

# Maintenance Rating Program Monroe Expressway

Quarter 1 MRP Assessment



May 2023

## CONSULTANT CERTIFICATION OF COMPLETION

May 4, 2023

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NCTA Monroe By-Pass Roadway Maintenance Performance Rating Program; Q1, FY 2023 Rating

This is to certify that I, Ken M. McEntire, PE am an authorized official representative of the company Mott MacDonald I&E, LLC, a subconsultant to HNTB North Carolina, P.C. Collaboratively; we are working as the Monroe By-Pass Roadway and Facility Maintenance Performance Rating Program Consultants.

I know of my own personal knowledge, and do hereby certify, that the work of the contract described above has been independently performed in accordance with, and in conformity to, the *NCTA Roadway and Facility Maintenance Performance Standards*.

Sincerely,

Mott MacDonald I&E, LLC

A handwritten signature in blue ink that reads "Ken M. McEntire". The signature is written in a cursive style with a clear, legible font.

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## 1.0 Executive Summary

The North Carolina Turnpike Authority (NCTA) Maintenance Rating Program (MRP) is a maintenance evaluation program for all roadway features and toll facilities on the Monroe Expressway. This report presents results from the 2023 First Quarter Assessment of the Monroe Expressway.

The overall 2023 first quarter rating of the Monroe Expressway was 97.5. This score is above the target rating score of 90 for the overall system. As shown in **Table 1**, all five elements assessed achieved a rating greater than the target rating of 85.

**Table 1: MRP Element Results for the 2023 First Quarter Assessment**

| Element                               | MRP Rating  | Target Rating |
|---------------------------------------|-------------|---------------|
| Road Surface                          | 100.0       | 85.0          |
| Unpaved Shoulders and Ditches         | 95.4        | 85.0          |
| Drainage                              | 97.4        | 85.0          |
| Roadside                              | 92.3        | 85.0          |
| Traffic Control Devices               | 99.4        | 85.0          |
| <b>Overall MRP Performance Rating</b> | <b>97.5</b> | <b>90.0</b>   |

This report also provides a rolling rating of the latest four quarterly inspections of the Monroe Expressway. As presented in **Table 2**, the rolling maintenance rating of the Monroe Expressway was 96.7.

**Table 2: MRP Rolling Element Results**

| Element                               | Q2 2022 Rating | Q3 2022 Rating | Q4 2022 Rating | Q1 2023 Rating | Rolling Rating |
|---------------------------------------|----------------|----------------|----------------|----------------|----------------|
| Road Surface                          | 94.5           | 100.0          | 98.8           | 100.0          | 98.3           |
| Unpaved Shoulders and Ditches         | 98.4           | 100.0          | 100.0          | 95.4           | 98.7           |
| Drainage                              | 98.8           | 98.5           | 97.6           | 97.4           | 98.1           |
| Roadside                              | 92.9           | 90.1           | 94.2           | 92.3           | 92.1           |
| Traffic Control Devices               | 94.4           | 96.5           | 97.0           | 99.4           | 96.5           |
| <b>Overall MRP Performance Rating</b> | <b>95.4</b>    | <b>97.0</b>    | <b>97.5</b>    | <b>97.5</b>    | <b>96.8</b>    |

All the element ratings were above the desired rating of 85, and one characteristic scored below the minimum 80 rating. It is important to note that these results are only representative of the first quarter sample, one of four quarterly surveys annually that provide an intermediate snapshot of seasonal conditions. Therefore, these results are not yet a statistically valid representation of the assets; only the total of all four quarterly inspections reported as a rolling rating, provides a 95% confidence level in statistical sampling.

## 2.0 Introduction

The North Carolina Turnpike Authority (NCTA) Maintenance Rating Program (MRP) is a maintenance evaluation program for roadway features and toll facilities on the NCTA system. It is a comprehensive planning, measuring, and managing process that provides a means for communicating to managers, stakeholders, and key customers the impacts of policy and budget decisions on program service delivery.

Using outcome-based performance measures and the service level scale (0 through 100), the survey results are rated against established threshold criteria. The program analysis is accomplished by implementing sampling procedures that capture the level of service being provided for individual asset features. Over time, these ratings will be charted to identify work needs and subsequent necessary actions. The evaluations are based on the establishment of "threshold" conditions that quantify the maximum defect allowed to exist for a characteristic before it is considered unacceptable.

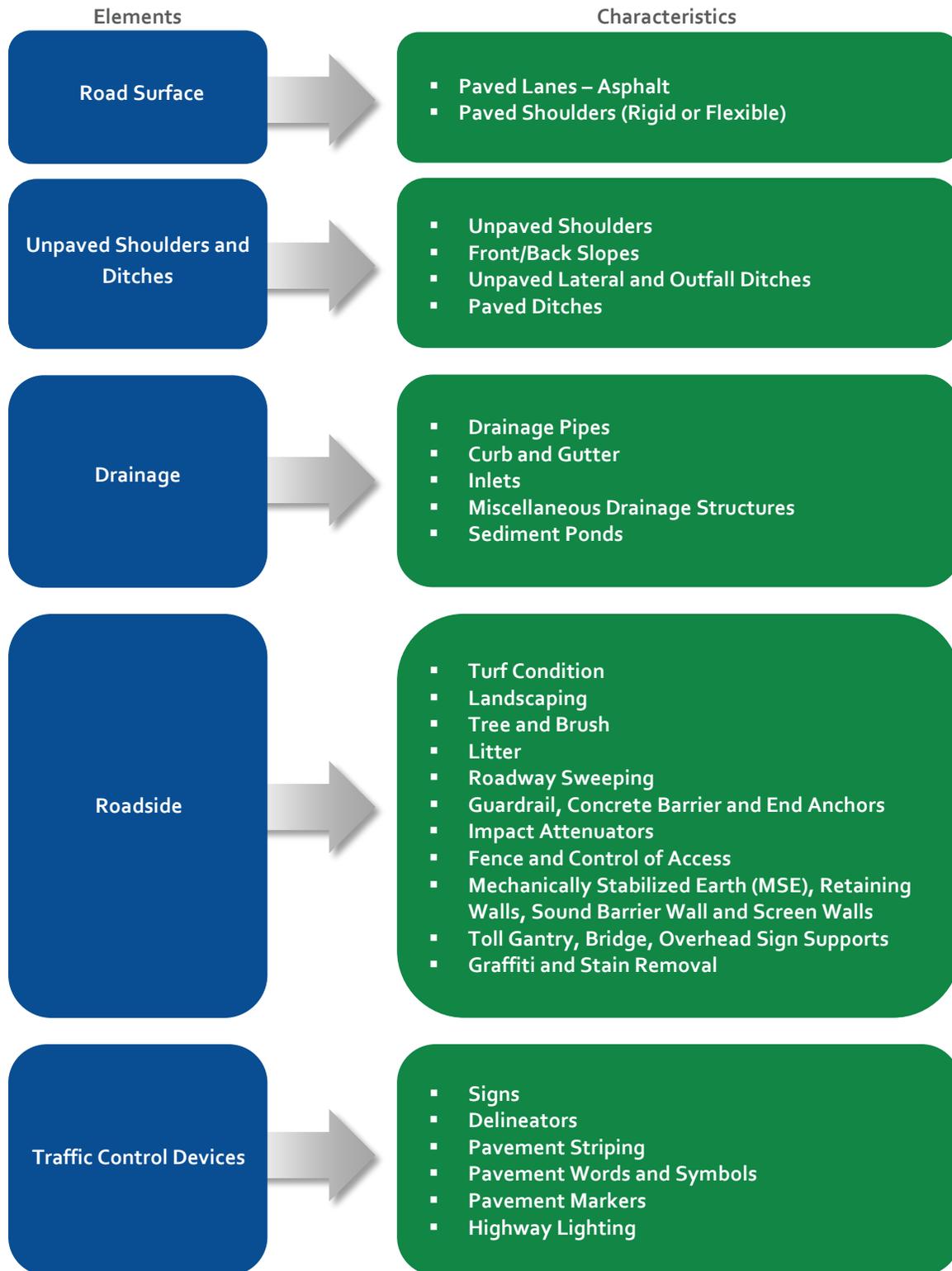
The NCTA performance standards, threshold criteria, and maintenance rating program were developed through a collaborative effort by NCTA managers, NCDOT maintenance staff, and consultants.

Using this field survey information, a maintenance matrix can be developed to show ties between maintenance activities and the characteristics of various roadway features. The purpose of this evaluation is to provide information that will be used to schedule and prioritize routine maintenance activities and provide uniform maintenance conditions that meet established objectives.

## 3.0 MRP Survey Procedure

Per the NCTA Roadway and Facility Maintenance Performance Standards, roadway assets on NCTA facilities have been grouped into characteristics which are categorized into 5 elements. These elements and their characteristics can be seen in *Figure 1* below:

Figure 1: Maintenance Elements and Characteristics



Because some roadway characteristics are of greater importance than others, a weighting system is applied to enable rational calculation of an overall level of service rating. Although one set of weighting factors for all characteristics could serve this purpose, a more useful system consists of two sets of weighting factors: one set that accounts for the importance of individual characteristics within a given maintenance element (1-9), and another set that accounts for the importance of the maintenance elements to the total rating (by % of score). This two-set system reveals deficiencies among characteristics and shows which maintenance elements are deficient.

The program analysis is accomplished using statistically valid, random sampling procedures that capture the level of service for individual assets with a 95% confidence level in sampling. Inspections are performed during the months of February, May, August, and November to account for dynamic changes in assets during the various seasons, such as vegetation growth. Each maintenance characteristic is evaluated and recorded according to the criteria developed by the NCTA performance standards. This inventory was completed with electronic data collection tablets and programs for accurate GPS coordinates of each transportation asset.

The evaluations are based on established "threshold" conditions that quantify the maximum defect allowed to exist for a characteristic before it is considered unacceptable. The ratings are done by comparing existing field conditions to the "threshold" value. If the characteristic meets or exceeds the "threshold," it is coded as YES to meeting the criteria. If it does not meet the criteria, it is coded as a NO. When the survey is complete, the number of YES's and NO's are totaled, and a composite number (using from 1 to 100 scale) is produced, which represents the level of maintenance currently being provided.

For any given asset, the number assigned as the target level of service represents the percentage of random samples in which the maintenance condition standard corresponding to the activity is to be met or exceeded. For instance, an activity with a level of service rating of 83 means that 83 percent of the sites met the condition standards.

The NCTA's overall target rating score is 90, with each element level scoring at or above 85 and every characteristic at or above 80.

## 4.0 Monroe Expressway Description

The Monroe Expressway extends for approximately 18.5 miles between the U.S. 74 interchange to the west and U.S. 74 near Marshville to the east. The Monroe Expressway consists of eight interchanges and seven all-electronic toll collection zones. A map of the Monroe Expressway can be seen in *Figure 2* below:

Figure 2: Monroe Expressway Map



## 5.0 Survey Results

The overall Q1 2023 MRP rating for the Monroe Expressway is 97.5. This score is above the target rating score of 90 for the overall system. All the element ratings were above the desired rating of 85, and one characteristic scored below the minimum 80 rating. Individual characteristic ratings will be discussed in detail in the analysis section of this report.

**Appendix A** shows each of the individual assets that failed the MRP criteria. **Appendix B** includes maps of each of the individual asset locations that failed to meet the criteria displayed in the tables below. The MRP rating value designated to each element and feature refers to the percentage of elements or features that pass the asset’s particular threshold criteria. After developing an inventory by recording the total number of instances of a particular feature, each feature is analyzed based on threshold criteria and a pass/fail result is designated and recorded for each to determine the percentage of the sample passed. The passing samples and sample totals are then multiplied by their weighted value, which are designated to each element based on importance to determine the actual and available rating points. Lastly, an MRP Performance Rating is calculated for each asset and element group based on the ratio of the actual points over the available points.

The overall MRP Performance rating results of the survey are presented in **Tables 3 and 4**.

**Table 3: Element Results for Q1 2023**

| Element                               | MRP Rating  |
|---------------------------------------|-------------|
| Road Surface                          | 100.0       |
| Unpaved Shoulders                     | 95.4        |
| Drainage                              | 97.4        |
| Roadside                              | 92.3        |
| Traffic Control Devices               | 99.4        |
| <b>Overall MRP Performance Rating</b> | <b>97.5</b> |

The overall score is determined by summing the elements multiplied by weighted factors as follows: Road Surface (25%), Unpaved Shoulders (13%), Drainage (15%), Roadside (17%), and Traffic Control Devices (30%).

Table 4: Characteristic Results for Q1 2023

| Road Surface                         | Sample Passed | Sample Total | Weighted Values | Actual PTS | Available PTS | Quarter Rating |
|--------------------------------------|---------------|--------------|-----------------|------------|---------------|----------------|
| Paved Lanes Asphalt                  | 21            | 21           | 9               | 189        | 189           | 100            |
| Paved Shoulder                       | 21            | 21           | 5               | 105        | 105           | 100            |
| <b>Element Total</b>                 |               |              |                 | <b>294</b> | <b>294</b>    | <b>100.0</b>   |
| Unpaved Shoulders & Ditches          | Sample Passed | Sample Total | Weighted Values | Actual PTS | Available PTS | Quarter Rating |
| Unpaved Shoulder                     | 19            | 21           | 9               | 171        | 189           | 90             |
| Front/Back Slopes                    | 21            | 21           | 6               | 126        | 126           | 100            |
| Lateral and Outfall Ditches, Unpaved | 21            | 21           | 6               | 126        | 126           | 100            |
| Ditches, Paved                       | 11            | 12           | 5               | 55         | 60            | 92             |
| <b>Element Total</b>                 |               |              |                 | <b>478</b> | <b>501</b>    | <b>95.4</b>    |
| Drainage                             | Sample Passed | Sample Total | Weighted Values | Actual PTS | Available PTS | Quarter Rating |
| Drainage Pipes                       | 31            | 31           | 7               | 217        | 217           | 100            |
| Curb and Gutter                      | 21            | 22           | 6               | 126        | 132           | 95             |
| Inlets                               | 31            | 32           | 7               | 217        | 224           | 97             |
| Misc. Drainage Structure             | 16            | 19           | 4               | 64         | 76            | 84             |
| Sediment Pond                        | 2             | 2            | 7               | 14         | 14            | 100            |
| <b>Element Total</b>                 |               |              |                 | <b>646</b> | <b>663</b>    | <b>97.4</b>    |
| Roadside                             | Sample Passed | Sample Total | Weighted Values | Actual PTS | Available PTS | Quarter Rating |
| Turf Condition                       | 40            | 50           | 7               | 280        | 350           | 80             |
| Landscaping                          | 14            | 15           | 4               | 56         | 60            | 93             |
| Trees and Brush                      | 16            | 16           | 4               | 64         | 64            | 100            |
| Litter                               | 21            | 21           | 4               | 84         | 84            | 100            |
| Roadway Sweeping                     | 21            | 21           | 5               | 105        | 105           | 100            |

Maintenance Rating Program for the Monroe Expressway

2023 First Quarter (January - March)

|   |    |    |   |             |             |             |
|---|----|----|---|-------------|-------------|-------------|
| Guardrail, Concrete Barrier and End Anchors | 30 | 32 | 9 | 270         | 288         | 94          |
| Impact Attenuators                          | 6  | 6  | 9 | 54          | 54          | 100         |
| Fence, Control Access                       | 29 | 32 | 7 | 203         | 224         | 91          |
| Retaining Walls and Sound Barrier Walls     | 14 | 14 | 5 | 70          | 70          | 100         |
| Toll Gantry Supports                        | 10 | 10 | 5 | 50          | 50          | 100         |
| Graffiti and Stain Removal                  | 30 | 30 | 4 | 120         | 120         | 100         |
| <b>Element Total</b>                        |    |    |   | <b>1356</b> | <b>1469</b> | <b>92.3</b> |

| <b>Traffic Control Devices</b> | <b>Sample Passed</b> | <b>Sample Total</b> | <b>Weighted Values</b> | <b>Actual PTS</b> | <b>Available PTS</b> | <b>Quarter Rating</b> |
|--------------------------------|----------------------|---------------------|------------------------|-------------------|----------------------|-----------------------|
| Signs                          | 67                   | 67                  | 7                      | 469               | 469                  | 100                   |
| Object Markers and Delineators | 21                   | 21                  | 3                      | 63                | 63                   | 100                   |
| Pavement Striping/Marking      | 21                   | 21                  | 8                      | 168               | 168                  | 100                   |
| Words and Symbols              | 46                   | 47                  | 7                      | 322               | 329                  | 98                    |
| Pavement Markers               | 21                   | 21                  | 9                      | 189               | 189                  | 100                   |
| Highway Lighting               | 4                    | 4                   | 6                      | 24                | 24                   | 100                   |
| <b>Element Total</b>           |                      |                     |                        | <b>1235</b>       | <b>1242</b>          | <b>99.4</b>           |

## 6.0 Analysis & Recommendations

### MRP Elements

During the first quarter, all elements exceeded NCTA's quarter score threshold criteria of 85. All elements received a quarter score above 90.

### MRP Characteristics

All characteristics exceeded the NCTA minimum threshold criteria of 80.

## 7.0 Current Rolling MRP Rating

The rolling maintenance rating of the Monroe Expressway was 96.8, exceeding NCTA’s overall target rating of 90. All elements exceeded NCTA’s rolling rating threshold criteria of 85. All characteristic rolling ratings met or exceeded the target rating of 80.

The 2022/2023 results are presented in *Exhibit 1* and *Table 5*. These results are a collection of the latest four quarterly inspections.

Exhibit 1: MRP Element Results for 2022/2023

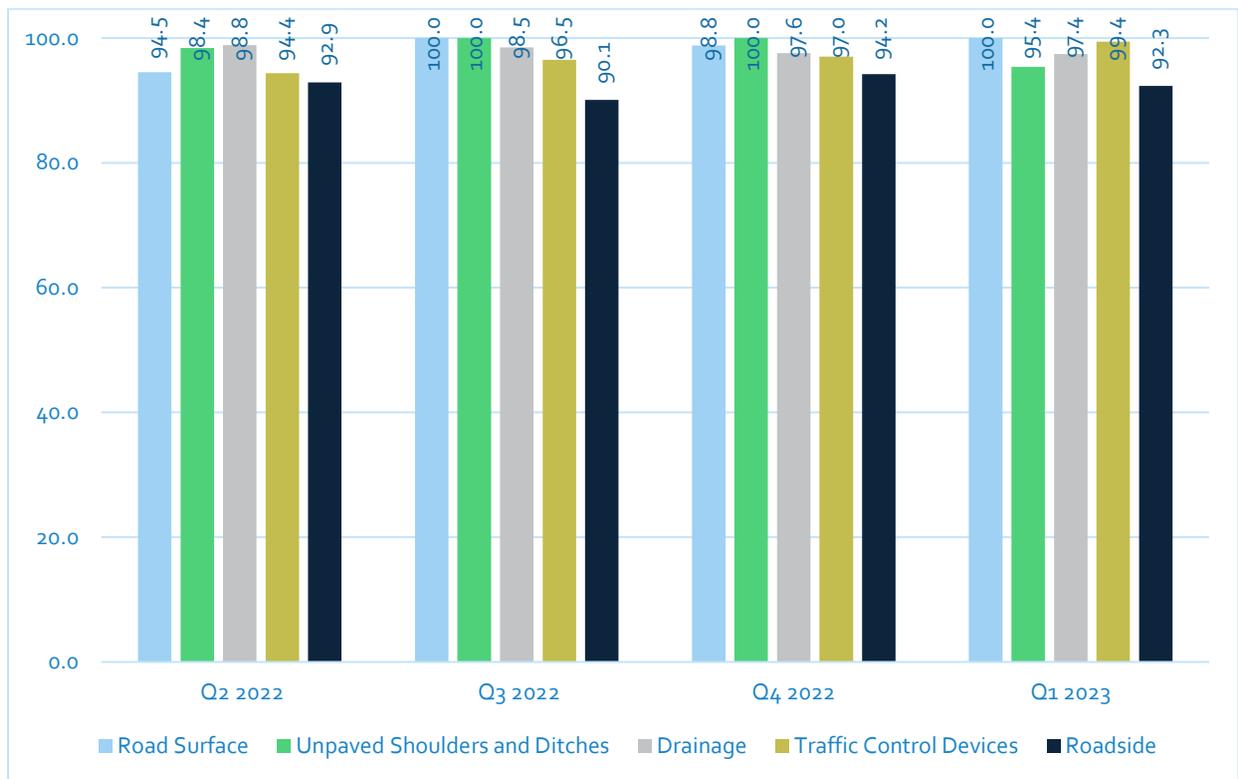


Table 5: MRP Rolling Element Results

| Road Surface                                 | Q2 2022 Rating | Q3 2022 Rating | Q4 2022 Rating | Q1 2023 Rating | Rolling Rating |
|--|----------------|----------------|----------------|----------------|----------------|
| Paved Lanes Asphalt                          | 93             | 100            | 100            | 100            | 98.3           |
| Paved Shoulder                               | 97             | 100            | 97             | 100            | 98.3           |
| <b>Element Total</b>                         |                |                |                |                | <b>98.3</b>    |
| Unpaved Shoulders and Ditches                | Q2 2022 Rating | Q3 2022 Rating | Q4 2022 Rating | Q1 2023 Rating | Rolling Rating |
| Unpaved Shoulder                             | 100            | 100            | 100            | 90             | 98.3           |
| Front/Back Slopes                            | 97             | 100            | 100            | 100            | 99.1           |
| Lateral and Outfall Ditches, Unpaved         | 100            | 100            | 100            | 100            | 100            |
| Ditches, Paved                               | 92             | 100            | 100            | 92             | 95.3           |
| <b>Element Total</b>                         |                |                |                |                | <b>98.7</b>    |
| Drainage                                     | Q2 2022 Rating | Q3 2022 Rating | Q4 2022 Rating | Q1 2023 Rating | Rolling Rating |
| Drainage Pipes                               | 100            | 100            | 100            | 100            | 100            |
| Curb and Gutter                              | 100            | 100            | 97             | 95             | 98.1           |
| Inlets                                       | 100            | 97             | 97             | 97             | 97.7           |
| Sediment Basins                              | 100            | 100            | 100            | 100            | 100            |
| Misc. Drainage Structure                     | 89             | 95             | 95             | 95             | 93.4           |
| <b>Element Total</b>                         |                |                |                |                | <b>98.1</b>    |
| Roadside                                     | Q2 2022 Rating | Q3 2022 Rating | Q4 2022 Rating | Q1 2023 Rating | Rolling Rating |
| Turf Condition                               | 74             | 65             | 81             | 80             | 74.9           |
| Landscaping                                  | 100            | 87             | 100            | 93             | 94.7           |
| Trees and Brush                              | 100            | 100            | 100            | 100            | 100            |
| Litter                                       | 100            | 100            | 100            | 100            | 100            |
| Roadway Sweeping                             | 100            | 100            | 100            | 100            | 100            |
| Guardrail, Concrete Barrier, and End Anchors | 100            | 94             | 100            | 94             | 96.9           |
| Impact Attenuators                           | 100            | 100            | 100            | 100            | 100            |
| Fence, Control Access                        | 92             | 95             | 86             | 91             | 91.0           |
| Retaining Walls and Sound Barrier Walls      | 86             | 100            | 100            | 100            | 96.4           |
| Decorative Supports                          | 100            | 100            | 100            | 100            | 100            |
| Graffiti and Stain Removal                   | 100            | 100            | 100            | 100            | 100            |
| <b>Element Total</b>                         |                |                |                |                | <b>92.1</b>    |
| Traffic Control Devices                      | Q2 2022 Rating | Q3 2022 Rating | Q4 2022 Rating | Q1 2023 Rating | Rolling Rating |
| Signs  | 90             | 91             | 95             | 100            | 94.3           |
| Delineators                                  | 93             | 100            | 100            | 100            | 98.3           |
| Pavement Striping/Marking                    | 93             | 100            | 100            | 100            | 98.3           |
| Words and Symbols                            | 100            | 97             | 100            | 98             | 98.6           |
| Pavement Markers                             | 97             | 100            | 93             | 100            | 97.4           |
| Highway Lighting                             | 100            | 100            | 100            | 100            | 100            |
| <b>Element Total</b>                         |                |                |                |                | <b>96.5</b>    |

## 8.0 Conclusion

This report presents the 2023 first quarter assessment of the Monroe Expressway. The NCTA's target ratings are 90 for the rolling rating, 90 for the overall quarter rating, 85 for elements, and 80 for characteristics. The first quarter rating was 97.5 and the rolling rating was 96.8, both ratings met the target rating of 90.

All element ratings were above the target ratings for the quarter. Only one characteristic, Turf, failed to meet the target rolling rating of 80 with a 74.9 rating. During the first quarter assessment, all characteristics met or exceeded the target rating of 80.

The maintenance provider is encouraged to continue using asset management principles and a performance management approach to work planning.

## **Appendix A**

**Monroe Expressway 2023 First Quarter Table Results of Assets Failing MRP**

## Appendix A: Monroe Expressway 2023 First Quarter Table Results of Assets Failing MRP

Provided below are a series of tables outlining the existing failures that occurred throughout the facility. Assets are defined by an Inventory ID, which is a unique identifier given to each individual asset. The components of the Inventory ID are an asset specific prefix along with a number, such as LS\_1. The Inventory ID and GIS Reference Page number correspond to the provided map packets and allow for quick location of particular asset failures. Photos of failures were provided when applicable.

All assets and their respective prefixes are listed below:

|  |     |
|--|-----|
| Guardrail, Concrete Barrier and End Anchors (BR).....                | 2   |
| Curb and Gutter (CG).....  | 3   |
| Toll Gantry Supports (GN).....                                       | 4   |
| Drainage Pipes (DP).....   | 5   |
| Misc. Drainage Structure (MDD).....                                  | 6   |
| Fence and Control of Access (FN) .....                               | 7   |
| Graffiti (GR).....   | 8   |
| Highway Lighting (HL) .....  | 9   |
| Impact Attenuators (IA).....   | 10  |
| Inlets (IN).....   | 11  |
| Landscaping (PB).....  | 12  |
| Paved Lanes – Asphalt (LS) .....                                     | 13  |
| Paved Shoulders (LS) .....   | 14  |
| Unpaved Shoulders (LS).....  | 15  |
| Front/Back Slopes (LS) .....   | 16  |
| Unpaved Lateral and Outfall Ditches (LS) .....                       | 17  |
| Litter (LS).....   | 18  |
| Roadway Sweeping (LS).....   | 19  |
| Pavement Striping (LS) .....   | 20  |
| Pavement Markers (LS).....   | 21  |
| Delineators (LS).....  | 22  |
| Paved Ditches (PD).....  | 23  |
| Pavement Words and Symbols (PS) .....                                | 24  |
| Signs (SN) .....   | 25  |
| Tree and Brush (TB).....   | 26  |
| Turf Condition (TF) .....  | 27  |
| Turf Condition (TF) .....  | 28  |
| Turf Condition (TF) .....  | 29  |
| Turf Condition (TF) .....  | 30  |
| MSE/Retaining Walls, Sound Barrier Walls and Screen Walls (WL) ..... | 31  |
| Sediment Basins(SB).....   | 332 |

## Guardrail, Concrete Barrier and End Anchors (BR)

| # | Material Type | Object ID | Failure Type | Photo   | GIS Reference Page |
|---|---------------|-----------|--------------|---|--------------------|
| 1 | Steel         | BR_392    | Twisted Post |   | B14 & B15          |
| 2 | Steel         | BR_412    | Twisted Post |  | B11                |

**Curb and Gutter (CG)**

| # | Material Type | Object ID | Failure Type | Photo  | GIS Reference Page |
|---|---------------|-----------|--------------|--|--------------------|
| 1 | Concrete      | CG_291    | Cracking     |  | B1                 |

## Toll Gantry Supports (GN)

---

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

## Drainage Pipes (DP)

---

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

**Misc. Drainage Structure (MDD)**

| # | Material Type | Object ID | Failure Type  | Photo  | GIS Reference Page |
|---|---------------|-----------|---------------|--|--------------------|
| 1 | Concrete      | MDD_68    | Rodent Screen |  | B11                |

## Fence and Control of Access (FN)

| # | Material Type | Object ID | Failure Type | Photo  | GIS Reference Page |
|---|---------------|-----------|--------------|--|--------------------|
| 1 | Woven         | FN_264    | Hole         |    | B4                 |
| 2 | Woven         | FN_331    | Hole         |   | B7                 |
| 3 | Woven         | FN_493    | Hole         |  | B25                |

**Graffiti (GR)**

---

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

## Highway Lighting (HL)

---

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

## Impact Attenuators (IA)

---

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

**Inlets (IN)**

| # | Material Type | Object ID | Failure Type | Photo  | GIS Reference Page |
|---|---------------|-----------|--------------|--|--------------------|
| 1 | Concrete      | IN_622    | Erosion      |  | B3 & B4            |

## Landscaping (PB)

---

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

**Paved Lanes – Asphalt (LS)**

---

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

**Paved Shoulders (LS)**

---

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

## Unpaved Shoulders (LS)

| # | Material Type | Object ID | Failure Type | Photo   | GIS Reference Page |
|---|---------------|-----------|--------------|---|--------------------|
| 1 | Asphalt       | LS_247    | Drop-off     |   | B7 & B8            |
| 2 | Asphalt       | LS_421    | Drop-off     |  | B14 & B15          |

### Front/Back Slopes (LS)

---

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

## Unpaved Lateral and Outfall Ditches (LS)

---

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

**Litter (LS)**

---

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

## Roadway Sweeping (LS)

---

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

## Pavement Striping (LS)

---

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

### Pavement Markers (LS)

---

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

## Delineators (LS)

---

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

**Paved Ditches (PD)**

| # | Material Type | Object ID | Failure Type | Photo  | GIS Reference Page |
|---|---------------|-----------|--------------|--|--------------------|
| 1 | Concrete      | PD_9      | Blockage     |  | B22 & B23          |

# Pavement Words and Symbols (PS)

| # | Material Type | Object ID | Failure Type       | Photo  | GIS Reference Page |
|---|---------------|-----------|--------------------|--|--------------------|
| 1 | Asphalt       | PS_8      | Daytime Assessment |  | B4                 |

## Signs (SN)

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| # | Sign Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|-----------|-----------|--------------|-------|--------------------|
|---|-----------|-----------|--------------|-------|--------------------|

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This asset did not produce any failures.

**Tree and Brush (TB)**

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| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

### Turf Condition (TF)

| # | Material Type | Object ID | Failure Type | Photo  | GIS Reference Page |
|---|---------------|-----------|--------------|--|--------------------|
| 1 | Turf          | TF_133    | Bare Ground  |    | B1                 |
| 2 | Turf          | TF_219    | Bare Ground  |   | B4                 |
| 3 | Turf          | TF_231    | Bare Ground  |  | B4                 |

## Turf Condition (TF)

| # | Material Type | Object ID | Failure Type | Photo  | GIS Reference Page |
|---|---------------|-----------|--------------|--|--------------------|
| 4 | Turf          | TF_270    | Bare Ground  |    | B7                 |
| 5 | Turf          | TF_346    | Bare Ground  |   | B17                |
| 6 | Turf          | TF_447    | Bare Ground  |  | B7                 |
| 7 | Turf          | TF_578    | Bare Ground  |  | B10                |

**Turf Condition (TF)**

| #  | Material Type | Object ID | Failure Type | Photo  | GIS Reference Page |
|----|---------------|-----------|--------------|--|--------------------|
| 8  | Turf          | TF_627    | Bare Ground  |    | B14                |
| 9  | Turf          | TF_726    | Bare Ground  |   | B19                |
| 10 | Turf          | TF_825    | Bare Ground  |  | B24                |

**Turf Condition (TF)**

| #  | Material Type | Object ID | Failure Type | Photo  | GIS Reference Page |
|----|---------------|-----------|--------------|--|--------------------|
| 11 | Turf          | TF_836    | Bare Ground  |  | B25                |

**MSE/Retaining Walls, Sound Barrier Walls and Screen Walls (WL)**

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| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

## Sediment Basins(SB)

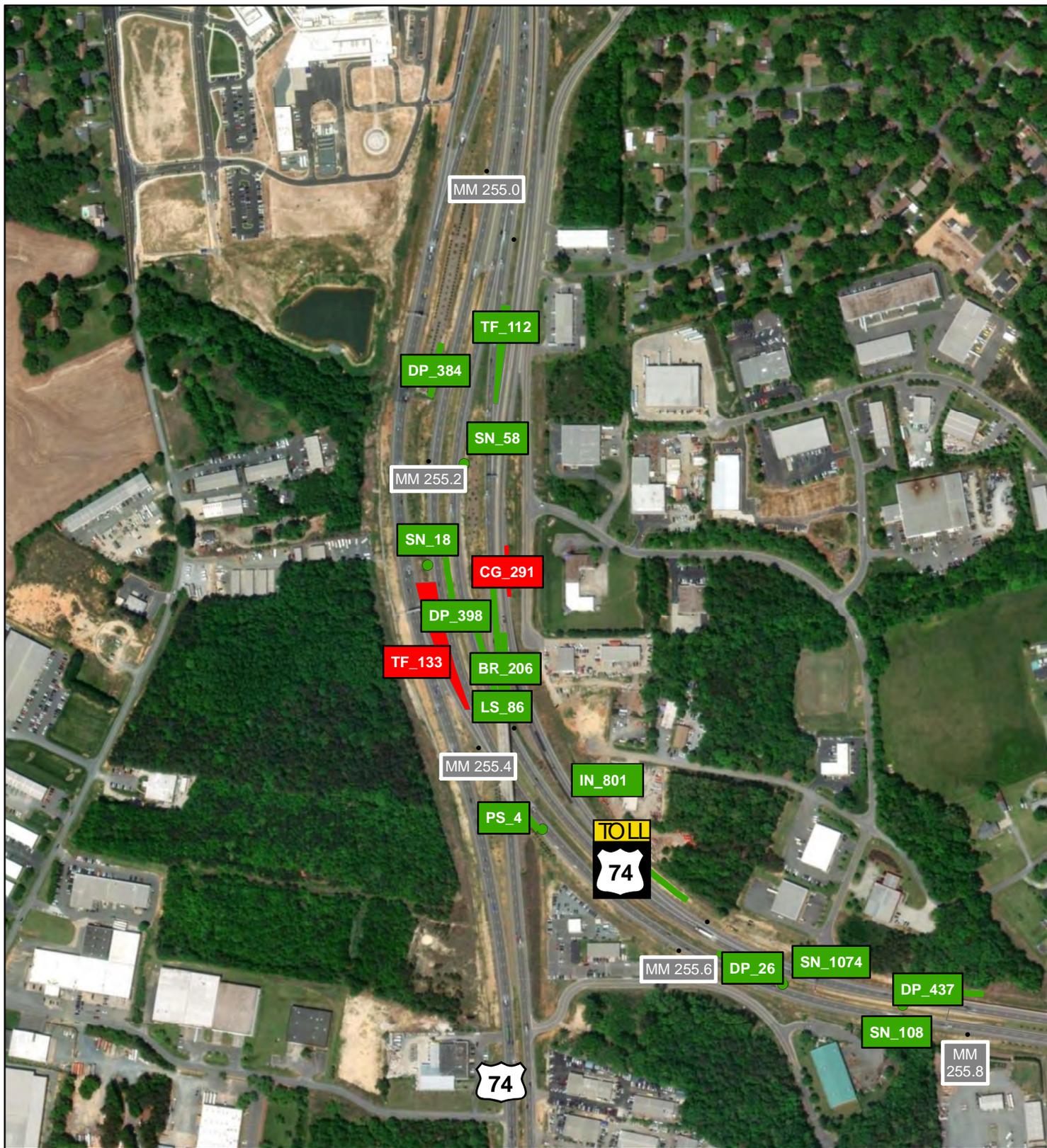
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| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

---

This asset did not produce any failures.

# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations



## Legend

- Failing Asset
- Passing Asset



# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations



## Legend

- Failing Asset
- Passing Asset



# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations

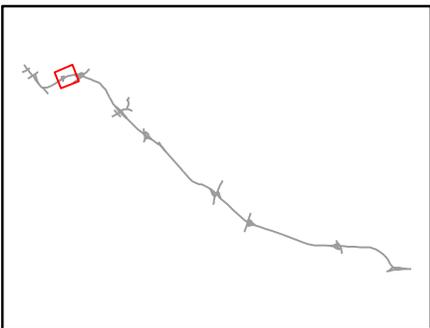


Indian Trail-Fairview Rd.



## Legend

- Failing Asset
- Passing Asset

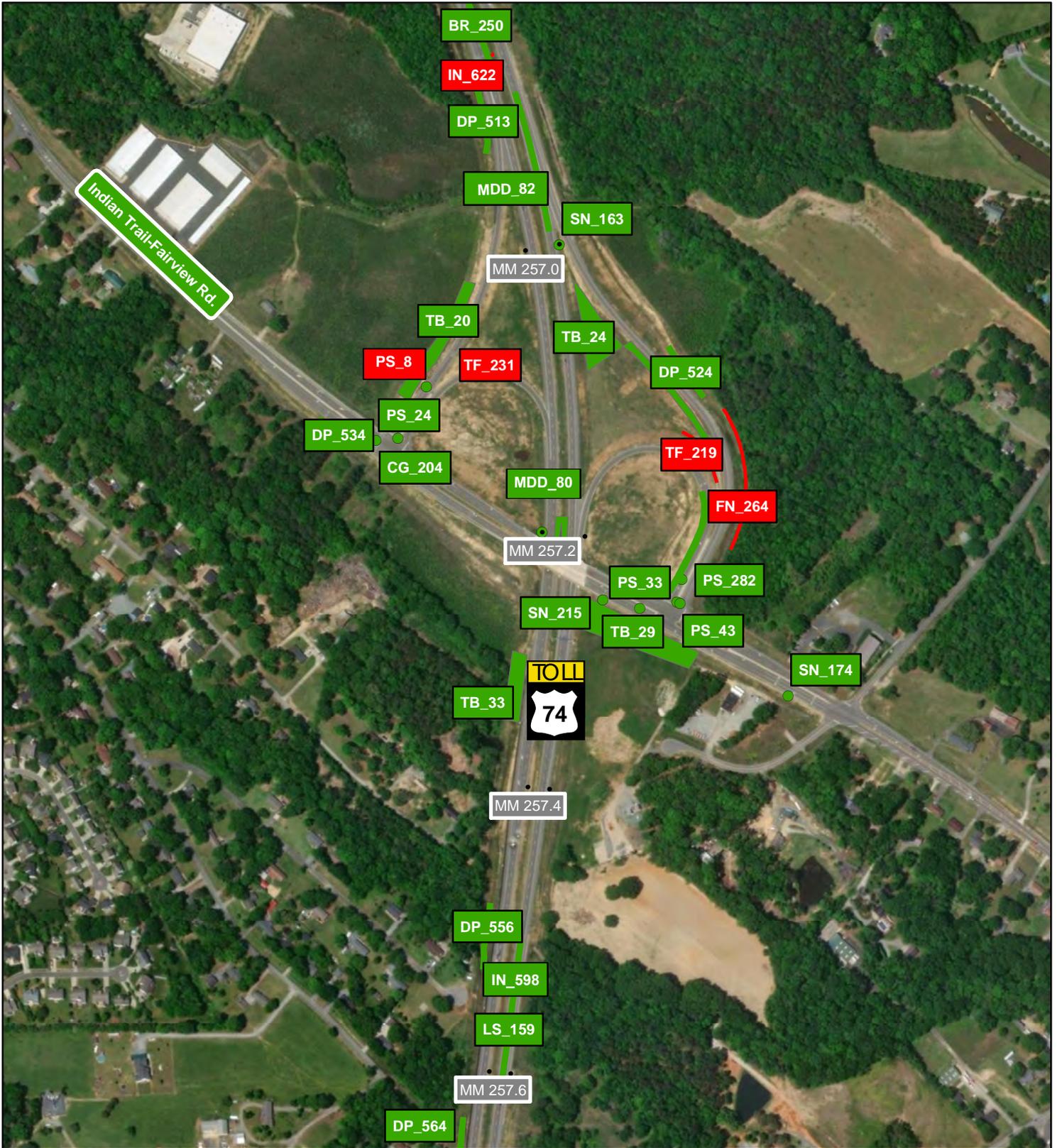




NORTH CAROLINA  
**Turnpike Authority**

B3

# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations



## Legend

- Failing Asset
- Passing Asset

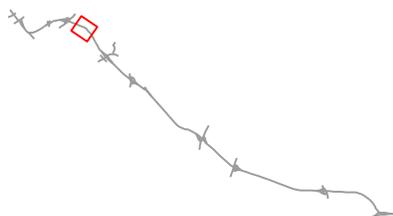


# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations



## Legend

- Failing Asset
- Passing Asset

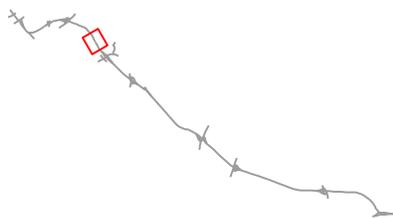


# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations

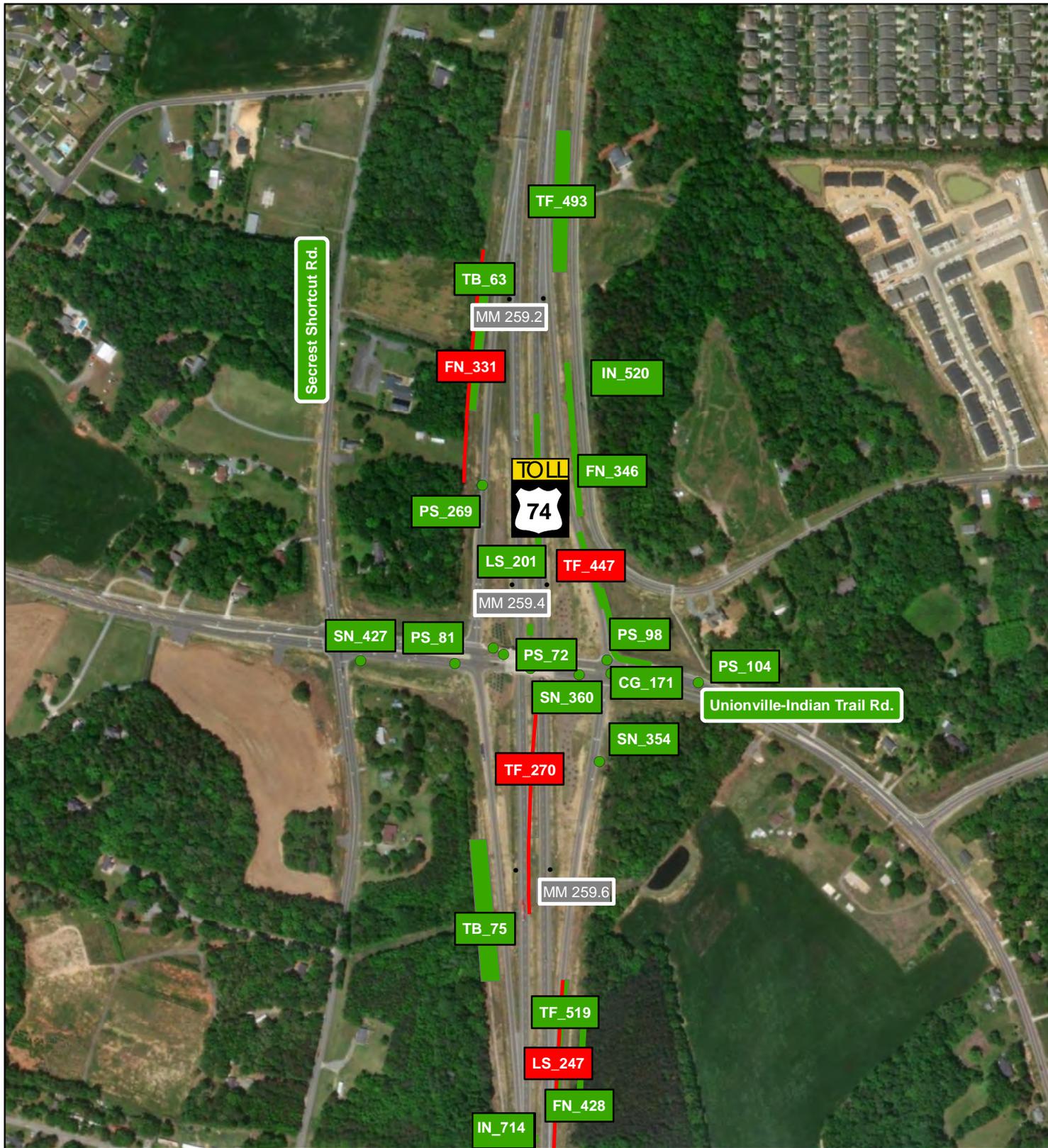


## Legend

- Failing Asset
- Passing Asset

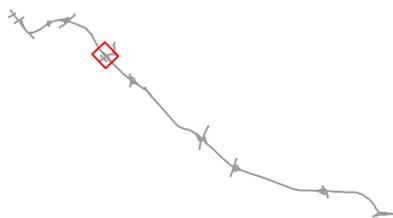


# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations

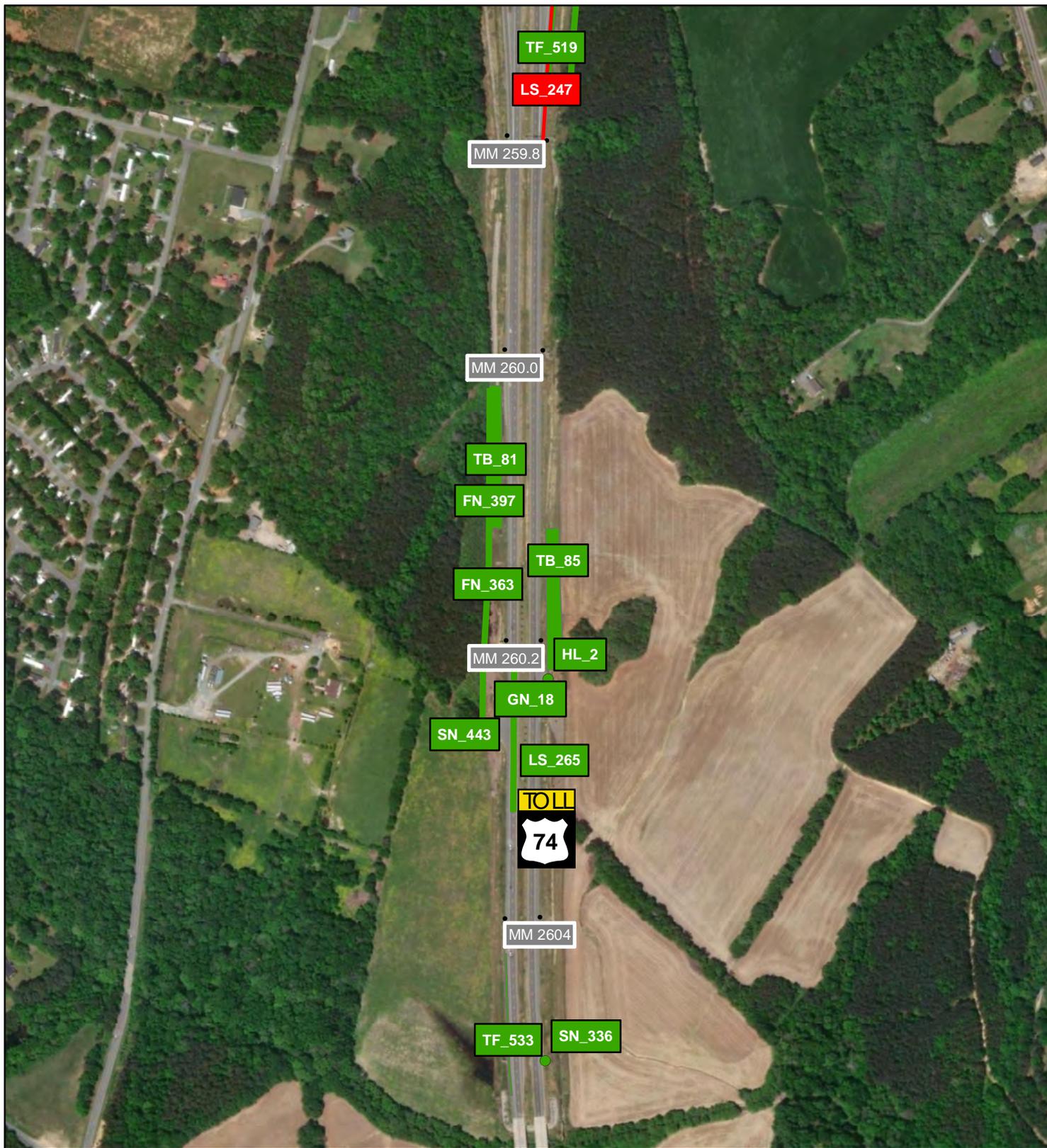


## Legend

- Failing Asset
- Passing Asset

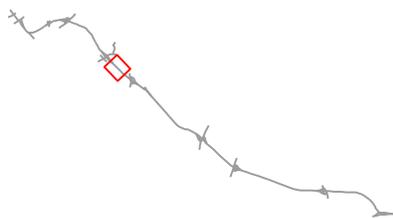


# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations

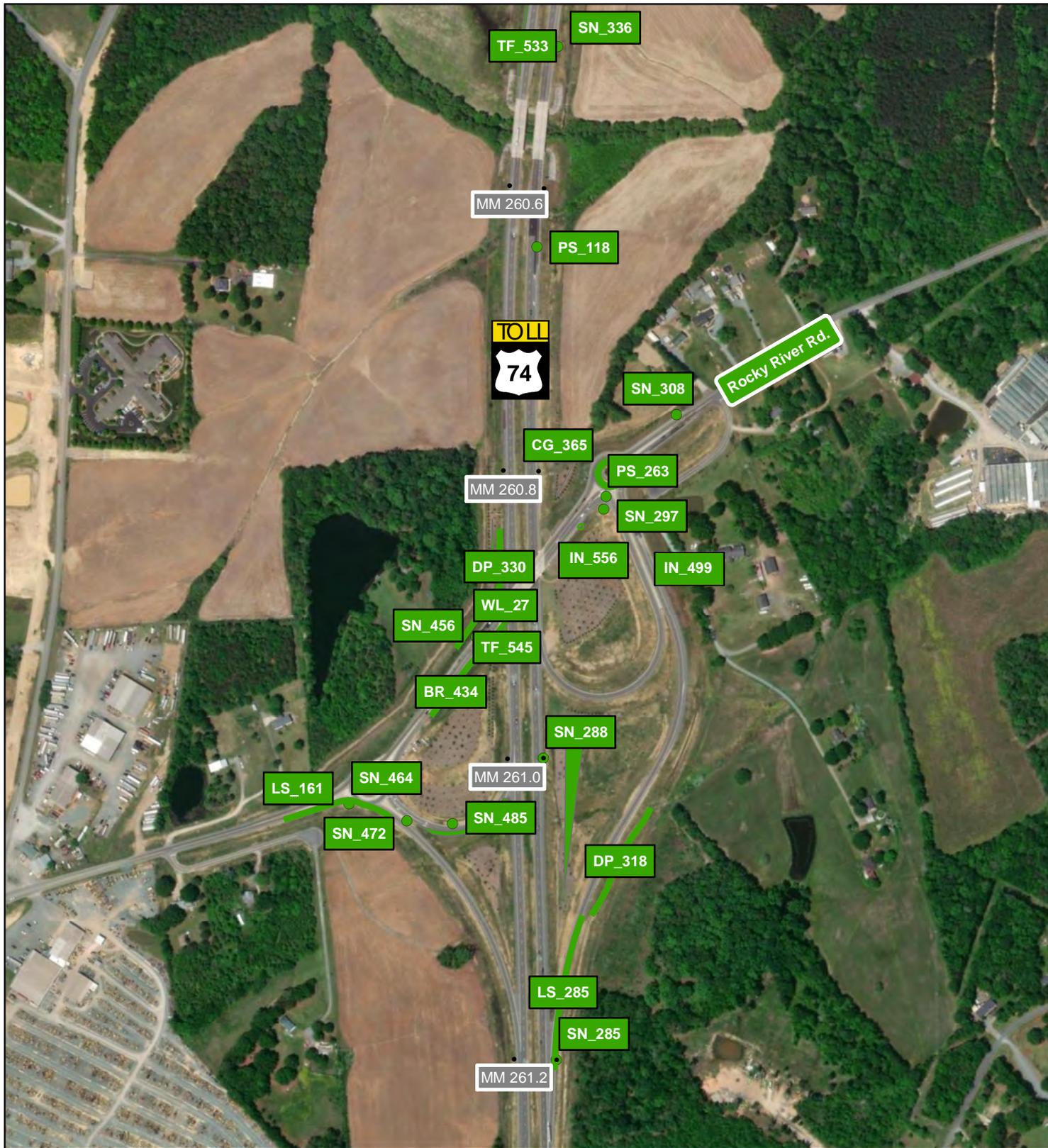


## Legend

-  Failing Asset
-  Passing Asset

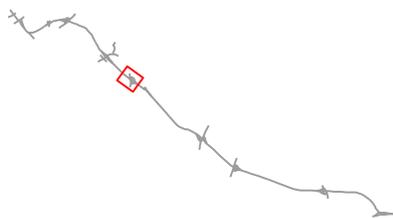


# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations

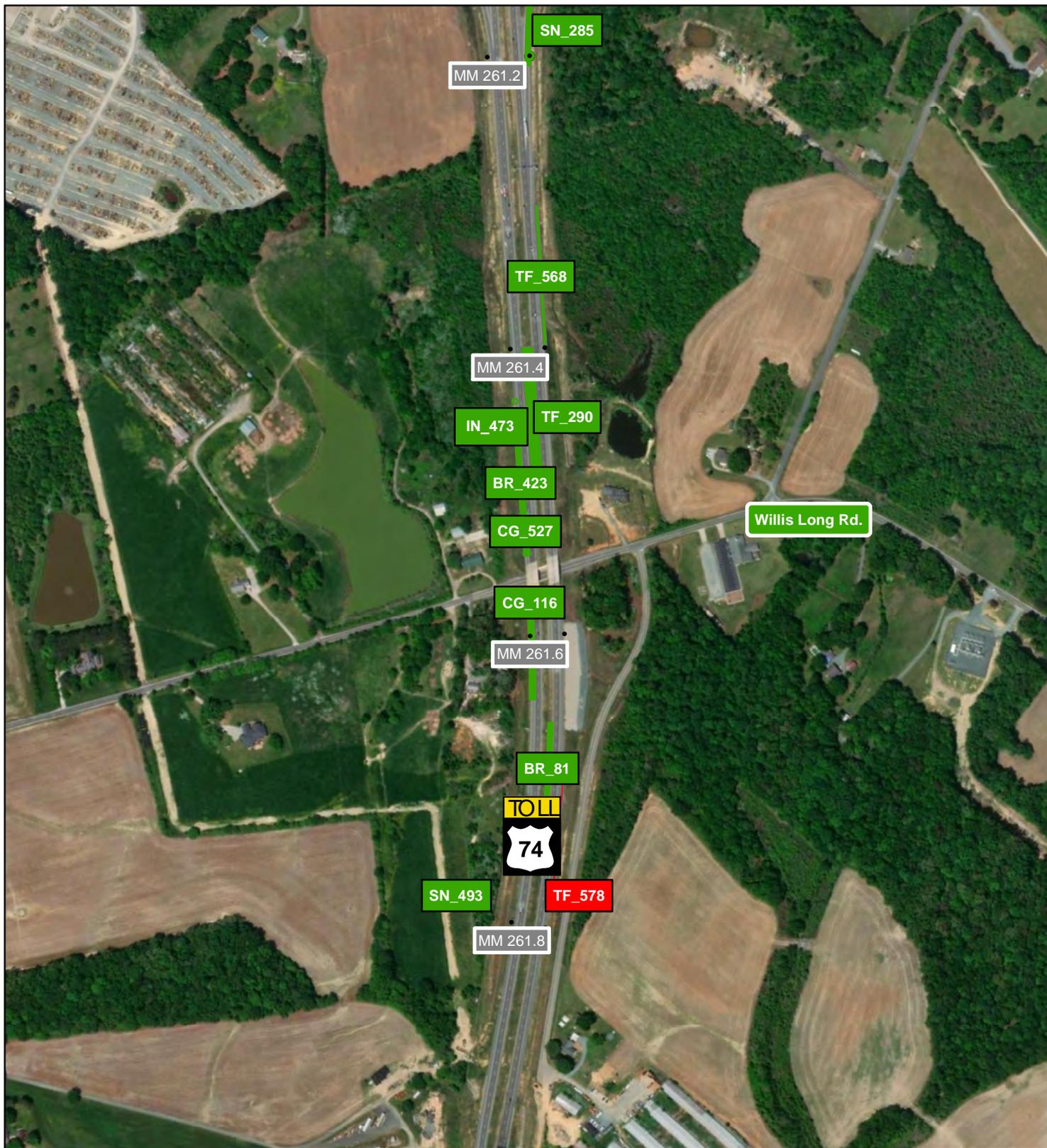


## Legend

- Failing Asset
- Passing Asset

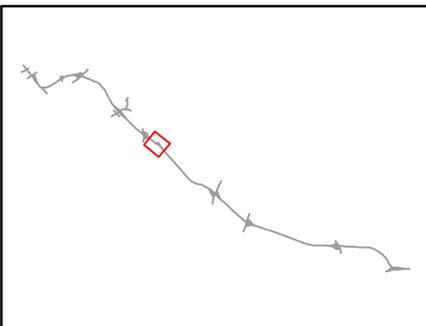


# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations



## Legend

- Failing Asset
- Passing Asset





NORTH CAROLINA  
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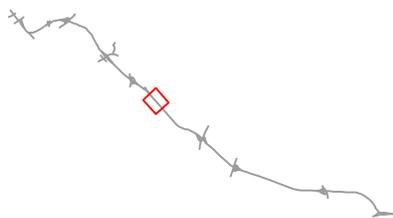
B10

# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations

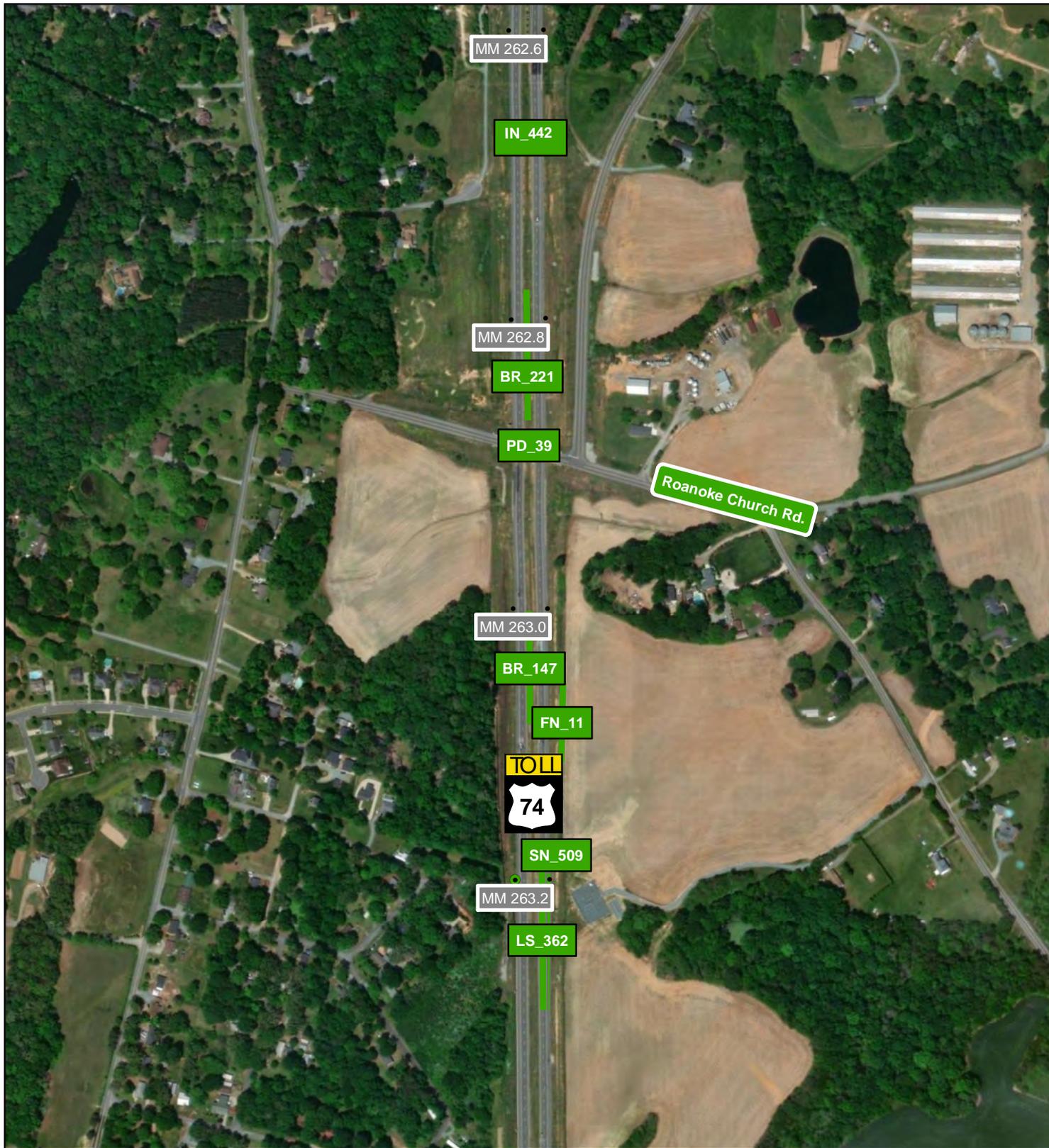


## Legend

- Failing Asset
- Passing Asset

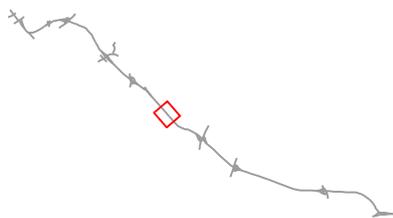


# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations



## Legend

- Failing Asset
- Passing Asset

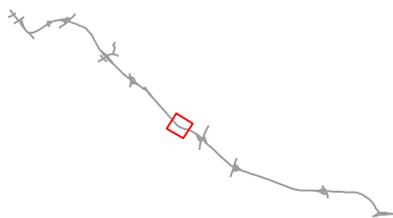


# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations

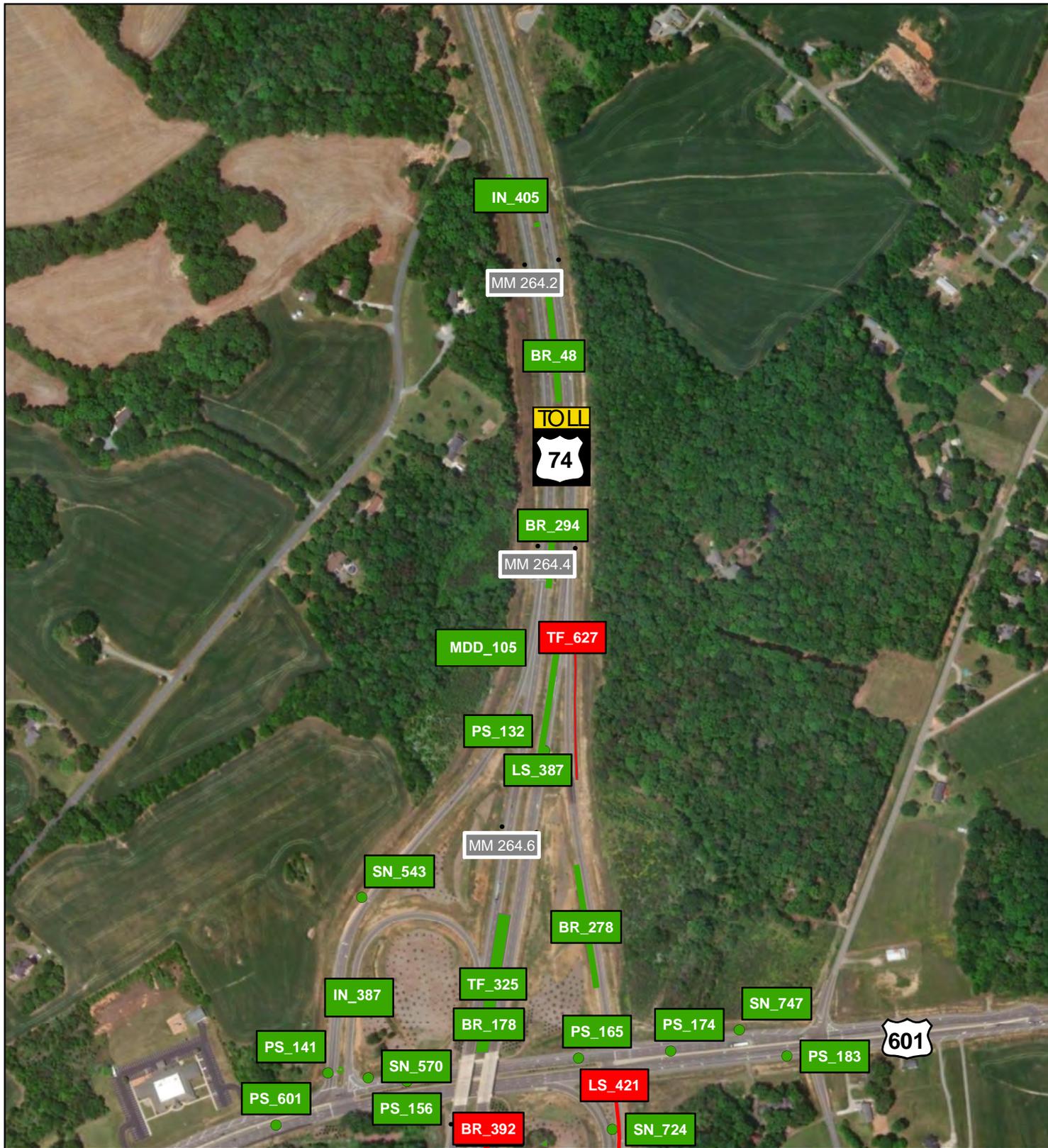


## Legend

- Failing Asset
- Passing Asset

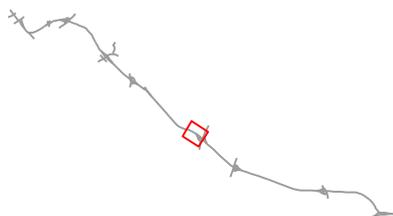


# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations

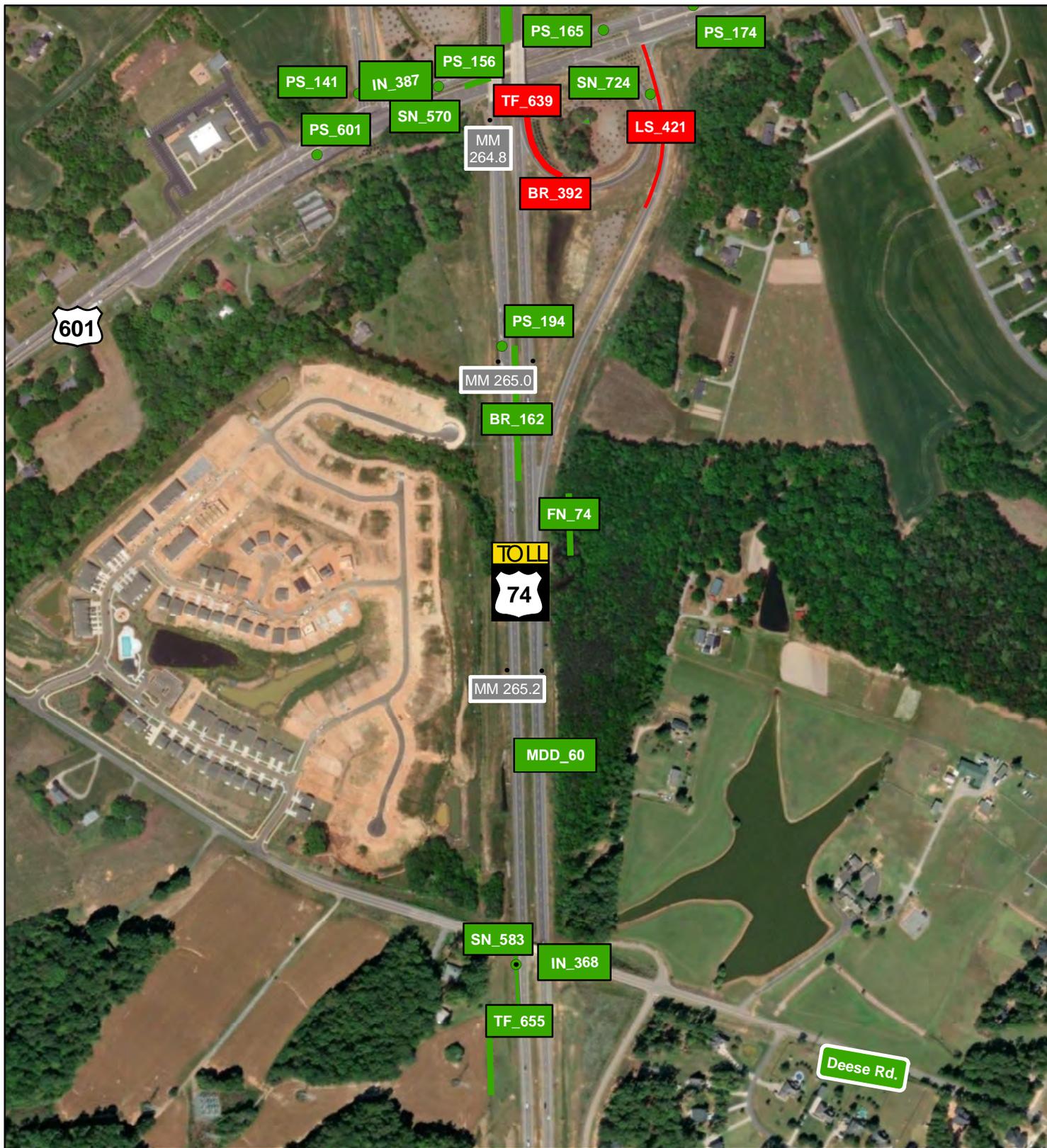


## Legend

- Failing Asset
- Passing Asset

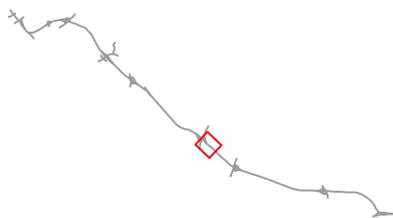


# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations



## Legend

- Failing Asset
- Passing Asset

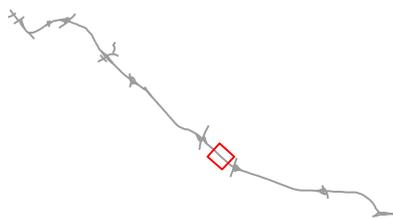


# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations

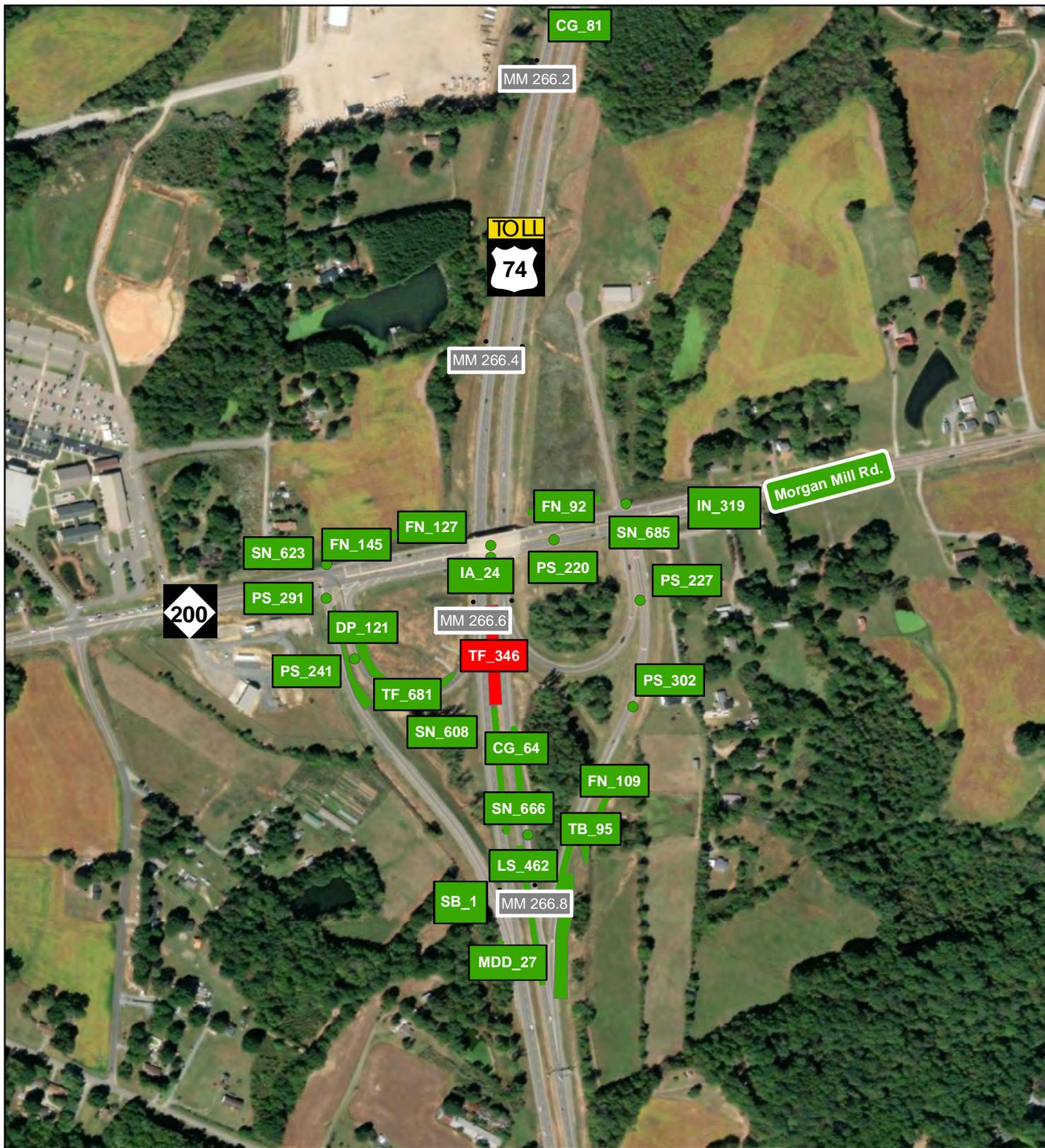


## Legend

- Failing Asset
- Passing Asset

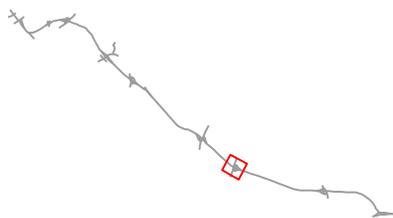


# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations

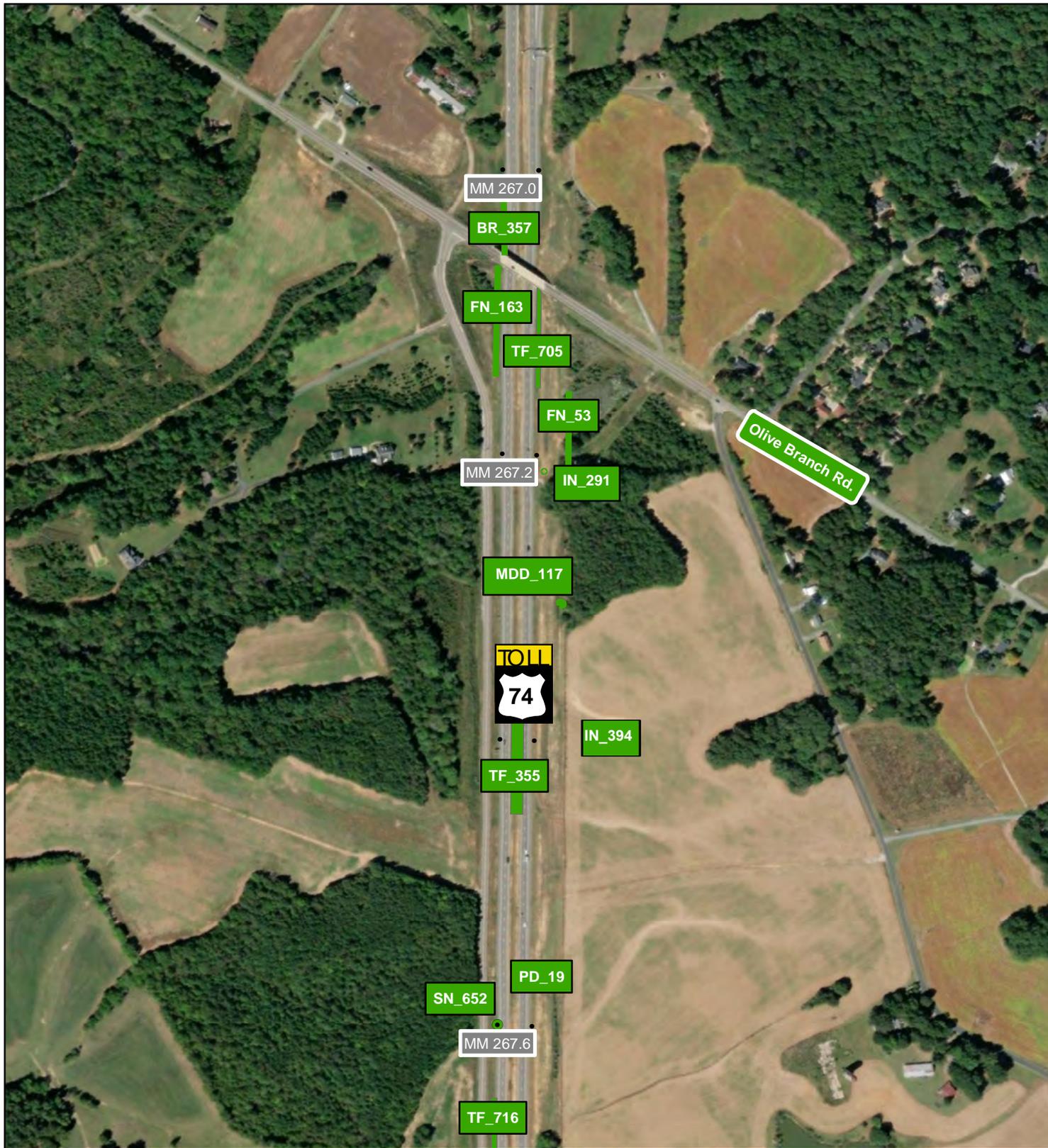


## Legend

- Failing Asset
- Passing Asset

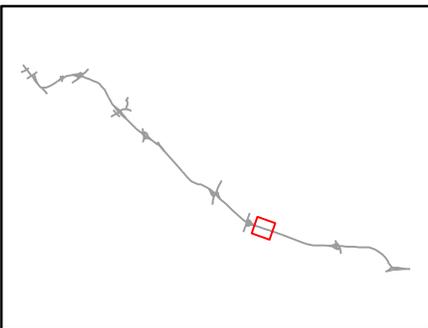


# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations



## Legend

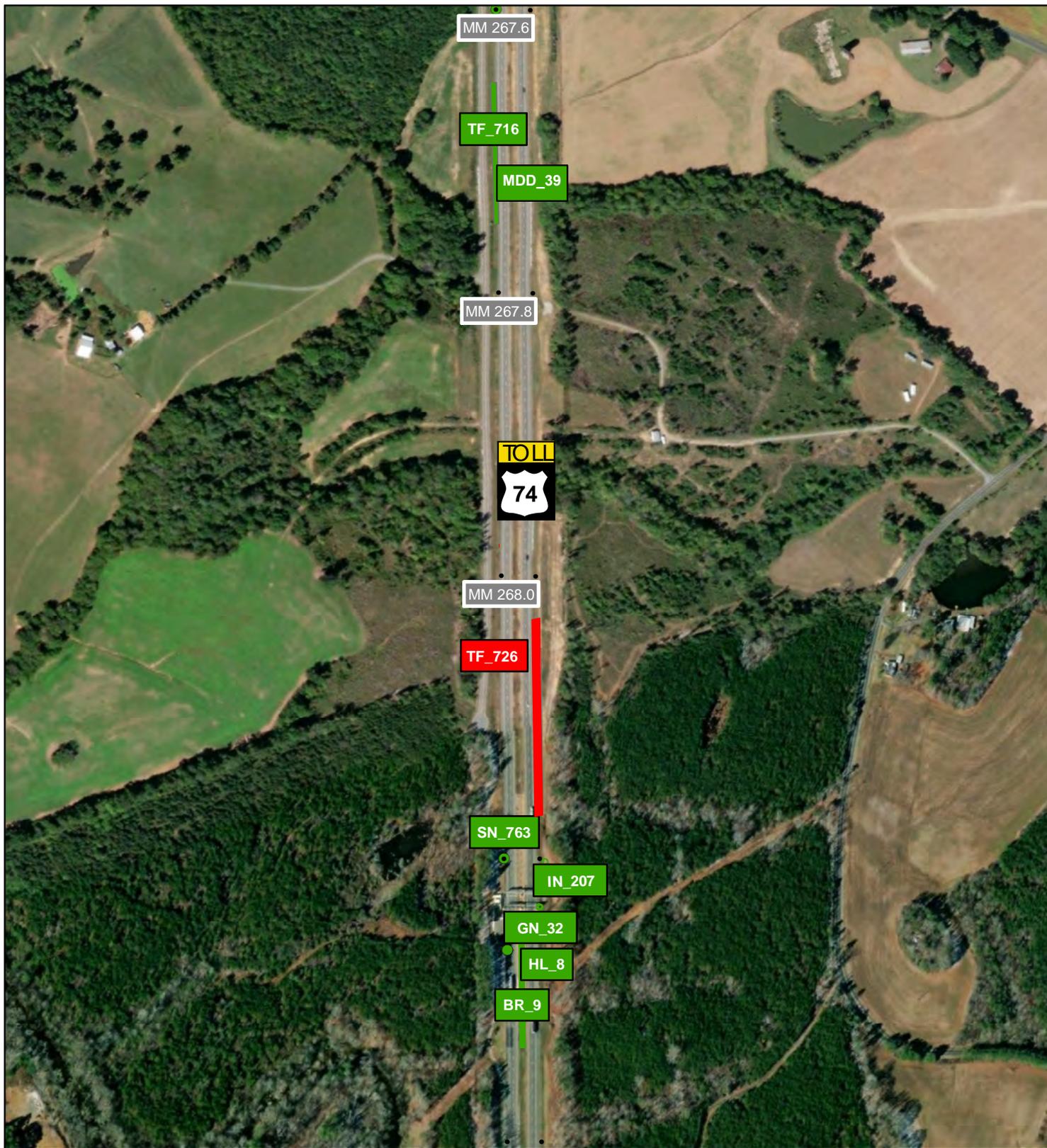
- Failing Asset
- Passing Asset



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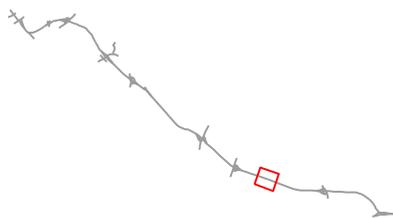
B18

# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations

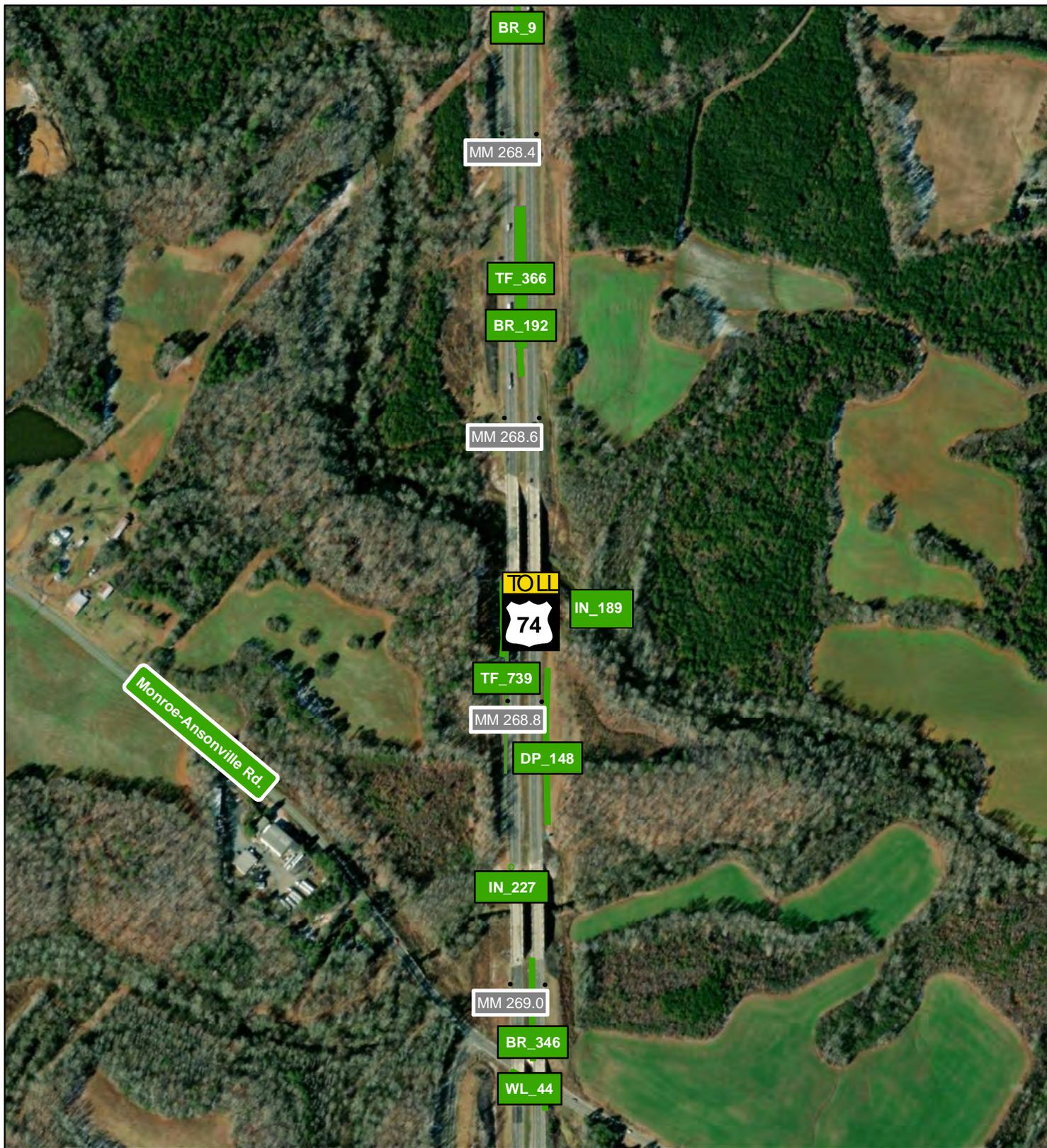


## Legend

-  Failing Asset
-  Passing Asset

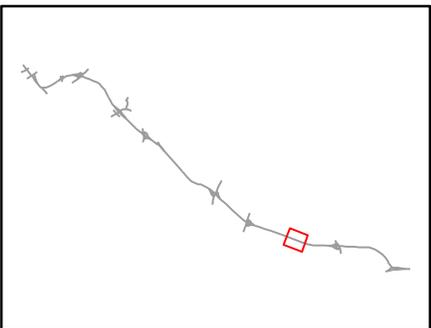


# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations



## Legend

- Failing Asset
- Passing Asset





NORTH CAROLINA  
**Turnpike Authority**

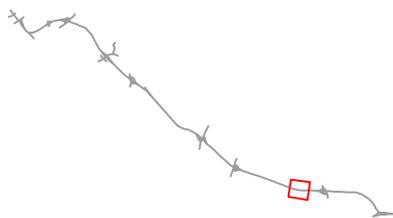
B20

# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations

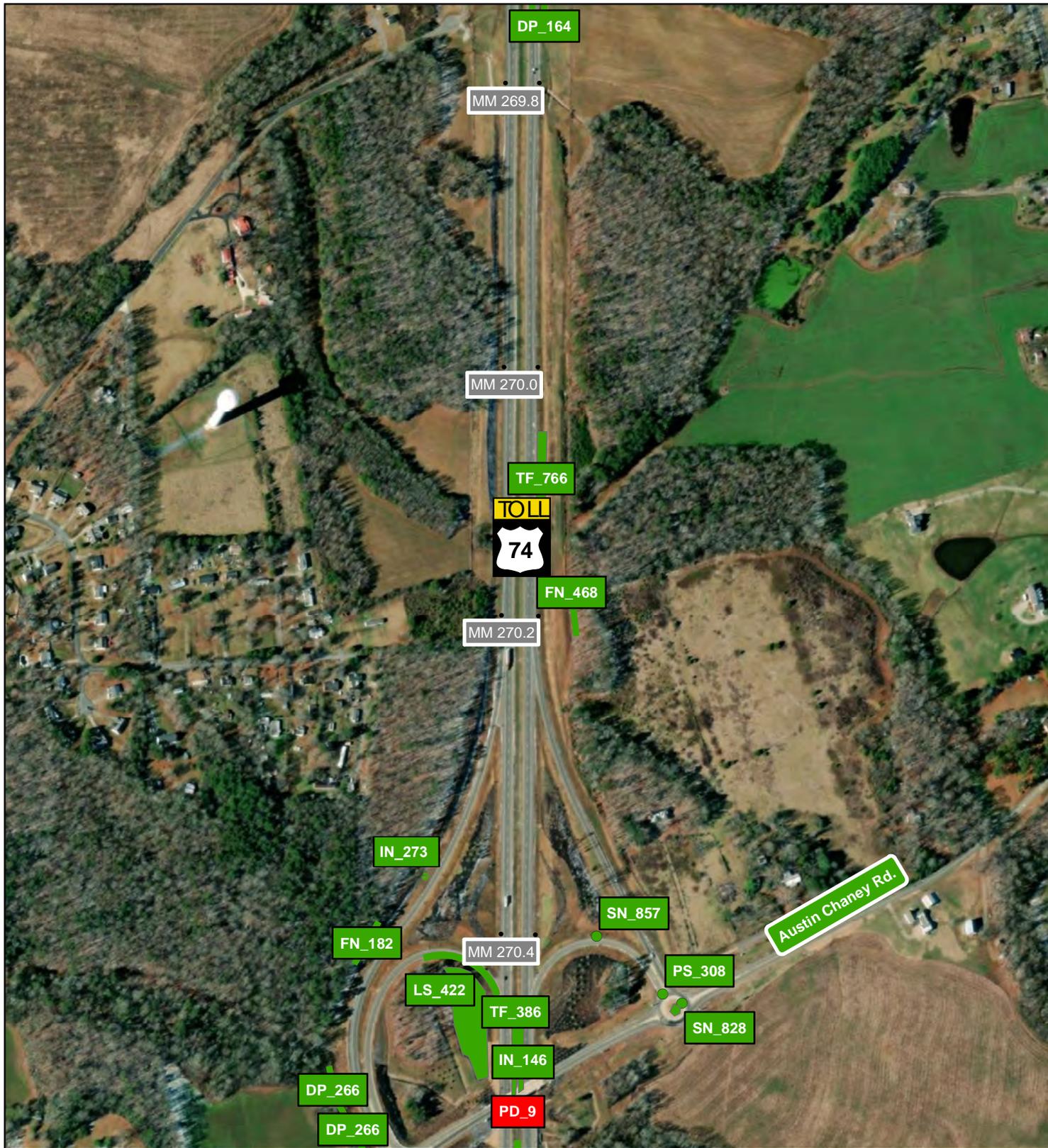


## Legend

- Failing Asset
- Passing Asset

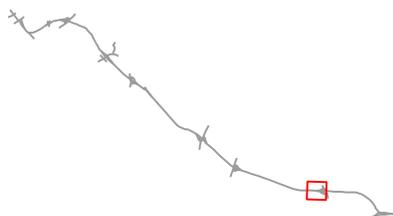


# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations



## Legend

- Failing Asset
- Passing Asset



# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations



## Legend

- Failing Asset
- Passing Asset



# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations



## Legend

-  Failing Asset
-  Passing Asset



# Appendix B: Monroe Expressway MRP Q1 2023 Assessment Locations



## Legend

- Failing Asset
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