

Florida Department of Environmental Protection

2021 Annual Air Monitoring Network Plan Addendum

**Division of Air Resource Management
Office of Air Monitoring
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AQS Site # 12-095-0011

Florida Department of Environmental Protection
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1.0 Introduction

This network plan addendum provides information to the United States Environmental Protection Agency (USEPA) Region 4 Air and Radiation Division to approve the site start-up of the second near-road nitrogen dioxide (NO₂) monitoring site in Orange County. In support of the 2010 NO₂ National Ambient Air Quality Standard (NAAQS), the USEPA revised the requirements for minimum numbers of ambient NO₂ monitors. This action included requirements:

- for new monitoring near major roads in larger urban areas,
- to characterize NO₂ concentrations representative of wider spatial scales in larger urban areas (area-wide monitors), and
- for monitors intended to characterize NO₂ exposures of susceptible and vulnerable populations.

Originally, the near-road component of the ambient NO₂ monitoring network was required to be completely operational by January 1, 2013. However, in 2012, through a public notice and comment rulemaking, the USEPA established three phases for the installation of near-road NO₂ monitoring stations. The revised installation schedule allowed more time for states to establish the near-road NO₂ monitoring network on a schedule consistent with available resources.

- Phase 1: In Core Based Statistical Areas (CBSAs) with a population of 1,000,000 or more persons, one near-road NO₂ monitor shall be reflected in the state Annual Monitoring Network Plan submitted July 1, 2013, and that monitor shall be operational by January 1, 2014.
- Phase 2: In CBSAs where two near-road NO₂ monitors are required (either because the CBSA has a population of 2,500,000 or more persons, or has a population of 500,000 or more persons plus one or more roadway segments having annual average daily traffic (AADT) counts of 250,000 or more), the second near-road NO₂ monitor shall be reflected in the state Annual Monitoring Network Plan submitted July 1, 2014, and that monitor shall be operational by January 1, 2015.
- Phase 3: In CBSAs with a population of at least 500,000 persons, but less than 1,000,000 persons, one near-road NO₂ monitor shall be reflected in the state Annual Monitoring Network Plan submitted July 1, 2016, and the monitor shall be operational by January 1, 2017.

On December 22, 2016, the USEPA revised the minimum monitoring requirements for near-road NO₂ monitoring. Specifically, the EPA removed the requirement to install and operate monitors for Phase 3 of the near-road monitoring network.

The 2018 census estimates indicated that the population for the Orlando-Kissimmee Core-Based Statistical Area (CBSA) is now above 2.5 million and as a result will require a second NO₂ near-road site. Florida Department of Environmental Protection (FDEP), Orange County and the USEPA Region 4 worked collaboratively on identifying a suitable site and continues to work in partnership for complete implementation of this site.

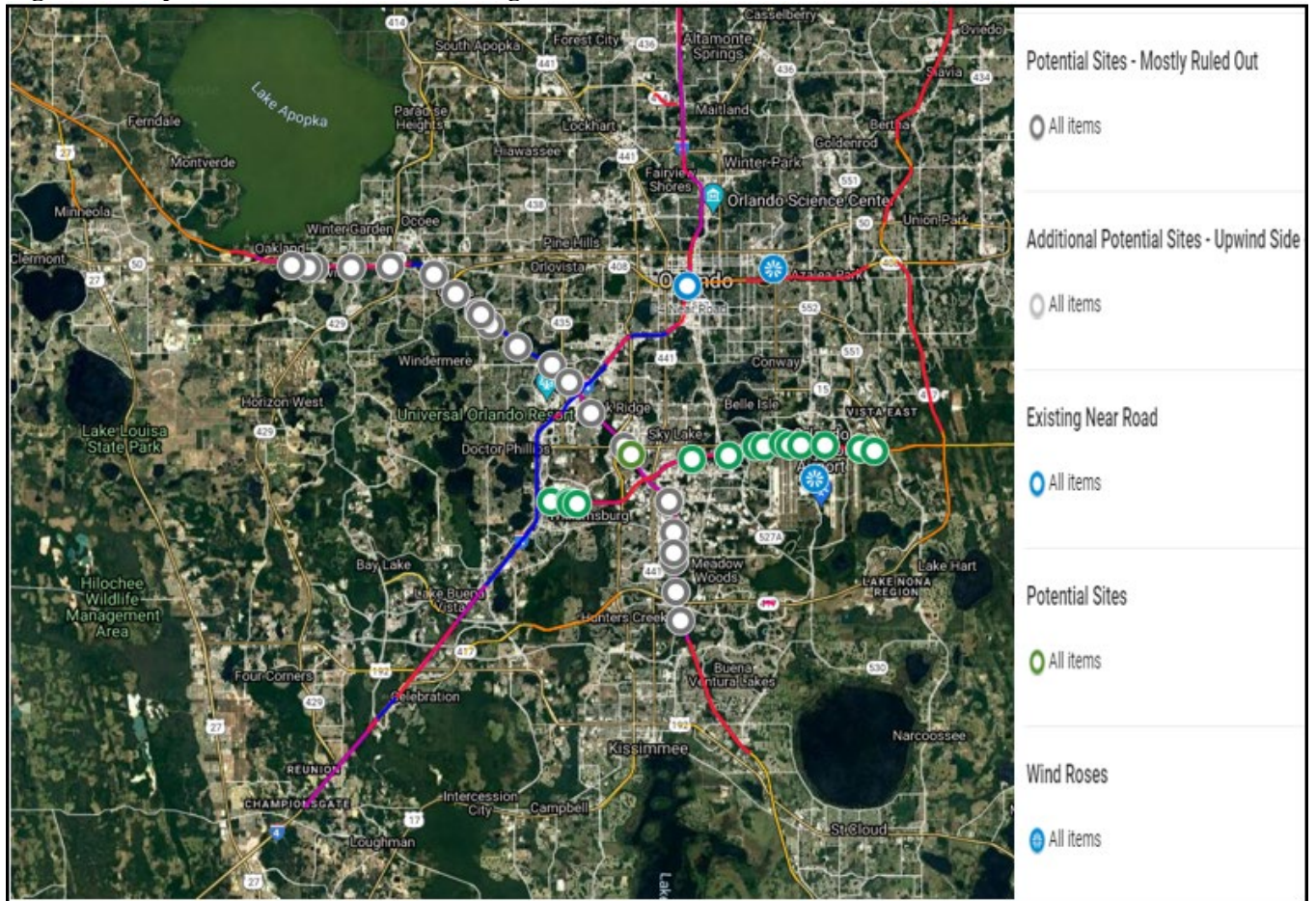
2.0 Other Sites Investigated/Considered

For a CBSA with a population over 2.5 million, the USEPA prescribes in the Near-road NO₂ Monitoring Technical Assistance Document (TAD), that a second near-road NO₂ monitoring site should differ from the initial near-road NO₂ monitoring site by one or more factors affecting traffic emissions and/or pollutant transport. These include fleet mix, congestion patterns, terrain, geographic area within the CBSA and route designation (Watkins & Baldauf, 2012). The USEPA also recommends that the second site represent as many different characteristics without sacrificing the objective of measuring relative peak NO₂ concentrations in the near-road environment. The data gathered to select the initial near-road NO₂ monitoring site is useful for determining placement of the secondary site.

There were several sites investigated/considered for the second near road site in Orange County. A map of each site location is shown below in Figure 1. Table 1 provides a summary of the sites that were investigated/considered, with comments about the characteristics of each site. Road segments on I-4 were excluded from consideration because of the similarity to the first near-road site in the area, and due to ongoing construction on I-4. Other factors that affected the selection and implementation process of the near-road monitoring station, include satisfying siting criteria, favorable site logistics (e.g., gaining access to property and safety), and consideration of population exposure. The USEPA, FDEP and Orange County worked through the TAD to determine the appropriate location of the second near-road NO₂ monitoring site, with consideration given to traffic volumes, fleet mix, roadway design, traffic congestion patterns, local terrain or topography, and meteorology. The President's Drive site was ultimately selected after careful consideration of these factors, and due to its accessibility, population exposure and the ability to ultimately satisfy strict siting criteria requirements.

Table 2 shows the counts and rankings for the 2018 Annual Average Daily Traffic (AADT), Heavy Truck Vehicle AADT, and Fleet Equivalent (FE) AADT. Due to the COVID-19 pandemic's disruption of transportation and travel behavior, the 2018 data was compared to both the 2019 and 2020 data. The 2018 data was determined to be a better representation of the highest traffic counts in the area. The Presidents Drive site is ranked number 3 in the heavy truck vehicle AADT that puts it at number 8 in the FE AADT.

Figure 1. Map of Sites Considered/Investigated



NOTE: Road segments on I-4 were excluded from consideration because of similarity to the first near-road site in the area, and due to ongoing construction on I-4.

Table 1. Sites Investigated/Considered

Site Name/Address	Comments
Orange County Utilities Center 8100 Presidents Drive	Siting criteria in 40 CFR Part 58 Appendix E will be met after the trees and vegetation is removed or trimmed. Most suitable site.
Orange County Fire Station #33 1700 S Apopka Vineland Rd.	Concerns with the site include clearing of the tree line, flooding, and running power to the site. The parcel shares a boundary with FDOT access to trees for trimming potentially an issue.
Turnpike and Hiawasse	Tree clearing needed to meet siting requirements, potential obstructions on site.
6540 Conroy Rd.	Concerns with the site include clearing a heavily wooded area, ground stability, potential site obstructions, accessibility, and flooding.
Mardell Ct. Retention Pond	Fully obstructed by wall structure.
Space Blvd.	Concerns with the site include ongoing construction on adjacent property, property split between a drainage ditch and assorted businesses.
4766 Southridge Ave.	Fully obstructed by wall structure.
7281 Branchtree Dr.	Fully obstructed by wall structure.
3814 Winderlakes Dr.	Fully obstructed by wall structure
Furlong Way	Fully obstructed by wall structure. Highest ranked FE AADT along the turnpike fully obstructed by wall structure not meeting siting requirements.
17914 State Rd. 438	Does not meet siting requirements; distance from the road is over 600 meters away from the Turnpike.

Table 2. Ranking of Road Segments based on FE AADT

ROADWAY	FROM	TO	AADT	AADT RANK	Heavy Duty Vehicle AADT	Heavy Duty Vehicle AADT RANK	FE AADT	FE AADT Rank
I4	Bridge No-750367	75280020 WB ON	235000	1	15275	13	372475	1
TURNPIKE	SR 408 / EW EXPWY	75470161 SB ON	144800	19	25050	2	370250	2
I4	N/A	N/A	120500	35	26872	1	362348	3
I4	Bridge No-750335	UNIVERSAL BLVD	196000	2	16072	10	340648	4
I4	75280020 WB ON	Bridge No-750335	193000	3	15826	11	335434	5
I4	Bridge No-750513	Bridge No-750158	183500	5	15047	14	318923	6
I4	SR-91	CONROY RD	178000	6	14596	15	309364	7
TURNPIKE	Bridge No-750610	SR 408 / EW EXPWY	118000	36	20414	3	301726	8
I4	N/A	SR-91	173000	8	14186	18	300674	9
I4	75280127 WB OFF	Bridge No-750367	177500	7	13490	23	298910	10
I4	Bridge No-750080	75280094 EB OFF	188000	4	10904	34	286136	11
I4	Bridge No-920094	N/A	128500	29	17219	5	283471	12
TURNPIKE	Bridge No-750626	Bridge No-750610	108300	37	18736	4	276924	13
I4	LAKE MARY BLVD	Bridge No-770008	151000	16	13892	19	276028	14
I4	Bridge No-750074	Bridge No-750080	173000	9	10034	40	263306	15
I4	Bridge No-750139	N/A	170500	10	9889	41	259501	16
I4	ORANGE CO LINE	SR 436	169500	11	9831	43	257979	17
I4	N/A	SEMINOLE CO LINE	169500	12	9831	44	257979	18
I4	N/A	75280127 WB OFF	143000	20	12155	27	252395	19
TURNPIKE	OSCEOLA COUNTY LINE	Bridge No-750626	98600	41	17058	6	252122	20
I4	75280094 EB OFF	Bridge No-750256	165500	13	9599	46	251891	21
TURNPIKE	Bridge No-750404	N/A	98400	43	17023	7	251607	22
C FL GRNWX TOLL PLZ	SR 417 SB	SR 417 SB	162000	14	9396	49	246564	23
BEACHLINE	Bridge No-750099	GORE WITH 75002000	106000	38	15582	12	246238	24
TURNPIKE	75470161 SB ON	N/A	94600	45	16366	8	241894	25

Note: The listed road segments from the Orange CBSA are ranked by FE AADT, which was calculated using 2018 traffic data available from Florida DOT.

3.0 Site Start-up

Orange County –Presidents Drive Near-road (12-095-0011)

The USEPA, FDEP and Orange County worked through the TAD to determine the appropriate monitoring site for the second near-road NO₂ monitoring site. Several potential sites were evaluated prior to selecting the Presidents Drive site. Section 2, Table 1 provides a discussion of each site that was evaluated. The President's Drive site was ultimately selected after balancing the over-arching objective of placing the monitor probes as near as practicable to a highly trafficked road where peak NO₂ concentrations are expected to occur, with the ability to safely access site and the ability to ultimately satisfy strict siting criteria requirements. Table 3 provides the site and monitor specific information for the Presidents Drive site, and Figures 2 – 7 provides site photographs, an aerial view and the wind rose for the site. Figures 8 and 9 provides a site survey and overview of existing trees and vegetation that will be removed/trimmed prior to site startup to ensure the requirements of 40 CFR Part 58 Appendices A, B, C, D and E (as required by 58.10 (a)(1)) are met.

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Table 3. Presidents Drive Near-road Site Review Information - AQS Site # 12-095-0011

	Presidents Drive Near-road Site
AQS Site #	12-095-0011
City (CBSA)	Orlando-Kissimmee-Sanford
Site Name	Presidents Drive Near-road
Statement of Purpose	Needed by Regulation
Site Review Date¹	12/1/2021
County	Orange
Location Latitude	28°44'62.6" N
Location Longitude	-81°41'74.4"W
Address	8100 Presidents Drive, Orlando, FL 32809
Target	Bridge No-750610
AADT²	118,000
Heavy Duty AADT²	20,414
FEAADT²	301,726
NO₂	Chemiluminescent TEI-42iQ
Objective	Mobile Source
Pollutants Monitored	Nitrogen Dioxide (NO ₂); Carbon Monoxide (CO); Particulate Matter (PM _{2.5}) (FEM)
Sampling and Analysis Method	Thermo 42iQ (NO ₂), Thermo 48iQ (CO), Thermo 5014i (PM _{2.5})
Spatial Scale	Micro
Operating Schedule	Continuous
Network Type	SLAMS
Distance from Inlet to nearest:	Tree Dripline = >10 meters Road = 45 meters Wall = N/A
Access	Limited; Badge entry only
Owner of Land	Orange County Board of County Commissioners
Other Monitored Parameters	CO, Continuous PM _{2.5} FEM Sharp5014i, Wind at 3 & 10 meters with vertical measurement
Inlet Height	Between 2-15 meters
Comments	Site construction expected completion July 2022 All Pine trees and crepe myrtles seen within 10 meters are being removed – no obstruction

¹The site review was performed by FDEP staff on 12/1/2021.

²Annual Average Daily Traffic (AADT) data was obtained from the Florida Department of Transportation (FDOT) website at <https://tdaappsprod.dot.state.fl.us/fto/>. Due to the COVID-19 pandemic's disruption of transportation and travel behavior, the 2018 data was analyzed against the 2019 and 2020 data, and the 2018 data was determined to be a better representation of the highest traffic counts in the area.

➤ *Photos and Aerial for the Orange County: Presidents Drive Near-road Site - AOS # 12-095-0011*

Figure 2. North from Presidents Drive Near-road Site



Figure 3. East from Presidents Drive Near-road Site



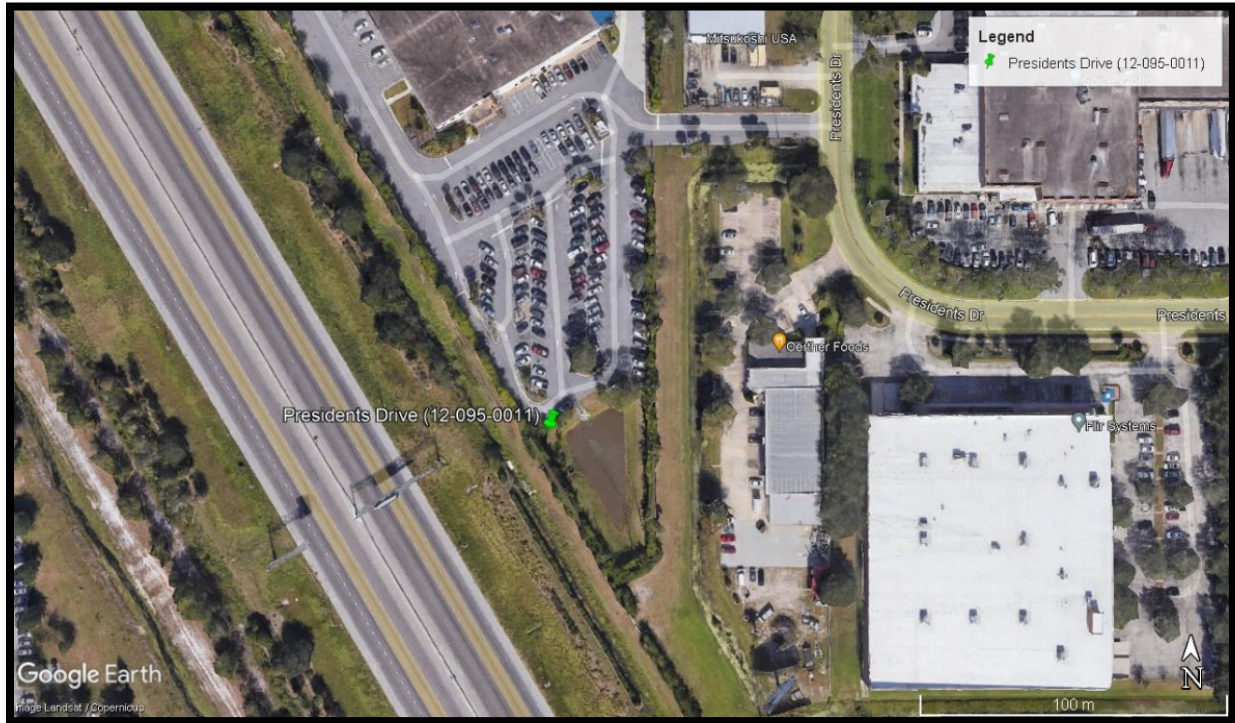
Figure 4. West from Presidents Drive Near-road Site



Figure 5. South from Presidents Drive Near-road Site



Figure 6. Aerial of Presidents Drive Near-road Site



NOTE: All Pine trees, Crepe Myrtles, and Oak trees within 10 meters of the shelter will be removed to achieve EPA siting criteria listed in 40 CFR Part 58 Appendices A, B, C, D, and E (as required by 58.10(a)(1)).

Figure 7. Wind Rose of Presidents Drive Near-road Site

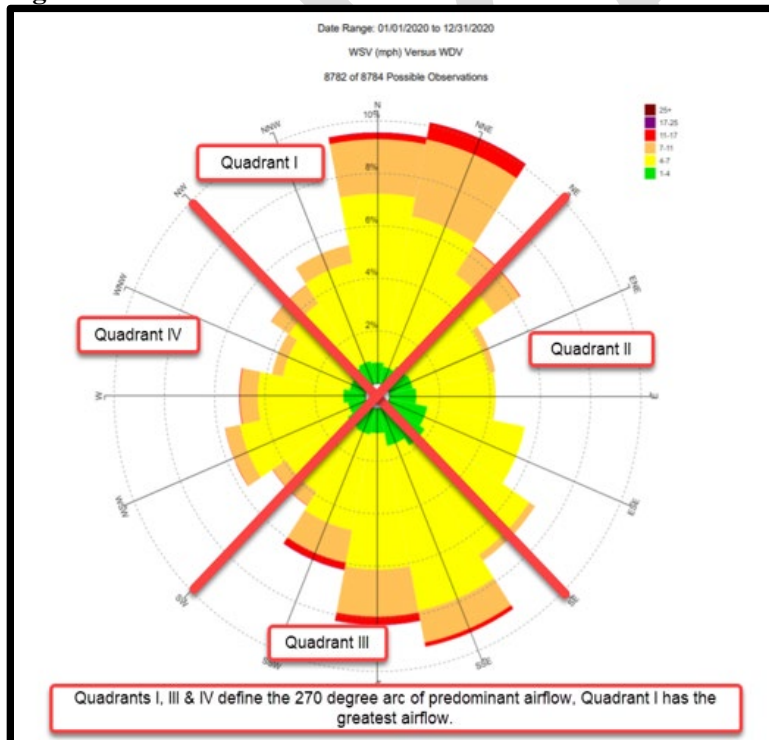
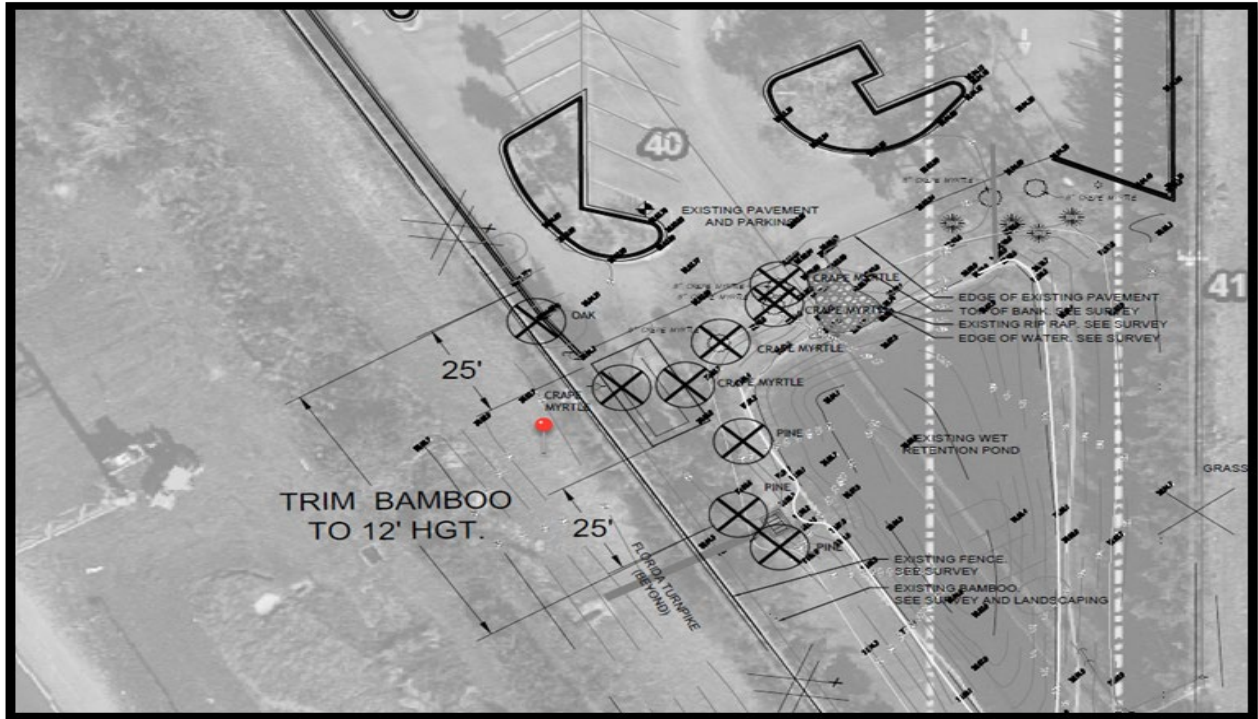
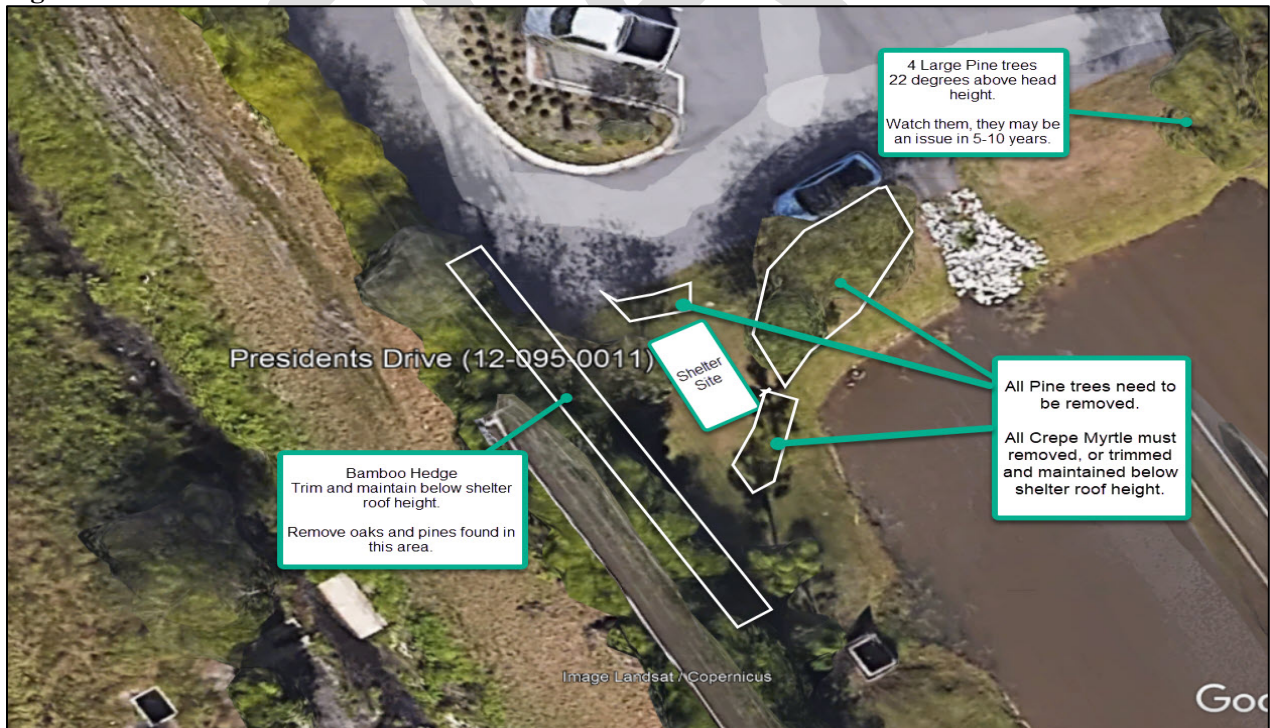


Figure 8. Survey



Note: Siting criteria requirements of 40 CFR Part 58 Appendices A, B, C, D, and E (as required by 58.10(a)(1)) will be met once tree removal and trimming are completed.

Figure 9. Site Overview



Note: Siting criteria requirements of 40 CFR Part 58 Appendices A, B, C, D, and E (as required by 58.10(a)(1)) will be met once tree removal and trimming are completed.

4.0 Glossary

AA DT	Annual Average Daily Traffic
AQS	Air Quality System – EPA’s repository of ambient air quality data.
CBSA	Core Based Statistical Area – a collective term for both metropolitan (metro) and micropolitan (micro) statistical areas.
CO	Carbon monoxide – an odorless, colorless gaseous; one of the "Six Common Air Pollutants," also known as "Criteria Pollutants," regulated by EPA.
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FE AADT	Fleet Equivalent Annual Average Daily Traffic – a value calculated according to the NO ₂ near-road technical assistance document, which weighs heavy-duty traffic 10 times more than other vehicles.
FEM	Federal Equivalence Method – method approved for comparison to NAAQS.
NAAQS	National Ambient Air Quality Standards – maximum threshold concentrations above which adverse health effects may occur. EPA established NAAQS for Criteria Pollutants based on the 1970 Clean Air Act.
NO	Nitrogen oxide
NO ₂	Nitrogen dioxide – a by-product of incomplete combustion that is intimately involved in photochemistry and ozone formation, as well as acid rain formation.
NO _x	A measure of total oxides of nitrogen, consisting primarily of nitrogen dioxide (NO ₂) and nitric oxide (NO).
PM	Particulate Matter – also known as particle pollution.
PM _{2.5}	Particulate Matter 2.5 micrometers in diameter and smaller.
PM ₁₀	Particulate Matter 10 micrometers in diameter and smaller.
PM _{10-2.5}	Particle size between 10 and 2.5 micrometers.
PQAO	Primary Quality Assurance Organization
PSD	Prevention of Significant Deterioration
SLAMS	State and Local Air Monitor Stations
SPM	Special Purpose Monitors
STN	Speciation Trends Network
SU/SD	Start-up/ Shutdown
TAD	Technical Assistance Document
USEPA	United States Environmental Protection Agency

5.0 References

Watkins, N., & Baldauf, D. R. (2012). *Near Road NO₂ Monitoring Technical Assistance Document*. Research Triangle Park: U.S. Environmental Protection Agency Office of Air Quality Planning and Standards.

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