CITY OF FORT LAUDERDALE

Memorandum

Memorandum No: 24-158

Date: November 12, 2024

To: Honorable Mayor, Vice Mayor, and Commissioners

From: Susan Grant, Acting City Manager

Re: **Citywide Condition Assessment for Roadways, Alleyways, and Sidewalks Update**

This memorandum is to provide the City Commission with an updated condition assessment for the roadways, alleyways, and sidewalks within the Public Right of Way.

On November 8, 2024, the City's consultant submitted the final Citywide Condition Assessment Summary prepared under Task Order No.4/P12896. The assessment was prepared using mobile light detection and ranging (LiDAR) data collected in Fall 2022 to perform the American Association of State Highway and Transportation Officials (AASHTO) Pavement Condition Index (PCI) scoring of City-owned roadways and alleyways. The LiDAR data was also used to manually determine the condition of City-owned sidewalk segments.

This project assessed a total of 529 lane miles and found 89% of the roads and alleyways were considered in good to fair condition (PCI of 100 to 56). The remaining 11% were considered in poor to failed condition (PCI below 56). Data included in the study contains the PCI scores from the roadways and alleyways assessment by percentages as follows:

Roadways and Alleyways Assessment

Good	25.3%	Very Poor	1.8%
Satisfactory	43.1%	Serious	2.1%
Fair	20.4%	Failed	0.1%
Poor	7.1%		

The project also identified areas of damaged sidewalks within the City's Right of Way and provided a means to capture and manage key data associated with existing sidewalk conditions, including possible repairs needed. More than 400 miles of existing concrete sidewalks (roughly 11,421,000 square feet) within the City limits were assessed. This assessment found just over 72% of the sidewalks were considered in good to fair condition, while almost 28% were considered in poor to failed condition. The database provided will be used by the City to document damaged sidewalk locations and to develop a work plan for repair or replacement based on available funding. The assessment presented in the chart below reveals the percentages as follows:

Citywide Sidewalk Conditions Assessment

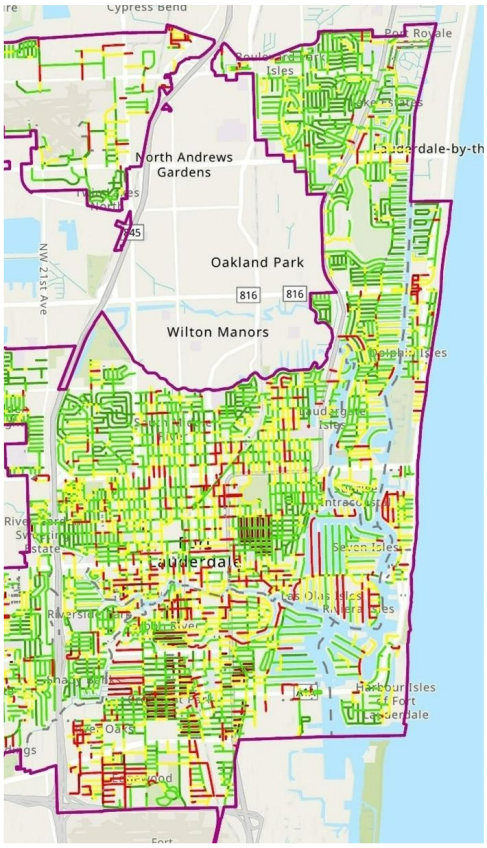
Good	7%	Very Poor	8.5%
Satisfactory	29.8%	Serious	1.2%
Fair	35.6%	Failed	0.1%
Poor	17.8%		

Attached is the final summary report for Citywide Condition Assessment for Roadways, Alleyways, and Sidewalks, which includes greater details including a breakdown by district. Also attached are Citywide maps that identify the assessed condition of individual sidewalks, roadways, and alleyways. Staff will be conducting further analysis and engineering reviews to include updating cost estimates in the next 60 days to update projects within the City's Community Investment Plan.

For additional information, please contact Alan Dodd, Director of Public Works, at 954-828-5806 or email: ADodd@fortlauderdale.gov

Attachment 1- Citywide Pavement Condition Assessment Summary
Attachment 2 – Roadways and Alleyways Condition Map
Attachment 3 – Sidewalk Conditions Map

c: Anthony G. Fajardo, Assistant City Manager
Laura Reece, Acting Assistant City Manager
Ben Rogers, Acting Assistant City Manager
Christopher Cooper, Acting Assistant City Manager
D'Wayne M. Spence, Acting City Attorney
David R. Soloman, City Clerk
Patrick Reilly, City Auditor
Department Directors
CMO Managers


Cypress Bend
Port Royale
North Andrews Gardens
Oakland Park
816
816
NW 21st Ave
Wilton Manors
Lauderdale
Seven Isles
Harbour Isles
Fort Lauderdale


Jacobs
Abbott Av
BYV·W83
COLORADO
LASER MAPPING INFRASTRUCTURE
Jacobs

Citywide Pavement Condition Assessment Summary

Client name:	City of Fort Lauderdale		
Project name:	P12896 Citywide Condition Assessment Summary		
Client reference:	Public Works Department	**Project no:**	D3593303
Document no:	241001093244_309a5a4e	**Project manager:**	Raul Alfaro, PE
Revision:	Final	**Prepared by:**	Jacobs
Date:	November 8, 2024		

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Executive Summary

Jacobs used mobile light detection and ranging (LiDAR) data collected in fall 2022 to perform American Association of State Highway and Transportation Officials (AASHTO) Pavement Condition Index (PCI) scoring of City of Fort Lauderdale (City)-owned roadways and alleyways. The LiDAR data were also used to manually determine condition of City-owned sidewalk segments. Sidewalks were manually reviewed using the LiDAR and the accompanying imagery to identify defects. The sidewalk segments delivered as part of *P12482 Task Order 2 Development of Street Swales and Curbing Asset Registry* (Task Order 2) were used as a means of summarizing the number of defects and determine severity ratings.

The resulting deliverables were updated geographic information system (GIS) features, including a centerline file with roadway and alleyway PCI scores, a polygon feature of roadway and alleyway defects, a City-owned sidewalk polygon feature with condition ratings, and a sidewalk defect point feature. These data were summarized by Jacobs's data collection zones and the Commission District for this report.

This report provides a high-level overview of City-owned pavement conditions. Further analysis and engineering review are required for project planning and accurate cost estimates.

Figure ES-1. Citywide Sidewalk Condition Scores (square feet)

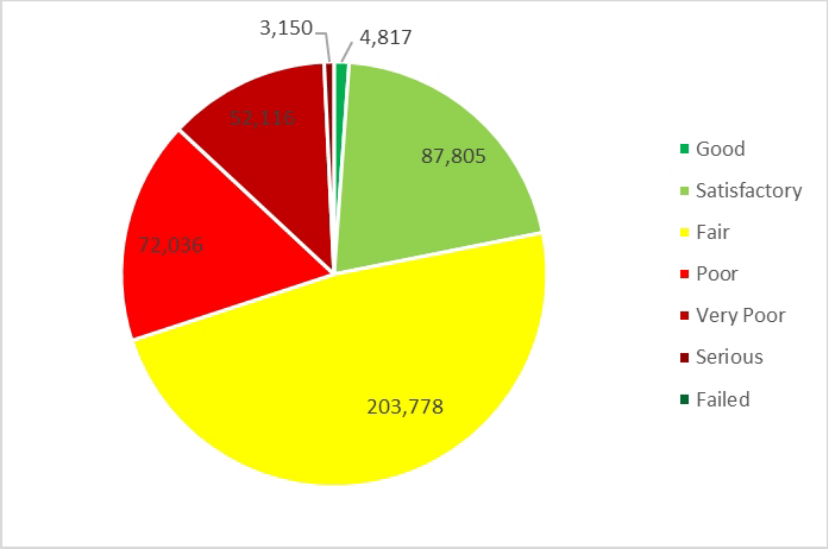
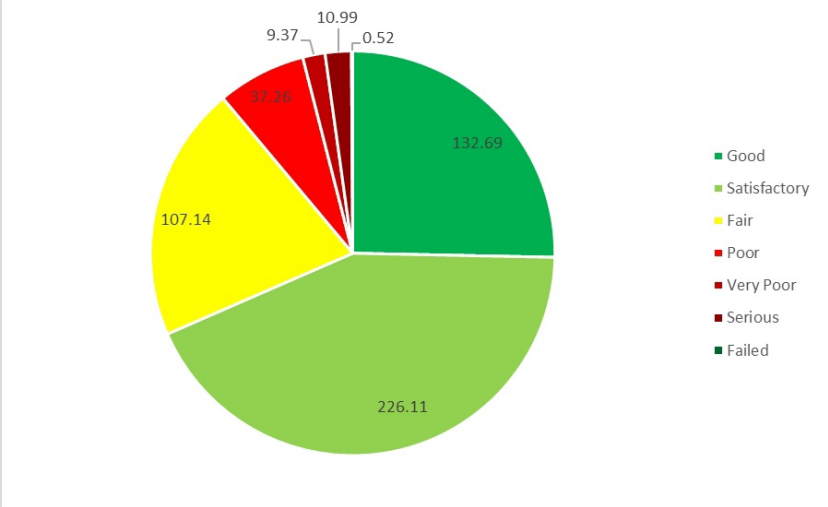


Figure ES-2. Citywide Roadway and Alleyway PCI Scores (miles)



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Tables

Figures

Acronyms and Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
City	City of Fort Lauderdale
LiDAR	light detection and ranging
PCI	Pavement Condition Index

1. Introduction

Jacobs used mobile LiDAR data collected in fall 2022 to perform American Association of State Highway and Transportation Officials (AASHTO) Pavement Condition Index (PCI) scoring of City of Fort Lauderdale (City)-owned roadways and alleyways. The LiDAR data were also used to manually determine condition of City-owned sidewalk segments.

Figure 1-1. Mobile Mapping Using Trimble MX9

The project study area was restricted to City-owned roadways, alleyways, and sidewalks. These areas were identified as follows:

- A roadway centerline shapefile was provided by the City during the previous P12482 Task Order 2 Development of Street Swales and Curbing Asset Registry (Task Order 2) on June 3, 2022. Roadways and alleyways where the owner was identified as the City of Fort Lauderdale were assessed in this project.
- Parcel data were provided by the City on May 3, 2024. Sidewalks within parcels where the owner was identified as CITY OF FORT LAUDERDALE, FORT LAUDERDALE DOWNTOWN; DEVELOPMENT AUTHORITY, PUBLIC LAND; or % CITY OF FORT LAUDERDALE were assessed in this project.

Further, only areas captured in the LiDAR collection for Task Order 2 were evaluated for this project.

Deliverables included the following:

- Roadway and alleyway centerline features with PCI scores
- Roadway and alleyway defect polygon features
- Sidewalk polygon feature with condition score
- Sidewalk defect point feature
- Summary reports by Zone and Commission District

2. Methodology

Tasks completed under this project included edge of pavement extraction, roadway, alleyway, and sidewalk pavement assessments. This methodology is further described in the Project Workplan delivered to the City on July 16th, 2024.

2.1 Roadways and Alleyways

Roadways and paved alleyways assessments were completed using ASTM International Standard D6433, *Standard Practice for Roadway and Parking Lots Pavement Condition Index Surveys*, for pavement facilities and related infrastructure. PAVER condition scores and associated ranges are identified in Table 2-1.

Table 2-1. PAVER PCI Description

Condition Description	PCI Range
Good	86-100
Satisfactory	71-85
Fair	56-70
Poor	41-55
Very Poor	12-40
Serious	11-25
Failed	0-10

Jacobs used TopoDOT software to identify and measure deficiencies and calculate PCI scores for roadways and alleyways. To run the PCI scoring tools within TopoDOT, the edge of pavement was digitized and used as a defining boundary. Boundaries were generated for roadway segments, as well as sample blocks within each segment.

The TopoDOT Road Surface Analysis tool was then used to identify asphalt deformation from the LiDAR data by calculating planes within each sample block. PCI scores were then calculated for each sample block and resulting scores were averaged for an individual roadway section.

Upon completion of the deficiency analysis and PCI scoring, quality control checks were performed to identify anomalies in the data and spot-check the identified deformations. Imagery collected with the LiDAR data was used to validate defects and ensure the automated tools were functioning properly.

Data were delivered by zone in ESRI file geodatabase format to the City for review. A final file geodatabase of all citywide data was submitted in September 2024.

2.2 Sidewalks

Only sidewalks within parcels where the owner was identified as CITY OF FORT LAUDERDALE, FORT LAUDERDALE DOWNTOWN; DEVELOPMENT AUTHORITY, PUBLIC LAND; or % CITY OF FORT LAUDERDALE in the City parcel data were included in this analysis.

For sidewalks, defects were manually derived from imagery collected during Task Order 2. Scores calculated in Task Order 2 were used as a starting point for this analysis.

For example, Task Order 2 sidewalks with a condition score of 1 with zero additional manually derived defects would remain in condition score 1, or "Good/Satisfactory" rating. If, however, the sidewalk had greater than 10 defects or some of the defects identified were severe, impacting the walkability of the section, the condition score would be downgraded to a lower category. Table 2-2 outlines sidewalk condition ratings.

Table 2-2. Sidewalk Condition Ratings

Sidewalk Condition Score	Rating
1-2	**Good**/Satisfactory
2-3	**Satisfactory**/Fair
3-4	Fair/**Poor**
5-6	**Very Poor**/Serious
6-7	Serious/**Failed**

3. Results

Data were summarized for roadways and alleyways as well as sidewalk condition by zone and Commission District.

3.1 Roadways and Alleyways

This project assessed total of 529 lane miles. Almost 89% of the roadways and alleyways assessed were considered in good to fair condition. The remaining 11% were considered poor to failed. Table 3-1 presents the PCI scores from the roadway and alleyway assessment by percentage, and Figure 3-1 presents the PCI scores by miles. Figure 3-2 maps the survey area and PCI scores.

Table 3-1. Citywide Roadway and Alleyway PCI Scores

PCI	Percentage
Good	25.3%
Satisfactory	43.1%
Fair	20.4%
Poor	7.1%
Very Poor	1.8%
Serious	2.1%
Failed	0.1%

Figure 3-1. Citywide Roadway and Alleyway PCI Scores (miles)

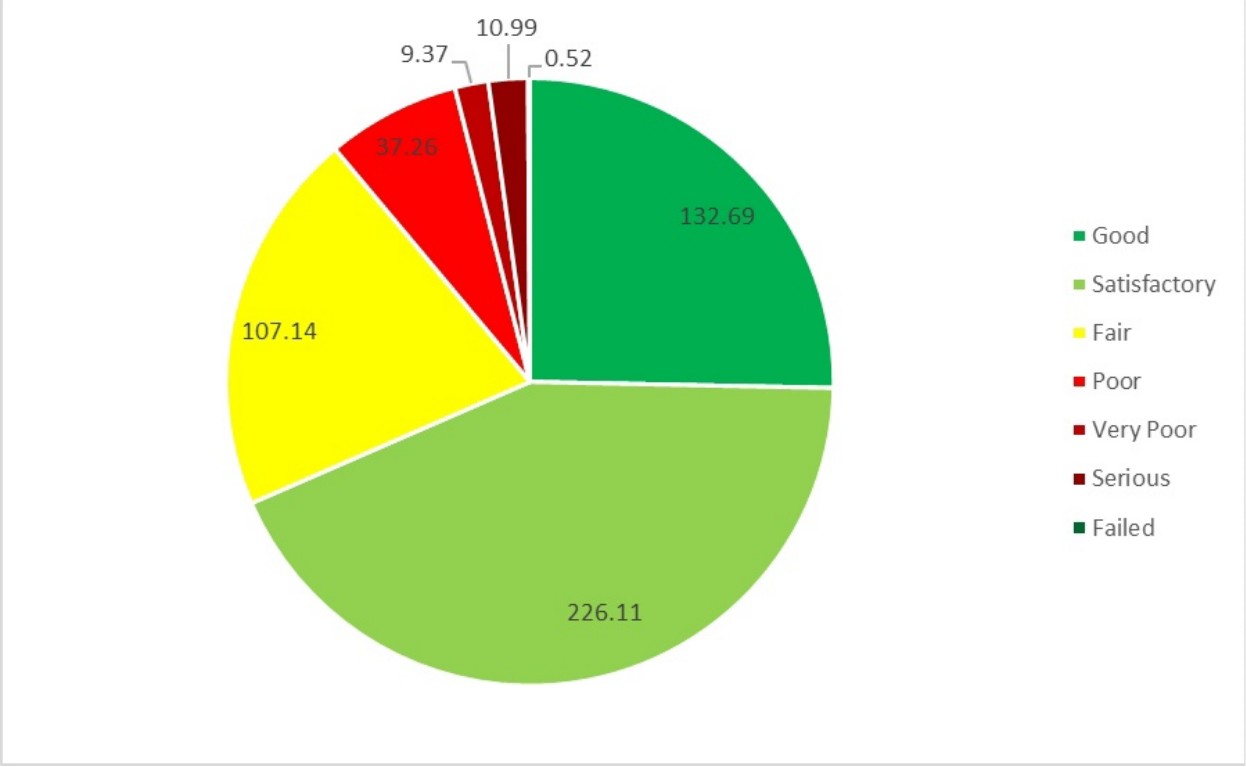
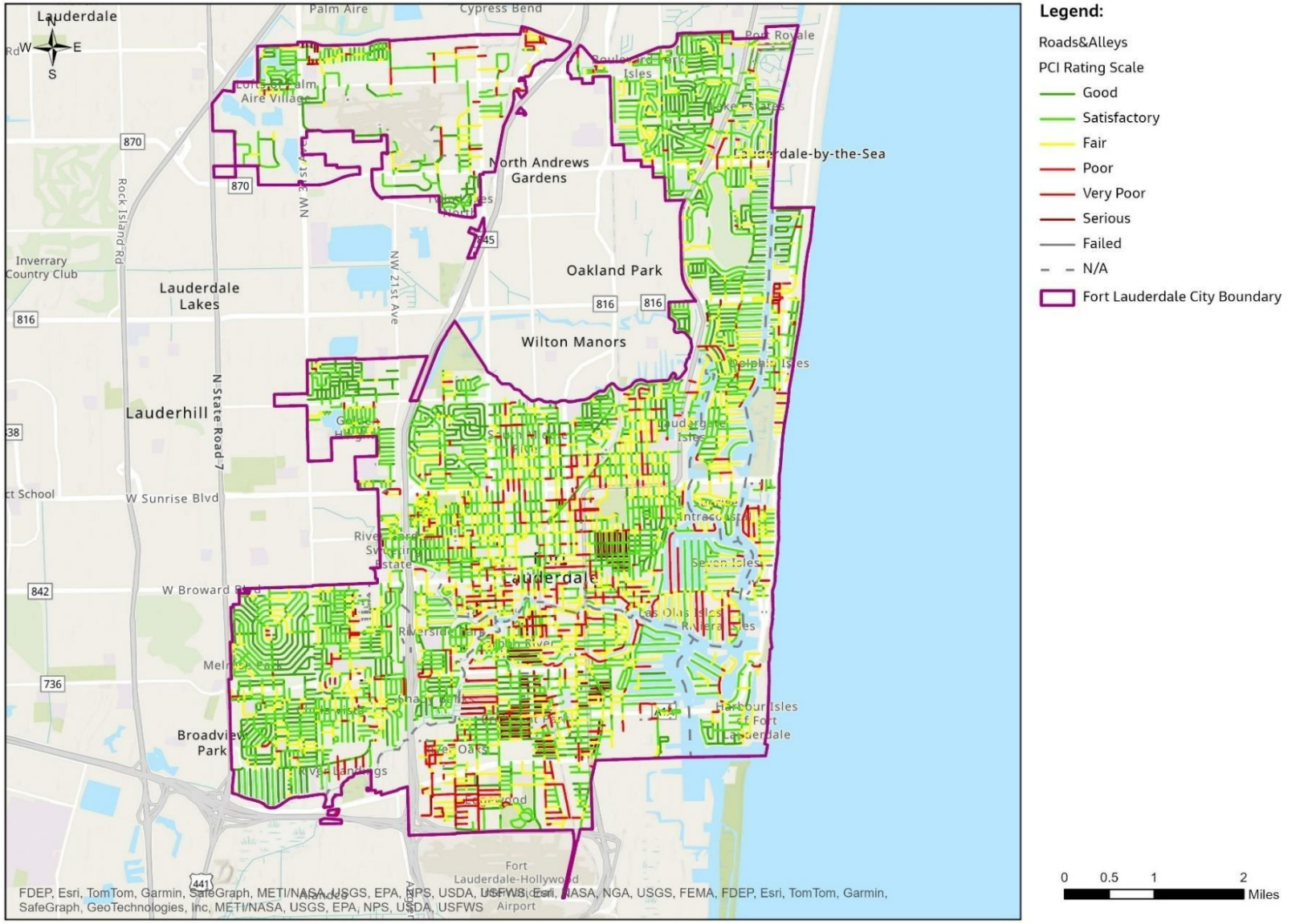


Figure 3-2. Citywide Roadway and Alleyway PCI Map



3.1.1 PCI by Zone

The roadway and alleyway PCI scores were summarized by collection zone in Table 3-2 and Figure 3-3 through Figure 3-8.

Table 3-2. PCI by Zone (miles)

PCI	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Good	6.24	24.29	26.34	23.90	32.59	19.33
Satisfactory	10.43	39.26	37.75	38.57	58.53	41.57
Fair	7.36	17.27	19.42	16.70	26.79	19.60
Poor	2.09	5.43	6.49	6.86	9.82	6.57
Very Poor	0.50	1.56	2.17	1.33	2.42	1.39
Serious	0.07	0.19	0.76	0.64	5.35	3.97
Failed	0.00	0.00	0.01	0.01	0.40	0.09

Figure 3-3. Zone 1 Roadway and Alleyway PCI Map

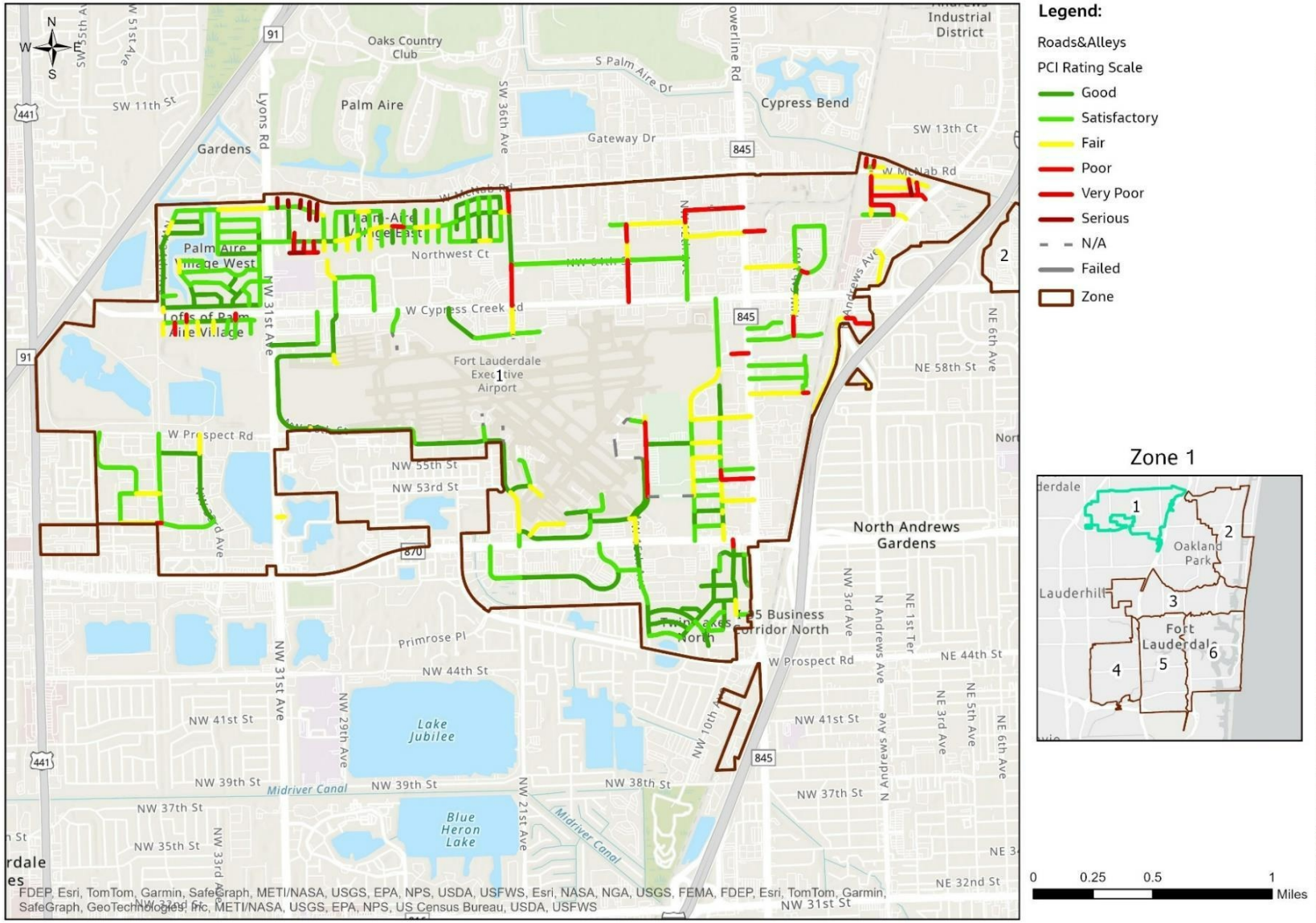


Figure 3-4. Zone 2 Roadway and Alleyway PCI Map

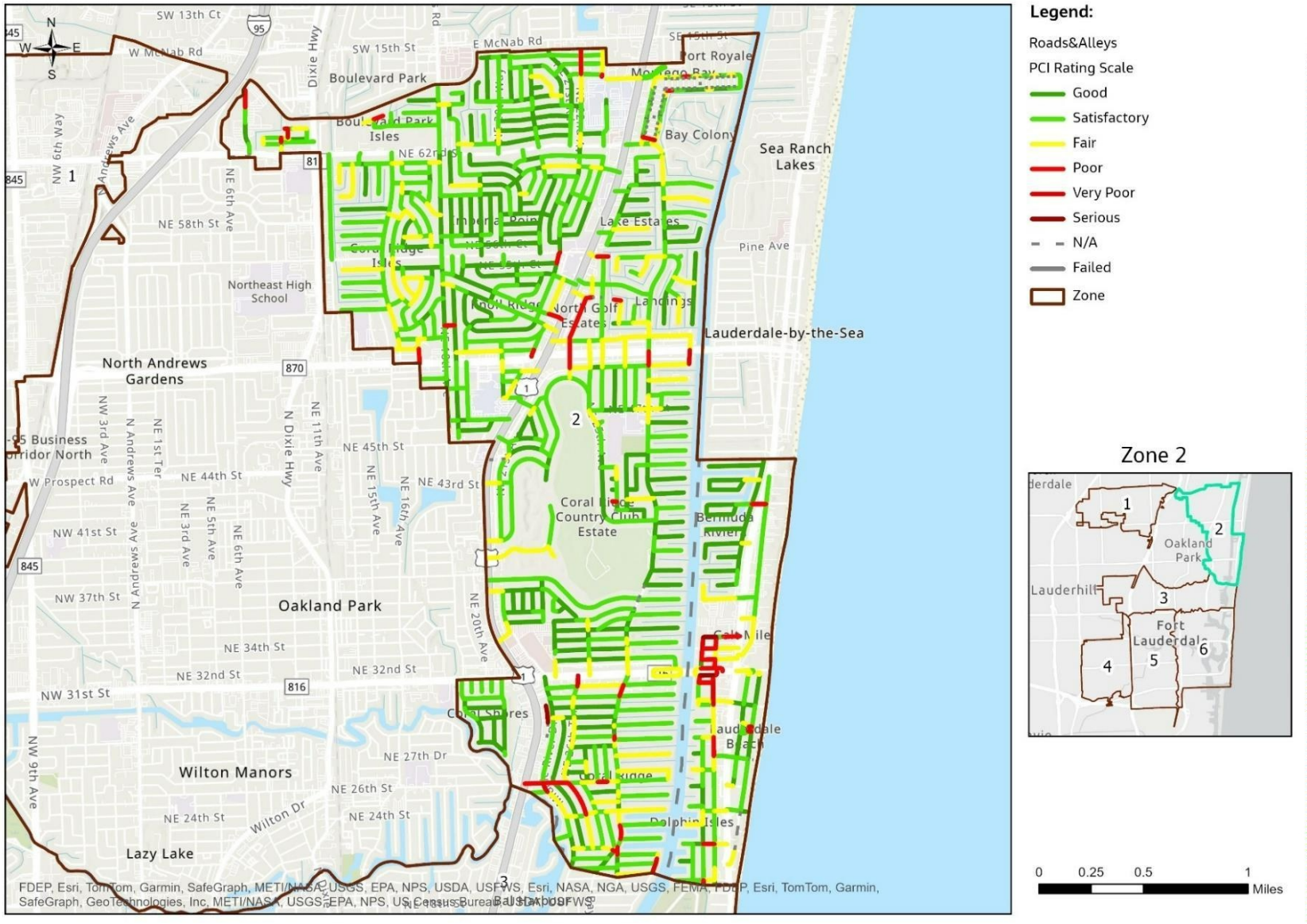


Figure 3-5. Zone 3 Roadway and Alleyway PCI Map

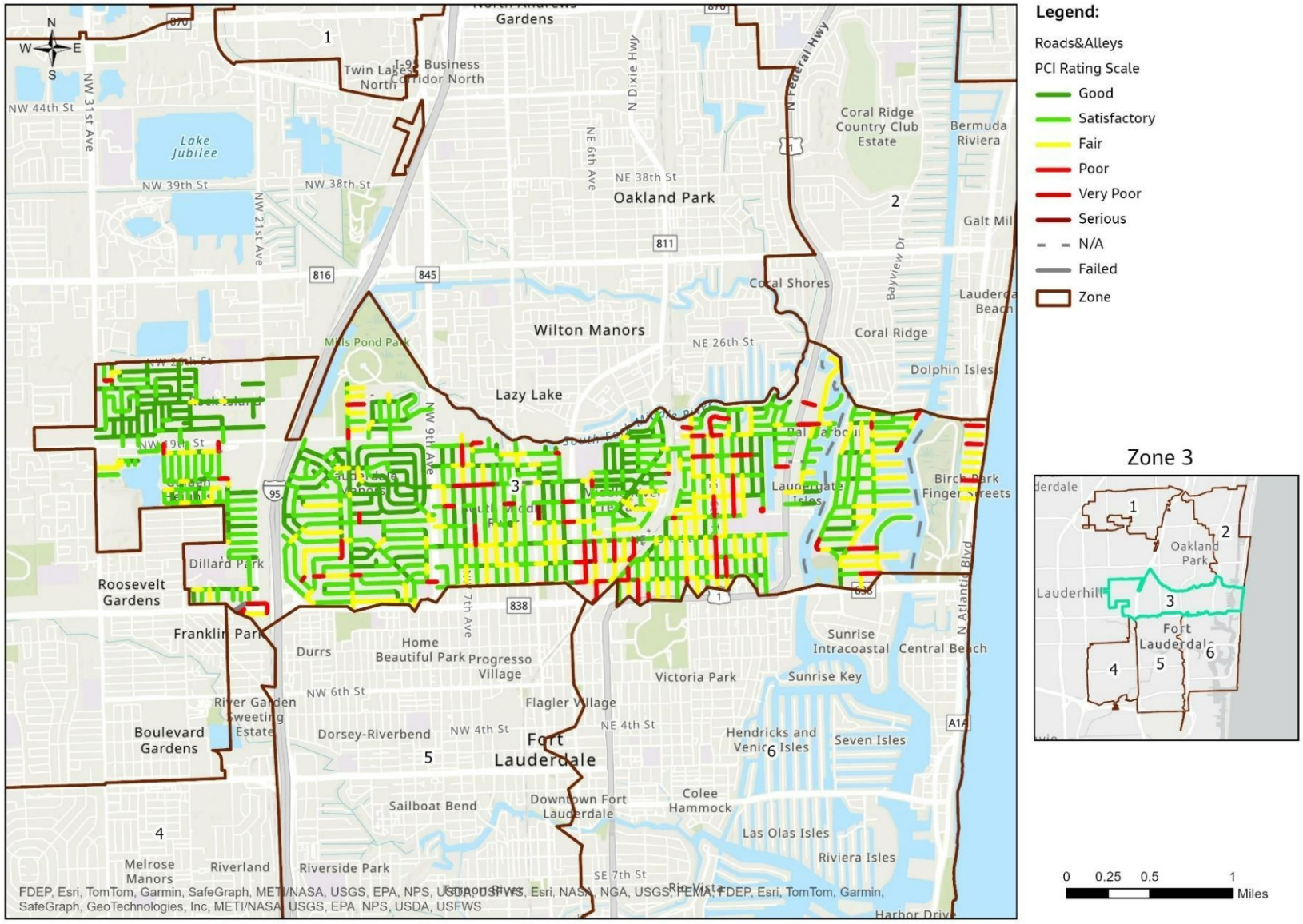


Figure 3-6. Zone 4 Roadway and Alleyway PCI Map

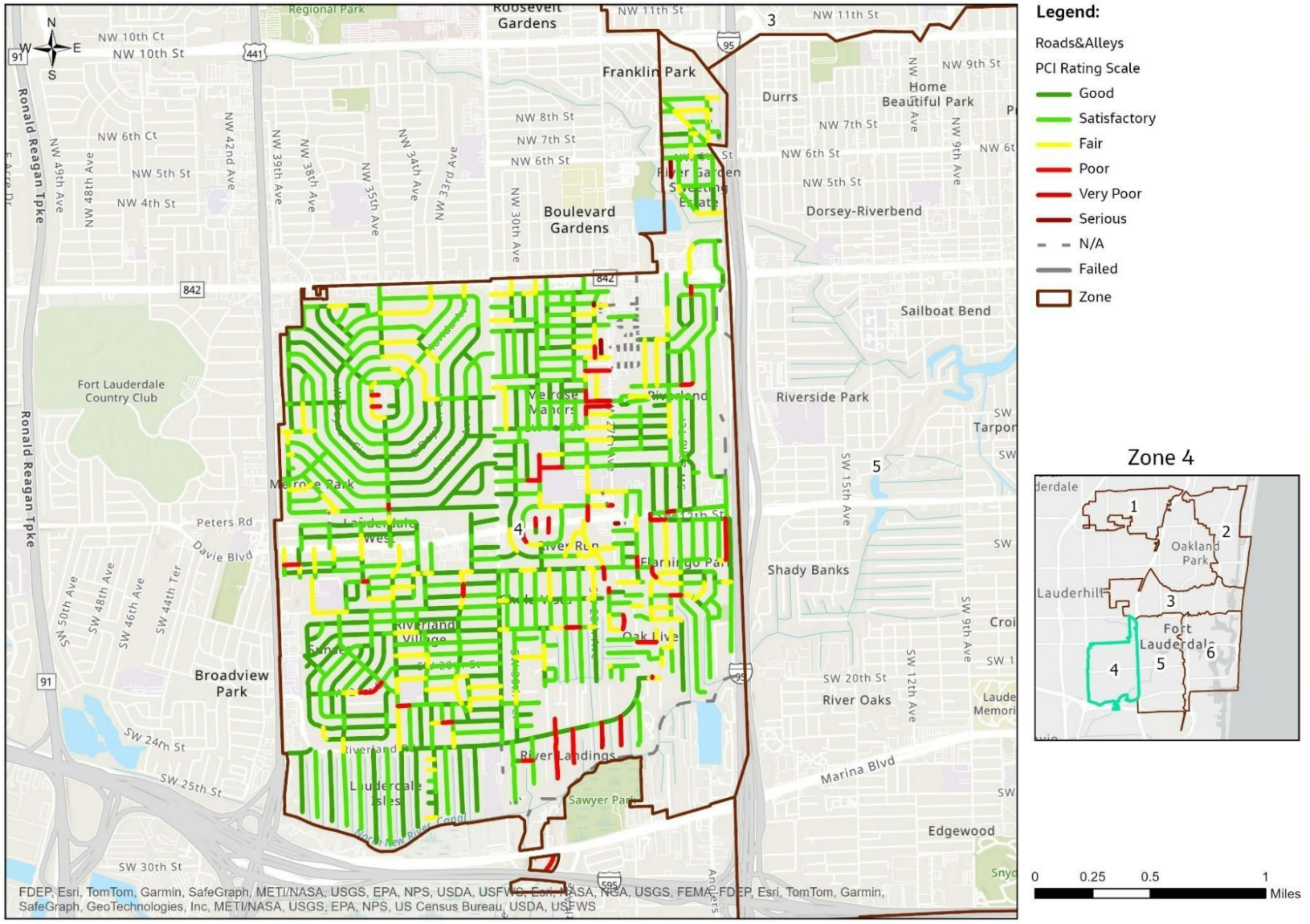


Figure 3-7. Zone 5 Roadway and Alleyway PCI Map

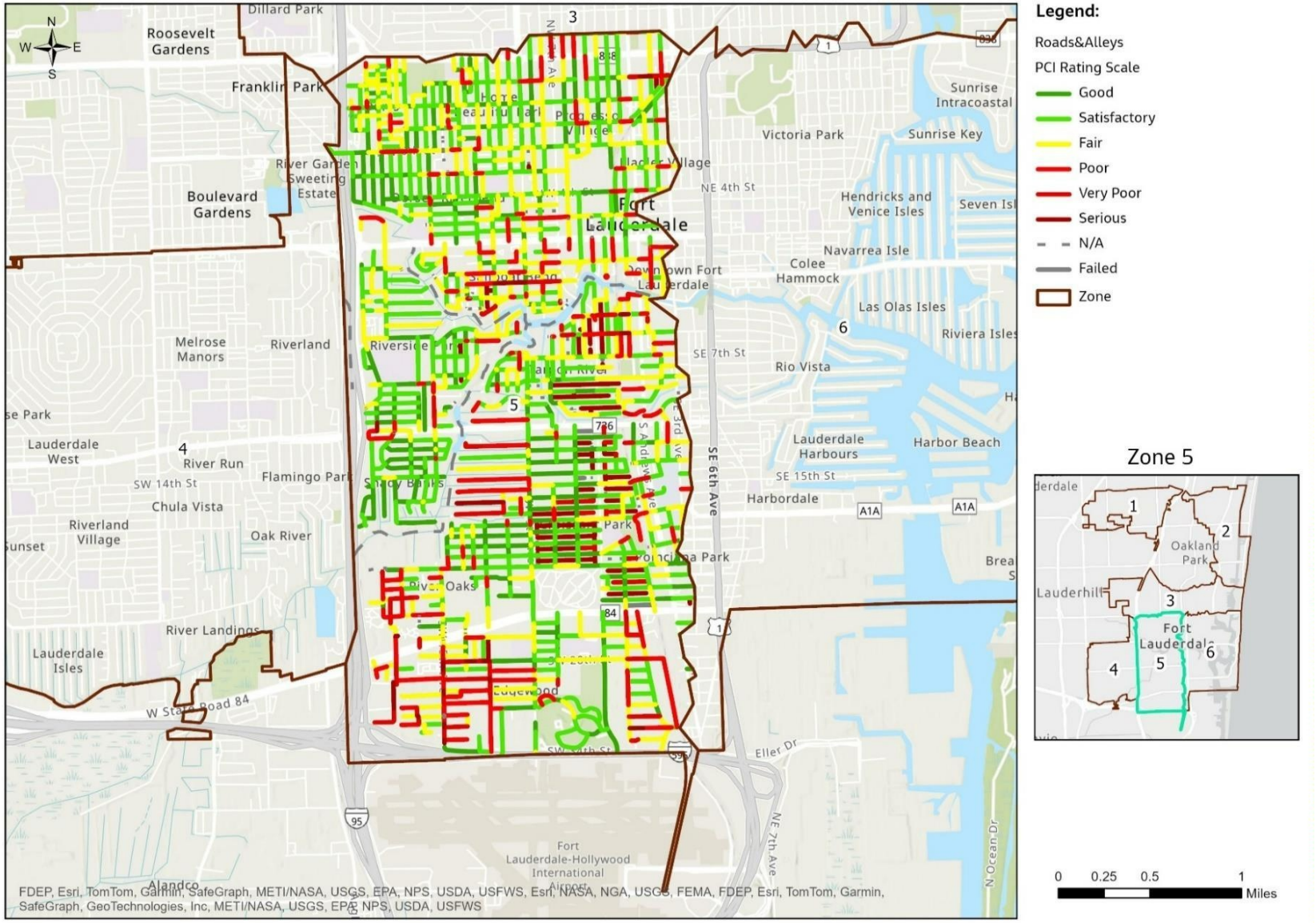
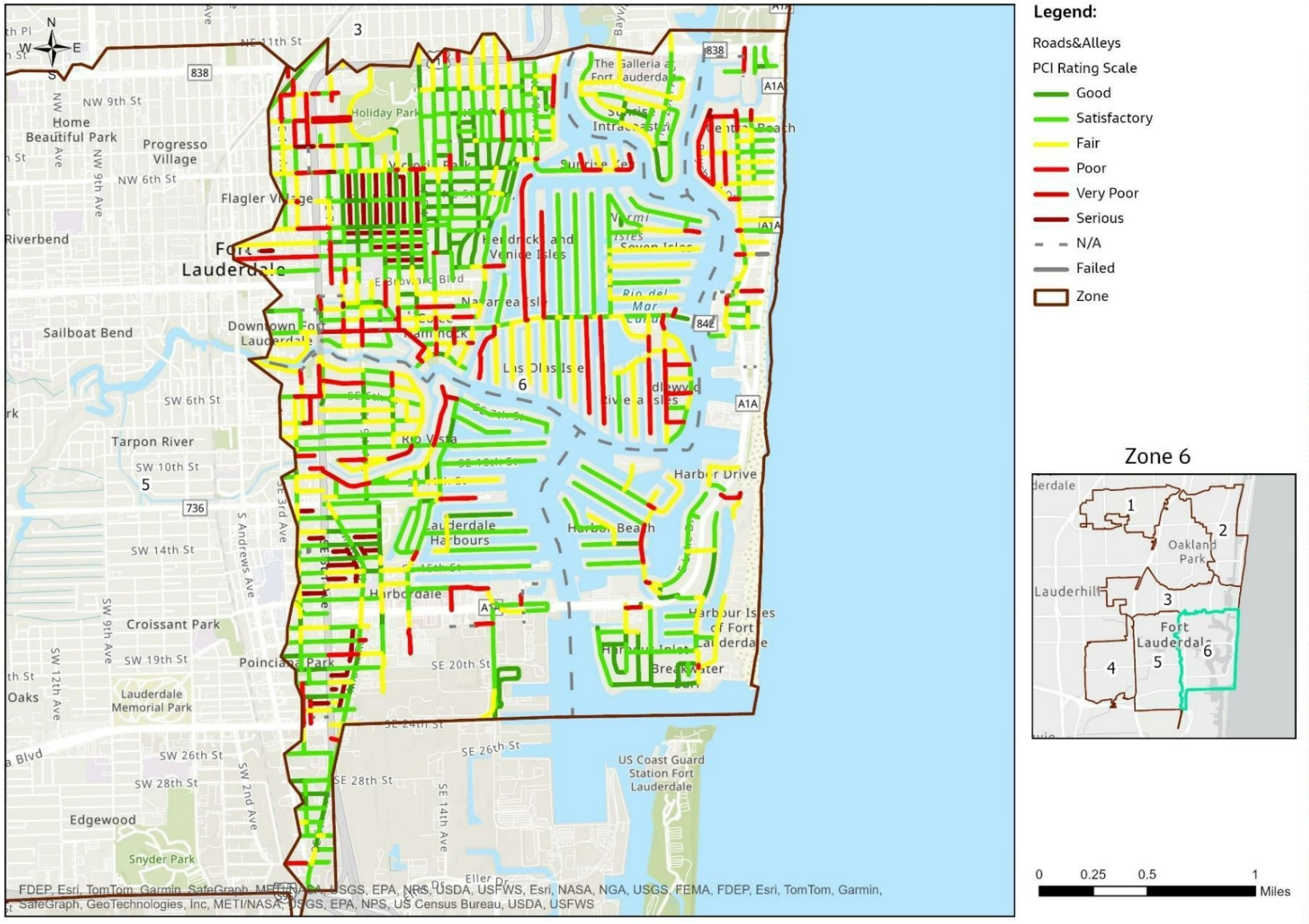


Figure 3-8. Zone 6 Roadway and Alleyway PCI Map



3.1.2 PCI by Commission District

The roadway and alleyway PCI scores were also summarized by Commission Districts in Table 3-3 and Figure 3-9 through Figure 3-12.

Table 3-3. PCI by Commission District (miles)

PCI	District 1	District 2	District 3	District 4
Good	43.31	18.94	44.11	26.33
Satisfactory	62.96	45.64	57.50	60.01
Fair	27.38	28.04	19.09	32.63
Poor	6.52	12.79	3.56	14.39
Very Poor	0.84	2.30	0.52	5.71
Serious	0.49	3.21	0.18	7.10
Failed	0.00	0.05	0.08	0.38

Figure 3-9. District 1 Roadway and Alleyway PCI Map

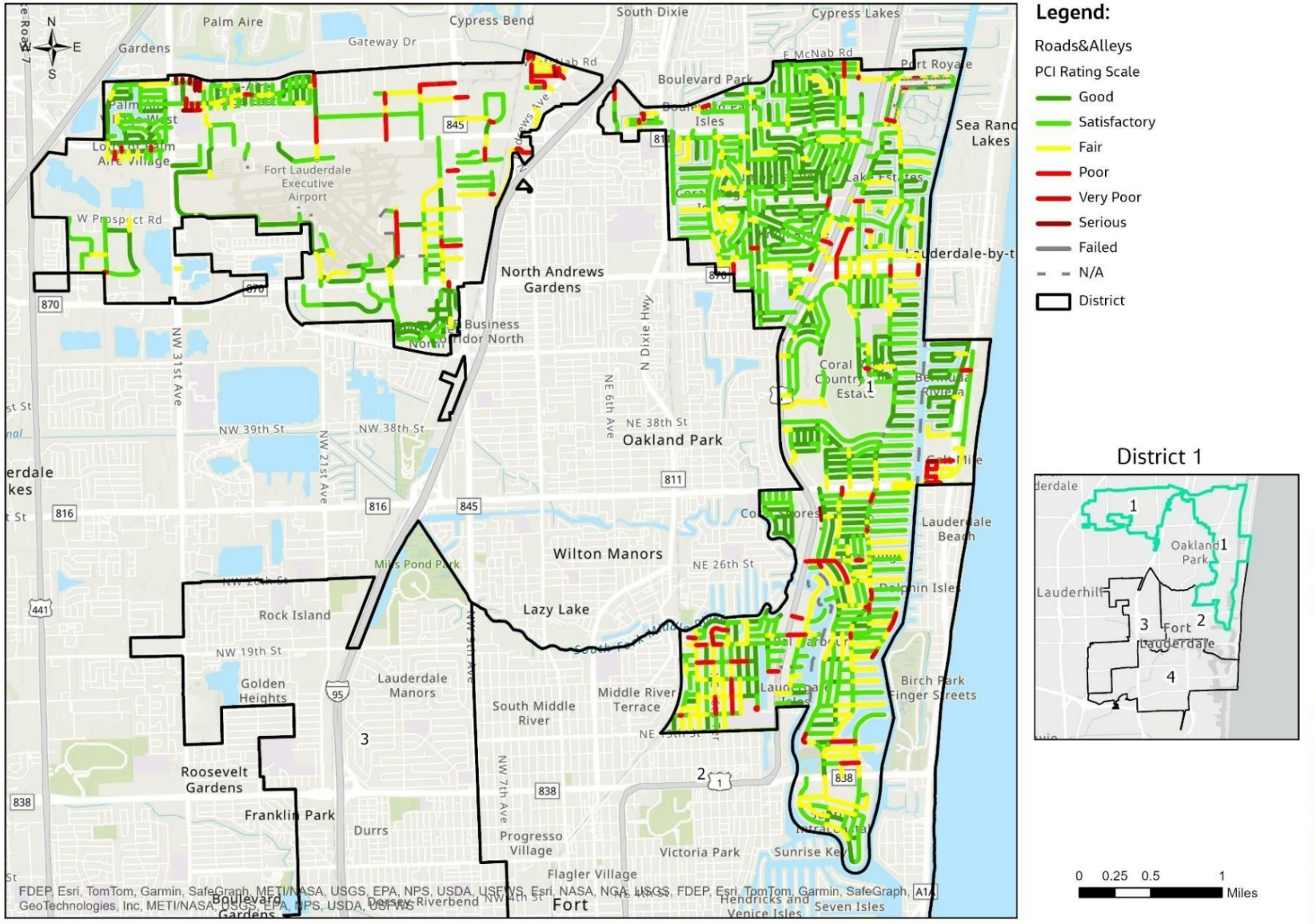


Figure 3-10. District 2 Roadway and Alleyway PCI Map

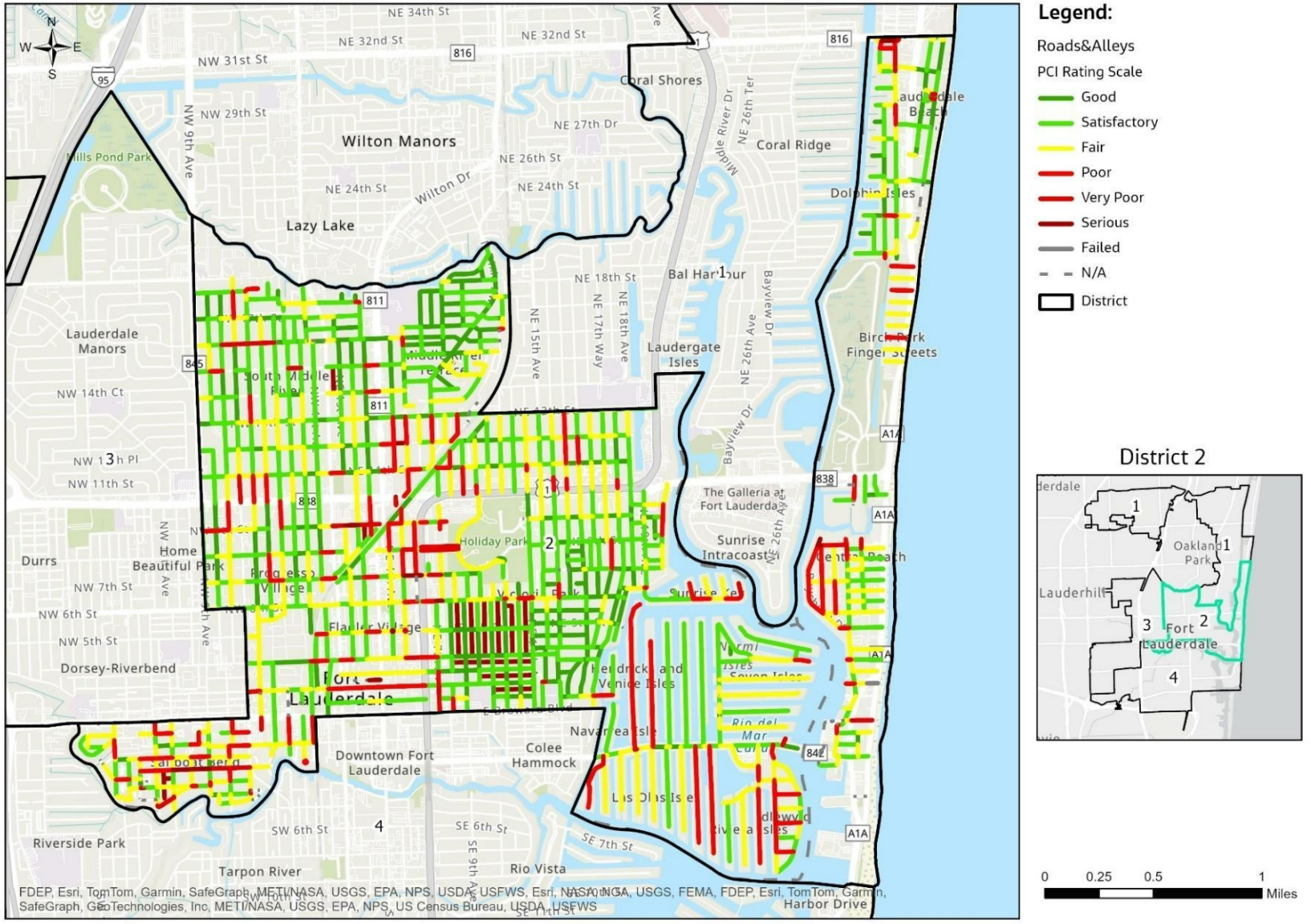


Figure 3-11. District 3 Roadway and Alleyway PCI Map

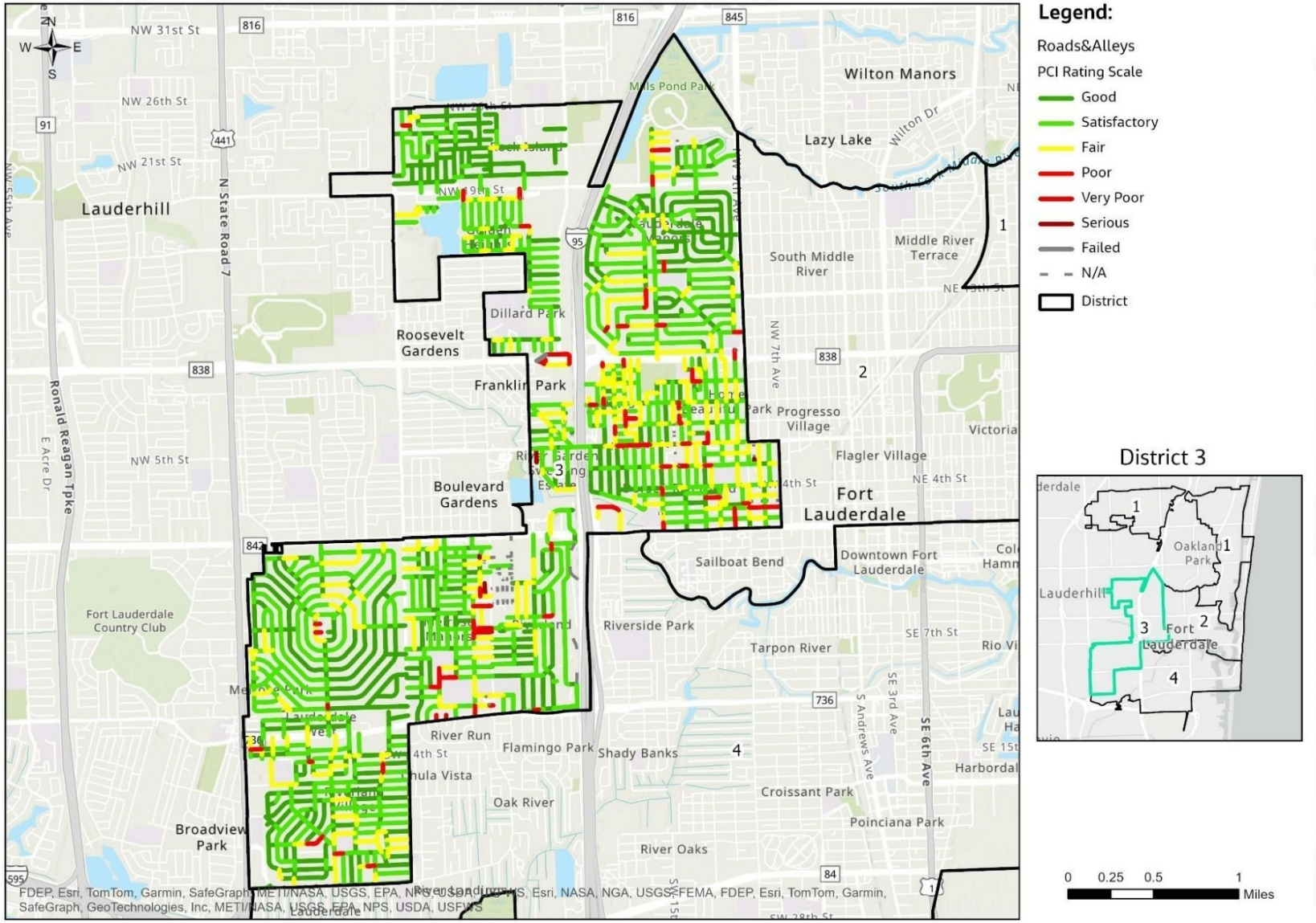
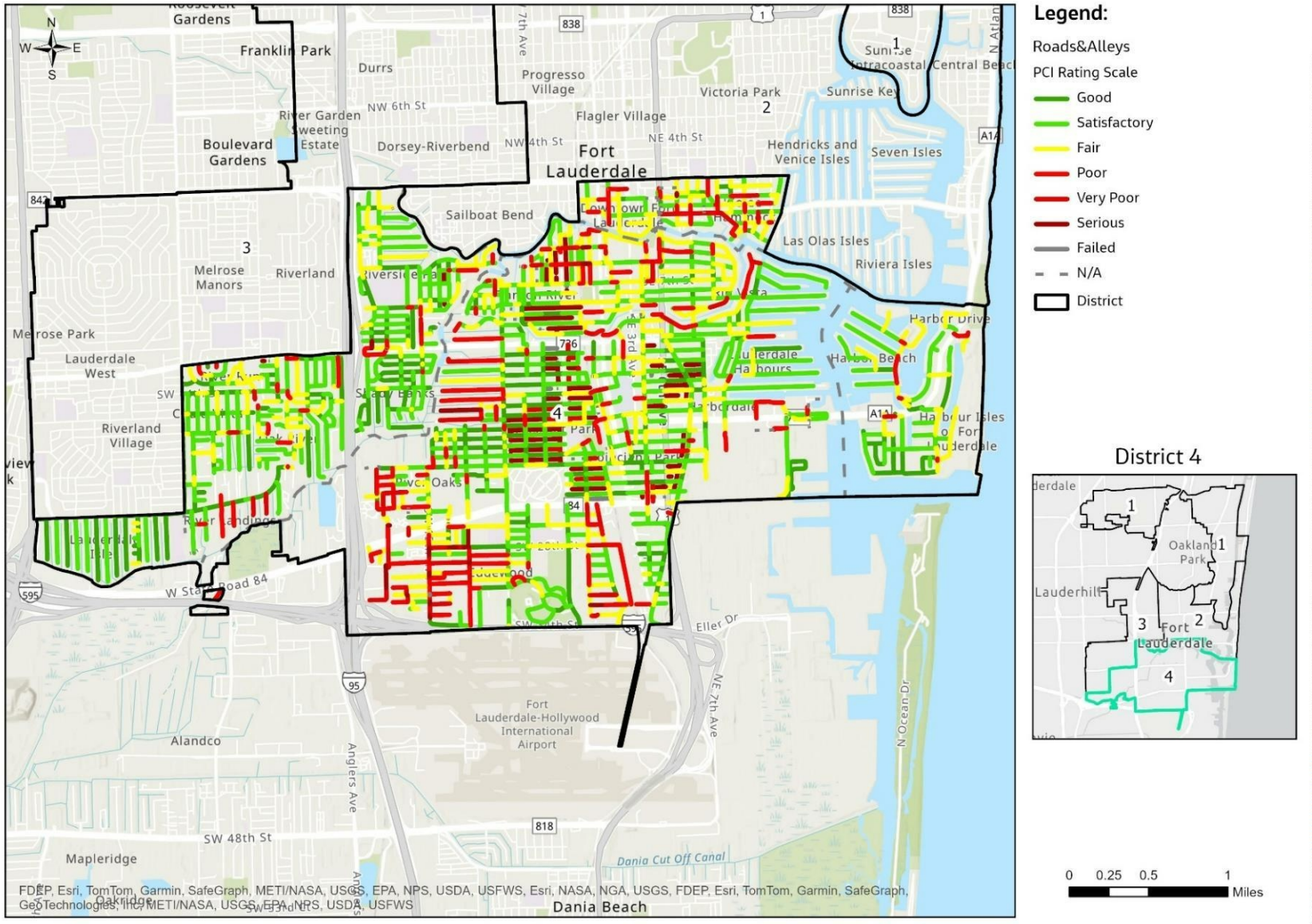


Figure 3-12. District 4 Roadway and Alleyway PCI Map



3.2 Sidewalks

Roughly 0.4 square mile, or 11,421,000 square feet, of sidewalk area were assessed in this project. Just over 72% of the sidewalks assessed were considered in good to fair condition. Almost 28% were considered poor to failed. Table 3-4 presents the PCI scores from the sidewalk assessment by percentage, and Figure 3-13 presents the PCI scores by square feet. Figure 3-14 maps the survey area and PCI scores.

Table 3-4. Citywide Sidewalk Conditions

Condition Score	Percentage
Good	7.0%
Satisfactory	29.8%
Fair	35.6%
Poor	17.8%
Very Poor	8.5%
Serious	1.2%
Failed	0.1%

Figure 3-13. Citywide Sidewalk Condition Scores (square feet)

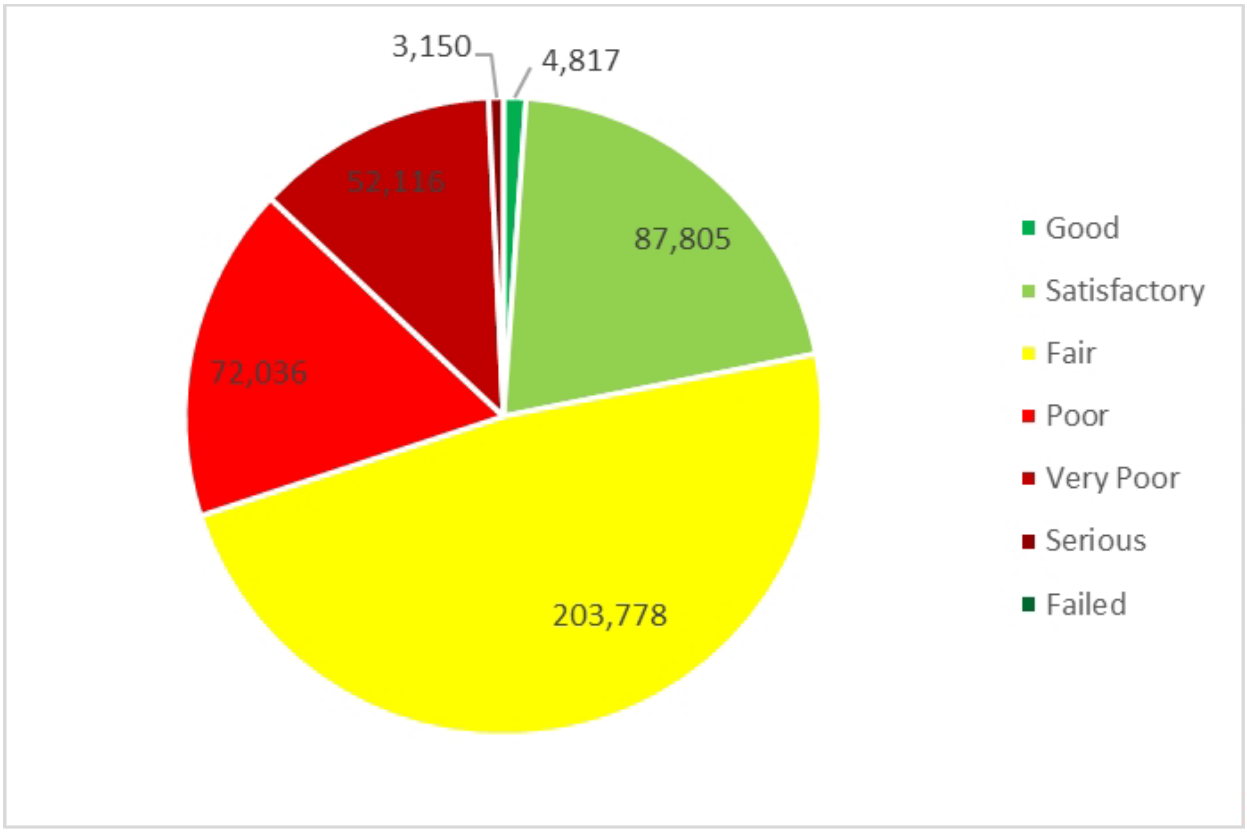
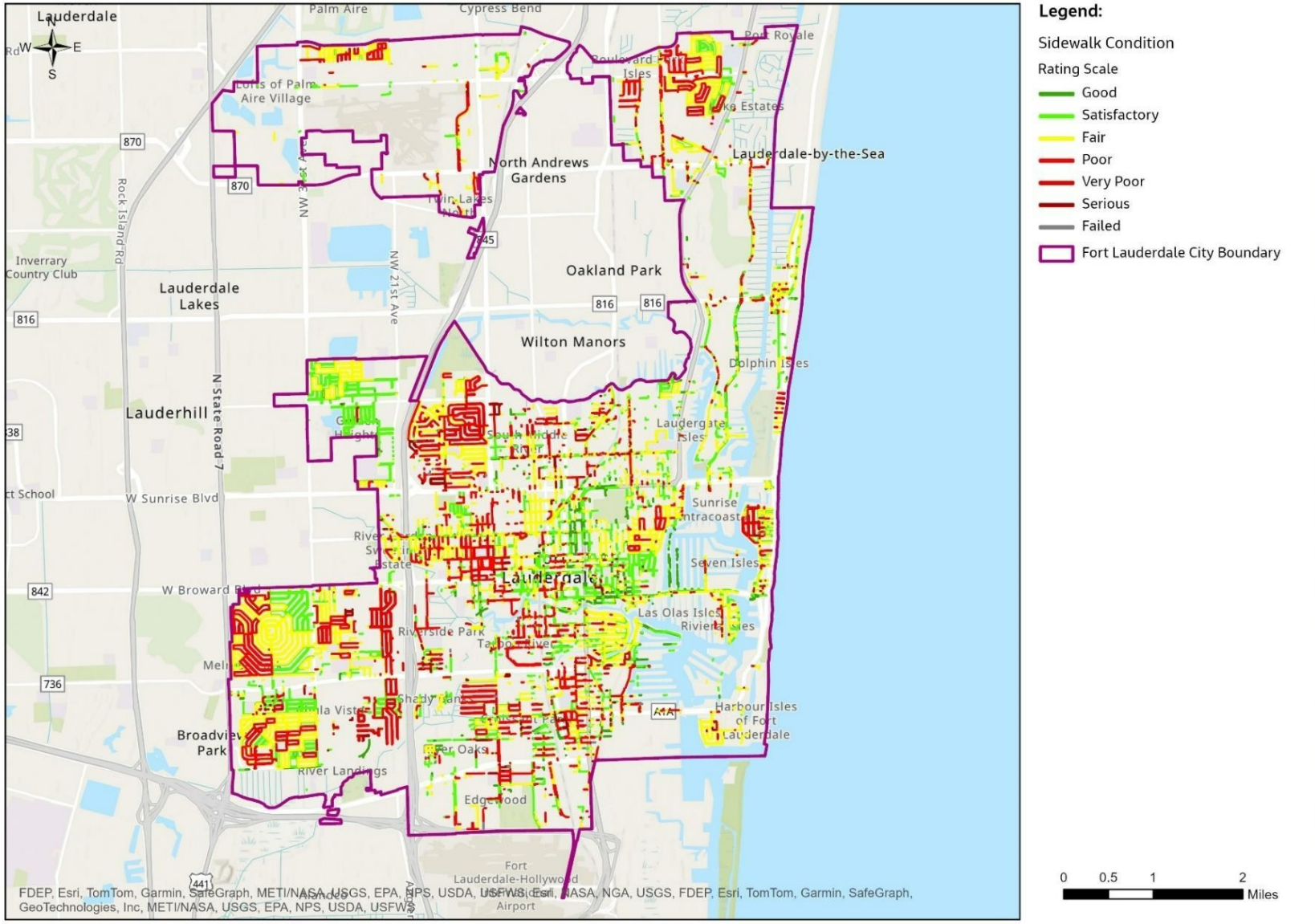


Figure 3-14. Citywide Sidewalk Condition Map



3.2.1 Condition Score by Zone

Condition ratings were completed and summarized by zone.

Table 3-5. Percent Sidewalk Condition by Zone

Condition	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Good	1%	7%	3%	5%	5%	17%
Satisfactory	21%	26%	32%	31%	31%	34%
Fair	48%	40%	37%	28%	28%	35%
Poor	17%	23%	14%	27%	27%	8%
Very Poor	12%	4%	11%	7%	7%	5%
Serious	1%	0%	3%	2%	2%	1%
Failed	1%	0%	0%	0%	0%	0%

Figure 3-15. Zone 1 Sidewalk Condition Map

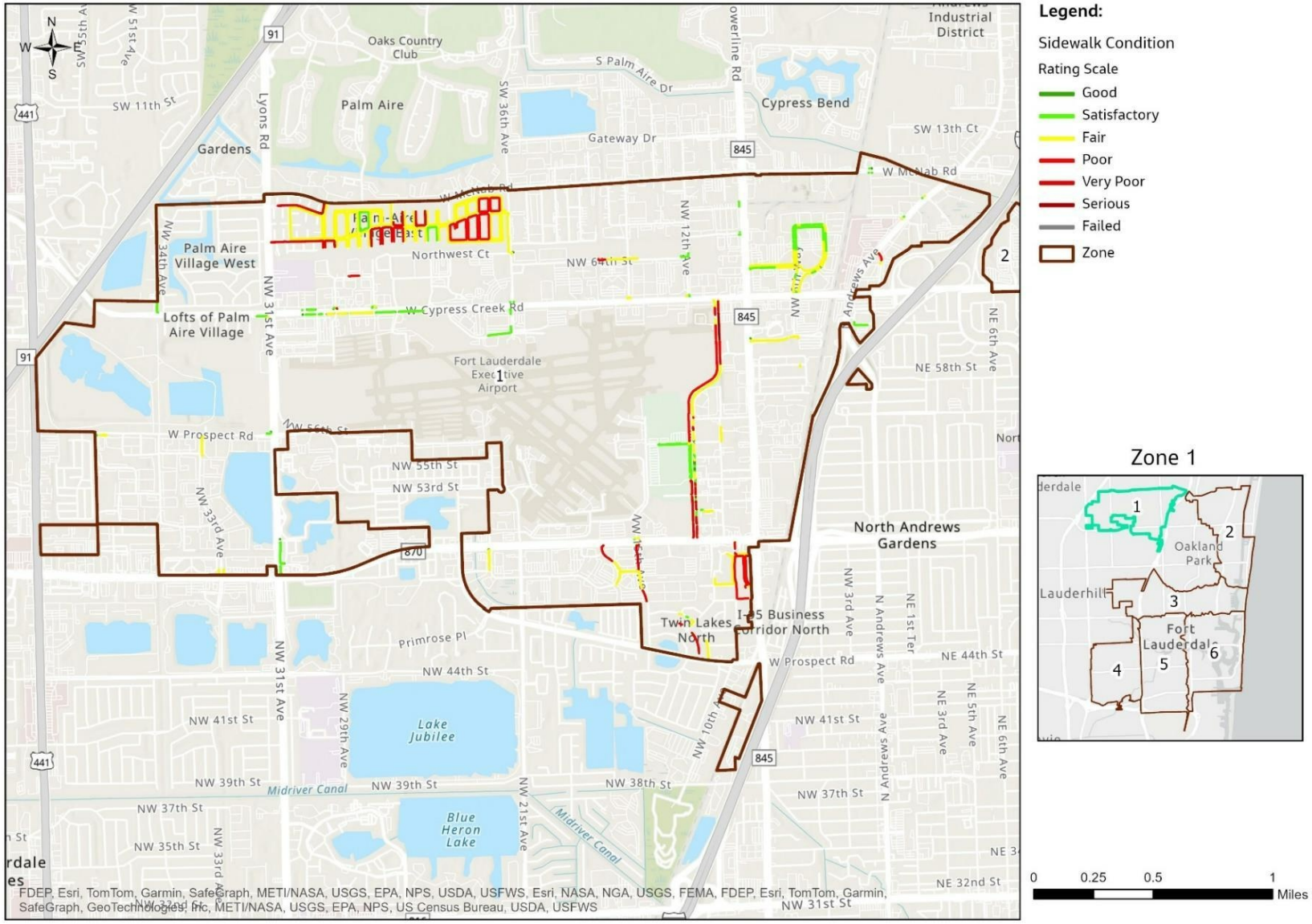


Figure 3-16. Zone 2 Sidewalk Condition Map

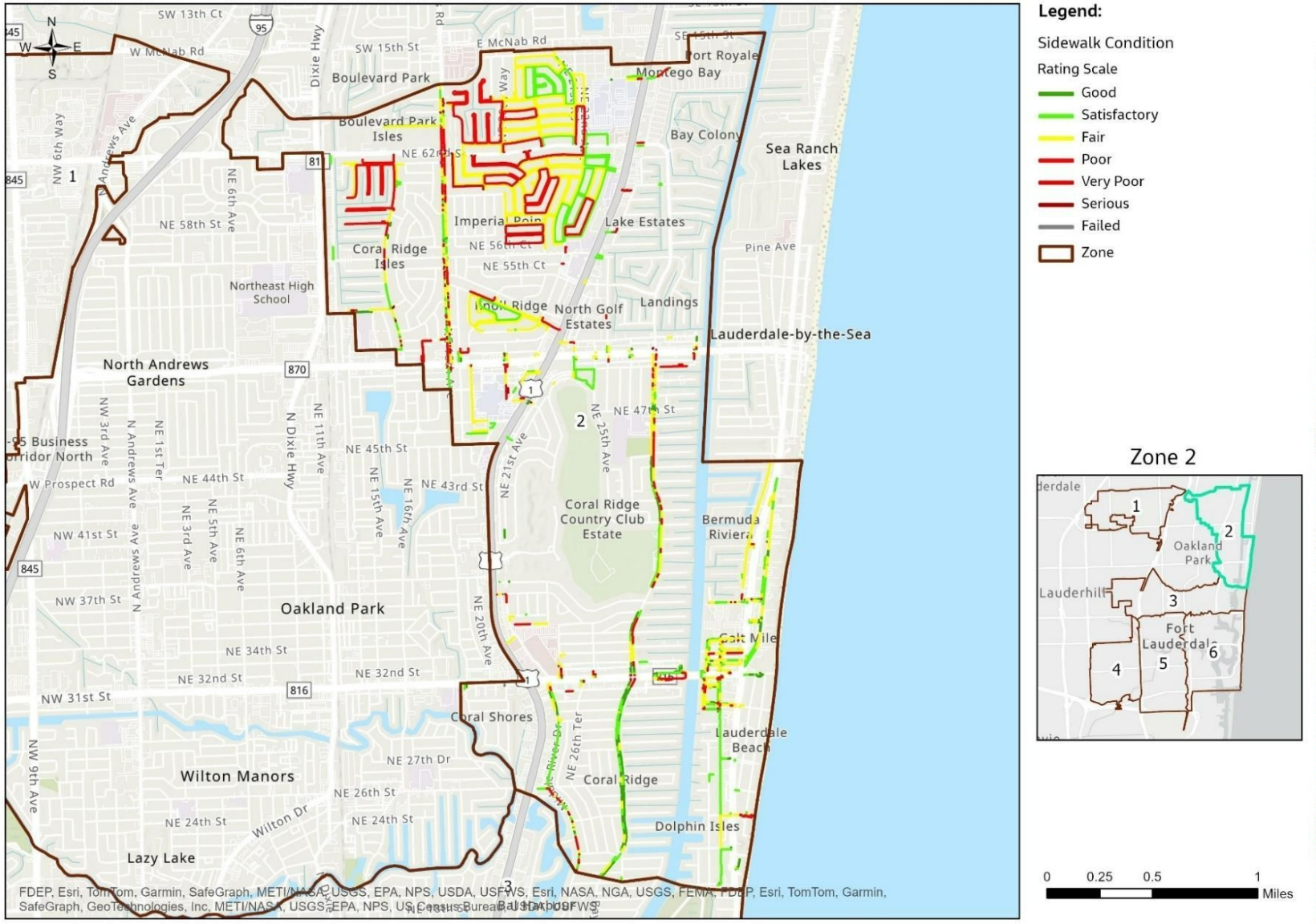


Figure 3-17. Zone 3 Sidewalk Condition Map

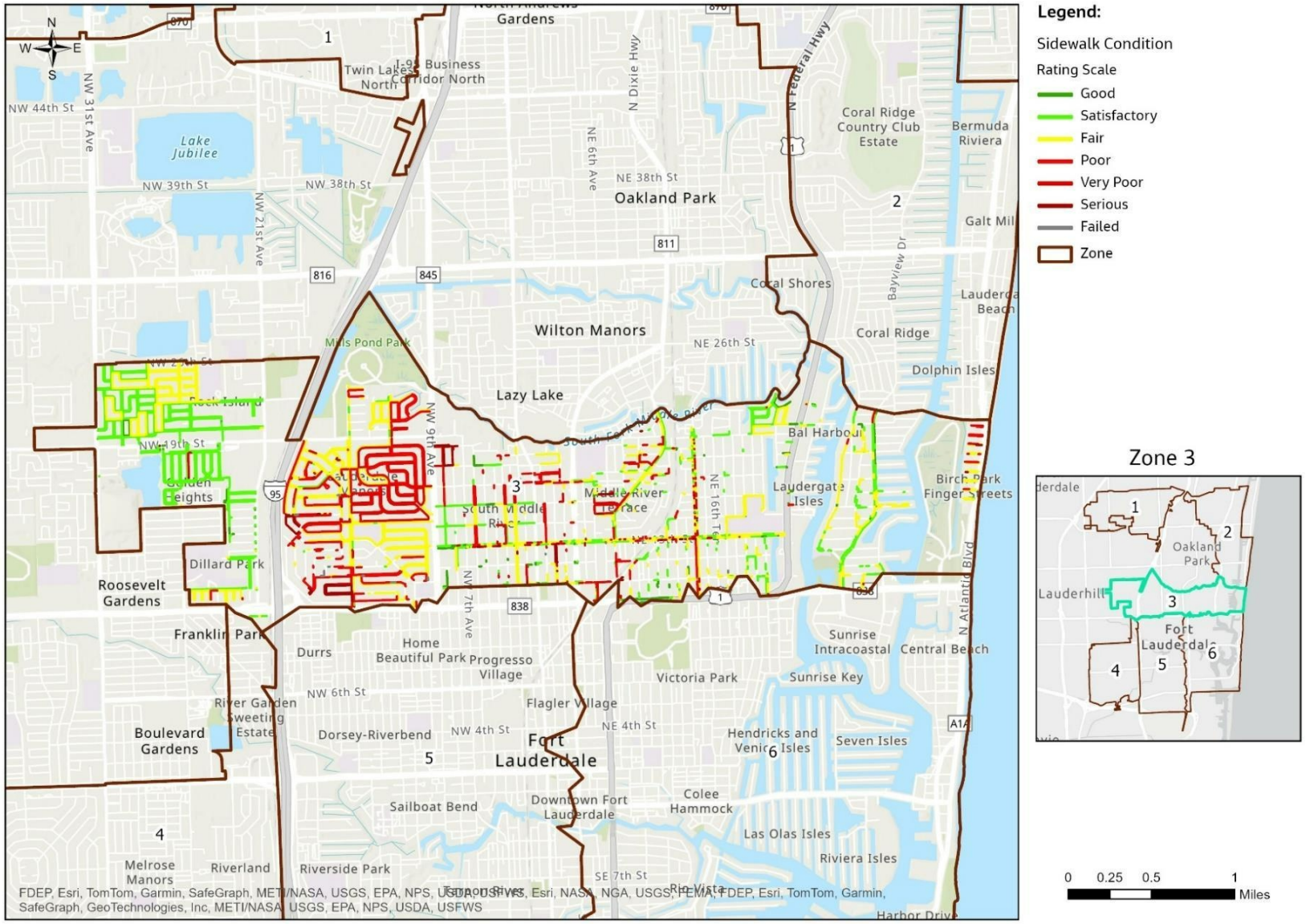


Figure 3-18. Zone 4 Sidewalk Condition Map

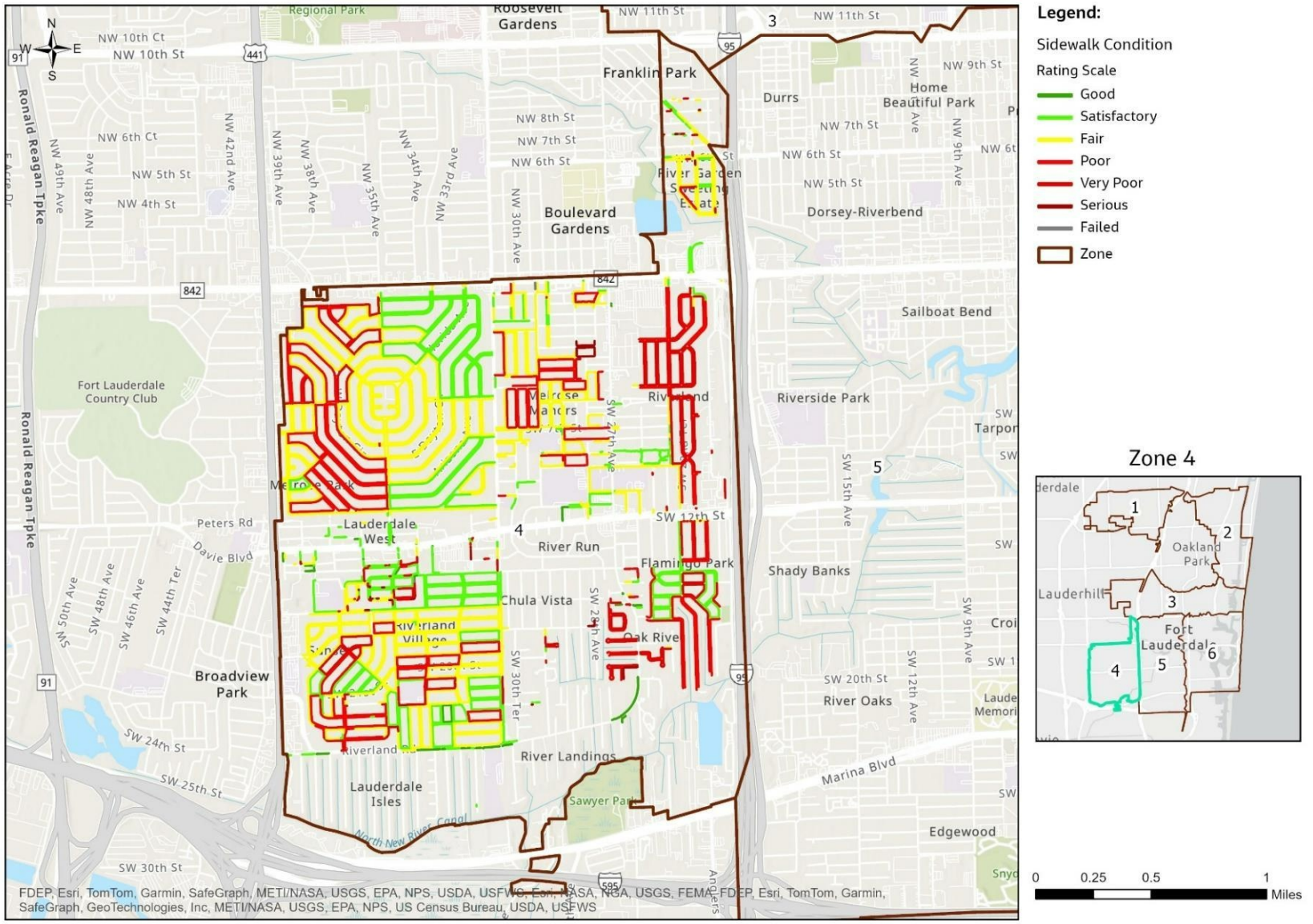


Figure 3-19. Zone 5 Sidewalk Condition Map

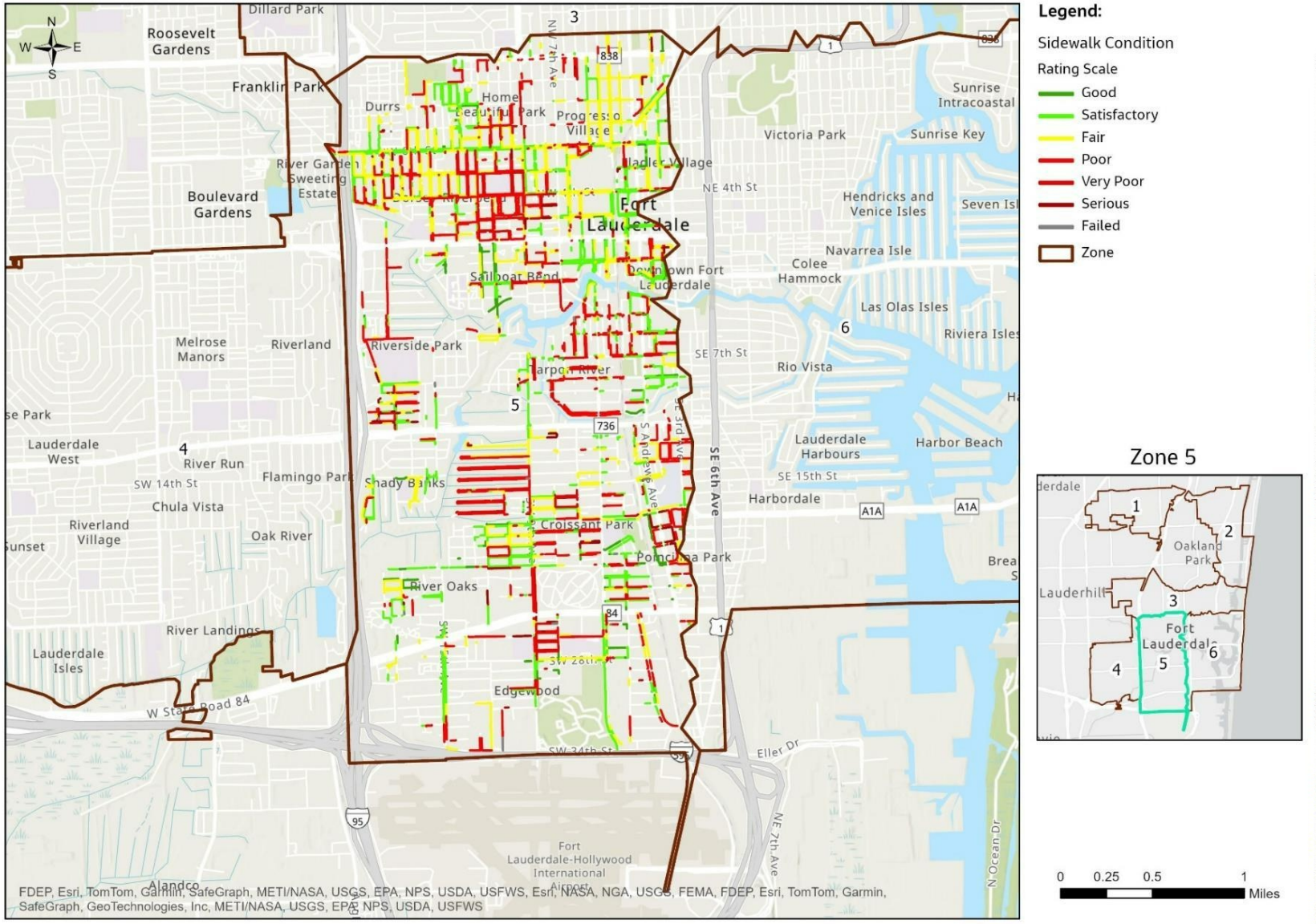
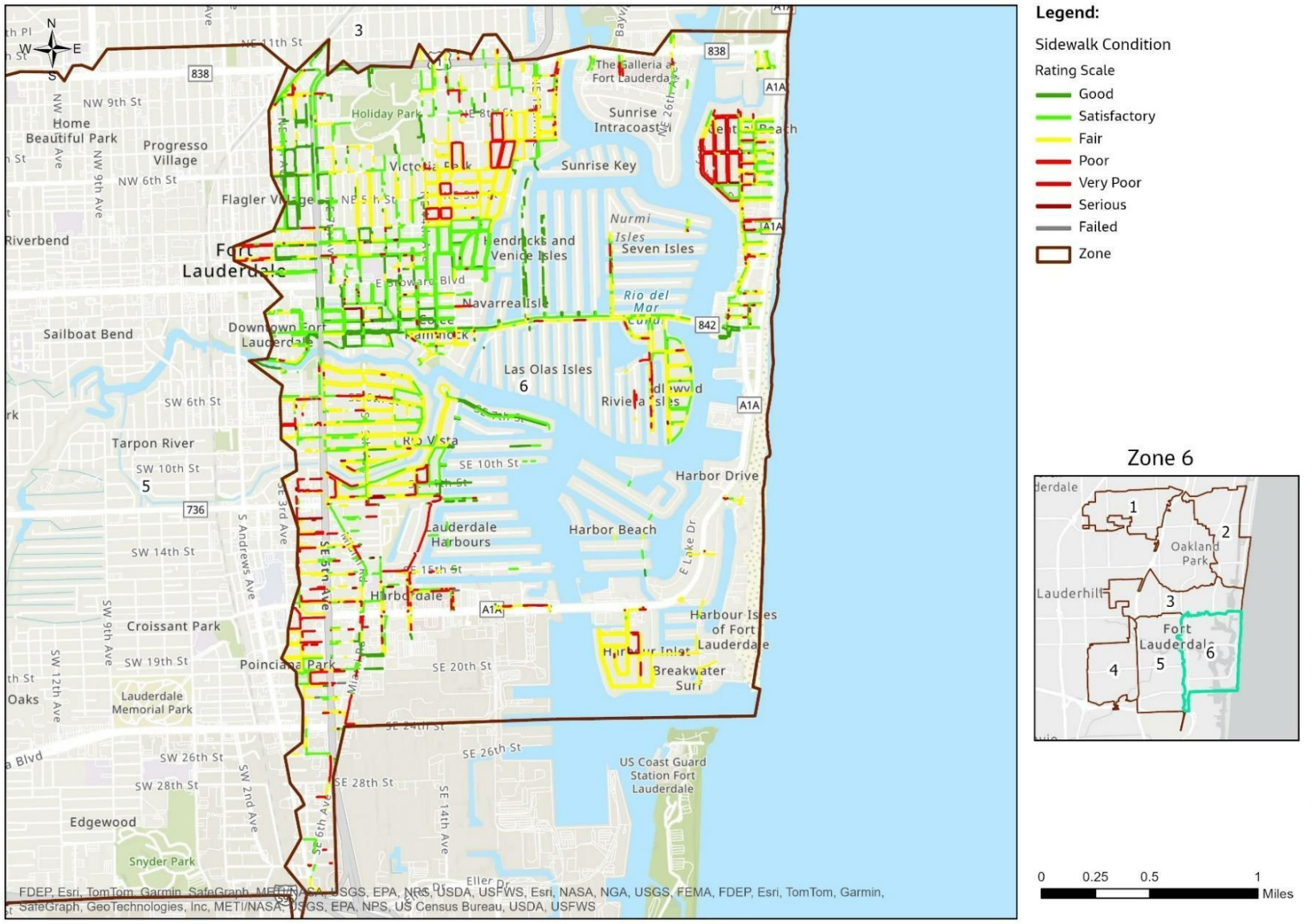


Figure 3-20. Zone 6 Sidewalk Condition Map



3.2.2 Condition Score by Commission District

Sidewalk condition ratings were also summarized by Commission District.

Table 3-6. Percent Sidewalk Condition by Commission District

Condition	District 1	District 2	District 3	District 4
Good	5.45%	13.84%	0.98%	6.96%
Satisfactory	26.58%	33.99%	28.15%	29.75%
Fair	42.78%	34.77%	38.94%	35.59%
Poor	19.01%	10.40%	20.05%	17.82%
Very Poor	5.76%	5.74%	10.61%	8.49%
Serious	0.40%	1.20%	1.17%	1.24%
Failed	0.02%	0.07%	0.10%	0.15%

Figure 3-21. District 1 Sidewalk Condition Map

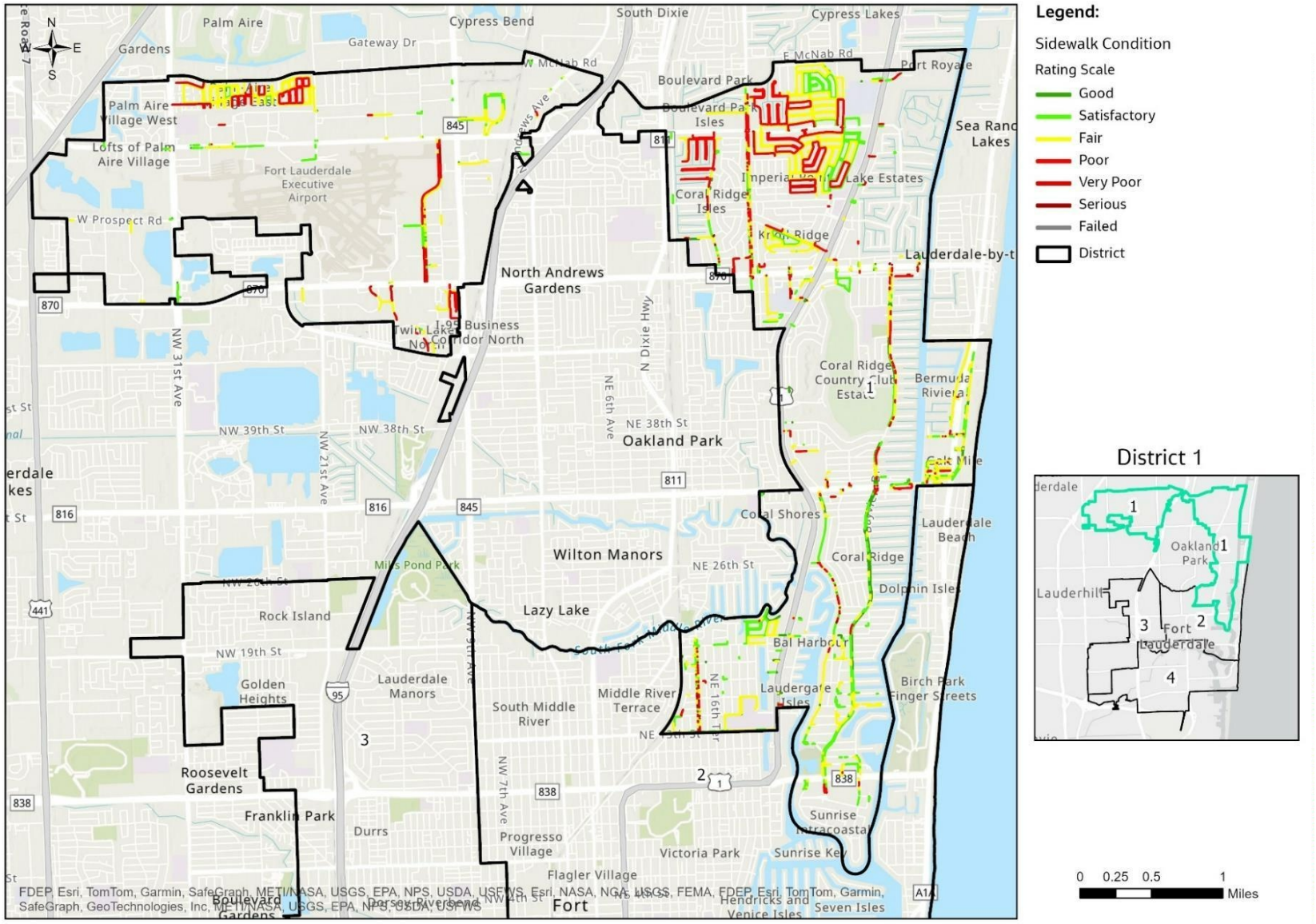


Figure 3-22. District 2 Sidewalk Condition Map

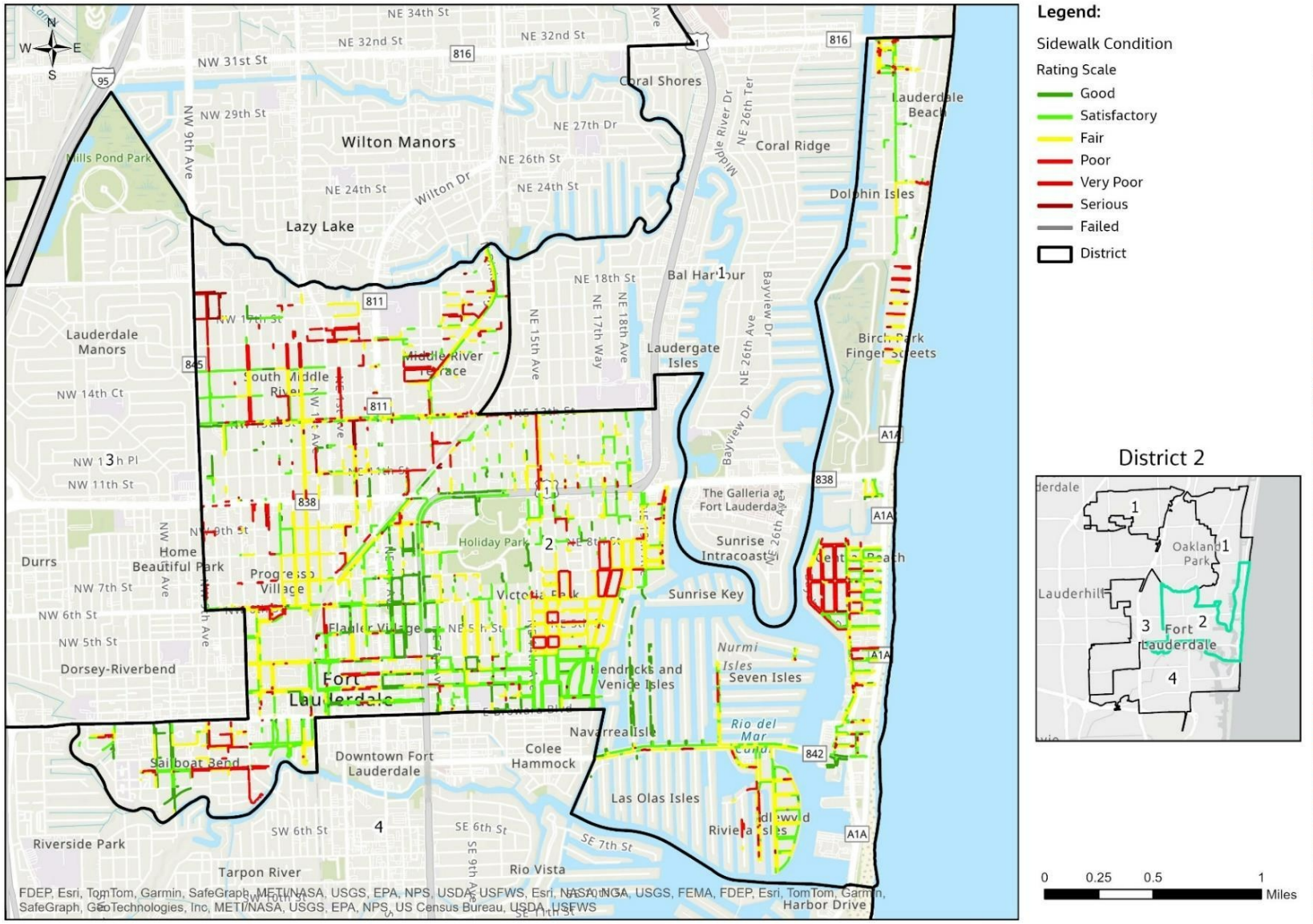


Figure 3-23. District 3 Sidewalk Condition Map

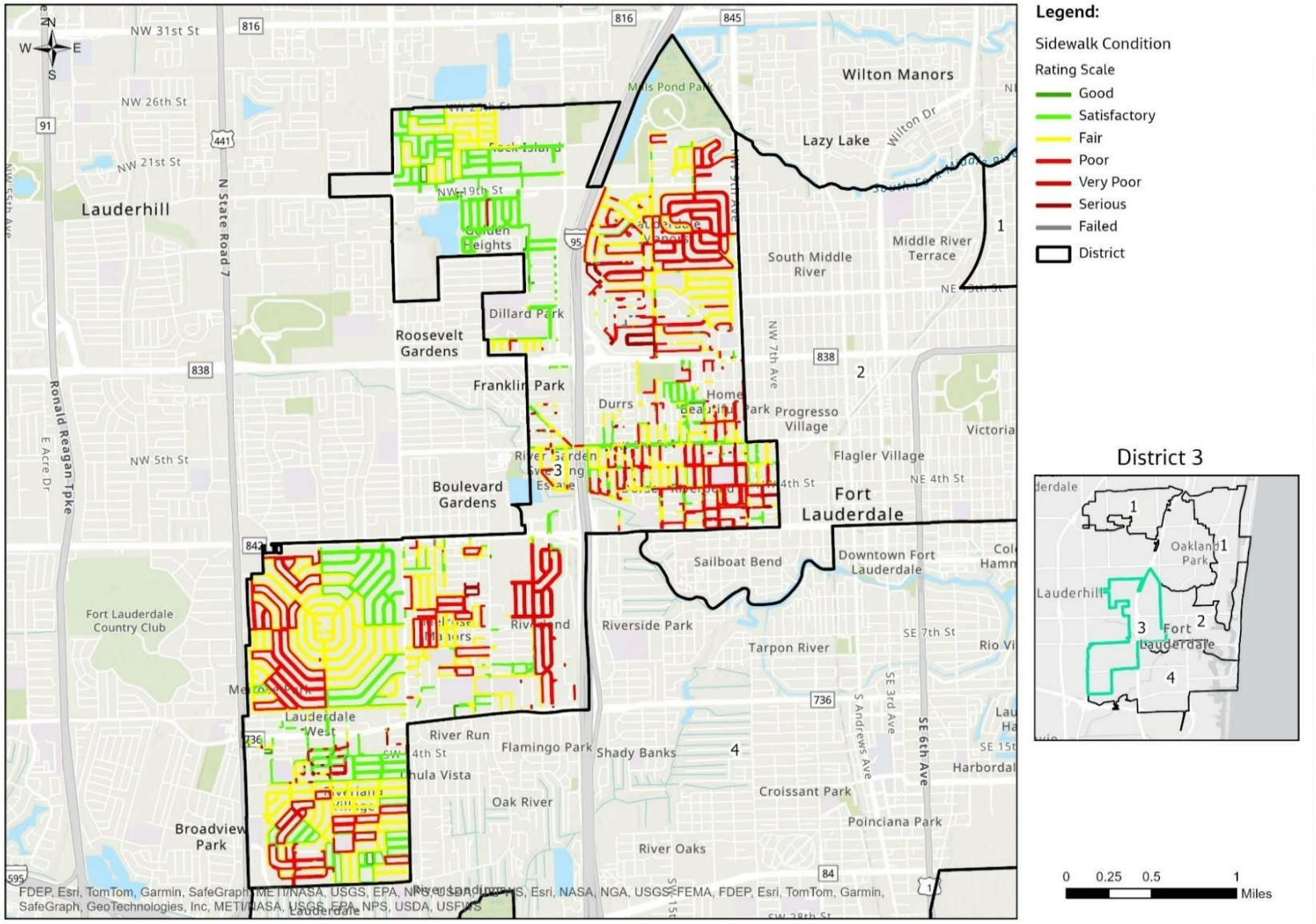
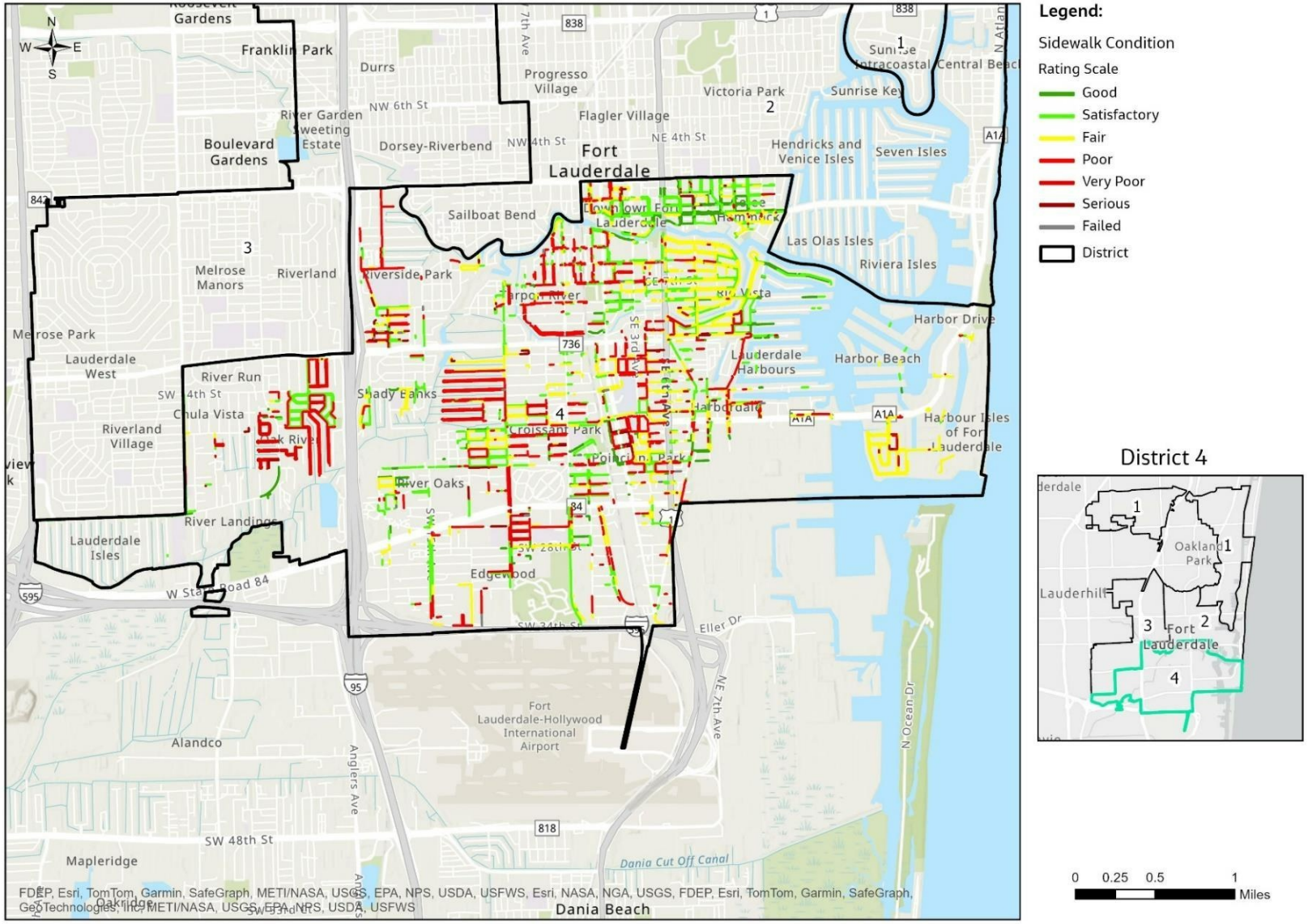


Figure 3-24. District 4 Sidewalk Condition Map



4. Summary and Recommendations

Preservation of pavement while still in good, fair, and even satisfactory, condition will provide the most cost benefit in the long term. This will reduce overall maintenance costs in these areas. This activity should be combined with full pavement reconstruction of 10 to 20% of the poor to failed pavements each budget cycle.

Low-severity rutting, depressions, and corrugations can be repaired with pavement preservation treatments, such as micro-surfacing. Shoving, bumps, and potholes require full depth patching and may require subgrade excavation prior to additional treatment. Crack sealing should be done with any pavement preservation and with milling and overlay treatments. Asphalt emulsion should be evaluated for new pavement in areas with significant shoving to reduce or eliminate future shoving. Swell areas will require subgrade testing and may require excavation and replacement of part of the subbase.

The following are general recommendations for pavement improvements based on average conditions scores and typical deficiencies associated with each score. Individual roadways will vary in the types, percentages, and severity of deficiencies and treatments required.

GOOD: Pavement preservation (such as chip seals, micro-surfacing, slurries) with minor spot repairs consisting of limited patching and crack sealing.

FAIR: Pavement preservation (such as chip seals, micro-surfacing, slurries) with spot repairs consisting of patching and crack sealing.

SATISFACTORY: Milling and 1- to 2-inch overlay (where the existing pavement is thick enough) with spot repairs consisting of patching and crack sealing. Surface treatment pavement preservation may be considered if the shoving and swelling areas are low in severity and can be repaired with patching.

POOR: Extensive patching required to correct shoving and swelling areas, but full pavement reconstruction may be more cost-effective and would include removing existing pavement and select areas of base/subbase for replacement.

VERY POOR: Higher percentages of shoving, swelling, and rutting generally require full pavement reconstruction including removing the existing pavement and larger areas of base/subbase for replacement.

SERIOUS: Full pavement reconstruction is generally required, including removing the existing pavement and select areas of base/subbase for replacement. Additional base/subbase repairs required in many of the serious areas and may require an increase in pavement and aggregate base thickness for the structural section.

FAILED: Treatment similar to serious condition score. More extensive shoving and overall pavement bumps, rutting, and depressions in this category will likely require additional base/subbase repairs and may require an increase in pavement and aggregate base thickness for the structural section.

Table 4-1 provides a rough order of magnitude cost for repairing roadways and alleyways. Further analysis and engineering review is required for project planning and accurate cost estimates.

Table 4-1. Estimated Repair Costs for Roadways and Alleyways

Condition	Pavement Area (square feet)	Estimated Cost
Good	13,842,690	$27,685,380.00
Satisfactory	24,627,719	$49,255,437.80
Fair	12,441,731	$24,883,462.39
Poor	4,341,253	$8,682,505.67
Very Poor	946,705	$6,626,937.65
Serious	625,336	$4,377,350.61
Failed	25,624	$179,370.50

2024
Existing Conditions
Roadway and Alleyway
City of Fort Lauderdale

Jacobs

N
W E
S

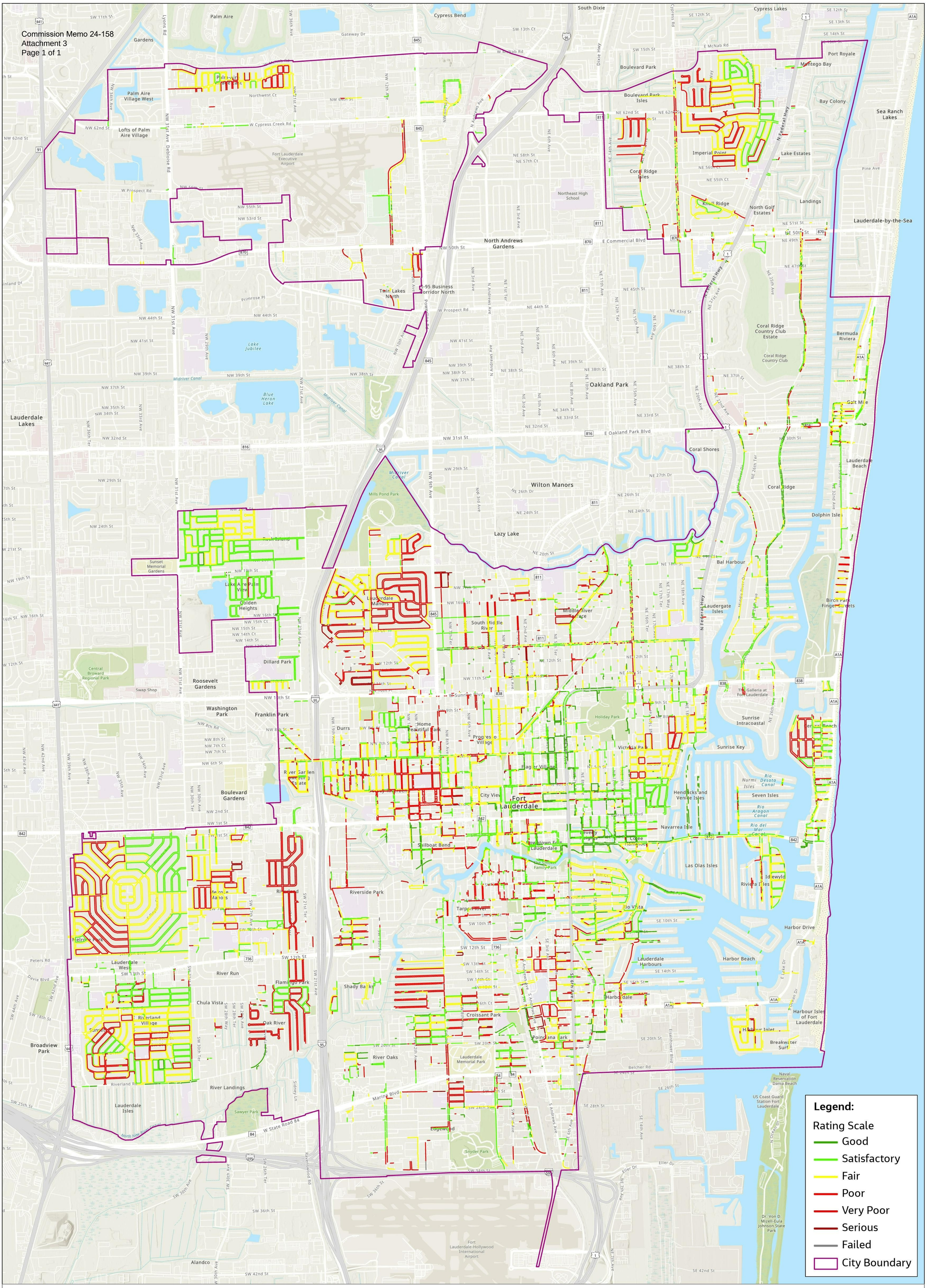
0 0.25 0.5 1 Miles

Legend:

PCI Rating Scale

- Good
- Satisfactory
- Fair
- Poor
- Very Poor
- Serious
- Failed
- N/A
- City Boundary

Commission Memo 24-158
Attachment 3
Page 1 of 1



2024
Existing Conditions
Sidewalks
City of Fort Lauderdale

Jacobs

N
W E
S

0 0.25 0.5 1 Miles