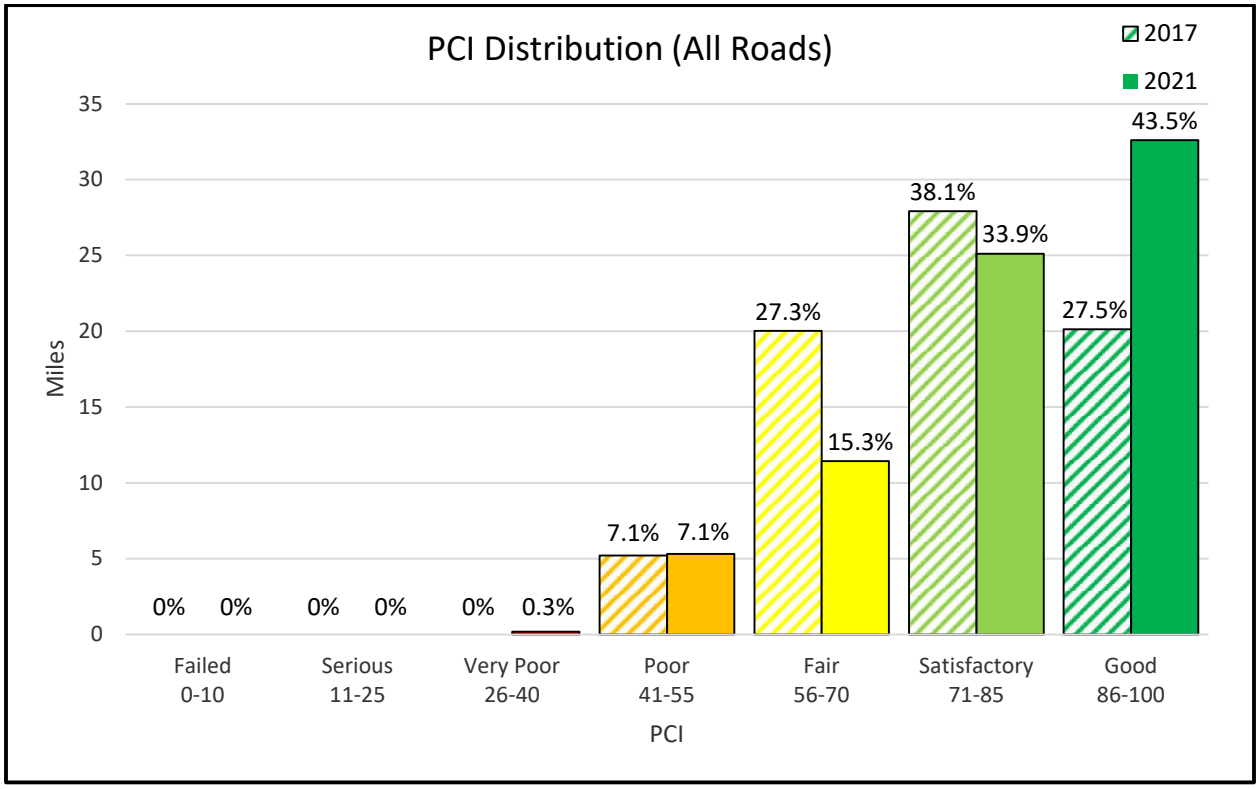


Figure 1 - Miles in each condition (state and local/urban compact roads)

GP used the American Public Works Association's (APWA) Paver™ software to analyze and predict pavement conditions and maintenance budget scenarios for the Town of Gray. GP uses the APWA Paver™ software because it focuses on pavement.

Sidewalks

In addition to the paved roadways, GP completed an assessment of the Town's sidewalks, reviewing surface condition, slopes, obstructions, and overall compliance with the Americans with Disabilities Act (ADA) standards. The Town currently maintains about 2.9 miles of sidewalk along seven (7) different roads. The 2021 length-weighted average sidewalk condition for the entire Town network is "Good". This designated condition means there are minor issues along the sidewalk, including: minor uplifts and less than 5% of sidewalk requires surface replacement. Figure 2 below shows the distribution of conditions for all sidewalks within the Town. Approximately **73%** of sidewalks are in "Good" or better condition. The percentages in each category represent the percentage of sidewalk in those conditions.

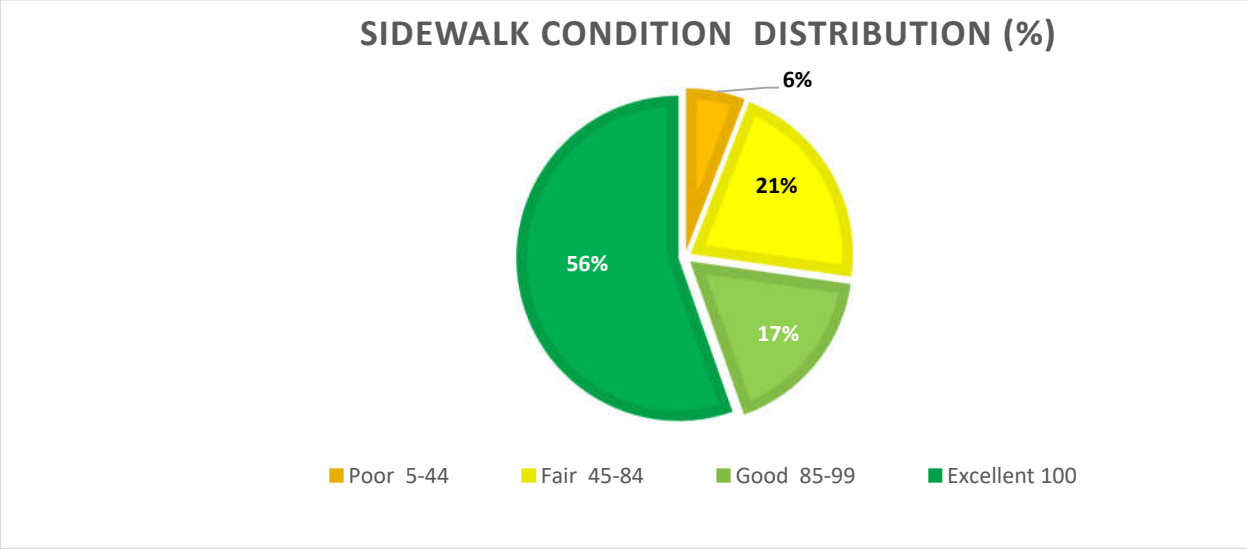


Figure 2 – Length-weighted average condition (sidewalks)

The length-weighted average condition is "Good" meaning long sidewalk sections have greater influence on the average, providing a more accurate overall rating. The recently completed Shaker Road Sidewalk Improvements project significantly improved the length-weighted average condition.

GP also completed an assessment of the Town's sidewalk ramps, reviewing the level of compliance with ADA standards. The survey concluded that **85%** of the Town's sidewalk ramps meet ADA standards.

GP used a sidewalk rating methodology derived from the Seattle Department of Transportation (SDOT) which generally aligns with international ISO 55000 guidance standards. The SDOT developed a sidewalk assessment that goes beyond the standard condition rating (good, fair, poor) and considers ADA compliance, width, cross slope, and overall surface condition. Since this is the first sidewalk assessment completed by the Town, we believe this methodology encapsulates the overall condition of the Town's sidewalk network.

Introduction

Gorrill Palmer was retained by the Town of Gray to perform a pavement condition study for state and local/urban compact roads throughout the Town (approximately 74.7 miles) and use this information to recommend a long-term capital plan that prioritizes the future road maintenance and improvements based on the pavement condition rating. A combination of maps and a list of Town and State roads obtained from the Maine Geographic Information System (GIS) were used to survey all public roads in Gray. Private and unpaved roadways were excluded. A total of 74.7 miles of roads were evaluated, including 59.5 miles of local/urban compact roads and 15.2 miles of state roads.

Pavement management is the process of inventorying and planning the most cost-effective maintenance and repair strategies for roadways while optimizing roadway conditions for future years. The goal of this study is to plan a maintenance and repair strategy to maintain or improve the overall pavement condition of the road network in a cost-effective way. GP utilized APWA's Paver™ software to assess existing pavement conditions and predict future conditions and maintenance strategies.

Paver™ is a decision-making tool used for developing cost-effective pavement preservation strategies and provides capabilities for pavement network inventory, pavement condition rating and maintenance and repair analysis of different budgeting scenarios. Pavement preservation technology and programs like Paver™ have improved greatly over the last 10 years. Few pavement management programs forecast future roadway conditions or suggest network wide budgets while focusing on pavement preservation, which is a major reason Paver™ was selected for this study. Paver™ focuses funding towards pavement preservation (crack sealing, patching, etc.) on roads in good condition and then reconstructing/rehabilitating roads in poor condition with remaining funds when it deems most efficient.

Paver™ was also selected because of the improved data collection process enabled by the tablet-based FieldInspector™ companion software. For collecting data in the field, the Paver FieldInspector™ software was used. This software allows for direct data input and instantaneous Pavement Condition Index (PCI) results while out in the field. This software was used on a Microsoft Surface Pro 3 tablet. Once all the data is entered into the program, it was exported to the Paver™ 7.1 software for analysis. We recommend the Paver™ field inventory be updated every three to four years to monitor the pavement deterioration rate and develop historical pavement condition data that can assist in revealing potential deficiencies or trends in the Town's road network. In interim years, if desired by the Town, we can update the Paver database with newly paved roads to track the Town's progress. It is important to understand that this methodology only addresses surface pavement condition and does not assess the adequacy of subbase gravel condition, pavement condition below surface, drainage, sidewalks, roadway safety, pavement markings, signage etc.

Pavement Deterioration Curve

Figure 3 illustrates that the ideal timing to complete preventive maintenance is before the pavement condition reaches a point where pavement rehabilitation is required. It is significantly less expensive to complete a pavement overlay on a roadway than to reconstruct a roadway. It is important to complete preventive maintenance to maintain the condition of the roadways so that they do not reach a point where reconstruction is the only solution. This "keep good roads good" concept is the same philosophy Paver™ uses when creating Maintenance & Repair (M&R) Work Plans.

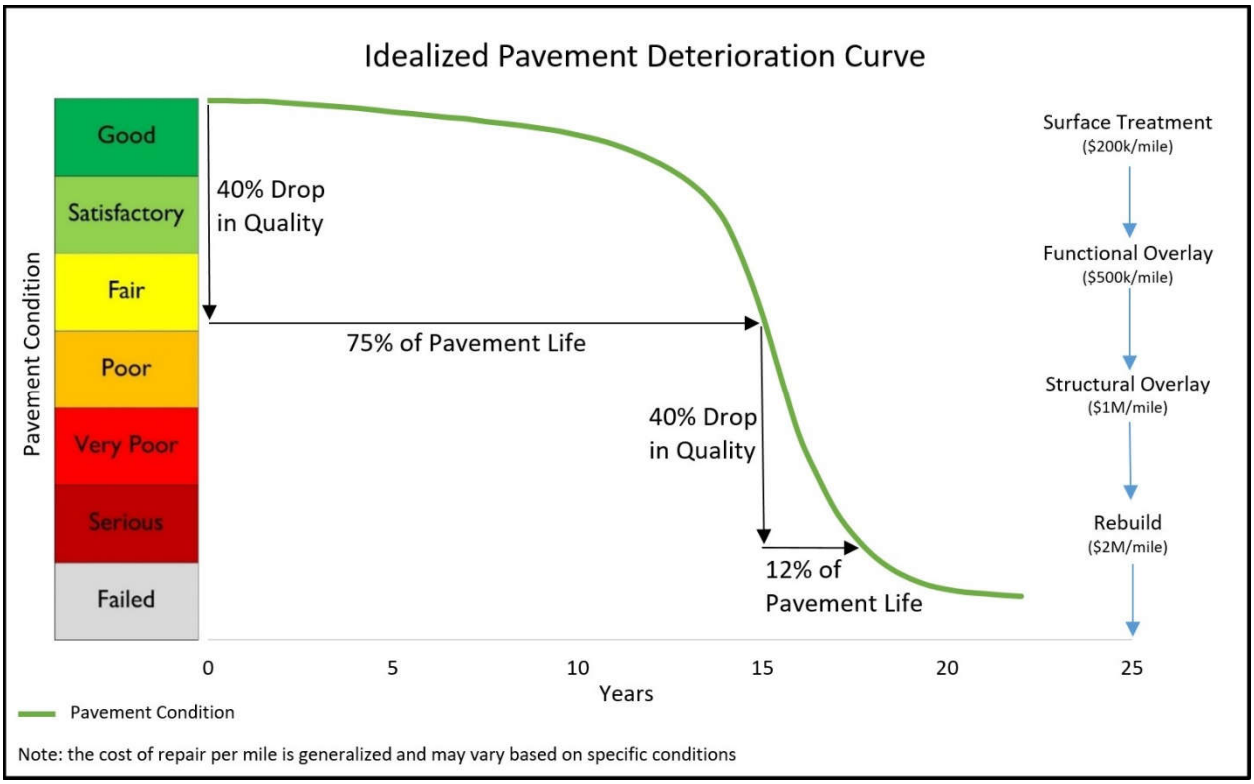


Figure 3 – Pavement Deterioration Curve
Note: The cost per mile estimates are approximate and can vary greatly depending on many variables such as distress type, distress severity, distress frequency, etc.

Data Collection

GP completed detailed condition assessments on approximately 74.7 miles of road, including 59.5 miles of local/urban compact roads and 15.2 miles of state roads. The data collection methodology generally followed the ASTM D6433-11, *Standard Practices for Road and Parking Lots Pavement Condition Index Surveys*. Each roadway was segmented into sections with contiguous characteristics (geometry, work history, pavement history, etc.) as defined by the Town of Gray. Each section was delineated by bordering cross streets, designated "to" and "from" streets, town lines, or pavement changes. The number of samples chosen per section was based on the parameters identified in Table 1. Each sample examines a 100-foot-long segment of the section.

Table 1 - Section Length to Number of Samples

Section Length	Number of Samples
< ¼ mile	Two samples collected, one beginning 100' back from the "from" cross street and one at the end of the section
> ¼ mile and < 1 mile	Multiple samples collected, one beginning 100' inward from the "from" street and subsequent samples 1,320 feet from the end of the previous sample (every quarter mile)
> 1 mile	Multiple samples collected, one beginning 100' inward from the "from" street and subsequent samples 2,640 feet from the end of the previous sample (every half mile)

GP used digital levels, measuring wheels, tape measures, and cameras to record sidewalk conditions. Each sidewalk was inspected "on-foot" to identify the different types of distresses. In addition, all sidewalk ramps at intersecting roads were reviewed to determine to the level of compliance with ADA standards.

Types of Distresses

Each sample area was examined for the extent and severity of the different types of pavement distresses as identified in ASTM D6433. The pavement distresses evaluated are summarized below:

- *Alligator Cracking* is typically a series of interconnected cracks caused by fatigue failure under repeated traffic loading. Typically, this type of distress occurs in vehicle wheel paths.

- *Bleeding* is when a film of bituminous material is observed on the pavement surface.

- *Block Cracking* is when cracking results in the division of pavement into approximate rectangular pieces. Block cracking is typically caused by the shrinkage of the pavement and daily temperature changes.

- *Bumps and Sags* are either upward or downward displacements of the pavement that can be caused by numerous factors.

- *Corrugation,* that is also known as wash-boarding, is typically caused by traffic loading combined with unstable pavement.

- *Depressions* are localized areas where the pavement has settled, creating areas where water will collect.

- *Edge Cracking* typically occurs within 18 inches of the outer edge of the pavement, and the cracks are often parallel to the center of the roadway.

- *Joint Reflection Cracking* is classified as cracks which occur in an asphalt surfaced pavement located over a concrete roadway.

- *Lane/Shoulder Drop Off* is a difference in elevation between the edge of the pavement and the adjacent ground. This can be a safety issue and can also contribute to premature edge cracking.

- *Longitudinal and transverse cracking* – Longitudinal cracks are typically parallel to the centerline are caused by a poorly constructed joint, shrinkage or reflective cracking. Transverse cracks are typically perpendicular to the roadway centerline and are typically not a result of pavement loading.

- *Patching & Utility Cut Patching* are areas where the original pavement has been replaced or repaired with new pavement or cold patch.

- *Polished Aggregate* is a result of wear to the pavement surface by vehicular traffic. The aggregate in the pavement appears worn and is smooth, resulting in less friction with vehicle tires.

- *Potholes* are usually bowl-shaped depressions in the roadway surface typically less than thirty inches in diameter.

- *Railroad Crossing* distresses are typically depressions or bumps adjacent to railroad tracks.

- *Rutting* is a pavement depression that occurs in the vehicle wheel paths and is caused by vehicle loading.

- *Shoving* is a when traffic pushes the pavement surface creating a short wave in the surface.

- *Slippage Cracking* typically consists of crescent-shaped cracks produced as a result of vehicle braking or turning movements.

- *Swell* is an upward hump in the pavement surface typically caused by frost action.

- *Raveling* is a result of wearing away of the pavement surface and can be a result of tracked vehicles traveling along the roadway.

- *Weathering* is a result of the asphalt wearing away on the pavement surface.

GP observed many of these pavement distresses in Gray, however, the most common distresses found were alligator cracking, edge cracking, and longitudinal and transverse cracking. The most common distresses that we found in Gray roads are similar to the types of distresses we find in other Maine communities.

Pavement Condition Index

The pavement survey distresses collected and recorded in the field were entered into FieldInspector™ software and then imported into Paver™ for analysis. FieldInspector™ generates a Pavement Condition Index (PCI) for each roadway section given the raw data that was entered. The PCI uses a scale from 1 to 100. A score of 100 represents a newly paved "perfect" roadway, while a score of 0 indicates a complete roadway failure. A depiction of the PCI rating scale and the corresponding maintenance scale is shown below in Figure 4. The colors associated with each category are standardized throughout Paver™ analysis.

PCI	Maintenance Strategy
86 - 100	Good - Future Overlay
71 - 85	Satisfactory - Future Overlay
56 - 70	Fair - Light Shim/Overlay (1.0")
41 - 55	Poor - Heavy Shim/Overlay (2.25")
26 - 40	Very Poor – Reclaim/Reconstruct
11 - 25	Serious - Reconstruct
0 - 10	Failed - Reconstruct

Figure 4 – PCI Rating Scale

Figure 5 below depicts representative examples of the various PCI pavement conditions. Please note that none of these images were taken in Gray. They're intent is to show approximately what each condition category may look like.

Good

Satisfactory

Fair

Poor

Very Poor

Serious

Failed

Figure 5 - Pavement Condition Examples. Note: The photographs in Figure 5 above represent examples of pavement conditions and were not necessarily taken in Gray.

Pavement Conditions

For this report, local/urban compact and state roadways were analyzed. Highway on/off ramps, the entirety of I-95, and private/unpaved roads were excluded from this study. Two PCI deterioration families were created for these roadways. The first family consists of all roadways in Gray with a local and urban compact road classification. Local roads were assigned rank "E" in Paver™. The second family consist of all the state roadways in Gray with either an Arterial or Collector road classification and were assigned ranks "B" and "C" in Paver™ respectively. Categorizing roads into families like these helps Paver™ predict future road conditions and required maintenance more accurately. The road classifications were determined using the Public Map Viewer on the Maine DOT's (http://www. maine.gov/mdot/mapviewer/).

The current area-weighted average PCI for the total 74.7 road miles in Gray (local/urban compact and state roads combined) based on the approximate 277 inspections performed is **79.20**, and the arithmetic average is **77.29** . The area-weighted average is similar to the arithmetic average but the square foot area of each road section is factored in. The PCI of longer road sections with large square foot areas have a greater influence (carry more weight) on the area-weighted average PCI than smaller, shorter road sections. In this report only the area-weighted average PCI is used. The full list of surveyed roads and their corresponding PCI values are included in Appendix A. As stated before, it's important to understand that Paver's™ methodology only analyzes the condition of surface pavement and does not assess the adequacy of subbase gravel condition, pavement condition below surface, drainage, sidewalks, roadway safety, pavement markings, signage etc. When a road is paved, Paver™ assigns that road a 100 rating regardless of the M&R strategy used to restore the surface (overlay, mill & fill, full reconstruction etc.). Paver™ then uses the pavement deterioration curve to predict future PCI ratings. This is important to note because Paver™ applies the same deterioration rate to each road, even though different M&R strategies will likely result in different deterioration rates. See Table 2 below for a summary of the area-weighted average PCI values for each deterioration family.

Table 2 – 2021 PCI Summary Table

Family	Average PCI 2021	Sections "Fair" or better	Total Miles
All Roads	79.20	92.7%	74.7
Local/Urban Compact Roads	80.17	96.2%	59.5
State Roads	75.68	78.9%	15.2

Approximately 96.2% (57.2 out of 59.5 miles) of all local/urban compact roads have a PCI of 56 (Fair) or better. Approximately 78.9% (12 out of 15.2 miles) of all state roads have a PCI of 56 (Fair) or better. Figures 6 and 7 below show the PCI rating versus roadway miles for local/urban compact and state roads respectively. The percentages above each bar represent the percentage of road miles in those conditions.

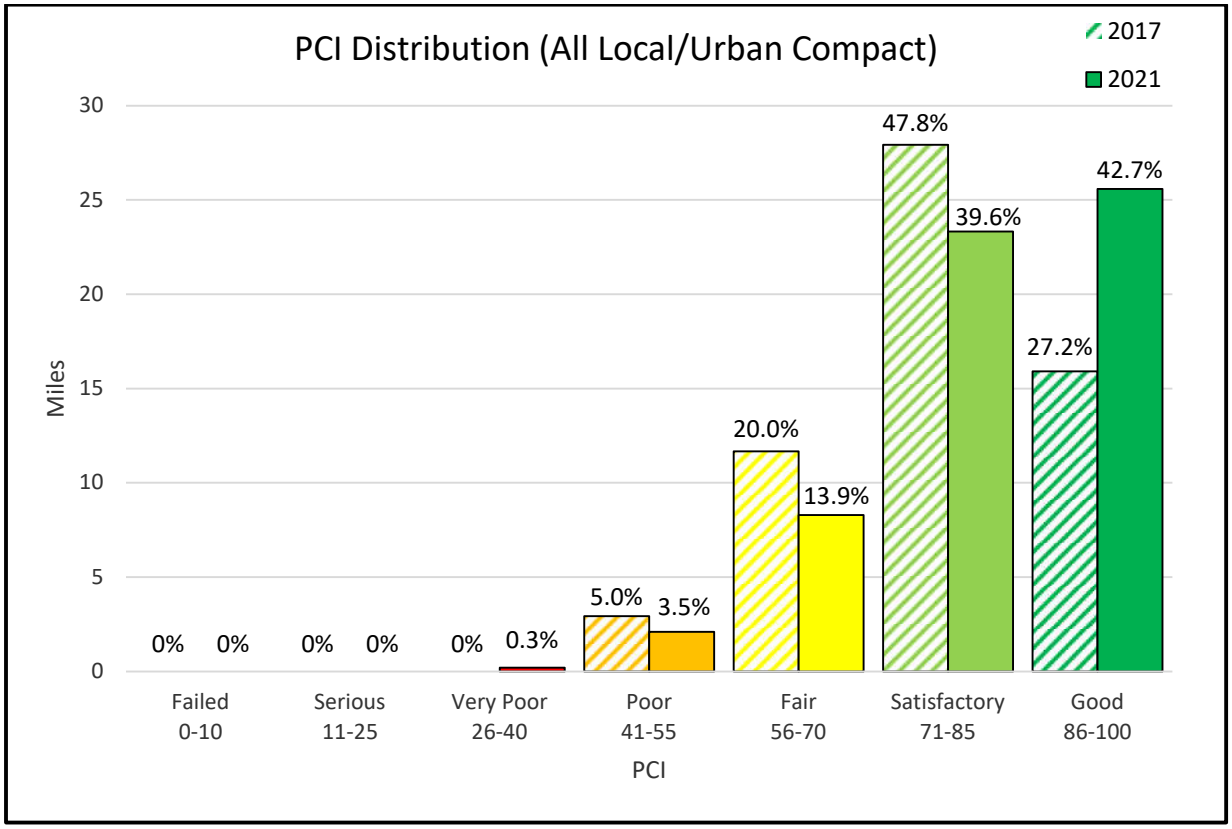


Figure 6 – PCI Distribution vs. Miles for 2021 (local/urban compact roads only)

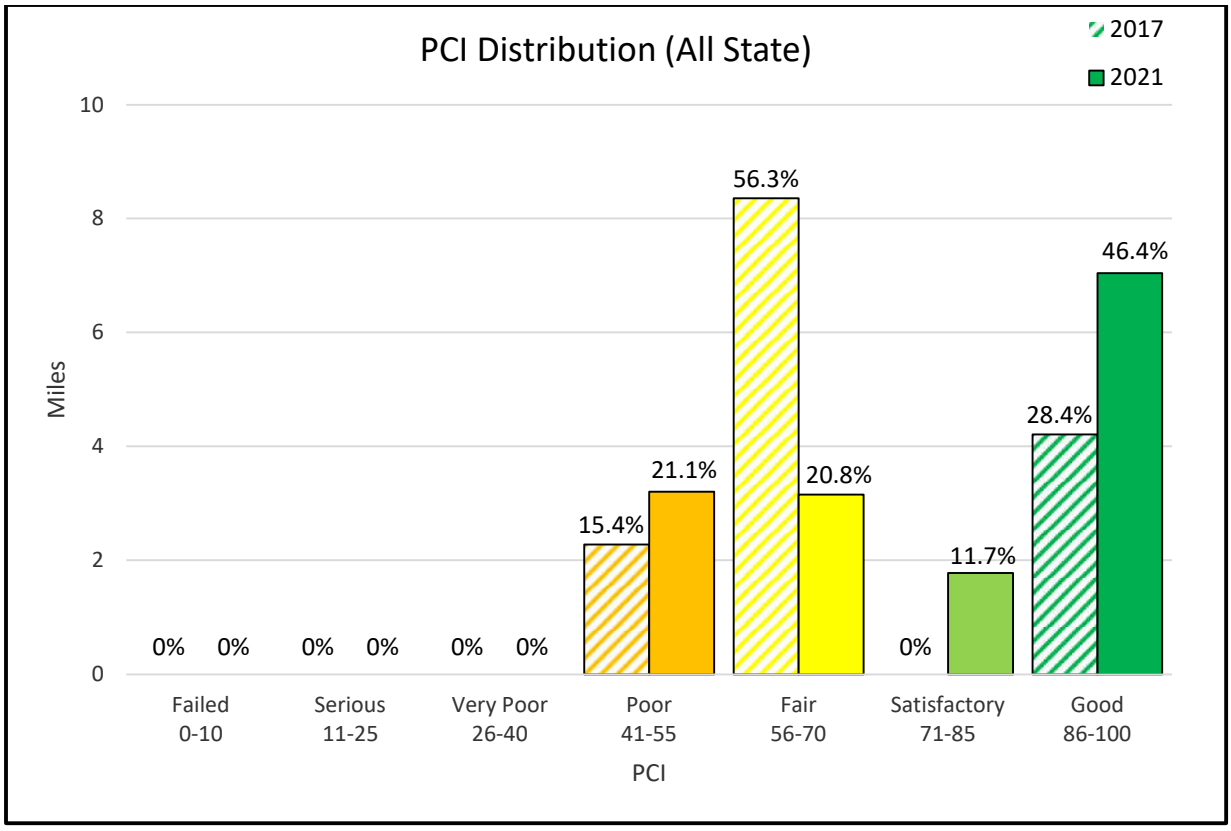


Figure 7 – PCI Distribution vs. Miles for 2021 (state roads only)

Treatment Alternatives

There are several treatment alternatives available for paved roadways. It is important to note that the treatment alternatives identified below are a result of the data collected in the field of the existing pavement conditions only. Drainage, safety issues, underground utilities etc. are not included in this assessment. It is recommended that the condition of the roadways be collected in the field approximately every three to four years. Over time, this will provide the Town of Gray with sufficient historical data to produce accurate deterioration curves for each family. This will further help to identify which roadways will need to be reconstructed or just overlaid. The typical treatment options are outlined below:

- *Crack Sealing:* This treatment uses a bituminous crack sealer to seal small pavement cracks; this approach prevents water from enlarging cracks through frost action.

- *Pothole Repair:* This treatment is a temporary repair to fill a pothole in the roadway, using a hot mix asphalt in the warm months, and a cold patch asphalt in the winter months.

- *Light Shim/Overlay:* Treatment alternative consists of a 3/4-inch shim course of pavement and a 1-inch surface course of pavement. The shim course, also known as a leveling course, is a thin layer of asphalt that is applied to the existing

pavement. It is intended to smooth out any distortion (rutting, small depressions, etc.) prior to the surface course. The shim allows for a more uniform roadway and for a more evenly compacted surface layer, which extends the pavement life and ride quality. This treatment can also be combined with milling (grinding the existing surface layer) of the pavement.

- *Heavy Shim/Overlay:* This treatment is similar to the light overlay, but uses a 1-inch shim and a 1 1/2-inch course of surface pavement to address a roadway build-up that has further deteriorated, and therefore needs a more structural treatment. This treatment can also be combined with milling (grinding the existing surface layer) of the pavement.

- *Reclaim:* A full-depth reclamation treatment pulverizes the existing pavement and mixes it with the existing base material. The material is then re-graded and prepared for a base course and surface course pavement. It is important to note that this treatment is not typically used in urban settings where a roadway has existing curb.

- *Reconstruction:* This treatment is a full reconstruction of the roadway; including the removal of all pavement as well as the gravel below. A new layer of gravel is then placed at a depth that is appropriate for the level of traffic and load the roadways is expected to receive. Finally, a new base course and surface course of pavement is placed.

Based on the PCI value, Paver™ assigns a maintenance category to each roadway section. Paver™ defines the categories based on the specified critical PCI (CPCI) value, the value at which the cost of applying localized preventative maintenance increases and the effectiveness decreases. This value is typically set at 65. The maintenance categories are outlined below:

Localized Preventative Maintenance & Repair (Localized M&R): Defined as distress maintenance activities performed with the primary objective of slowing the rate of deterioration in a localized area. This would include activities such as crack sealing, minor pothole repair, and light shim and overlays. This category is applied to pavements above the CPCI.

We typically recommend about 10 – 15% of the budget is used for crack seal applications. This process involves the placement of rubberized liquid asphalt in surface cracks of the pavement to prevent infiltration of water into the underlying pavement layers. The service life is typically 3 – 8 years however it can help minimize cracks from spreading on recently paved roads.

Major Maintenance & Repair Above Critical PCI (Major M&R **Above** CPCI): Activities applied to the entire pavement section to correct or improve structural and functional requirements for above CPCI. Treatment in this maintenance category is typically a heavy shim & overlay or mill & fill.

Major Maintenance & Repair Under Critical PCI (Major M&R **Below** CPCI): Activities applied to the entire pavement section to correct or improve structural and functional requirements for sections below CPCI. Treatments in this maintenance category range from a heavy shim & overlay to a full roadway reconstruction.

Localized Stopgap (Safety) Maintenance & Repair (Stopgap M&R): Defined as the localized maintenance and repair needed to keep the pavement operationally in a safe condition. Work like this would include repairing potholes that may damage vehicles or removing large bumps from the roadway. This category is typically applied to pavements below the CPCI and is intended to be temporary pending reconstruction.

The pavement condition indexes are an average PCI for the length of the roadway segment, so it is possible that one survey site has a much lower pavement condition rating compared to the remainder of the roadway segment. Before construction is scheduled for any roadway improvements, a site visit should be completed to determine the exact scope of work. It is important to note that as the condition of the roadways decline, the cost to repair the roadways increases; therefore, it is more cost effective to overlay roadways before they reach a point where they need to be reconstructed.

Treatment Alternatives

Localized Preventive M&R

- Crack Seal
- Patching
- Light Shim & Overlay

Major M&R

- Heavy Shim & Overlay
- Heavy Mill & Fill
- Reclaim & Repave
- Full Reconstruction

Localized Stopgap M&R

- Drag Shim
- Patching
- Mill & fill

Budget Analysis

It is our understanding that the Town's paving construction budget has been approximately $450,000 in recent years. This budget along with several other funding scenarios around the Town's budget range were evaluated to determine the relative effects on pavement conditions of local/urban compact roads only (state roads were excluded from all budgeting scenarios). Paver™ predicts future pavement conditions by creating a pavement deterioration curve based on the current PCI value and last construction date of each road shown in Figure 8 below. The pavement deterioration curve shown in Figure 8 is for the "local road" family.

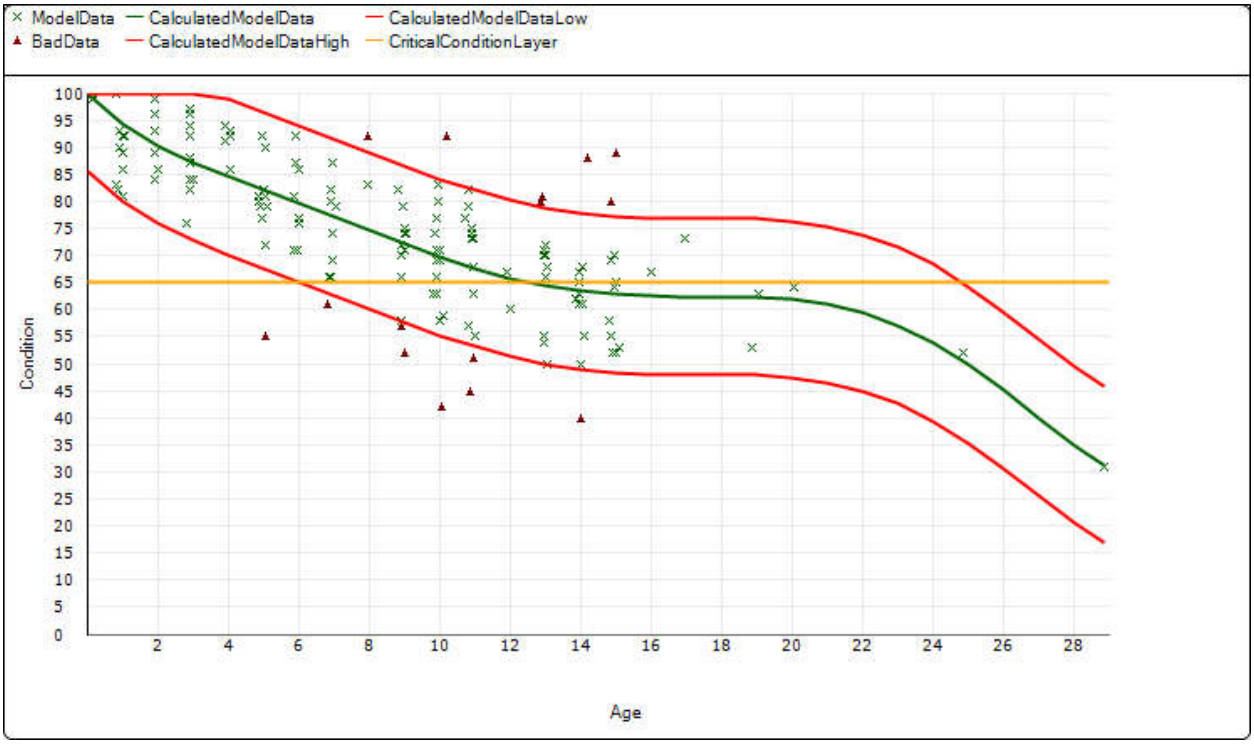


Figure 8 – Gray 2021 Pavement Deterioration Curve

Each road section is shown with a green "x" or a red triangle, which correspond to a road section's "Age" (years) and "Condition" (PCI). The green "x" indicates the road sections that were included in creating the pavement deterioration curve, and the red triangles indicate road sections not included in creating the pavement deterioration curve. Paver™ excludes sections with PCI levels outside of the PCI standard deviation, shown as red lines, in Figure 7. The roads that fall outside the red standard deviation lines are: Ambrose Circle (82), Frost Road (42), Hancock Street (52), Jenny Drive (40), Lawrence Road (81), Legrow Road (55), Lyons Point Road (89), Magnolia Drive (92), Mountain View Drive (92), Seagull Drive (61), Spruce Drive (57), and Totten Road (51). These roads are omitted from the deterioration curve to more accurately predict future pavement conditions. Note that the deterioration curve includes the road sections from the 2017 PCS and is why the PCIs listed above may not represent the current road PCI.

For the budgeting analysis, Paver's™ Maintenance and Repair (M&R) Work Planning feature was used to calculate the costs and consequences of different budget scenarios. We have assumed

that the Town's annual paving budget is only applied to the local/urban compact roads; therefore, this budget analysis only applies to those roads (not state roads).

Budget Scenarios

The M&R Critical PCI method was used for the funding scenarios presented below, which optimizes M&R activity against a specified budget, or determines the budget needed to maintain a specified condition level. The funding scenarios that we evaluated are as follows:

- **Zero Funding** – the "do nothing" approach; shows the effects of spending no money on improving or maintaining roadways.
- **Maintain Current PCI Level for 10 years** – this scenario shows what the cost would be to approximately maintain the Town's area-weighted average PCI (80.17) for 10 years.
- **Different Levels of Funding** – this scenario shows five other funding levels that include $300,000, $450,000 (Town's budget), $700,000, and $800,000 for 10 years.
- **Increase PCI Level to "Good" condition after 10 years** – this scenario shows what the cost would be to increase the Town's area-weighted average PCI (80.17) up to the "Good" condition (86 and above) after 10 years.

Paver's™ M&R analysis utilizes "cost by condition" tables to allocate funding to road sections when Paver™ deems fit. There are cost by condition tables for each maintenance category (Major, Preventive, Stopgap) that associate a square foot cost of maintenance and repair to PCI ratings. Paver™ includes default cost by condition tables based on studies conducted by the U.S. Army Corps of Engineers. GP backchecked the default cost per square foot values and determined that most were conservative. We adjusted the higher end of the 'full reconstruction' cost from $6.50/sf to $7.00/sf to better reflect local pricing. Table 3 below shows the Major M&R cost by condition table used for the M&R analysis in this report.

Table 3: Major M&R Cost By Condition Table

Treatment	PCI	Cost	Unit
Full Reconstruction	0.00	$7.00	SqFt
	10.00	$7.00	SqFt
	20.00	$7.00	SqFt
Heavy Mill & Fill	30.00	$6.50	SqFt
	40.00	$5.00	SqFt
	50.00	$3.80	SqFt
Heavy Shim & Overlay	60.00	$2.80	SqFt
	70.00	$1.75	SqFt
	80.00	No Major M&R	
	90.00		
	100.00		

Tables 4 and 5 below show the Preventive and Stopgap "cost by condition" tables used for the M&R analysis in this report, respectively. GP did not adjust these cost tables due to the variability in treatment alternatives and their associative costs. Similar to the Major M&R square foot costs, the Preventive and Stopgap square foot costs also appear to be conservative when compared to typical stopgap and preventative pavement treatments. For these reasons, Paver's™ default cost by condition tables developed by U.S. Army Corps of Engineers were used for Preventive and Stopgap M&R Work Planning.

Table 4: Preventive M&R Cost by Condition Table

PCI	Cost	Unit
0.00	No Preventive M&R	
10.00		
20.00		
30.00		
40.00		
50.00		
60.00	$0.20	SqFt
70.00	$0.05	SqFt
80.00	$0.01	SqFt
90.00	$0.01	SqFt
100.00	$0.01	SqFt

Table 5: Stopgap M&R Cost by Condition Table

PCI	Cost	Unit
0.00	$0.60	SqFt
10.00	$0.50	SqFt
20.00	$0.20	SqFt
30.00	$0.04	SqFt
40.00	$0.02	SqFt
50.00	$0.01	SqFt
60.00	$0.01	SqFt
70.00	No Stopgap M&R	
80.00		
90.00		
100.00		

Summary of Budget Scenarios

Paver's™ M&R software analyzed the given scenarios and funding levels for the local/urban compact roads only (state roads were excluded from these budgeting scenarios). As stated before Paver's™ M&R Work Plan analysis philosophy is to "keep good roads good". Paver™ focuses on allocating funds towards pavement preservation over reconstructing the roads in the worst condition first. A summary of the results is shown in Table 6. For additional Condition Distribution Graphs and figures for each scenario refer to Appendix B.

Table 6 – Local/Urban Compact Road Funding Scenarios

Funding Scenario	Cost/year	2021 PCI	2031 PCI
1) No Funding	$0	80.17	63.61
2) $300,000 budget for 10 years	$300,000	80.17	69.47
3) $450,000 budget for 10 years (current budget)	$450,000	80.17	78.11
4) Maintain PCI for 10 years	**$560,000**	**80.17**	**79.69**
5) $700,000 budget for 10 years	$700,000	80.17	81.52
6) $800,000 budget for 10 years	$800,000	80.17	82.38
7) Increase PCI to "Good" ($1,050,000) over 10 years	$1,050,000	80.17	86.05

Each PCI is an area-weighted average for local/urban compact roads only. A standard annual inflation rate of 3% was used in all the funding scenarios. The starting PCI for each scenario is the current area-weighted average PCI of 80.17 (local/urban compact roads only) that was calculated immediately after data input completion (August 1, 2021). A tolerance of one (+/- 1) PCI was used for the iteration for scenario 4.

Paver's™ M&R analysis internally decides where to spend the available funding. There is an option to specifically direct certain percentages of funding into Localized M&R and Major M&R separately, however, there are an infinite number of scenarios that can be created in terms of how to budget and spend money on paving projects. For this reason, Paver's™ default decision making was used. See below for the Local/Urban Compact Road Conditional Distribution Graphs that accompany the local/urban compact road budgeting scenarios presented in Table 6.

Scenario 1: No Funding (do nothing approach)

A "do nothing" approach will result in a PCI drop from 80 to 63 in 10 years. Figure 9 shows a condition distribution graph with no funding for 10 years. The figure shows the elimination of road sections in "Good" condition and a big increase in the "Fair" condition by 2031. Appendix B shows more graphs relating to each scenario.

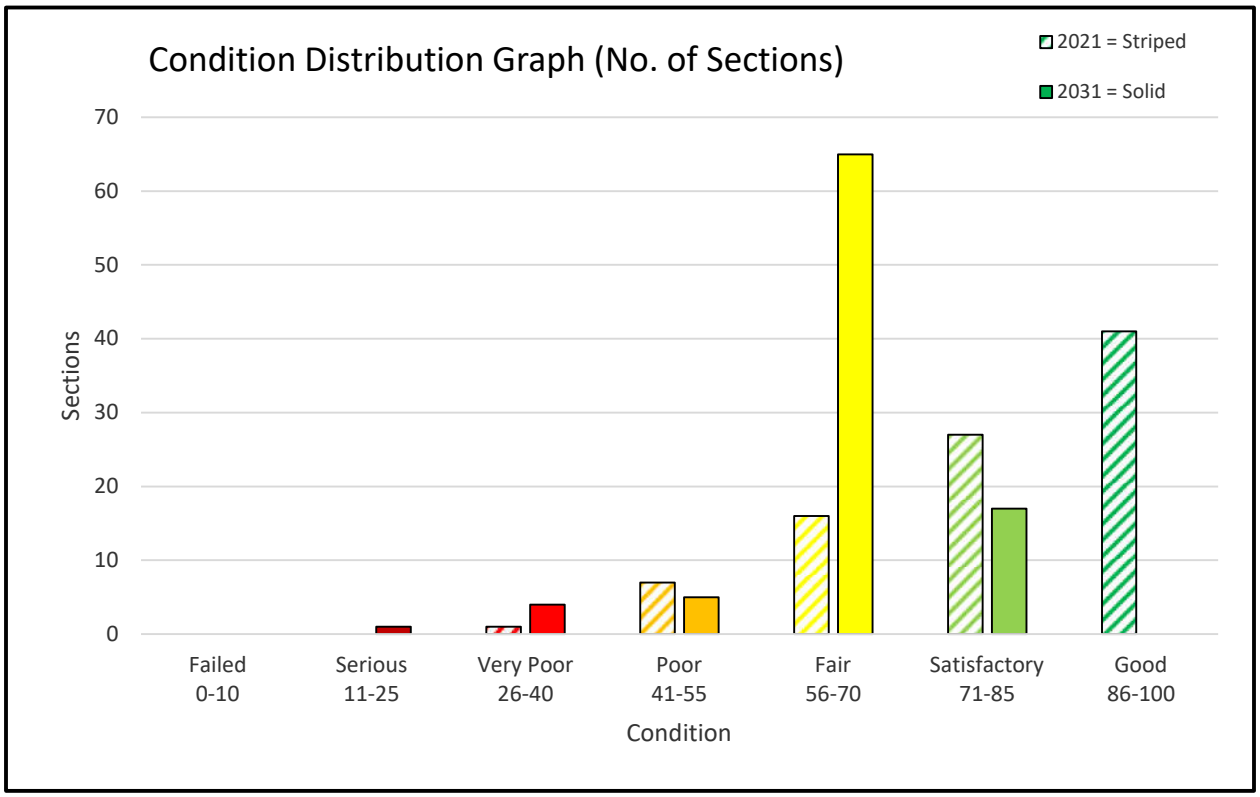


Figure 9 – Local/Urban Compact Road Condition Distribution Graph 2021 vs. 2031

Scenario 2: $300,000 budget per year for 10 years

This scenario projects future conditions for a $300,000 budget for 10 years on local/urban compact roads only. Figure 10 shows a large decrease in the "Good" condition and a large increase in the "Satisfactory" and "Fair" conditions by 2031. Note that the increase in the "Satisfactory" condition is largely due to the low funding level inhibiting the maintenance required to keep roads sections in "Good" condition. Refer to Appendix B for more graphs.

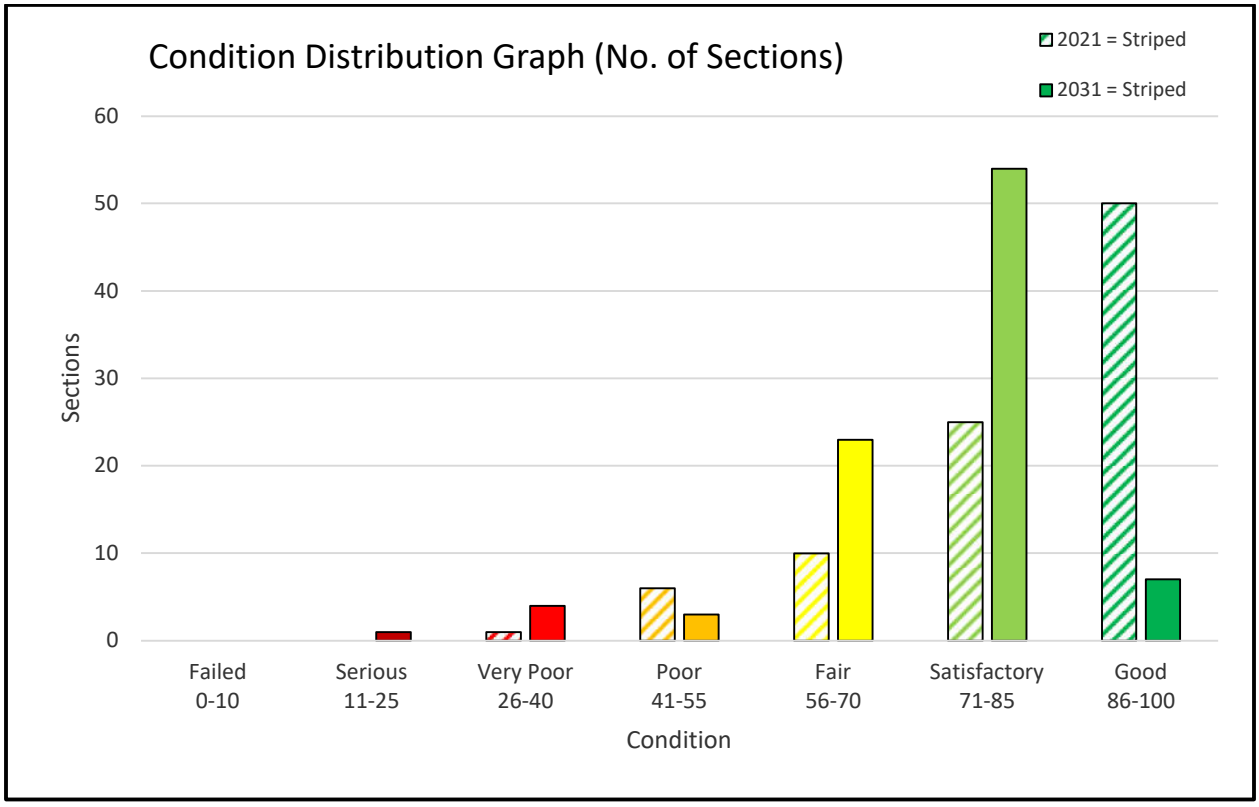


Figure 10 – Local/Urban Compact Road Condition Distribution Graph 2021 vs. 2031

Scenario 3: $450,000 budget per year for 10 years (Town's current budget)

This scenario projects future conditions if the Town maintained the current budget ($450,000) on local/urban compact roads for the next 10 years. Figure 11 shows a decrease in the "Good" condition and large increase in the "Satisfactory" condition by 2031. Refer to Appendix B for more graphs.

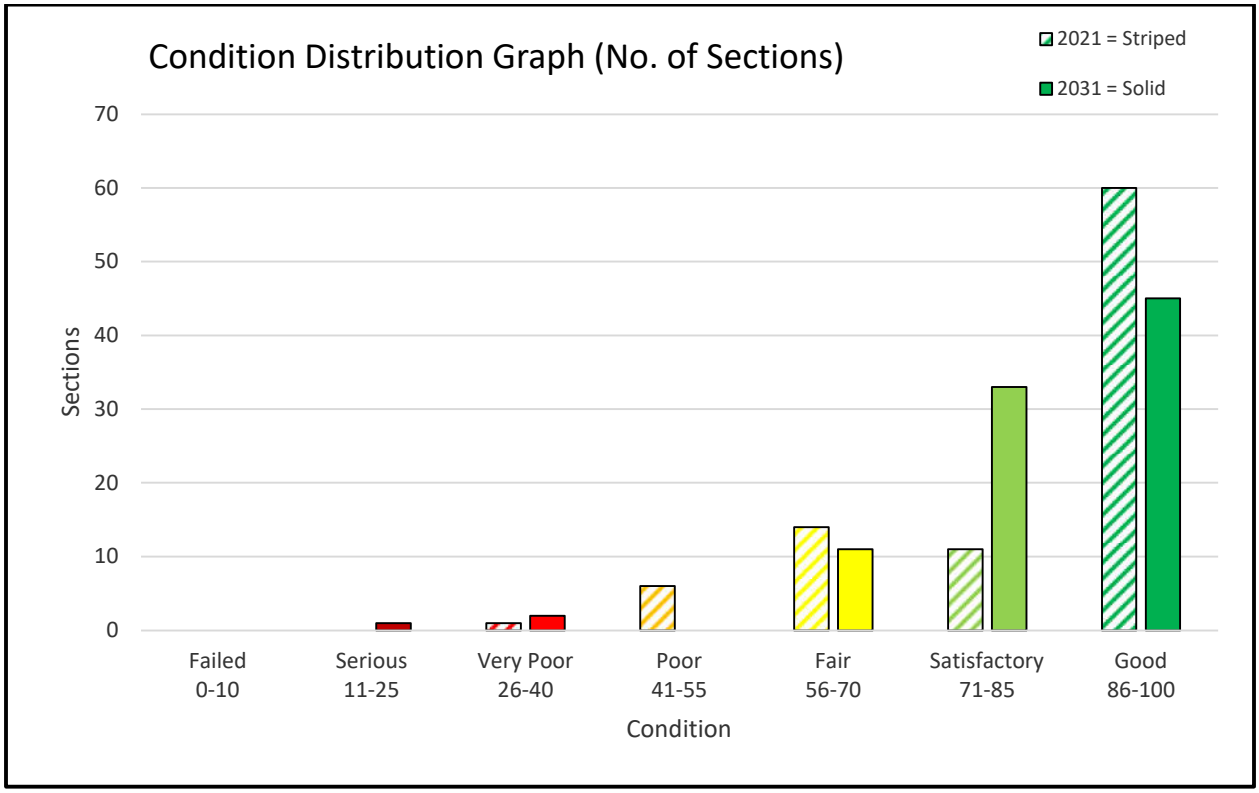


Figure 11 – Local/Urban Compact Road Condition Distribution Graph 2021 vs. 2031

Scenario 4: Maintain PCI budget per year for 10 years

For this scenario, Paver™ computed the annual funding for 10 years required to maintain the existing local/urban compact PCI of 80.17. The $560,000 budget per year was split between Stopgap, Preventive, and Major M&R. Figure 12 shows a decrease in "Fair" or worse conditions and an increase in the "Satisfactory" condition by 2031. There is a decrease in "Good" condition in 2031 due to Paver's™ "keep good roads good" philosophy. It will not reconstruct a road that is in adequate condition just to reach the target PCI (80.17). Refer to Appendix B for more graphs.

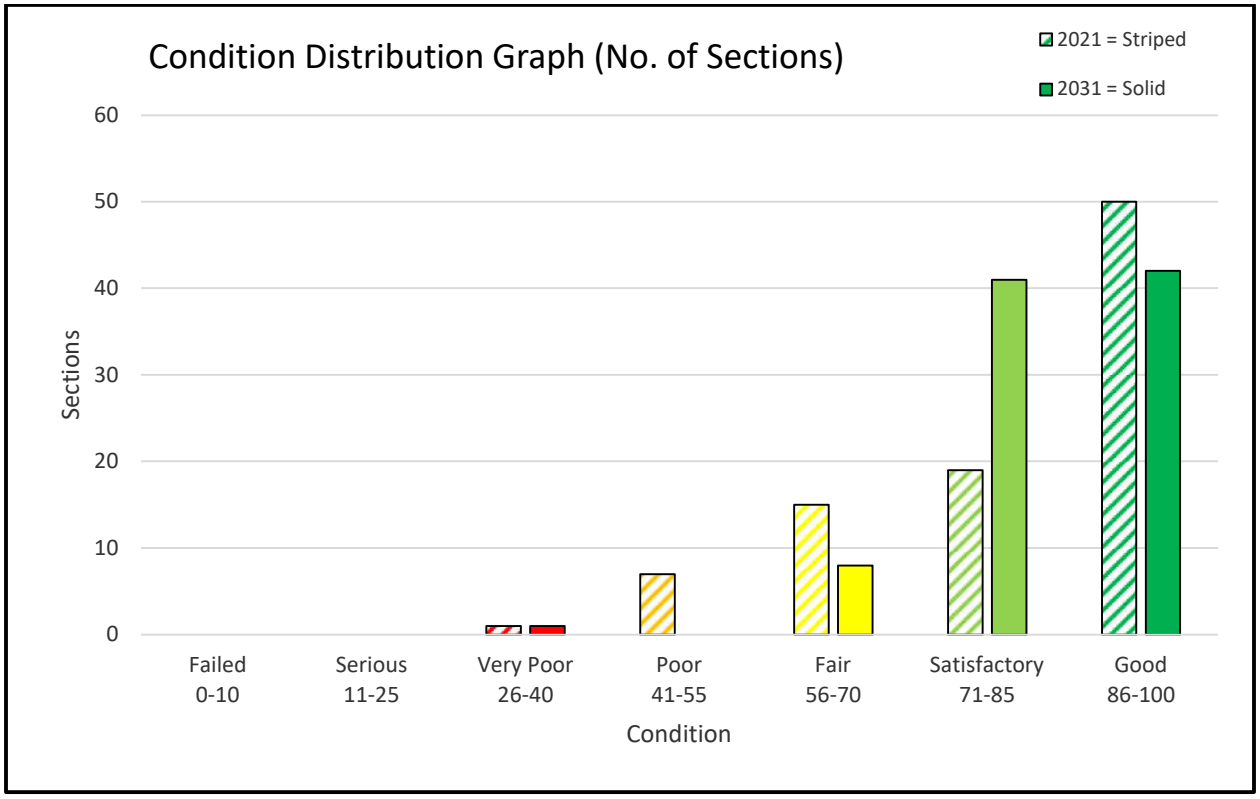


Figure 12 – Local/Urban Compact Road Condition Distribution Graph 2021 vs. 2031

Scenario 5: $700,000 budget per year for 10 years

This scenario projects future conditions for a $700,000 budget for 10 years on local/urban compact roads only. Figure 13 shows an increase in the "Satisfactory" and "Good" conditions and the elimination of "Very Poor" condition and near elimination of the "Poor" condition by 2031. Refer to Appendix B for more graphs.

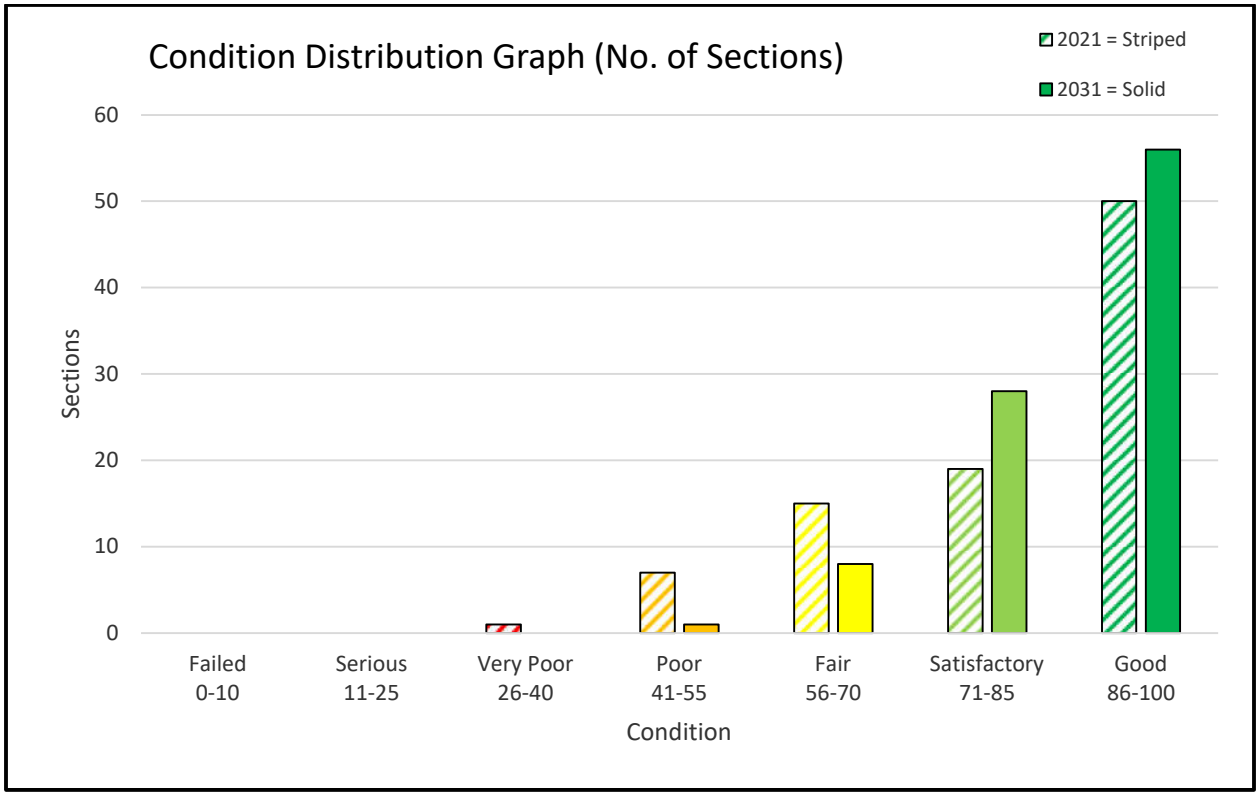


Figure 13 – Local/Urban Compact Road Condition Distribution Graph 2021 vs. 2031

Scenario 6: $800,000 budget per year for 10 years

This scenario projects future conditions for a $800,000 budget for 10 years on local/urban compact roads only. Figure 14 shows an increase in the "Good" condition and decrease in all other conditions by 2031. The main difference between this scenario and Scenario 5 ($700,000 budget per year for 10 years) is that the increased funding level allows for more road reconstruction and preventive maintenance resulting in an increase in the "Good" condition. Refer to Appendix B for more graphs.

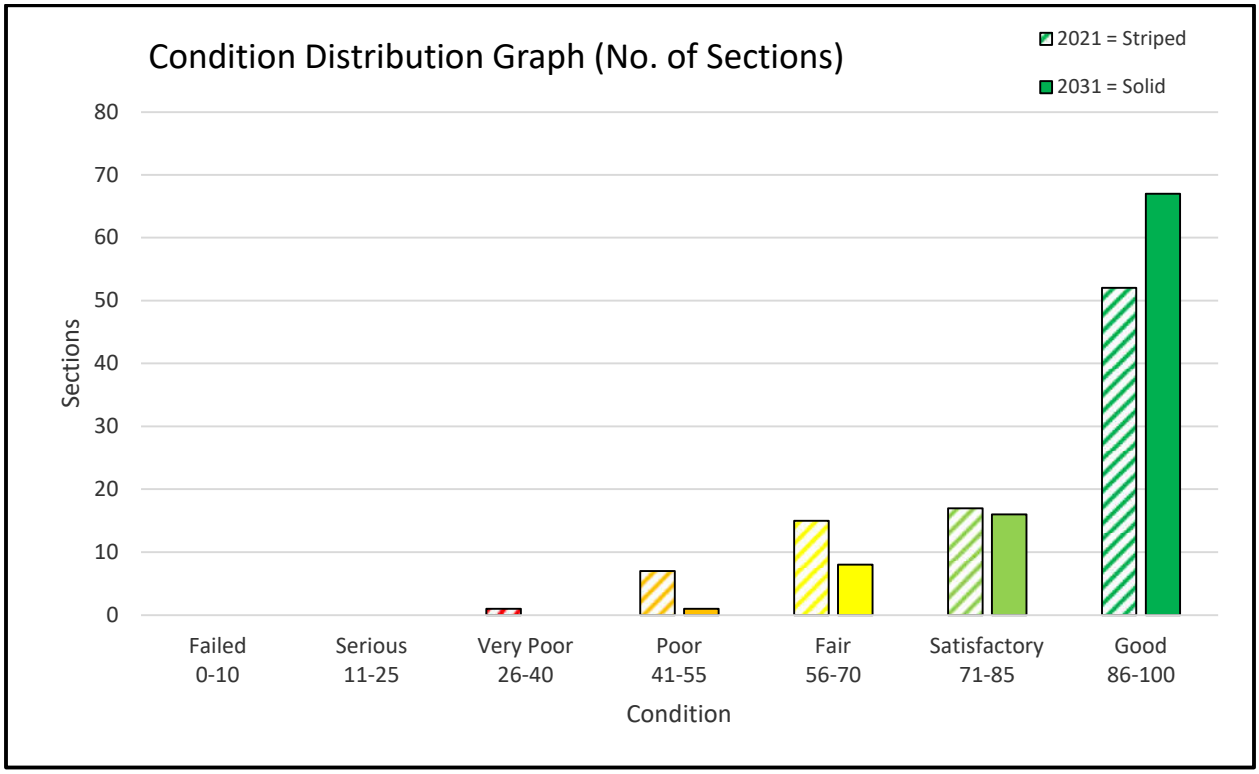


Figure 14 – Local/Urban Compact Road Condition Distribution Graph 2021 vs. 2031

Scenario 7: Increase PCI Level to "Good" ($1,050,000 annual budget for 10 years)

For this scenario, Paver™ computed that a $1,050,000 annual budget for 10 years is required to raise the existing local/urban compact PCI of 80.17 to the "Good" condition (PCI 86 to 100). Figure 15 shows an increase in the "Good" and "Satisfactory" condition and decrease in all other conditions by 2031. The main difference between this scenario and Scenario 6 ($800,000 budget per year for 10 years) is that the increased funding level allows for more road reconstruction and preventive maintenance resulting in an increase in the "Good" and "Satisfactory" condition. Refer to Appendix B for more graphs.

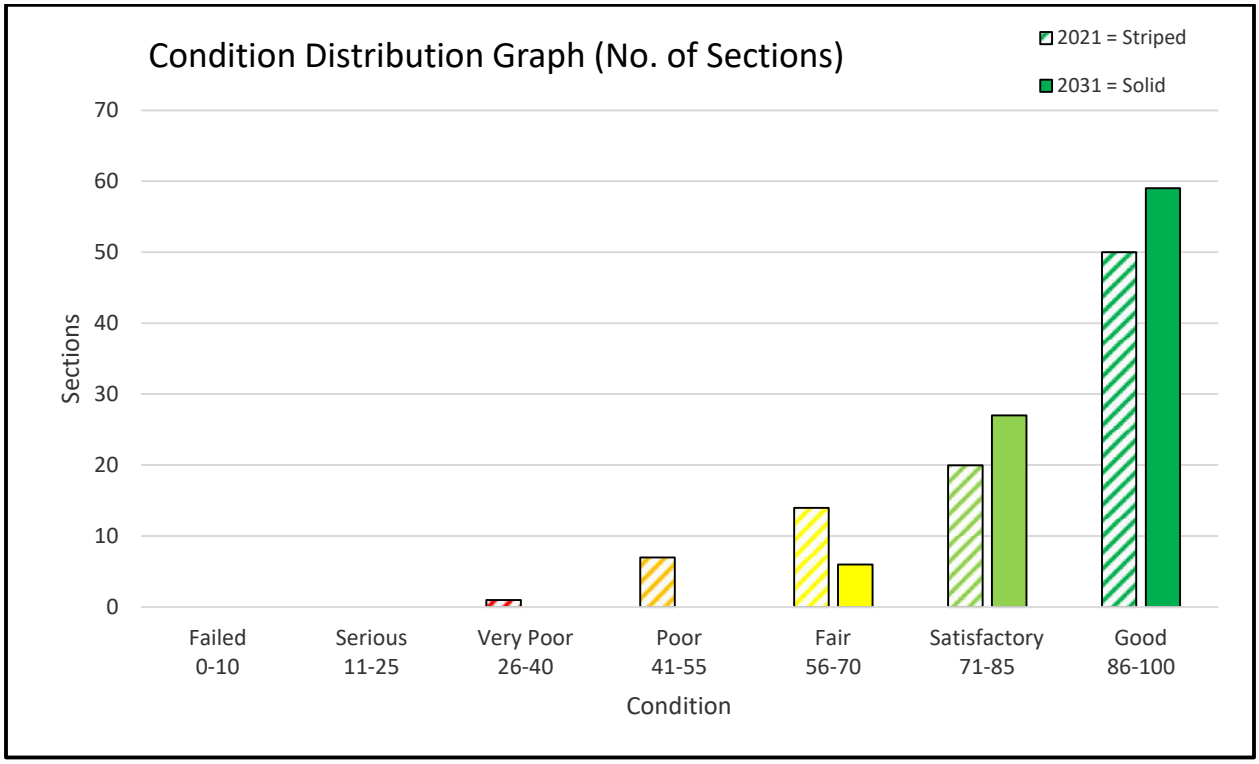


Figure 15 – Local/Urban Compact Road Condition Distribution Graph 2021 vs. 2031

Sidewalk Assessment

In addition to the roadway pavement assessment, the Town retained GP to evaluate the existing sidewalks within the Town, totaling 2.9 miles across seven roads. Within these sections of sidewalks, are 47 ramps that were also reviewed as part of the sidewalk assessment. GP recorded observations along all known Gray sidewalks. Observations included surface deterioration, uplifts, obstructions, cross slopes, and width. Private sidewalks and/or sidewalks associated with public facilities (Town Office, Library, etc.) were not included in the assessment.

A sidewalk assessment was conducted to provide the Town with a wholistic understanding of their sidewalk network current condition and accessibility. Similar to roadway pavement management, the sidewalk assessment helps inform the Town of the current maintenance and repairs costs associated with the existing sidewalks. This report will support future capital improvements to the existing network as well as budgeting for expansion to enhance accessibility to the downtown area.

Types of Distresses

Each sidewalk was surveyed entirely to identify conditions potentially impacting pedestrians. The following conditions were reviewed:

- *Uplift* is a vertical change in height along a sidewalk that exceeds ½ inch at its highest point. This can occur at sections of sidewalk where multiple panels meet or where surface cracks exist.

- *Cracking* is at locations where the sidewalk surface (typically bituminous, concrete, or brick) has cracked and shows signs of vertical/horizontal movement.

- *Settling* is the sinking of sidewalk panels that creates differential elevations on either side of the panels. Settling will often create ponding issues which will further deteriorate the sidewalk material and pose as a potential slip hazard in freezing climates.

- *Running Slope* is the slope measured in the direction of travel. Typically parallel with the curb and roadway alignment.

- *Cross Slope* is the slope measured perpendicular to the direction of travel (running slope).

- *Obstruction* is an object that reduces the sidewalk width to less than 48 inches. These objects can be fixed (utility poles, hydrants, signs, etc.) or vegetated (trees, shrubs, etc.).

- *ADA* compliance was evaluated based on the accessibility standards issued under the Americans with Disabilities Act (ADA) adopted in 2010. The ADA standards include several dimensional and slope requirements that relate to the other sidewalk conditions described above, specifically cross slopes, clear width, and running slopes.

The full length of each sidewalk was evaluated using the conditions described above. Although it is difficult to evaluate 100% of the sidewalk surface, GP walked each sidewalk and reviewed the general condition and measured conditions at a 25-foot spacing.

Sidewalk Condition Rating

Unlike the roadway PCI where specific "samples" were surveyed, the sidewalk condition was evaluated using the full length of each sidewalk. The rating system is based on a sidewalk condition assessment methodology developed by the SDOT which generally aligns with the international ISO 55000 transportation asset standards. The assessment used wholistic sidewalk conditions, ADA standards, and other conditions (uplift, settling, cracking, obstructions) to score each sidewalk with the following rating:

Condition	Score	Description
Excellent	**100**	➢ No observable issues along the pedestrian clear width ➢ clear width (> 48") ➢ compliant cross slope (< 2%)
Good	**85 – 99**	➢ Minor issues along clear width ➢ Sidewalk extends full length of block with no discontinuities ➢ Minor uplifts and of sidewalk requires replacement (< 5%) ➢ May have clear width (36" – 48") ➢ Primary cross slope (2 – 4%)
Fair	**45 – 84**	➢ Medium severity issues along clear width ➢ Discontinuities exist that may impact mobility ➢ Sidewalk requires replacement (5 – 25%) ➢ May have clear width (24" – 36") ➢ Primary cross slope (4 – 6%)
Poor	**5 – 44**	➢ Severe issues along clear width ➢ Discontinuities exist that may impact mobility ➢ Sidewalk requires replacement (25 – 75%) ➢ May have clear width (12" – 24") ➢ Primary cross slope (6 – 8%)
Very Poor	**0 – 4**	➢ Widespread severe issues along clear width ➢ Discontinuities exist that may impact mobility ➢ Sidewalk requires replacement (75 – 100%) ➢ May have clear width (< 12") ➢ Primary cross slope (> 8%)

Figure 16 – Sidewalk Rating Scale

Sidewalk Conditions

For this report, all sidewalks along public roads were evaluated. Sidewalks located on private roads/sites were not included. Additionally, sidewalks associated with public facilities (library, town office, etc.) were also excluded from this study. Each sidewalk segment was assigned a visual condition rating (0 – 100) which represents a wholistic condition of the sidewalk while considering ADA compliance. The current length-weighted average condition rating for the total 2.9 miles of sidewalks in Gray is **89.1**, and the arithmetic average is **70.4**. The length-weighted average is similar to the arithmetic average, but the footage of each road section is factored in. The condition rating of longer sidewalk sections has a greater influence (carry more weight) on the length-weighted average rating than shorter sidewalk sections. In this report only the length-

weighted average is used. The recent Shaker Road sidewalk improvement project had significant influence on the length-weighted average as the project included reconstructing 55% (1.57 miles) of the Town's sidewalk network. The full list of sidewalk inventory is included in Appendix C. Similar to the roadway survey, the sidewalks were evaluated based on the condition of the surface and did not assess the subsurface conditions, drainage, and signage. See Figure 17 below for a summary of the length-weighted average condition rating for Town sidewalks.

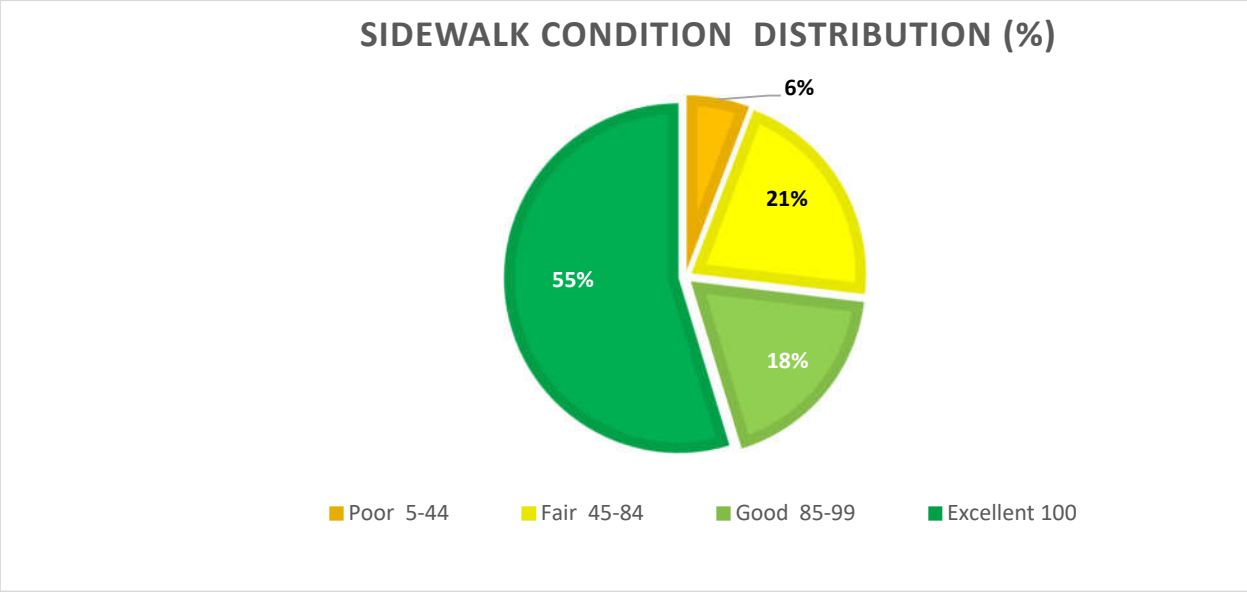


Figure 17 – Length-weighted average condition (sidewalks)

In addition to sidewalks, a separate inventory of the existing sidewalk ramps was documented and included in Appendix C. Sidewalk ramps are typically located at intersecting streets where the sidewalk transitions to a roadway crossing (i.e. crosswalk). In some cases, crossings are not located at intersecting streets but at high volume locations that provide pedestrian connectivity to either side of the road. These locations are often called "mid-block crossings". As noted above, sidewalks (and ramps) associated with public facilities (Town Office, Library, etc.) were not included in the survey. The Town has a total of 47 sidewalk ramps along public roadways. Approximately **40** ramps (85%) were noted as meeting ADA standards.

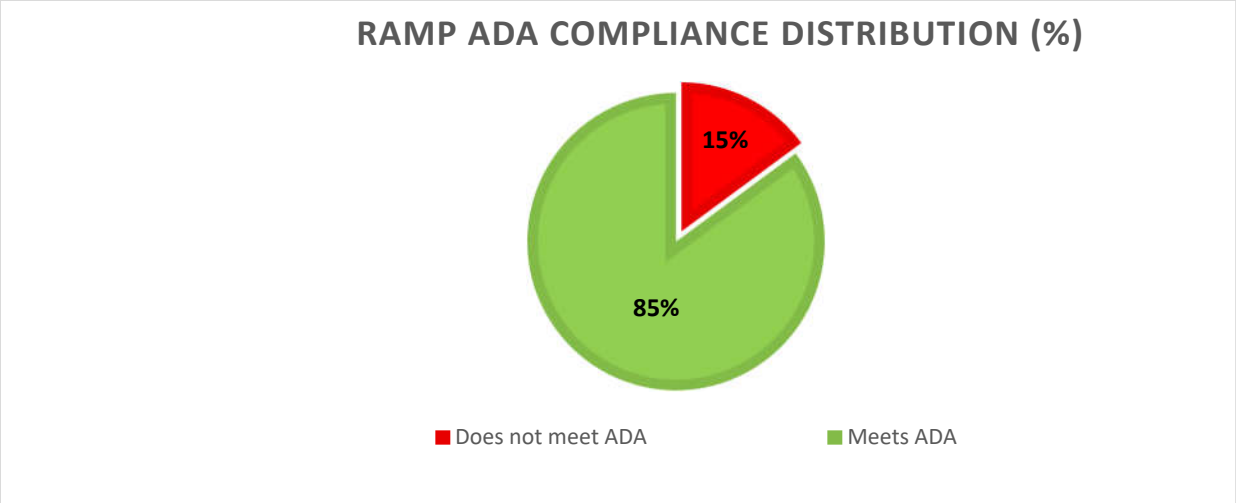


Figure 18 – Percentage of Sidewalks in each Condition

A breakdown of each sidewalk segment condition can be found in Table 7 below. The table provides a summary of the critical elements.

Table 7 – Sidewalk Condition Summary Table

Roadway (Segment ID)	Figure #	From	To	Length (feet)	Condition Rating
Brown Street (1)	2	Main Street	Yarmouth Rd	750	87 (Good)
Brown Street (2)	2	Aroma Joes	Main St	160	75 (Fair)
Lewiston Road (1)	3	Main St	American Legion	1570	80 (Fair)
Libby Hill Road (1)	6	Shaker Rd	GNG High School	690	84 (Fair)
Main Street (1)	4	Yarmouth Rd	Brown St	210	39 (Poor)
Main Street (2)	4	Brown St	Town Office	950	85 (Good)
Main Street (3)	4	Town Office	#26 Main St	180	20 (Poor)
Main Street (4)	4	Lewiston Rd	#13 Main St	290	70 (Fair)
Main Street (5)	4	#13 Main St	Shaker Rd	110	55 (Fair)
Main Street (6)	4	Shaker Rd	W Gray Rd	350	73 (Fair)
Portland Road (1)	5	Gray Plaza	#15 Portland Rd	350	44 (Poor)
Portland Road (2)	5	#15 Portland Rd	#11 Portland	100	37 (Poor)
Portland Road (3)	5	#11 Portland Rd	Mobil Gas Station	500	87 (Good)
Portland Road (4)	5	Mobil Gas Station	Yarmouth Rd	40	25 (Poor)
Shaker Road (1)	6	#138 Shaker Rd	Hannaford Drive	190	87 (Good)
Shaker Road (2)	6	Libby Hill Rd	Seagull Dr	200	82 (Fair)
Shaker Road (3)	1	#69 Shaker Rd	Main St	4600	100 (Excellent)
Shaker Road (4)	1	#50 Shaker Rd	Main St	3700	100 (Excellent)
Yarmouth Road (1)	2	Hancock St	Brown St	50	90 (Good)
Yarmouth Road (2)	2	Brown St	#19 Yarmouth Rd	350	88 (Good)

The full sidewalk inventory can be found in Appendix C. The inventory includes the following elements for each segment:

- Visual Condition Assessment (0 – 100)
- Surface Material Type (pavement, concrete, brick, etc.)
- Curb Material Type (bituminous, concrete, etc.)
- Length (feet)
- Trip Hazard (low, medium, high severity)
- ADA compliant (Y or N)
    - Width = min. 4' (excludes curb)
    - Cross Slope = max. 2% (1:48)
    - Running Slope = max. 5% (1:20)

The full ramp inventory can also be found in Appendix C and includes the following elements for each ramp:

- Visual Condition Assessment (0 – 100)
- Surface Material Type (pavement, concrete, brick, etc.)
- ADA compliant (Y or N)
    - Turning Space (min. 4'x4')
    - Clear Space (min. 4'x4')
    - Flare Slope = max. 10%
    - Cross Slope = max. 2%
    - Running Slope (%) = max. 8.3%
    - Detectable Warning Field (Y or N)

In order for the sidewalks/ramps to be considered compliant with ADA standards, the segment must meet all of the standards listed above under the 'ADA compliant' bullet. It should be noted, the survey was conducted on foot and measurements were taken at an average spacing of 25-feet.

Treatment Alternatives

Sidewalk treatments have more limited options compared to roadway treatments. Depending on the surface material, there are different maintenance and repair options for sidewalks. In Gray, most of the sidewalks are comprised of bituminous pavement with the exception of brick sidewalks on Main Street. As previously stated, the assessment is based on surface conditions only. Drainage, safety issues, underground utilities etc. are not included in this assessment. The typical maintenance and repair options are separated into two (2) categories:

Minor Maintenance & Repair: Defined as repair maintenance activities performed with the primary objective repairing deteriorated sidewalk sections or isolated areas. These repairs are needed to keep the sidewalk operational and safe pedestrians. This would include activities such as pothole repairs, repave, or drag shims. This category applies to all sidewalk condition categories however is intended to repair isolated sections in poor condition. This category can also be applied as a stopgap keep sidewalks in "Poor" and "Very Poor" condition operational. Descriptions of each activity are provided below:

- *Pothole Repair:* This treatment is a temporary repair to fill a pothole in the sidewalk, using a hot mix asphalt in the warm months, and a cold patch asphalt in the winter months. This eliminates potential trip hazards and keeps the sidewalk operational. This temporary repair can be used on all surface materials however will function the best on bituminous sidewalks. Brick sidewalks can also be repaired with new bricks, if desired, to provide a more aesthetically pleasing product. Refer to the Brick Reconstruction description below for details.

- *Drag Shim:* This treatment alternative is also a temporary repair and consists of a 3/4-inch shim course of pavement. The shim course, also known as a leveling course, is a thin layer of asphalt that is applied to the existing pavement. It is intended to smooth out any distortion (uplifts, settling, etc.) and provide adequate cross slope. The shim allows for a more uniform sidewalk which ensures surface runoff drains to the gutter while also improving walkability for pedestrians. This treatment should not be used in downtown urban settings where grades are especially sensitive around buildings, doorways, and ramps.

Major Maintenance & Repair: Defined as repair maintenance activities performed with the primary objective of reconstructing sidewalks to improve base materials, drainage, and ADA compliance. This would include activities such as resetting/replacing curb, new gravel, new pavement, and adding detectable warning fields. This category is applied to sidewalks in "Poor" and "Very Poor" condition. Descriptions of each activity are provided below:

- *Repave:* This treatment includes removing the existing sidewalk pavement entirely and repaving to an average depth of 2-inches. The new pavement allows for a more uniform sidewalk which ensures surface runoff drains to the gutter while also improving walkability for pedestrians. Although the intent is for the existing curb to remain in-place, some curb may have to be reset to meet ADA standards.

- *Bituminous Reconstruction:* This treatment is a full reconstruction of the sidewalk; including the removal of all pavement as well as the gravel below. The existing curb is either reset or replaced with new curb. The curb is set at a uniform height relative to the adjacent roadway. A new base layer of gravel is then added and a new sidewalk surface is installed (bituminous pavement or concrete). Additionally, ramps and landings are reconstructed in accordance with ADA standards. Intersecting driveways are regraded to provide accessible route connection.

- *Brick Reconstruction:* This treatment includes all of the worked described in the Bituminous Reconstruction however the surface material includes a bituminous base, a sand-cement layer, followed by brick pavers assembled to a uniform surface and slope.

Budget Analysis

For the purpose of budgeting sidewalk improvements, we have prepared budget scenarios for all treatment alternatives and applied them to the sidewalks that currently fall into the "Fair" and "Poor" conditions. The cost associated with each treatment alternative (Minor and Major M&R) are based on a cost per foot and assume an average sidewalk width of 5-feet. Before the Town implements any M&R treatments, the sidewalks should be evaluated more closely to identify other cost considerations such as drainage improvements, condition of curb, utility relocation, etc. Table 8 below provides budget costs for each treatment alternative:

Table 8 – Sidewalk Maintenance & Repair Budget Costs

Sidewalk Treatment Alternative	Cost
Minor M&R	
Pothole Repair	$8/foot
Drag Shim	$15/foot
Major M&R	
Repave	$50/foot
Bituminous Reconstruction	$100/foot
Brick Reconstruction	$165/foot

The Minor Maintenance & Repair budgeting costs (provided above in Table 7) have been applied to all sidewalks currently in "Fair" and "Poor" condition. Table 9 below provides budgeting costs for each sidewalk:

Table 9 – Minor M&R Sidewalk Budget Scenario Costs

Sidewalk Section	Length	Pothole Repair Cost	Drag Shim Cost
Brown Street (2)	750'	$6,000	$11,250
Lewiston Road (1)	1,570'	$12,560	$23,550
Libby Hill Road (1)	690'	$5,520	$10,350
Main Street (1)	210'	$1,680	$3,150
Main Street (3)	180'	$1,440	$2,700
Main Street (4)	290'	$2,320	$4,350
Main Street (5)	110'	$880	$1,650
Main Street (6)	350'	$2,800	$5,250
Portland Road (1)	350'	$2,800	$5,250
Portland Road (2)	100'	$800	$1,500
Portland Road (4)	40'	$320	$600
Shaker Road (1)	200'	$1,600	$3,000

The Major Maintenance & Repair budgeting costs (provided above in Table 8) have been applied to all sidewalks currently in "Poor" condition. Table 10 below provides budgeting costs for each sidewalk:

Table 10 – Major M&R Sidewalk Budget Scenario Costs

Sidewalk Section	Length	Repave Cost	Reconstruction Cost
*Main Street (1)	210'	$10,500	$34,650
*Main Street (3)	180'	$9,000	$29,700
Portland Road (1)	350'	$17,500	$35,000
Portland Road (2)	100'	$5,000	$10,000
Portland Road (4)	40'	$2,000	$4,000

*Assumes Brick Reconstruction

Given the limited sidewalks in Gray (2.9 miles total), we have not included sidewalk maintenance and repair costs (Major or Minor) in any of the funding scenarios provided in this report. However, the Town may incorporate sidewalk improvements into the workplan as budget allows.

Conclusion

This report was prepared to assist the Town with their long-term planning for street repairs and maintenance as well as to provide a current snapshot of the existing roadway pavement conditions. A total of 74.7 miles of roads were evaluated, including 59.5 miles of local/urban compact roads and 15.2 miles of state roads. Overall, approximately 96.2% of the Town's roadways are in "Fair" or better condition, however, 3.8% are in "Poor" to "Failed" condition. The cost to maintain a roadway in this 3.8% will likely be four to six times higher than a road that is in "Fair" or better condition. This is why it is important for the Town to continue a maintenance schedule on "Good" roads while working to upgrade the roads in "Poor" or worse conditions. The Town's current average budget of approximately $450,000 is a good effort to maintain roads in the network that are in "Fair" to "Good" conditions. Again, all funding scenarios in this report were allocated towards local/urban compact roads only (states roads were excluded from all budgeting scenarios). Within each funding scenario, we recommend about 10 – 15% of the total budget is allocated to crack sealing recently paved roads. This will help minimize any surface cracks from spreading. Each funding scenario provided in this report includes crack sealing under the localized preventative maintenance and repairs costs.

Approximately 78.9% of the State road miles are in the "Fair" or better condition. It appears Egypt Road, one section of North Raymond Road, and two sections of North Yarmouth Road have been paved since the last study in 2017. Note that two sections of Yarmouth Road and a small portion of the third section were paved in 2021, and as result, the sections were combine to a single section with the same 2021 construction date. As previously stated, this report does

not address other factors along the roadways such as subbase gravel condition, pavement condition below surface, drainage, safety, signage, etc.

The Town sidewalks are overall in "Good" condition based on the length-weighted average. The Town's recent Shaker Road Sidewalk Improvement project is the primary contributor to the "Good" condition rating as the project covered over 50% of the Town's total sidewalk network.

Updating Paver Database

Gorrill Palmer recommends that the Town continue to update the Paver™ database furnished by GP as part of our work and to include the following:

- Document the work performed on the roadways annually for input into Paver™. This includes shims, overlays, reclaims and full reconstructions.
- Evaluate funding levels annually.
- Update construction dates as needed.
- Update pavement condition with data collection every three to four years.

Recommendations

Referring back to Figure 3 as mentioned previously in this report, the "keep good roads good" philosophy should be continued. It is more cost effective to maintain the roads above fair condition with crack sealers and small patches, than to reconstruct every poor road with the given budget since "good" roads will deteriorate quicker than "poor" roads.

GP also recommends the Town continue to inventory pavement condition indexes every three to four years. This will allow for the development of historical pavement condition data that can assist in revealing potential deficiencies within the Town's road network. Updating the inventory also creates a more accurate PCI deterioration curve based on current and historic PCI values which aids in more accurate pavement condition predictions.

Sidewalks noted in "Poor" condition should receive Major M&R treatment to ensure continuity and accessibility are maintained within the current sidewalk network. Depending on available funding, Minor M&R treatments may be used for temporary short-term improvements.

APPENDIX A – Existing Pavement Condition Inventory

Pavement Condition Rating - Local/Urban Compact Roads (Alphabetical)

Branch Name	BranchID	SectionID	From	To	Rank	Length (ft)	Width (ft)	Const. Date	2017 PCI	2021 PCI
Alder Sr Drive	1	1	Shaker Road	Tim's Run	E	1260	23.00	08-01-2014	84	74
Alling Lane	2	1	Mayberry Road	Cul-De-Sac	E	840	21.50	10-15-2021	64	100
Ambrose Circle	3	1	Autumn Crossing	Pavement Change	E	1096	24.00	09-01-2006	82	80
Ambrose Circle	3	2	Pavement Change	May Meadows Drive	E	986	24.00	07-01-2014	84	79
Autumn Crossing	4	1	May Meadows Dr - South	May Meadows Dr - North	E	1675	24.00	09-01-2006	79	69
Blueberry Lane	5	1	Shaker Road	Blueberry Lane	E	6950	22.00	05-15-2021	74	100
Brown Street	6	1	Lewiston Road	Yarmouth Road	E	725	33.00	06-01-2016	92	79
Bull Run Road	82	1	Merrill Road	End of Pavement	E	1525	21.00	08-01-2014	-	85
Cambell Shore Road	7	1	West Gray Road	Latimer Road	E	9493	22.00	08-01-2016	93	92
Center Road	8	1	West Gray Road	Windham Town Line	E	19290	22.00	09-01-2016	82	81
Charlonate Drive	9	1	Shaker Road	End of Road	E	3090	21.00	07-01-2017	100	86
Chris Lane	10	1	Spruce Road	Alder Drive	E	590	22.00	07-01-2007	69	68
Colley Hill Road	11	1	Main Street	End of Pavement	E	2355	20.00	08-01-2015	84	71
Collyer Brook Road	12	1	Depot Road	End of Road	E	1430	26.00	09-01-2011	81	74
Doughty Farm Road	13	1	Long Hill Road	End of Road	E	1700	24.00	08-15-2018	52	92
Dunn Drive	14	1	Shaker Road	End of Road	E	350	22.00	08-01-2010	82	68
Dutton Hill Road	15	1	Center Road	Portland Road	E	10075	22.00	10-15-2021	80	100
Eagles Nest Road	16	1	Upper Marginal Way	End of Road	E	1390	20.50	05-15-2021	53	100
Fairview Avenue	17	1	End of Pavement	Shaker Road	E	2020	21.00	08-01-2016	90	77
Forest Lake Road	18	1	Dutton Hill Road	Cumberland Town Line	E	5256	21.00	08-15-2019	60	96
Foster Hill Road	19	1	Legrow Road	End of Road	E	511	19.50	09-01-2007	63	62
Fran Circle	20	1	Jenny Drive - West	Jenny Drive - East	E	3150	24.00	08-01-2021	69	100
Frost Road	21	1	Center Road	End of Road	E	1640	21.00	07-01-2011	77	54
Garret Road	22	1	Egypt Road	End of Road	E	960	28.00	09-15-2020	61	100
George Perley Road	23	1	Town Farm Road	End of Road	E	1245	20.00	07-01-2017	100	92
Gore Road	24	1	Pavement Change	End of Road	E	3384	22.00	08-15-2018	76	96
Gray Park	25	1	Shaker Road - South	Shaker Road - North	E	2625	24.00	08-15-2019	57	89
Graystone Road	26	1	Dutton Hill Road	End of Road	E	1278	24.00	10-15-2021	59	100
Hancock Street	27	1	Yarmouth Road	End of Road	E	950	21.50	10-15-2021	52	100
Hemlock Lane	28	1	Ramsdell Road	Cul-De-Sac	E	1601	24.00	07-01-2008	74	72
Hunts Hill Road	29	1	Portland Road	Center Road	E	4490	21.00	09-01-2016	83	80
Jenny Drive	30	1	Cambell Shore Road	Fran Circle	E	1140	24.00	08-01-2021	71	100
Jessi Lane	31	1	May Meadows Drive	End of Road	E	480	24.00	08-01-2006	73	70
Lawrence Road	32	1	West Gray Road	Center Road	E	6902	22.00	08-01-2004	81	73
Legrow Road	33	1	Lewiston Road	Foster Hill Road	E	270	24.00	07-01-2016	92	90
Legrow Road	33	2	Foster Hill Road	Pavement Change	E	2858	20.67	07-01-2016	86	81
Legrow Road	33	3	Pavement Change	End of Road	E	162	13.00	07-01-2016	89	72
Lewiston Road	74	2	C.U.L. @ Weymouth Road	Shaker Road	B	10254	35.00	08-01-2009	65	65
Libby Hill Road	34	1	Shaker Road	End of Road	E	2200	24.50	07-01-2008	71	68
Liberty Avenue	35	1	West Gray Road	End of Road	E	835	22.00	10-15-2021	63	100
Lindan Lane	36	1	Shaker Road	End of Road	E	1540	21.00	10-15-2021	58	100
Long Hill Road	37	1	Portland Road	Cumberland Town Line	E	9065	22.00	08-01-2011	92	83
Lyons Point Road	38	1	Raymond Town Line	Private Road	E	7802	22.00	08-15-2018	55	89
Magnolia Drive	39	1	Mayall Road 2	End of Road	E	1206	25.00	05-01-2007	92	88
Marie Street	40	1	Shaker Road	Weymouth Road	E	1030	22.00	05-15-2021	75	98
Marion Avenue	41	1	End of Road	Marie Street	E	470	20.50	05-15-2021	55	100
May Meadows Drive	42	1	Egypt Road	End of Road	E	4125	24.00	08-15-2018	77	88
Mayall Road	43	1	Yarmouth Road	Depot Road	E	3375	23.00	05-15-2021	71	100
Mayall Road	43	2	Depot Road	Lewiston Road	E	13405	22.50	08-01-2014	82	69
Mayall Road	43	3	Lewiston Road	New Gloucester Town Line	E	5085	22.00	07-01-2016	81	72
Mayberry Road	44	1	Shaker Road	North Raymond Road	E	10865	22.00	08-01-2011	87	80
Mckonkey Road	45	1	West Gray Road	End of Pavement	E	1282	19.00	09-01-2008	82	80
Megquire Drive	46	1	Mayall Road 2	End of Road	E	1075	20.00	09-01-1992	52	31
Merrill Road	47	1	Mayall Road 2	New Gloucester Town Line	E	8497	23.00	08-01-2013	91	83
Mountain View Road	48	1	Cambell Shore Road	Pavement Change	E	6965	22.00	08-01-2013	94	92
Mountain View Road	48	2	Pavement Change	End of Road	E	3715	22.00	05-15-2021	-	100
North Raymond Road	49	3	Egypt Road	Raymond Town Line	E	7289	22.00	08-15-2019	70	93
Partridge Lane	50	1	Yarmouth Road	End of Road	E	1060	24.00	08-01-2007	71	63
Pleasant View Drive	52	1	West Gray Road	End of Road	E	2625	24.00	05-15-2021	67	100
Poplar Ridge Road	83	1	Lawrence Road	End of Road	E	2020	24.00	08-01-2006	-	87
Portland Road	75	3	C.U.L. @ Turnpike Acres	West Gray Road	B	2350	33.33	07-01-2010	91	83
Presidential Drive	51	1	Lewiston Road	End of Road	E	1960	23.00	05-15-2021	75	100
Ramsdell Road	53	1	West Gray Road	End of Road	E	9250	22.00	08-01-2012	79	79
Rockwood Terrace	84	1	Wayne Avenue	End of Pavement	E	210	16.00	08-01-2019	-	75
Route 26 Bypass	76	1	West Gray Road	Shaker Road	B	6188	53.33	08-01-2006	84	84
Seagull Drive	54	1	Shaker Road	Gate	E	600	25.50	09-01-2010	61	45

Pavement Condition Rating - Local/Urban Compact Roads (Alphabetical)

Branch Name	BranchID	SectionID	From	To	Rank	Length (ft)	Width (ft)	Const. Date	2017 PCI	2021 PCI
Shaker Road	77	1	Lewiston Road	PC @ I-95 Bridge	B	5353	41.00	08-01-2008	67	64
Shaker Road	77	2	PC @ I-95 Bridge	PC @ Dunn Drive	B	1213	45.50	08-01-2006	72	71
Shaker Road	77	3	PC @ Dunn Drive	PC @ House #419	B	15408	35.00	08-01-2017	100	91
Shaker Road	77	4	PC @ House #419	New Gloucester Town Line	B	639	39.50	08-01-2017	100	93
South Ridge Road	55	1	Whitney Road	End of Road	E	1260	24.00	08-15-2018	66	96
Spiro Avenue	56	1	Shaker Road	End of Road	E	540	21.00	05-15-2020	66	99
Spruce Drive	57	1	Shaker Road	End of Road	E	760	22.50	08-01-2008	57	55
Stave Mill Road	58	1	Weymouth Road	End of Road	E	1010	24.00	10-15-2021	67	100
Summit Road	59	1	Upper Marginal Way	End of Road	E	1210	21.50	10-15-2021	66	100
Sunset Park	60	1	Shaker Road	End of Road	E	560	21.00	08-01-2008	72	71
Tamarack Lane	61	1	Hemlock Lane	End of Pavement	E	860	24.00	08-01-2008	70	70
Tim's Run	62	1	Alder Sr Drive	Fairview Drive	E	1195	22.50	08-01-2014	87	87
Totten Road	63	1	Center Road	West Gray Road	E	6537	21.00	08-01-2010	66	51
Town Farm Road	64	1	North Yarmouth Town Line	Depot Road	E	4025	22.00	07-01-2017	100	93
Two Rod Road	65	1	West Gray Road	End of Pavement	E	885	18.50	07-01-2007	58	50
Upper Marginal Way	66	1	Hunts Hill Road	Portland Road	E	5585	22.50	08-15-2018	77	97
Wanda Lane	67	1	Alder Sr Drive	Spruce Road	E	575	22.00	08-01-2008	58	54
Wayne Avenue	68	1	Lewiston Road	End of Road	E	885	22.50	08-15-2019	65	99
West Gray Road	78	2	C.U.L. @ Liberty Ave	PC @ McKonkey Road	B	1225	32.00	08-01-2016	88	87
West Gray Road	78	3	PC @ McKonkey Road	Portland Road	B	3399	51.00	08-15-2018	69	89
Westwood Road	69	1	Egypt Road	Hunnewell Drive	E	3896	21.00	09-01-2014	76	66
Weymouth Road	70	1	Shaker Road	Lewiston Road	E	11144	22.00	08-01-2010	80	73
Wheeler Road	71	1	West Gray Road	Two Rod Road	E	947	20.50	07-01-2015	86	86
Whitney Road	72	1	Portland Road	Cumberland Town Line	E	7475	21.00	07-01-2012	82	74
Wildwood Lane	73	1	Mayberry Road	End of Road	E	2090	22.00	08-15-2018	52	94
Yarmouth Road	79	2	PC @ Sawyer Lane	Portland Road	C	3500	27.00	08-01-2015	100	76

Pavement Condition Rating - State Roads (Alphabetical)

Branch Name	BranchID	SectionID	From	To	Rank	Length (ft)	Width (ft)	Const. Date	2017 PCI	2021 PCI
Depot Road	80	1	Yarmouth Road	New Gloucester Town Line	C	13575	24.67	06-01-2013	61	57
Egypt Road	81	1	North Raymond Road	Raymond Town Line	C	8830	24.00	08-01-2021	63	100
Lewiston Road	74	1	New Gloucester Town Line	C.U.L. @ Weymouth Road	B	4897	32.00	08-01-2009	58	53
North Raymond Road	49	1	Shaker Road	C.U.L. @ Mayberry Road	C	2061	22.25	08-15-2019	64	84
North Raymond Road	49	2	C.U.L. @ Mayberry Road	Egypt Road	C	3080	23.00	08-01-2010	61	57
Portland Road	75	1	Cumberland Town Line	PC @ Long Hill Road	B	12039	25.00	07-01-2010	54	49
Portland Road	75	2	PC @ Long Hill Road	C.U.L. @ Turnpike Acres	B	7342	33.00	08-01-2013	87	75
West Gray Road	78	1	Windham Town Line	C.U.L. @ Liberty Avenue	B	14887	32.00	09-01-2017	100	87
Yarmouth Road	79	1	North Yarmouth Town Line	PC @ Sawyer Lane	C	13450	29.00	08-01-2021	41	100

Pavement Condition Rating - Local/Urban Contract Roads (PCI - low to high)

Branch Name	BranchID	SectionID	From	To	Rank	Length (ft)	Width (ft)	Const. Date	2017 PCI	2021 PCI
Megquire Drive	46	1	Mayall Road 2	End of Road	E	1075	20.00	09-01-1992	52	31
Seagull Drive	54	1	Shaker Road	Gate	E	600	25.50	09-01-2010	61	45
Two Rod Road	65	1	West Gray Road	End of Pavement	E	885	18.50	07-01-2007	58	50
Totten Road	63	1	Center Road	West Gray Road	E	6537	21.00	08-01-2010	66	51
Frost Road	21	1	Center Road	End of Road	E	1640	21.00	07-01-2011	77	54
Wanda Lane	67	1	Alder Sr Drive	Spruce Road	E	575	22.00	08-01-2008	58	54
Spruce Drive	57	1	Shaker Road	End of Road	E	760	22.50	08-01-2008	57	55
Foster Hill Road	19	1	Legrow Road	End of Road	E	511	19.50	09-01-2007	63	62
Partridge Lane	50	1	Yarmouth Road	End of Road	E	1060	24.00	08-01-2007	71	63
Shaker Road	77	1	Lewiston Road	PC @ I-95 Bridge	B	5353	41.00	08-01-2008	67	64
Lewiston Road	74	2	C.U.L. @ Weymouth Road	Shaker Road	B	10254	35.00	08-01-2009	65	65
Westwood Road	69	1	Egypt Road	Hunnewell Drive	E	3896	21.00	09-01-2014	76	66
Chris Lane	10	1	Spruce Road	Alder Drive	E	590	22.00	07-01-2007	69	68
Dunn Drive	14	1	Shaker Road	End of Road	E	350	22.00	08-01-2010	82	68
Libby Hill Road	34	1	Shaker Road	End of Road	E	2200	24.50	07-01-2008	71	68
Autumn Crossing	4	1	May Meadows Dr - South	May Meadows Dr - North	E	1675	24.00	09-01-2006	79	69
Mayall Road	43	2	Depot Road	Lewiston Road	E	13405	22.50	08-01-2014	82	69
Jessi Lane	31	1	May Meadows Drive	End of Road	E	480	24.00	08-01-2006	73	70
Tamarack Lane	61	1	Hemlock Lane	End of Pavement	E	860	24.00	08-01-2008	70	70
Colley Hill Road	11	1	Main Street	End of Pavement	E	2355	20.00	08-01-2015	84	71
Sunset Park	60	1	Shaker Road	End of Road	E	560	21.00	08-01-2008	72	71
Shaker Road	77	2	PC @ I-95 Bridge	PC @ Dunn Drive	B	1213	45.50	08-01-2006	72	71
Hemlock Lane	28	1	Ramsdell Road	Cul-De-Sac	E	1601	24.00	07-01-2008	74	72
Legrow Road	33	3	Pavement Change	End of Road	E	162	13.00	07-01-2016	89	72
Mayall Road	43	3	Lewiston Road	New Gloucester Town Line	E	5085	22.00	07-01-2016	81	72
Lawrence Road	32	1	West Gray Road	Center Road	E	6902	22.00	08-01-2004	81	73
Weymouth Road	70	1	Shaker Road	Lewiston Road	E	11144	22.00	08-01-2010	80	73
Alder Sr Drive	1	1	Shaker Road	Tim's Run	E	1260	23.00	08-01-2014	84	74
Collyer Brook Road	12	1	Depot Road	End of Road	E	1430	26.00	09-01-2011	81	74
Whitney Road	72	1	Portland Road	Cumberland Town Line	E	7475	21.00	07-01-2012	82	74
Rockwood Terrace	84	1	Wayne Avenue	End of Pavement	E	210	16.00	08-01-2019	-	75
Yarmouth Road	79	2	PC @ Sawyer Lane	Portland Road	C	3500	27.00	08-01-2015	100	76
Fairview Avenue	17	1	End of Pavement	Shaker Road	E	2020	21.00	08-01-2016	90	77
Brown Street	6	1	Lewiston Road	Yarmouth Road	E	725	33.00	06-01-2016	92	79
Ramsdell Road	53	1	West Gray Road	End of Road	E	9250	22.00	08-01-2012	79	79
Ambrose Circle	3	2	Pavement Change	May Meadows Drive	E	986	24.00	07-01-2014	84	79
Ambrose Circle	3	1	Autumn Crossing	Pavement Change	E	1096	24.00	09-01-2006	82	80
Hunts Hill Road	29	1	Portland Road	Center Road	E	4490	21.00	09-01-2016	83	80
Mayberry Road	44	1	Shaker Road	North Raymond Road	E	10865	22.00	08-01-2011	87	80
Mckonkey Road	45	1	West Gray Road	End of Pavement	E	1282	19.00	09-01-2008	82	80
Center Road	8	1	West Gray Road	Windham Town Line	E	19290	22.00	09-01-2016	82	81
Legrow Road	33	2	Foster Hill Road	Pavement Change	E	2858	20.67	07-01-2016	86	81
Long Hill Road	37	1	Portland Road	Cumberland Town Line	E	9065	22.00	08-01-2011	92	83
Merrill Road	47	1	Mayall Road 2	New Gloucester Town Line	E	8497	23.00	08-01-2013	91	83
Portland Road	75	3	C.U.L. @ Turnpike Acres	West Gray Road	B	2350	33.33	07-01-2010	91	83
Route 26 Bypass	76	1	West Gray Road	Shaker Road	B	6188	53.33	08-01-2006	84	84
Bull Run Road	82	1	Merrill Road	End of Pavement	E	1525	21.00	08-01-2014	-	85
Charlonate Drive	9	1	Shaker Road	End of Road	E	3090	21.00	07-01-2017	100	86
Wheeler Road	71	1	West Gray Road	Two Rod Road	E	947	20.50	07-01-2015	86	86
Poplar Ridge Road	83	1	Lawrence Road	End of Road	E	2020	24.00	08-01-2006	-	87
Tim's Run	62	1	Alder Sr Drive	Fairview Drive	E	1195	22.50	08-01-2014	87	87
West Gray Road	78	2	C.U.L. @ Liberty Ave	PC @ McKonkey Road	B	1225	32.00	08-01-2016	88	87
Magnolia Drive	39	1	Mayall Road 2	End of Road	E	1206	25.00	05-01-2007	92	88
May Meadows Drive	42	1	Egypt Road	End of Road	E	4125	24.00	08-15-2018	77	88
Gray Park	25	1	Shaker Road - South	Shaker Road - North	E	2625	24.00	08-15-2019	57	89
Lyons Point Road	38	1	Raymond Town Line	Private Road	E	7802	22.00	08-15-2018	55	89
West Gray Road	78	3	PC @ McKonkey Road	Portland Road	B	3399	51.00	08-15-2018	69	89
Legrow Road	33	1	Lewiston Road	Foster Hill Road	E	270	24.00	07-01-2016	92	90
Shaker Road	77	3	PC @ Dunn Drive	PC @ House #419	B	15408	35.00	08-01-2017	100	91
Cambell Shore Road	7	1	West Gray Road	Latimer Road	E	9493	22.00	08-01-2016	93	92
Doughty Farm Road	13	1	Long Hill Road	End of Road	E	1700	24.00	08-15-2018	52	92
George Perley Road	23	1	Town Farm Road	End of Road	E	1245	20.00	07-01-2017	100	92
Mountain View Road	48	1	Cambell Shore Road	Pavement Change	E	6965	22.00	08-01-2013	94	92
Town Farm Road	64	1	North Yarmouth Town Line	Depot Road	E	4025	22.00	07-01-2017	100	93
North Raymond Road	49	3	Egypt Road	Raymond Town Line	E	7289	22.00	08-15-2019	70	93
Shaker Road	77	4	PC @ House #419	New Gloucester Town Line	B	639	39.50	08-01-2017	100	93

Pavement Condition Rating - Local/Urban Contract Roads (PCI - low to high)

Branch Name	BranchID	SectionID	From	To	Rank	Length (ft)	Width (ft)	Const. Date	2017 PCI	2021 PCI
Wildwood Lane	73	1	Mayberry Road	End of Road	E	2090	22.00	08-15-2018	52	94
Forest Lake Road	18	1	Dutton Hill Road	Cumberland Town Line	E	5256	21.00	08-15-2019	60	96
Gore Road	24	1	Pavement Change	End of Road	E	3384	22.00	08-15-2018	76	96
South Ridge Road	55	1	Whitney Road	End of Road	E	1260	24.00	08-15-2018	66	96
Upper Marginal Way	66	1	Hunts Hill Road	Portland Road	E	5585	22.50	08-15-2018	77	97
Marie Street	40	1	Shaker Road	Weymouth Road	E	1030	22.00	05-15-2021	75	98
Spiro Avenue	56	1	Shaker Road	End of Road	E	540	21.00	05-15-2020	66	99
Wayne Avenue	68	1	Lewiston Road	End of Road	E	885	22.50	08-15-2019	65	99
Alling Lane	2	1	Mayberry Road	Cul-De-Sac	E	840	21.50	10-15-2021	64	100
Blueberry Lane	5	1	Shaker Road	Blueberry Lane	E	6950	22.00	05-15-2021	74	100
Dutton Hill Road	15	1	Center Road	Portland Road	E	10075	22.00	10-15-2021	80	100
Eagles Nest Road	16	1	Upper Marginal Way	End of Road	E	1390	20.50	05-15-2021	53	100
Fran Circle	20	1	Jenny Drive - West	Jenny Drive - East	E	3150	24.00	08-01-2021	69	100
Garret Road	22	1	Egypt Road	End of Road	E	960	28.00	09-15-2020	61	100
Graystone Road	26	1	Dutton Hill Road	End of Road	E	1278	24.00	10-15-2021	59	100
Hancock Street	27	1	Yarmouth Road	End of Road	E	950	21.50	10-15-2021	52	100
Jenny Drive	30	1	Cambell Shore Road	Fran Circle	E	1140	24.00	08-01-2021	71	100
Liberty Avenue	35	1	West Gray Road	End of Road	E	835	22.00	10-15-2021	63	100
Lindan Lane	36	1	Shaker Road	End of Road	E	1540	21.00	10-15-2021	58	100
Marion Avenue	41	1	End of Road	Marie Street	E	470	20.50	05-15-2021	55	100
Mayall Road	43	1	Yarmouth Road	Depot Road	E	3375	23.00	05-15-2021	71	100
Pleasant View Drive	52	1	West Gray Road	End of Road	E	2625	24.00	05-15-2021	67	100
Presidential Drive	51	1	Lewiston Road	End of Road	E	1960	23.00	05-15-2021	75	100
Stave Mill Road	58	1	Weymouth Road	End of Road	E	1010	24.00	10-15-2021	67	100
Summit Road	59	1	Upper Marginal Way	End of Road	E	1210	21.50	10-15-2021	66	100
Mountain View Road	48	2	Pavement Change	End of Road	E	3715	22.00	05-15-2021	-	100

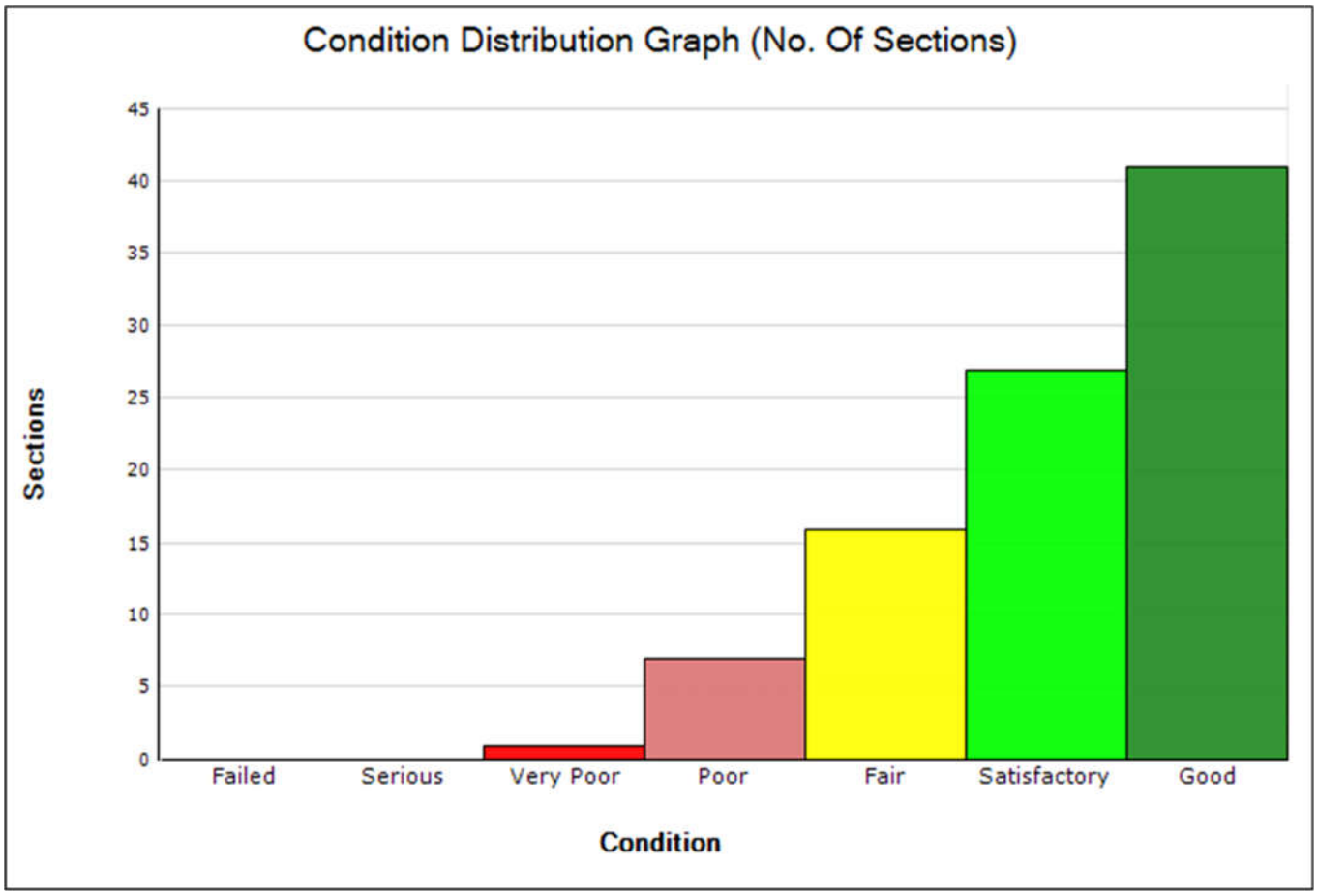
Pavement Condition Rating - State Roads (PCI - low to high)

Branch Name	BranchID	SectionID	From	To	Rank	Length (ft)	Width (ft)	Const. Date	2017 PCI	2021 PCI
Portland Road	75	1	Cumberland Town Line	PC @ Long Hill Road	B	12039	25.00	07-01-2010	54	49
Lewiston Road	74	1	New Gloucester Town Line	C.U.L. @ Weymouth Road	B	4897	32.00	08-01-2009	58	53
Depot Road	80	1	Yarmouth Road	New Gloucester Town Line	C	13575	24.67	06-01-2013	61	57
North Raymond Road	49	2	C.U.L. @ Mayberry Road	Egypt Road	C	3080	23.00	08-01-2010	61	57
Portland Road	75	2	PC @ Long Hill Road	C.U.L. @ Turnpike Acres	B	7342	33.00	08-01-2013	87	75
North Raymond Road	49	1	Shaker Road	C.U.L. @ Mayberry Road	C	2061	22.25	08-15-2019	64	84
West Gray Road	78	1	Windham Town Line	C.U.L. @ Liberty Avenue	B	14887	32.00	09-01-2017	100	87
Egypt Road	81	1	North Raymond Road	Raymond Town Line	C	8830	24.00	08-01-2021	63	100
Yarmouth Road	79	1	North Yarmouth Town Line	PC @ Sawyer Lane	C	13450	29.00	08-01-2021	41	100

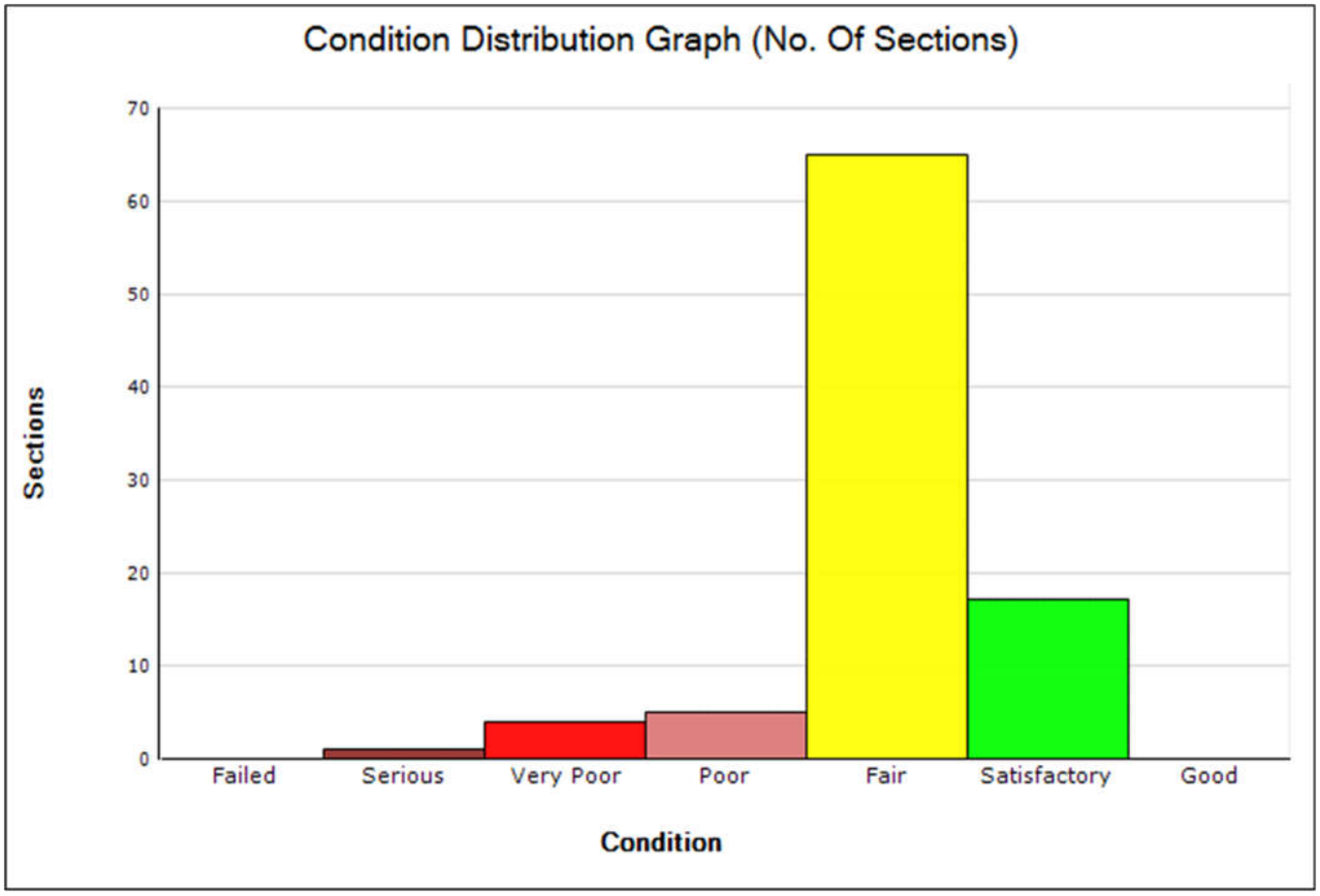
APPENDIX B – M&R Budget Analysis (Graphs)

NOTE: The Annual Condition graphs show PCI levels at the end of each year after work has been completed. This is why the PCI for 2021 varies for each scenario.

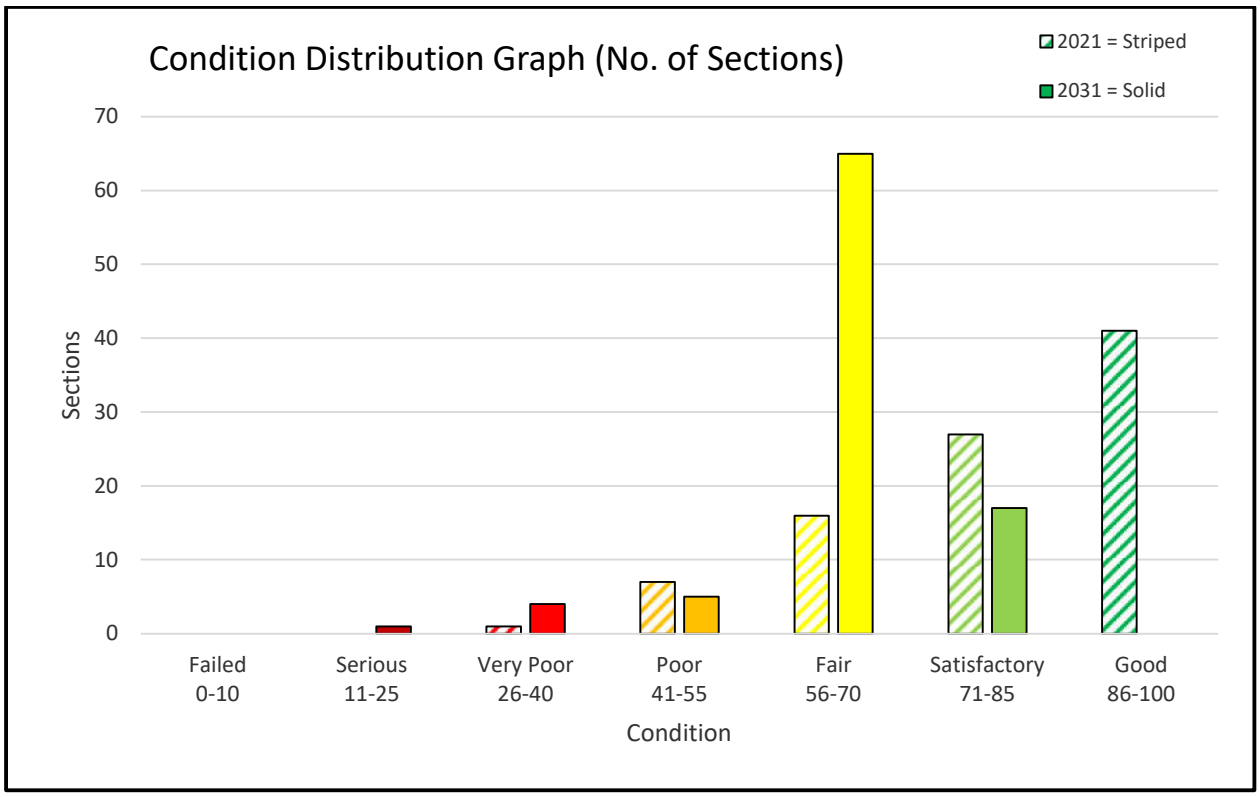
Scenario 1: No Funding (do nothing approach)



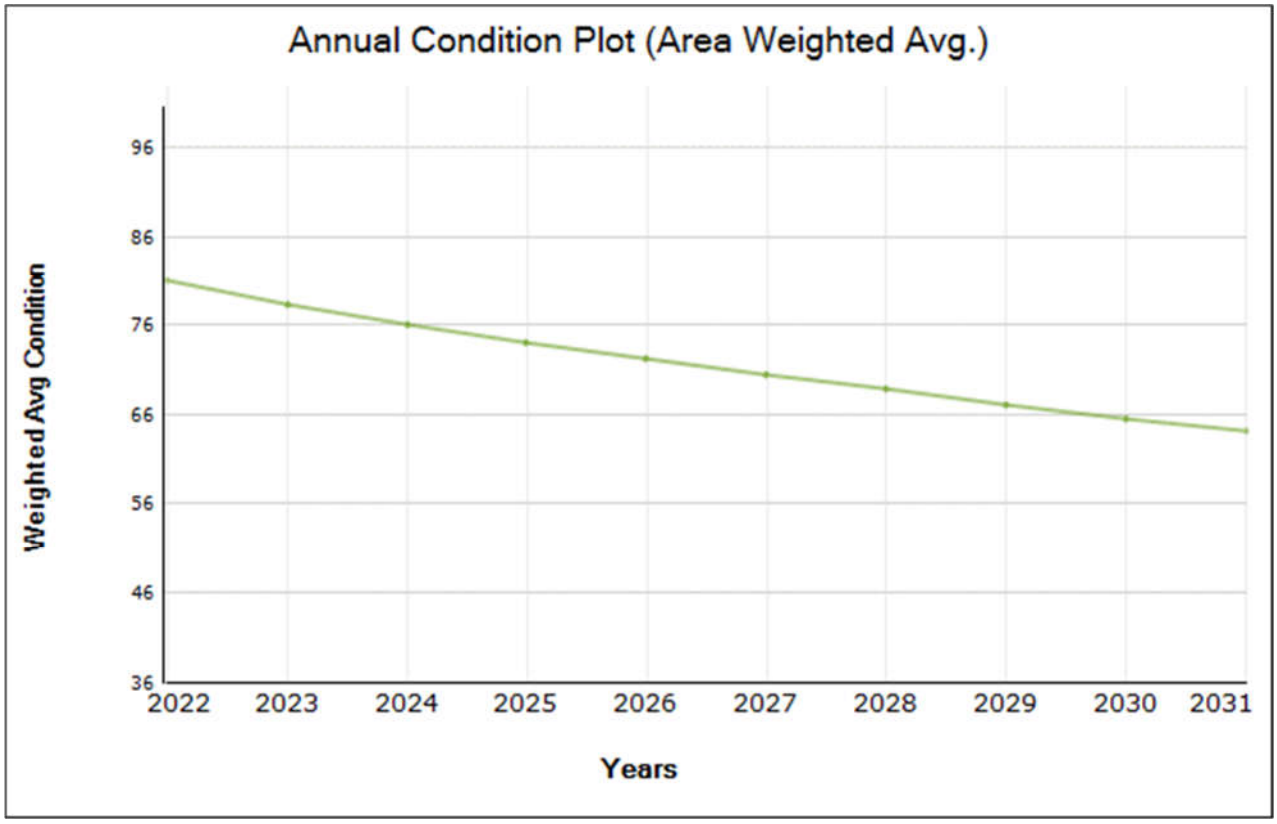
Condition Distribution Graph (CDG) 2021



CDG 2031

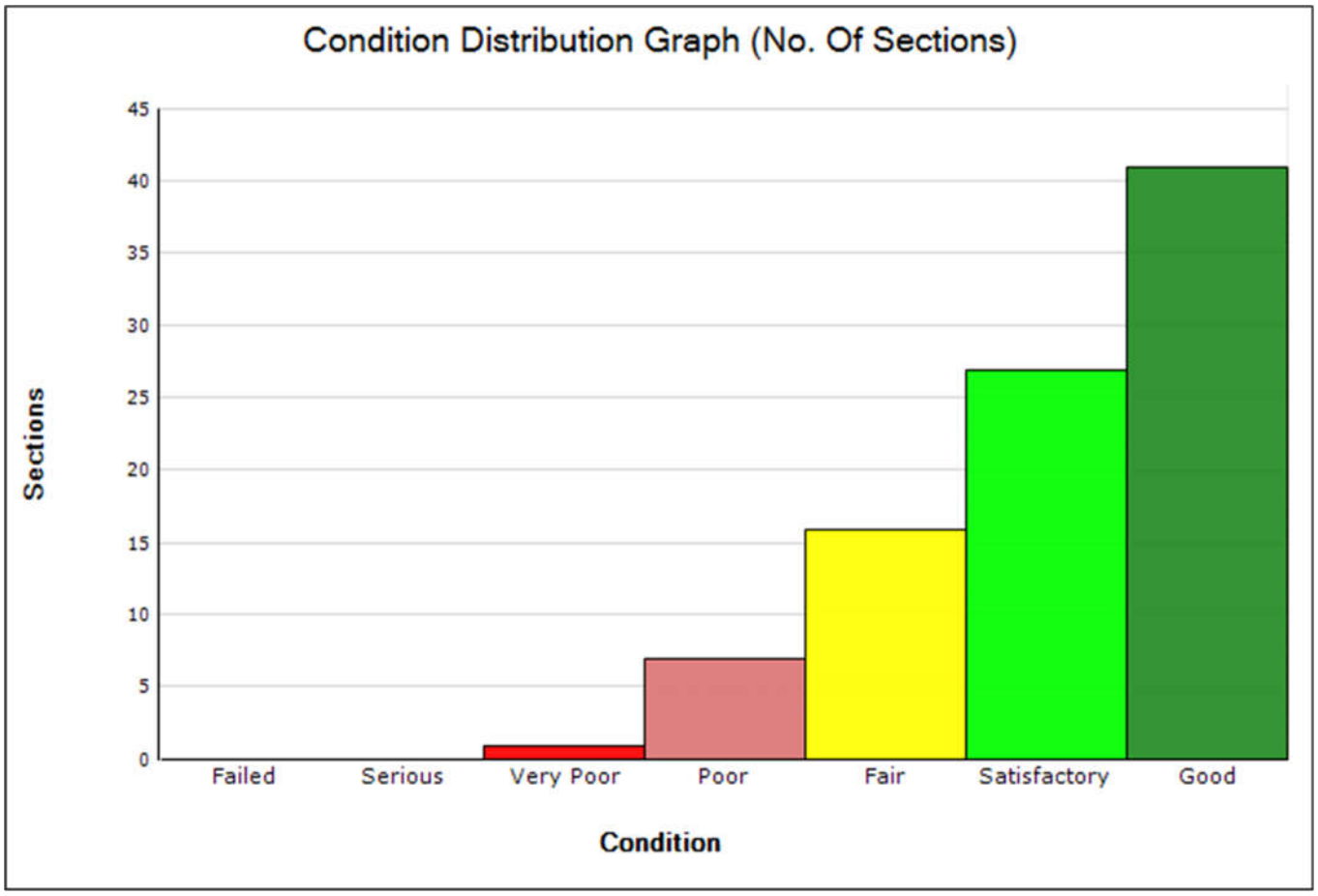


CDG 2021 vs. 2031

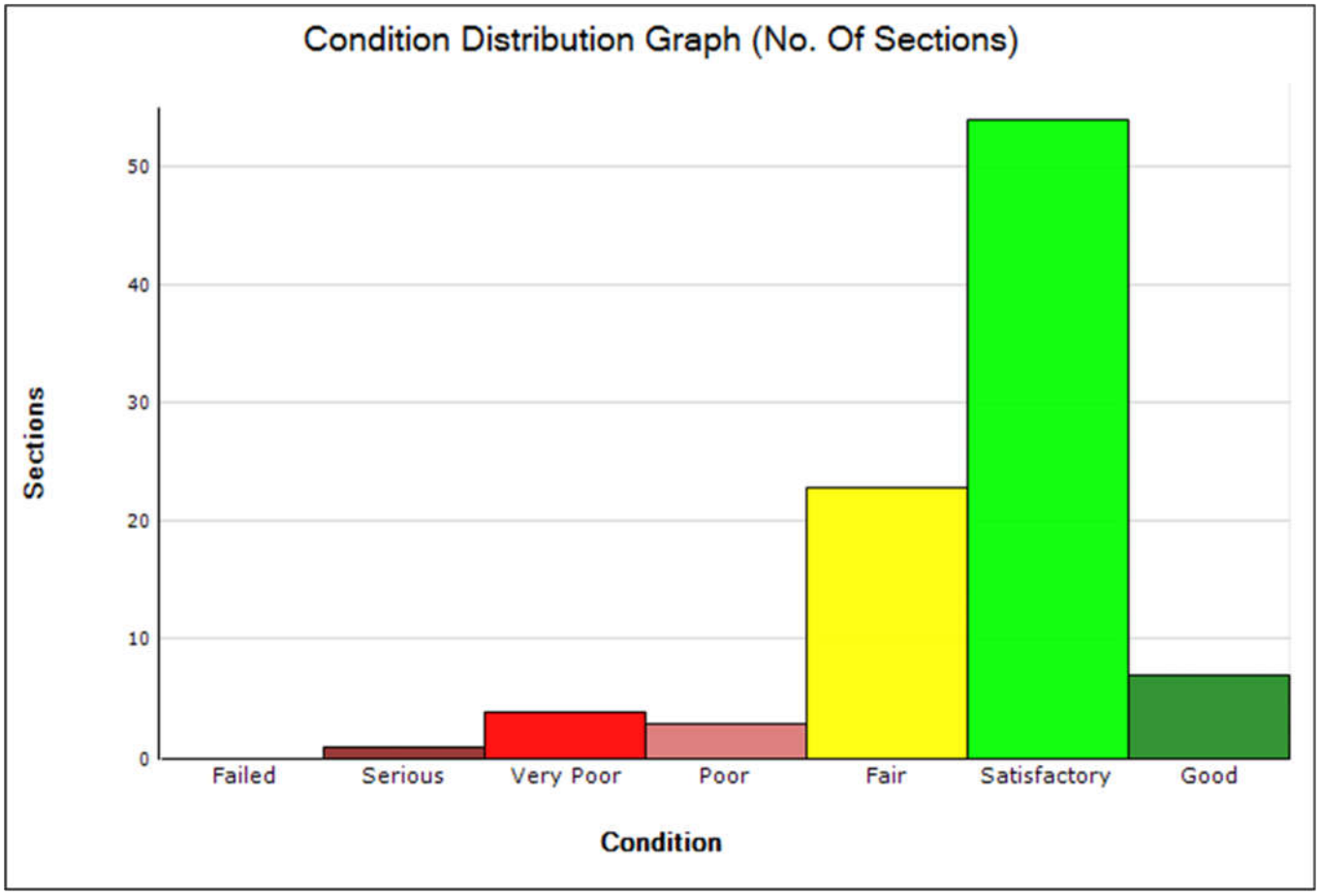


Annual PCI levels

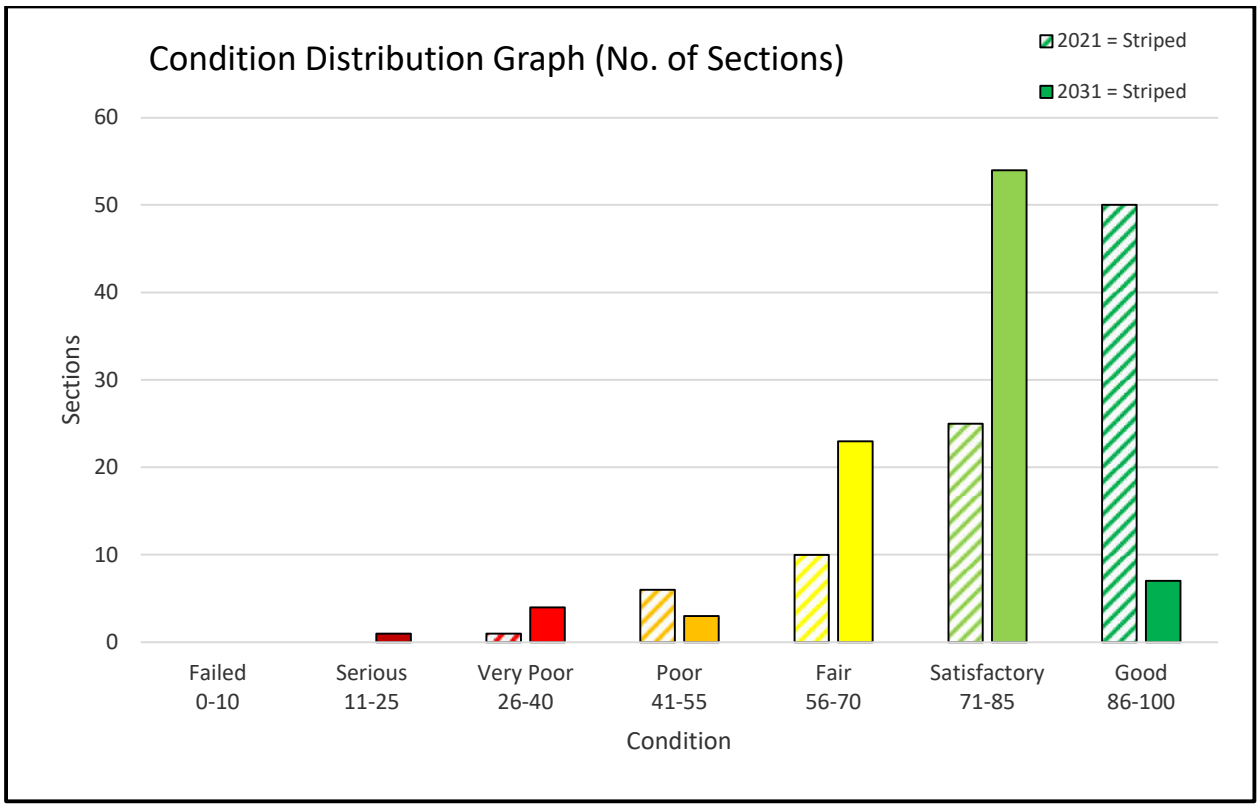
Scenario 2: $300,000 budget per year for 10 years



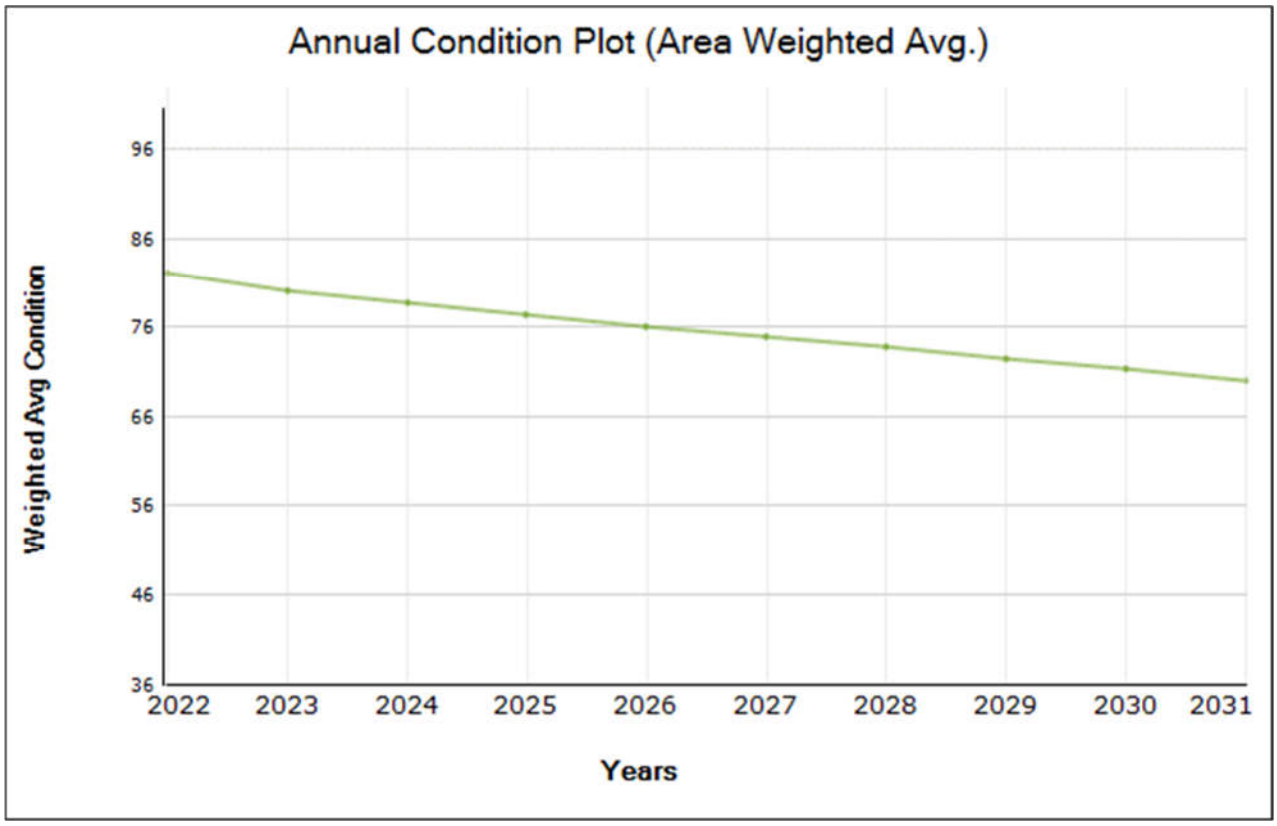
CDG 2021



CDG 2031

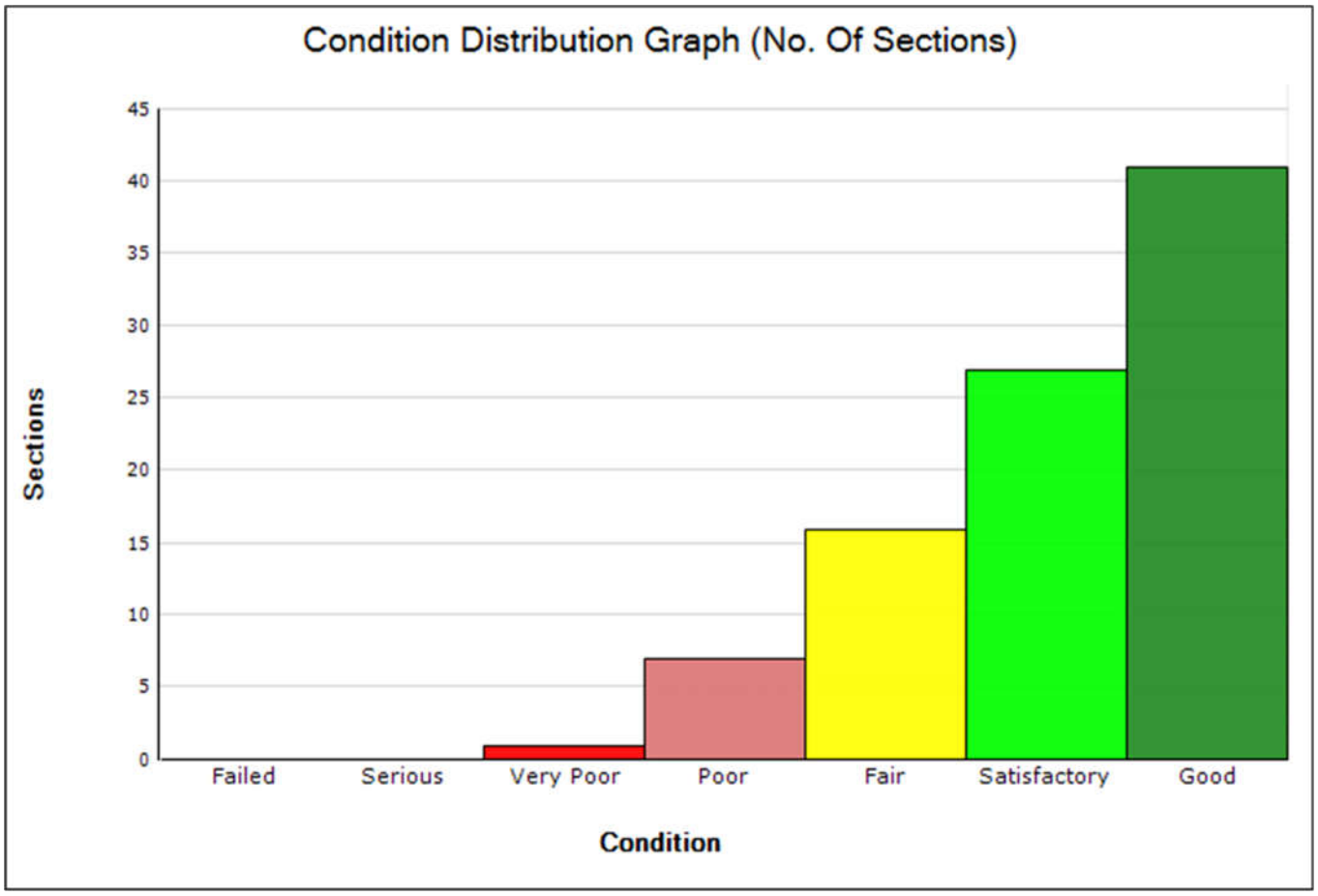


CDG 2021 vs. 2031

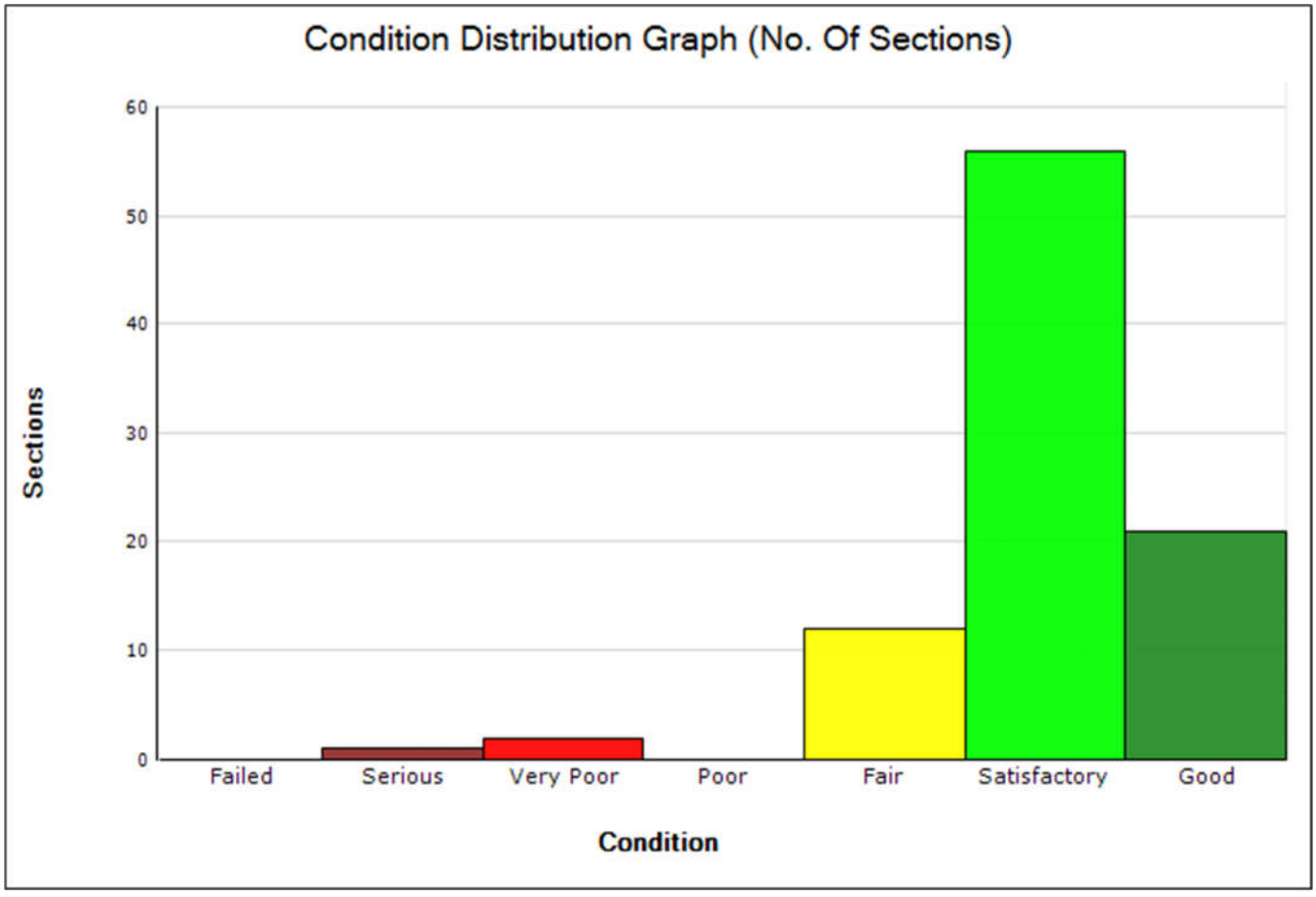


Annual PCI Levels

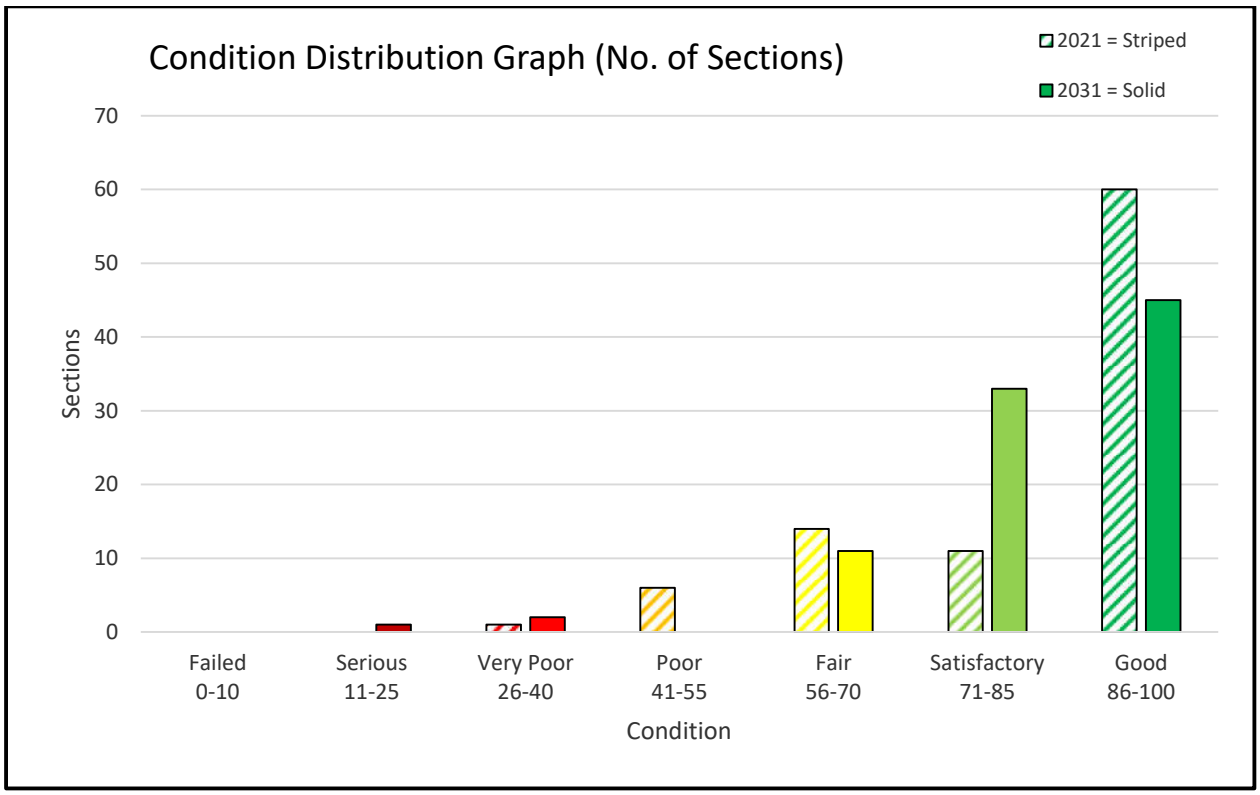
Scenario 3: $450,000 budget per year for 10 years



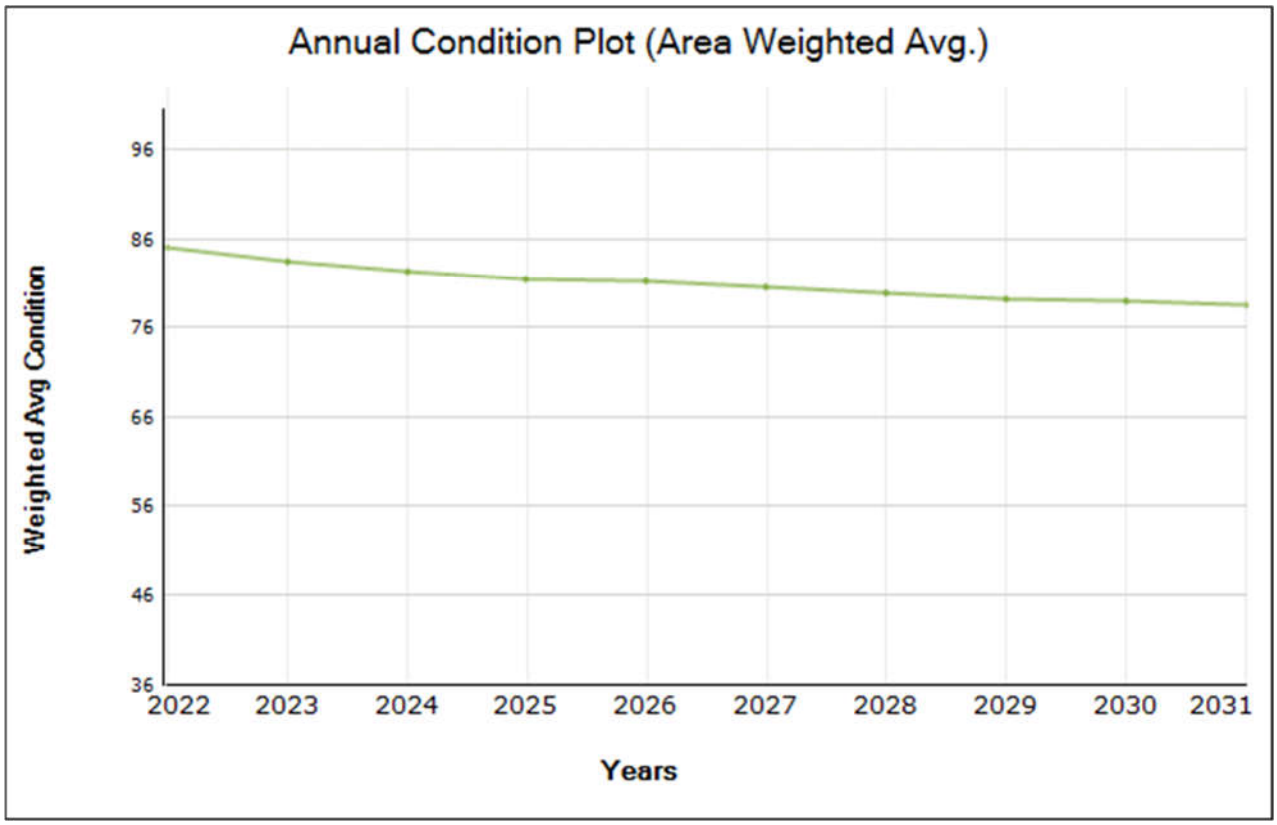
CDG 2021



CDG 2031

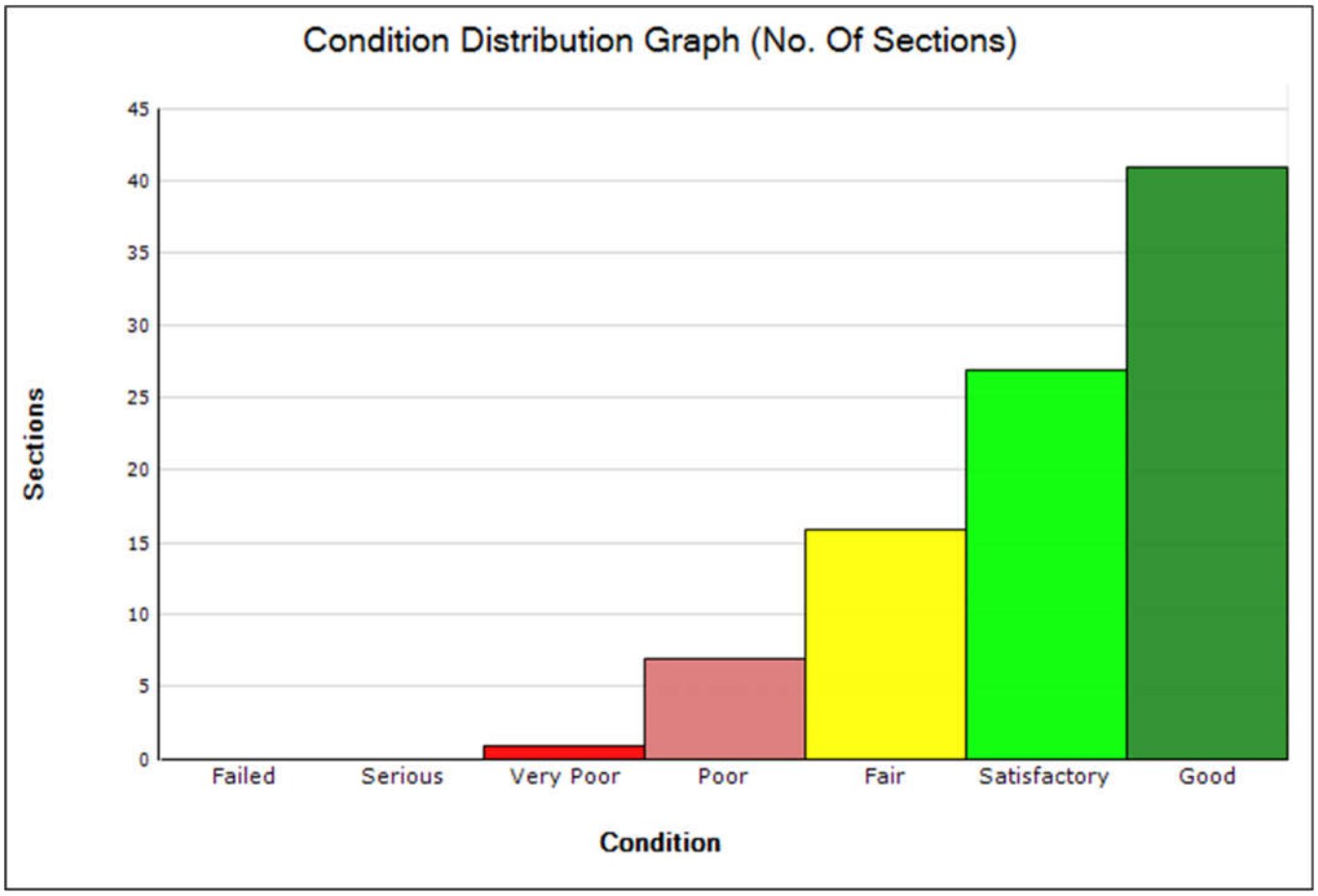


CDG 2021 vs. 2031

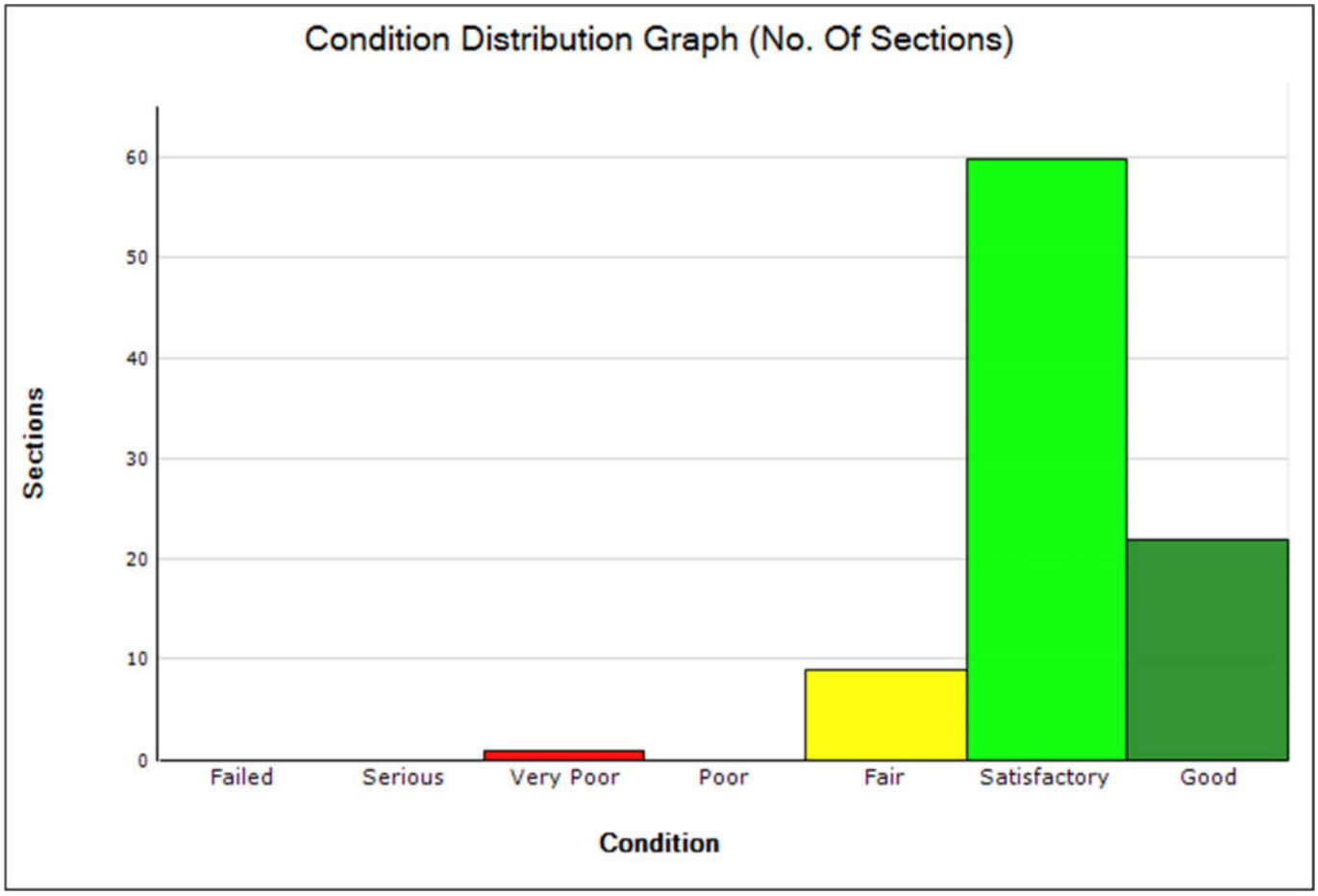


Annual PCI Levels

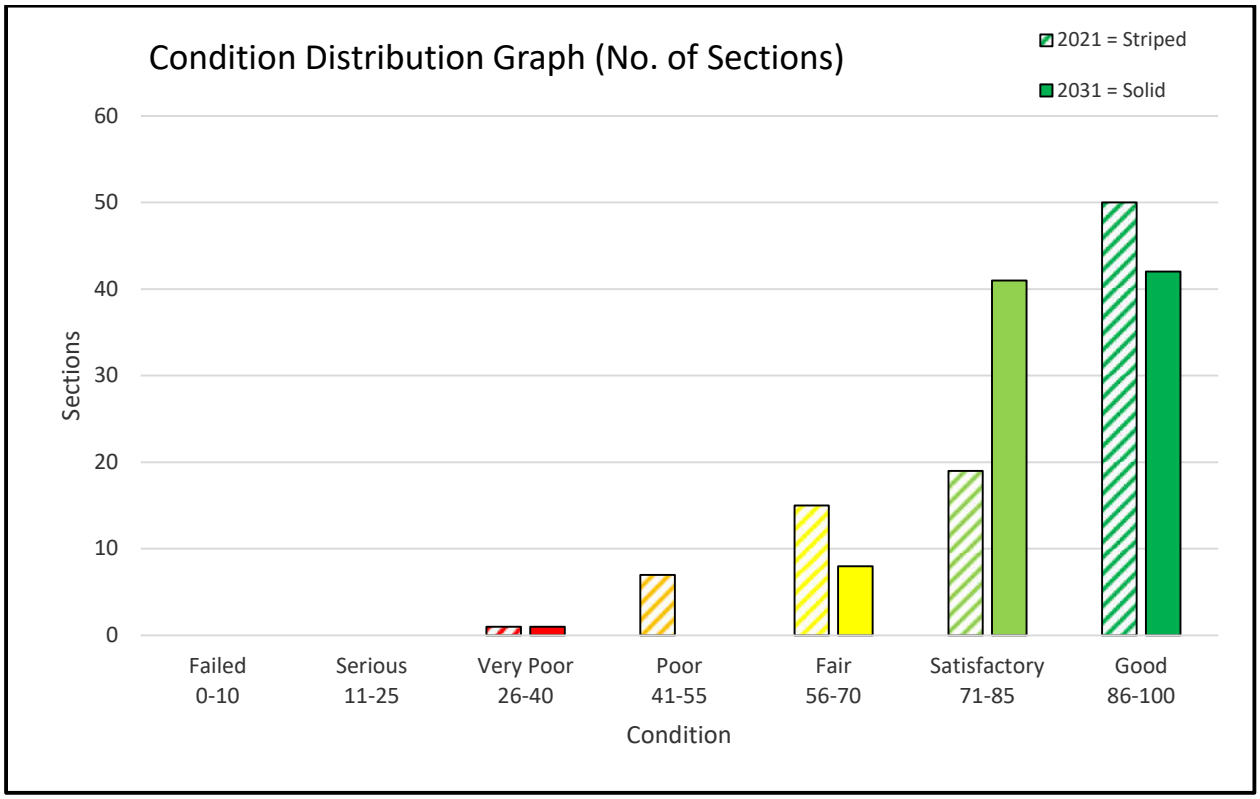
Scenario 4: Maintain current PCI for 10 years ($560,000)



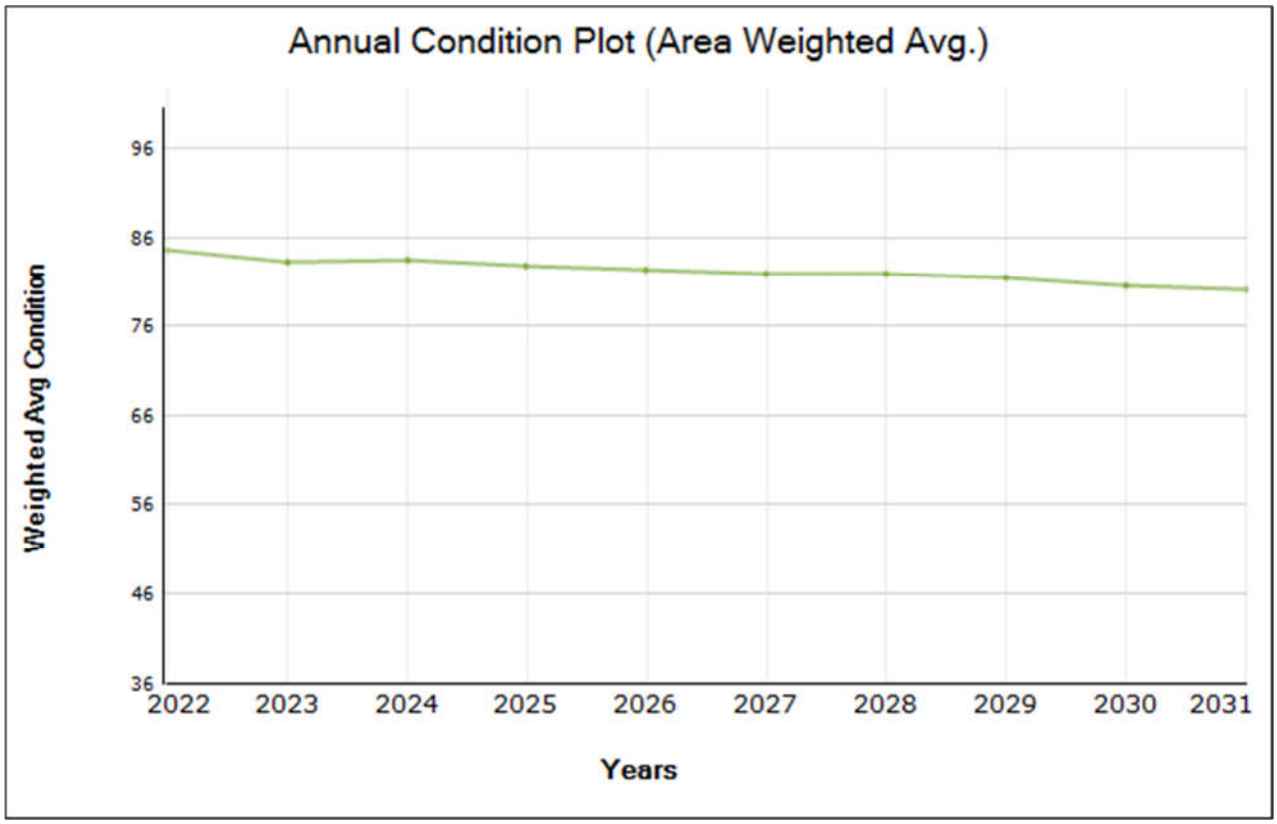
CDG 2021



CDG 2031

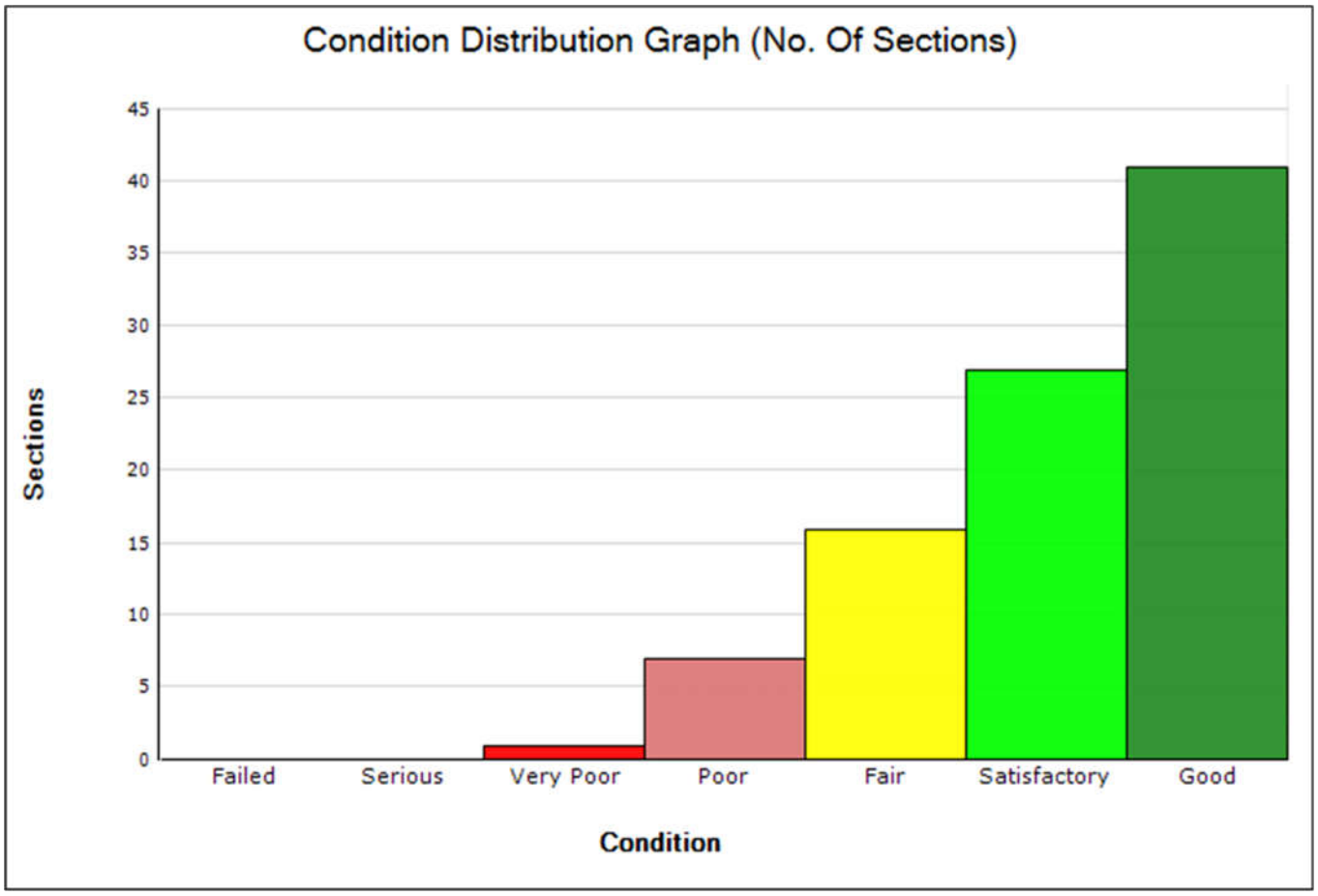


CDG 2021 vs. 2031

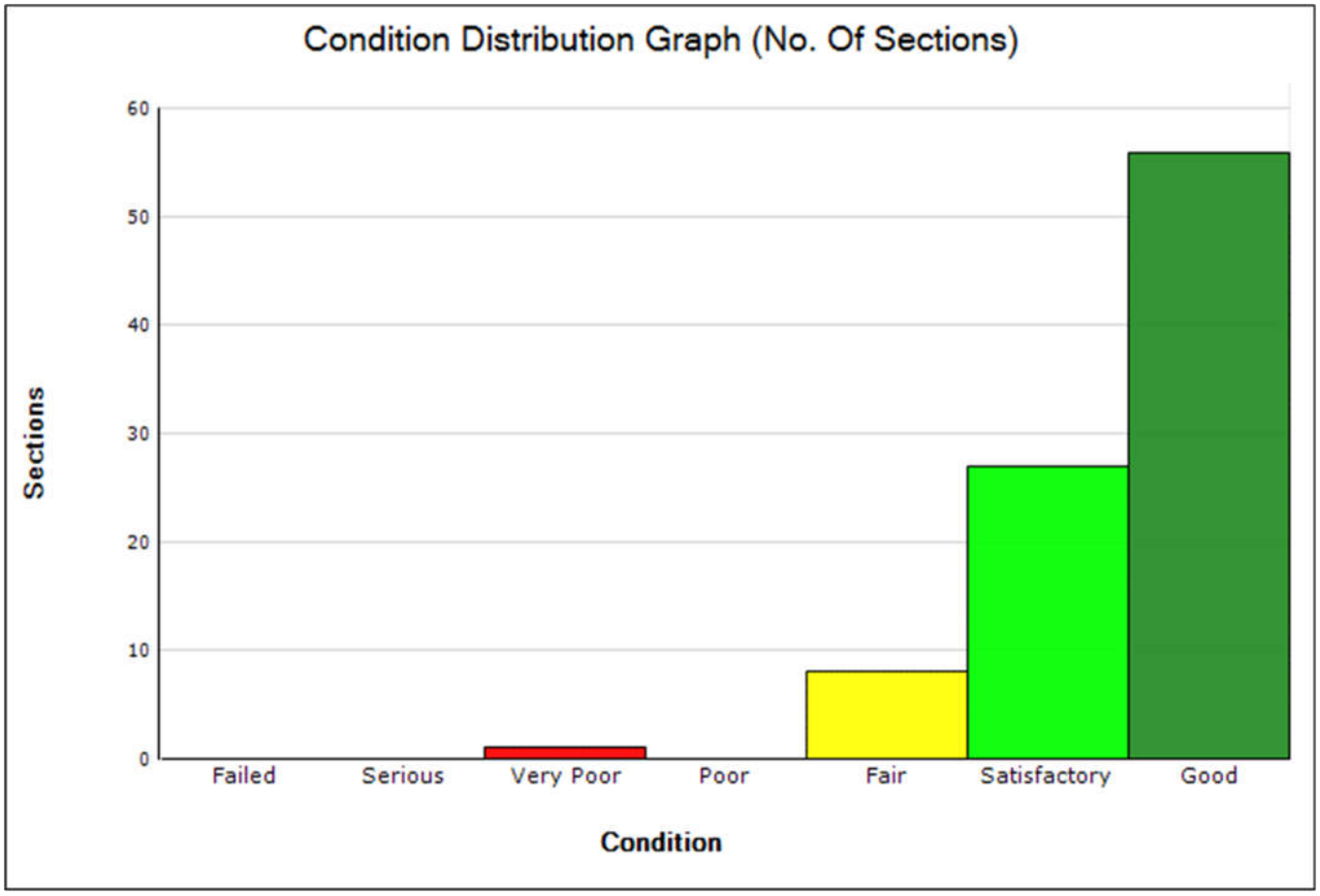


Annual PCI Levels

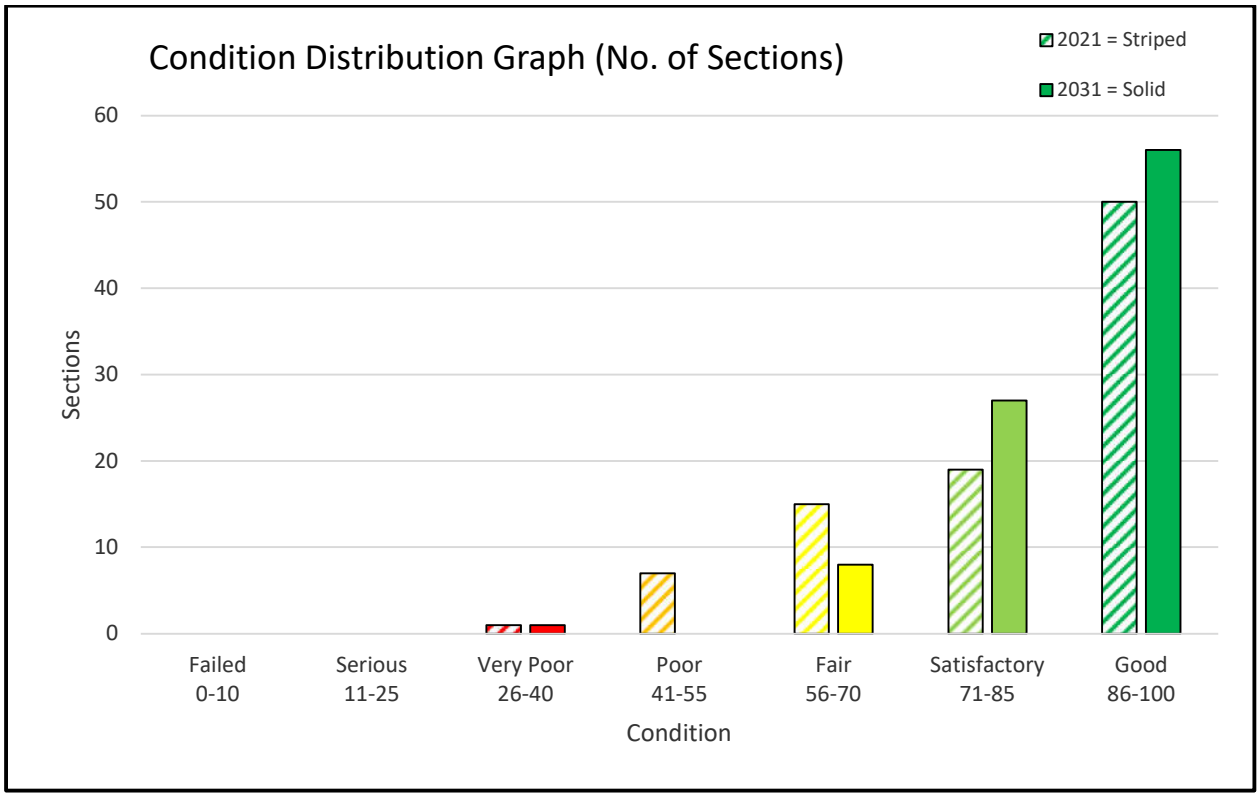
Scenario 5: $700,000 budget per year for 10 years



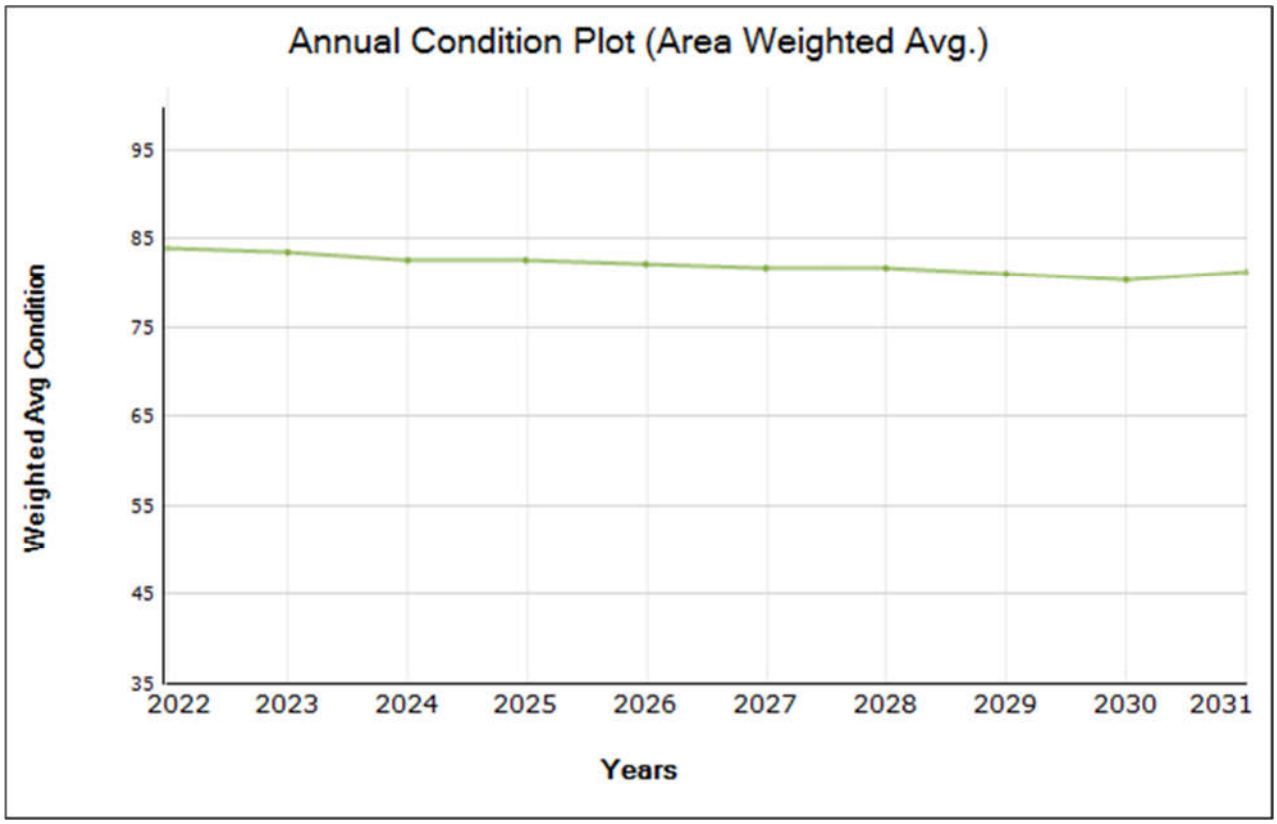
CDG 2021



CDG 2031

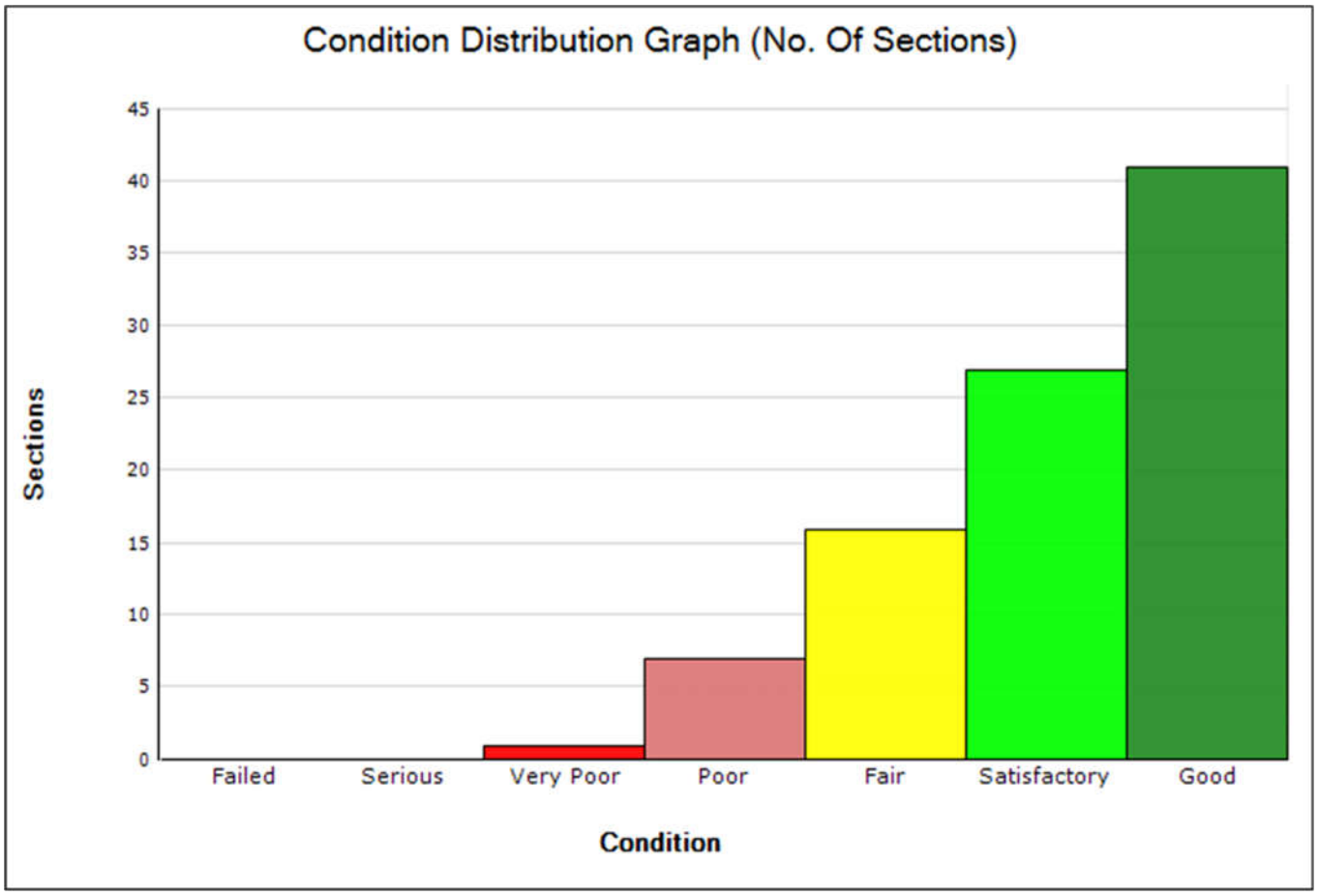


CDG 2021 vs. 2031

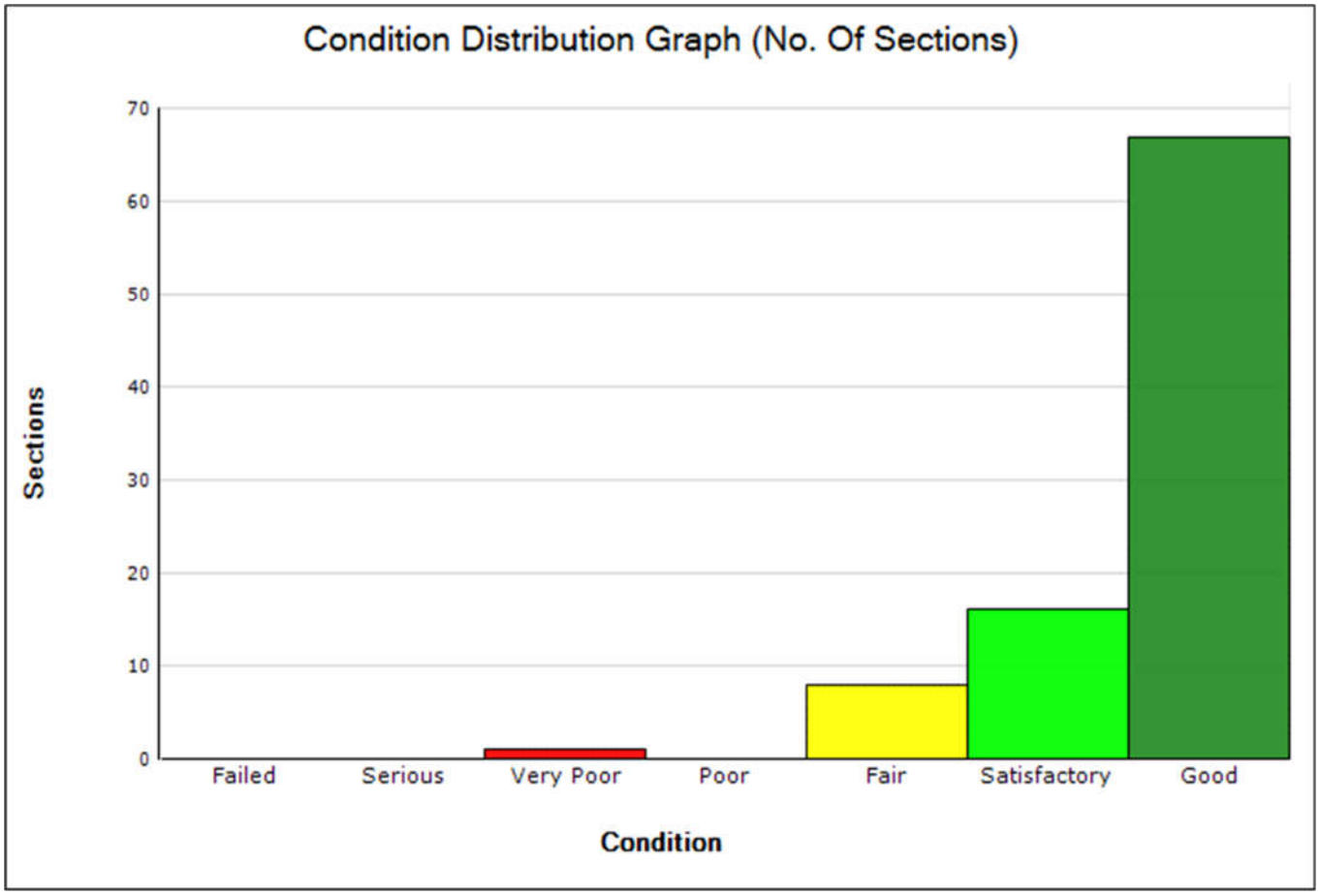


Annual PCI Levels

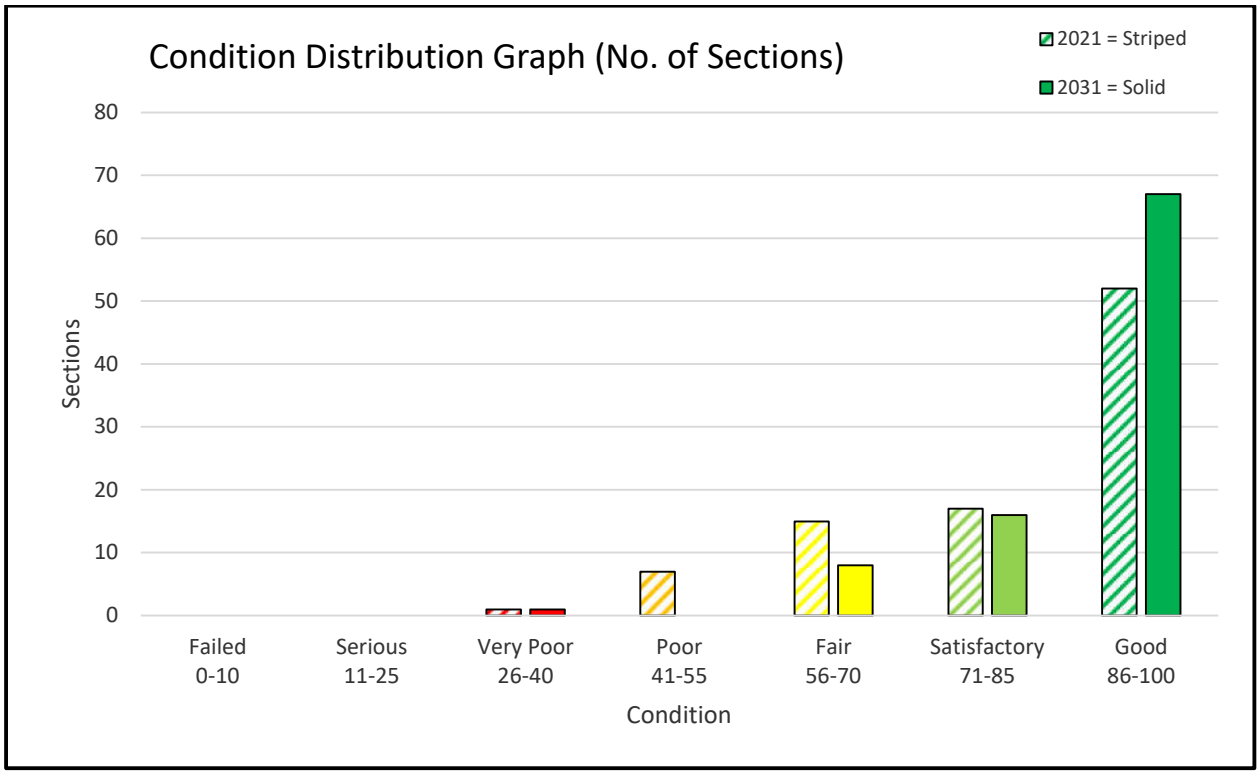
Scenario 6: $800,000 budget per year for 10 years



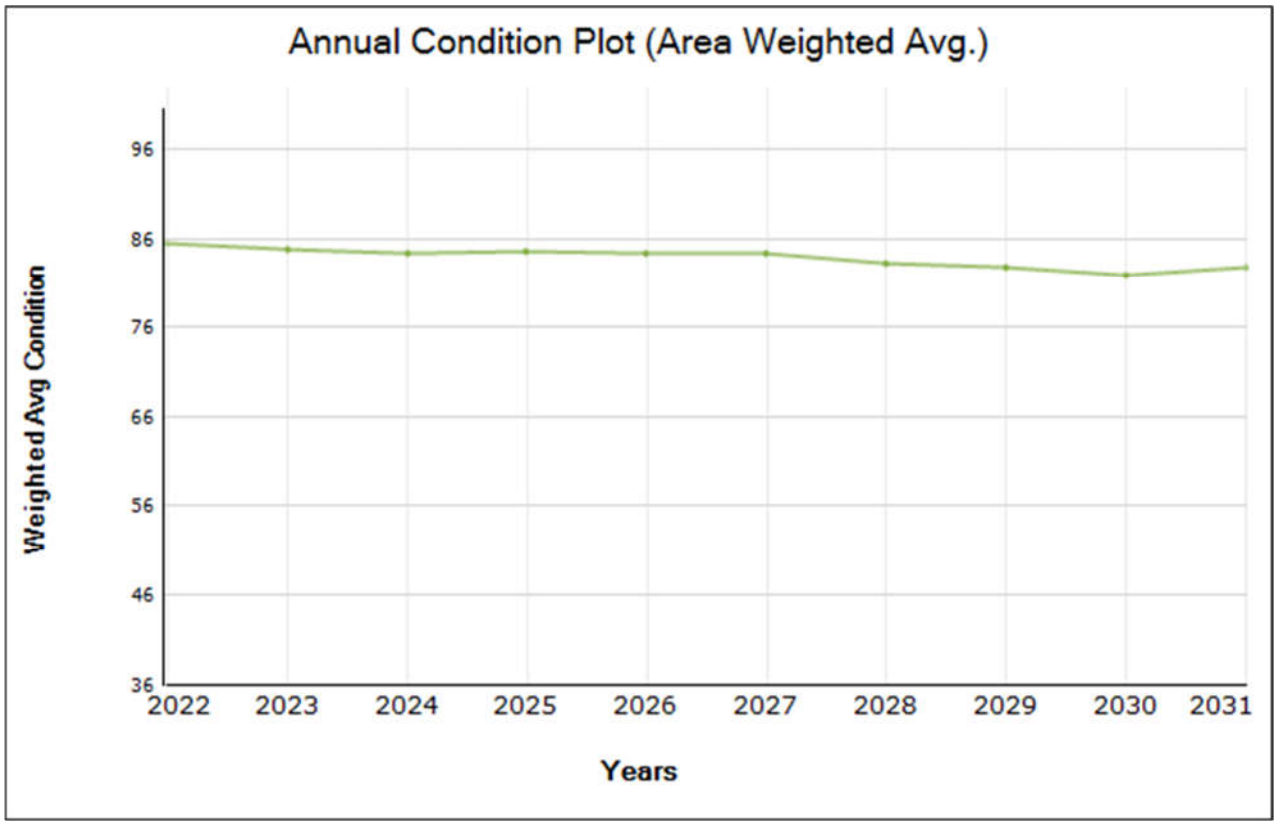
CDG 2021



CDG 2031

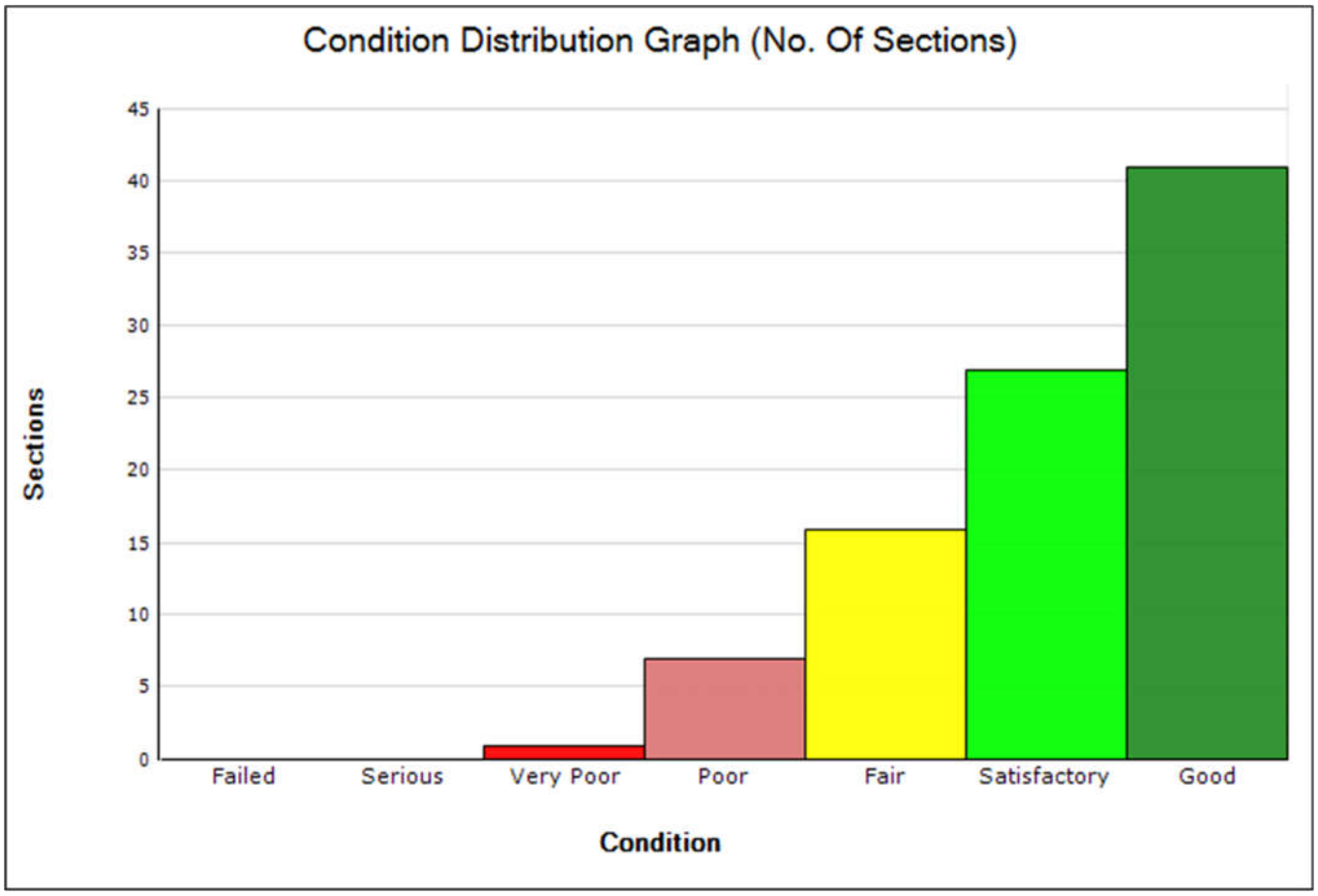


CDG 2021 vs. 2031

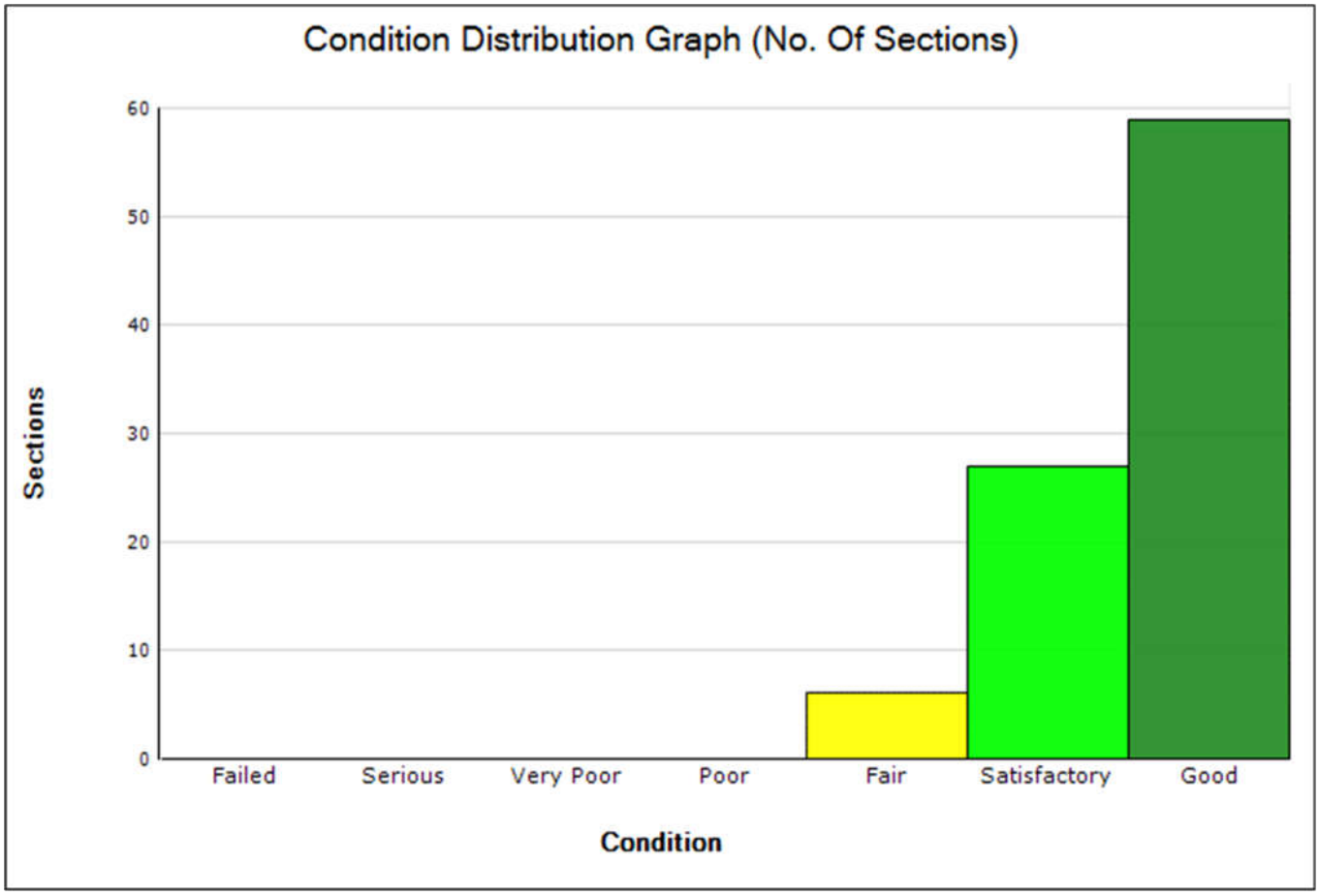


Annual PCI Levels

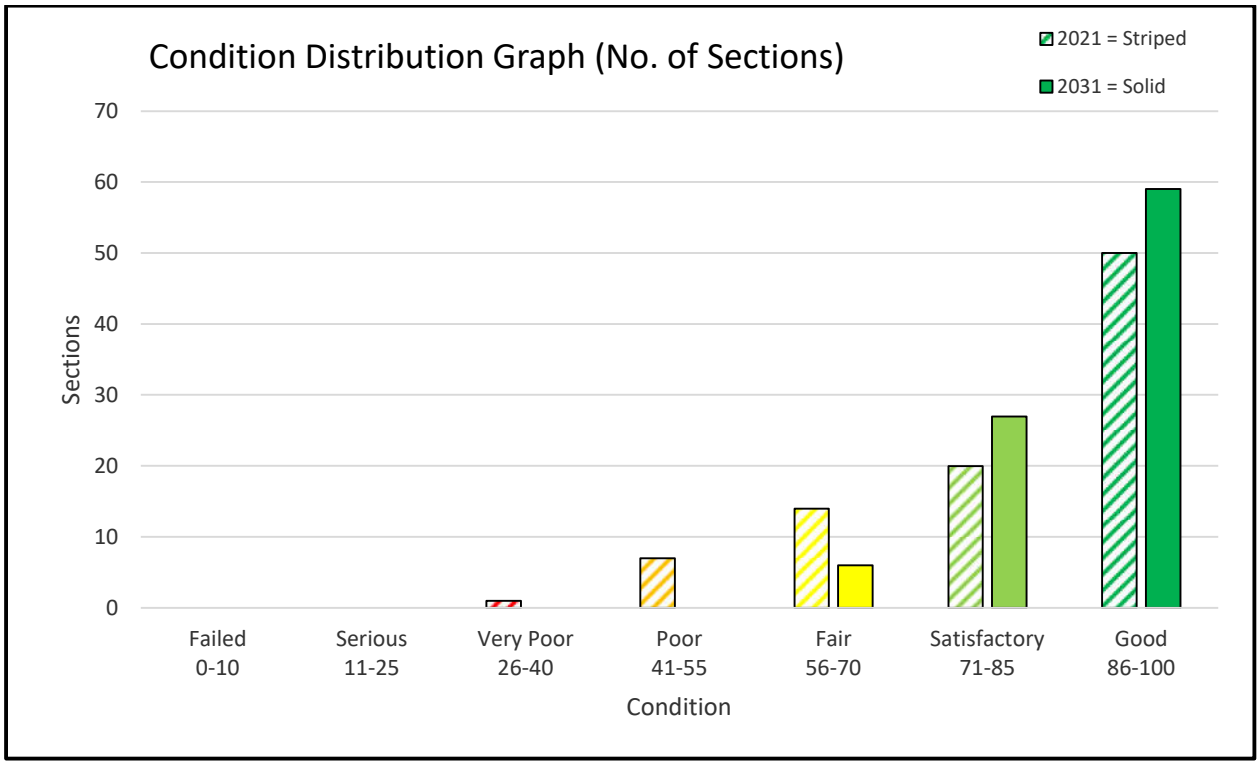
Scenario 7: Increase PCI Level to "Good" ($1,100,000 per year for 10 years)



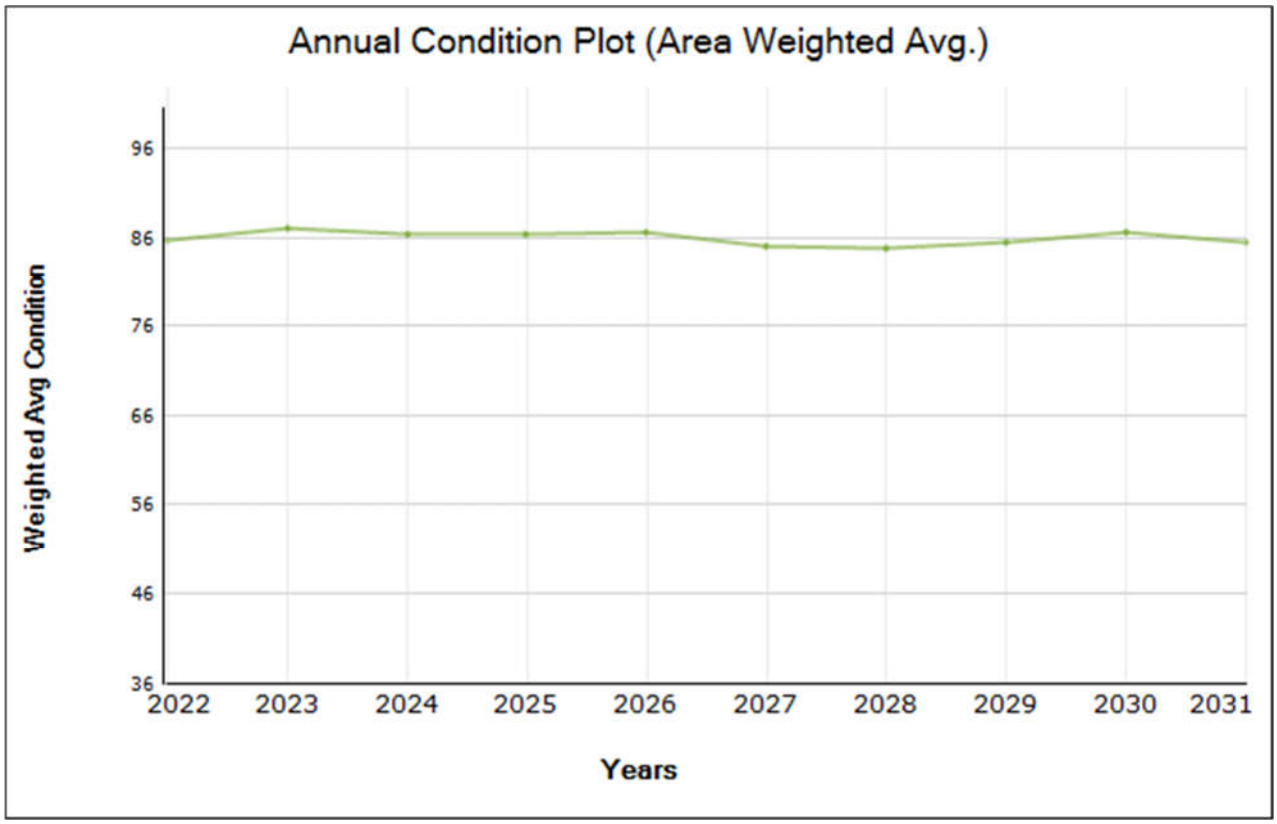
CDG 2021



CDG 2031



CDG 2021 vs. 2031



Annual PCI Levels

APPENDIX C – Existing Sidewalk Condition Inventory

Sidewalk Condition Rating - Inventory (Alphabetical)

Sidewalk Location	SectionID	From	To	Width (avg.)	Length	Sidewalk Material	Curb Material	ADA Compliant	Cross Slope (avg.)	Running Slope (avg.)	2021 PCI	PCI Category
Brown Street	1	Main St	Yarmouth Rd	5.0'	750'	Pavement	Granite	No	2.2%	0.8%	87	Good
Brown Street	2	Aroma Joes	Main St	4.0'	160'	Pavement	Granite	Yes	1.6%	1.1%	75	Fair
Lewiston Road	1	Main Street	American Legion	4.5'	1570'	Pavement	Granite	Yes	1.1%	0.6%	80	Fair
Libby Hill Road	1	High School	Shaker Road	4.5'	520	Pavement	Bituminous	Yes	1.0%	0.8%	84	Fair
Main Street	1	Yarmouth Rd	Brown St	4.5'	210'	Pavement	Granite	No	2.3%	0.8%	39	Poor
Main Street	2	Brown St	Town Office	5.3'	950'	Brick	Granite	Yes	0.5%	0.5%	85	Good
Main Street	3	Town Office	#26 Main St	3.0'	180'	Pavement	NA	No	3.7%	0.3%	20	Poor
Main Street	4	Lewiston Rd	#13 Main St	5.0'	290'	Pavement	Granite	No	2.1%	0.8%	70	Fair
Main Street	5	#13 Main St	Shaker Rd	3.0'	110'	Pavement	Granite	No	1.2%	0.6%	55	Fair
Main Street	6	Shaker Rd	W Gray Rd	7.0'	350'	Brick	Granite	Yes	0.8%	0.9%	73	Fair
Portland Road	1	Gray Plaza	#15 Portland Rd	4.3'	350'	Pavement	NA	Yes	1.4%	1.8%	44	Poor
Portland Road	2	#15 Portland Rd	#11 Portland Rd	3.8'	100'	Pavement	NA	No	1.4%	1.1%	37	Poor
Portland Road	3	#11 Portland Rd	Mobile Gas Station	4.3'	500'	Pavement	Bituminous	Yes	1.4%	2.4%	87	Good
Portland Road	4	Mobile Gas Station	Yarmouth Rd	4.0'	40'	Pavement	Granite	No	0.6%	2.4%	25	Poor
Shaker Road	1	#138 Shaker Rd	Hannaford Entrance	5.0'	190'	Pavement	Granite	Yes	1.6%	2.0%	87	Good
Shaker Road	2	Libby Hill Rd	Seagull Dr	5.0'	200'	Pavement	Granite	Yes	1.8%	0.9%	82	Fair
Shaker Road	3	#69 Shaker Rd	Main St	5.0'	4600'	Pavement	Granite	Yes	2.0%	0.3%	100	Excellent
Shaker Road	4	#50 Shaker Rd	Main St	5.0'	3700'	Pavement	Granite	Yes	2.0%	0.3%	100	Excellent
Yarmouth Road	1	Hancock St	Brown St	5.0'	50'	Pavement	Granite	Yes	0.7%	1.6%	90	Good
Yarmouth Road	2	Brown St	#19 Yarmouth Rd	5.3'	350'	Pavement	Granite	Yes	1.3%	0.6%	88	Good

Ramp Condition Rating - Inventory (Alphabetical)

Ramp Location	SectionID	Intersecting Street	Sidewalk Material	ADA Compliant	Turning Space	Flare Slope (1)	Flare Slope (2)	Clear Space	Cross Slope (avg.)	Running Slope (avg.)	Detectable Warning Field
Brown Street	1	Yarmouth Rd	Pavement	Yes	Yes	NA	NA	Yes	0.6%	0.9%	Yes
Brown Street	2	Yarmouth Rd	Pavement	No	No	4.5%	1.4%	Yes	3.8%	3.2%	Yes
Brown Street	3	McDonalds entrance	Pavement	Yes	Yes	NA	NA	Yes	0.8%	5.1%	Yes
Brown Street	4	McDonalds entrance	Pavement	Yes	Yes	NA	NA	Yes	0.5%	8.0%	Yes
Brown Street	5	McDonalds entrance	Pavement	Yes	Yes	NA	NA	Yes	0.2%	7.1%	Yes
Brown Street	6	McDonalds entrance	Pavement	Yes	Yes	NA	NA	Yes	0.7%	6.1%	Yes
Brown Street	7	Main St	Concrete	Yes	Yes	6.5%	9.7%	Yes	1.4%	1.0%	Yes
Brown Street	8	Main St	Concrete	Yes	Yes	6.9%	9.3%	Yes	1.8%	1.0%	Yes
Libby Hill Road	1	Shaker Rd	Concrete	No	No	7.1%	NA	Yes	1.3%	2.3%	Yes
Libby Hill Road	2	High School entrance	Pavement	No	No	1.9%	7.3%	Yes	1.2%	0.2%	Yes
Main Street	1	Yarmouth Rd	Pavement	No	No	4.6%	4.5%	Yes	1.6%	4.6%	No
Main Street	2	Brown St	Concrete	Yes	Yes	4.0%	0.8%	Yes	0.2%	5.3%	Yes
Main Street	3	McDonalds entrance	Brick	Yes	Yes	NA	NA	Yes	1.0%	4.7%	Yes
Main Street	4	McDonalds entrance	Brick	Yes	Yes	NA	NA	Yes	1.2%	2.2%	Yes
Main Street	5	Cumberland Farms entrance	Brick	Yes	Yes	NA	NA	Yes	2.0%	0.5%	Yes
Main Street	6	Cumberland Farms entrance	Brick	Yes	Yes	NA	NA	Yes	2.0%	0.5%	Yes
Main Street	7	Cumberland Farms entrance	Brick	Yes	Yes	NA	NA	Yes	2.0%	0.5%	Yes
Main Street	8	Cumberland Farms entrance	Brick	Yes	Yes	NA	NA	Yes	2.0%	0.5%	Yes
Main Street	9	Town Office entrance	Brick	Yes	Yes	NA	NA	Yes	0.2%	3.3%	Yes
Main Street	10	Town Office entrance	Concrete	Yes	Yes	NA	NA	Yes	1.4%	2.9%	Yes
Main Street	11	Town Office exit	Concrete	Yes	Yes	4.6%	NA	Yes	0.7%	6.7%	Yes
Main Street	12	Town Office exit	Pavement	No	No	2.7%	4.9%	Yes	2.2%	4.9%	No
Main Street	13	Mid-block crossing	Concrete	Yes	Yes	6.0%	NA	Yes	0.1%	6.2%	Yes
Main Street	14	Mid-block crossing	Pavement	Yes	Yes	NA	NA	Yes	0.2%	3.0%	Yes
Main Street	15	Shaker Rd	Concrete	Yes	Yes	NA	NA	Yes	0.7%	1.7%	Yes
Main Street	16	Shaker Rd	Concrete	Yes	Yes	6.1%	4.6%	Yes	0.1%	0.4%	Yes
Main Street	17	Shaker Rd	Pavement	Yes	Yes	5.0%	4.5%	Yes	0.6%	0.5%	Yes
Main Street	18	West Gray Rd	Brick	Yes	Yes	NA	NA	Yes	5.7%	0.7%	Yes

Ramp Condition Rating - Inventory (Alphabetical)

Portland Road	1	Dollar Tree entrance	Pavement	No	Yes	NA	NA	Yes	0.5%	1.4%	No
Portland Road	2	Gray Plaza entrance	Pavement	No	Yes	NA	NA	Yes	1.8%	0.4%	No
Shaker Road	1	Hannaford entrance	Concrete	Yes	Yes	NA	NA	Yes	0.2%	4.0%	Yes
Shaker Road	2	Libby Hill Rd	Concrete	Yes	Yes	10.0%	NA	Yes	2.0%	8.0%	Yes
Shaker Road	3	Mid-block crossing (near #55)	Pavement	Yes	Yes	NA	NA	Yes	0.5%	8.0%	Yes
Shaker Road	4	Sunset View	Pavement	Yes	Yes	NA	NA	Yes	2.0%	8.0%	Yes
Shaker Road	5	Sunset View	Pavement	Yes	Yes	NA	NA	Yes	2.0%	8.0%	Yes
Shaker Road	6	Mid-block crossing (near Fidd	Pavement	Yes	Yes	NA	NA	Yes	0.5%	5.0%	Yes
Shaker Road	7	Mid-block crossing (near #9)	Pavement	Yes	Yes	NA	NA	Yes	0.5%	8.0%	Yes
Shaker Road	8	Dunkin Donuts entrance	Pavement	Yes	Yes	NA	NA	Yes	2.0%	8.0%	Yes
Shaker Road	9	Dunkin Donuts entrance	Pavement	Yes	Yes	NA	NA	Yes	2.0%	8.0%	Yes
Shaker Road	10	Mid-block crossing (near #9)	Pavement	Yes	Yes	NA	NA	Yes	0.5%	8.0%	Yes
Shaker Road	11	Gray Park (south)	Pavement	Yes	Yes	5.0%	8.0%	Yes	0.5%	8.0%	Yes
Shaker Road	12	Gray Park (south)	Pavement	Yes	Yes	NA	NA	Yes	2.0%	8.0%	Yes
Shaker Road	13	Gray Park (north)	Pavement	Yes	Yes	NA	NA	Yes	2.0%	8.0%	Yes
Shaker Road	14	Gray Park (north)	Pavement	Yes	Yes	NA	NA	Yes	2.0%	8.0%	Yes
Shaker Road	15	Mid-block crossing (near #50)	Pavement	Yes	Yes	NA	NA	Yes	0.5%	8.0%	Yes
Yarmouth Road	1	Hancock St	Pavement	Yes	Yes	7.1%	NA	Yes	1.4%	5.0%	Yes
Yarmouth Road	2	Brown St	Pavement	Yes	Yes	NA	NA	Yes	0.2%	1.0%	Yes

Condition	Score
Excellent	100
Good	85 - 100
Fair	45 - 84
Poor	5 - 44
Very Poor	0 - 4

N

0 250 500

1 inch = 500 ft.

Design: OCC	Date: JAN 2022
Draft: LAN	Job No.: 2344.152
Checked: WCH	Scale: AS SHOWN
File Name: 2344.152–SW–PCR.dwg	

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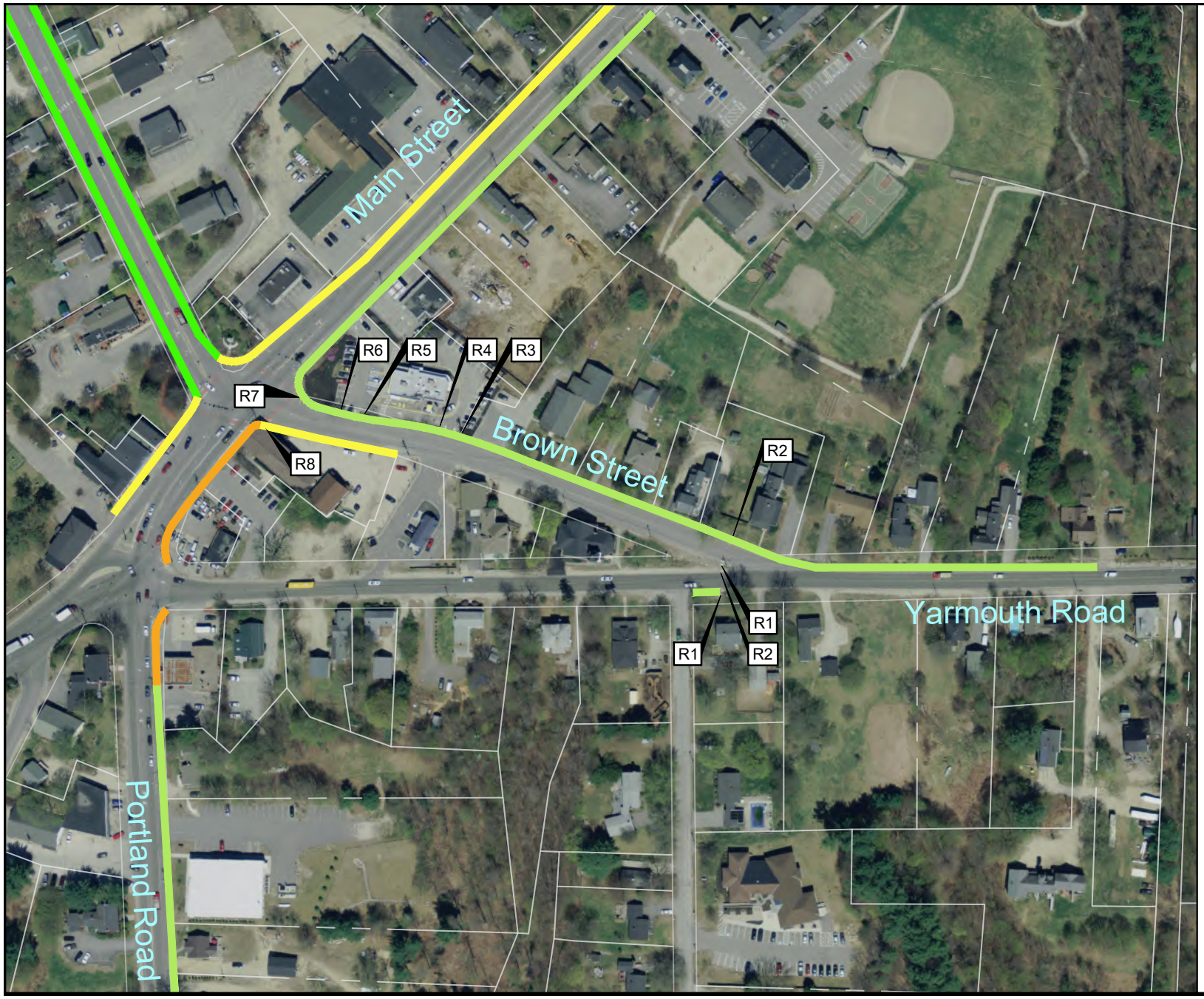
Drawing Name: **Shaker Road**

Project: **2021 Sidewalk Condition Survey**
Gray, Maine

Figure No. **1**



Condition	Score
Excellent	100
Good	85 - 100
Fair	45 - 84
Poor	5 - 44
Very Poor	0 - 4

N

0 100 200

1 inch = 200 ft.

Design:	OCC	Date:	JAN 2022
Draft:	LAN	Job No.:	2344.152
Checked:	WCH	Scale:	AS SHOWN
File Name: 2344.152–SW–PCR.dwg			

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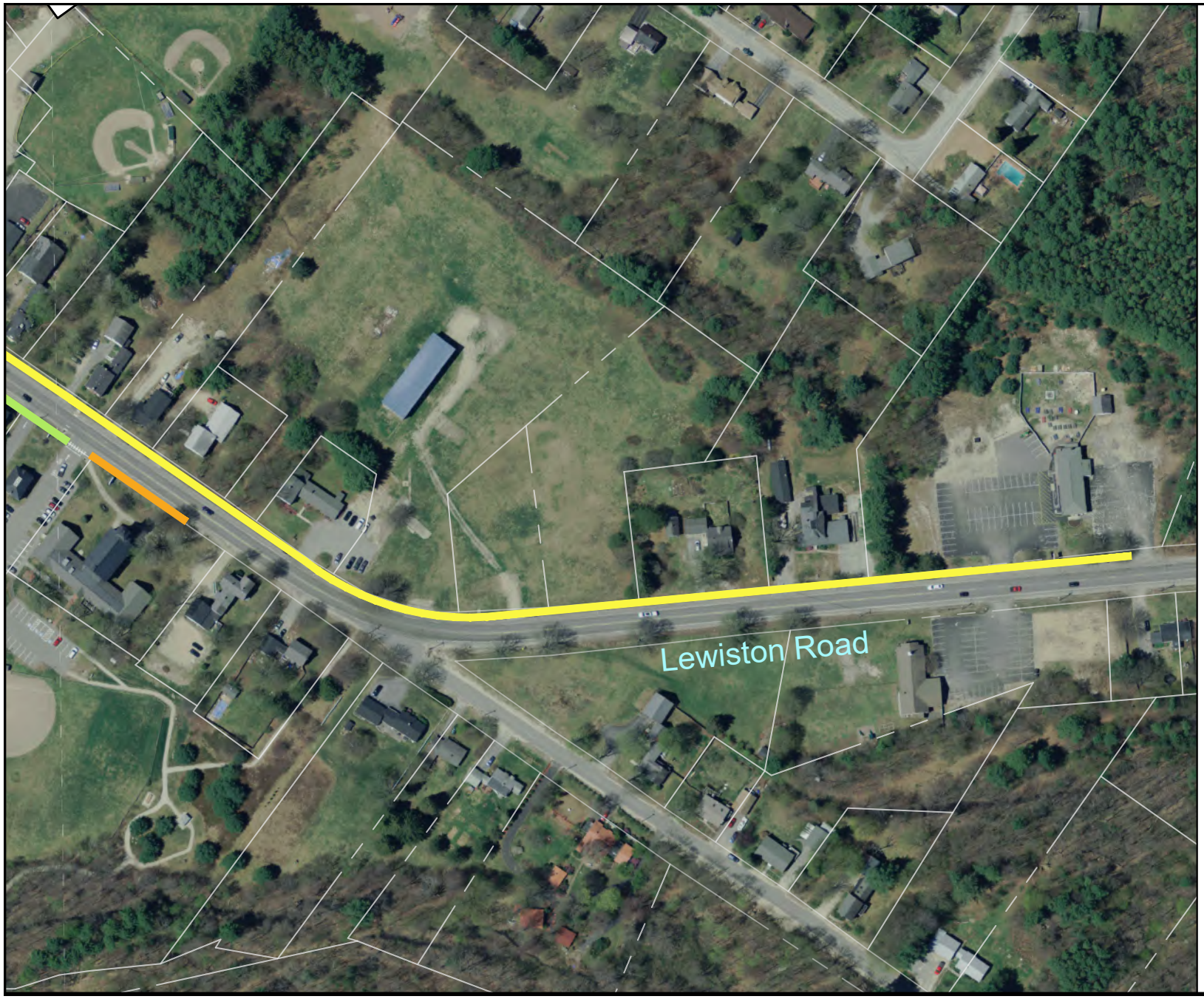
Drawing Name: **Brown Street & Yarmouth Road**

Project: **2021 Sidewalk Condition Survey**
Gray, Maine

Figure No. 2



Condition	Score
Excellent	100
Good	85 - 100
Fair	45 - 84
Poor	5 - 44
Very Poor	0 - 4

N

0 100 200

1 inch = 200 ft.

Design: OCC	Date: JAN 2022
Draft: LAN	Job No.: 2344.152
Checked: WCH	Scale: AS SHOWN
File Name: 2344.152-SW-PCR.dwg	

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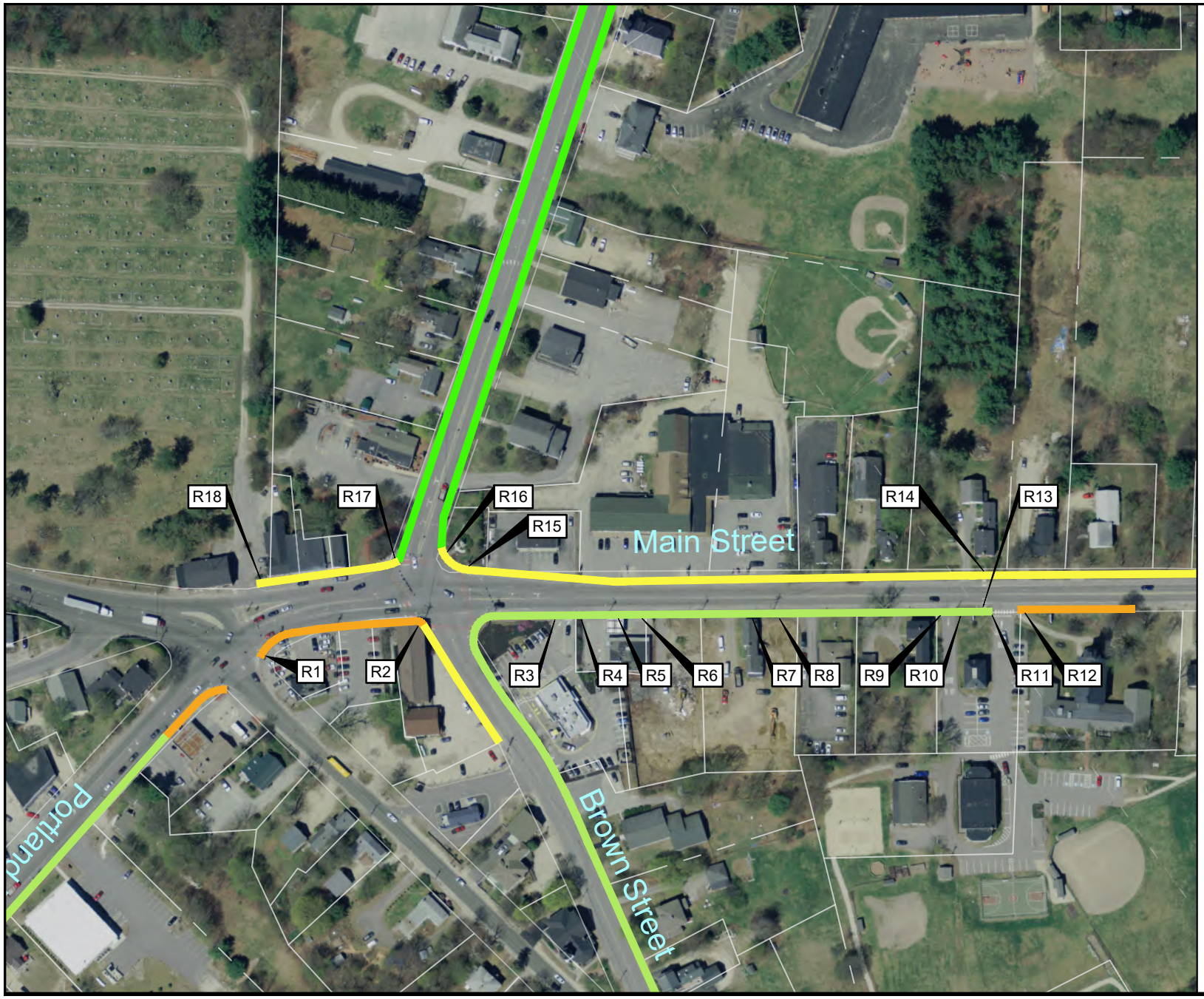
Drawing Name: **Lewiston Road**

Project: **2021 Sidewalk Condition Survey**
Gray, Maine

Figure No. 3



Condition	Score
Excellent	100
Good	85 - 100
Fair	45 - 84
Poor	5 - 44
Very Poor	0 - 4

N

0 100 200

1 inch = 200 ft.

Design: OCC	Date: JAN 2022		
Draft: LAN	Job No.: 2344.152		
Checked: WCH	Scale: AS SHOWN		
File Name: 2344.152-SW-PCR.dwg			

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Drawing Name: **Main Street**

Project: **2021 Sidewalk Condition Survey**
Gray, Maine

Figure No. 4

Condition	Score
Excellent	100
Good	85 - 100
Fair	45 - 84
Poor	5 - 44
Very Poor	0 - 4

N

0 100 200

1 inch = 200 ft.

Design: OCC	Date: JAN 2022
Draft: LAN	Job No.: 2344.152
Checked: WCH	Scale: AS SHOWN
File Name: 2344.152–SW–PCR.dwg	

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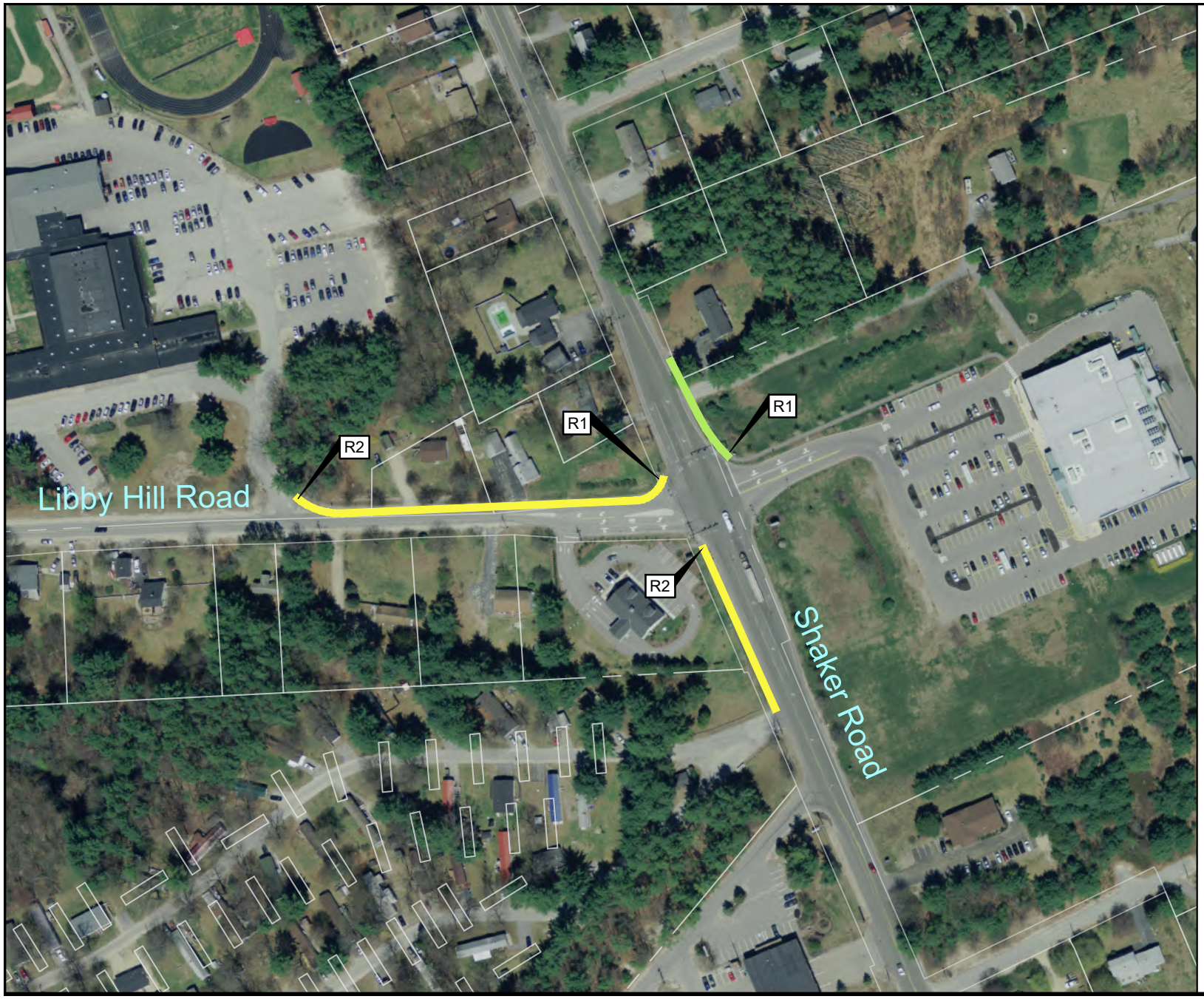
Drawing Name: **Portland Road**

Project: **2021 Sidewalk Condition Survey**
Gray, Maine

Figure No. 5



Condition	Score
Excellent	100
Good	85 - 100
Fair	45 - 84
Poor	5 - 44
Very Poor	0 - 4

N

0 100 200

1 inch = 200 ft.

Design: OCC	Date: JAN 2022
Draft: LAN	Job No.: 2344.152
Checked: WCH	Scale: AS SHOWN
File Name: 2344.152-SW-PCR.dwg	

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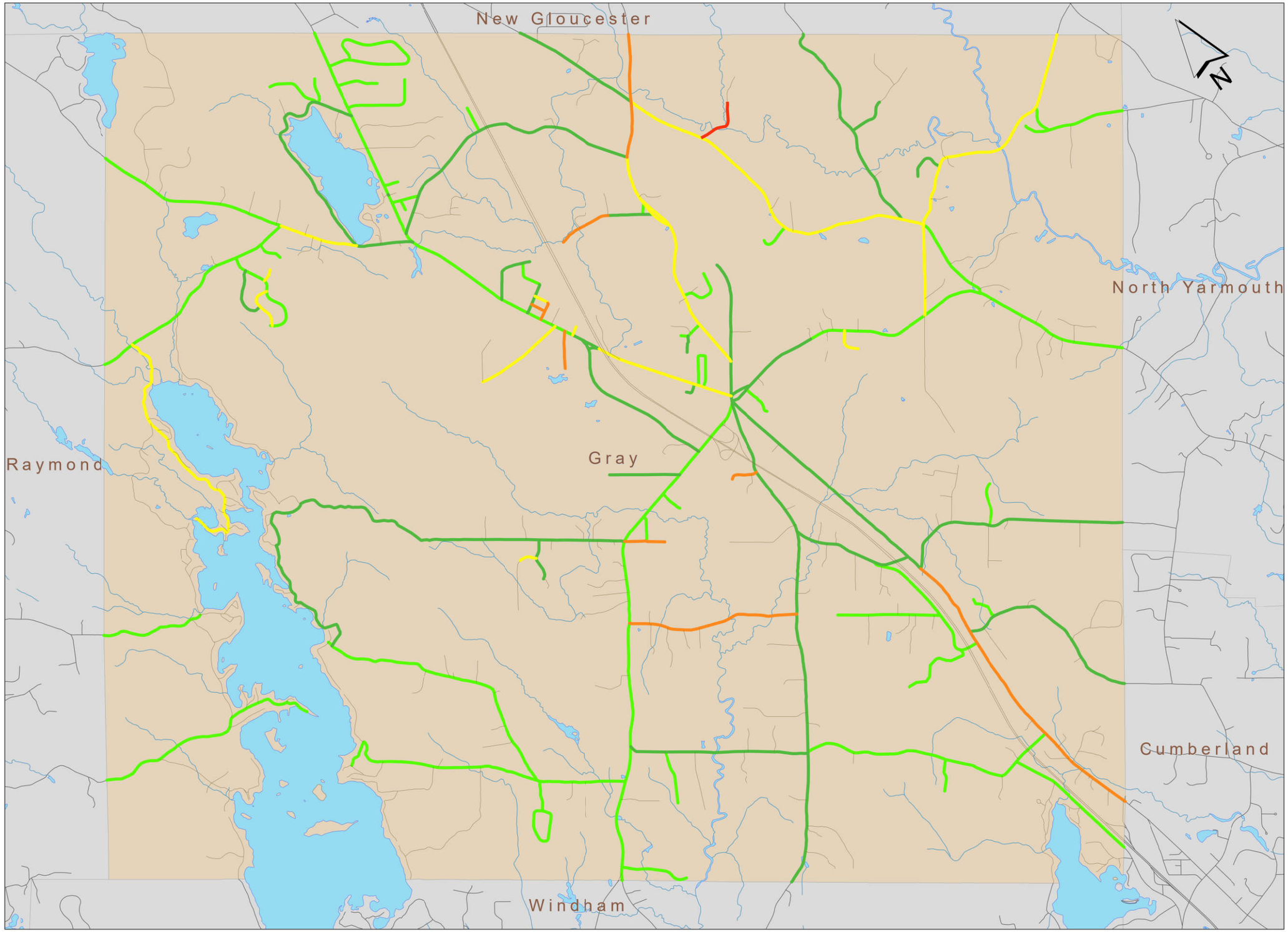
Drawing Name: **Libby Hill Road & Shaker Road**

Project: **2021 Sidewalk Condition Survey**
Gray, Maine

Figure No. **6**

APPENDIX D – Existing Pavement Condition Map



LEGEND	
86-100	GOOD - FUTURE OVERLAY
71-85	SATISFACTORY - FUTURE OVERLAY
56-70	FAIR - LIGHT OVERLAY/SHIM (1.0")
41-55	POOR - HEAVY OVERLAY/SHIM (2.5")
26-40	VERY POOR - RECONSTRUCT
11-25	SERIOUS - RECONSTRUCT
0-10	FAILED - RECONSTRUCT

2021 Pavement Management Survey Gray, Maine

0 0.25 0.5 1 Miles

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