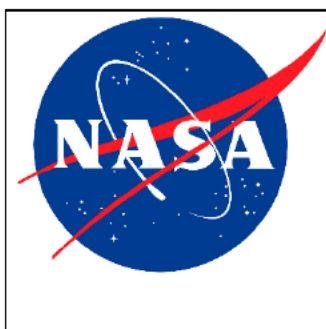

SUMMARY REPORT
FY23 TRAFFIC CONTROL DEVICES INSPECTION REPORT
DRD 3.2.13.5-2



Submitted on December 28, 2023



Prepared for:
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
KENNEDY SPACE CENTER, FLORIDA

Prepared By:
amentum >
BOSS

TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE NUMBER
A	Introduction	3
B	Executive Summary	3
C	Inspection of Traffic Control Signage 1) Work Performed – Traffic Control Signage Inspection 2) Inspection Findings – Traffic Control Signage 3) Corrective Actions - Traffic Control Signage	5
D	Inspection of Traffic Signals 1) General Maintenance Information 2) Equipment Information 3) Work In Progress	7
E	Inspection of Pavement Markings and Turf Shoulder Drop-Offs and Build-Ups 1) Work Performed – Inspection of Pavement Markings and Turf Shoulder Drop-Offs and Build-Ups 2) Inspection Findings – Pavement Markings & Turf Shoulder Drop-Offs and Build-Ups 3) Corrective Actions – Pavement Markings & Turf Shoulder Drop-Offs and Build-Ups	8
F	Inspection of Helipads 1) Work Performed – Inspection of Helipads 2) Inspection Findings - Helipads 3) Corrective Actions - Helipads	10

Attachments:

- 1) Attachment 1 - FY23 Traffic Control Sign Inventory with Recorded Attributes
- 2) Attachment 2 - FY23 Traffic Signal PM & Repairs WONS
- 3) Attachment 3 – FY23 Job Plan PSTC21A_Traffic Signal Annual
- 4) Attachment 4 - FY23 Pavement Markings and Turf Shoulder Inspection Results
- 5) Attachment 5 - FY23 Helipad PM & Repair WONS
- 6) Attachment 6 – FY23 Job Plan BSM002A Annual Helipad Inspection

FY23 Traffic Control Devices Inspection Report - DRD 3.2.13.5-2**A. INTRODUCTION**

- 1) In accordance with Data Requirements Description (DRD) 3.2.13.5-2 of the Base Operations and Spaceport Services Contract (BOSS) 80KSC018C0017 and Sections 3.2.13.2-5 and 3.2.13.2-6 of the Performance Work Statement (PWS) of the Contract, this FY23 annual *“Traffic Control Devices Inspection Report”* has been developed. The following tasks have been completed:
 - a) Traffic control signage Manual of Uniform Traffic Control Devices (MUTCD) retroreflectivity standards visual inspection, pavement marking and turf shoulder drop-offs and build-ups assessment, sign inventory with sign attributes, helipad markings/windsock/lighting assessment, and applicable notes in accordance with PWS Section 3.2.13.2-5.
 - b) For traffic control signs, **Attachment 1** is a list of FY23 inspection results. For roadway pavement markings and turf shoulder drop-offs and build-ups, **Attachment 4** contains the results of the required FY23 inspections.
 - c) Traffic signal assessment with applicable notes in accordance with PWS Section 3.2.13.2- 6.
 - d) **Attachment 3** and **Attachment 6** are the Job Plans utilized for the performance of traffic signal and helipad Preventive Maintenance Inspections.
- 2) Details of the Work Performed, Inspection Findings and Corrective Actions are included in this report and **Attachments 1 through 6** that are listed in the table of contents and referenced throughout this report.

B. EXECUTIVE SUMMARY

- 1) The traffic control devices at the Kennedy Space Center are generally considered to be in fair to good condition.
- 2) Throughout the report, Traffic Control Signage are rated based on a condition code system. The condition code is a rating from 1 to 5 assigned to each asset and based upon engineering judgement: a rating of 5 being the best with no further repairs/replacements required for approximately 3-4 years and 1 being the worst with repairs/replacement required within 6-12 months.

FY23 Traffic Control Devices Inspection Report - DRD 3.2.13.5-2

- 3) The following is a brief summary of the observations made during the inspection of each of the traffic control devices listed in Section A and described in more detail in Sections C through F of this report:

- a) *Traffic Control Signage*: BOSS surveyed a total of 1,749 traffic control signs with a complete inventory compiled by an inspection performed. After this year's FY23 inspection, it was found that, based on reflectivity observations, 76.0% of the signs were "ACCEPTABLE", 19.1% of the signs were "UNACCEPTABLE", and 4.9% were not applicable to a reflectivity code during inspection. The Civil SHARP Team will review the inspection results and prioritize the ranking of sign replacements and/or repairs.
- b) *Inspection of Traffic Signals*: There are 22 signalized traffic intersections at Kennedy Space Center that are included in the BOSS contract for operations and maintenance. The traffic control equipment at these intersections is thoroughly inspected for any deficiencies on an annual basis under variations of master generic job plan PSTC21A. The inspection includes the verification of control system functionality, the condition of structural components, and the removal of dust, debris, and insects if they are present within the traffic cabinet. Wiring and cabling are inspected for condition and connection. The cabinet fan and thermostat are tested, and the cabinet air filter is replaced as these steps are critical to keep cabinet temperatures within the operational range of the traffic control electronics. Intersections equipped with camera systems, and/or UPS systems, have additional maintenance plans for those additional components. See the included traffic maintenance spreadsheet for recent preventative maintenance performed and next maintenance due dates.
- c) *Inspection of Pavement Markings and Turf Shoulder Drop-Offs and Build-Ups*: The pavement markings at KSC paved roadways in the main areas are generally in good to great condition. The pavement markings in outlying areas are generally in poor to fair condition. Approximately 150 miles of pavement markings on paved roadways were inspected in FY23 by BOSS. A condition code rating was assigned to each defined segment of roadway. The breakdown of the percentages of each condition code with respect to the total mileage of inspected roadway pavement markings is presented in Table 4 in Section E of this report.

Relatively few locations of significant turf shoulder drop-offs were observed, however build-up of sediment and vegetation was observed frequently at KSC. The build-up of vegetation appears to be more of a prevalent condition than turf shoulder drop-offs in the more densely populated areas. EWRs will be submitted to repair the identified areas.

FY23 Traffic Control Devices Inspection Report - DRD 3.2.13.5-2

- d) *Inspection of Helipads*: The 10 helipads being maintained at KSC are in fair to good condition. BOSS Shops performed the FY23 Preventive Maintenance Inspection of these helipads and observed the common deficiencies of fading pavement markings, minor cracks and spalls in the pavement, deteriorated or missing windsocks and overgrowth of vegetation along the perimeter of the helipad. Baseline WONs were created to address the deficiencies.

C. INSPECTION OF TRAFFIC CONTROL SIGNAGE

1) Work Performed – Traffic Control Signage

- a) In accordance with PWS Section 3.2.13.2-5, BOSS has performed traffic control signage inspections during the last quarter of Calendar Year 2023. All traffic control signs that are included in the current issue of the Manual of Uniform Traffic Control Devices (MUTCD) have been checked visually for general compliance with MUTCD retro reflectivity standards. An inventory of 1,749 traffic control signs were assessed indicating all sign attributes including the following:
- An assigned asset number
 - Date of the current inspection
 - Global Positioning System (GPS) location coordinates
 - Wording or description of the image that is on the sign
 - MUTCD sign type designation
 - Sign panel dimensions
 - Sign orientation
 - Placement within the roadway cross section
 - Sign condition code
 - Acceptability of sign retro reflectivity based on a visual inspection only
 - Post condition (if evaluated to need maintenance).

All collected data has been stored as GIS geodatabase features, utilizing ArcGIS software that is compatible with the KSC/GIS system.

FY23 Traffic Control Devices Inspection Report - DRD 3.2.13.5-2

All collected sign inventory data and attributes have been imported into a Microsoft Excel spreadsheet - see **Attachment 1** of this report, "FY23 Traffic Control Sign Inventory with Recorded Attributes".

- b) There are photographs of each sign. The photos are imbedded in the ArcGIS geodatabase.

2) Inspection Findings – Traffic Control Signage

- a) Referring to **Attachment 1** of this report, of the 1,749 signs that were inspected, 76.0 percent were rated as having an "ACCEPTABLE" retro reflectivity rating, 19.1 percent were rated as "UNACCEPTABLE", and 4.9 percent were rated as N/A due to the sign being missing/excessed or inaccessible.
- b) Condition Codes were recorded primarily to represent the physical condition of the sign. The following is the percentage distribution of the Condition Code values with respect to the total number of signs in Table 1 below:

Table 1: Percentage of Reflectivity

Reflectivity	Acceptable	Unacceptable	N/A
Total Amount of Signs (of 1,749 total signs)	1330	334	85
Percentage (%) of all signs	76.0%	19.1%	4.9%

Table 2: Percentage of Condition Code

Condition Code	1	2	3	4	5	N/A
Total Amount of Signs (of 1,749 total signs)	446	112	254	530	392	15
Percentage (%) of All Signs	25.5%	6.4%	14.5%	30.3%	22.4%	0.9%

*N/A refers to signs that are missing or if no condition assessment could be determined.

3) Corrective Actions – Traffic Control Signage

- a) During the first quarter in Calendar Year 2024, the Civil SHARP Team will review and discuss the collected inspection data that is included in **Attachment 1** of this report. The SHARP Team will prioritize the replacement of traffic control signs (and posts if needed) based on the damage assessment performed during this year's inspection and will submit EWRs for replacement and repairs determined to be required.

FY23 Traffic Control Devices Inspection Report - DRD 3.2.13.5-2

- b) As a general note, the signs that are determined to require replacement that do not have a standard cylindrical post per FDOT 700-010 will need a post replacement regardless of post condition. This will bring the sign to current state standards.

D. INSPECTION OF TRAFFIC SIGNALS**1) General Maintenance Information**

- a) There are 22 signalized traffic intersections at Kennedy Space Center that are included in the BOSS contract for operations and maintenance. The traffic control equipment at these intersections is thoroughly inspected for any deficiencies on an annual basis under variations of master generic job plan PSTC21A.
- b) The inspection includes the verification of control system functionality, the condition of structural components, and the removal of dust, debris, and insects if they are present within the traffic cabinet. Wiring and cabling are inspected for condition and connection. The cabinet fan and thermostat are tested, and the cabinet air filter is replaced as these steps are critical to keep cabinet temperatures within the operational range of the traffic control electronics. Intersections equipped with camera systems, and/or UPS systems, have additional maintenance plans for those additional components. See the included traffic maintenance spreadsheet for recent preventative maintenance performed and next maintenance due dates.

2) Equipment Information

All traffic cabinets are equipped with PEEK ATC-1000 Advanced Traffic Controllers, and Eberle MMU2-16LE Malfunction Management Units. 5 of our 22 intersections employ camera-based vehicle detection systems using PEEK Video Trak-I.Q. camera systems. 17 of our 22 intersections detect vehicle presence with standard inductive loops. 5 of our signalized intersections are supported with a traffic UPS system capable of continuing normal traffic control operation for 6-8 hours if power to the control cabinet is interrupted. Those cabinets are monitored for power loss and low battery conditions via a radio connected to our CRMS mesh radio network.

3) Work In Progress

A new traffic cabinet has been installed at the pedestrian crossing between the VAB and OSB II on Saturn Causeway. The pedestrian crossing and the nearby intersection of Saturn Cswy and Utility Rd are now equipped with ADA pedestrian buttons and audible signaling for the vision impaired.

Twelve of the oldest traffic cabinets at KSC are performing well but are beyond the end of their service life (estimated to be 25 years in the state of Florida). These 12 cabinets are

FY23 Traffic Control Devices Inspection Report - DRD 3.2.13.5-2

being replaced this year under WON 10175164. In addition to the cabinets, supporting infrastructure such as transformers, disconnects, and related electrical conduits are also being refreshed. All the new traffic cabinets will be equipped with battery backup systems for increased safety in the event of power outages.

Space Commerce Way is being widened to 4 lanes under a NASA project in cooperation with the Florida D.O.T. This road leads to the new entrance of the K.S.C. Visitors Center and connects state roads SR-3 (Merritt Island) and SR-405 (Titusville). The three traffic cabinets on this roadway are being replaced under that effort. When the projects to replace the 12 oldest cabinets and to widen Space Commerce Way are completed in 2024, all 22 traffic cabinets at KSC will have been replaced within the past 5 years and upgraded to current standards and technologies.

E. INSPECTION OF PAVEMENT MARKINGS AND TURF SHOULDER DROP-OFFS AND BUILD-UPS**1) Work Performed – Inspection of Pavement Markings and Turf Shoulder Drop-Offs and Build-Ups**

- a) In accordance with the requirements of PWS 3.2.13.2-5, pavement markings and turf shoulder drop-offs and build-ups on all accessible KSC paved roads were visually inspected and a qualitative assessment was made. The inspections were performed during the last quarter of Calendar Year 2023. **Attachment 4** documents the engineer assessment with regards to condition and other attributes associated with several segments of each roadway at Kennedy Space Center. The inspections, and data collection and reporting, were divided into the following seven (7) areas:
 - 1) NASA Causeway.
 - 2) Kennedy Parkway.
 - 3) Industrial Area.
 - 4) Launch Complex 39 Area.
 - 5) Miscellaneous Roads South of the Industrial Area.
 - 6) Miscellaneous Roads North of the Industrial Area.
 - 7) Pads and Beaches.
- b) **Attachment 4**, “FY23 Pavement Markings and Turf Shoulder Inspection Results”, is a spreadsheet that includes the aforementioned seven areas. The assigned condition code and any pertinent comments for the pavement markings for each road segment has been recorded. In addition, the following information was pre-loaded into the spreadsheet for each roadway segment: Roadway Segment Number, Roadway Name, Roadway Segment Limits, Estimated Length of Roadway (miles),

FY23 Traffic Control Devices Inspection Report - DRD 3.2.13.5-2

Number of Travel Lanes, Estimated Roadway Width, and Significant Turf Shoulder Drop-off or Build-Up Observed.

- c) The condition of pavement markings was determined utilizing a condition code rating system with assigned condition codes per the definitions detailed in the footnotes of **Attachment 4**.
- d) Per PWS 3.2.13.2-5, turf shoulder drop-offs and sediment or vegetation build-up on all accessible KSC paved roads were visually inspected and a qualitative assessment, by roadway name, was made. If drop-offs were observed that were approximately 3 inches or greater in depth or appeared to be a safety concern and if significant sediment or vegetation buildup was observed – then these conditions were noted in **Attachment 4** of this report. Additional comments were included when deemed necessary.

2) Inspection Findings – Pavement Markings and Turf Shoulder Drop-Offs and Build-Ups

- a) The following Table 4 summarizes the condition of the pavement markings in each of the seven (7) areas of inspection that indicated in Attachment 4 of this report:

Table 3 Summary of Road Conditions and Lengths

Inspection Area	Miles of Condition Code 1	Miles of Condition Code 2	Miles of Condition Code 3	Miles of Condition Code 4	Miles of Condition Code 5	Total Miles per Area
NASA Causeway/Nasa Parkway	0.00	11.40	14.60	0.00	0.00	26.00
Kennedy Parkway	0.00	0.00	22.99	17.99	0.00	40.98
Industrial Area	5.07	2.48	4.84	2.61	0.00	15.00
Launch Complex 39 Area	0.46	1.33	4.10	4.62	0.00	10.51
Miscellaneous - South of Industrial Area	5.72	0.00	0.16	2.88	0.96	9.72
Miscellaneous - North of Industrial Area	14.69	7.37	5.75	4.31	0.17	32.29
Pads and Beaches	5.20	2.19	0.74	7.16	0.00	15.29
Total Miles Per Code	31.14	24.77	53.18	39.57	1.13	149.79
Percentage (%) of Each Code	20.8	16.5	35.5	26.4	0.8	

FY23 Traffic Control Devices Inspection Report - DRD 3.2.13.5-2

- b) Referring to Table 4 above, the following is the breakdown of the approximate percentage of the total inspected pavement marking mileage that has been rated as Condition Codes 1 through 5:

Condition Code 1: 20.8%

Condition Code 2: 16.5%

Condition Code 3: 35.5%

Condition Code 4: 26.4%

Condition Code 5: 0.8%

- c) Relatively few locations of significant turf shoulder drop-offs or build-up of sediment or vegetation were observed at KSC – with most of the observed conditions being in outlying areas away from the more heavily traveled roadways. The build-up of vegetation appears to be more of a prevalent condition than turf shoulder drop-offs. Refer to all tabs of the spreadsheet of **Attachment 4** for the road segment locations of these findings.

3) Corrective Actions – Pavement Markings and Turf Shoulder Drop-Offs and Build-Ups

- a) During the period of the first quarter of Calendar Year 2024, the Civil SHARP Team will review and discuss the collected inspection data that is included in **Attachment 4** of this report. The SHARP Team will prioritize the repairs for all pavement markings and turf shoulder drop-offs and build-ups and will submit EWRs for repair implementation.

F. INSPECTION OF HELIPADS

1) Work Performed – Inspection of Helipads

- a) The helipads at KSC are for emergency and security operations. In accordance with the requirements of PWS 3.2.13.2-5, annual Preventive Maintenance (PM) Inspections are performed by BOSS Shops on 10 helipads at the Kennedy Space Center, three of which have lights. The PM inspections for FY23 have been completed and were performed in accordance with the instructions contained in Job Plan BSM002A, “Inspection, Helipads - Annual” – see **Attachment 6**. Inspection of the lighting at 3 helipads was performed by BOSS Electrical System Engineering.
- b) The PM inspection of helipads includes a qualitative assessment of the pad surface, markings, windsocks, overgrowth of vegetation, mold or soil coverage, anything that

FY23 Traffic Control Devices Inspection Report - DRD 3.2.13.5-2

would inhibit the pilot's ability to see the helipad clearly and other tasks defined in Job Plan BSM002A.

- c) See **Attachment 5**, "FY23 Helipad PM & Repair WONS", for a comprehensive list of helipad PM and repair work orders and associated data. Inspection notes are included in the "LOG" tab of the Maximo work orders.
- d) The 10 helipads that receive annual PM inspections by BOSS include the following:
 - 1) Helipad 1 – located on the Towway near the south end of the SLF.
 - 2) Helipad 2 – located between Crawlerway tracks near the Mobile Service Structure Bypass Road.
 - 3) Helipad 4 – located just south of the Pad 39B gate.
 - 4) Helipad 5 – located adjacent to North Beach Road near Playalinda Road.
 - 5) Helipad 6 – located on South Beach Road – a little less than a mile south of the intersection of the Pad A Bypass Road and South Beach Road.
 - 6) Helipad 7 – located near M6-0495A, Dispensary – on the east side of C Avenue SE. There are lights at this helipad.
 - 7) Helipad 8 – located at the Crawlerway - west of J7-1388 (Industrial Water Pumping Station)
 - 8) Helipad 9 – located northwest of Pad B on Titusville Beach Road.
 - 9) Helipad 11 – located adjacent to the NASA Causeway East (north side of road), approximately one mile southeast of the Banana River Bridge. There are lights at this helipad.
 - 10) Helipad P – located at the Press Site off Saturn Causeway, there are lights at this helipad.

NOTES:

- 1) Helipad 3, previously located near the Pad A gate, has been removed as part of the SpaceX site modifications.
- 2) Helipad 10 has been discontinued.

2) Inspection Findings - Helipads

- a) Most of the discrepancies noted included the following:

FY23 Traffic Control Devices Inspection Report - DRD 3.2.13.5-2

- 1) Torn, damaged or missing windsocks
 - 2) Fading or failed pavement markings
 - 3) Cracked or spalled concrete
 - 4) Mold or soil build-up on the helipad and vegetation overgrowth along the perimeter of the helipad or growing through pavement cracks.
- b) The following is a summary of the evaluation findings and repairs performed helipads:
- 1) Helipad 1 – Helipad was pressure washed and painted with black traffic paint. White pavement markings were added. Waiting on new windsock to be procured and installed.
 - 2) Helipad 2 – Vegetation overgrowth and concrete is cracking at the corners. Pavement markings are beginning to fade but in acceptable condition. Will need to reevaluate at 2024 PM if new pavement markings are needed.
 - 3) Helipad 4 – Paint faded and flaking. Will need to be repainted soon. Mild corrosion on windsock frame.
 - 4) Helipad 5 – Windsock pole needs corrosion control and painted. Pavement markings beginning to fade. WON10141773 open to repair the helipad including patching cracked or spalling concrete, repaint pavement markings, corrosion control the windsock pole, and add new rope.
 - 5) Helipad 6 – Windsock frame is rusted significantly and bearings in poor condition. New windsock was procured under WON10185001 and awaiting install.
 - 6) Helipad 7 – Annual PM effort was completed. No notable concerns were flagged by BOSS shops.
 - 7) Helipad 8 – Corner edge of helipad has a broken section of concrete. Windsock is torn and needs replaced. WON10141775 currently open to repair the helipad and windsock pole as well as landscape the overgrown vegetation.
 - 8) Helipad 9 – WON10141780 currently open to replace the rope and patch concrete pad as needed. Windsock was replaced and rope installed. Waiting on pavement markings to be repainted.
 - 9) Helipad 11 – Windsock was off frame during inspection. A PM discrepancy work order will need to be issued to procure and replace the windsock.
 - 10) Helipad P – Annual PM effort was completed. No notable concerns were flagged by BOSS shops.

3) Corrective Actions - Helipads

There are six (6) open work orders that are currently open to repair any noted damage based on the annual PM inspection.